

# Preface

This report is the product of a fifteen-month long project by the McKinsey Global Institute, working in collaboration with McKinsey's India Office, on the economic performance of India.

McKinsey undertook this project as an important step towards developing our understanding of how the global economy works. India, which will soon be the world's most populous country, remains one of the poorest. Reforms over the past ten years have been inadequate. If it were to continue with its current economic performance, the economic prospects of millions of Indians living in rural India would decline steadily over the next ten years – one of the most serious problems of today's global economy. We conducted this project, with a view to discovering whether better economic policies could significantly improve India's situation.

This project builds upon the previous work of the McKinsey Global Institute in assessing economic performance among the major economies of the world. Our early reports separately addressed labour, capital productivity and employment<sup>1</sup>: the fundamental components of economic performance. Later, we combined these components to address the overall performance of Sweden, Australia, France, Germany, the Netherlands, Brazil, Korea, the UK, Russia, Poland and Japan.<sup>2</sup> In all of these countries, economic performance was compared with the US and other relevant countries.

This study continues our efforts to assess economic performance across countries. As before, the core of our work is concentrated on conducting sector case studies to measure differences in productivity, output and employment performance across

---

<sup>1</sup> *Service Sector Productivity*, McKinsey Global Institute, Washington, D.C., October 1992; *Manufacturing Productivity*, McKinsey Global Institute, Washington, D.C., October 1993; *Employment Performance*, McKinsey Global Institute, Washington, D.C., November 1994; *Capital Productivity*, McKinsey Global Institute, Washington, D.C., June 1996.

<sup>2</sup> *Sweden's Economic Performance*, McKinsey Global Institute, Stockholm, September 1995; *Australia's Economic Performance*, McKinsey/Australia and McKinsey Global Institute, Sydney, November 1995; *Removing Barriers to Growth in France and Germany*, McKinsey Global Institute, March 1997; *Boosting Dutch Economic Performance*, McKinsey Global Institute and Max Geldens Foundation for Societal Renewal, September 1997; *Productivity-The Key to an Accelerated Development Path for Brazil*, McKinsey Brazil Office and McKinsey Global Institute, Sao Paulo, Washington, March 1998; *Productivity-led Growth for Korea*, McKinsey Seoul Office and McKinsey Global Institute, Seoul, Washington, March 1998; *Driving Productivity and Growth in the U.K. Economy*, McKinsey London Office and McKinsey Global Institute, October 1998; *Unlocking Economic Growth in Russia*, McKinsey Global Institute, October 1999; *Poland's Economic Performance*, McKinsey Global Institute, March 2000; *Why the Japanese Economy is not Growing: micro barriers to Productivity Growth*, McKinsey Global Institute, July 2000.

countries and to determining the reasons for the differences. Since 60 per cent of the workforce in India is employed in the agricultural sector, we had to conduct case studies in agriculture for the first time. This case study work provides the basis for our conclusions on how to improve economic performance in India.

The report consists of three volumes. Volume 1 has six chapters, the first of which is an executive summary. Chapter 2 describes our project objective and approach. Chapter 3 reviews the performance of the Indian economy at an aggregate level and also presents perspectives that we found about its performance in economic literature. Chapter 4 presents the synthesis of our sector level findings about India's current economic performance. Chapter 5 provides our assessment of India's growth potential. And Chapter 6 gives our recommendations. Volumes 2 and 3 contain the 13 sector case studies broadly divided into agriculture: dairy farming and wheat farming; manufacturing: apparel, automotive assembly, dairy processing, steel and wheat milling; and services: housing construction, electric power, retail, retail banking, software and telecommunications.

A core group of six consultants from McKinsey's India office and five consultants from the McKinsey Global Institute made up the working team for this project. The India based consultants were Neeraj Agrawal, Chandrika Gadi, Deepak Goyal, Jayant Kulkarni, Anish Tawakley, Sanoke Viswanathan and Alkesh Wadhvani. The Global Institute consultants were Angelique Augereau, Vivake Bhalla, Amadeo Di Lodovico, Axel Flasbarth and Catherine Thomas. Jaya Banerji, Amrit Dhillon, Shampa Dhar-Kamath, Uma Khan and Jeanne Subramaniam provided editorial support. Jayshri Arya, Saandra Desouza, Audrey D'Souza, Leslie Hill Jenkins and Eleanor Rebello provided administrative assistance. Shirish Sankhe was responsible for the day-to-day management of the project, assisted by Amadeo Di Lodovico and Alkesh Wadhvani. This project was conducted under the direction of Ranjit Pandit and I, with assistance from Vincent Palmade.

In carrying out the work we were fortunate to have an external advisory committee. The committee members were Montek Singh Ahluwalia now of the IMF and earlier of the Planning Commission of India, Orley Ashenfelter of Princeton University, and Rakesh Mohan now of the Ministry of Finance and formerly of the National Council of Applied Economic Research. The working team had four one and a half day meetings with the advisory committee to periodically review progress during the course of the project and benefited from many written comments and individual discussions. The members of the advisory committee participated in this project as individuals and not as representatives of their respective institutions. It is McKinsey that is solely responsible for the content of this report.

Throughout the project we also benefited from the unique worldwide perspective and knowledge that the McKinsey consultants brought to bear on the industries researched for our case studies. Their knowledge was a product of intensive work with clients and a deep investment in understanding industry structure and behaviour to support client work. McKinsey sector leaders provided valuable input to our case studies and reviewed our results. McKinsey's research and information department provided invaluable information and insights while working under trying deadlines.

Finally, we could not have undertaken this work without the information we received from numerous interviews with corporations, industry associations, government officials and others. We thank all those who gave of their time and help.

Before concluding, I'd like to emphasise that this work is independent and has not been commissioned or sponsored in any way by any business, government or other institution.

August 2001

Bill Lewis  
Director

McKinsey Global Institute

# India: The Growth Imperative

A decade ago, India and China had roughly the same GDP per capita. But at US\$ 440, India's current GDP per capita is now only half that of China's. Further, India's GDP is growing at a mere six per cent a year, compared to China's 10 per cent. India's working-age population, however, is expanding ever faster. Unless GDP grows at closer to 10 per cent a year, India could face unemployment as high as 16 per cent by 2010 (**Exhibit 1.1**).

Over the past 16 months, the McKinsey Global Institute (MGI) has studied India's economy to see what is holding back growth and what policy changes might accelerate it. Our study has shown that, with the right new policies, GDP growth of 10 per cent a year is within India's reach.

We examined 13 sectors in detail — two in agriculture, five in manufacturing and six in services. Together, they accounted for 26 per cent of India's GDP and 24 per cent of its employment. We identified the barriers to productivity and output growth in each of these sectors in a bottom-up, rigorous manner and quantified their impact. We then extrapolated these findings to the overall economy.

Our work revealed that there are three main barriers to faster growth: the multiplicity of regulations governing product markets (i.e., regulations that affect either the price or output in a sector); distortions in the land markets; and widespread government ownership of businesses (**Exhibit 1.2**). We estimated that, together, these inhibit GDP growth by around 4 per cent a year. In contrast, we found that the factors more generally believed to retard growth — inflexible labour laws and poor transport infrastructure — while important, constrain India's economic performance by less than 0.5 per cent of GDP a year. Therefore, it would be a mistake to focus growth policies exclusively on these familiar problems. To raise India's growth trajectory a broader reform agenda is required.

Removing the main barriers to growth would enable India's economy to grow as fast as China's, at 10 per cent a year. Annual growth in labour productivity would double to 8 per cent. Some 75 million new jobs would be created, sufficient not only to ward off the looming crisis in employment, but also to reabsorb any workers that might be displaced by productivity improvements.

We believe that India's government can rapidly overcome these three main barriers to growth. In order to do this, however, it will have to adopt a deeper, faster process of reform immediately. We have identified 13 policy changes the government should enact now to ensure that India's economy grows as fast as it must.

## **THREE MAJOR BARRIERS INHIBIT INDIA'S ECONOMIC GROWTH**

Productivity — the amount of output per unit of labour and unit of capital invested — is the most powerful engine of GDP growth. Countries with the highest productivity have the highest GDP per capita (**Exhibit 1.3**), as the percentage of people employed is not significantly different across countries. Clearly, increases in productivity in these countries have not led to a decline in employment. India's efforts to increase GDP should thus be focused squarely on increasing productivity in all sectors of the economy. The three main barriers to growth — regulations governing products and markets, land market distortions and government owned businesses — have a depressing effect largely because they protect most Indian companies from competition, and thus from incentives to improve productivity. Removing these barriers will increase productivity immediately.

### **Product market regulations restrict competition and best practice**

Taken together, product market barriers and the rules and policies governing different sectors of the economy impede GDP growth by 2.3 per cent a year. India's liberalised automotive industry shows what could be gained by removing them. As part of its economic reforms in 1991, the Indian government relaxed licensing requirements for carmakers and restrictions on foreign entrants. Competition increased dramatically, and the old, pre-reform automobile plants lost substantial market share. But demand for the new, cheaper, higher quality Indian-made automobiles soared, leading to a net increase in employment in the industry despite its very high productivity growth (**Exhibit 1.4**).

India's current regulatory regime has five features especially damaging to competition and productivity:

- ¶ **Inequitable regulation:** Many regulations restrict competition because they are inequitable and ill-conceived. In telecommunications, for example, the inconsistency and instability of the policy framework has meant that competitive intensity has remained low in the fixed line telephony arena even though the sector was opened up to private players in 1994. Even after several revisions, the telecom regulatory and policy framework has several features that tilt the playing field in favour of the incumbent thus decreasing the competitive intensity necessary to foster growth in productivity and output. For instance, private entrants must pay heavy fees for licenses while government-owned incumbents pay no such fees. In addition, rules about the access to other operators' networks are unclear. Incumbents have used this ambiguity to delay the start-up of private entrants' operations. .

- ¶ **Uneven enforcement:** The rules are not applied equally to all players. So, for example, sub-scale steel mills frequently steal electricity and underreport their sales to avoid tax. Larger, more visible players cannot get away with such irregularities. So the less productive players survive by competing unfairly against the larger ones (**Exhibit 1.5**).
- ¶ **Reservation of products for the small-scale enterprises:** Around 830 products in India are currently reserved for manufacture by firms below a certain size. For example, producers of certain types of clothing and textiles face limits on their spending on new plants. These limits protect (indeed, promote) clothing-makers that are below efficient scale. As a result, a typical Indian clothing plant has only about 50 machines, compared to over 500 in a Chinese plant. Restrictions on imports of clothing from more productive countries protect the domestic markets of these subscale Indian players.

At present, their exports are protected too. Several countries, including the United States, import a guaranteed quota of Indian clothing each year. As a result, India's share of garment imports in countries without such a quota is much lower than it is in quota countries, while the opposite is true of China's more competitive garment exports. But all such quotas are to be lifted over the next five years. Indian exports will be highly vulnerable, unless the sector can become more productive (**Exhibit 1.6**).

Removing the small-scale industry reservation will allow these manufacturers to expand and achieve an efficiency of scale sorely needed to enable competition with imports. The WTO agreement has already resulted in the removal of restrictions on 550 items out of a total of 830. This was made effective in 2001.

- ¶ **Restrictions on Foreign Direct Investment (FDI):** FDI is prohibited in certain sectors of the Indian economy — retail, for example — closing off a fruitful source of technology and skills. Global, best practice retailers have enabled the retail sectors in Thailand, China, Brazil and Poland to develop rapidly. Their international experience helps them to build operations quickly and to tailor formats to local environments. Foreign retailers also prompt local supply chains to improve, stimulating investment and productivity growth in wholesaling, food processing and consumer goods manufacturing, for example. Allowing FDI in food retail will ensure that the share of supermarkets increases dramatically – from its current 2 per cent to 25 per cent by 2010. Since these supermarkets can offer prices, which are, on average, 9 per cent lower than those offered by traditional grocery stores, an increase in the share of supermarkets would lead to an improvement in the standards of living of Indians across the social spectrum.

- ¶ **Licensing or quasi-licensing:** In several sectors of the Indian economy, operators need a license from the government to compete — in the dairy industry, for example. Although licensing dairy processors through the Milk and Milk Products Order (MMPO) was supposed to ensure high levels of quality and hygiene, the licensing authority has in fact prevented high quality private dairy plants from competing in certain areas, thus protecting government-owned plants and cooperative dairies from competition, and from any incentive to shed excess labour or to improve operations. Removing these restrictions would increase competition among processors, forcing them to make improvements such as working with farmers to improve cattle breeds and milk yields, or using chilling centres (**Exhibit 1.7**).

### **Unrecognised land market distortions constrain biggest domestic sectors**

We estimated that land market distortions account for close to 1.3 per cent of lost growth a year, but largely remain excluded from public debate. They limit the land available for housing and retail, the largest domestic sectors outside agriculture. Less room to expand for players in these sectors means less competition. Scarcity has helped make Indian land prices the highest among all Asian nations, relative to average incomes (**Exhibit 1.8**). Land market distortions include:

- ¶ **Unclear ownership:** Most land parcels in India — 90 per cent by one estimate — are subject to legal disputes over their ownership. The problem might take Indian courts a century to resolve at their current rate of progress. Being unclear about who owns what makes it immensely difficult to buy land for retail and housing developments. Indian developers also have trouble raising finance since they cannot offer land to which they do not have a clear title as collateral for loans. As a result, most new housing developments are constructed either on land already owned by the developers, or by the few insiders who know how to speed up the bureaucratic title-clearing process.

Streamlining this process and revising the law on land ownership would boost competition in construction. Competitive builders would improve their productivity and offer lower house prices. And the sluggish Indian construction market would expand dramatically.

- ¶ **Counterproductive taxation:** Low property taxes, ineffective tax collection and subsidised user charges for power and water leave local governments unable to recover investments in infrastructure, particularly in suburban areas. In Delhi, for example, water is supplied at only 10 per cent of its true cost. Property tax collected in Mumbai amounts to only 0.002 per cent of the estimated capital value of the buildings: The usual

ratio in developed countries is around 1-2 per cent. With more efficient collection of higher taxes, local governments could invest in the infrastructure required to support new developments on large parcels of suburban land. Developers would compete to build on such plots. If they could build up to 25 houses in a project instead of the single homes they more typically construct today, construction costs would fall by as much as 25 per cent.

Conversely, stamp duties in India are extraordinarily high, close to 8-10 per cent of the value of the property changing hands. This, too, discourages land and real estate transactions.

- ¶ **Inflexible zoning, rent and tenancy laws:** Zoning laws, rent controls and protected tenancies “freeze” land in city centres that would otherwise be available for new retail outlets and flats. Protected tenants cannot be evicted, and will never voluntarily surrender their cheap tenancies, so their ancient buildings can never be renovated. These laws also restrict competition. For example, subsidised rents allow traditional inner city counter stores to overlook their operational inefficiencies. But in Chennai, the capital of India’s southern state of Tamil Nadu, where rent control and zoning laws are less stringent, modern supermarkets already account for almost 20 per cent of total food retailing compared to less than 1 per cent in cities with higher average incomes such as Mumbai and Delhi.

### **Government control of companies promotes inefficiency and waste**

Government-controlled entities still account for around 43 per cent of capital stock in India and 15 per cent of employment outside agriculture. Their labour and capital productivity levels are well below those of their private competitors (**Exhibit 1.9**). In effect, they suppress potential competition and productivity improvements equivalent to 0.7 per cent of GDP growth every year. For example, the near-monopoly status of government-owned companies in some sectors, including telecommunications and oil, guarantees their profits however unproductive they may be. Failing state-owned companies in industries open to competition such as steel and retail banking can get government support, allowing them, too, to survive despite their inefficiencies. In telecommunications and electrical power, the government controls both the large players and the regulators, creating an uneven playing field for private competitors.

India’s electric power sector illustrates how government control of companies can promote inefficiency. Government-owned State Electricity Boards (SEBs) lose a staggering 30-40 per cent of their power, mostly to theft, compared to private power distributors’ losses of around 10 per cent, arising mostly from technical

factors. Government subsidies—and corruption — blunt the public sector managers' motivation to control theft. Subsidies also limit their incentive to prevent blackouts and to maintain power lines, all tasks which private players do better. Privatising SEBs would save government the subsidies (amounting to almost 1.5 per cent of GDP), and oblige managers to improve their financial and therefore their operational performance. They would have to monitor theft and improve capital and labour productivity.

### **Minor barriers to growth**

The popular view is that India's economy would grow faster if it were not for its inflexible labour laws and its poor transport infrastructure. We found that these factors, in fact, constrain India's economic performance less than what is commonly assumed: Together, they account for lost growth equivalent to only 0.5 per cent of GDP. While India would benefit if these three problems were tackled, they should not become the sole focus of attention.

Current labour laws do inhibit productivity in labour intensive and export oriented manufacturing sectors such as clothing by making it difficult for firms to shed workers rendered redundant by changing market or production conditions. But these sectors account for less than 4 per cent of India's employment. Moreover, companies in these sectors can generally overcome the ban on shedding workers by offering voluntary retirement schemes, as do firms in capital-intensive sectors, like electrical power and automobile assembly. In addition, current labour laws, including the Factory Act, do not apply to private players in the service industries — software and private banking, for example. Employment in these sectors is more flexible, governed only by the terms of contracts between individual employees and their employers.

The impact of poor transport infrastructure on productivity is overstated. In fact most companies typically find ways around the problem. For instance, automotive suppliers are often located close to assembly plants to avoid disrupting the plants' just-in-time operations. More importantly, there is much that could be done to make the existing transport infrastructure work better. For example, less red tape in port management would speed up customs clearance and cargo ships' turnaround time; modest investments in handling equipment would greatly increase the productivity of India's ports. In the absence of such efforts, the funding devoted to creating additional transportation infrastructure would be sub-optimally utilised.

## **POLICIES TACKLING MAJOR BARRIERS WILL ACCELERATE GROWTH**

Thirteen policy changes would succeed in removing the bulk of these critical barriers to higher productivity and growth. They include removing reservations on products to small scale manufacturers; rationalising taxes and excise duties; establishing effective, pro-competition regulation and powerful, independent regulators; removing restrictions on foreign investment; reforming property and tenancy laws; and widespread privatisation. If the government were to carry out these changes over the next two to three years, we believe that the economy could achieve most of the projected 10 per cent yearly growth by 2004-05.

Such profound changes will certainly prompt resistance, especially from those protected by the current regulatory regime. But the fact is that several of the current policies have not achieved their social purpose, however worthy their intentions. Many have, in fact, been counterproductive. So, for example, small-scale reservation has cost India manufacturing jobs by preventing companies from becoming productive enough to compete in export markets. Similarly, tenancy laws designed to protect tenants have driven up non-protected rents and real estate prices, making ordinary, decent housing unaffordable to many Indians.

Critics might still argue that the increase in GDP resulting from these policy changes will all flow towards the already rich. But if we examine the effects of the proposed reforms on the Indian economy carefully, we can see that, again, the opposite is true. By creating a virtuous cycle of broad-based GDP growth, with millions of construction, retail and manufacturing jobs, they will benefit every Indian. Farming families, the poorest group, will increase their real incomes by at least 40 per cent.

Implementing such a broad reform programme rapidly will undoubtedly be politically challenging. The challenge can, however, be made more manageable in two ways. First, by understanding and accommodating the interests of the parties affected, wherever possible. And it is possible to do so in a number of instances. For example, import duties could be lowered to Asian levels in a pre-determined but phased manner (over an approximate 5-year period) to give the industries adequate time to improve their competitiveness. Similarly, standard retrenchment compensation norms should be introduced and stringently observed to protect the interests of workers as organisations are granted greater freedom to retrench. Furthermore, granting generous equity stakes at discounted prices to the workers will also reduce their resistance to privatisation. Second, in some of the areas of reform, the Government should also try and manage political opposition by targeting its efforts on those portions of the reform that will yield maximum impact. For example, when removing small-scale reservations, the Government should first focus on the 68 items that account for 80 per cent of the production of the total 836 reserved items. Similarly, rent control for old tenancies could be

phased out over a period of 5-10 years so as to allow adequate time for those affected to find alternative accommodation.

## **THE EFFECTS OF REFORM**

India's economy has three types of sector: modern sectors — with production processes resembling those in modern economies — provide 24 per cent of employment and 47 per cent of output; transitional sectors provide 16 per cent of employment and 27 per cent of output; and agricultural sectors provide 60 per cent of employment and 26 per cent of output. Transitional sectors comprise those informal goods and services consumed by a growing urban population: street vending, domestic service, small-scale food processing and cheap, mud housing, to name a few. Transitional businesses typically require elementary skills and very little capital, so they tend to absorb workers moving out of agriculture.

What will happen to the economy if India immediately removes all the existing barriers to higher productivity? Our analysis shows that the resulting increases in labour and capital productivity will boost growth in overall GDP to 10 per cent a year; they will release capital for investment worth 5.7 per cent of GDP; and they will generate 75 million new jobs outside agriculture, in modern as well as transitional sectors.

### **Growth in labour productivity will almost double to 8 per cent**

Removing all the productivity barriers would almost double growth in labour productivity to 8 per cent a year over the next ten years. The modern sectors would account for around 90 per cent of the growth, while it would remain low in the other two sectors. In fact, productivity in the modern sectors of the economy would increase almost three times over the next 10 years (**Exhibit 1.10**). Though there may be small improvements in agricultural productivity, mainly from yield increases, the massive rise in agricultural productivity which mechanised farming has supported in developed countries is unlikely to occur in India for another ten years, at least, while there is still a surplus of low cost rural labour to deter farmers from investing in advanced machines. Enterprises in the transitional sectors have inherently low labour productivity because they use labour intensive “low-tech” materials, technologies or business formats. So although these sectors will grow to meet rising urban demand, their labour productivity will remain about the same.

### **Capital productivity will increase by 50 per cent**

If all the barriers were removed, capital productivity in the modern sectors would grow by at least 50 per cent. Increased competition would force managers to eliminate the tremendous time and cost over-runs on capital projects and low

utilisation of installed capacity which they can get away with now, especially in state-run enterprises. Regulation to ensure healthy competition, equitably enforced, would prevent unwise investments common today such as the construction of sub-scale and under-utilised steel mills.

### **Higher productivity means faster growth with less investment**

Many policy-makers and commentators believe it would take investment equivalent to more than 35 per cent of GDP, an almost unattainable amount, to achieve a 10 per cent GDP growth rate in India. Our analyses, however, suggest that, at the higher levels of labour and capital productivity, India can achieve this rate of GDP growth with investment equivalent to only 30 per cent of GDP a year for a decade, less than China invested between 1988 and 1998. Although still a challenge, this rate is certainly achievable, since removing the barriers that hinder productivity will unleash extra funds for investment, equivalent to the consequent drop in the public deficit and the increase in FDI. These sources, by themselves, would be sufficient to increase investment from its current level of 24.5 per cent of GDP to 30.2 per cent.

The funds would be released in the following manner: Removing the barriers to higher productivity would generate extra revenue for the government through more efficient taxation — particularly on property — and from privatisation, and the government would save what it now spends on subsidies to unprofitable state-owned enterprises. As a result, its budget deficit would decrease by around 4 per cent of GDP, an amount which would then become available for private investment elsewhere.

In the instance of foreign investment: Current flows of FDI into India are worth just 0.5 per cent of GDP. By contrast, many developing countries, including Malaysia, Thailand and Poland, consistently attract FDI worth more than 3 per cent of annual GDP. We estimate that lifting restrictions on FDI and opening all modern sectors of India's economy to well regulated competition will increase FDI by at least 1.7 per cent of GDP within the next three years.

### **India will enjoy job-creating growth**

Productivity growth and increased investment will create more than 75 million new jobs outside agriculture in the next 10 years compared to the 21 million projected as a result of current policies. But while most of the productivity gains and 32 million of the new jobs will, indeed, appear in the modern sectors, 43 million new jobs will be created in the transitional sectors, making the move to town worthwhile for low paid and underemployed agricultural workers. Agricultural wages will therefore rise. Although there will be job losses in government-dominated sectors like steel, retail banking and power, these will be more than offset by new jobs in transitional and modern sectors such as food processing, retail trade, construction, apparel and software. More workers with

more disposable income will stimulate more demand for goods and services. Greater demand will create opportunities for further investment, in turn creating more jobs.

This migration of labour between sectors is a feature of all strongly growing economies and should be welcomed by policy-makers. For even though increasing productivity may displace labour, it stimulates more overall employment.

## **INDIA NEEDS A DEEPER, FASTER PROCESS OF REFORM**

For India to enjoy the benefits of faster growth, a small team of senior cabinet ministers, under the direct supervision of the Prime Minister, should make implementing the 13 policy reforms their immediate priority. While the central government must take the lead, state governments will have a crucial supporting role to play: one-third of the reforms required — those concerning the land market and power sectors — lie in their hands (**Exhibit 1.11**). However, state governments will need careful guidance from the centre. Central government should identify for each state the critical areas for reform; design model laws and procedures for the states to adapt and enact; and encourage them to implement the reforms with financial incentives.

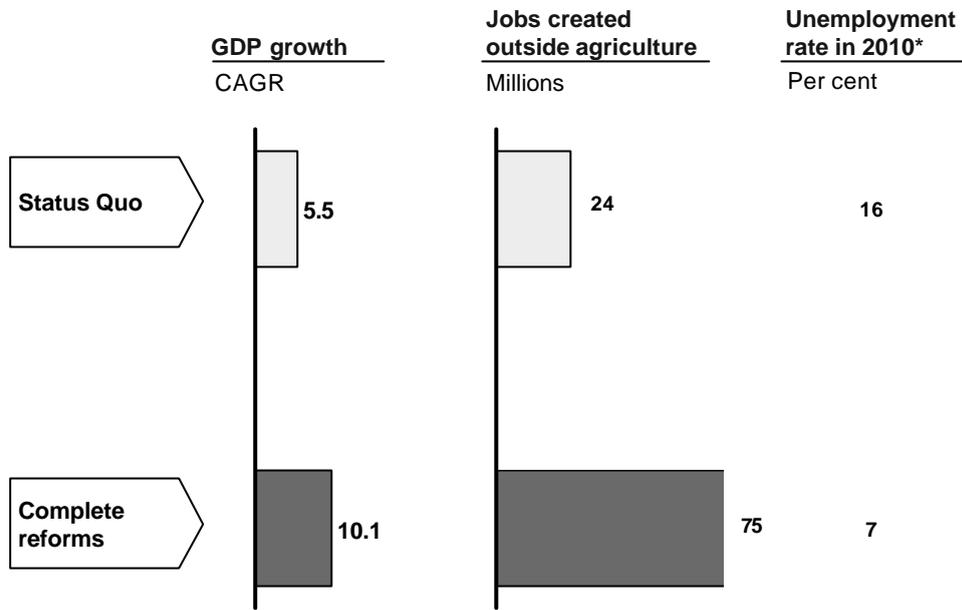
Central government must act now to achieve a positive outcome soon. Though the 2001 Union Budget gave a powerful boost to the second round of economic reforms, the pace needs to be much faster. We urge the government to complete these 13 policy reforms over the next two to three years, in order to achieve the 10 per cent growth target by 2004-05.

\* \* \*

India will be a very different country in ten years time if these reforms are undertaken. With a GDP of around US\$ 1100 billion, individual Indians will be more than twice as rich, and probably live in the fastest growing economy in the world. Best of all, this is no pipe dream but an achievable goal — if India's government and its people act decisively and quickly.

Exhibit 1.1

**INDIA NEEDS TO INCREASE ITS GDP AT 10% PER YEAR**



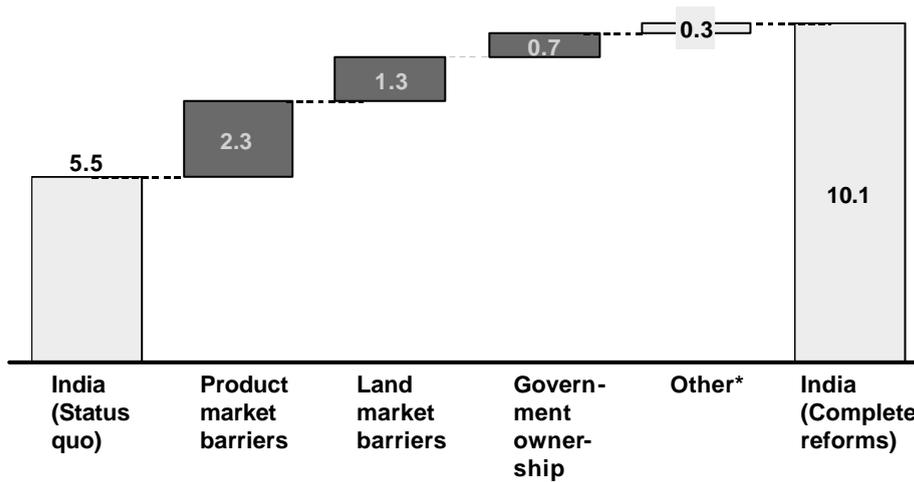
\* Current Daily Status. Assuming that labour participation rate remains constant

Source: McKinsey analysis

Exhibit 1.2

**PRODUCT AND LAND MARKET BARRIERS AS WELL AS GOVERNMENT OWNERSHIP ARE THE KEY BARRIERS TO GDP GROWTH**

CAGR (2000-2010)



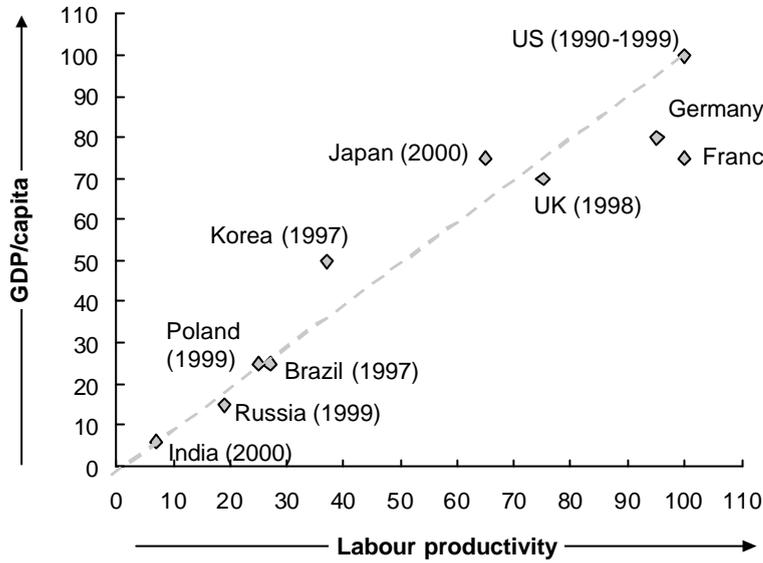
\* Includes lack of transport infrastructure and labour market barriers

Source: McKinsey analysis

Exhibit 1.3

### PRODUCTIVITY AND GDP PER CAPITA ARE CLOSELY CORRELATED

Indexed to the US = 100 in 1996

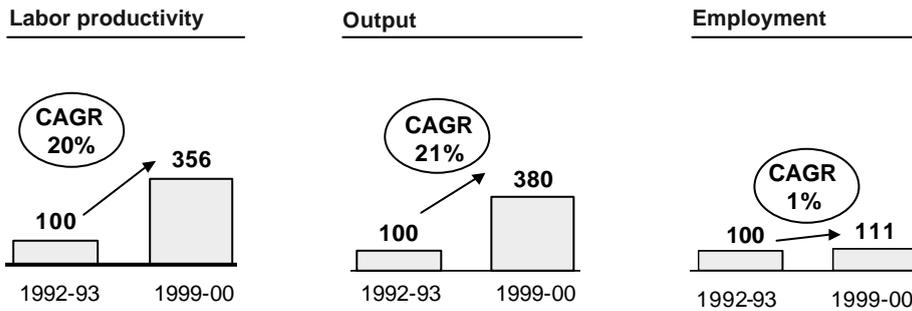


Source: Economic Intelligence Unit; OECD; MGI

Exhibit 1.4

### RAPID PRODUCTIVITY AND OUTPUT GROWTH IN THE PASSENGER CAR ASSEMBLY SEGMENT 1992-93

Equivalent cars per equivalent employee; Indexed to India = 100 in 1992-93



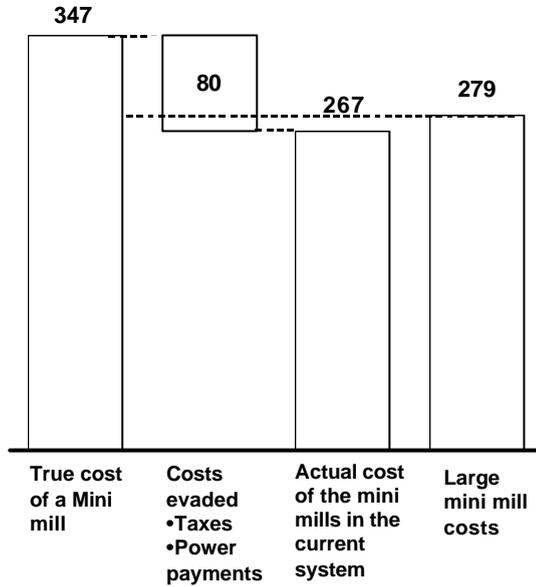
Source: Interviews, SIAM, Annual reports

Exhibit 1.5

**NON-LEVEL TAXES AND ENERGY PAYMENTS ALLOW SMALL STEEL MILLS TO SURVIVE**

US\$ per ton of liquid steel

Punjab example

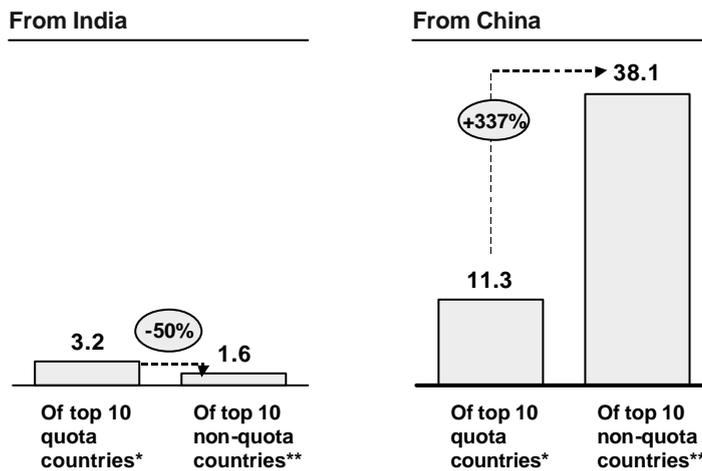


Source: McKinsey metals and mining practice, interviews, Indian Railways, McKinsey analysis

Exhibit 1.6

**QUOTAS PROTECT INDIA'S MARKET SHARE IN WORLD APPAREL**

Per cent of total apparel imports



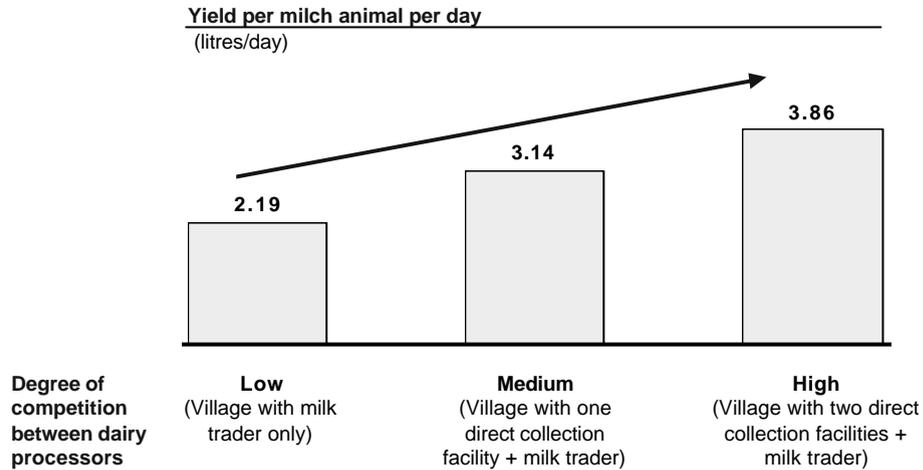
\* U.S., Germany, UK, France, Italy, Belgium, Canada, Spain, Austria, Denmark

\*\* Japan, Netherlands, Switzerland, Sweden, Australia, Norway, Singapore, Poland, Korea, Chile

Source: UN International Trade Statistics

Exhibit 1.7

### COMPETITION BETWEEN DAIRY PROCESSORS BENEFITS FARMERS

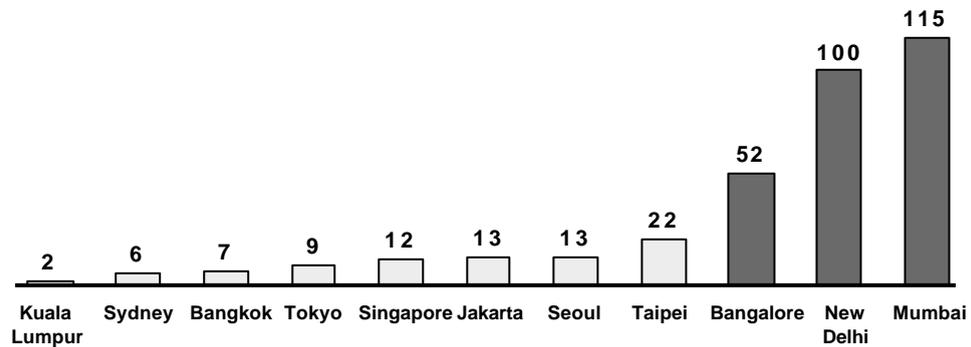


Source: Basic Animal Husbandry Statistics, 1999; NCAER Evaluation of Operation Flood on Rural Dairy Sector, 1999, 1991 census data; interviews; McKinsey analysis

Exhibit 1.8

### LAND COSTS RELATIVE TO INCOME LEVELS ARE VERY HIGH IN INDIA

Indexed to New Delhi=100; Ratio of land cost per sq m to GDP per capita in 1999

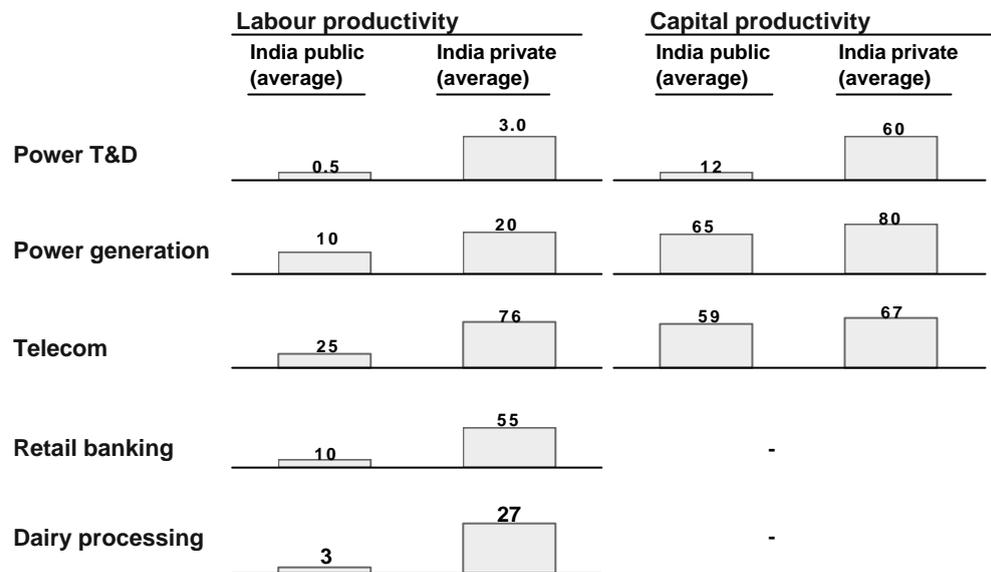


Source: Colliers Jardine, Asia Pacific Property Trends (October 1999); *The Economist* (1996)

Exhibit 1.9

## GOVERNMENT OWNERSHIP HINDERS PRODUCTIVITY

Indexed to US=100 in 1998



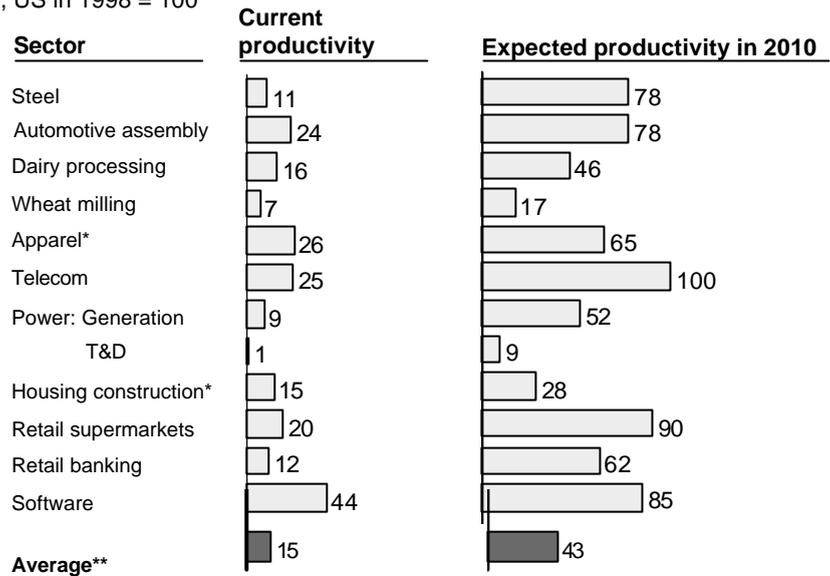
Source: Bank source; CEA, DoT, Ministry of Planning; Interviews; McKinsey Analysis



Exhibit 1.10

## LABOUR PRODUCTIVITY IN MODERN SECTORS UNDER 'COMPLETE REFORMS'

Per cent, US in 1998 = 100



\* Modern sector only – transition component excluded

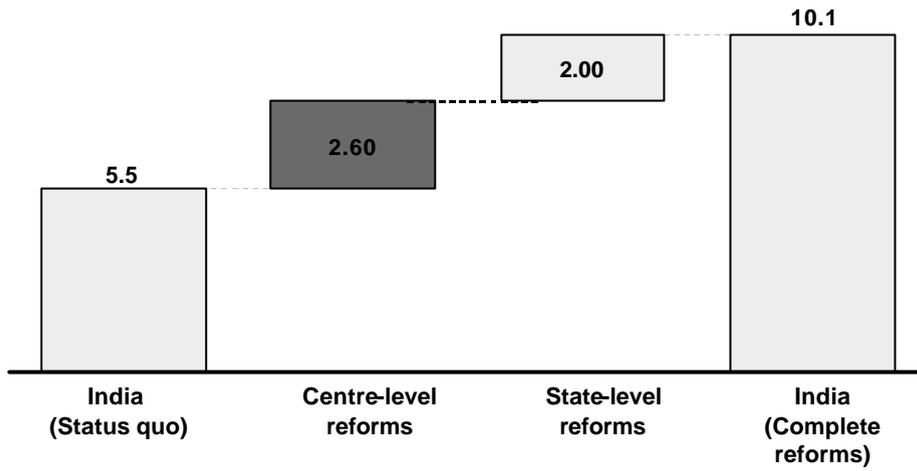
\*\* Extrapolated from the sectors studied to the overall economy

Source: Interviews, McKinsey analysis



Exhibit 1.11

**CENTRE-LEVEL REFORMS WILL BE KEY IN DRIVING GROWTH**  
CAGR (2000-2010)



Source: McKinsey analysis

<b>Category</b>	<b>Action</b>	<b>Key sectors directly affected</b>	
Product market	1	Eliminate reservation of all products for small-scale industry; start with 68 sectors accounting for 80 percent of output of reserved sectors	<ul style="list-style-type: none"> <li>• 836 manufactured goods</li> </ul>
	2	Equalize sales tax and excise duties for all categories of players in each sector and strengthen enforcement	<ul style="list-style-type: none"> <li>• Hotels and restaurants</li> <li>• Manufacturing (e.g. steel, textiles, apparel)</li> </ul>
	3	Establish effective regulatory framework and strong regulatory bodies	<ul style="list-style-type: none"> <li>• Retail trade</li> <li>• Power</li> <li>• Telecom</li> <li>• Water supply</li> </ul>
	4	Remove all licensing and quasi-licensing restrictions that limit number of players in affected industries	<ul style="list-style-type: none"> <li>• Banking</li> <li>• Dairy processing</li> <li>• Petroleum marketing</li> <li>• Provident fund management</li> </ul>
	5	Reduce import duties on all goods to levels of South East Asian Nations (10 percent) over 5 years	<ul style="list-style-type: none"> <li>• Sugar</li> <li>• Manufacturing</li> </ul>
	6	Remove ban on foreign direct investment in retail sector and allow unrestricted foreign direct investment in all sectors	<ul style="list-style-type: none"> <li>• Insurance</li> <li>• Retail trade</li> </ul>

<b>Category</b>	<b>Action</b>	<b>Key sectors directly affected</b>	
Land market	7	Resolve unclear real-estate titles by setting up fast-track courts to settle disputes, computerizing land records, freeing all property from constraints on sale, and removing limits on property ownership	<ul style="list-style-type: none"> <li>• Telecom</li> </ul>
	8	Raise property taxes and user charges for municipal services and cut stamp duties (tax levied on property transactions to promote development of residential and commercial land and to increase liquidity of land market	<ul style="list-style-type: none"> <li>• Construction</li> <li>• Hotels and restaurants</li> <li>• Retail trade</li> </ul>
	9	Reform tenancy laws to allow rents to move to market levels	
Government ownership	10	Privatize electricity sector and all central and state government-owned companies; in electricity sector, start by privatizing distribution; in all other sectors, first privatize largest companies	<ul style="list-style-type: none"> <li>• Airlines</li> <li>• Banking and insurance</li> <li>• Manufacturing and mining</li> <li>• Power</li> <li>• Telecom</li> </ul>
			<ul style="list-style-type: none"> <li>• Labor-intensive manufacturing and service sectors</li> </ul>
Others	11	Reform labor laws by repealing section 5-B of the Industrial Disputes Act; introducing standard retrenchment-compensation norms; allowing full flexibility in use of contract labor	<ul style="list-style-type: none"> <li>• Labor-intensive manufacturing and service sectors</li> </ul>
	12	Transfer management of existing transport infrastructure to private players, and contract out construction and management of new infrastructure to private sector	<ul style="list-style-type: none"> <li>• Airports</li> <li>• Ports</li> <li>• Roads</li> </ul>
	13	Strengthen extension services to help farmers improve yields	<ul style="list-style-type: none"> <li>• Agriculture</li> </ul>

# Objectives and Approach

The purpose of this study was to identify and prioritise the measures that would help accelerate India's economic growth. As we have said, India's GDP per capita, the best measure of economic performance, is only 6 per cent that of the US and 50 per cent that of China. Of the two components that make up GDP per capita, employment per capita and labour productivity (output per employee), increases in the former will yield only small increases in GDP per capita. Our focus was thus on labour productivity in India, more specifically, on estimating current productivity levels and determining how they could be improved. To do this, we analysed India's output and productivity gap vis-à-vis output and productivity in the US and in other developing countries.

In this chapter we explain our approach to this study and the methodology behind our analyses and conclusions.

## APPROACH TO THE STUDY

The main focus of our work was on building a microeconomic understanding of the performance of 13 sectors in India's economy, encompassing agriculture, manufacturing and services, that would be considered representative of the major sectors of the Indian economy, and then extrapolating these findings to determine overall productivity levels.

Having done this, we benchmarked the productivity of Indian industry with that of the best performing economies in the world. We then identified the main barriers to productivity growth and to the productive investments necessary for output and employment growth in each sector. By synthesising the results from the 13 case studies, we drew conclusions on the actions needed to improve India's economic performance.

As we have said, productivity growth is the key determinant of GDP growth (**Exhibit 2.1**). More efficient use of resources allows the economy to provide lower cost goods and services relative to the income of domestic consumers and to compete for customers in international markets. This raises the nation's material standards of living (**Exhibit 2.2**). Productivity growth is also the key determinant of higher firm profitability if there is free and fair competition (*see* "Productivity and Profitability").

The main debates on improving India's economic performance have centred around the importance of privatisation, improving infrastructure, reducing the budget deficit, containing corruption and liberalising labour laws. However, the

bulk of the discourse has neither been conclusive, nor led to a successful reform agenda. It has focused mainly on India's aggregate performance without studying specific industries that collectively drive the performance of the national economy. In contrast, we believe that systematically analysing the relative importance of determinants of productivity in a representative set of sectors is crucial to understanding the nature of India's economic problems and to providing convincing evidence to help prioritise reforms.

Our work has emphasised the economic barriers to India's prosperity in the medium and long term. We have not addressed the short-term macroeconomic factors that may affect economic performance at any given moment. In drawing policy implications from our findings, we bore in mind that higher material living standards are only one of many policy goals that a government can have. We believe, however, that higher productivity and output levels release resources that can be used to address social challenges more effectively.

## **STUDY METHODOLOGY**

The research and analysis in this study are based on the methodology developed by the McKinsey Global Institute (MGI) and consist of two main steps. First, we reviewed the data on the country's overall economic performance as well as current opinion on the factors behind it as expressed in existing academic and official documents. This allowed us to capture the current understanding of the factors in past productivity, output and employment patterns in India. Having done this, we compared India's performance with that of the US and other developing countries to provide a point of departure for our case studies.

Second, we used industry case studies to highlight the economic factors that explained the performance of different sectors of the economy. Then, by looking at common patterns across our case studies, we identified the main barriers to productivity and output growth in India. In doing so, we estimated the impact of removing such barriers on India's GDP and employment as well as on the required levels of investment (**Exhibit 2.3**).

### **Sector case studies**

The core of the research project was a detailed analysis of 13 agriculture, manufacturing and services sectors. We selected sectors that covered around 26 per cent of India's output and 24 per cent of its total employment (**Exhibit 2.4**) and represented the following key areas of its economy: agriculture: wheat and dairy farming; heavy manufacturing: steel and automotive assembly; light manufacturing: dairy processing, wheat milling and apparel; infrastructure sectors with large investment requirements: electric power and telecommunications; a domestic sector with a large employment component: housing construction;

service sectors critical to any modern economy: retail, retail banking and the hi-tech software sector.

In each of the sectors we followed the same two-step process: (1) measuring current productivity relative to world benchmarks and India's potential at current factor costs (*see* "Interpreting Global Productivity Benchmarks"); (2) generating and testing hypotheses on the causes of the observed gap.

¶ **Measuring productivity:** Productivity reflects the efficiency with which resources are used to create goods and services and is measured by computing the ratio of output to input. To do this, we first defined each sector in India such that it was consistent with the comparison countries, making sure that our sectors included the same parts of the industry value chain. We then measured the sector's output using measures of Purchasing Power Parity and adjusted value added or physical output. We measured labour inputs as number of hours worked and capital inputs (used in steel, power and telecom) as capital services derived from the existing stock of physical capital (*see* **Appendix 2A: Measuring Output and Productivity**). We measured labour productivity in all 13 case studies and capital productivity in only the most capital-intensive sectors, i.e., steel, power generation, power transmission and distribution and telecommunications.

Given the lack of reliable statistical data in some sectors, we complemented official information with customised surveys and extensive interviews with customers, producers and regulators (**Exhibit 2.5**). This methodology was particularly helpful in deriving bottom-up productivity estimates in service sectors such as housing construction, retailing, retail banking and software, where traditional sources of information are particularly unreliable and incomplete. Finally, given the size of the Indian Territory, we also conducted over 600 interviews in different cities to account for regional performance differences. These interviews were particularly helpful in sectors such as wheat farming, dairy farming and retail, where local policies (especially as they relate to soil conditions and land use) are a crucial determinant of competitive intensity.

¶ **Generating and testing causality hypotheses:** To explain why levels of productivity in India differ from the benchmarks, we started by generating a set of hypotheses on the possible causes of low productivity. In explaining this productivity gap, we also estimated the productivity *potential* of each sector given India's current low labour costs. This is the productivity level that India could achieve right now making only investments that are currently viable. This productivity potential takes into account India's low labour costs compared to the US, which limit the amount of viable investments.

In this phase, we drew on McKinsey & Company's expertise in many industries around the world, as well as on the expertise of industry associations and company executives in both India and the benchmark countries. By using a systematic framework, we captured the major causes of productivity differences across countries. This framework has three hierarchical layers of causality: differences in productivity due to practices followed in the production process; differences arising from industry dynamics; and differences due to external factors, that is policy and regulatory prescriptions, that explain why the choices of Indian companies differ from those in the comparison countries (*see Appendix 2B: Defining a Framework*).

### **Synthesis and growth potential**

Having identified the causal factors for each industry, we compared the results across industries. The patterns that emerged allowed us to determine the causes of the aggregate productivity gap between India and the comparison countries, as well as the potential for productivity growth in different sectors if external factors were removed. We also estimated the total investment that would be required to reabsorb displaced labour.

Estimating the expected evolution of output by sector was key in determining the required investment rate. Taking into account the potential to improve capital productivity at the sector level, we first estimated the investment requirements for each of our 13 sectors. We then scaled up the results to the overall economy taking into account the expected output evolution. We calculated output growth at the sector level from benchmarks of domestic consumption growth and of the additional output that could be expected from exports.

Finally, we estimated the resulting evolution in employment. We then extrapolated our productivity and output growth estimates to the overall economy, for each sector, to obtain average productivity growth, GDP evolution by sector and, hence, the employment evolution by sector.

We then tested the feasibility of our overall estimates and assessed the impact of each policy scenario on the country's investment levels, skill requirements, fiscal deficit and balance of payments situation. This allowed us to assess the relative importance of different barriers and formulate the specific reforms that would place India on a high growth path.

## Appendix 2A: Measuring output and productivity

Productivity reflects the efficiency with which resources are used to create value in the marketplace. We measured productivity by computing the ratio of output produced in a year to inputs used in that production over the same time period.

### **Output (value added)**

GDP can be seen as the sum of all the value added across sectors in the economy. In other words, the GDP of a country is the market value of the final goods and services produced. It reflects the market value of output produced by means of the labour and capital services available within the country.

For a given industry, the output produced differs from the traditional notion of sales. Sales figures include the value of goods and services purchased by the industry to produce the final goods or services (for example, milk purchased by dairies to produce pasteurised milk). In contrast, the notion of value added is defined as factory gate gross output less purchased materials, services and energy. The advantage of using value added is that it accounts for differences in vertical integration across countries. Furthermore, it accommodates quality differences between products, as higher quality goods normally receive a price premium that translates into higher value added. It also takes into account differences in the efficiency with which inputs such as energy are used.

In the case study of the retail industry, we used the value added measure of output while for software we used total sales. One complication that could arise is that value added is not denominated in the same currency across countries. As a result, this approach requires a mechanism to convert value added to a common currency. The standard approach uses Purchasing Power Parity (PPP) exchange rates, a topic which is discussed separately below.

In sectors where prices for inputs and/or outputs are distorted, we used physical production as a measure of output. This was the case in dairy farming, wheat farming, steel, automotive assembly, dairy processing, wheat milling, apparel, electric power, telecommunications, housing construction and retail banking. To make our measures comparable to our benchmark countries, we needed to adjust for the product variety and quality differences across countries. This approach also required data from the same part of the value chain in every country: In some countries an industry may simply assemble products while in others it may produce them from raw materials. Physical measures would tend to overestimate the productivity of the former, as fewer inputs would be required to produce the

same amount of output. To overcome these problems, our adjusted physical output measure accounts for differences in quality and relative differences in energy consumption.

### **Purchasing Power Parity exchange rate**

To convert value added in different countries to a common currency, we used PPP exchange rates rather than market exchange rates. PPP exchange rates can be thought of as reflecting the ratio of the actual cost of purchasing the same basket of goods and services in local currencies in two countries.

The reason for not using the market exchange rate was that it only reflects international transactions; it cannot reflect the prices of non-tradeable goods and services in the economy. Furthermore, comparisons made on the basis of market exchange rates would be affected by fluctuations in the exchange rate resulting from, say, international capital movements.

For our aggregate survey and some of our cases, we used PPP exchange rates reported by the United Nations and by the Economist Intelligence Unit. In principle, as long as the products are in the same market, we only need the PPP for one product and can use the market relative prices to compute the PPPs for the rest of the product range. In cases where the PPP exchange rates were not readily available, they were constructed “bottom up” by comparing the actual market price of comparable goods and services across countries, and then aggregating the individual prices up to a “price” for sector-specific baskets of goods and finally the total GDP.

Finally, we adjusted our PPP rates to exclude sales tax and other taxes and accounted for different input prices in order to obtain a Double Deflated PPP, which is the PPP exchange rate ultimately used in our value added comparisons.

### **Inputs**

Our inputs consist of labour and capital. Labour inputs are the more straightforward to measure: we sought to use the total annual number of hours worked in the industry by workers at the plant site. When actual hours were not available, we estimated labour inputs by multiplying the total number of employees by the best available measure of average hours of work per employee in the sector. In the case of India, we also needed to account for additional services provided by some companies that are not usually provided by companies in the benchmark countries. These included social and recreational services for workers that are still to be found in some Indian factories (mainly in heavy manufacturing, e.g., townships provided by steel companies) and are a legacy of pre-reform times. In these cases, detailed data on workers’ occupation was needed in order to subtract them from the labour inputs figures used in our productivity calculations.

In the steel, electric power and telecommunications case studies we also measured capital inputs. The heterogeneity of capital makes measuring capital inputs more difficult. Capital stock consists of various kinds of structures (such as factories, offices and stores) and equipment (such as machines, trucks and tools). The stock is built up incrementally by the addition of investment (business gross fixed capital formation) to the existing capital stock. Each piece of capital provides a flow of services during its service life. The value of this service is what one would pay if one were leasing this asset and this is what we used as our measure of capital inputs. To estimate the current value of capital stock we used the real Gross Fixed Capital Formation data provided by the Annual Survey of Industries published by the Central Statistical Office (CSO). In certain instances, such as the telecommunications sector, the CSO data did not match our sector definition. In this case, we used a “bottom-up approach” and constructed the capital figures from the companies’ balance sheets.

Once we had measured capital stock, we constructed our capital service measures using the Perpetual Inventory Method (PIM). We based our estimates on US service lives for structures and equipment. Although ideally we would have liked to measure the capital inputs in each of our case studies, we concentrated on the steel, electric power and telecommunications industries since they were the most capital-intensive sectors in our sample. For the remaining case studies, we treated capital as a causal factor in explaining labour productivity.

## Appendix 2B: Defining a framework

To arrive at a detailed understanding of the factors that contributed to the gap between current and benchmarked productivity, we used a framework incorporating causes of low productivity at three levels: in the production process; in industry dynamics, i.e., the conduct of players in the industry; and in the external factors that shape managerial decisions, i.e., policy and regulation. Possible barriers to high productivity are also described to explain the importance of each cause and to introduce some of the barriers that are presented in the later discussions.

### **Production process**

The first set of factors affecting productivity arise in the production process and can be grouped into operations, product mix/marketing and production factors. It is important to remember that factors in the production process are in turn determined by elements of a firm's external environment that are beyond its control and decisions made by its managers.

¶ **Operations:** A large number of operational processes determine productivity. They are:

- **Organisation of functions and tasks:** This is a broad category encompassing the way production processes and other key functions (product development, sales, marketing) are organised and run. It reflects managerial practices in most areas of the business system as well as the structure of incentive systems for employees and companies.
- **Excess labour:** These are workers who could be laid off immediately without any significant change to the organisation of functions and tasks. It also includes the variable portion of workers still employed despite a drop in output.
- **Design for manufacturing (DFM):** DFM is the adoption of efficient building or product design by using an optimal site/plant layout, then using standard, interchangeable and cost competitive materials.
- **Capacity utilisation:** This represents the labour productivity penalty associated with low capacity utilisation given the fixed proportion of workers (i.e., management, machine operators, maintenance, etc.).

- **Suppliers:** Suppliers can contribute to industry productivity through efficient delivery, collaboration in product development or products and services that facilitate production (e.g., material suppliers in residential construction). They can cause productivity penalties through lower quality supplies or services and fluctuations in the delivery of inputs.
  - **Marketing:** Within product categories, countries may differ in the quality of products made. Production of higher value added products or services using similar levels of input is reflected in higher productivity (e.g., branding in software services). Another source of productivity differences within product categories is product proliferation (e.g., the variety of Stock Keeping Units –SKUs–in retail). A wide range of product or service lines can reflect a sub-optimal product mix that reduces productivity. Finally, both within the manufacturing sectors and in services, design can influence which technology might be applied. Design changes might simplify the production process and improve productivity.
  - **Labour skills and trainability:** This factor captures any possible labour productivity penalties due to lower frontline trainability potentially caused by lower educational levels, different educational focus (discipline/skills), low frontline worker motivation, lack of incentives/possibility for top management to impose changes. It is also a factor when (older) workers/middle management find it particularly difficult to break old habits.
- ¶ **Product/Format mix:** Countries may differ in the categories of products they demand or supply, and a productivity penalty can arise if a country's output consists of a higher share of inherently less productive product or service categories (such as mud houses in housing construction). Demand for such output is mainly the result of consumers' inability to afford inherently more productive products (such as brick houses).
- ¶ **Technology:** The choice and use of technology affects productivity through three factors:
- **Lack of scale:** Higher production scale generally leads to increased productivity if fixed assets are a large enough proportion of total costs. We use capital in the sense of physical assets and their embodied technologies (such as machines, plants, buildings and hardware). We classify assets as being sub-scale when they do not reach the minimum efficient scale.
  - **Lack of viable investment:** This refers to investment in upgrading as well as new investment that would be economical even with India's low labour costs. For our calculations, we applied current wage levels and a weighted average cost of capital (WACC) of 16

per cent typically used by domestic and foreign corporations in India.

- **Non-viable investments:** This refers to investment in upgrading assets as well as investment in green field operations that would not be economical given India's low relative labour costs. As a result, this category includes investments that are not being made only because of the lower relative cost of labour (such as full packaging automation).

### **Industry dynamics**

The competitive pressure in the industry influences management decisions to adopt best practices in production. We studied the influence of three factors:

- ¶ **Domestic competitive intensity:** This refers to differences in the industry structure and the resulting competitive behaviour of domestic players. Other factors being equal, more competition puts more pressure on management to adopt more productive processes. Industries with high competitive intensity typically experience frequent entry and exit of players as well as changes in prices and profitability.
- ¶ **Exposure to best practice:** This includes competitive pressures from foreign best practice companies either via imports or through foreign direct investment (FDI).
- ¶ **Non-level playing field:** In a well regulated and well functioning market economy, the same laws and rules (such as pricing, taxation) apply to different players in the same industry, ensuring that productivity levels will determine who succeeds and who fails. Conversely, in markets where regulation is differentially applied, companies can often ignore productivity pressures since less productive firms may flourish at the expense of more productive ones.

### **External factors**

External influences on productivity relate to conditions in the economy or policy and regulatory prescriptions that determine how companies operate. These factors are largely outside the control of firms and include:

- ¶ **Macroeconomic conditions (e.g., labour costs or income levels):** To illustrate, for a given level of capital costs, where labour costs are low relative to capital, managers will use less automated production processes. This could reduce labour productivity. Low incomes may lead to the consumption of inherently less productive products and services hampering the country's overall productivity.

- ¶ **Macroeconomic barriers:** Policy and practice within the overall economy can have a negative impact on productivity. For instance, large public budget deficits increase the cost of funds for private investors, since the government's need to borrow to make up the deficit pushes up interest rates. Furthermore, the general economic environment in which managers operate affects their planning horizon, investment decisions and everyday operational decisions. Investments are more difficult to commit to in an unstable macroeconomic and political environment where high inflation rates, uncertainty about exchange rates, or frequently changing fiscal policies generate additional uncertainty. This instability leads to higher capital costs (for domestic investors) or higher country risk (for foreign investors). These higher discount rates will lead profit-maximising managers to choose different production technologies, resulting in labour and capital productivity differences across economies.
- ¶ **Capital markets:** Distortions in the capital market (such as administered interest rates) result in an inefficient allocation of capital across sectors and firms and will distort the market's ability to reward productive firms.
- ¶ **Government ownership:** The amount of pressure from owners or shareholders can influence the rate at which productivity is improved. Companies under government ownership are often not under much pressure since they receive subsidies that allow them to compete against more productive players.
- ¶ **Labour market:** How the labour market is regulated as well as the skill levels within it also affect productivity. Labour regulations may influence the implementation of productivity improvements (e.g., by restricting efforts to reduce excess workers). With regard to skills, managers and frontline workers in one country may have lower levels of education or a different educational focus (discipline/skills) than those in other countries. This may lead to lower frontline skills/trainability, resulting in lower productivity.
- ¶ **Product market:** Regulations governing different sectors of the economy can pose barriers to productivity growth (**Exhibit 2.6**). They include:
  - **Entry barriers:** Regulations prohibiting or discouraging investment in certain services, products or players can lower the productivity of a sector. These include restrictions on the size of players (e.g., the reservation of products for manufacture by small scale industry), origin of players (in the form of trade barriers and restrictions on FDI) or type of player (e.g., licensing in dairy processing that prevents new private players from entering in certain areas).

- **Competition distortions:** Regulations can distort competition by subjecting players to differing rules. These include direct tax breaks and/or subsidies for certain kinds of players, such as small-scale or government-owned firms. They also include regulations that limit or distort competition by protecting or favouring incumbent companies (as in the telecom sector). Similarly, regulations prohibiting or discouraging certain products or service offerings (including regulations on pricing) can harm productivity, for example, by forcing farmers to sell through intermediaries.
- **Lack of enforcement:** Unequal enforcement of tax (as in tax evasion by small retailers) as well as other acts of omissions (such as the lack of enforcement of intellectual property rights in software) also distort competition. As an example, uneven enforcement of energy payments among different kinds of players will also create differences in costs and value added. This is particularly relevant in energy intensive manufacturing sectors such as steel.
- **Other product market barriers:** Other policies and practices that can harm productivity include:
  - **Standardisation:** Although many firms and consumers benefit from standards, individual firms often do not have sufficient incentive to promote a standard. Government intervention is often required (for instance, in quality standards for construction materials) on the grounds that the society does not yet have the means or incentives to invest in standardisation.
  - **Threat from red tape/harassment:** Excessive red tape and regulatory harassment increase costs through the time and other investments needed in negotiating complex procedures, limiting the incentives of firms to optimise operations.
- ¶ **Land market barriers:** Distortions resulting from the tax system or regulations relating to land use can prevent efficient use of land. Examples are low property taxes, stringent tenancy laws, discretionary procedures for government procurement contracts and land allocation. Another barrier is a defective system of land titles, which prevents the formation of an efficient land market thereby distorting the allocation of land among players.
- ¶ **Problems imposed by related industries:** Supplier or downstream industries can hamper productivity by reducing the competitive pressures on industry players. An underdeveloped upstream industry can also impose significant productivity costs by failing to provide products or services that facilitate production or by delivering lower quality

goods or services and/or at irregular frequencies (e.g., irregular milk supply to dairy processors).

- ¶ **Poor infrastructure:** This includes issues in the country's infrastructure such as roads, transportation and communications. As a related sector, infrastructure can affect productivity either through the demand side (for instance in inefficient distribution) or through the cost side (e.g., in input procurement).
- ¶ **Other barriers:** Markets within different countries may vary in the structure of consumer demand as a result of varying climates, tastes, or traditional consumption patterns. This influences the product mix demanded, which can affect the value of the total output and thus productivity. Productivity penalties may also arise through the structure of costs as a result of climatic, geographical and geological differences across countries.

## **Box 1**

### **PRODUCTIVITY AND PROFITABILITY**

Within any given market, a firm that is more productive will enjoy higher profitability unless it suffers from some other source of cost disadvantage. A more productive firm will either produce the same output with fewer inputs and thus enjoy a cost advantage, or produce better output with the same inputs and thus enjoy a price premium.

Over time, the higher profitability of productive firms will attract competition. As competitors catch up in productivity, profitability will tend to converge. In such an environment, the only way a firm can enjoy higher profitability is by pushing the productivity frontier beyond its competitors. If, as a result, the firm achieves higher productivity, it will enjoy higher profitability only until its competitors catch up again. In other words, profitability, in a dynamic world, is a transient reward for productivity improvements. This linkage holds within a given market, unless the playing field is not level, i.e., competition is distorted. As we explain below, an uneven playing field is one of the more important factors in explaining India's productivity gaps.

While a more productive firm will enjoy higher profitability within a given market, this may not be true for firms operating in different markets, for two reasons. First, higher cost of inputs may render a productive firm in one market unprofitable, while a less productive firm in another market with lower cost of inputs may be profitable. For example, a US firm may be more productive but less profitable than an Indian firm because US wages are higher. Second, competitive intensity may differ across markets so that a productive firm in a highly competitive market may be less profitable than an unproductive monopolist or oligopolist in another market. To illustrate, in the 1980s, European airlines enjoyed higher profitability than their more productive US counterparts because they faced much less price competition.

However, deregulation and globalisation are eliminating distinctions between national markets. As barriers are removed, productive firms will enter markets with unproductive incumbents. This could take the form of exports if goods are traded. While cheap input prices may temporarily shield unproductive incumbents in the importing country, they are not sustainable in the long run. The cost of capital (a key input price) is converging internationally, and wages (the other key input price) will eventually catch up with productivity (so that no country can enjoy both low wages and high productivity in the long run). The other form of market entry for productive firms is foreign direct investment. In this case, productive transplants will face the same input prices as unproductive incumbents and will therefore enjoy higher profitability.

In sum, as markets liberalise and globalise, the only sustainable source of higher profitability for a firm will be to continually achieve productivity higher than that of its competitors.

## **Box 2**

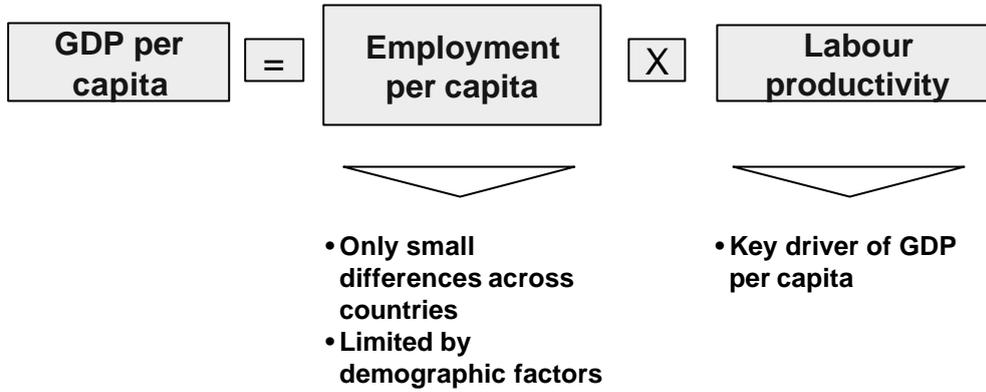
### **INTERPRETING GLOBAL PRODUCTIVITY BENCHMARKS**

To assess the performance of Indian industries, we compared their labour productivity levels with those of the best performing economies in the world. This benchmark allowed us to measure the existing efficiency of the production processes of Indian companies relative to their potential efficiency. The comparisons also allowed us to identify the reasons for the productivity gap through a detailed comparison of production processes and other business practices in India and the benchmark country.

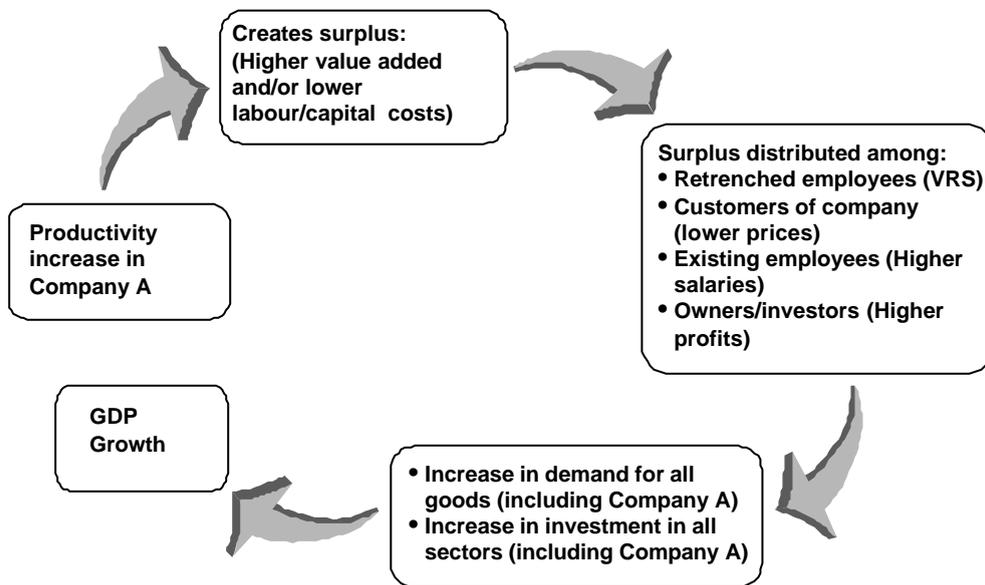
The global benchmarks should not be perceived, however, as a measure of maximum possible productivity levels. At any given moment, there are individual companies with productivity levels above the average of the best performing economy. And over time, the global benchmark rises as individual companies continuously improve their productivity. So while the benchmark productivity level can be interpreted as a realistically achievable level of efficiency, it should not be seen as a limitation.

Independent of the global benchmark for any specific sector, we have chosen to express all our productivity measures in consistent units defined relative to the US average productivity level. The US has the highest real income level among large countries, which makes it the benchmark for the level of total GDP per capita. While this is not the case for several industries, we believe that using a consistent benchmark unit helps the interpretation of productivity gaps in individual industries and facilitates performance comparisons across them.

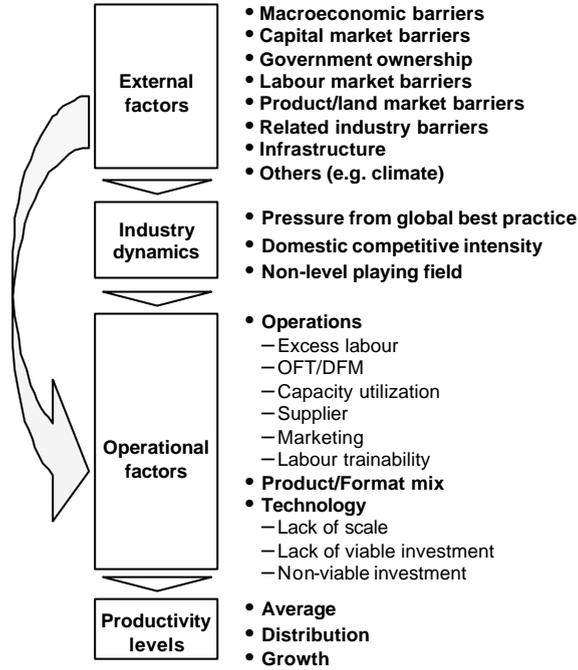
**LABOUR PRODUCTIVITY GROWTH DRIVES GDP PER CAPITA GROWTH**



**DYNAMICS OF PRODUCTIVITY LED GROWTH**

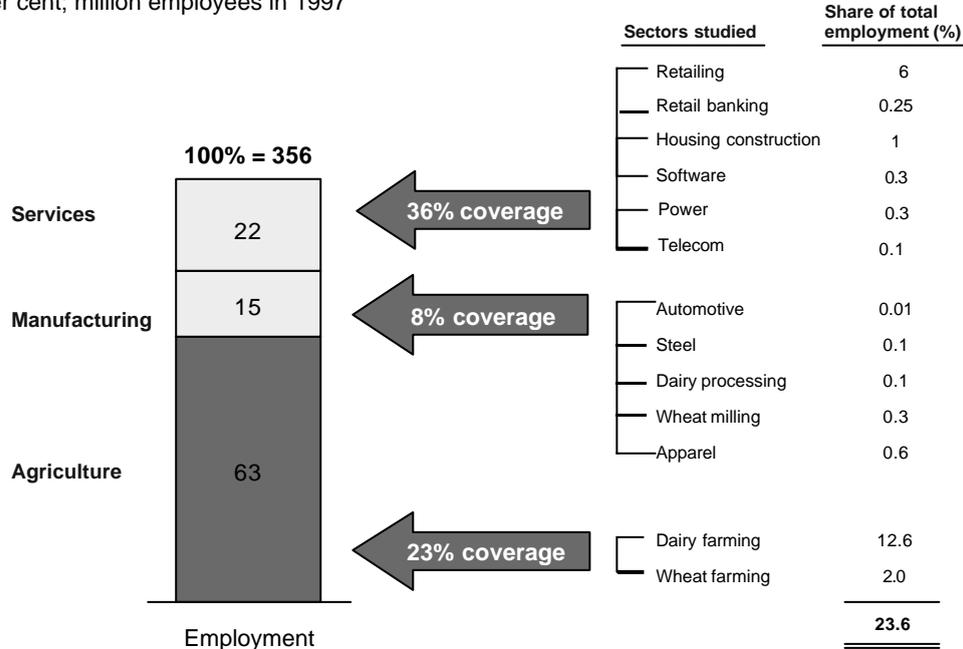


### MGI FRAMEWORK: FINDING THE CAUSES FOR LOW PRODUCTIVITY PERFORMANCE



### SECTOR COVERAGE OF MGI INDIA STUDY

Per cent; million employees in 1997



Source: NSSO; MGI

Exhibit 2.5

2001-01-10MBZXJ151(vd)

**McKINSEY GLOBAL INSTITUTE'S INDUSTRY STUDIES IN INDIA: NUMBER OF INTERVIEWS**

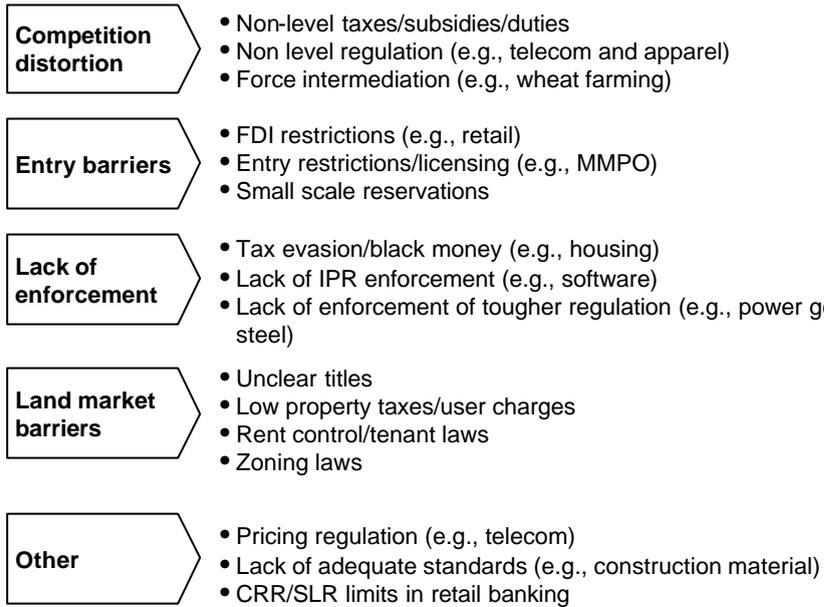
<b>Industry</b>	<b>Interviews</b>
Dairy farming	51
Wheat farming	89
Automotive	15
Power	37
Steel	44
Telecom	32
Dairy processing	29
Wheat milling	45
Apparel	56
Housing construction	96
Retail banking	46
Retailing	54*
Software	33
<b>Total</b>	<b>627</b>

\* Does not include survey of 1,000 respondents

Source: McKinsey Global Institute

## KEY PRODUCT AND LAND MARKET BARRIERS

ILLUSTRATIVE



# Current Perspectives on India's Economic Performance

A starting point in our study was to review India's economic performance in the past decade, and compare it with that of the US and other developing countries. By analysing available data and reviewing official and academic publications, we identified the main factors for India's current economic performance. This allowed us to draw conclusions on the relative importance of the different barriers to output and productivity growth in India.

We found these to be quite different from the barriers commonly identified in the current discourse. According to the ongoing debate, India's fiscal deficit and its capital market distortions, restrictive labour laws and poor infrastructure are the most important of the remaining barriers to rapid growth. Throughout this report, we show that the real problems lie elsewhere: Important product and land market barriers are severely hampering India's economic growth and, more disturbingly, its ability to absorb an imminent surge in the working age population.

## **INDIA'S ECONOMIC PERFORMANCE IS SLUGGISH COMPARED TO OTHER DEVELOPING ECONOMIES**

Despite the economic reforms of 1991, India's economic growth has been slow compared to the levels achieved by other Asian economies in the past (**Exhibit 3.1**). To assess India's economic development, it is useful to compare its performance with that of the US, the world leader in productivity and GDP per capita, and to benchmark its performance against that of other developing countries such as China, Korea, Indonesia and Thailand, which have been among the strongest Asian performers in the past two decades. Taking GDP per capita as a measure of economic well-being, we have explained India's level of output per capita through the differences in labour inputs (employment per capita) and labour productivity (the efficiency with which labour inputs are used to produce a certain level of output).

## **India has the lowest GDP per capita among the benchmark countries**

The best available measure to compare material living standards across countries is GDP per capita measured in Purchasing Power Parity (PPP) terms. Currently, India's GDP per capita stands at around US\$ 440 a year, or 6 per cent of US levels (**Exhibit 3.2**). With a GDP per capita that is about 50 per cent that of China's, India has the lowest GDP per capita among our benchmark countries (**Exhibit 3.3**).

From 1991 – when the economic reforms began – till 2000-end, India's GDP per capita has grown at 4.2 per cent a year. Output growth has been low compared to that achieved in Korea, Indonesia, China and Thailand, when they were at India's current GDP per capita levels. In fact, at current growth rates, it would take India 18 years to reach the levels of Indonesia and China, 35 years to reach Thailand and over 50 years to reach Korea's levels.

Economic growth in India has evolved in three distinct phases (**Exhibit 3.4**). Up to the early 1980s, GDP per capita grew at only 1.6 per cent a year. The government owned large swathes of industry and rigorously controlled the economy, severely restricting entry into all its sectors. From the mid-1980s to 1991, GDP per capita grew to around 2.6 per cent a year. This was the result of limited reforms, focusing as they were on only de-licensing and tariff reduction in just a few sectors. Growth was somewhat unfettered only in 1991, when more fundamental reforms were introduced, leading to an increased GDP per capita growth of around 4 per cent a year. Government monopolies and licensing requirements were abolished in many sectors. Trade tariffs were reduced and the reservation of certain sectors for small-scale industry were removed. In this period, output growth in the manufacturing and service sectors increased significantly, reducing agriculture's share in the economy from 31 per cent in 1990 to 27 per cent in 1998 (**Exhibit 3.5**).

## **Labour productivity increases have contributed most to GDP per capita growth**

Growth in labour productivity has been the key source of past GDP per capita growth in India (**Exhibit 3.6**). Since 1993, employment growth has not kept pace with population growth and increases in GDP per capita have come mainly from higher productivity of the employed workforce. This trend is consistent with the experience of other countries such as Korea, Japan, the UK and the US where GDP per capita is highly correlated with labour productivity levels (**Exhibit 3.7**). As we have said, the level of labour productivity reflects the extent to which an economy is making

efficient use of its labour inputs. We treat capital inputs as a potential causal factor affecting the level of labour productivity. Higher levels of investment in mechanisation and technology will increase the output that each hour of labour can produce.

### **Employment growth has not kept pace with population growth**

Employment per capita in India has declined in the past decade. Since 1991, labour inputs per capita have fallen at the rate of around 0.7 per cent a year and are now at 81 per cent of the US level. Therefore, despite the creation of around 24 million jobs in the last 6 years, jobs have not grown at the same rate as has the population.

Employment in India is skewed towards the agriculture sector, which accounts for around 60 per cent of total employment. In line with the evolution of output described above, employment in agriculture has decreased from 64 per cent in 1994 to around 62 per cent in 1998 (**Exhibit 3.8**). Moreover, the agricultural workforce is heavily under-employed: Of the officially reported agricultural hours, over half actually consist of idle time (**Exhibit 3.9**). Most non-agricultural employment is in the non-registered sector: Only 8 per cent of total employment is in companies registered under the Companies Act (**Exhibit 3.10**).<sup>1</sup>

The situation is quite alarming considering the upcoming demographic changes in India. By 2010, as much as 62 per cent of the population will be aged between 15 and 59, leading to a substantial increase in the working age population (**Exhibit 3.11**). This will put a significant strain on the economy that can only be contained if India's GDP grows at around 10 per cent per year, i.e., at almost twice the current rate.<sup>2</sup>

### **High investment levels have produced only limited GDP growth**

India's past GDP growth has been accompanied by a significant increase in capital stock, which has grown at around 5.4 per cent since 1991 (**Exhibit 3.12**). In contrast to the experience of other countries, high investment rates in India have resulted in relatively low growth. This is partly explained by the fact that around 40 per cent of the net capital stock in India is in the hands of the government.

The increase in capital stock is due to relatively high investment rates, which have risen from around 15 per cent of GDP in the 1970s to over 25 per cent in 1997. These

---

<sup>1</sup> In India, the non-registered sector is also called the "unorganised" sector.

<sup>2</sup> See Chapter 5: India's Growth Potential.

investments have been almost entirely financed domestically, with foreign direct investment accounting for around 0.5 per cent of GDP.

But the high investment levels have resulted in relatively limited GDP growth. In the post reform period, India needed to invest around 4.2 per cent of its output for each per cent of GDP growth. In contrast, in Thailand, Indonesia, Korea, Malaysia and China, the investment requirements per unit of GDP growth were up to 30 per cent lower (**Exhibit 3.13**).

### **Social indicators have improved**

Socio-economic indicators in India have somewhat improved as a result of higher GDP growth. The proportion of the population below the poverty line has declined from around 45 per cent in 1980 to 26 per cent in 2000 according to official figures (**Exhibit 3.14**). Life expectancy has risen by over 25 per cent (from 50 to 63 years) between 1980 and 1998. Similarly, the overall literacy rate has almost doubled: from 30 per cent of the total population in 1980 to around 54 per cent in 2000.

## **CONVENTIONAL PERSPECTIVES ON REASONS FOR POOR ECONOMIC PERFORMANCE**

Our review of academic, official and other documents showed that – in the official and academic perspectives – a large fiscal deficit, poor infrastructure and stringent labour laws, among an array of other issues, are major impediments to India's economic growth. Unfortunately, these assertions tend to be unsupported by solid arguments or evidence. Nor do they shed any light on which reforms are the most important ones and should, therefore, be tackled first by the government.

Product and land market barriers have been largely ignored in the current debate. In fact, there is a feeling in policy circles that most product market barriers have already been removed by the 1991 reforms (e.g., through the abolition of licensing in many sectors). Our study shows clearly that significant product and land market barriers still remain, and constitute the key barriers to productivity growth, leading to the inescapable conclusion that removing these barriers constitutes the most important task of the government.

Conventional perspectives on constraints to economic growth, as reflected in official and academic documents, can be summarised as follows:

- ¶ **Fiscal indiscipline constrains growth:** Current academic and policy documents often highlight the large fiscal deficit as a key factor in limiting

investment and growth in India. Government borrowing to finance the deficit crowds out private investment by keeping domestic real interest rates high (**Exhibit 3.15**).

Despite the 1991 reforms, India's consolidated fiscal deficit is growing and is currently at around 11 per cent of GDP (**Exhibit 3.16**). Poor tax collection and increasing expenditure are the main causes of the growing deficit. Subsidies have grown at the expense of capital formation and now account for around 30 per cent of central government and over 60 per cent of state government expenditures.

On the external front, things seem more stable. The current account deficit has substantially decreased from the high pre-reform levels. Net capital inflows have grown rapidly, boosting foreign exchange reserves (**Exhibit 3.17**). Remittances make up most of the inflows, and compensate for the low levels of foreign direct investment. The government's managed exchange rate policy helps boost reserves but results in overvaluation of the rupee, increasing the cost of importing capital equipment which could increase productivity and hence GDP growth.

- ¶ **Capital market barriers discourage productive investment:** Distortions in the financial sector are seen as key barriers to productive investment.<sup>3</sup> Financial controls such as directed lending increase intermediation costs and keep interest rates high. Bank operating costs in India account for around 10 per cent of banking assets compared to around 3 per cent in the US and Korea (**Exhibit 3.18**). Operational inefficiencies and the large amount of non-performing assets are also responsible for the high intermediation costs. Financially unstable players hold almost 85 per cent of the assets in the Indian financial system and more than 5 per cent of their portfolios make up non-performing assets (**Exhibit 3.19**).
- ¶ **Government ownership harms productivity growth:** Academic and other publications sometimes cite government ownership as an important barrier to productivity and output growth in some sectors. Government ownership distorts managers' incentives and directly hampers productivity. Despite announced plans to privatise key sectors, most Public Sector Units (PSUs) still remain under government control. As a result, the government still controls around 70 per cent of employment in the registered sector and 40 per cent of the net capital stock. Key sectors such as oil, power,

---

<sup>3</sup> *Financial Sector Policies in India* by Surjit Bhalla (Oxus, 2000).

telecommunications, insurance and banking are almost completely government-owned.

- ¶ **Restrictive labour laws are behind slow output and productivity growth:** Labour market distortions are frequently cited as the key reasons for India's slow output and productivity growth.<sup>4</sup> Stringent labour laws make it difficult for companies to restructure, thereby hampering their ability to improve efficiency and expand output.

Employment in India's registered sector is highly protected. Registered companies (i.e., those with more than 100 employees) must obtain specific permission from the state government to retrench or to close down. Stronger restrictions apply to government-owned companies and managers whose jobs are directly protected by the state governments.

Enforcement of labour laws also differs between registered and non-registered sectors. While workers in the registered sector enjoy absolute protection from retrenchment, contract labour and other workers are under the perpetual threat of being laid off. Smaller units typically work outside existing legislation. Moreover, large companies usually sub-contract work to smaller units to bypass labour laws.

- ¶ **Low labour skills are a further constraint:** Low literacy levels within the labour force are another factor referred to in discussions about low output levels and low growth. Nearly 50 per cent of India's population is illiterate. In contrast, in Thailand, China and Brazil less than 20 per cent of the population is illiterate (**Exhibit 3.20**).

The correlation between education and wages has frequently been cited as evidence of the higher productivity of more educated workers. Recent reports have paid increasing attention to the role of human capital in economic growth. Education can affect output in two ways. First, a lack of education prevents workers from acquiring skills, which directly limits their productivity. Second, a lack of education prevents voters from making the choices that would ultimately help improve policy making in the country.

While levels of education are more readily comparable across countries, the quality of education is also important. There has been concern over the quality of basic education in India, suggesting that the education gap between India and

---

<sup>4</sup> See "Freeing the Old Economy" by Arvind Panagariya (*The Economic Times*, 31 Jan 2001).

other developing countries may actually be even larger when the quality of schooling is taken into account.

In our case studies, however, we found that a lack of education is not an absolute barrier to productivity growth since on-the-job training can often substitute for education. We also found that this holds true for blue-collar workers as well as technicians and managers.

- ¶ **Product market barriers have largely been removed:** The reforms in 1991 removed some key product market barriers. De-licensing removed government monopoly in major sectors of the economy. Small-scale reservation was removed in some export-oriented sectors (**Exhibit 3.21**), and reduction in tariffs and duties as well as fiscal concessions on exports boosted trade and increased pressure on domestic producers. But a large number of product market barriers remain and are described in relevant chapters. The current debate on outstanding product market reforms focuses mostly on small-scale reservation.<sup>5</sup> Over 800 labour-intensive sectors remain reserved for small-scale operations. Small-scale reservation limits scale economies and increases costs. Moreover, small-scale operations often result in lower quality and increase the complexity costs for downstream producers who are forced to source from many small suppliers.
- ¶ **Red tape and corruption discourage investment:** The large amount of red tape and corruption in India is also believed to discourage productive investment. According to surveys of large companies' executives, corruption levels in India are perceived to be substantially higher than in other developing countries like Korea, Malaysia, Brazil and Thailand (**Exhibit 3.22**). Multiple and often conflicting regulations increase red tape (especially in customs) delaying production and hampering exports. As a result, foreign best-practice players may be deterred from entering the market, further limiting competitive intensity.
- ¶ **Inadequate infrastructure is an ever-present barrier:** Poor infrastructure is one of the most frequently mentioned barriers to rapid growth in India. To take just one element of infrastructure – roads. In a country as large as India, the capacity of the whole economy to function as one market hinges on efficient infrastructure that reduces transportation costs and makes regional producers face competition from one another. But India's road network is not

---

<sup>5</sup> *Small Scale Reservation in India* by Rakesh Mohan (NCAER, 1999); "Freeing the Old Economy" by Arvind Panagariya (*The Economic Times*, 31 Jan 2001).

up to the task, being largely unpaved and in poor condition (**Exhibit 3.23**). Furthermore, electricity shortages are common in many regions.

Poor infrastructure not only hampers players in the domestic economy, it also holds them back when competing in international markets. In India, ports are heavily utilised but are very inefficient compared to other Asian ports (**Exhibit 3.24**). On average, waiting time at berth is 4-5 days in India compared to less than 1 day in Singapore. This puts exporters at a cost disadvantage in international markets, and benefits domestic producers by raising the prices of imported goods.

## **REAL BARRIERS TO ECONOMIC GROWTH**

We have found that the major causes of low productivity lie in the distortions that create product and land market barriers, which – together with government ownership – substantially limit labour and capital productivity.

Further, while presenting an extensive list of issues as barriers to economic growth, official and academic documents offer no indication as to their relative importance. But prioritising these factors is essential for tailored policy prescriptions.

This prioritisation cannot be accomplished by analysing overall economic performance. Our India study and our previous work in other countries have taught us that it is industry-level analysis that provides the answers. By looking at the different factors at the industry level, we are able to understand how managers operate under current conditions. Taken together, these individual decisions and actions indicate how policy and competitive behaviour dictate economic performance.

We have applied this method to 13 key sectors of the Indian economy, as described in Volume I, Chapter 2: Objectives and Approach. These case studies have helped us identify the recurring barriers to performance improvement in India. We have (1) evaluated the economic cost of previously recognised factors in low productivity; (2) identified new important issues that restrict economic growth; and (3) prioritised the different barriers in order to identify viable policy actions that can substantially enhance India's growth and allow it to meet its biggest need: Generating enough employment for the surge in the labour force that is a result of the large-scale additions to the working-age population.

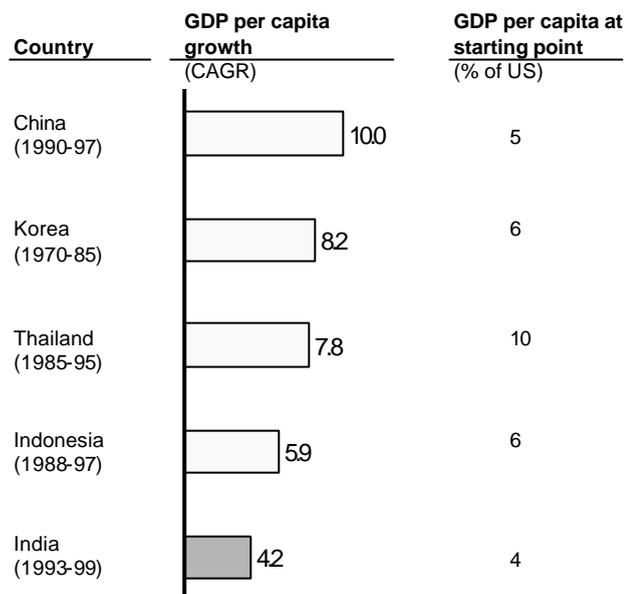
In the following chapters, we describe in detail the factors hampering productivity and output growth in each of the 13 sectors we have studied. In the final chapters, we

provide our perspective on the current performance and growth potential of the Indian economy as a whole.

Exhibit 3.1

20000211DL-ZXL350\_B(ECO-PERF)

### OUTPUT GROWTH IN SELECTED COUNTRIES

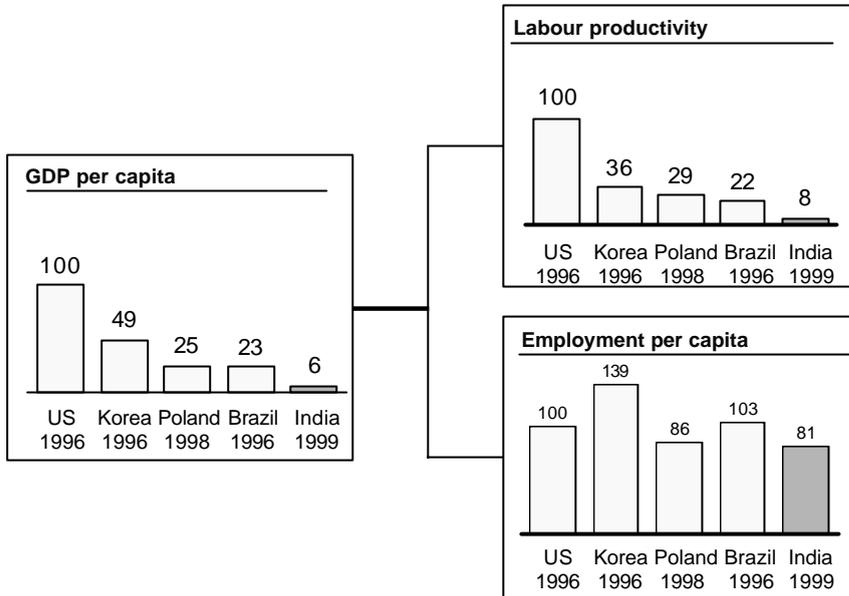


Source: World Development Indicators; *The Economist* (2000)

Exhibit 3.2

20000211DL-ZXL350\_8(ECO-PERF)

**BREAK-UP OF INDIAN GDP PER CAPITA**  
 Indexed to US in 1996 = 100, 1990-99

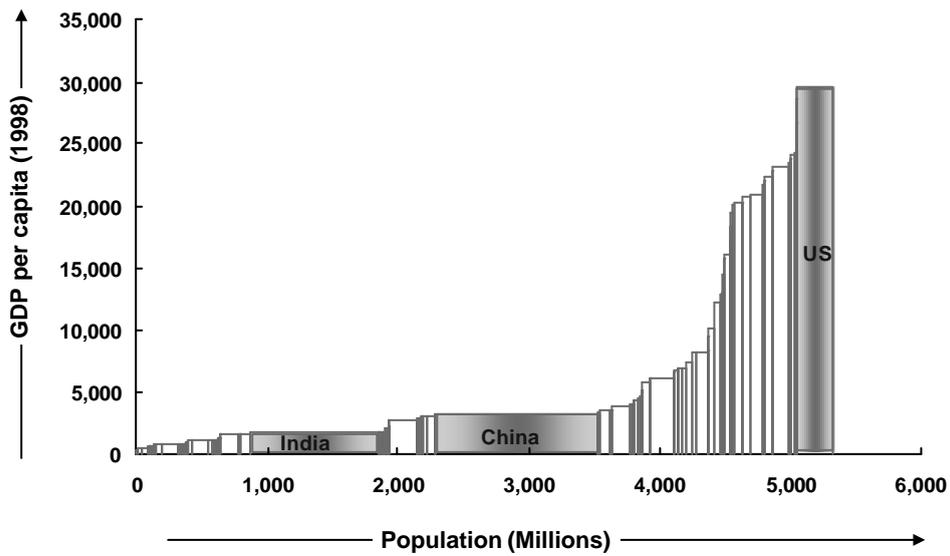


Source: CMIE (Monthly Review of the Indian Economy, November 1999); Manpower (Profile India Yearbook 1999); *The Economist* (1996); MGI

Exhibit 3.3

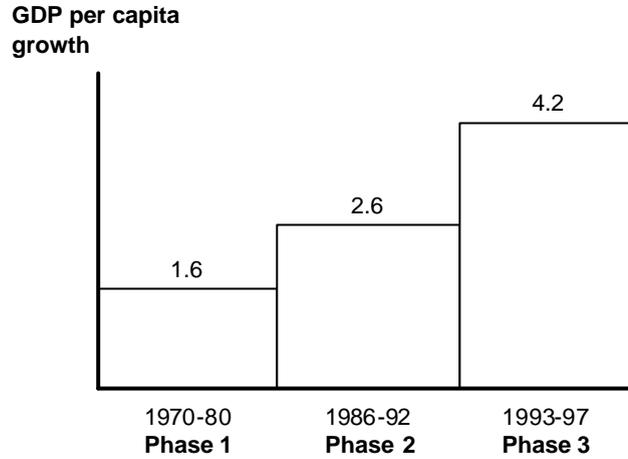
20000211DL-ZXL350\_8(ECO-PERF)

**WORLD DISTRIBUTION OF PER CAPITA GDP BY COUNTRY**  
 US\$, PPP adjusted



Source: Economic Intelligence Unit; OECD; MGI

**ERA ANALYSIS OF INDIA'S ECONOMIC GROWTH, 1970-99**  
Per cent



Source: MGI; Team analysis

**GDP AT FACTOR COST BY SECTOR, 1980-96**  
Per cent

100%* = Rs billion	1,224	1,565	2,212	8358**	9643**	10818**
Other services	19.3	20.2	21.3	23	23	24.8
Trade***	16.7	17.6	17.8	19.8	20.9	21.4
Construction	5.0	4.6	4.6	5.1	4.8	5.0
Electricity, gas and water	1.7	2.0	2.3	2.5	2.4	2.5
Manufacturing (including mining and quarrying)	19.2	21.0	23.1	19.2	20.3	19.5
Agriculture	38.1	34.6	30.9	30.4	28.6	26.8
	1980	1985	1990	1994	1996	1998

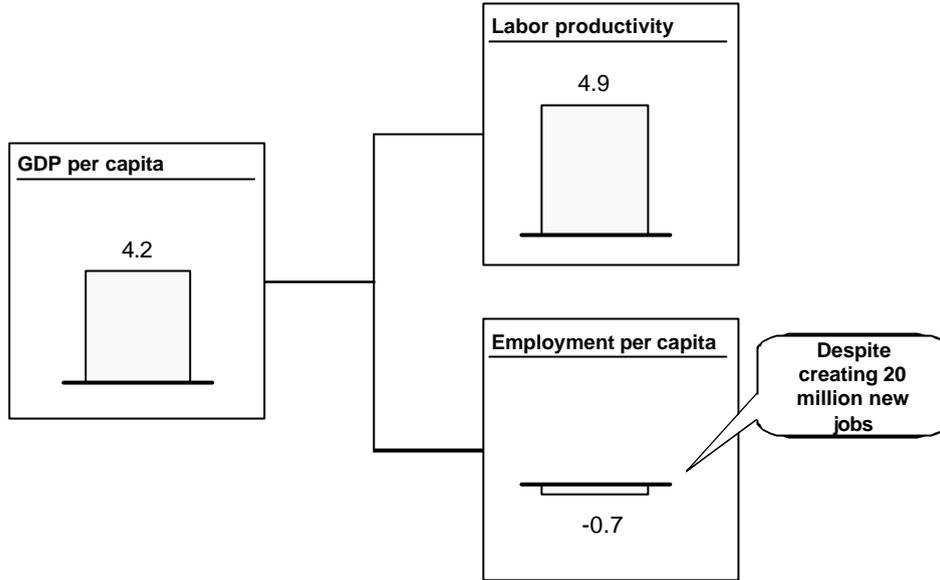
\* At factor cost at constant prices

\*\* GDP figures for 1994, '96, and '98 are as per new series started from 1993

\*\*\* Includes trade, hotels and restaurants, transport, storage, and communication

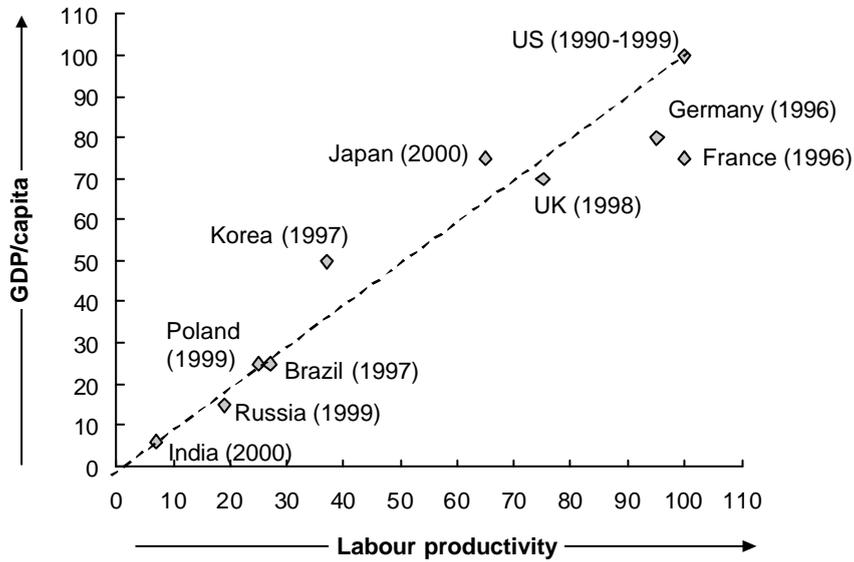
Source: CMIE (National Income Statistics, November 1998)

### INDIAN GDP PER CAPITA GROWTH CAGR (1993-99)



Source: CMIE (Monthly Review of the Indian Economy, November 1999); NSS Report No. 455, Employment and Unemployment in India, 1999-2000 – Key Results; Census of India 2001; McKinsey Analysis

### PRODUCTIVITY AND GDP PER CAPITA ACROSS COUNTRIES Indexed to the US = 100 in 1996



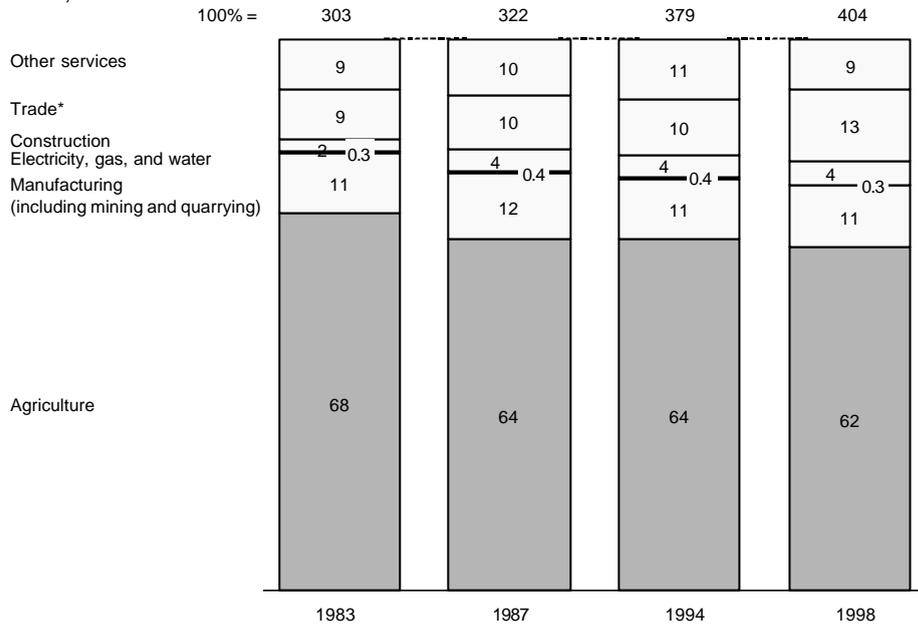
Source: Economic Intelligence Unit; OECD; MGI

Exhibit 3.8

20000211DL-ZXL350\_8(ECO-PERF)

### EMPLOYMENT BREAK-UP BY SECTOR, 1983-98

Per cent, million



\* Includes trade, hotels and restaurants, transport, storage, and communication

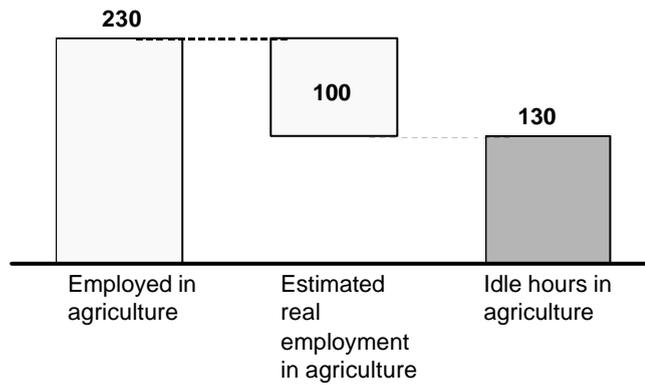
Source: Manpower (Profile of India); NSSO quinquennial surveys; Census of India, 1991 and 2001

Exhibit 3.9

20000211DL-ZXL350\_8(ECO-PERF)

### EXTENT OF UNDER-EMPLOYMENT IN AGRICULTURE

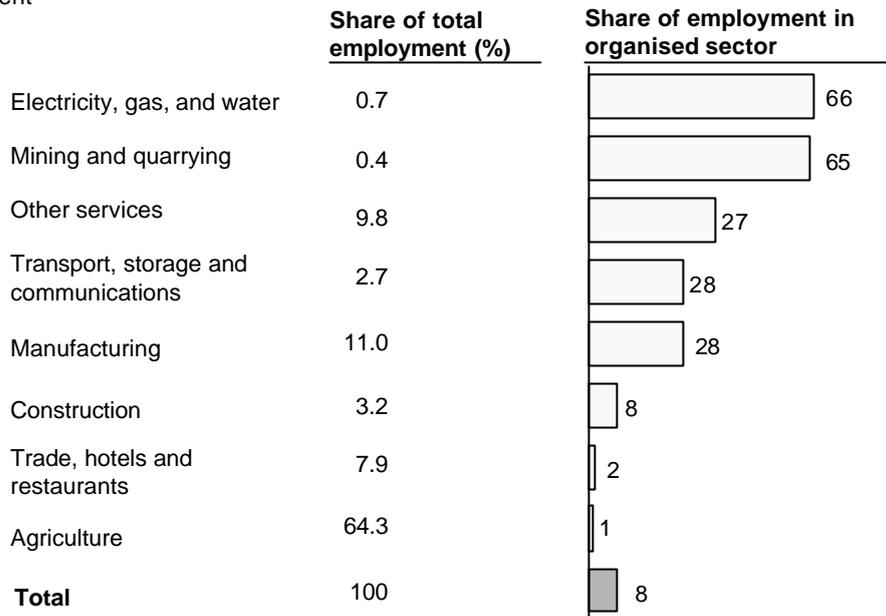
Full Time Equivalent (FTEs) millions



Source: National Income Statistics, 1998; Team analysis

**SECTOR BREAK-UP OF ORGANISED EMPLOYMENT\*, 1995**

Per cent

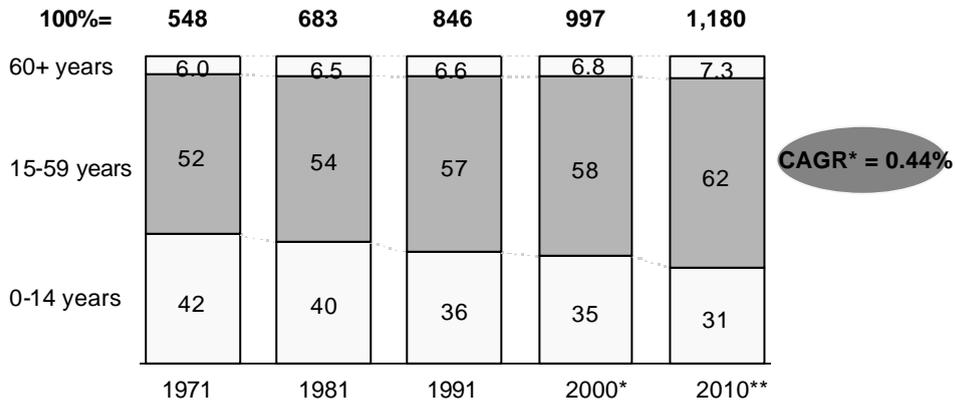


\* Employment in registered companies

Source: Manpower (Profile India Yearbook), 1999

**EVOLUTION OF WORKING-AGE POPULATION**

Per cent, million



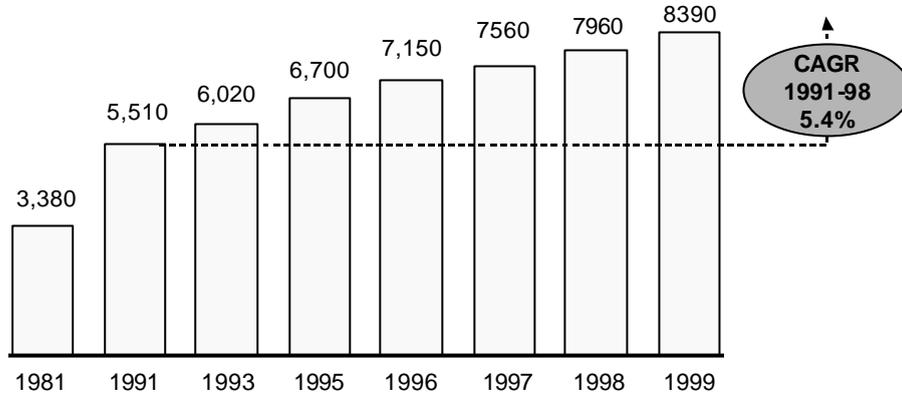
\* Compounded annual growth rate

\*\* Projections

Source: *Overview of demographic transition in India*, K. Srinivasan, Population Foundation of India; Population projections for India; Census of India 1991

**GROWTH IN CAPITAL STOCK IN INDIA\*, 1991-99**

Rs billion; constant 1980-81 prices



\* Net capital stock  
Source: Statistical Outline of India, 1998-99

**INTERNATIONAL BENCHMARKS FOR INVESTMENT RATES**

Country	GDP growth (CAGR)	Average total investment (Per cent of GDP)	GDP at starting point (%) (US=110 in 1998)	Per cent of total investment per GDP (%) growth
India (1990-99)	5.8	24.5	4.9	4.2
Thailand (1972-82)	7.1	24.9	5.7	3.5
Indonesia (1989-97)	7.6	27.5	5.3	3.6
Korea (1970-80)	7.6	27.2	6.0	3.6
Malaysia (1970-80)	7.8	24.8	8.6	3.2
China (1988-98)*	10.8	32.9	6.0	3.0

\* According to Chinese official statistics  
Source: World Development Indicators; McKinsey analysis

**MAIN INDIAN SOCIO-ECONOMIC INDICATORS**

	<u>1980-81</u>	<u>1990-91</u>	<u>1999-2000</u>
• Poverty (%)*	44.5 (1983)	38.9 (1987)	26
• Life expectancy (years)	50.4	58.7	63**
• Population growth rate (%)	1.9	1.9	1.64
• Household size (#)			5.5
• Literacy (%)	30	39.3	54

\* Defined as the share of population below the poverty line defined by around 2,500 calories of food intake per capita per day

\*\* For 1995

Source: Economic Survey, 1995-96, Statistical Outline of India, India Human Development Report

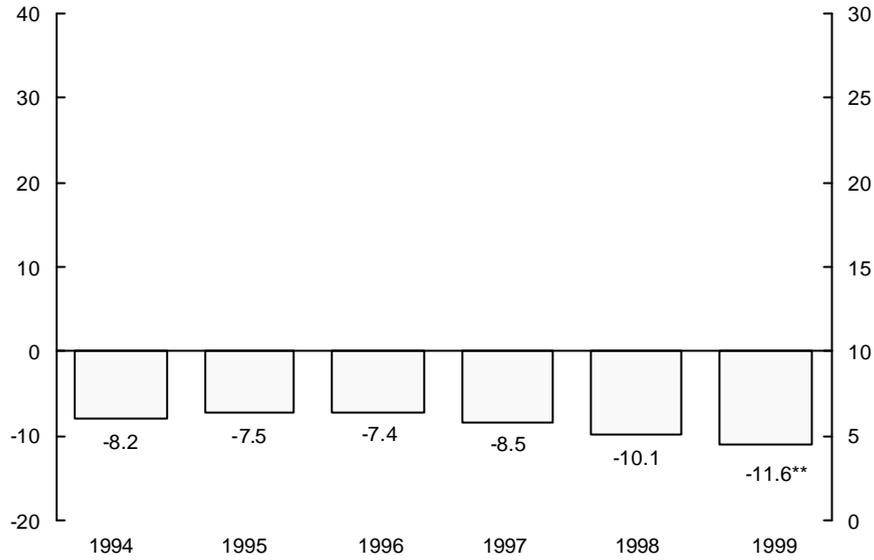
**REAL INTEREST RATES AND INFLATION IN INDIA, 1991-99**

Per cent



Source: CMIE (Monthly Review of the Indian Economy, November 1999); Reserve Bank of India (Annual Report 1998/99)

**EVOLUTION OF CONSOLIDATED\* INDIAN FISCAL DEFICIT**  
Per cent of GDP

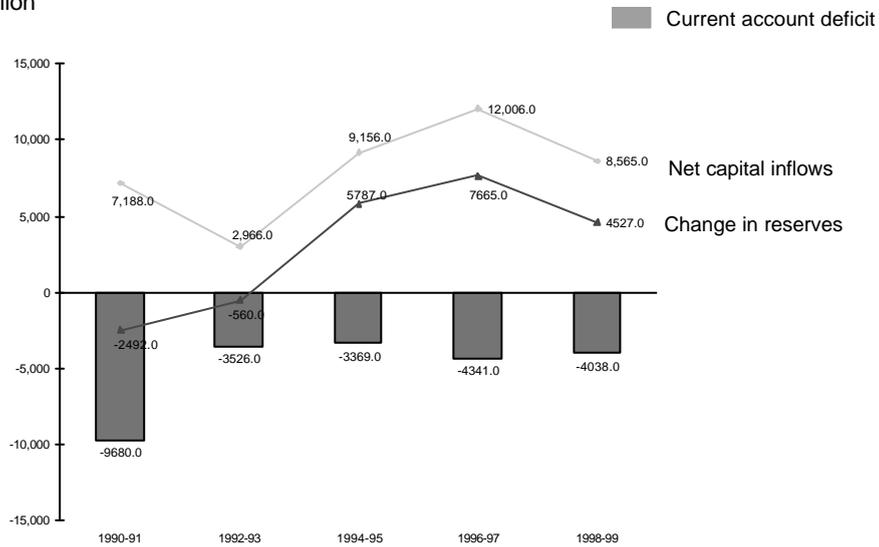


\* For both centre and state governments

\*\* Including the power sector losses

Source: CSO; Government of India Budget documents; CMIE

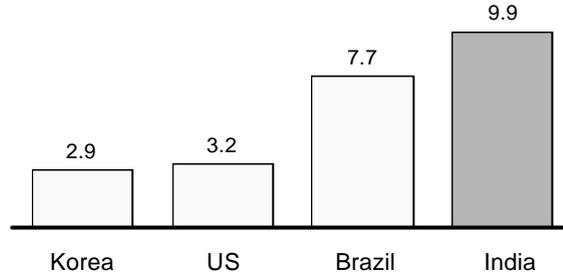
**CURRENT ACCOUNT BALANCE, CAPITAL INFLOWS\*, AND FOREIGN EXCHANGE RESERVES, 1990-98**  
US\$ million



\* Also includes changes in IMF deposits and an adjustment for errors

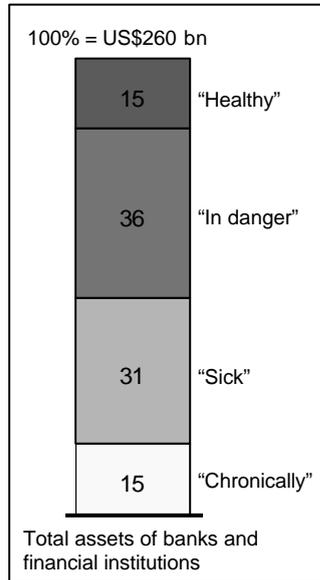
Source: RBI Annual Report

**INTERNATIONAL COMPARISONS OF BANKING OPERATING COSTS, 1997**  
Per cent of total banking assets



Source: CMIE; Team analysis

**PERFORMANCE OF INDIAN BANKS, MARCH 1998**  
Per cent of assets



**Performance criteria**

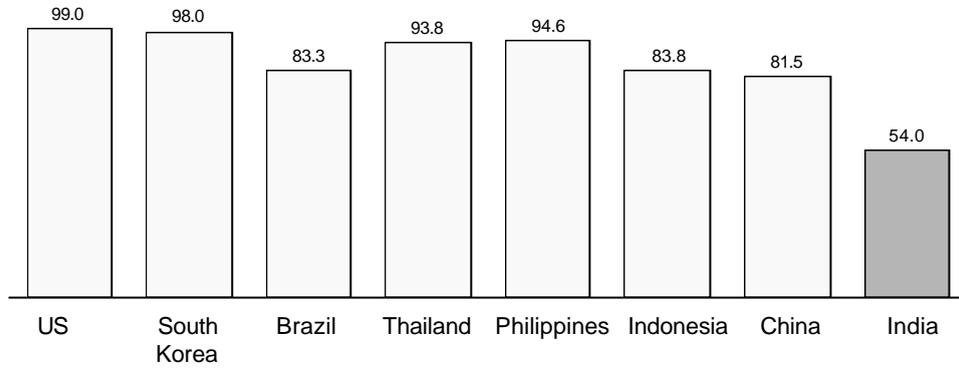
**Number of players**

- Profitable for last 3 years
- Non-performing assets <5%
- CAR >12%
- ROA >1.5%
  
- Non-performing assets 5 - 9%
- CAR >10%
- ROA >1%
  
- Non-performing assets >9%
- CAR <10%
- ROA <1%
  
- Non-performing assets >10%
- ROA <0.5%
- CAR <10%

- 5 banks
- 1 financial institution
- 75% of foreign banks
  
- 20 banks
- 4 financial institutions
- 25% of foreign banks
  
- 11 banks
- 2 financial institutions
- 50% of state co-op banks
- 50% of state-level banks
- 30% of NBFCs
  
- 8 banks
- 1 financial institution
- 50% of state co-op banks
- 50% of state-level banks
- 40% of NBFCs

Source: McKinsey Financial Sector Restructuring project, 1999

**CROSS-COUNTRY COMPARISONS OF LITERACY RATES, 1998**  
Per-cent



Source: Economic Intelligence Unit

**INDUSTRY DE-LICENSING IN 1991 REFORMS**

**From...**

Pre 1991

- Government license needed for new investment in greenfield or expansion
- 850 items reserved for exclusive production by small-scale industry

**...to**

Key reforms

- Licensing abolished for all but 9 sectors
- Exemption permitted in export-oriented industries
- 836 items remain reserved

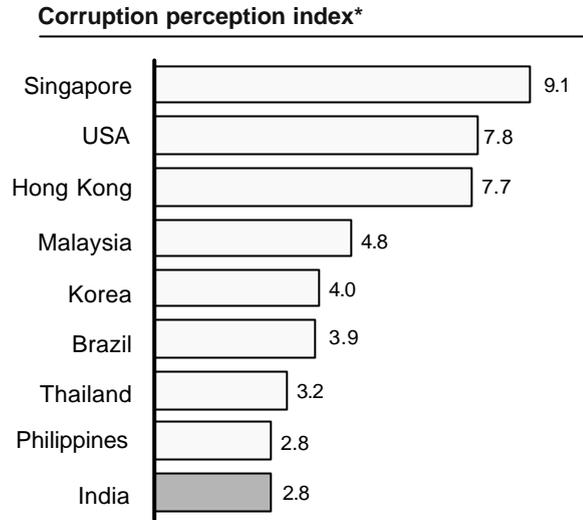
**Current licensing requirements**

- Coal and Lignite
- Petroleum (non-crude) and its distillation products
- Distillation, brewing of alcoholic drinks
- Sugar
- Liquor and cigarettes (of tobacco and manufacture tobacco substitutes)
- Hazardous chemicals
- Electronic aerospace and defence equipment
- Industrial explosives
- Drugs and pharmaceuticals

\* Defined as units with < Rs.3 crore of investment, exemption of >50% exported

Source: Confederation of Indian Industry, Annual Report; Press clippings

### INTERNATIONAL COMPARISONS OF CORRUPTION LEVELS, 2000

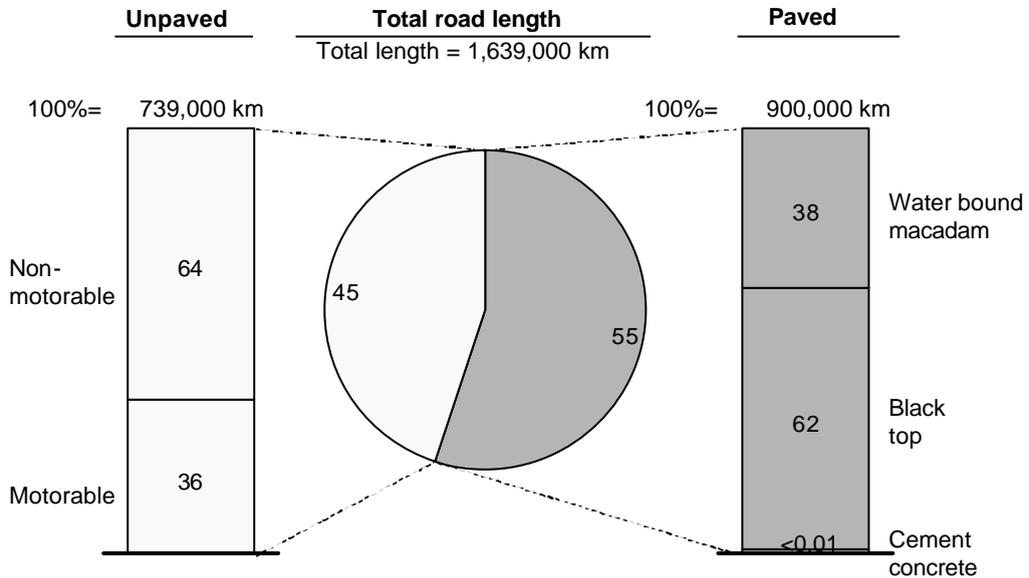


\* Relates to perceptions of the degree of corruption as seen by business people, risk analysts, and the general public, and ranges between 10 (highly clean) and 0 (highly corrupt).

Source: Transparency International ([www.transparency.org](http://www.transparency.org))

### INDIAN ROAD QUALITY, 1996

Per cent

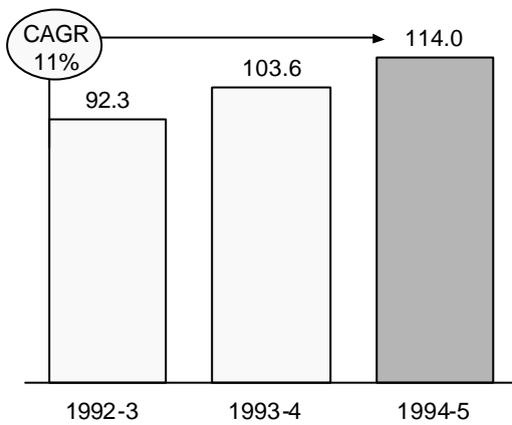


Source: The India Infrastructure Report

### POOR CONDITIONS OF INDIAN PORTS

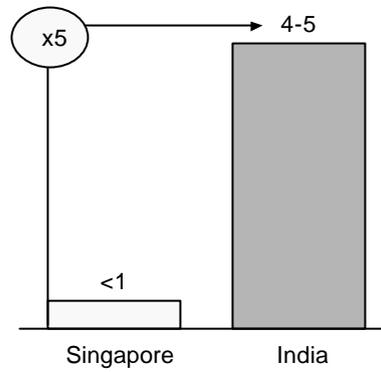
#### Capacity utilisation of major Indian ports\*

Per cent



#### Average waiting time at berth

Days per ship



\* Major ports comprise Calcutta, Haldia, Paradip, Vizag, Madras, Tuticorin, Cochin, Mangalore, Marmugao, Mumbai, Kandla, JNPT

Source: The Indian Infrastructure Report

# India's Growth Potential

India can achieve the target GDP growth of 10 per cent a year by raising its labour and capital productivity. Productivity gains through more efficient processes and more product and service innovations are the key source of growth.

In the last chapter, we presented our assessment of India's labour and capital productivity performance and employment generation potential based on 13 case studies and drew implications for India's growth. In this chapter, we extrapolate our findings and the corresponding implications for these 13 sectors to the overall economy (*see Appendix 5A* for a detailed discussion on the methodology used for extrapolation).

We show that India has the potential to improve both labour and capital productivity (**Exhibit 5.1**) if economic reforms are accelerated. This conclusion is based on the implications that removing the barriers to productivity growth will have for India's growth, as identified in our 13 case studies (*see Appendix 5B*). To summarise:

- ¶ If the current slow pace of reforms continues, India will only be able to maintain GDP growth at around its current 5.5 per cent. The Indian economy will not be able to absorb the expected surge in the workforce, which will lead to an increase in idle hours in agriculture from 36 per cent to 45 per cent of economy-wide employment.
- ¶ If all barriers to productivity improvement are removed, India can achieve around 8 per cent growth in labour productivity, which will translate into a 10 per cent growth in GDP. To translate the productivity gains into a higher aggregate output, India will have to invest in new capacity that will create high productivity jobs.
- ¶ Contrary to the commonly held belief that a total investment rate of 35 per cent of GDP is needed for 10 per cent growth in GDP, we believe that an increase to 30 per cent from the current 24.5 is necessary for India to achieve the 10 per cent GDP growth target. Capital productivity in the sectors can be increased by around 50 per cent through a 20 per cent improvement in capacity utilisation and a 30 per cent improvement in the cost per unit of capacity. This increase will, however, be offset by a reduction of around 15 per cent in overall capital productivity due to a shift in output towards the capital intensive modern sectors. Average capital productivity will thus show a net increase of around 30 per cent.

- ¶ The 30 per cent investment rate is well within India's reach. The additional investment of 5.7 per cent of GDP required to grow at 10 per cent will be funded from two sources. First, removing barriers to productivity and investment will increase FDI from its current 0.5 per cent of GDP to 2.2 per cent. Second, increased domestic savings mainly through a reduction in the consolidated budget deficit will finance the remaining 4 per cent of investment.
- ¶ With complete reforms, India will be able to more than double its current growth rate while creating 75 million jobs outside agriculture and therefore absorbing the new young people entering the workforce over the next 10 years. Our case studies show that India's expected skill profile will be able to support high growth.
- ¶ Quantifying the barriers to growth in India indicates that around half of India's growth potential can be achieved by removing product market barriers. This will contribute as many as 2.3 percentage points to growth. Removing land market barriers and eliminating government ownership will increase growth by 1.3 per cent and 0.7 per cent respectively. Labour reforms and infrastructure investments will contribute 0.2 per cent and 0.1 per cent respectively.

### **INDIA'S OUTPUT AND EMPLOYMENT PROSPECTS ARE LIMITED IF REFORMS ARE NOT ACCELERATED**

If the current slow pace of reforms continues, India's GDP will grow at around 5.5 per cent a year due to slow productivity growth and decreasing employment per capita (**Exhibit 5.2**). Labour productivity will grow at around 4.9 per cent a year (**Exhibit 5.3**), driven by small productivity increases in the modern sectors due to organisational improvements stimulated by deregulation in some sectors. Productivity in agriculture will grow at around 4 per cent a year because of continued mechanisation and yield improvements through better extension services and diffusion of best practices in farming.

#### **Employment will not increase enough to absorb expected growth in workforce**

If barriers to productivity growth are not removed, the Indian economy will not be able to absorb the substantial increase (around 2.2 per cent a year) that is likely to take place in the workforce over the next 10 years. The current demographic profile and mechanisation trend in agriculture will inevitably increase underemployment in India (*see* Volume I, Chapter 3: Current Perspectives on India's Economic Performance). Although the population will grow at 1.5 per cent a year, the entry of young people into the workforce will cause it to expand by 2.2

per cent a year. In addition, the existing underemployment in agriculture is likely to increase as current mechanisation trends in agriculture continue.

Without further reforms, this demographic change will increase underemployment in agriculture to 45 per cent of total employment by 2010 (**Exhibit 5.4**). At present, around 36 per cent of the economy's official employment (i.e., 56 per cent of official agricultural employment) consists of idle time. In future, population growth and the increase in the working age population could raise idle hours to 50 per cent of total employment. Continuing mechanisation in agriculture will further displace workers, increasing idle hours to 51 per cent. Although output growth in the transition<sup>1</sup> and modern sectors will create jobs, this will only absorb 5.8 per cent of employment, leaving idle hours in 2010 at around 45 per cent of total employment.

### **INDIA'S LABOUR PRODUCTIVITY CAN GROW AT 8 PER CENT IF ALL BARRIERS ARE REMOVED**

If all productivity barriers are removed, India's labour productivity can rise from the current levels of 4.9 per cent a year to 7.9 per cent. This result is derived from extrapolating our case findings to the overall economy. This high productivity growth will primarily be achieved in the modern sectors, which will take advantage of better organisational practices and economically viable investments (**Exhibit 5.5**). Our case studies provide detailed arguments and estimates on the productivity improvement potential as explained in the previous chapter.

#### **Productivity in the modern sectors could grow at 11 per cent**

Labour productivity in the modern sectors can grow at around 11 per cent per year from the current 15 per cent of US levels to 43 per cent in 2010 (**Exhibit 5.6**). As mentioned in the previous chapter, most of the productivity improvements will come from rationalising workforces, improving the organisation of functions and tasks and investing in viable assets. For example:

- ¶ Reforms in the steel industry can increase labour productivity from its current 11 per cent of US levels to 78 per cent in 2010. Privatisation and the lowering of import duties will increase competition among large steel players and force them to rationalise labour and streamline workflow. Similarly, controlling tax evasion and energy theft will force sub-scale and under-utilised mini-mills to exit and allow cheaper productive players to gain market share.

---

<sup>1</sup> These sectors typically provide goods of lower quality than their modern counterparts (e.g., mud houses as opposed to modern brick houses) to cater to groups that cannot afford the higher quality goods produced by the modern sector.

- ¶ In dairy processing, removing subsidies for cooperative and government-owned plants as well as MMPO (Milk and Milk Products Order) restrictions will increase productivity almost three-fold from 16 per cent to 46 per cent of US levels in 10 years. Increased competitive pressure coupled with removal of subsidies will force cooperatives and public dairy plants to reduce excess workers and improve organisational practices. Moreover, the entry of private players will facilitate the diffusion of best practices, which will reduce seasonal milk fluctuations and increase capacity utilisation in the flush season.
- ¶ In the telecommunications sector, privatisation of operators and a more stable regulatory framework administered by an empowered regulator will allow providers to increase their productivity from the current 25 per cent to the potential 100 per cent of US levels. The entry of new operators and increased choice for consumers will induce managers to rationalise labour and invest in automated repair and maintenance equipment. These practices will lower the operators' labour costs as well as improve the quality of service.
- ¶ Allowing FDI and removing land market barriers will allow retail supermarkets to increase productivity more than four-fold from the current 20 per cent to almost 90 per cent of US levels in 10 years. Removing restrictions on FDI and land ownership as well as levelling taxes across formats will enable the diffusion of retail best practices and enable the restructuring of the retail supply chain. High productivity will allow supermarkets to lower prices below those of counter stores, thereby gaining market share.

### **Productivity growth in agriculture and transition sectors will be limited**

Even if all barriers are removed, productivity in agriculture will grow at only 5 per cent a year while productivity in the transition sectors will remain at current levels. The scope for mechanisation in agriculture will remain limited for the foreseeable future.

- ¶ **Removing barriers in agriculture will allow productivity to grow at 5 per cent mainly because of yield improvements:** In dairy farming, disseminating improved farming practices will ensure an increase in yields. In wheat, the scope for yield improvements and productivity improvement lies mainly in improving extension services and increasing the use of tractors from the current 60 per cent of total land to 90 per cent in 10 years.
- ¶ **Further mechanisation in agriculture (e.g., switching to combine harvesters) will not be economically viable for the next 10 years at least:** Currently, underemployment in agriculture keeps average incomes

in rural areas low. Agricultural wages increase only during the harvesting and sowing seasons when the greater need for labour absorbs virtually all the underemployed workers in rural areas (**Exhibit 5.7**). As the economy grows, underemployed agricultural workers will migrate to transition jobs where average wages are high enough to compensate for their forgone average agricultural income as well as travel costs to urban areas. Initially, these workers will return to their villages to help in harvesting and sowing to earn higher peak season agriculture wages. This return of transition labour eases the pressure on peak season agricultural wages and limits the scope for mechanisation.

In the long run, as demand for transition products and services increases, transition workers will return less often to their villages during peak season. The resulting labour shortage will increase agricultural wages over time and enable mechanisation in the form of combine harvesters and automatic milking parlours. As seen in Thailand, the use of combine harvesters in agriculture occurs only when countries have reached a per capita income four times higher than India's current level. India's per capita income will not reach this threshold level till 2010.

- ¶ **Labour productivity in the transition sectors is limited at around 7 per cent of US levels:** Although currently higher than in agriculture, productivity in the transition sectors is inherently low due to the crude materials (e.g., mud housing), primitive technology (e.g., *chakkis* and tailors), and rudimentary business formats (e.g., street vendors and rural counter stores) used. In most of our case studies, the transition sectors have already achieved their productivity potential in India.

## **TOTAL INVESTMENT RATE OF 30 PER CENT CAN YIELD 10 PER CENT GDP GROWTH RATE**

Achieving India's GDP growth potential will require investments in additional capacity. High productivity growth in the modern sectors will involve rationalising excess labour, improving organisation of the workforce and investing in viable mechanisation. To translate the productivity gains into a higher aggregate output, India will have to invest in new capacity that will create high productivity jobs.

Most people believe that India will require at least 35 per cent investment rate to achieve a 10 per cent GDP growth. However, our findings show otherwise. If all the barriers to productivity growth are to be lifted, India's investment rate will need to increase from its existing 24.5 per cent to only 30.2 per cent to achieve the 10 per cent GDP growth potential. We have found that barriers that hinder capital productivity improvements are the same as those that hinder labour productivity growth. Hence, we do not need to make a separate effort to improve capital productivity. Higher capital productivity will allow India to sustain a given growth

with lower investment levels. As a result, labour productivity will grow at around 7.9 per cent, roughly maintaining current employment split across sectors. Given the expected increase in the workforce of 2.2 per cent a year, this productivity increase will result in a GDP growth of around 10.1 per cent a year.

These requirements are based on the investment estimates for each of our 13 case studies, which incorporated the capital productivity improvement resulting from the removal of productivity barriers. We then took these case level estimates and extrapolated them to reflect a figure for the overall economy, taking into account the output mix evolution that would result from a removal of the barriers. The output mix evolution is the key to estimating overall investment as each sector has different capital requirements per unit of output.

The additional investment of 5.7 per cent of GDP required to grow at 10 per cent will be funded from two sources. First, removing barriers to productivity and investment will increase FDI and allow India to sustain the resulting increase in its current account deficit of 1.7 per cent of GDP. Second, increased domestic savings mainly through a reduction in the consolidated budget deficit will finance the remaining 4 per cent of investment.

### **India's capital productivity in sectors can increase by 30 per cent**

India's capital productivity can increase by around 30 per cent if all productivity barriers are removed (**Exhibit 5.8**). Capital productivity at the sector level will increase by around 50 per cent due to a 20 per cent improvement in capacity utilisation and a 30 per cent improvement in the cost per unit of capacity. At the same time, output will shift towards the modern sectors, reducing overall capital productivity by around 15 per cent. Taking both effects into account, the average capital productivity will show a net gain of around 30 per cent.

At the sector level, capital productivity has two components: The first is capacity utilisation, which is the degree to which equipment and buildings are used during the production or service delivery process. The second is capacity created with assets, which is an indicator of the cost per unit in putting up the equipment and buildings in the first place. Indian companies can improve on both aspects.

¶ **Capacity utilisation:** On average, the capacity utilisation of Indian plants is at least 20 per cent lower than that of plants in the US (**Exhibit 5.9**). Capacity utilisation could be improved in the following ways:

- In the steel industry, players should exit from small mini mills and invest in well-utilised large mills.
- In dairy processing, replacing nondescript cows with crossbred cows and buffaloes will increase the utilisation of processing plants in summer.

- In wheat milling, *chakkis* (primitive flour mills) in rural India can improve their capacity utilisation by 4 per cent every year, the rate of growth in wheat output.
  - Better maintenance of plants and better sourcing of coal will increase utilisation in power generation plants.
  - In retail and retail banking, improved management and economic growth will lead to higher throughput and increase the utilisation of equipment and buildings (such as Point of Sale machines in supermarkets, computers in bank branches).
- ¶ **Capacity created with assets:** Capacity created with assets is typically around 30 per cent lower in India than in the US. This means that Indian plants are typically costlier by 30 per cent than US plants of the same capacity. This is after taking into account the decrease in capital productivity because of the increased substitution of capital for labour as managers invest in viable equipment in response to increasing wages. Several factors are responsible for India's lower capacity created with assets, as described below (**Exhibit 5.10**).
- **Time and cost overruns:** Most Indian steel and power plants have time overruns of 1 to 2 years. Government ownership and lack of competition mean that managers face little pressure to monitor construction costs and completion times. At the prevailing debt to equity ratio of around 1.5 for such projects, this delay translates into an increase in interest cost equal to 10-15 per cent of the total cost of operators.
  - **Over-invoicing of equipment:** At some plants in India, plant equipment is over-invoiced to misappropriate money from projects. In private plants, over-invoicing is possible because of a lack of pressure from the main shareholders and lenders, typically government-owned banks and insurance companies. In government-owned companies, over-invoicing happens because of poor corporate governance. The cost to projects from such overpayments ranges from 5 to 10 per cent.
  - **Over-engineering of plant and machinery:** Instead of following a standardised blueprint, Indian power generation companies typically design each plant individually, leaving ample scope for over-engineering. This practice is also common in fertilisers and petroleum refining where the rate of return is linked to the capital invested.
  - **Low scale and outdated technology:** Sub-scale steel mini-mills, which cost more to build on a per ton basis, are able to compete with large plants by evading taxes and energy payments. While US plants have an average scale of 10.2 million tons per annum (mtpa), Indian

plants have an average scale of 4.1 mtpa. Low scale leads to a difference in capital cost of around 4 per cent. Similarly, petroleum refineries in India are typically smaller in scale than in the US.

In the apparel sector, outdated domestic apparel plants are shielded from competition by entry restrictions on foreign best practice players. Similar penalties arising from outdated technology apply to Indian plants in other sectors as they typically use technology that is at least one generation behind that of the US. The effect of this could increase plant costs by as much as 2-3 per cent.

### **Shift in output mix towards modern sectors will decrease capital productivity by 15 per cent**

An output shift towards the modern sectors, resulting from complete reforms, will significantly decrease India's capital productivity. Modern sectors are typically more capital intensive than are transition and agricultural sectors. Therefore, an increase in the output mix towards the former will decrease India's capital productivity from the current average at the sector level. To illustrate this point, applying Korea's relative capital productivity across sectors to India's expected output mix shows that the output shift can reduce India's capital productivity by around 15 per cent (**Exhibit 5.11**). However, this decrease in overall capital productivity is significantly smaller than the expected 50 per cent improvement at the sector level described earlier.

If all barriers are removed, the output mix will shift towards modern sectors, which will increase total output from today's 47 per cent to 69 per cent by 2010.

#### **Estimating output growth**

We have followed two steps in estimating output growth. First, we estimated domestic consumption from international benchmarks. Second, we adjusted the output growth from domestic consumption to reflect India's increased export potential if all productivity barriers were removed.

Estimates for domestic consumption are derived from case level international benchmarks. Since consumers tend to have similar consumption patterns across countries for a given GDP per capita, we have used "penetration curves" to estimate the relationship between GDP per capita and physical consumption in each sector. To arrive at the output growth for the modern sectors, we have deducted the expected demand for transition goods and services in every case. To estimate output of transition sectors, we have used the evolution of transition employment in Thailand from 1970 to 1990 to estimate future output growth in India (**Exhibit 5.12**). Given that the productivity of this sector is not expected to grow in the future, output growth will directly translate into employment growth.

Finally, once we estimated the output evolution at the sector level, we scaled up these results to estimate output growth for the overall modern sectors.<sup>2</sup>

The domestic output mix is adjusted to account for India's export potential in the future. Indian exports will grow from the current 10.8 per cent of GDP to around 15 per cent, mainly due to growth in the export of manufacturing goods and business services, including software and remote services.

In contrast to the modern sectors, output in the agriculture and transition sectors will lag behind GDP growth.

- ¶ Agricultural output will grow at 4 per cent to meet the expected demand increase. Output growth in agriculture takes place mainly through yield improvements. Our observation in the wheat and dairy farming sectors is that yield will improve as a result of the dissemination of better farming practices and improved irrigation. Increases in exports will be limited and restricted mainly to cash crops such as tea and coffee.
- ¶ Output in the transition sectors will grow at around 6 per cent. Growth in transition output will be driven by higher incomes in the economy. The increased purchasing power of low-income groups will result in a greater demand for transition goods and services. For example, low-income groups that were previously producing their own food and housing will now buy from street vendors and from builders in the relatively inexpensive, unorganised sector. Furthermore, higher income classes will also have a greater need for transition services such as domestic help and other personal services such as laundry and ironing.

### **Business investment rate will increase to 22 per cent**

Total investment can be decomposed into business and non-business (e.g., health and education) investment. Currently, India's total investment rate of 24.5 per cent of GDP is the result of 17.5 per cent of business investment and 7 per cent of non-business investment.

If all barriers to productivity are removed, India's business investment rate will grow from the current 17.5 per cent to 22 per cent of GDP in order to absorb labour reallocated within the modern sectors and to realise India's 10 per cent GDP growth potential. The modern sectors will remain the key drivers of this increased investment (**Exhibit 5.13**).

Our estimates of the investment requirements in the 13 sectors we have studied and scaled up to the overall economy (**Exhibit 5.14**), which take into account the

---

<sup>2</sup> For more detail see **Appendix 5B**: Methodology for extrapolation.

capital productivity improvement potential, show that business investment must increase by at least 4.5 per cent.

Our projected increase to 22 per cent in the business investment rate is consistent with the overall trends in capital productivity and output. As we have said, India's overall capital productivity can be increased by around 30 per cent through improved capacity utilisation and capacity created with assets, and taking into account the expected output mix towards modern sectors. In turn, this improvement in capital productivity will translate into a decrease in the business investment per unit of output of around 30 per cent (**Exhibit 5.15**).

### **Non-business investment will also increase**

Although our case-level findings show that transport infrastructure is not a constraint to productivity growth, India has fallen behind on its investment in infrastructure and health and education as well as private housing compared to other benchmark developing countries such as Thailand and Brazil. As a result, we are including in our estimates an increase in non-business investment to bridge this gap.

The increased investment in transport infrastructure, from the current 2.2 per cent of GDP to 4.2 per cent, will be directed mainly towards making targeted improvements to existing transport infrastructure and housing (**Exhibit 5.16**).<sup>3</sup>

- ¶ Investment in roads will need to increase from 1 per cent of GDP to 2.2 per cent in order to widen and refurbish India's highways and major roads.
- ¶ Investment in ports can continue at the current level of 0.1 per cent of GDP but must be better targeted. Less focus on building new berths and terminals and more attention to removing bottlenecks in existing capacity will create sufficient port capacity for India's future trade demands. In addition, existing capacity can be better used by reducing red tape and bureaucracy in customs, thus contributing to faster ship turnaround.
- ¶ Investment in airports will increase from 0.4 per cent of GDP to 0.5 per cent to fund the required increase in passenger throughput capacity. This includes larger terminals as well as sophisticated air traffic control equipment to increase the take off and landing rate.
- ¶ Investment in urban infrastructure will increase from 0.7 per cent to 1.4 per cent of GDP. Most of this investment should be directed to water, sewerage and roads in city suburbs in order to increase the availability of developed land for construction and retailing.

---

<sup>3</sup> See **Appendix 5E**: Required infrastructure investment.

The government will also increase its investment in education and health from 0.7 per cent to 1 per cent, mainly in the form of equipment and buildings. Although we did not find education to be a constraint to India's current growth potential, faster growth in the future will hinge on adequate investment in the sector. Furthermore, the social value of better education and improved health is now recognised. Better education allows citizens to capture economic opportunities, make better choices and participate productively in a democratic system.<sup>4</sup>

Besides investing in health and education, we also include in our estimates an increase in the current spending on health and education by 1 per cent of GDP, mainly for better salaries for teachers and doctors<sup>5</sup> (see section on the evolution of the government deficit). For a rapidly growing GDP, this implies increasing the overall spending in health and education more than five-fold.

Finally, reforms in the construction sector will also boost private investment in housing from 1.6 per cent to 3 per cent of GDP. Increased competition in housing construction and removal of land market distortions will drive down housing prices and increase the square metres of construction per capita in India to reach international benchmarks (*see* Volume III, Chapter 1: Housing Construction for details on the evolution of this sector).

### **India will invest more efficiently than most fast growing Asian countries**

If all productivity barriers are removed, India will invest more efficiently than most fast growing Asian countries (**Exhibit 5.17**). First, it will need to invest more than other Asian countries (except China) did when they were at India's stage of development. Second, India will need to ensure more efficient allocation and use of capital to attain close to best practice capital productivity. In fact, the investment to GDP growth ratio should be higher than that observed in all other Asian countries.

### **REQUIRED INVESTMENT RATE IS WITHIN REACH**

If all barriers to productivity growth are removed, the required 30 per cent investment rate and hence the 10 per cent GDP growth potential will be within India's reach. The additional investment of 5.7 per cent of GDP required to grow at 10 per cent will be funded from two sources. First, the increased inflow of FDI will allow India to sustain the resulting increase in the current account deficit of

---

<sup>4</sup> For a discussion on India's past performance in health and education and their impact on the country's social development *see* *India: Economic Development and Social Opportunity* by Amartya Sen and Jean Dreze, Oxford University Press, 1995.

<sup>5</sup> These estimates are based on international benchmarks for teachers and doctors per capita in India vis-à-vis other developing countries.

1.7 per cent of GDP. Second, increased domestic savings resulting mainly from a reduction in the consolidated budget deficit will finance the remaining 4 per cent of investment (**Exhibit 5.18**).

### **Increased FDI will finance 1.7 per cent of GDP of additional investment**

If India removes all barriers to productivity improvement and growth, FDI will certainly increase. This increase will fund additional investment to the tune of 1.7 per cent of GDP, though absorbing this FDI without putting pressure on the exchange rate will require an increase in the current account deficit. This is sustainable because of the higher imports stemming from higher investment in upgrading existing capital stock and installing new capacity.

The current account deficit will grow from the current 1.1 per cent of GDP to nearly 2.8 per cent over the next 10 years (*see Appendix 5C*). Although exports and invisibles (e.g., tourism) will increase, imports will grow faster. Exports will grow by 5 per cent of GDP, from the current 10.8 per cent to 15.8 per cent mainly through software exports, remote services and exports in selected manufacturing sectors such as apparel and textiles. Imports will grow by 7.4 per cent of GDP primarily due to greater imports of capital goods for upgrading existing equipment and installing new capacity. Finally, the increase in the inflow of invisibles will also increase by 0.7 per cent from 1.7 per cent to approximately 2.4 per cent of GDP owing mainly to increased earnings from tourism.

With complete reforms, India could increase its FDI inflow from 0.5 per cent of GDP in 2000 to at least 2.2 per cent by 2010. This will bring India closer to the FDI levels of other developing countries (**Exhibit 5.19**). In fact, the potential is as high as 4-5 per cent of GDP but from a current account deficit perspective we can absorb 2.2 per cent. This FDI can be attracted in any of the three sectors: domestic sector, export-oriented sector or through privatisation. Further, the barrier that prevents productivity and output growth also prevent FDI inflows.

The main reforms needed are the removal of product market barriers and arbitrary enforcement, removing restrictions on foreign ownership and the elimination of government ownership. This will encourage the entry of best practice players. For example, allowing FDI in retail and enforcing taxes uniformly on all players will encourage best practice retail players to enter the Indian market just as they have done in China and Poland. In turn, these large retail players will attract foreign food processing companies, thereby bringing in additional FDI.

### **Increased domestic savings will finance remaining 4 per cent**

Removing productivity barriers will also increase domestic savings enough to finance the remaining 4 per cent of GDP for investment. Currently, India's gross domestic savings of 24.5 per cent of GDP are below the levels achieved in other developing countries. Following the removal of productivity barriers, we expect

India's domestic savings to increase to around 27.4 per cent of GDP, a level achieved by other Asian countries at similar GDP per capita levels (**Exhibit 5.20**).

Domestic savings will rise in three ways:

- ¶ First, removing barriers to productivity growth will shrink the consolidated budget deficit, a key factor in the current low levels of domestic savings by at least 4.9 per cent (*see Appendix 5D*). Such measures as rationalised taxation, better tax enforcement, less power theft and higher user charges will directly improve the balance of both central and state governments. Expenditure can be reduced by around 2.3 per cent of GDP by privatising government-owned companies and reducing losses in the power sector as well as using the proceeds of privatisation to alleviate interest charges on public debt. Similarly, government receipts can be increased by around 2.6 per cent of GDP by levelling excise duties and increasing property tax collection and user charges.
- ¶ Second, reforms will make investment more attractive, encouraging companies to reinvest profits and expand their productive businesses.
- ¶ Third, higher incomes and improved returns on savings will give individuals more incentive to increase personal savings.

## **RESULTING EMPLOYMENT GROWTH WILL ABSORB EXPECTED SURGE IN WORKFORCE**

With complete reforms, India will be able to more than double its current growth rate while creating 75 million jobs outside agriculture and, thereby, absorbing the young people entering the workforce over the next 10 years. Our case studies show that India's expected skill profile will suffice to support high growth.

### **Additional new jobs will absorb increase in the workforce**

Besides raising GDP growth from 5.5 to 10 per cent a year, removing barriers to productivity growth will also enable the Indian economy to absorb the substantial increase in the workforce that will take place over the next 10 years (**Exhibit 5.21**). We believe that complete reforms will create 75 million new jobs outside agriculture and prevent underemployment in agriculture from growing.

Our employment estimates are derived from our productivity and output estimates at the case study level, including our benchmark of employment growth from the experience of Thailand. As mentioned in the previous sections, productivity growth estimates are derived from our quantification of the productivity gap as well as our assessment of how fast this gap can be closed. Output growth at the sector levels is obtained by summing domestic consumption growth derived from

the “penetration curves” and the output growth that would come from exports. These productivity and output growths at the case level are then scaled up for the overall economy to obtain average productivity growth, GDP evolution by sector and, hence, employment evolution by sector.

The estimated output and employment evolution by sector is consistent with the experience of Thailand in 1992, when it was at the same stage of development that India will be at 10 years from now (**Exhibits 5.22 & 5.23**).

As we have said, the current demographic profile and growing productivity in agriculture are likely to exacerbate underemployment in agriculture unless sufficient jobs are created by the transition and modern sectors. Although the population will grow by 1.5 per cent a year, the entry of young people into the workforce will cause an overall annual increase of 2.2 per cent in the workforce. Moreover, productivity growth in agriculture will release around 8 million jobs, reducing the share of (full time equivalent) employment in agriculture from the current 28 per cent to 21 per cent in 2010. As a result, an additional 75 million jobs will be required to maintain underemployment at current levels and keep the share of idle hours to 36 per cent of total employment (i.e., 56 per cent of official employment in agriculture).

This employment challenge can be met only if India unleashes growth in the modern and transition sectors through productivity-enhancing actions (**Exhibit 5.24**). In the modern sectors, this will create around 32 million jobs while the transition sectors will create an additional 43 million jobs. As a result, these sectors will be able to absorb the expanding workforce as well as the workers displaced from productivity improvements in the modern sectors.

### **India has sufficient aggregate labour skills to achieve 10 per cent GDP growth**

The current evolution of skills in India will be sufficient to support the 10 per cent GDP growth required for the next 10 years. Although additional skills are required to sustain higher GDP growth, our findings show that most of these skills can be acquired on the job. As a result, we did not find low literacy rates (*see* Volume I, Chapter 4: Synthesis of Sector Findings) to be a constraint on productivity growth in the sectors we studied. Moreover, most of the new jobs will be created in sectors such as construction and retail, which require relatively lower skills than sectors like banking and software.

Accounting for the retirement of existing workers, India will require an additional 2 million skilled and 51 million semi-skilled workers over the next 10 years (**Exhibit 5.25**). To sustain a 10 per cent GDP growth rate, the modern sectors will need to employ 36 million skilled and 90 million semi-skilled workers in 2010. These estimates are based on our extensive interviews and findings in the case studies and scaled up to the overall modern sector (**Exhibit 5.26**). Sectors such as

construction and retail can achieve best practice productivity levels even with relatively less literate workers. Moreover, high school graduates could fill blue-collar jobs in manufacturing plants.

Graduates will be required only in top-level managerial positions in manufacturing and in high value added services such as banking and software. Interestingly, given the current workforce profile, most of these jobs will be filled by existing young workers who will still be active in 2010.

India's educational system will be able to close the expected skill gap. Even at current supply trends, India's educational system will provide an additional 30 million skilled and 105 million semi-skilled workers, which is well above the estimated requirements (**Exhibit 5.27**). This "excess" of skills is also a feature of India's current performance, with current employment already skewed towards higher skills than required. As we found in our case studies, skilled graduates are often found performing low skill jobs.

We found a similar result when we tested the availability of specialised engineering skills for manufacturing and software services. Despite the increased sourcing of software professionals by companies in developed markets, the recent growth in the number of graduates from Indian engineering schools is likely to be sufficient to meet the needs of a high growth economy over the next 10 years (**Exhibit 5.28**).

## **RELATIVE IMPORTANCE OF DIFFERENCE BARRIERS TO OUTPUT GROWTH**

Around half of India's additional growth potential will come from the removal of product market barriers. More specifically, of the additional 5 percentage points of GDP growth, the removal of product market barriers will account for as many as 2.3 points. Land market barriers and government ownership are also significant, constraining India's growth by 1.3 per cent and 0.7 per cent respectively. We found that labour market and infrastructure barriers are relatively less significant, restricting India's growth by only 0.2 per cent and 0.1 per cent respectively (**Exhibit 5.29**). This estimate is based on the external barriers to labour and capital productivity analysed in each case study, accounting for the fact that barriers may affect productivity and output differently.

## Appendix 5A: Assessing the barriers to productivity and output growth

In this appendix we explain how we quantified the barriers to productivity growth, using the following three-step process:

- ¶ First, we quantified the external barriers to labour productivity in each case study.
- ¶ Second, in each case, we accounted for the fact that barriers may affect productivity and output differently. We also accounted for the fact that capital productivity barriers may differ from labour productivity barriers.
- ¶ Third, we extrapolated the figures in the case studies to the economy to arrive at the overall quantification of barriers to output growth.

### **QUANTITATIVE IMPACT OF PRODUCTIVITY BARRIERS**

As we have said, we found that product market barriers are the major constraint to labour productivity in most sectors, accounting for 70-90 per cent of the constraint on labour productivity growth. Land market barriers also act as impediments to the growth of the retail and housing construction sectors. In the case of largely government-owned sectors such as power, retail banking, steel and telecommunications, we found that government ownership inhibited labour productivity by limiting the competitive intensity in the industry. This accounted for 70-80 per cent of the constraint on labour productivity. Labour market barriers were found to limit labour productivity only in automotive plants and are relatively less important in most other cases, accounting for less than 10 per cent of the constraint on labour productivity growth (**Exhibit 5.30**).

### **DIFFERENTIAL IMPACT OF BARRIERS TO PRODUCTIVITY AND OUTPUT GROWTH**

Barriers to output may not always have the same relative importance as barriers to labour productivity. For example, in retail banking, one of the biggest barriers to labour productivity growth is the government's ownership of large banks. While these banks employ the majority of the employees in the industry, they are unable to invest in technology and introduce new channels. However, the new private banks are able to do all this and have been growing significantly in market share.

It is, therefore, conceivable that most of the output growth in the future will come from private banks. The most important barrier to output growth in the industry is not government ownership but product market barriers such as interest rate controls and an unsatisfactory judicial system.

In each case study, we have analysed whether barriers to output growth are the same as barriers to labour productivity growth and whether they have the same relative importance in preventing both output growth and labour productivity growth.

As **Exhibit 5.31** shows, in almost all cases, the relative importance of product market barriers increases while that of government ownership and labour market barriers decreases. This is consistent with the fact that greenfield investment or capacity additions contribute most of the output growth in most industries. Both are most hindered by product and land market barriers. For example, in dairy processing, current productivity growth is checked by government ownership of cooperative plants. If product market restrictions such as MMPO licensing were to be removed, we would find that most of the growth in milk processing would come from private entrants.

As we moved from pure labour productivity barriers to output barriers, we also quantified the barriers to capital productivity growth in cases with significant capital investment. We found that, in the power, telecom and steel industries, the barriers to capital productivity were very similar to the barriers to output growth. As before, this corresponds to the fact that a lot of the capital invested in these sectors is likely to be new capacity, the creation of which suffers from the same barriers that affect output growth.

## **EXTRAPOLATING OUTPUT ONLY BARRIERS**

Having quantified the barriers to output growth, we scaled them up to arrive at the weighted average impact of each barrier. This was done by weighting the barriers in each case by the average increase from the “status quo” output expected between 2000 and 2010. Areas such as the automotive sector, where the increase in output between a “status quo” scenario and a “complete reforms” scenario is small, were given a lower weight than sectors such as retail or housing construction, which are likely to witness huge increases in output.

At the aggregate level, barriers that prevent the growth in output of modern sectors are weighted higher than those that affect agriculture or transition because their contribution to overall output growth is much lower. On scaling up, we found that product and land market barriers are four to five times more likely than government ownership to constrain output growth. Labour market barriers and poor infrastructure do not have a significant effect.

## Appendix 5B: Methodology for extrapolation

Our estimates of overall productivity, output and employment are based on the productivity and output estimates for the case studies extrapolated to calculate that for the overall economy. This extrapolation was done in two stages:

- ¶ First, we reclassified Indian non-agricultural output and employment in transition and modern sectors. To do this, we made a detailed examination of employment figures from the 49<sup>th</sup> National Sample Survey round at the 3-digit level of the SIC code. We classified each sub-sector based on information from our case studies as well as expert interviews. For example, we included mud-house construction in the transition construction sector and tailoring and *chakkis* (primitive flour milling) in the transition manufacturing sector. According to this analysis, around 60 million employees (around 15 per cent of total employment) are working in transition sectors in India while 86 million employees (around 21 per cent of total employment) are working in modern sectors (**Exhibits 5.32 & 5.33**).
- ¶ Second, we scaled up productivity and output for each segment.
  - We scaled up productivity and productivity growth by averaging, for each sub-sector, the productivity levels and growth estimates of the following representative sectors:
    - In the transition sectors, tailoring and *chakkis* for manufacturing and street vendors for trade; mud-house construction for transition construction; and tailoring and street vendors for personal services (such as domestic help).
    - In modern sectors, steel for mining and quarrying; steel, automotive assembly, food processing and apparel for manufacturing; telecom for transport, storage and communications; power for utilities; housing construction for construction; retail for trade; banking and software for financial and business services; and public sector banks for government services.
  - We also scaled up output growth by averaging the output growth estimates of the representative sectors. As mentioned earlier, we used “penetration curves” as benchmarks for estimating output growth in the modern sectors. In the case of transition sectors, we used

employment growth in transition sectors in Thailand as a benchmark for output growth potential in India.

## Appendix 5C: Balance of Payments if barriers are removed

If productivity barriers are removed, the current account deficit will grow from the current 1.1 per cent to nearly 2.8 per cent of GDP over the next 10 years (**Exhibit 5.34**), due to an increase in exports, imports and invisible transfers. Exports will grow from the current 10.8 per cent to 15.8 per cent of GDP. Imports will also grow from 13.6 to 21 per cent of GDP, driven primarily by an increase in the import of capital goods and consumption goods. Finally, inflow of invisibles transfers (mainly increased earnings from tourism) will increase from 1.7 per cent to approximately 2.4 per cent of GDP.

### EXPORTS

Although Indian exports have reached 10.9 per cent of GDP by growing at an average rate of 10 per cent a year since 1990, they are unlikely to exceed 16 per cent of GDP by 2010 even if all barriers to productivity growth are removed (**Exhibit 5.35**). This is lower than the export levels of benchmark countries such as China and Thailand (**Exhibit 5.36**). This slow growth is primarily due to the fact that western countries have already outsourced most of their manufacturing to lower wage countries and, therefore, are unlikely to further outsource manufacturing to India. Service exports will grow rapidly but are unlikely to exceed 5 per cent of GDP by 2010.

- ¶ **Agricultural exports:** Agricultural exports could grow from their current level of US\$ 5.4 billion to US\$ 10.1 billion by 2010, an average annual growth of 6.2 per cent. This is close to the past trend of 6 per cent a year, driven mainly by an increase in tea and coffee exports.

Exports of tea and coffee could grow at 7.6 per cent a year. While India already has a significant share of world trade in these products, its share could rise further due to India's growing superiority in quality tea and coffee. Inadequate marketing is the main factor limiting this growth.

Exports of other agricultural products will continue to grow at their current rate of 6 per cent a year. The low growth of the world market means that, to increase exports, India needs to steal market share from competing nations. Given its lack of competitive advantage over other producing nations, this will be difficult to achieve.

¶ **Export of manufactured goods:** Export of Indian manufactured goods could rise from the current level of US\$ 37.8 billion to US\$ 108.2 billion by 2010, an average annual growth of 11.1 per cent compared to the 8 per cent of the past. This modest growth will be driven mainly by an increase in the export of apparel and allied products (textiles, shoes and leather), toys and electronics. However, India will not witness the export boom experienced by other South East Asian countries through the outsourcing of manufacturing by the West. India's earlier restrictions on FDI and other product and labour market distortions have deterred Western businesses from entering. Since a lot of the outsourcing has already happened, even if India were to remove all barriers to FDI and to productivity and output growth, few Western firms would switch their manufacturing to India. Moreover, the continuing underemployment in China's rural areas would continue to keep its wages low.

Sectors with higher export potential such as apparel and allied products and electronics will increase from US\$ 10.8 billion in 2000 to US\$ 38.5 billion by 2010, an average annual growth of 13.5 per cent. A rapid growth in world trade of these products and India's geographical advantages will drive this growth. In particular, India can take advantage of its geographical proximity to European markets and increase the market share from other low wage countries exporting to these regions. To achieve this, India needs to remove important product market barriers still affecting these sectors such as small-scale reservations, import barriers and restrictions on FDI (*see* Volume II, Chapter 3: Apparel).

Exports of other manufactured products will increase from US\$ 26.9 billion in 2000 to US\$ 69.8 billion in 2010, continuing their past average annual growth of 10 per cent.

¶ **Services exports:** Export of services from India can rise from the current level of US\$ 2.2 billion to US\$ 52 billion by 2010, an average annual growth of 37.2 per cent (**Exhibit 5.37**). Software exports and remote services will contribute to this boom, as will some percentage of pharmaceutical and health services exports.

Software exports and remote services are expected to grow from US\$ 2.2 billion to US\$ 47 billion between 2000 and 2010. India has a huge competitive advantage in software services primarily due to its large, well educated, English-speaking population. A language advantage is key in software and remote services, where customer interaction and coding language are mainly in English (*see* Volume III, Chapter 5: Software for more details on estimates of export growth potential).

In pharmaceuticals, just as US firms are outsourcing their software service requirements to India, Western pharmaceutical firms are expected

to outsource their back-end research and development functions to India. Early forecasts indicate that this business will be worth US\$ 5 billion by 2010.

## IMPORTS

Imports are expected to grow at nearly 20 per cent a year over the next 10 years from 13.6 per cent to 21 per cent of GDP (**Exhibit 5.38**).

- ¶ Import of capital goods is expected to rise from 1.7 per cent to nearly 5.5 per cent of GDP. With complete reforms, the capital-intensive modern sectors of telecom and power will drive a substantial share of total import growth. We expect that 50 per cent of the incremental machinery and equipment required will be imported. This is consistent with our findings in Brazil and Poland.
- ¶ Import of petroleum products will increase from 2.8 per cent to 3.5 per cent of GDP over the next 10 years. In the past, consumption of petroleum products has grown in line with GDP growth. Domestic production, which amounts to nearly one third of demand, has remained constant over the last decade. Consequently, petroleum product imports have grown at a slightly higher rate than GDP. In future, with increased private participation in the oil sector, we expect domestic production to grow at around 5 per cent per annum, lower than the projected growth in consumption of 10 per cent a year. Therefore, we expect imports to grow at 12-14 per cent a year and remain the dominant source of supply.
- ¶ Imports of consumer goods will grow from 1.7 per cent to 4.1 per cent of GDP by 2010. With the opening up of the Indian economy, imports have grown at 30 per cent a year in absolute terms, although from a very small base. As consumption increases in line with increased GDP per capita, we expect these imports to continue to grow at around 30 per cent a year.
- ¶ Export-related imports are expected to experience growth rates similar to corresponding exports (such as gems and precious stones, apparel and chemicals) and, hence, are likely to grow from 2.7 per cent to 3.2 per cent of GDP.
- ¶ Other imports, mainly durable goods, have grown at nearly the same rate as GDP and are expected to continue to experience growth rates in line with GDP growth.

## **INVISIBLE TRANSFERS**

Net inflow from invisibles will increase from 1.7 per cent to 2.4 per cent of GDP over the next 10 years, due to an increase in tourism receipts as well as continuing growth in private transfers from Non-Resident Indians (NRIs).

Over the next 10 years, the sharp potential increase in the number of tourists of around 17 per cent a year will increase tourism revenues by over 10 times their current value of US\$ 1.2 billion. Due to its wealth of culture and largely English-speaking population, India has a strong competitive advantage in tourism. The removal of land and product market barriers will boost investment in retail, hotels and restaurants geared to tourists. Similarly, boosting business activity will also increase business investment into the country. As a result, we can expect a significant growth in the number of tourists, reaching at least half of China's current level by 2010. Most tourism revenues will be generated in the retail, hotel and restaurant industries. This increased output from tourism exports has already been captured in the output growth estimates of the retail industry. Since the potential growth of these industries has been calculated by benchmarking against countries that also have significant numbers of tourists, the estimated future output already captures future tourism revenues.

Private transfers from NRIs have grown at nearly 12-13 per cent a year over the last 10 years. Since the earnings determining these NRI inflows are linked more to the growth of the world economy than the Indian economy, we expect these inflows to continue to grow at the same rate. At the same time, there might be some increase with more Indians moving out to work for international companies and repatriating earnings back to India. Hence, we believe that these inflows will grow at around 13 per cent a year.

## **CAPITAL INFLOWS**

With complete reforms, India's capital inflows will increase from the current 2.5 per cent to 4.7 per cent of GDP due to an increase in FDI from the current 0.5 per cent to 2.2 per cent of GDP.

## Appendix 5D: India's consolidated deficit if all barriers are removed

Removing productivity barriers will reduce the consolidated budget deficit by nearly 4.9 per cent (from the current 11.6 per cent) of GDP, contributing to an increase in domestic savings.<sup>6</sup> This reduction will result from a potential cutback in government expenditure of around 2.3 per cent of GDP and an increase in revenue receipts of nearly 2.6 per cent (**Exhibit 5.39**).

### **REDUCTION IN GOVERNMENT EXPENDITURE**

With the right measures, the government could succeed in reducing its expenditure by nearly 4.6 per cent of GDP. Having achieved these savings, the government could support faster growth by increasing its expenditure on health, education and infrastructure by approximately 2.3 per cent of GDP. The main actions the government needs to take are as follows:

- ¶ **Privatising Public Sector Units (PSUs):** This will help reduce the government's budgetary support to these PSUs by nearly 0.5 per cent. This reduction is brought by eliminating all support from centre and state governments towards capital expenditure, maintenance and part funding of losses. The centre and state governments together provide around 1.0 per cent of GDP as budgetary support to these PSUs. The government would, however, lose the dividend and other receivables from these PSUs, which are around 0.5 per cent of GDP.
- ¶ **Reforming the power sector:** This will help the government save nearly 1 per cent of GDP. Reforming the power sector will help the government reduce losses by nearly 1 per cent of GDP. These losses are mainly due to heavy subsidies to agricultural and domestic consumers, power theft and poor state of SEB receivables. As a result, the power sector is experiencing a loss of around Rs 25,000 crore or nearly 1.5 per cent of GDP.
- ¶ **Reducing interest payments:** Interest payments, the largest single expenditure item in the government budget, can be reduced by 3.2 per

---

<sup>6</sup> All figures in this section are average percentages of GDP for the next 10 years. In the case of the budget deficit, increased revenues from reforms (e.g., privatisation) would mostly accrue during the initial years.

cent of GDP. This reduction can be achieved almost equally by adopting a two-pronged approach:

- By repaying outstanding debt with the proceeds from privatisation
- Reducing the cost of debt through lower interest rates.

A 60-80 per cent privatisation of all non-strategic PSUs, including the State Electricity Boards, is likely to provide the government with about US\$100 billion with which to repay debt. This will help reduce the interest expenditure by around 2.2 per cent. Further, floating administered interest rates (e.g., in small saving schemes such as provident funds and post office deposits), which form a large part of the debt burden, will reduce interest expenditure by around 1 per cent of GDP.

- ¶ As we have said, the government will need to increase spending on health, education and infrastructure by nearly 2.3 per cent of GDP. Total spending on health and education (for better equipment and buildings) needs to be increased by nearly 0.3 per cent of GDP. As we have pointed out, we also estimate an increase in infrastructure spending by nearly 2 per cent of GDP (*see Appendix 5E* for a detailed discussion on infrastructure investment requirements).

## INCREASED RECEIPTS

The government can increase its revenue receipts by nearly 2.6 per cent of GDP by levelling taxes and duties as well as implementing economic user charges and property taxes.

- ¶ As much as 46 per cent of the total manufacturing sector output is from the small-scale sector, which is exempt from paying excise duties. Complete reforms will allow the government to levy excise duties uniformly, increasing receipts by nearly 1.5 per cent of GDP.
- ¶ Increasing user charges for water and sewerage and rationalising the property tax and stamp duty structure will increase receipts by 1 per cent of GDP. Raising average yearly user charges for water and sewerage to Rs.1,100 per household from an average of Rs.100 today, combined with better enforcement, can help improve receipts from user charges by nearly 0.5 per cent of GDP. Rationalising property tax and stamp duty structure can increase government collections by nearly 0.5 per cent of GDP. This increase can be achieved by: (a) freeing property tax from rent control and linking it to the market value of the property; (b) bringing the property tax rate closer to international levels to around 1 per cent from nearly 0.5 per cent; and (c) by rationalising stamp duties to

2-4 per cent levels from the current levels of 8-12 per cent and encouraging larger number of property transactions to be registered.

## Appendix 5E: Required transport infrastructure investment

Although our case-level findings show that transport infrastructure is not a constraint to productivity growth, India has fallen behind on its investment in infrastructure and health and education as well as private housing compared to other benchmark developing countries such as Thailand and Brazil. As a result, we are including in our estimates an increase in government investment in transport infrastructure from 2.2 per cent of GDP to 4.2 per cent of GDP.

### KEY ISSUES IN TRANSPORT INFRASTRUCTURE

While the length of India's road and rail network will not be a bottleneck to economic growth, the quality and width of some of the key roads, the amount of railway freight rolling stock and the capacity of Indian ports and airports are key issues to be addressed in the face of very high GDP growth.

- ¶ **Poor quality of Indian roads:** The length of Indian roads compares very favourably with benchmark countries. India has 280 kilometres of paved road per thousand square kilometres of land area. This is more than Indonesia (90), China (28), the Philippines (130) and Thailand (130) (**Exhibit 5.40**). India has 950 kilometres of paved road per million people. This is more than Indonesia (810), China (220) and the Philippines (550) and marginally less than Thailand (1080). India has 13.3 kilometres of highways and expressways per thousand square kilometres of land area. This is more than both Indonesia (7.0) and China (2.6).

However, the quality of Indian roads is a problem, and will become increasingly so in the future. Key highway segments, in particular along the “golden quadrangle”, are very overburdened and need to be widened. In addition many roads are in need of resurfacing.

- ¶ **Inadequate port capacity:** Capacity in Indian ports is currently massively overstretched. However, it can be increased almost five-fold with limited investment in machinery and automation and better organisation of functions and tasks (**Exhibit 5.41**). This increase will eliminate the need to build new ports for the next 10 years.

- ¶ **Overstretched airports:** India's main airports are also very overstretched. With an expected 10.3 per cent annual growth in passenger traffic, India will need to increase the capacity of its existing international airports as well as upgrade some of its larger domestic ones.
- ¶ **Poor quality railways:** India's rail track length compares very favourably with its benchmark countries. India has 12.4 kilometres of track per thousand square kilometres of land area. This is more than Indonesia (3.4), China (5.9) and Thailand (7.2) and marginally less than the Philippines (13.0). India has 42 kilometres of track per million people. This is greater than Indonesia (31) and the Philippines (5) and marginally less than China (45) and Thailand (62).

However, as India's GDP grows, it will face a shortage of freight wagons. India currently has only 4.3 freight wagons per kilometre of track compared to 7.4 in China and an average of 4.8 in countries with a GDP between 12 per cent and 25 per cent of the US.

In addition, poor quality rolling stock and railway track constrain passenger and freight throughput and will need to be improved in the future. The existing rolling stock, both passenger and freight, is outdated. Further, the railway track is of different gauges in different regions and is mostly not electrified.

## **INVESTMENTS REQUIRED TO IMPROVE TRANSPORT INFRASTRUCTURE**

To facilitate economic growth, in our estimates we include and increase in government investment in transport infrastructure from the current 2.2 per cent of GDP to 4.2 per cent in 10 years. These estimates include a 30 per cent capital productivity improvement potential in these sectors.<sup>7</sup> This will complement private investment in infrastructure as a result of the removal of the productivity and output barriers, including privatisation in power and telecom.

- ¶ **Government investment in infrastructure:** The government will invest in roads, ports, airports and urban infrastructure.
  - **Roads:** Investment in roads will increase from 1 per cent of GDP to 2.2 per cent (on average US\$ 15.3 billion per annum) to fund highway widening and road resurfacing. The proposed widening of the golden quadrangle will cost US\$ 5 billion. Widening other highways will cost

---

<sup>7</sup> Since the government will make some of these investments, our estimate of the potential for capital productivity improvement in infrastructure projects is lower than our full reforms estimate of 50 per cent.

US\$ 22 billion and resurfacing roads will cost US\$ 128 billion over the next 10 years.

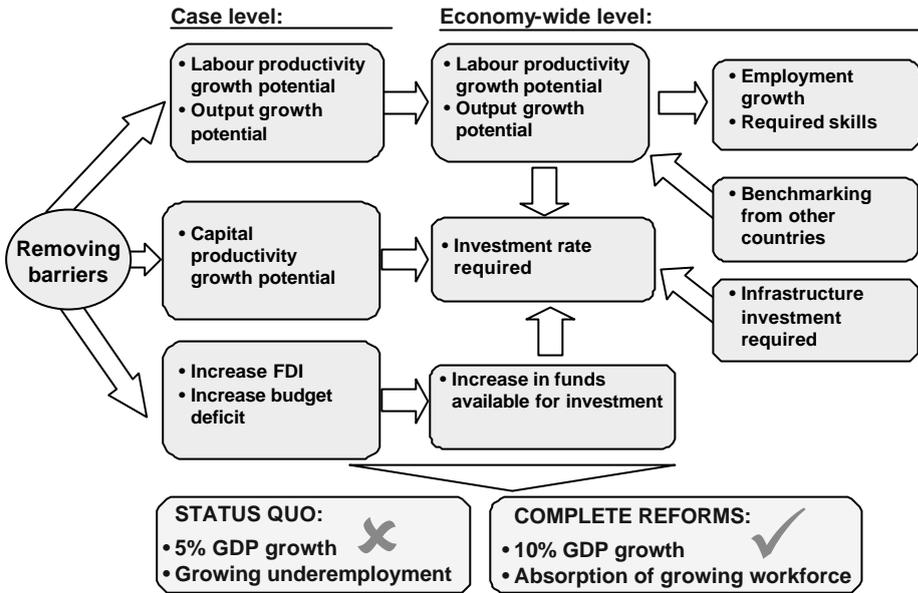
- **Ports:** Investment in ports need not increase but should be better targeted. Better targeting of investment, with less focus on building new berths and terminals and more focus on the right equipment to remove bottlenecks to existing capacity, will create sufficient port capacity to cope with India's future trade demands. We estimate that 0.1 per cent of GDP (on average US\$ 0.9 billion per annum) is needed to fund the automation and equipment required at the existing major ports.
  - **Airports:** Investment in airports will increase from 0.4 per cent of GDP to 0.5 per cent (on average US\$ 3.2 billion per annum) to fund the required increase in passenger throughput capacity. This includes both larger terminals (US\$ 32.3 billion) and advanced air traffic control equipment to increase the maximum take off and landing rate from one plane every 5 minutes to one plane every minute (US\$ 1.1 billion).
  - **Urban infrastructure:** Investment in urban infrastructure will increase from 0.7 per cent to 1.4 per cent of GDP. Most of this investment should be made in water, sewerage and roads in city suburbs in order to increase the availability of developed land for construction and retailing.
- ¶ **Business investment in infrastructure:** Business investment will also increase, following privatisation and other actions.

Investment in the railways will increase from 0.7 per cent of GDP to 0.9 per cent (on average US\$ 6.2 billion per annum) to fund the necessary track and rolling stock improvements. This comprises track widening where necessary, track electrification and additional modern rolling stock

Similarly, investments in power and telecommunications will also increase, fuelled by privatisation and increased competition (*see* Volume III, Chapters 2 and 6, for details).

Exhibit 5.1

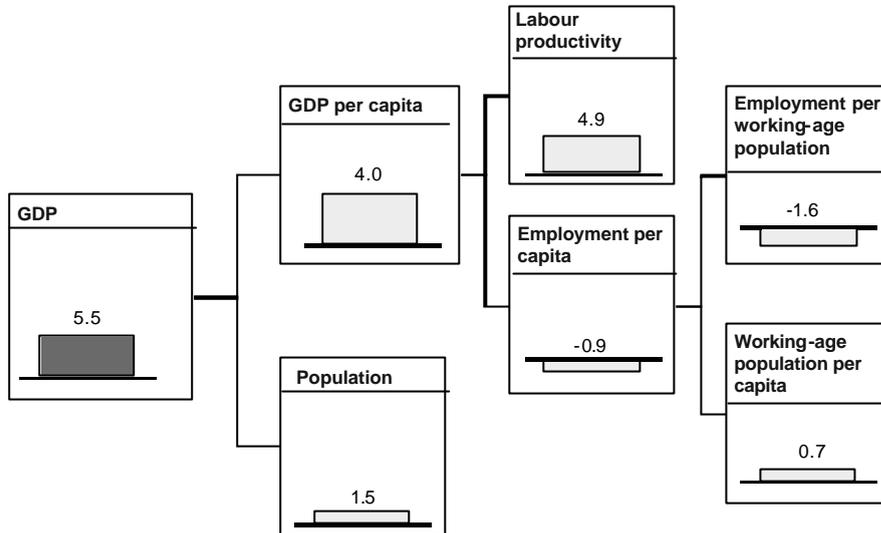
### ESTIMATING INDIA'S GROWTH POTENTIAL



Source: McKinsey analysis

Exhibit 5.2

**STATUS QUO: ESTIMATES OF OUTPUT GROWTH, 2000-2010**  
CAGR



Source: McKinsey analysis

Exhibit 5.3

**PRODUCTIVITY GROWTH ESTIMATES UNDER 'STATUS QUO'**

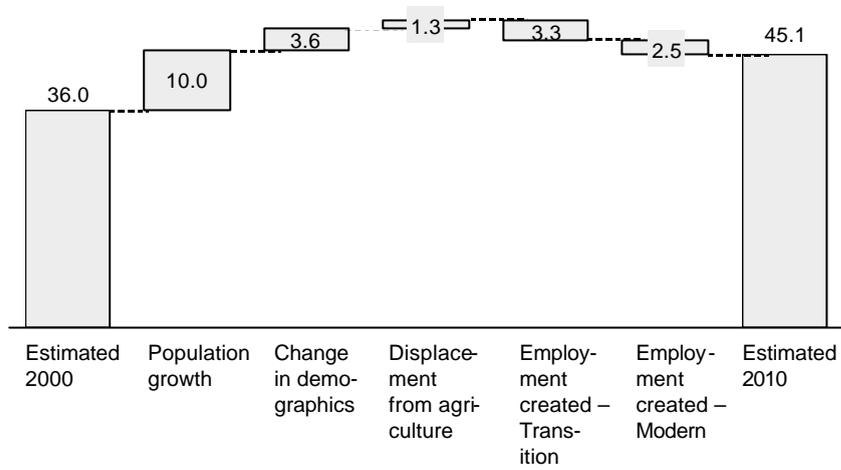
Sector	Past productivity growth Per cent	Expected productivity growth, 2000-2010 Per cent
Dairy farming	5	5
Wheat farming	5	5
Steel	16	5
Automotive assembly	20	10
Dairy processing	7	7
Wheat milling	3	4
Apparel	4	3
Telecom	19	16
Power: Generation	5	5
T&D	5	5
Housing construction	3	2
Retail	5	4
Retail banking	2	6
Software	7	7

Source: Interviews; McKinsey analysis

Exhibit 5.4

**SHARE OF IDLE HOURS UNDER 'STATUS QUO'**

Per cent

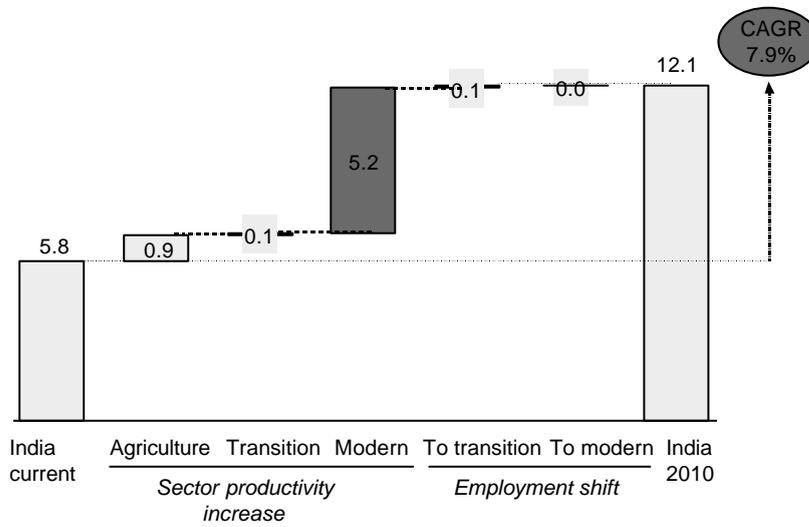


Source: NSS; India Manpower Profile, 2000; McKinsey analysis

Exhibit 5.5

**SOURCES OF LABOUR PRODUCTIVITY GROWTH**

Per cent, US = 100

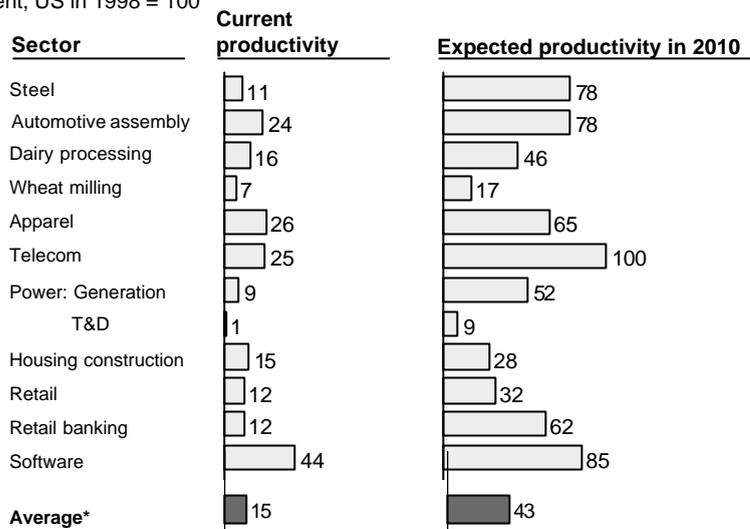


Source: Cases; McKinsey analysis; Manpower Profile of India

Exhibit 5.6

### LABOUR PRODUCTIVITY IN MODERN SECTORS UNDER 'COMPLETE REFORMS'

Per cent, US in 1998 = 100



\* Grossed up to the overall economy

Source: Interviews, McKinsey analysis

Exhibit 5.7

### RELATIONSHIP BETWEEN PEAK SEASON AGRICULTURAL WAGES AND TRANSITION WAGES

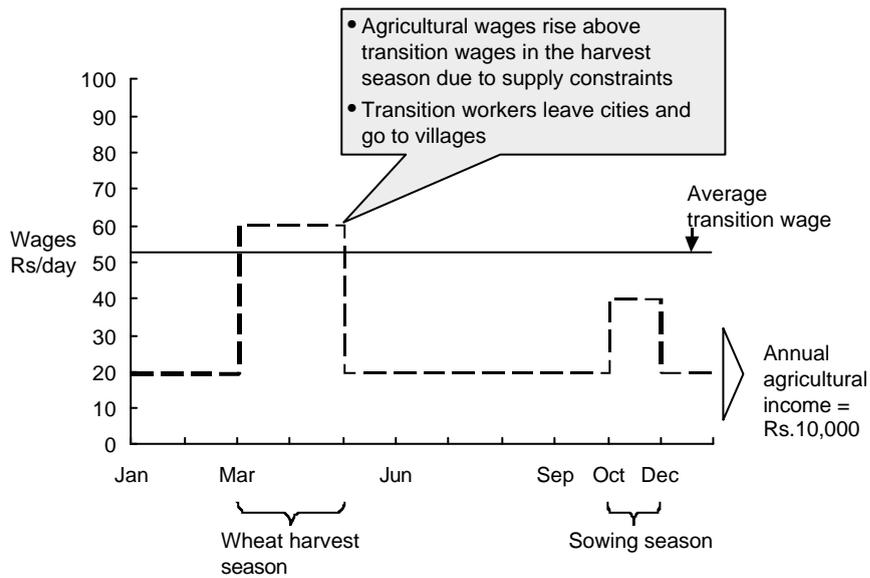
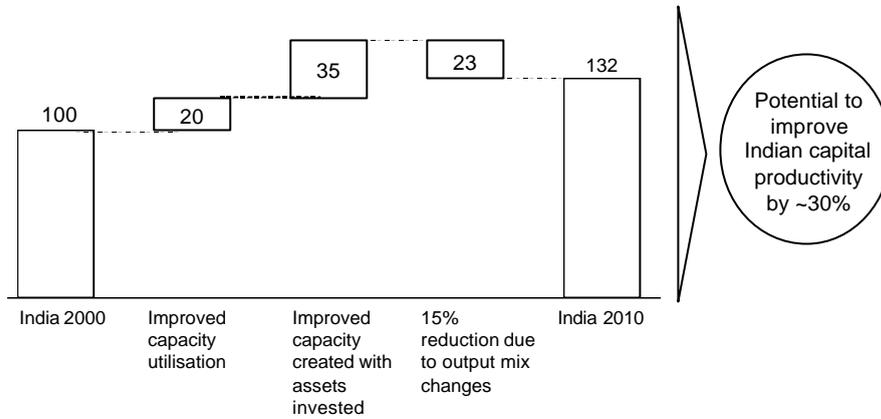


Exhibit 5.8

**EXPECTED CHANGES IN CAPITAL PRODUCTIVITY**  
 Index, India average in 2000 = 100



Source: Interviews; McKinsey analysis

Exhibit 5.9

**CAPACITY UTILISATION OBSERVED IN CASES STUDIED**

Case	India		India potential in 2010	Potential improvement
	Per cent of US	Per cent of US		
Power: Generation	83	100	100	20
T&D	30	30 *	30 *	0
Steel	64	100	100	56
Telecom	81	100	100	21
Dairy farming	30	80	80	170
Wheat farming	25	34	34	36
Dairy processing	69	77	77	12
Wheat milling	26	40	40	54
Retail (supermarkets)	30	60	60	100
Housing construction	71	80	80	13
Apparel (Modern)	70	100	100	43
Automotive	59	80	80	36
Retail banking	54	83	83	54
Software	95	100	100	5
<b>Average</b>	<b>56</b>	<b>76</b>	<b>76</b>	<b>&gt;20</b>

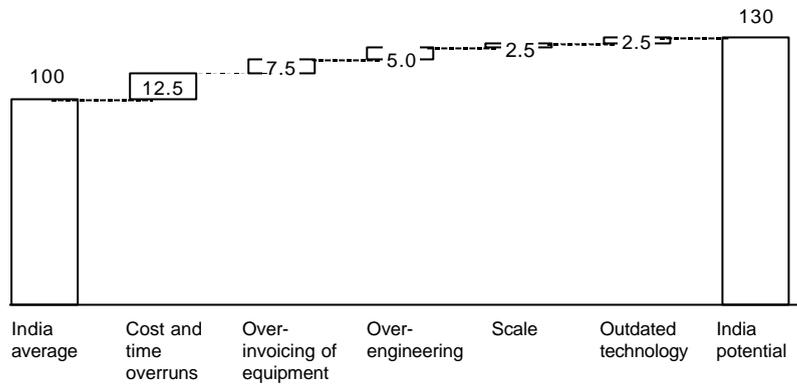
\* Based on monetary realisation of stolen energy

Source: Interviews; McKinsey analysis

Exhibit 5.10

### CAPACITY CREATED BY ASSETS INVESTED

Index, India average in 2000=100

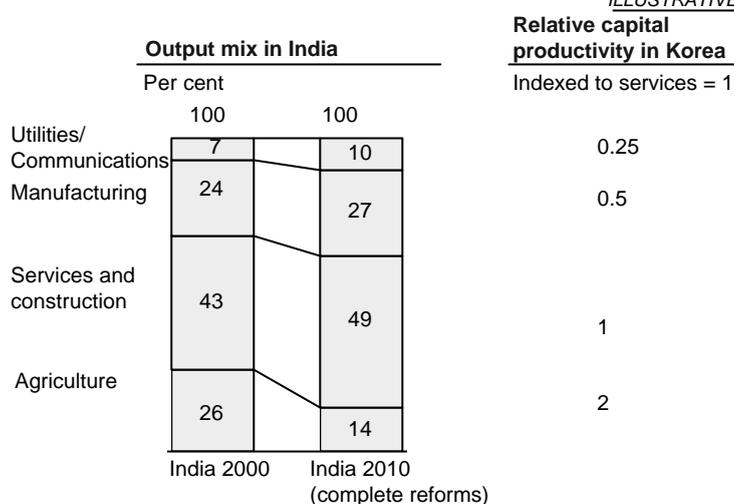


Source: Case interviews; McKinsey analysis

Exhibit 5.11

### IMPACT OF OUTPUT MIX EVOLUTION ON CAPITAL PRODUCTIVITY

*ILLUSTRATIVE*

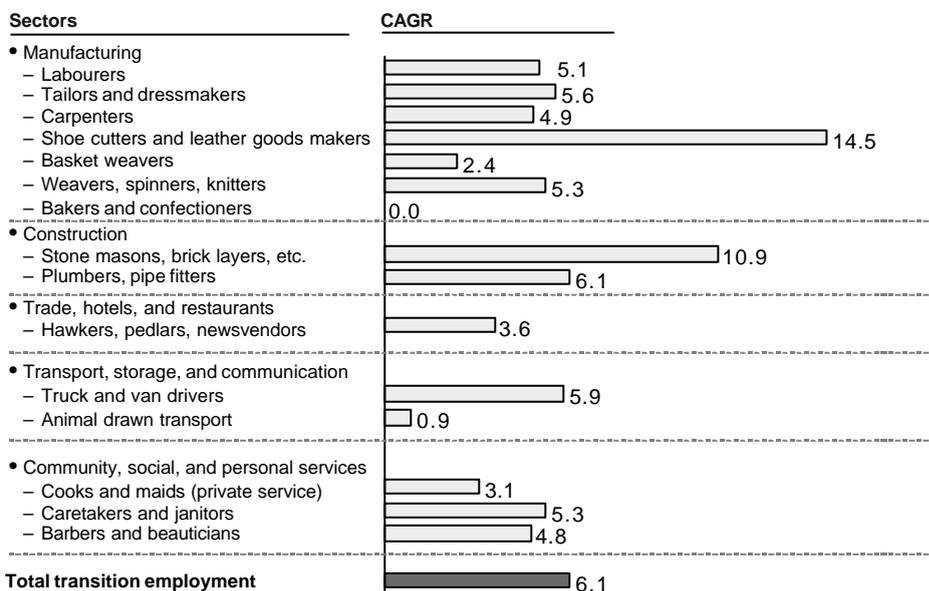


Source: MGI Korea report

Exhibit 5.12

### TRANSITION OUTPUT TRENDS IN THAILAND, 1970-1990

Per cent

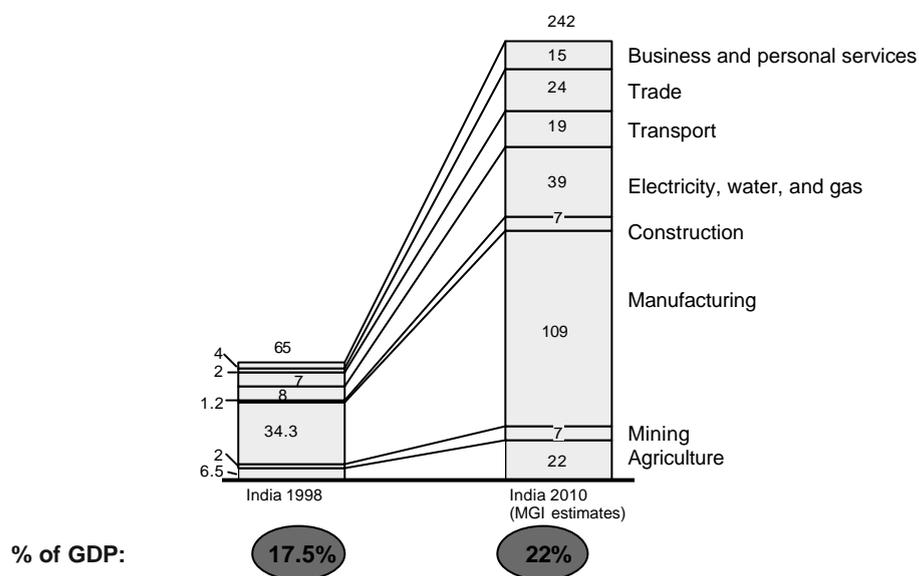


Source: Thailand labour survey; Interviews with economists from Thailand Development Research Institute; McKinsey analysis

Exhibit 5.13

## BUSINESS INVESTMENT SPLIT BY SECTOR

US\$ billion



Source: Statistical online of India, 1998-99; MGI Korea Report; McKinsey analysis

Exhibit 5.14

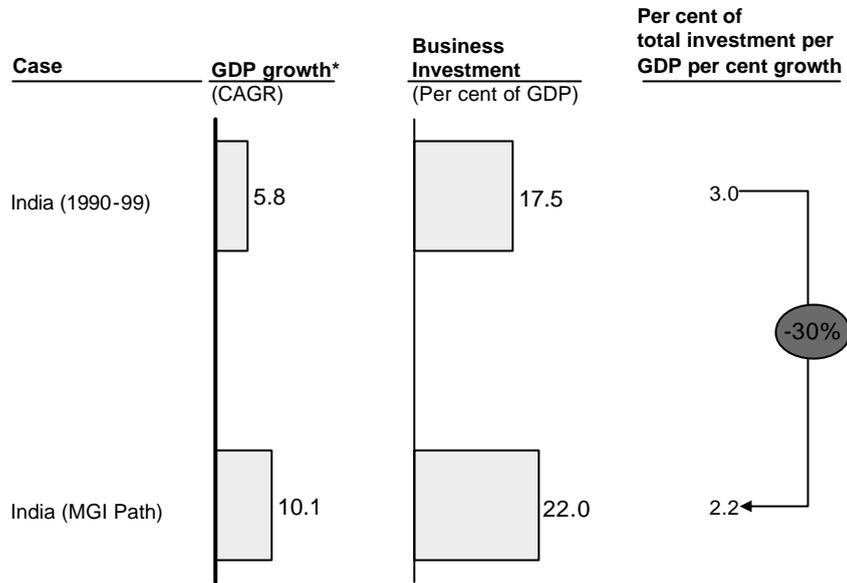
## CASE LEVEL ESTIMATES OF INVESTMENT REQUIREMENTS

US\$ billion

Case	Maintenance	Upgrades	New capacity (including maintenance)	Total needed for next 10 years	Examples
Dairy farming	0.0	0.2	20.2	20.4	• Cross bred cows
Wheat farming	4.8	2.1	0.0	6.9	• Full tractorisation
Dairy processing	0.6	0.0	0.9	1.5	• New processing plants
Wheat processing	0.2	0.0	0.5	0.7	• New atta mills
Retail	31.7	47.6	21.7	101	• Supermarkets, counter stores
Housing construction	2.0	0.2	9.4	11.6	• Hand tools
Apparel	2.8	0.5	3.4	6.7	• New plants
Automotive	0.8	0.2	4.4	5.4	• Automation and new plants
Retail banking	0.5	3.4	0.0	3.9	• Automating manual branches
Power: T&D	21.3	2.0	117.3	140.6	• More transmission lines
Generation	32.0	4.9	174.4	211.3	• More power plants
Steel	3.9	1.0	25.4	30.3	• More plants and automation
Telecom	5.2	1.0	54.3	60.5	• Toolkits and new lines
Software	0.9	0.0	3.7	4.6	• Computers
<b>Total</b>	<b>106.7</b>	<b>63.1</b>	<b>435.6</b>	<b>605.4</b>	

Exhibit 5.15

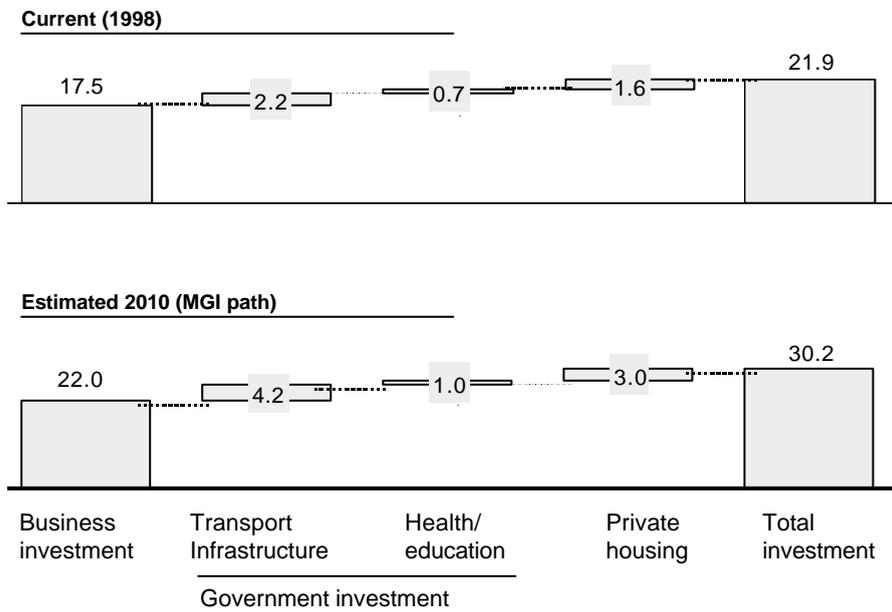
### INDIAN REQUIRED BUSINESS INVESTMENT RATES



Source: World Development Indicators; McKinsey analysis

Exhibit 5.16

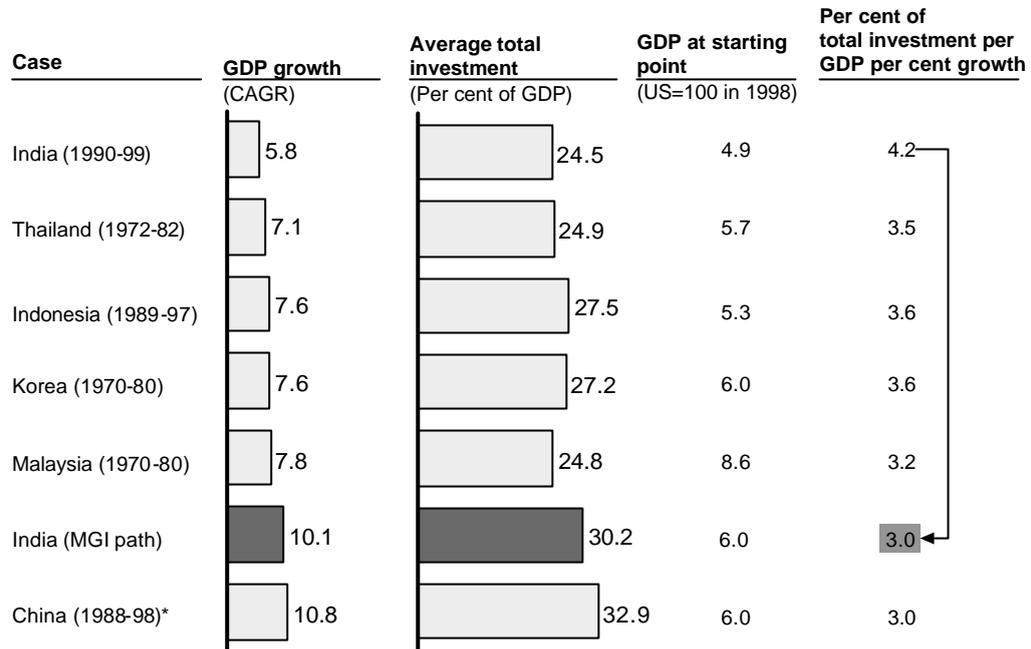
### DECOMPOSITION OF TOTAL INVESTMENT Per cent of GDP



Source: CMIE

Exhibit 5.17

## INTERNATIONAL BENCHMARKS OF INVESTMENT REQUIREMENTS



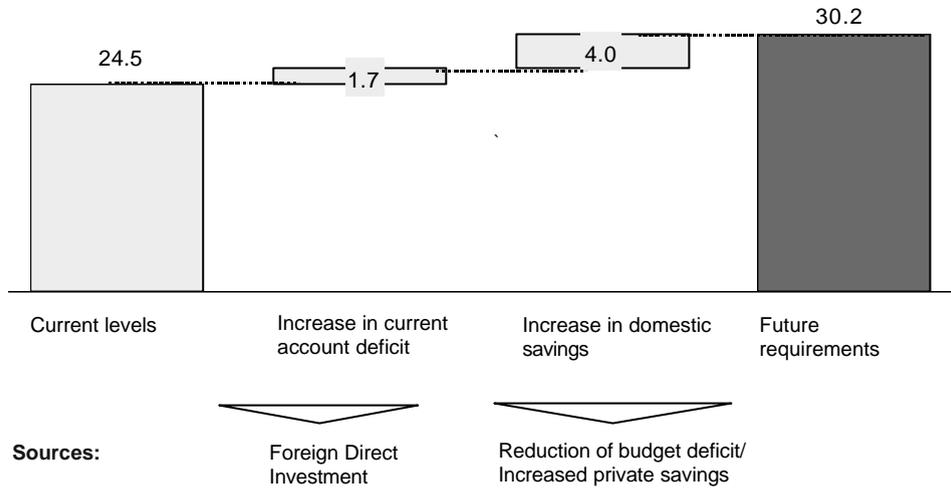
\* According to Chinese official statistics

Source: World Development Indicators; McKinsey analysis

Exhibit 5.18

### REQUIRED INVESTMENT RATE IS WITHIN INDIA'S REACH

Per cent of GDP



Source: Interviews; McKinsey analysis

Exhibit 5.19

### FDI COULD AVERAGE 2.2% OF GDP OVER NEXT 10 YEARS

US\$ billion

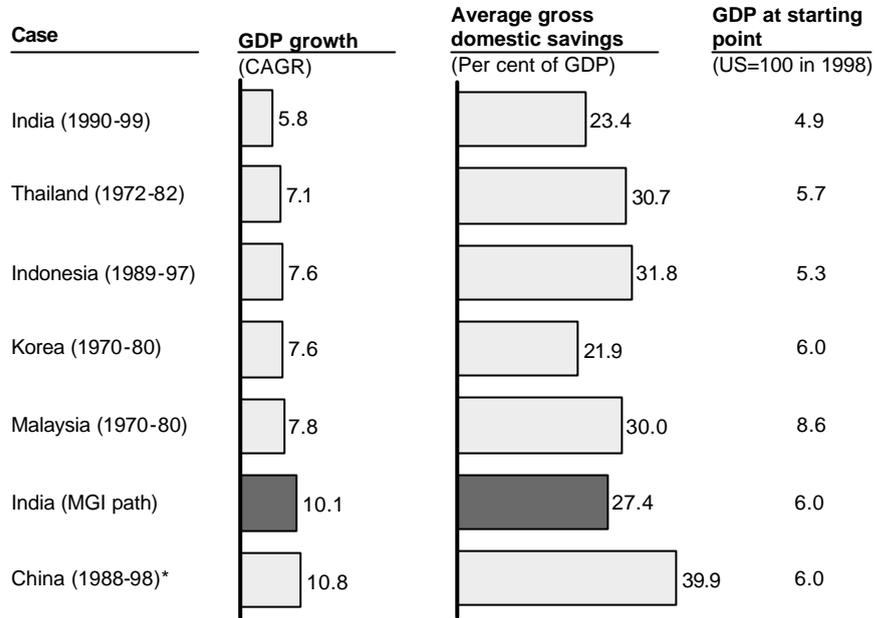
	FDI as a % of GDP*	FDI Cumulative (1990-98) US\$ billion
Malaysia	5.7	41
China	5.2	261
Poland	3.2	22
Mexico	2.7	38
Thailand	2.3	20
Indonesia	1.9	61
Brazil	1.5	154
US	1.1	875
Russia	0.8	13
India	0.5	16.2

\* Average for 1993-98 period

Source: World Investment Report (1999), World Development Indicators

Exhibit 5.20

### INTERNATIONAL BENCHMARKS OF GROSS DOMESTIC SAVINGS

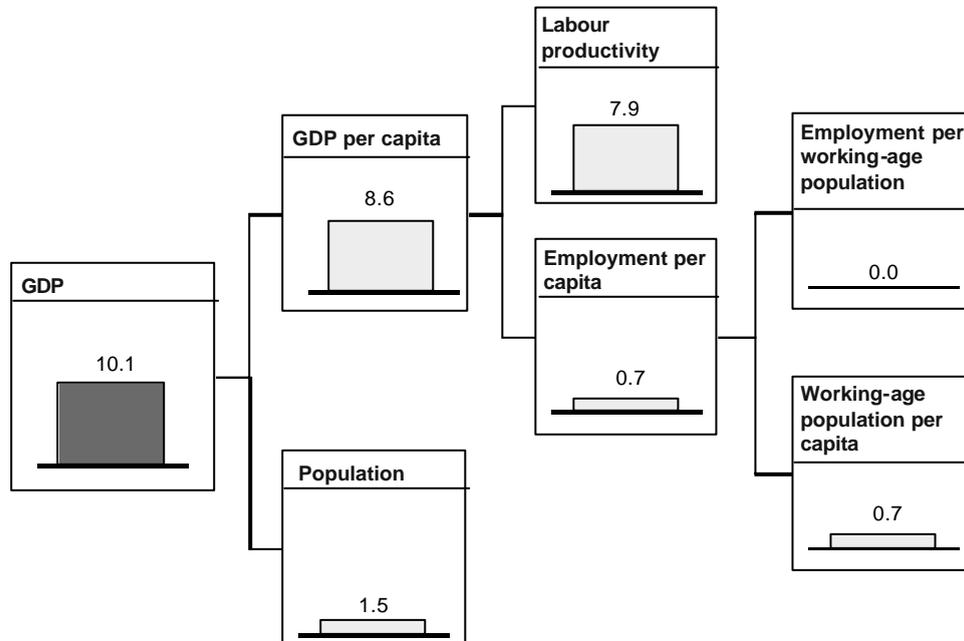


\* According to Chinese official statistics

Source: World Development Indicators; McKinsey analysis

Exhibit 5.21

### COMPLETE REFORMS: ESTIMATES OF OUPUT GROWTH, 2000-2010 CAGR

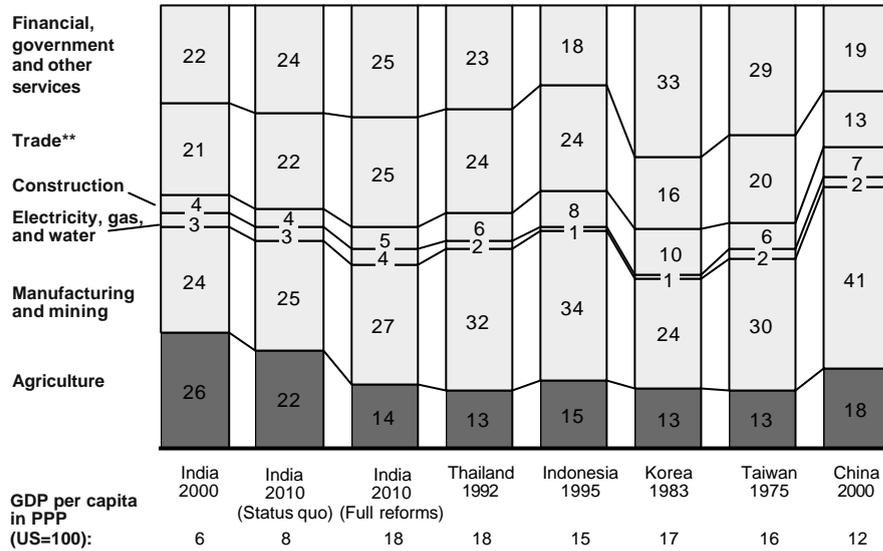


Source: McKinsey analysis

Exhibit 5.22

### INTERNATIONAL BENCHMARKS OF GDP SPLIT BY SECTOR\*

Per cent



\* Using national accounts-based pricing

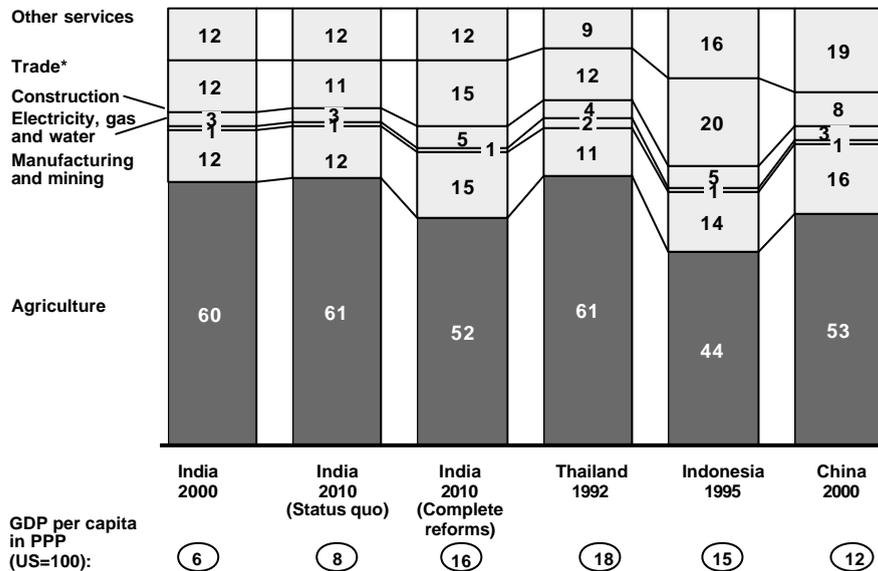
\*\*Includes trade, hotels and restaurants, transport, storage, and communication

Source:McKinsey analysis

Exhibit 5.23

### INTERNATIONAL BENCHMARKS OF EMPLOYMENT SPLIT BY SECTOR

Per cent



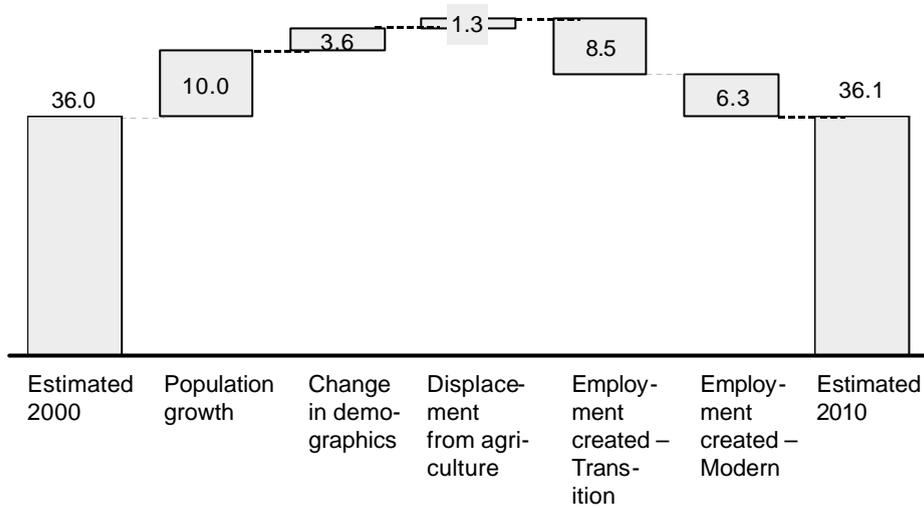
\*Includes trade, hotels and restaurants, transport, storage, and communication

Source:McKinsey analysis

Exhibit 5.24

### SHARE OF IDLE HOURS UNDER COMPLETE REFORMS

Per cent

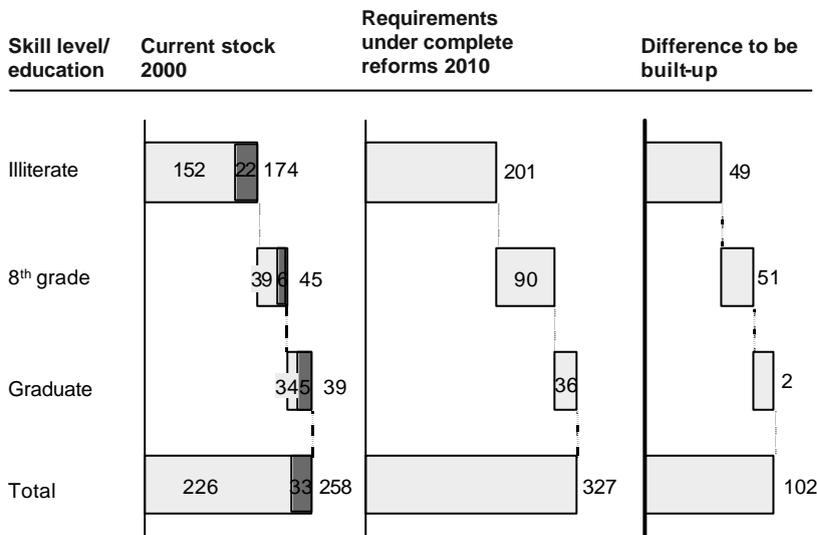


Source: NSS; India Manpower Profile, 2000; McKinsey analysis

Exhibit 5.25

### AGGREGATE SKILL REQUIREMENTS UNDER COMPLETE REFORM

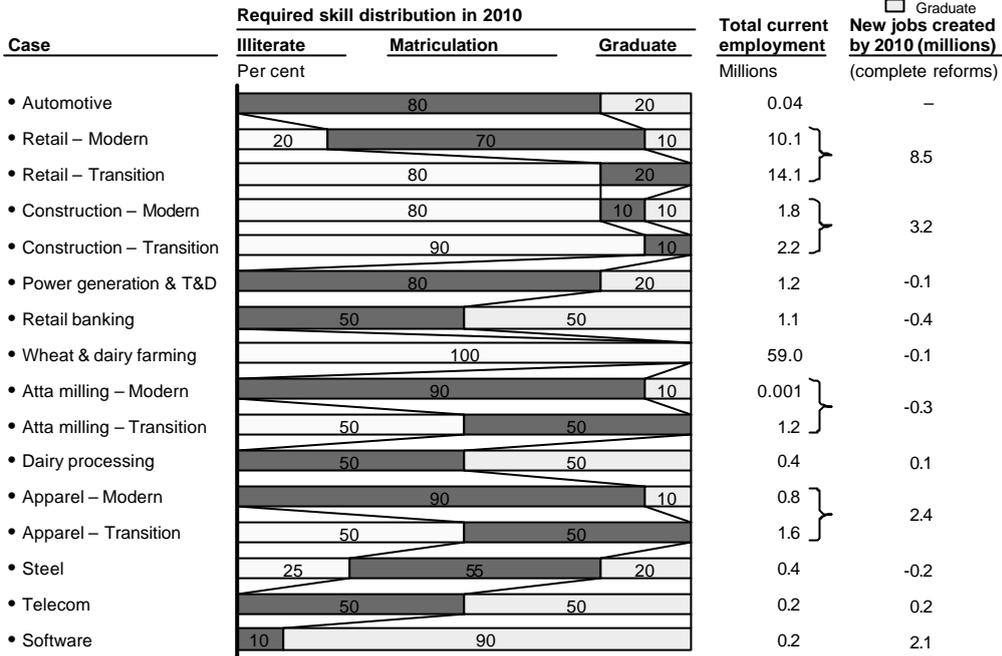
Workforce retiring by 2010



Source: Manpower Profile of India; NCAER; McKinsey analysis

Exhibit 5.26

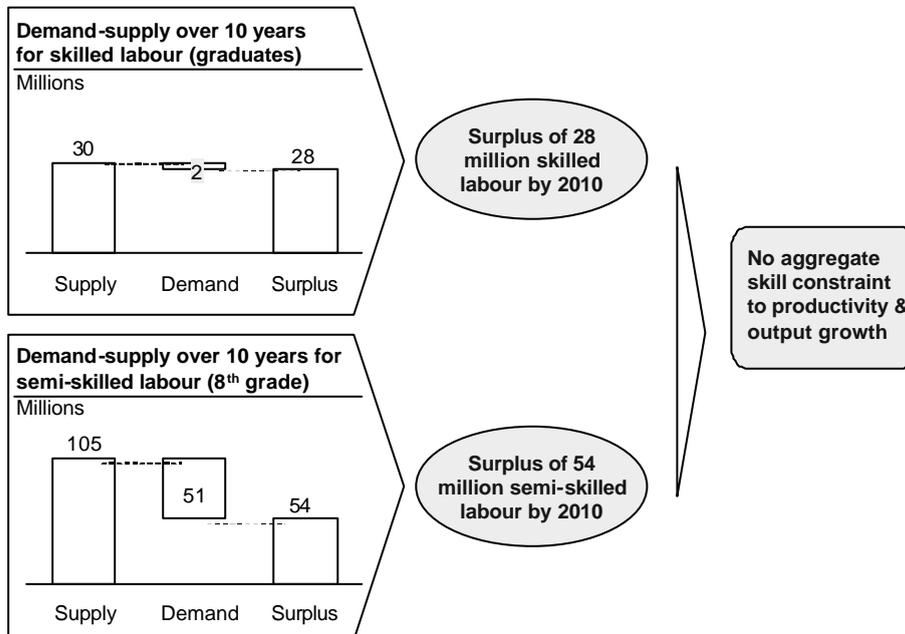
### REQUIRED DISTRIBUTION OF SKILLED LABOUR IN CASES



Source: Interviews; McKinsey analysis

Exhibit 5.27

### TESTING FOR SUPPLY OF SKILLED LABOUR

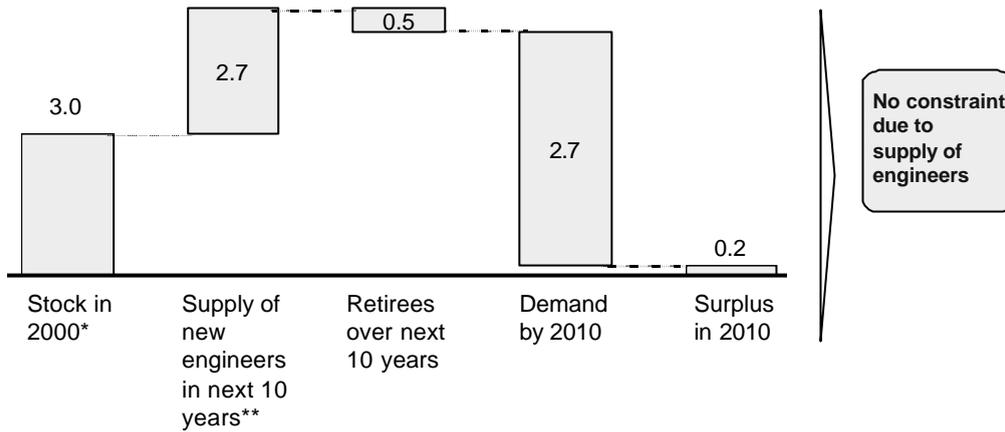


Source: Ministry of Human Resource Development; McKinsey analysis

Exhibit 5.28

### TESTING SUPPLY OF ENGINEERS AS A CONSTRAINT TO OUTPUT GROWTH

Millions



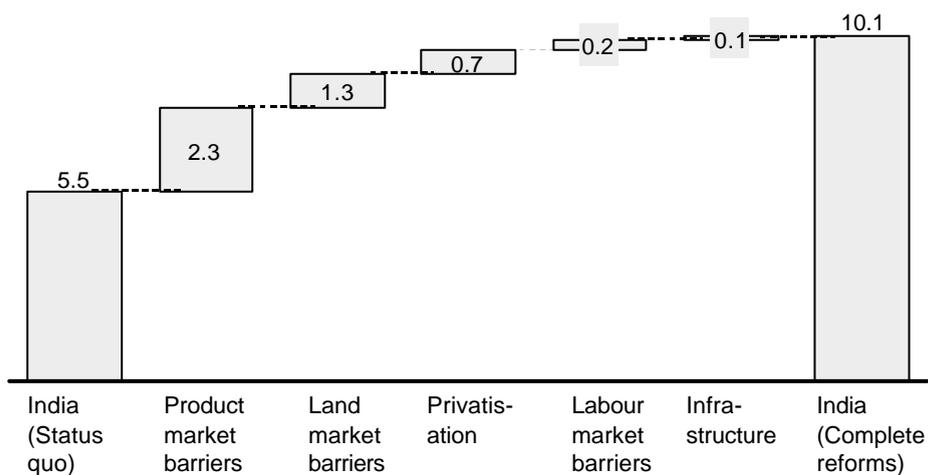
\* Includes all engineers and diploma holders graduated after 1970

\*\* Assuming an annual increase of 10% in the output of engineers over the next 10 years

Source: Ministry of Human Resource Development; McKinsey analysis

Exhibit 5.29

### BARRIERS TO ACHIEVING 10% GDP GROWTH CAGR (2000-2010)



Source: McKinsey analysis

Exhibit 5.30

### LABOUR PRODUCTIVITY BARRIERS QUANTIFIED AT CASE LEVEL

Per cent of total

<b>Case</b>	<b>Govt ownership</b>	<b>Capital market</b>	<b>Labour market</b>	<b>Product market</b>	<b>Land market</b>	<b>Related industry</b>	<b>Infra- structure</b>
Automotive	-	-	70	24	-	6	-
Retail – Modern	-	-	9	45	35	11	-
Retail – Transition	-	-	9	45	35	11	-
Construction – Modern	-	-	6	8	75	11	-
Construction – Transition	-	-	6	8	75	11	-
Power Generation	60	-	10	22	-	8	-
Power T&D	80	-	2	18	-	-	-
Retail banking	75	-	7	8	-	10	-
Wheat farming	-	-	-	24	-	76	-
Dairy farming	-	-	-	-	-	100	-
Wheat milling – Modern	-	-	-	95	-	5	-
Wheat milling – Transition	-	-	-	95	-	5	-
Dairy Processing	36	-	9	25	-	30	-
Apparel – Modern	-	-	10	55	-	20	15
Apparel – Transition	-	-	10	55	-	20	15
Steel	28	-	12	33	-	27	-
Telecom	66	-	8	26	-	-	-
Software	-	-	-	33	-	67	-
<b>AVERAGE</b>	<b>19</b>	<b>-</b>	<b>9</b>	<b>47</b>	<b>18</b>	<b>23</b>	<b>2</b>

Source: McKinsey analysis

Exhibit 5.31

**OUTPUT BARRIERS AT CASE LEVEL**

Per cent of total

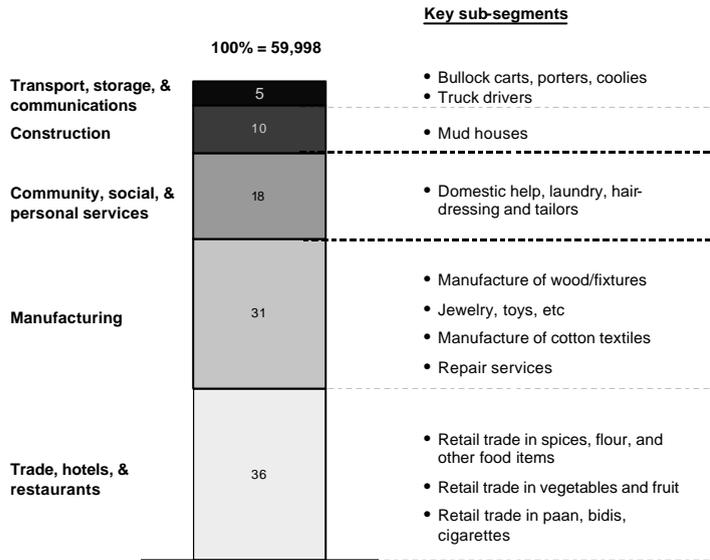
■ Adjusted for output only barriers

Case	Govt ownership	Capital market	Labor market	Product/land market	Product/land market	Related industry	Infra-structure
Automotive	-	-	25	75	-	-	-
Retail – Modern	-	-	-	35	45	11	-
Retail – Transition	-	-	-	35	45	11	-
Construction – Modern	-	-	-	8	75	10	-
Construction – Transition	-	-	-	8	75	10	-
Power Generation	-	-	-	-	-	100	-
Power T&D	80	-	2	18	-	-	-
Retail banking	30	-	5	30	-	30	-
Wheat farming	-	-	-	24	-	76	-
Dairy farming	-	-	-	-	-	100	-
Wheat milling – Modern	-	-	-	95	-	5	-
Wheat milling – Transition	-	-	-	95	-	5	-
Dairy Processing	-	-	-	70	-	30	-
Apparel – Modern	-	-	10	55	-	20	15
Apparel – Transition	-	-	10	55	-	20	15
Steel	25	-	-	40	-	35	-
Telecom	25	-	-	75	-	-	-
Software	-	-	25	25	-	50	-
<b>AVERAGE</b>	<b>13</b>	<b>-</b>	<b>6</b>	<b>38</b>	<b>18</b>	<b>23</b>	<b>2</b>

Source: McKinsey analysis

Exhibit 5.32

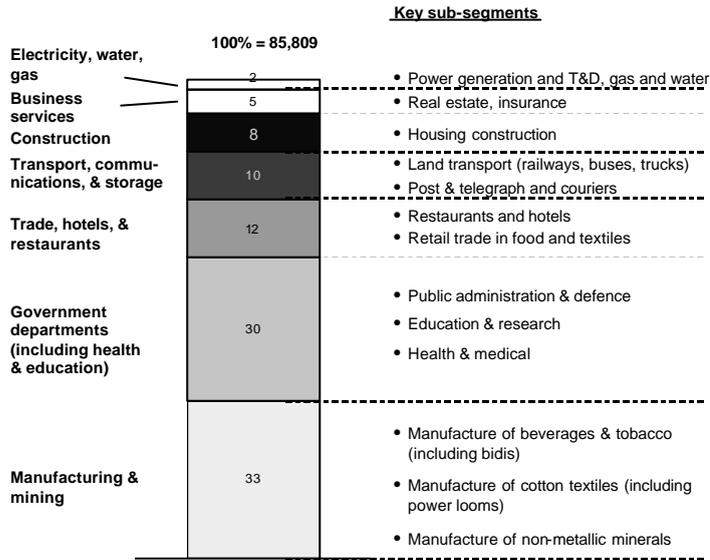
### RECLASSIFICATION OF EMPLOYMENT IN INDIA: TRANSITION '000



Source: Census of India; NSS; McKinsey analysis

Exhibit 5.33

### RECLASSIFICATION OF EMPLOYMENT IN INDIA: MODERN '000



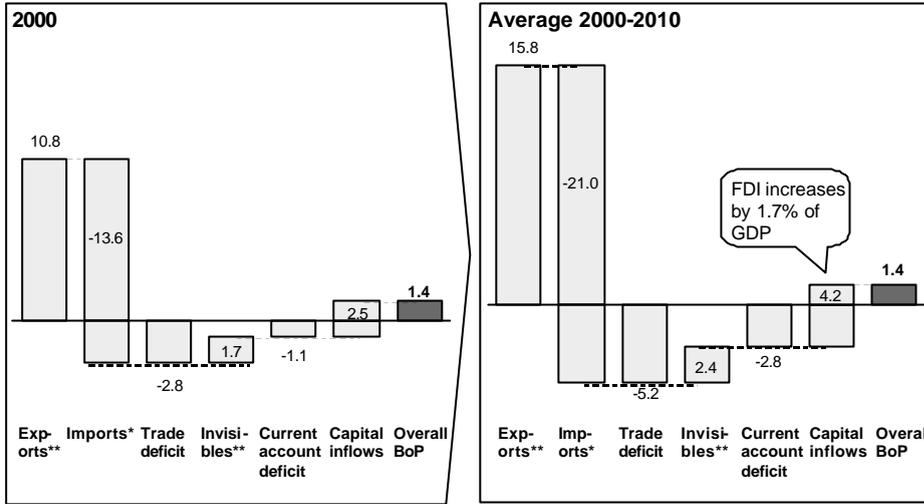
Source: Census of India; NSS; McKinsey analysis



Exhibit 5.34

### INCREASE IN FDI WILL FINANCE INCREASE IN CURRENT ACCOUNT DEFICIT

Per cent of GDP



\* CIF value of imports

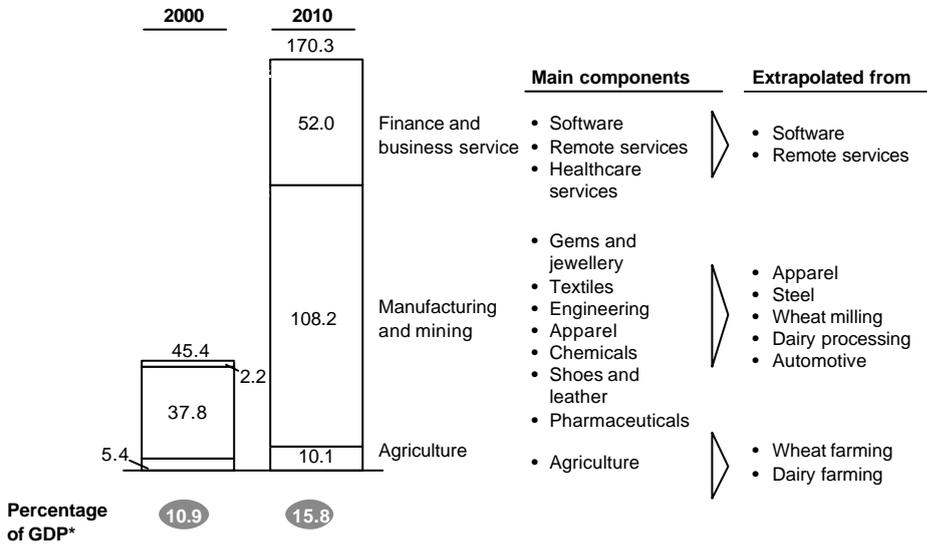
\*\* Software exports are counted in exports and hence excluded from invisibles

Source: RBI; CMIE; National Accounts Statistics, 2000; McKinsey analysis

Exhibit 5.35

### ESTIMATED COMPOSITION OF INDIAN EXPORTS IN 2010 UNDER FULL REFORMS

US\$ billions



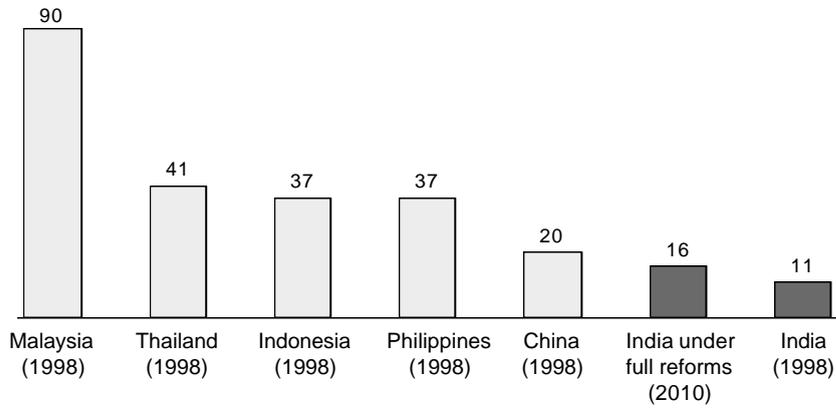
\* Total value (rather than value-added) for exports. Assumes constant value-added to value ratio for export goods

Source: CMIE; NASSCOM; McKinsey analysis

Exhibit 5.36

### INDIAN EXPORTS COMPARED TO BENCHMARK COUNTRIES

Exports as a per cent of GDP\*



\* Total value (rather than value-added) for exports

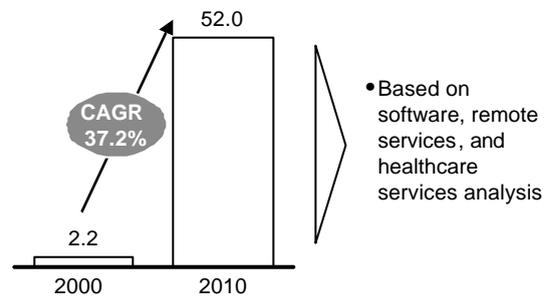
Source: *The Economist*, 2001

Exhibit 5.37

### ADDITIONAL SERVICE EXPORTS UNDER FULL REFORMS

US\$ billion

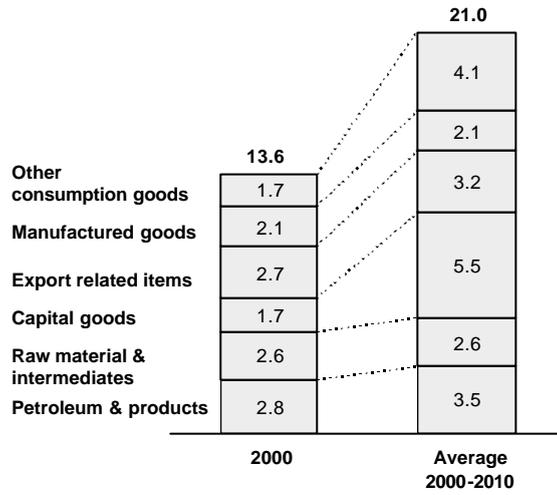
**Total services\***



Source: NASSCOM; interviews; McKinsey analysis

Exhibit 5.38

**IMPORTS WILL INCREASE FROM 13.6% TO 21.0% OF GDP BY 2010**  
Per cent of GDP



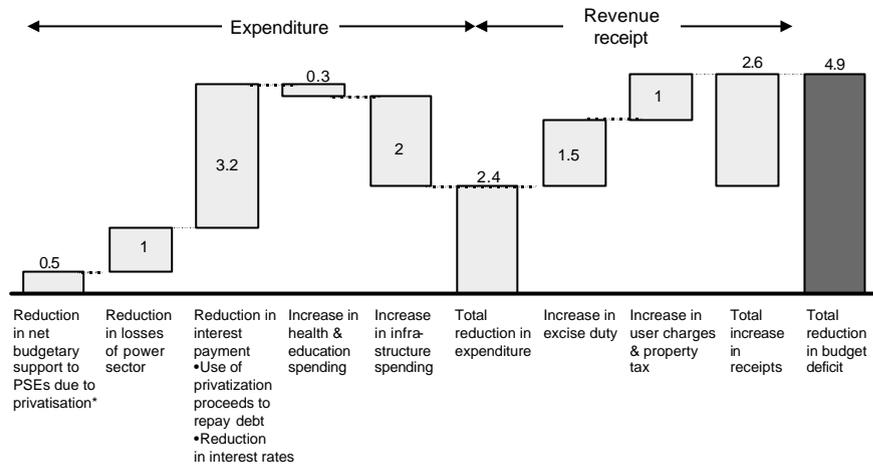
Source: RBI; CMIE; National Accounts Statistics, 2000; McKinsey analysis

Exhibit 5.39

## INDIA COULD INCREASE INFRASTRUCTURE AND SOCIAL SPENDING WHILE REDUCING BUDGET DEFICIT BY 4.9% OF GDP

Per cent of GDP

### Impact of removing productivity barriers

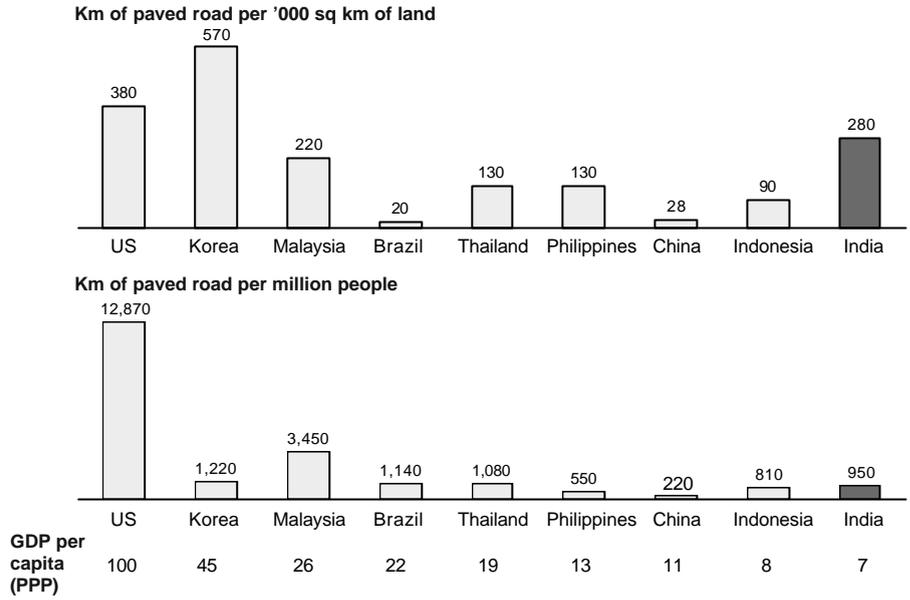


\* Includes support for capex, maintenance, part funding of losses, and loss of dividend and other receivables

Source: Government of India Budget papers; CMIE; McKinsey analysis

Exhibit 5.40

### PAVED ROAD DENSITY

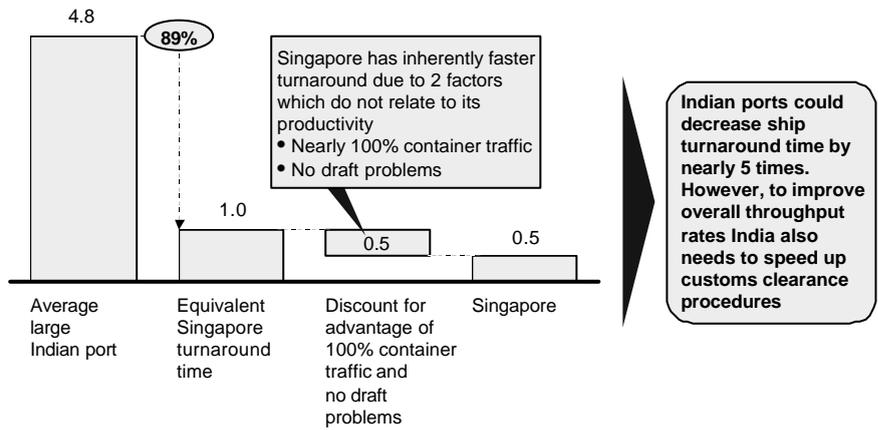


Source: Global Competitiveness Report, 1998; *The Economist*; Worldbank

Exhibit 5.41

### POTENTIAL EFFICIENCY INCREASE IN INDIAN PORTS

Ship turnaround time, days



Source: CMIE; PSA



# Synthesis of Sector Findings

Since growth in labour and capital productivity is the key engine of economic growth, our main objective in this study was to assess labour and capital productivity in India and identify the measures required to improve them. India has already witnessed the impact of labour productivity on GDP growth. Since 1993, increases in GDP per capita have come mainly from the higher productivity of the employed workforce. The fundamental link between productivity and output has been confirmed by the experience of other countries (*see* Chapter 3: Current Perspectives on India's Economic Performance).

In this chapter, we present our assessment of India's labour and capital productivity performance, based on our 13 case studies, and draw out the implications of these findings for India's growth. To summarise:

- ¶ Labour and capital productivity in India is well below its potential.
- ¶ India's agriculture and transition sectors, which account for around 85 per cent of employment, have limited potential for improving productivity.
- ¶ India's modern sectors have the potential to increase productivity from the existing 15 per cent to 63 per cent of US levels. The productivity level will reach 43 per cent of US levels by 2010 and can drive India's GDP growth. Therefore, unleashing this potential will become the main driver of India's GDP growth. Historically, key operational factors such as surplus labour, poor organisation of functions and tasks and lack of viable investments have kept India's labour and capital productivity well below potential in these sectors.
- ¶ The lack of competitive pressure is the main factor inhibiting productivity. It reduces pressure on Indian companies from trying to improve performance and allows less productive players to survive.
- ¶ External factors such as distortions in the product and land markets, together with government ownership, play a major role in limiting competition and thwarting productivity growth.

## PRODUCTIVITY IS WELL BELOW POTENTIAL

In most of the sectors studied, we have found labour productivity to be low with most sectors achieving productivity levels, which are under 10 per cent of US levels (**Exhibit 4.1**). Extrapolating our findings to the rest of the economy shows that average productivity stands at around 5.8 per cent of US levels, compared to an average of 7 per cent estimated from official statistics.<sup>1</sup> Productivity is well below potential even in new and growing sectors such as software where productivity is 44 per cent of US levels. Moreover, in all the sectors studied, labour productivity can rise significantly even under current low labour costs. Similarly, capital productivity is well below potential in all sectors (**Exhibit 4.2**).

As mentioned in the case studies, we distinguish between three types of sectors: agriculture, transition and modern. These sectors differ substantially in their current productivity levels as well as in their potential labour productivity growth, given current factor costs (**Exhibit 4.3**).

- ¶ **Agriculture:** This sector has the lowest labour productivity, at 1.2 per cent of US levels on average, of all the sectors studied. Moreover, its productivity potential is “only” double its current level. Most of this growth will come from higher yield rather than investment in more mechanised equipment. For example in dairy farming, the largest employer in the agriculture sector, yield can improve six fold, but almost no mechanisation is viable.
- ¶ **Transition sector:** This sector, comprising entry-level jobs for people migrating from agriculture has a somewhat higher productivity at 6.9 per cent of US levels on average, but has very limited potential for productivity growth. Transition sectors are usually one-/two-person operations with very limited capital requirements, e.g., street vendors, rural counter stores, tailors. They usually provide goods of lower quality and have an inherently lower productivity than their modern counterparts. Their goods typically act as cheaper substitutes for products provided by the modern sector (e.g., mud houses instead of modern brick houses and loose flour at flour mills or *chakkis* instead of packaged flour).
- ¶ **Modern sector:** Comprising the bulk of the output and employment in developed countries but only 15 per cent of employment in India, the modern sector has the highest labour productivity of the three – around 15 per cent of US levels on average. But more importantly, productivity can be almost three times higher reaching 43 per cent of US levels by 2010, even at India’s low labour costs. Similarly, capital productivity in

---

<sup>1</sup> See Volume I, Chapter 5: India’s Growth Potential for details on the methodology used for this extrapolation.

the capital-intensive sectors can almost triple from 32 per cent to 88 per cent of US levels.

## **AGRICULTURE AND TRANSITION SECTORS HAVE LIMITED PRODUCTIVITY POTENTIAL**

Current productivity in agriculture is very low at 1.2 per cent of the US levels and potential productivity at current factor costs is only slightly higher at 2 per cent of the US. Indian farming is characterised by three features. First, it follows a fragmented, joint dairy and field-farming model, with low levels of mechanisation and productivity. The average farm size is 4 acres and 78 per cent of farmers own farms of less than 10 acres in size (**Exhibit 4.4**). Second, 60 per cent of farming households are involved in dairy and, of these, 98 per cent engage in it on a part time basis. Third, the potential for further mechanisation is low. For example, in wheat farming almost 70 per cent of the land is already tilled using tractors and, further mechanisation, by way of combine harvesters and larger irrigation pumps, is not economically viable at the current low labour costs.

In short, most productivity gains will not come from mechanisation. At current factor costs, the use of tractors in wheat can increase to 90 per cent, while the scope for combine harvesters is limited to some regions in Punjab, constituting less than 3 per cent of total land in the state. The gains will come instead from the dispersal of extension and irrigation services, which will allow farmers to improve their yields and achieve their productivity potential (**Exhibit 4.5**). In the near future, most of the productivity improvements in dairy farming will come from the spread of better farming practices through higher coverage from Direct Collection Services (DCS) and private milk processors, which will facilitate the diffusion of optimal breeding and feeding practices (**Exhibit 4.6**). These practices will increase yield at least six fold and allow India to achieve its productivity potential of 3.1 per cent at current factor costs (**Exhibit 4.7**).

Unless other sectors of the economy absorb current idle hours, we expect wages in the agriculture sector to remain stagnant and rise only once yields increase. In a trend that is consistent with the agricultural evolution observed in other countries, Indian agriculture will continue to be largely non-mechanised with the “joint-farming model” likely to stay well beyond 2010 for the following reasons:

- ¶ Currently, part time dairy farmers have a significant cost advantage over full time farmers due to the negligible opportunity cost of labour and lower dry fodder cost.
- ¶ The opportunity cost of labour will continue to be negligible as long as rural under-employment continues to be significant.

- ¶ Once full-time dairy farming becomes viable, field and dairy farms will grow independently as there will be limited synergies in their operations. However, this will only happen when rural wages increase and allow dairy farming to be independently sustainable. This is not expected to happen in the next 10 years.
- ¶ The experience of other countries suggests that dairy continues to be a secondary occupation to farming for a fairly long period. In Thailand, a shift away from agriculture was driven by job creation in other sectors.

Today, the low-productivity transition sector is absorbing labour migrating from agriculture. The transition sector includes entry-level jobs requiring very little capital and skills (for instance, street vending, building of mud houses, wheat milling and tailoring) and can, therefore, be undertaken by rural workers. Moreover, since these transition jobs mostly involve self-employment, they allow migrant labour to return to agricultural activities during the harvesting season when manpower is in short supply.<sup>2</sup>

As mentioned earlier, the transition sector usually provides lower quality goods than those provided by the modern sector (for instance, mud houses instead of modern brick houses) and are, therefore, purchased by lower income consumers.

The labour productivity of this sector is also very low. Although currently higher than in agriculture (averaging 6.9 per cent of US levels), productivity is inherently low due to the materials (such as mud housing), technology (such as primitive flour mills or *chakkis*) or business formats (such as street vending and rural counter stores) used. To illustrate, mud and stones used for construction are less amenable to standardisation and scale economies than modern materials such as bricks (**Exhibit 4.8**). Most of our case studies show that the transition sector has already achieved its productivity potential in India.

## **INEFFICIENT OPERATIONS PREVENT MODERN SECTORS FROM ACHIEVING THEIR HIGH POTENTIAL**

Excess labour, poor organisation of functions and tasks (OFT), lack of scale and lack of viable assets are the key operational reasons why Indian companies are not achieving high productivity despite their potential to do so (**Exhibits 4.9 & 4.10**). Poor OFT, and low capacity utilisation also explain why capital productivity is well below potential in modern sectors (**Exhibits 4.11 & 4.12**). Less important operational factors include inefficient format and product mix, poor suppliers. Contrary to conventional wisdom, we did not find poor labour skills and work disruptions arising from poor infrastructure to be significant factors.

---

<sup>2</sup> See Volume I, Chapter 5: India's Growth Potential for details on the wage dynamics for transition jobs and how they relate to agricultural wages.

## **Surplus labour is prevalent across sectors**

Indian companies, especially government-owned ones, are plagued by redundancy in employment. Redundant workers are those whose labour is not required even before improvements are made in the way functions and tasks are performed. These workers are typically idle or under-utilised all day long. This problem exists in many of the sectors we studied:

- ¶ In the steel industry, excess workers account for around 30 per cent of the workforce in large integrated steel players.
- ¶ Over 50 per cent of employment in pre-liberalisation automotive plants is excess labour.
- ¶ In cooperative and government-owned dairy plants, over 50 per cent of employment is excess labour (**Exhibit 4.13**).
- ¶ Most managers in government-owned telecom companies readily acknowledge the presence of excess labour, with estimates ranging from 25 per cent to 50 per cent of the total workforce.
- ¶ In the power sector, overstaffing occurs in all areas. In support functions such as finance, administration, accounts and HR, there is one support staff per MW compared to 0.1 per MW in the US. In areas such as security, there are often over 100 people per plant compared to fewer than five in the US. Finally, each worker/operator in shift operations has a “helper”, a redundant function absent in US generation plants. In transmission and distribution, unnecessary helpers and artisans, comprising as much as 50-75 per cent of line staff, are employed.
- ¶ In public retail banks, redundant staff in front desk and back office clearing operations account for at least 10 per cent of total employment.

## **Poor organisation of functions and tasks is a major constraint**

Poor OFT is the main operational reason why Indian companies do not achieve their potential labour and capital productivity levels. Improvements in OFT can almost double Indian labour productivity levels in modern sectors. We have observed four types of OFT problems:

- ¶ **Lack of multi-tasking:** Many Indian players have been following a “Taylor” model with a functional orientation and high task specialisation leading to significant downtime. To illustrate:
  - In steel shops, workers are typically assigned one role and conduct only those tasks defined as part of that role. For example, in the steel shop of an IBFP plant, there were 27 separately defined roles. Each person did only those tasks that were defined as part of their role.

- In the power sector, maintenance workers are organised rigidly by function (electrical, mechanical, control, instrumentation and so on) instead of being organised into multi-skilled crews by area.
  - In the retail sector, limited use of multi-tasking and a negligible use of part time help during peak hours lower the productivity of retail stores.
- ¶ **Lack of centralisation of common tasks:** Common and repetitive tasks are often performed at different locations, each working below capacity, as the examples that follow show.
- Control rooms in State Electricity Board plants are placed in each area of the main plant (e.g., boiler, turbine and boiler feed pump) instead of between different units with shared staff.
  - Bill collection in telecom is typically done through staffed booths where subscribers line up, make their payment and receive a receipt, instead of through drop-in boxes that save resources and increase customer convenience. Moreover, government-owned carriers usually assign maintenance personnel on a geographic basis instead of centralising them in one location to share fixed costs.
- ¶ **Low workforce motivation:** Poor management and lack of incentive payments reduce workers' motivation and hence productivity.
- Low motivation of workers in domestic apparel plants results in high absenteeism, high rejection levels, and a high percentage of delayed shipments (**Exhibit 4.14**). High absenteeism often results in slower, unskilled operators filling in for skilled labour.
  - In the power sector, low motivation and high job security reduces the managers' incentive to limit outages and maintenance time.
- ¶ **Poor managerial practices:** A range of poor managerial practices such as inefficient planning, poor design and lack of delegation combine to hamper productivity.
- Lack of centralised planning and maintenance at steel plants often result in massive load imbalances. Moreover, poor handling of existing automation diminishes the quality of the steel produced. Poorly trained personnel typically fail to optimise plant settings, resulting in substantial differences in the chemical composition and physical properties of the steel produced.
  - In the automotive sector, the late implementation of lean production techniques significantly hampers the productivity of pre-liberalisation plants. In these plants, a large proportion of cars leave the assembly

line with defects, which must then be remedied. The older Indian post-liberalisation plants also suffer from lower skill levels with over 20 per cent of their workforce consisting of trainees with little experience.

- In dairy processing, poor scheduling of cleaning time and idle time at process bottlenecks (such as unloading of milk) disrupt workflow and increase labour requirements (**Exhibit 4.15**).
- In housing construction, poor planning by contractors results in time and cost overruns. Material and equipment deliveries are not planned in advance and workers sometimes remain idle until the required resources are procured. Moreover, workers are not specialised: It is common to find masons in India doing both bricklaying and plastering. Moreover, in small cities and rural areas, houses are typically built one room at a time. Finally, owners choose to act as both developer and contractor despite having low skills and capability in planning and managing the construction process.
- Poor store layout in Indian supermarkets increases labour requirements by around 10 per cent.
- Managers of public sector banks do not delegate authority to branch employees, resulting in multiple approvals being needed to complete transactions. Cash withdrawals in cashier-based public banks can take three times longer than in teller-based private banks (**Exhibit 4.16**). Similar inefficiencies are found in operations such as clearing cheques, issuing demand drafts, making telegraphic and electronic funds transfers, opening accounts and approving retail credit.

### **Lack of investment in viable assets also inhibits productivity**

A lack of investment in economically viable assets is another key factor limiting labour productivity in modern sectors. These investments can increase value added and optimise labour usage.

- ¶ Automation in steel melting shops and continuous casting machines will reduce the amount of labour required and improve the quality and consistency of steel produced (**Exhibit 4.17**). Moreover, investments in cold rolling facilities will increase the value of the steel produced to more than justify the investment required.
- ¶ Many domestic apparel manufacturers lack simple assets such as suitable ironing equipment and adequate washing and drying facilities. The common use of hand-washing and line-drying often results in fading or shrinking. Moreover, exporters lack specialised equipment such as

spreading machines. Instead, cloth for cutting is laid out manually, often stretching the fabric and distorting the size of the final garment.

- ¶ Automation in network and fault management systems can increase labour productivity in telecom by almost 50 per cent. The cost of interactive voice response hotlines, automated test procedures to localise faults and verify fault repair, and automated scheduling systems, is more than compensated for by the reduction in labour costs and improvements in the quality of service provided to customers (**Exhibit 4.18**).
- ¶ In the power sector, customers are not charged for over 30 per cent of the electricity produced, owing to a lack of metering or faulty meters (**Exhibit 4.19**). Investment in electronic meters will cost only 20 per cent of the annual savings it will yield. Furthermore, technical power losses are also greater due to under-investment in high-tension lines and lack of power capacitors. Besides electronic metering, viable investment in computerisation of inventory, billing and accounting as well as call centres will improve service levels and reduce labour requirements by over a third.
- ¶ In retail banking, a lack of automation and rationalisation of processes makes banking operations very inefficient. In an average public sector bank branch, a customer has to go to different windows where most of the tasks are carried out manually (**Exhibit 4.20**). Cheques are collected and dispatched to individual branches for signature recognition instead of using collection boxes and centralised signature databases. Automating and centralising key repetitive processes will more than double the productivity of public retail banks.
- ¶ In housing construction, workers lack even basic tools and small equipment. They carry material as “head loads” as opposed to the wheelbarrows used in other countries. Manual tools are used to prepare wood for shutters, instead of more efficient circular saws and electric surface planers. Large surfaces are painted with standard brushes instead of the more efficient roller brushes or spray-painting equipment.

### **Other operational factors also play a significant role**

Apart from the major causes of low productivity listed earlier, inefficiencies across the value chain also constrain productivity. These include:

- ¶ **Poor marketing and inefficient product/service mix:** Poor marketing practices increase costs and reduce value added in service sectors. A lack of attention to product and service mix has the same effect. The examples that follow prove the point.

- In telecom, the lack of marketing efforts for call completion services (such as call waiting, voicemail) by government-owned telecom operators reduces usage and limits labour and capital productivity.
  - Modern retail channels account for only 2 per cent of Indian sales compared to 30 per cent in Indonesia and around 85 per cent in the US (**Exhibit 4.21**). Modern formats like supermarkets and specialty chains are two to three times more productive than the traditional ones even in India. Moreover, the larger volumes they can support raise productivity potential by lowering procurement, distribution and marketing costs. In addition, the higher skills of best practice supermarkets and specialty stores allow them to optimise merchandising and marketing as well as supply chain and inventory management.
  - A large share of the revenues of Indian software companies comes from low value added services. On average, Indian companies earn about 30 per cent of their revenues from the lower value added domestic services market. In global markets as well, Indian companies focus on inherently lower value added services. Moreover, lack of brand recognition and poor marketing is forcing average service companies to offer significant price discounts (25-30 per cent lower than prices of best practice companies) in order to induce clients to outsource business to them.
- ¶ **Low capacity utilisation:** Low capacity utilisation leads to considerable productivity loss. To illustrate:
- In the automotive sector, average plant utilisation is only 59 per cent compared to 80 per cent in the US (**Exhibit 4.22**). Lower capacity utilisation for plants producing mid-sized cars causes a productivity loss mainly in indirect and production support functions.
  - At dairy processing plants, capacity utilisation during the flush season is around 69 per cent compared to an average utilisation of 77 per cent in the US. Raising utilisation to US levels will require only a small increase in staffing of managerial and unloading functions.
- ¶ **Inefficient supply:** Inefficiencies in supply affect utilisation of labour, increase complexity and hence costs, and reduce quality of output. To illustrate:
- In dairy processing, due to seasonal variations in milk supply, plant utilisation during the lean season often falls below 60 per cent (**Exhibit 4.23**). To make up for the shortfall, dairy plants typically undertake liquid milk reconstitution from milk powder and fat during the summer months, thereby duplicating processing efforts. Moreover,

additional labour needs to be employed in the lean season to reprocess inputs previously processed in the flush season. Using crossbred cows can reduce these seasonal fluctuations in milk supply.

- In housing construction, the lack of standardised and pre-fabricated materials increases complexity and hampers task specialisation on construction sites. Brick sizes in India typically vary significantly even within the same lot, requiring additional levelling work when building and plastering walls. Furthermore, using pre-cut and pre-threaded plumbing (such as PVC plumbing) instead of the plain tubes currently used will reduce installation time and increase task repetition at the work site.
- In retail banking, the lack of credit bureaus forces branch employees to spend a lot of time making credit decisions. As a result, mortgage approvals can take up to 4 weeks compared to 2 days in the US. Similarly, the lack of a reliable postal system limits centralisation and automation of cheque clearing functions. As a result, clearing is done in small, decentralised centres for which investment in Magnetic Ink Character Recognition (MICR) reader-sorter machines is not economical.

¶ **Lack of scale:** Low scale operations in many manufacturing sectors add up to considerable productivity losses.

- In the steel industry, around a third of the output is produced in very small mini-mills with an average capacity of only 50,000 tons compared to the more than 1 million tons of average US mini-mills.
- In apparel, the average domestic manufacturer and exporter employs fewer than 50 machines, whereas producers in China and Sri Lanka often have 1,000 machines under one roof. Technically, a 500-machine factory is the minimum size needed for efficient functioning and larger factories are still more efficient.
- In housing construction, individual houses are typically built one at a time. In contrast, in best practice countries such as the US and the Netherlands, over 70 per cent of total single family construction is built in projects of over 20 houses each. Building on a larger scale provides savings through bulk material purchasing, less idle time, better equipment utilisation and more efficient use of prefabricated materials (**Exhibit 4.24**).

¶ **Poor design for manufacturing (DFM):** Design for manufacturing involves incorporating the optimisation of the production process into the product design without compromising on quality. As the two examples we elucidate show, DFM is not fulfilling its promise in India.

- In the automotive sector, post-liberalisation plants still produce old and outdated models. For example, we estimate that the largest selling small car in India could be assembled in roughly 15 per cent less time if it were totally redesigned today. Even new models in India do not reflect best practice DFM: Indian models require almost twice as many body panels and spot welds compared to global best practice models (**Exhibit 4.25**).
- In housing construction, non-optimal design and lack of modularity increases the amount of rework in construction projects (**Exhibit 4.26**). Bricks and tiles need to be broken to fit corners while windows and doors need to be custom built to fit the unique design of each building. Moreover, poor planning often results in disruption of tasks or rework. For example, to install electrical wiring, a builder often needs to cut and re-plaster walls, causing disruption in the masonry work.

### **Lack of skills and poor infrastructure have less impact on operations than estimated**

Contrary to conventional wisdom, low labour skills and poor infrastructure do not have a significant effect on productivity. We found that with appropriate training and adequate managerial practices, even illiterate workers in sectors such as housing construction and retail could achieve best practice productivity levels.

In terms of infrastructure, although energy shortages and poor transportation conditions can potentially affect operations, their impact on Indian productivity is actually quite limited (less than 5 per cent) since companies have learnt to overcome infrastructure constraints. To overcome power shortages, for example, companies often build their own generation facilities with few efficiency losses. Similarly, automotive parts suppliers and apparel exporters overcome poor road conditions by locating their production facilities close to assembly plants and ports. Bottlenecks at ports, however, do constrain the competitiveness of Indian exporters.

### **Main causes of low labour productivity also lead to low capital productivity**

The key factors behind the labour productivity gap, namely poor OFT, low capacity utilisation and lack of viable assets, are also responsible for low capital productivity.

- ¶ **Poor OFT:** Improvements in OFT alone can increase capital productivity by around 60 per cent. In the sectors we have studied, cost overruns, poor planning and over-invoicing considerably curtail capital productivity. To illustrate:

- Constructing a steel plant in India typically takes almost twice as long as it would to build the same plant in the US. Moreover, over-invoicing of imported equipment is reportedly common practice, mainly due to inadequate supervision by shareholders and bankers.
  - In telecom, managers typically lay lower than optimal capacity copper cable in order to meet their line growth targets for that year (**Exhibit 4.27**). This practice results in higher costs per subscriber as it does not take advantage of scale economies in cable capacity (lower cost per line of higher capacity cable) and in major work such as digging trenches (digging the trench only once for a higher capacity cable).
  - State Electricity Boards (SEBs) take over 5 years, on average, to construct large coal plants compared to 3-4 years by best practice Indian plants. Construction overruns arise due to lack of funds, delays in tendering and antiquated engineering, procurement and construction practices. Moreover, plant redundancies and the absence of standardised plant designs often result in over-engineering and increase capital costs.
- ¶ **Low capacity utilisation:** Small steel mini-mills run at round 31 per cent of their capacity. In contrast, mini-mills in the US run at 90 per cent. Similarly, a lack of focus on marketing efforts by telecom operators results in 18 per cent fewer minutes per installed line compared to US operators (excluding Public Call Offices). Improvements in capacity utilisation will increase capital productivity by over 30 per cent.
- ¶ **Lack of viable assets:** A lack of investment in viable assets also hampers capital productivity by reducing the value added per physical unit of production. As discussed earlier, investments in cold rolling facilities in steel and in electronic metering in transmission and distribution will increase the value added to more than justify the investment required.

## **LACK OF COMPETITION GIVES COMPANIES LITTLE REASON TO IMPROVE PRODUCTIVITY**

The lack of competition in Indian industry is the main reason for the poor operational performance of Indian companies and hence for the low labour and capital productivity described earlier (**Exhibit 4.28**). In the absence of strong competition, managers can afford to ignore significant operational issues under their control (such as excess workers, poor OFT and inadequate equipment) and are able to earn high profits despite these inefficiencies. The lack of competition also shields companies from exposure to global best practices. Moreover, competition in some markets is distorted by unequally applied rules and

enforcement, allowing less productive players to thrive at the expense of the more productive ones.

The importance of competition in improving productivity and output growth is clearly seen in the Indian automotive industry. After the entry of Maruti Udyog Ltd and other foreign players, competitive intensity has increased dramatically, resulting in substantial market share loss for pre-liberalisation plants (**Exhibit 4.29**). The resulting lower prices and improved quality have boosted demand, thereby increasing employment despite the very high productivity growth (**Exhibit 4.30**).

### **Lack of competition leads to inefficiency and low consumer choice**

The absence of competition creates monopoly power for incumbent players. This in turn results in low choice and higher prices for customers. The ill effects of low competition are evident in the examples cited.

- ¶ In dairy processing, the licensing regime ensures that new plants are not established close to existing plants (i.e., in the milk shed area of the existing plant). This practically ensures that the incumbent plants have a procurement monopoly, as it is not feasible for farmers to supply to plants located geographically far away from them. As a result, incumbent processors have little incentive to rationalise labour and improve OFT.
- ¶ Competitive pressure on small domestic apparel manufacturers is low because large players cannot benefit from economies of scale without modern retail formats. Furthermore, the reservation of this area for small-scale industry protects small manufacturers and limits the expansion of large modern producers.
- ¶ In telecom, government-owned incumbents still account for over 93 per cent of the market while private entrants in the local market have limited their operations to the more profitable business segment. Moreover, the prices of the long distance and international segments (currently a government monopoly) remain very high, when compared to countries such as the US. As a result, government-owned incumbents enjoy higher profits than their counterparts in the US who face greater competitive pressures (**Exhibit 4.31**).
- ¶ In power generation, there is very little wholesale competition (i.e., inter-utility buying and selling of electricity). Although private players were allowed to enter the market in 1991, very few have actually entered owing to contractual disputes and payment delays by SEBs. Furthermore, retail competition in generation (i.e., where customers can buy electricity from competing producers) is non-existent in India. The experience of

other countries shows that competition in the wholesale and retail segments results in lower prices and better supply.

- ¶ Developers in India's real estate sector are shielded from competition by the scarcity of land, which is available only to a few insiders. As a result, these well-connected players are able to keep their profits high by focusing their efforts on land procurement and clearing red tape and more or less neglecting productivity in construction (**Exhibit 4.32**).
- ¶ In food retailing, counter stores typically enjoy a captive clientele based on personal relationships and services like home delivery and credit. The choice available to customers is further limited by the low penetration of modern supermarkets.
- ¶ Finally, in banking, despite delicensing in 1993, competition is still not strong enough for the larger public banks. Private banks are still small and active only in select urban and metropolitan areas.

### **Exposure to global best practices is also limited in many sectors**

Exposure to best practices increases pressure on managers to improve productivity. Furthermore, as recent experience in the automotive sector has shown, the presence of best practice companies also facilitates the dissemination of more efficient managerial practices.

One sector in which global best practice is almost totally absent is the apparel industry. Foreign firms often prefer to establish operations in countries such as China or Thailand where they can find sufficient good quality textiles as well as cheap labour. In retail, existing restrictions on foreign best practice players limit the diffusion of sophisticated sourcing and organisational practices, a key success factor in this complex business.

### **Unfair competition allows less productive players to survive**

In a market economy, strong competition ensures that the more productive companies grow at the expense of the less productive ones. In India, however, the presence of a non-level playing field and uneven enforcement of regulation allow less productive players to thrive even when domestic competition is high.

In the steel industry, for example, uneven enforcement of taxes and energy payments allows sub-scale, inefficient plants to compete despite their lower quality and higher inefficiencies. In retail, lax enforcement of taxes and duties among small players helps unproductive retail counter stores and limits penetration of supermarkets.

In dairy processing, the subsidisation of cooperatives and government-owned plants allows overstaffed and inefficient government-owned cooperatives to stay

in business. In telecom, higher licence fees and interconnection agreements increase entry costs and limit the entry of telecom operators using wireless technology.

## **EXTERNAL FACTORS LIMIT COMPETITION AND THWART PRODUCTIVITY GROWTH**

Widespread market distortions in India raise many barriers to high capital and labour productivity (**Exhibit 4.33 & Exhibit 4.34**). It has its most negative effect through product market barriers, that is regulation governing specific sectors. Land market barriers, government ownership and problems in related industries (mostly due to product market barriers in these sectors) are other important barriers to labour and capital. However, our case studies show that other widely discussed obstacles such as stringent labour laws, poor infrastructure and low literacy rates have a lower effect on productivity than assumed. Restrictions on labour laws were found to be overcome through use of voluntary retirement schemes (VRS).

### **Product market distortions are the most important barrier to productivity growth**

On average, in our case studies, we have found that removing product market barriers will increase labour productivity by around 80 per cent. In contrast, government ownership lowers productivity in almost 40 per cent of labour in modern sectors. Moreover, removing product market distortions is a key prerequisite for reaping the productivity benefits from privatisation. As we showed in our report on the Russian economy, distortions to competition introduced by distortions in the product market will limit managers' incentives to improve productivity despite privatisation.<sup>3</sup>

Product market barriers also play a key role in limiting capital productivity in the sectors we have studied. For example, regulation on the rate of returns limits managers' incentives to cut capital costs and encourages over-engineering in power generation, transmission and distribution. Similarly, unequal tax enforcement and investment subsidies allow under-utilised small mini-mills to compete despite their higher capital costs per ton of steel produced.

Outright barriers to entry, differential rules and uneven enforcement play a major role in hampering productivity.

- ¶ **Outright entry barriers:** A number of regulations such as restrictions on foreign direct investment (FDI), high import tariffs and licensing and

---

<sup>3</sup>*Unlocking Economic Growth in Russia*, McKinsey Global Institute, October 1999.

small-scale reservations decrease competition and thus productivity in India.

- **Restrictions on FDI:** Three examples show the adverse effect of FDI restrictions on productivity. In the retail sector, current regulation restricts global retailers to wholesale trade and operating retail outlets through local franchisees. In apparel, FDI in domestic-oriented manufacturers is limited to 24 per cent of equity. This restricts the transfer of technology, skills and managerial knowledge from foreign best practice firms to local ones. In housing construction, restrictions on foreign ownership of land limit the entry of foreign builders and developers into the construction market. Foreign players face higher risks when operating in India, as they are unable to take land ownership as collateral for the capital they have invested.
- **High tariffs on imports:** In three of the sectors we have studied, high tariffs considerably depress competition and thus productivity. Import duties in the steel industry still protect Indian companies from price-based competition with global best practice players, reducing their incentive to increase the efficiency of their plant operations and make economically viable investments.

In the automotive sector, high import duties on mid-sized cars allow subscale and under-utilised automotive assembly plants to compete with productive foreign players. In apparel, quantitative restrictions prevent imports from more productive lower cost countries. As a result, India's domestic apparel industry faces less pressure to improve productivity. If quotas are removed, India's apparel sector will be forced to restructure in order to compete with China, which, unlike India, has already gained ground in markets not currently protected by the quota system (**Exhibit 4.35**).

- **Processing licences through Milk and Milk Products Order (MMPO):** This prevents new entry in dairy processing. Although the MMPO was set up primarily to ensure high levels of quality and hygiene, its ability to grant processing licences has become a way to limit the entry of new cooperatives and, in particular, private plants into particular milk shed areas. As a result, government-owned and cooperative dairy plants remain profitable and have little incentive to rationalise excess labour and improve OFT.
- **Reservation for small-scale industry (SSI):** In the apparel industry, reservation of specific areas for small-scale players limits entry and competition. Although removed for the woven segment since November 2000, reservations remain in place in the knitted and hosiery segments. With increasing trade in apparel products, SSI

restrictions are protecting subscale plants from competing with large-scale Chinese manufacturers.

¶ **Non-level rules and uneven enforcement:** Rules that sometimes irrationally differentiate between different kinds of players or the uneven enforcement of rules (e.g., on taxes and inputs payments) give some industry players an unfair advantage. Protected players have little motivation to improve productivity and are able to compete despite their inefficiencies. To illustrate:

- In the steel industry, small mini-mills frequently evade energy payments and taxes by under-reporting their sales. This gives them an unfair cost advantage of 15 per cent that allows them to survive and compete against larger, more “visible” players. Moreover, subsidies for new companies in underdeveloped areas have contributed to the proliferation of these small-scale players. The tax subsidy regime gives incentives to invest in several small plants rather than a single larger one. Similarly, large integrated players benefit from subsidised coal and iron ore prices obtained through preferential long-term mining leases. As a result, overstaffed and inefficient integrated players have a cost advantage over more efficient large mini-mills (**Exhibit 4.36**).
- Cooperative dairy plants have received large subsidies from state governments in the form of loss write-offs and soft loans. These subsidies have allowed them to survive despite their excess labour and poor OFT.
- For some products in the apparel industry, firms with investments of less than US\$ 200,000 are exempt from paying excise duty, thereby improving their cost position vis-à-vis larger manufacturers.
- Pro-incumbent regulation in telecom often inhibits the entry of new players, limiting competition. Moreover, even when entry occurs, differential regulation increases the costs for new private players. This allows government-owned incumbents to maintain market share despite their lower productivity. Besides paying a high licensing fee (17 per cent of revenues), new local telecom providers also face limitations on geographical coverage, delays in interconnecting and unequal access to long distance telephony. In the wireless market, recent legislation permits incumbent wireline operators to provide “limited mobility” mobile services without paying the additional licence fees that regular mobile providers are required to pay.
- Power wholesale tariffs protect SEBs and central government-owned generators from competition through capacity additions by private

players. Furthermore, the lack of independent regulators allowed SEBs to pass the costs arising from operating inefficiencies and energy losses/thefts on to consumers.

- In retail, unequal tax and labour laws give traditional counter stores a 15-20 per cent benefit in gross margins vis-à-vis supermarkets. Most traditional retailers evade most of their income tax as well as some of their sales tax. Moreover, traditional stores also pay lower rates for land and energy compared to modern formats. Frozen rents and lower residential power rates typically halve the land and power costs for some traditional counter stores.

¶ **Other product market barriers:** Productivity also suffers through restrictions on or practices in specific industries.

- In retail banking, interest rate restrictions hamper bank operations. India's central bank, the Reserve Bank of India, prevents banks from offering any interest on checking accounts (current accounts) for small businesses and limits interest on checking accounts for retail customers to 4.5 per cent. Similarly, the interest rates on small loans are limited to 12-13.5 per cent. Although these restrictions have not stopped new private banks from rapidly attracting wealthier customers on the strength of better service and higher rates for fixed term retail deposits, they could restrict their growth into the mass market which has a higher demand for liquidity.
- Cross subsidies in telecom limit operators' incentives to boost usage, lowering both labour and capital productivity. Moreover, under current conditions, cross subsidisation allows local incumbents to take advantage of artificially high long distance prices to finance their local operations, lowering their costs vis-à-vis new local providers not present in the long distance market.
- Inadequate standards for building and materials hamper DFM in housing construction and limit competition. Better building standards will facilitate the diffusion of best practice DFM (with competition among developers as a prerequisite), increase the information available to consumers, and facilitate housing financing. Moreover, enforcement of standards will compel contractors to focus on lowering labour costs rather than on sourcing cheap, lower quality materials.
- In software, weak enforcement of intellectual property rights increases software piracy rates to around 61 per cent compared to only 25 per cent in the US. As a result, product companies lose revenues that can increase their productivity by 88 per cent (**Exhibit 4.37**). While the

direct impact of this will be a virtual doubling of current productivity in products, the indirect impact is far higher. With the right protection, products companies will derive higher returns on their investments in research and development, gain scale and dramatically improve productivity.

### **Land market distortions also restrict productivity growth**

Land market barriers, usually ignored in the public debate over economic reforms, critically affect large domestic sectors such as housing construction and retail. The important issues here are unclear titles, low property taxes, subsidised user charges, rent control and stringent tenancy laws and zoning laws.

¶ **Unclear titles:** It is believed that most, over 90 per cent by one estimate, of the land titles in India are “unclear”, leading to numerous legal disputes over property. The lack of clear titles affects price-based competition in housing construction and retail in several ways. First and foremost, it limits access to land to a few privileged developers who thrive in this environment, making their profits on the basis of offering clear titles as opposed to lower prices. Second, it makes collateral-based financing very difficult, restricting the number of transactions in both the primary and secondary housing markets. The lower number of transactions, in turn, limits price information for consumers and further reduces competitive intensity among developers. Finally, unclear land titles also limit the expansion of large modern retailers by limiting access to a few well-connected players.

¶ **Low property taxes:** Low property tax and its collection reduces the local governments’ incentives to build new infrastructure. Again, this restricts the land available to housing developers and retailers. Property tax collection, a key source of revenue for infrastructure financing in other countries, is low in India for two reasons. First, in city centres, property valuations for tax purposes are usually outdated and often linked to the controlled rents paid by existing tenants. Second, in city suburbs, where rents are not controlled, property tax collection is low since there is a larger amount of unauthorised construction (i.e., slums) and higher tax evasion due to corrupt officials.

The lack of infrastructure development restricts new construction to the city centres where only well-connected developers and retailers are able to acquire land. In particular, it severely limits the large-scale development of single-family homes, which require large land lots at the city edges. Moreover, the lack of suburban developments reduces the amount of price information available to consumers by reducing the size of the “built for sale” housing market.

- ¶ **Subsidised user charges:** As with low property taxes, heavily subsidised user charges limit the incentives for local governments to invest in new infrastructure and limit the land available for housing and retail developments. Water and sewerage services are typically government-owned and pricing decisions are often taken on political rather than economic grounds. Similar issues affect the electricity sector where, despite private participation, energy thefts and subsidised tariffs for certain segments of consumers greatly reduce collection.
- ¶ **Rent control and stringent tenancy laws:** Stringent rent control and tenancy laws reduce competition among housing developers and retailers. First, they freeze land in city centres, thereby contributing to the lack of “clear” land for construction and retail. Second, rent control directly hampers the size of the rental market. More and cheaper rental accommodation will increase competitive pressure on developers.
- ¶ **Zoning laws:** Zoning laws contribute to the lack of “clear” land and limit competition among housing developers and retailers. Local governments are often slow to convert rural land to residential land and this limits the supply of land in city suburbs. In other countries, the incentives offered to local government to convert rural land are linked to the future tax collection from new developments on this land. These incentives are severely restricted in India as a result of the low property tax and user charge collection in suburban areas.

### **Government ownership is a major restraint on productivity**

Government ownership inhibits productivity in modern industries such as steel, power, telecom and banking. Government-owned bodies, which account for around 40 per cent of employment in modern sectors, exhibit substantially lower productivity than their private counterparts who, incidentally, also perform well below their productivity potential because of product market barriers (**Exhibit 4.38**).

Government ownership lowers productivity in three main ways. First, political interference and the compulsion to create jobs have led to massive over-employment, resulting in poor labour productivity at government-owned plants. Second, the constant bailing out of companies in financial trouble and the subsidising of operational inefficiencies allows these players to survive without restructuring. Finally, government ownership often induces regulation that protects inefficient incumbents at the expense of more efficient private entrants.

At the operational level, government ownership affects productivity in two ways. For one, it hampers labour productivity by reducing the managers’ incentives to rationalise the labour force, improve organisational practices and invest in viable assets, as is described in the instances that follow.

- ¶ Despite being vastly overstaffed and inefficient, subsidies and bail-out packages allow large government-owned steel producers to compete with more efficient private players.
- ¶ In the power sector, state-owned SEBs employ, on average, four persons per MW as against one person per MW at even the old private sector plants.
- ¶ In telecommunications, the government monopoly leads to very high long distance telecom tariffs and thus high revenues, reducing pressure on the management to improve operations. As a result, heavily overstaffed operators are able to compete with more efficient new private entrants. Moreover, the government's investment targets limit economically viable investment by favouring investment in new lines as the only performance target. Viable investments are further limited by the multiple layers of approvals required to obtain funds for items outside the annual budget.
- ¶ In banking, subsidised public sector banks have little financial incentive/pressure to automate branches and rationalise labour. Managers are also typically unwilling to confront powerful labour unions, which have imposed many internal barriers to increasing productivity.

At the external level, government ownership also hampers capital productivity. Public enterprise managers, with little reason to maximise profits, are complacent and often tolerate under-billing, construction time and cost overruns and over-invoicing of imported equipment. Similarly, the lack of shareholder vigilance from government-owned banks and insurance companies also leads to over invoicing.

- ¶ Corruption and lack of profit incentives often result in over invoicing of equipment and time overruns in building government-owned steel plants. Moreover, private steel plants, under the lenient eye of government banks and large state-owned institutional shareholders (e.g., insurance companies), incur similar time and cost over-runs.
- ¶ Government targets and bureaucratic delays hamper the capital productivity of government-owned telecom operators. First, viable investments are limited by the multiple approvals required to obtain funds for items outside the annual budget. Second, network planning becomes short sighted as the capacity in place only reflects current targets instead of anticipating future demand. Finally, corrupt practices sometimes result in over invoicing of capital equipment.
- ¶ Poor corporate governance in the power sector, primarily at SEBs, is the main external factor leading to low capital productivity in generation and transmission and distribution. In generation, SEBs have the longest construction overruns and the lowest capacity utilisation. In transmission

and distribution, they lose about 20-25 per cent of power (mainly due to theft) compared to the 2-3 per cent mainly technical losses of best practice private players

### **Distortions in related sectors have negative spillover effects**

Distortions in related industries harm productivity in many of the sectors we have studied. Typically, these distortions are the result of product market barriers in these sectors, as the examples we have elucidated show.

- ¶ **The food value chain:** The underdeveloped supply chain of this sector is a critical barrier for global food retailers who will not invest in India unless they can source a large proportion of their requirements locally and at the right quality. This prevents the spread of best practice, for example, through contract farming or in streamlining the distribution chain and reducing downstream costs for processors.

Large players account for only 25 per cent of the food processing output in India. The small-scale industry (SSI) accounts for a third of the output and non-registered traditional manufacturers for another 42 per cent. While the SSI reservation is being progressively relaxed, some products remain restricted (bread, some confectionery, etc.) and the legacy effect is strong. As a result, food processors in India remain small and fragmented, and are unable to reap the benefits of scale or invest in brand building. The absence of large processors also limits the diffusion of contract farming, an efficient way to provide extension services to farmers. Extension services such as bulk buying of feed and fodder, provision of management information, and education about animal health and hygienic practices are very important if dairy farmers are to increase their productivity.

The absence of large retailers also increases distribution inefficiencies and reduces competition in wholesaling. In India, distribution of most food items involves multiple intermediaries, high cycle times and losses during transportation and storage (**Exhibit 4.39**). These distribution inefficiencies are the largest in the fruit and vegetable chain where the absence of a cold chain and convenient marketing channels leads to huge wastage.

- ¶ **The apparel value chain:** The apparel industry suffers from fragmented textile suppliers and retailers. Retailers are also constrained by the lack of large producers of branded apparel. Large mills that can produce significant quantities of quality fabric are scarce and export much of their production. One of the reasons is that small-scale reservation, the uneven enforcement of labour laws and non-level taxes allow powerlooms and handlooms to thrive despite their lower productivity (**Exhibit 4.40**).

Furthermore, zoning codes and labour laws make it difficult for the mills to move to cheaper land/labour cost areas.

The poor quality of local textile fabrics hampers the productivity of apparel exporters as well as domestic manufacturers. For exporters, poor quality deters FDI. All things being equal, investors prefer a country with a readily accessible supply of textiles to cut down on the turnaround time and minimise problems with customs clearance. Poor quality textiles affect domestic producers even more dramatically since they do not have the option of importing fabric at low duties. Small lots of faulty fabric push up complexity costs and prevent the adoption of new technology.

Finally, the fragmentation of domestic apparel producers increases the sourcing costs for retailers since it makes it difficult for large formats such as department stores to find sufficient brands and quality merchandise.

- ¶ **The steel value chain:** Here, government control on ore deposits acts against the market. Government long-term leases on iron ore and coal mines enable integrated players to source iron ore and coal at highly subsidised prices and thus compete with more productive large mini-mills and foreign imports. At the same time, a lack of concern for quality steel on the part of real estate developers and contractors helps many of the small mini-mills and rolling mills, which typically serve only their local construction market. Larger players would not produce sub-standard steel because it would damage their brand.
- ¶ **Power generation and transmission and distribution:** As mentioned earlier, the bankruptcy of the SEBs is one of the key reasons why entry into the wholesale generation market has been very slow. Private investors, fearing default on payments, attach a high risk premium to generation projects. In turn, SEBs are bankrupt mainly because of government ownership, which limits the incentives to improve operations and reduce rampant theft.
- ¶ **Credit rating systems and retail banking:** The lack of reliable credit information in India directly reduces productivity in retail banking. In the US, the Fair Credit Reporting Act of 1971 allows credit bureaus to release customer histories to entities with a legitimate need to determine customers' creditworthiness. In contrast, regulation on credit bureaus is not clear in India. Moreover, government-owned banks have little interest in improving their credit approval process. Consequently, most banks do not have access to credit data and hence have to spend a vast amount of time on the underwriting process (**Exhibit 4.41**).

## Factors with less influence on labour and capital productivity

Despite a widely-held view that rigid labour laws, worker illiteracy, red tape and corruption and poor infrastructure are important causes of the productivity gap between India and the US, we found these barriers to be not as important as commonly believed.

¶ **Labour market distortions:** Stringent labour laws are not significant barriers to high productivity. This is because rigid labour laws are only applicable to the manufacturing and government sectors. Even in these sectors, it is possible to gradually prune the workforce. Thus labour market rigidities may slow down productivity growth in some cases, but they do not generally prevent an industry from achieving its potential labour productivity over time. Although it is difficult to dismiss workers except on disciplinary grounds, the workforce can still be rationalised using VRS. For example, large private steel plants have already reduced their labour force by 10 per cent in one year using VRS. Similarly, overstuffed government-owned companies now facing competition from best practice private entrants have recently offered VRS and over 10 per cent of the employees have applied for it. Labour laws do, however, affect India's attractiveness as a manufacturing destination for exports to global markets. This has been the experience in the apparel sector, where global players have chosen to locate their sourcing bases in other Asian countries.

¶ **Poor transportation infrastructure:** We have not found poor transportation infrastructure (i.e., roads and ports) to be as significant a constraint on productivity and output growth in our case studies as the top three factors, belying the common belief that poor infrastructure represents a serious bottleneck. Indian road and railway coverage appears to be well in line with that of other developing countries (**Exhibit 4.42**). Road shipping delays are due in part to the poor quality of roads and also to poor traffic management. Similarly, delays in ports are mainly a consequence of red tape and inadequate and poorly managed material handling facilities rather than the shortage of berthing capacity.

Best practice companies usually find ways of overcoming the operational effects of infrastructure inefficiencies. For instance, automotive suppliers tend to locate themselves close to the assembly plants and best practice supermarkets typically use small generating facilities to cope with the energy shortages during peak demand.

¶ **Low labour skills or literacy rates:** We did not find India's current low literacy rates to be a constraint on productivity growth. In all the sectors we studied, we found that Indian blue collar workers could improve their performance if on-the-job training were provided and managerial best

practices put in place. We found similar examples in the US as well.<sup>4</sup> A Houston-based housing builder achieved best practice productivity with illiterate Mexican ex-agricultural workers who were not fluent in English. Similarly, a Richmond food processor trained his employees, many of whom had difficulties in reading and writing, to fulfil complex work within a highly automated plant.

Where labour skills are more important is in the software sector whose future growth may be hampered by the expected shortage of experienced software professionals. Although the availability of English-speaking software professionals has not been an issue in the past, increased sourcing of software professionals by companies in developed markets might limit the Indian industry's ability to continue growing at its current rate. Public and private training institutions that have increased their output of specialised engineers over the past few years, however, are already addressing this issue.

- ¶ **Red tape and corruption:** These are factors that do have a negative effect on productivity, albeit not as great as assumed. Red tape and corruption directly affect productivity by disrupting workflow and making planning difficult. Moreover, red tape and corruption can also discourage entry, especially by foreign players, thereby limiting competition for domestic as well as foreign best practice players. Two examples prove the point:
- In housing construction, frequent site inspections and harassment by government inspectors often cause work stoppage, making it difficult to plan work.
  - In apparel, red tape and corruption in Indian ports is a strong deterrent to FDI. Delays in ports critically affect exporters by increasing transportation costs and making “time to market” difficult. As a result, foreign investors prefer to establish their operations in China, where higher labour costs are more than compensated for by lower transportation costs.

---

<sup>4</sup> *Productivity – The Key to an Accelerated Development Path for Brazil*, McKinsey Global Institute, March 1998.

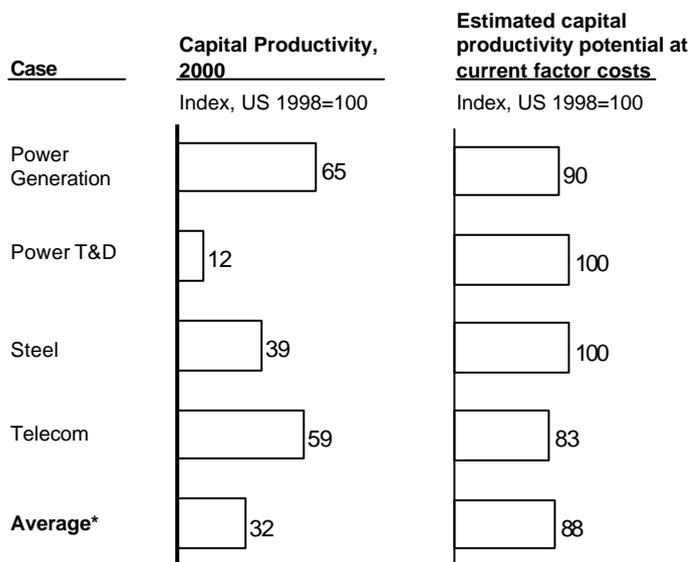
### SECTOR-WISE LABOUR PRODUCTIVITY PERFORMANCE



\* Grossed up to the Indian economy  
Source: McKinsey analysis; Interviews

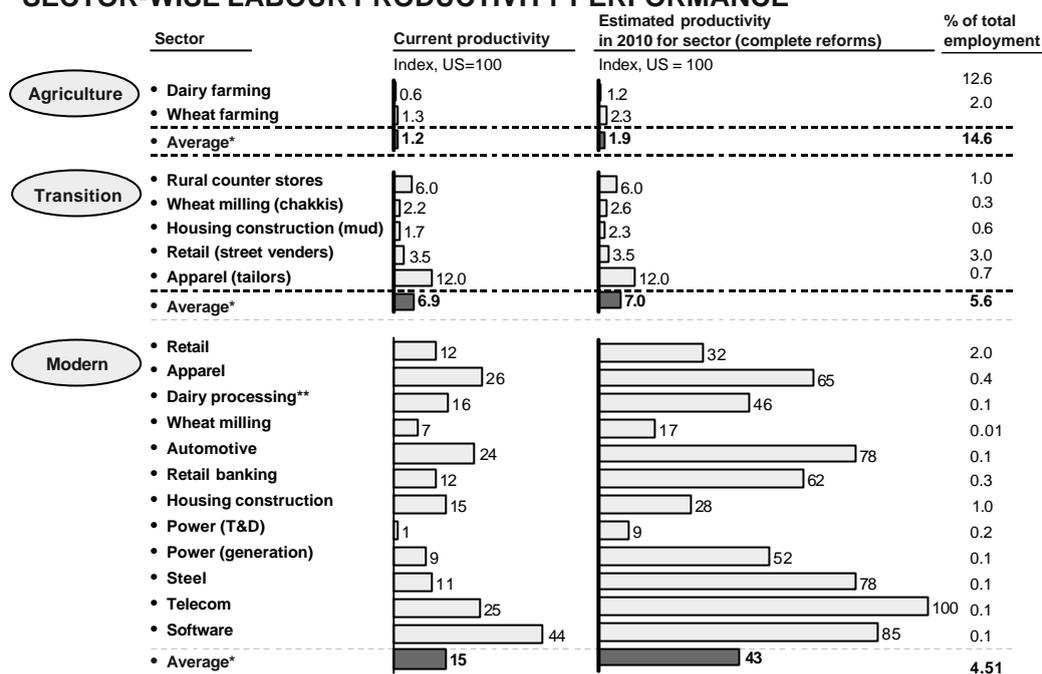
Compared to 7%  
according to  
official statistics

### SECTOR-WISE CAPITAL PRODUCTIVITY PERFORMANCE



\* Weighted using current levels of capital stock  
Source: McKinsey analysis

## SECTOR-WISE LABOUR PRODUCTIVITY PERFORMANCE



\*Grossed up to the overall economy

\*\*Organised sector only

Source: Interviews; McKinsey Analysis

## COMPARATIVE DEVELOPMENT OF INDIAN AGRICULTURE

Country	PPP adjusted GDP/ capita	Employed in agriculture	Key characteristics of farming model		
			Average landholding size	Level of mechanisation	Farming model
	% of US	%	Hectares		% integrated*
USA	100	2.2	197	• Combine • Air spraying	• Low
Japan	83.9	4.6	1.4	• Combine	• Low
France	76.4	3.7	31.5	• Combine	• Low
Mexico	27.9	22.7	41.4	• Combine	• Low
Thailand	22.3	58.0	3.4	• Combine	• Medium
Turkey	22.2	47.7	5.8	• Combine	• Low
Brazil	21.8	17.8	72.8	• Combine	• Medium
<b>India</b>	<b>5.7</b>	<b>60.5</b>	<b>1.6</b>	<b>• Tractorised • Limited (&lt;5%) use of combine</b>	<b>• High</b>

\* High: &gt;66%; Medium: 33-66%, Low: &lt;33% where % integrated = per cent of cattle raised by part-time farmers

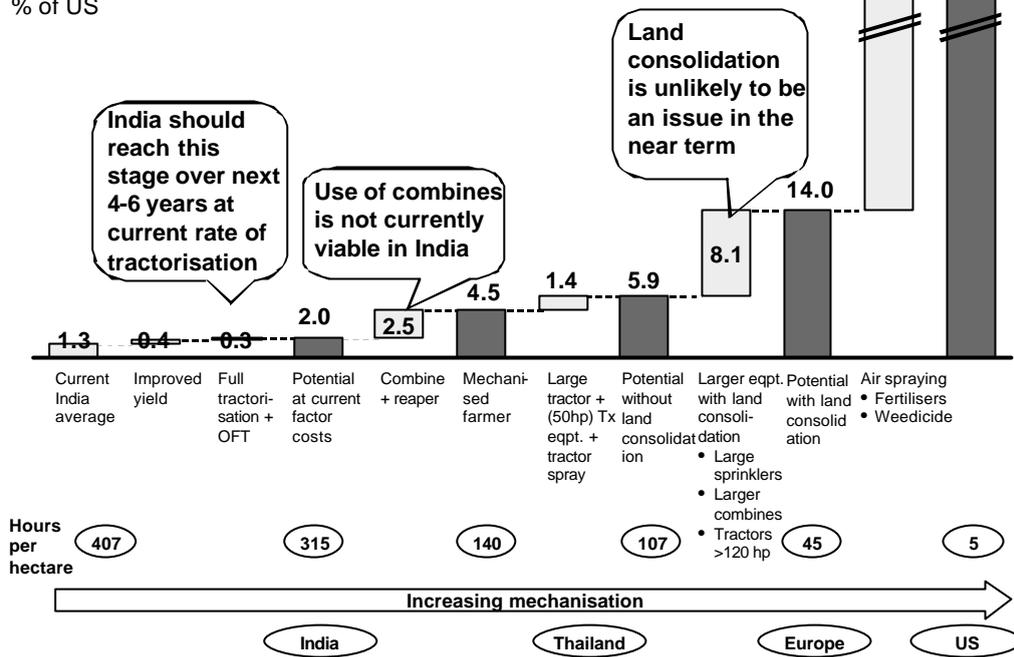
Source: *The Economist* (2000); FAO Handbook, 1998

Exhibit 4.5

**PRODUCTIVITY LADDER FOR WHEAT FARMING**

% of US

2000-08-31MBZXJ151

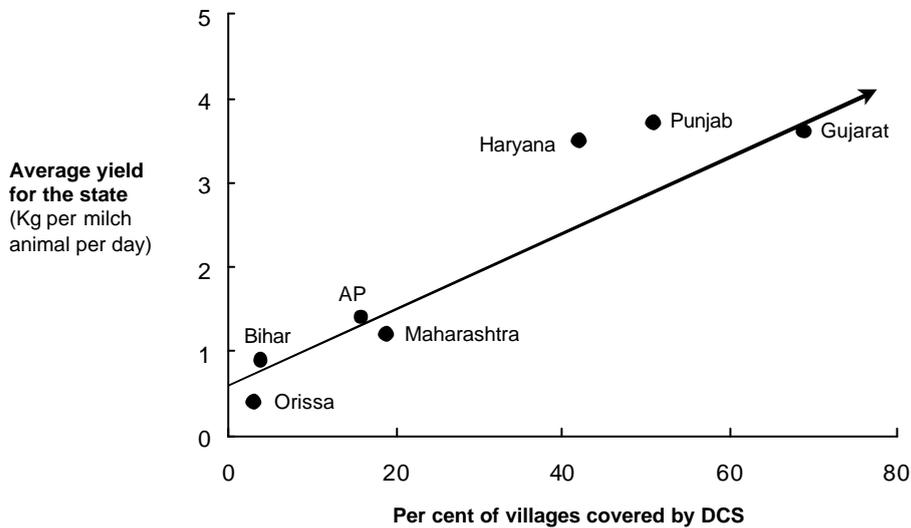


Source: Team analysis; Interviews

Exhibit 4.6

**DCS COVERAGE AND DAIRY YIELD FOR STATES, 1994-95**

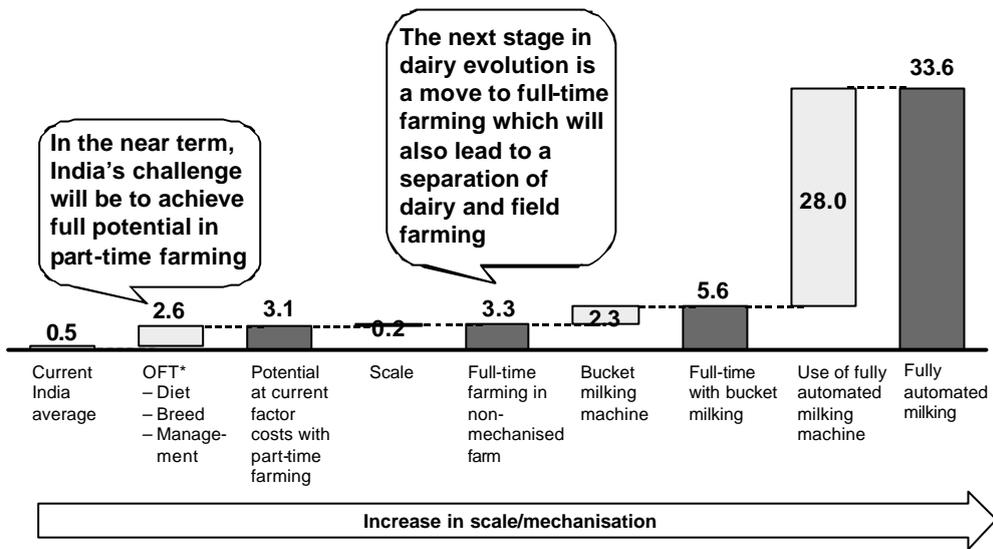
2000-08-31MBZXJ151



\* Other factors that affect yields b/w states and climatic conditions and difference is animal mix  
 Source: Basic animal husbandry data 1999; Census of India 1991

### PRODUCTIVITY LADDER FOR DAIRY FARMING

% of US



\* Organisation of functions and tasks

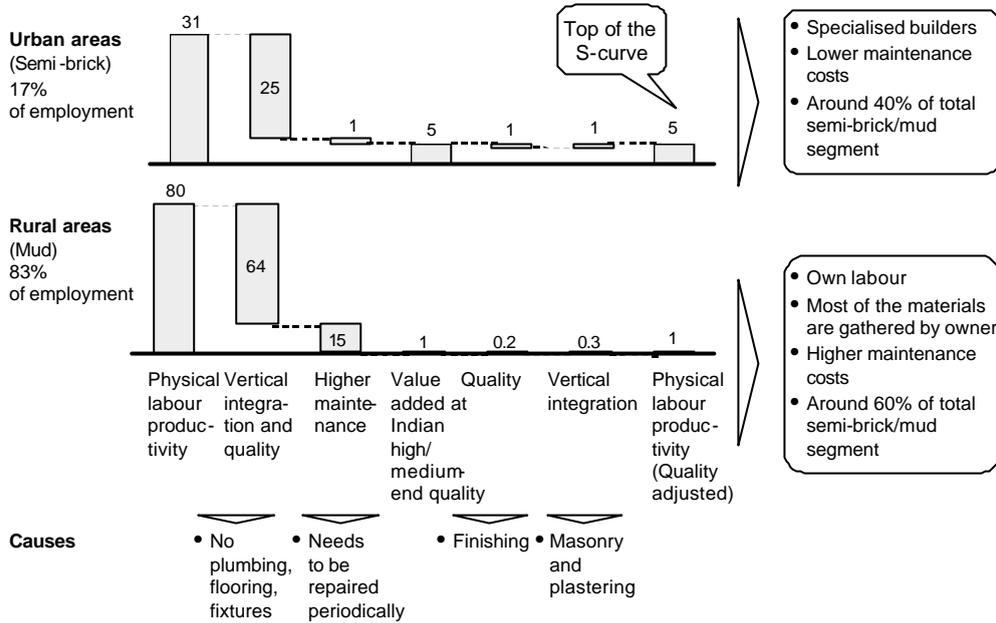
Source: Team analysis; Interviews

Exhibit 4.8

2000-08-31MBZXJ151

### LABOUR PRODUCTIVITY IN RESIDENTIAL HOUSING CONSTRUCTION

Indexed to US=100; Sq m per '000 hours



Source: Interviews; McKinsey analysis

Exhibit 4.9

2000-08-31MBZXJ151

### SUMMARY OF OPERATIONAL FACTORS LEADING TO LOW LABOUR PRODUCTIVITY IN MODERN SECTORS

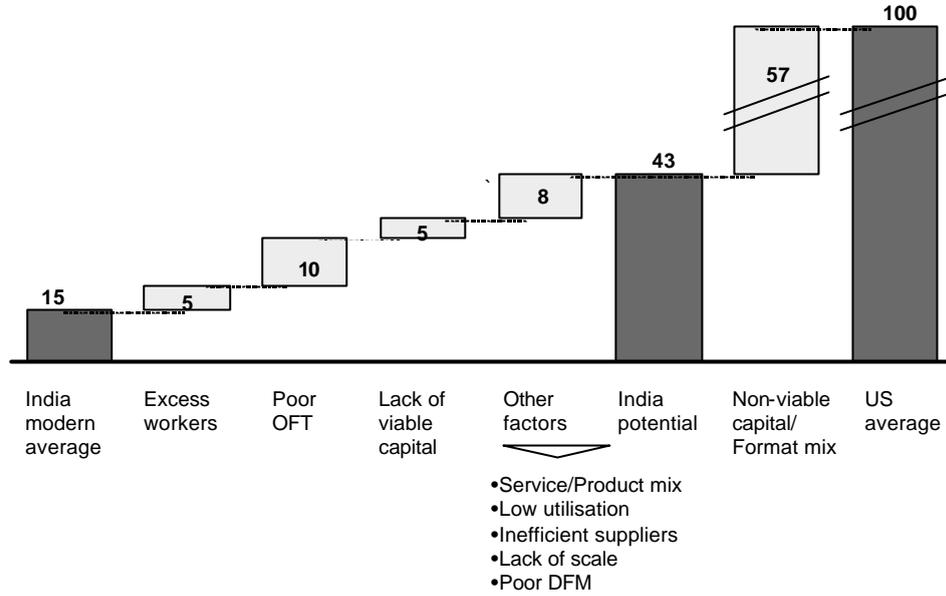
● Important  
○ Less important  
→ Not important

	Steel	Auto-motive	Food Processing		Power		Housing	Banking	Retail	Software	Total
			Wheat	Dairy	Apparel	Telecom	Gen. T&D				
<b>Operations</b>											
- Excess labour	●	●	→	●	→	●	●	→	○	→	●
- OFT	●	●	●	●	●	○	●	●	●	●	●
- DFM	→	○	→	→	→	→	→	●	→	→	○
- Capacity utilisation	○	●	→	●	→	→	→	→	→	→	○
- Supplier	→	○	→	●	○	→	○	→	●	○	○
- Marketing	→	→	→	→	→	●	→	→	→	○	○
- Labour trainability	→	→	→	→	→	→	→	→	→	→	→
<b>Product/Format mix</b>	→	→	→	→	●	→	→	○	○	●	○
<b>Technology</b>											
- Lack of scale	●	●	→	→	●	→	→	→	→	○	●
- Lack of viable investment	○	→	→	○	●	●	●	○	●	→	●
- Non-viable investment	○	○	●	○	→	→	●	○	→	→	●

Source: Team analysis; Interviews

### CAUSAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES IN MODERN SECTORS

Indexed to US=100



Source: Team analysis; Interviews

### SUMMARY OF OPERATIONAL FACTORS LEADING TO LOW CAPITAL PRODUCTIVITY

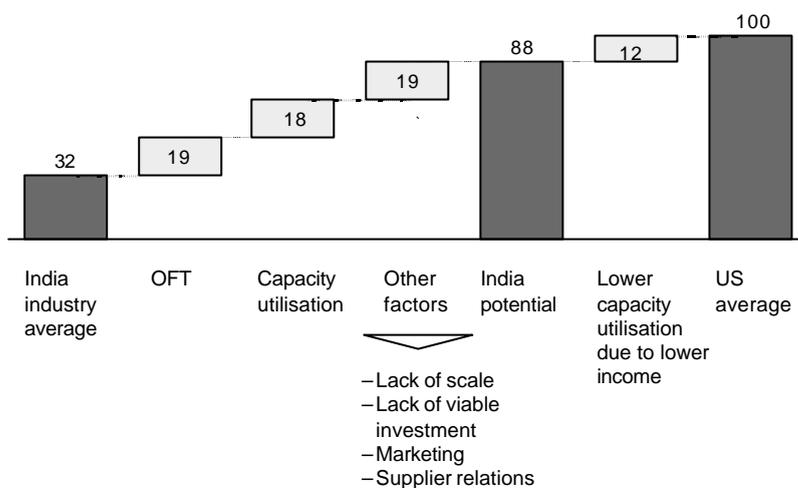
● Important  
○ Less important  
— Not important

	Power		Steel	Telecom	Average
	Generation	T&D			
<b>• Operations</b>					
– OFT	●	●	●	○	●
– DFM	—	—	—	—	—
– Capacity utilisation	●	—	●	●	●
– Supplier	○	—	—	○	○
– Marketing	—	—	—	●	○
– Labour trainability	—	—	—	—	—
<b>• Product/Format mix</b>	—	—	●	—	○
<b>• Production factors</b>					
– Lack of scale	●	—	●	—	●
– Lack of viable investment	○	●	○	—	○

Source: Team analysis; Interviews

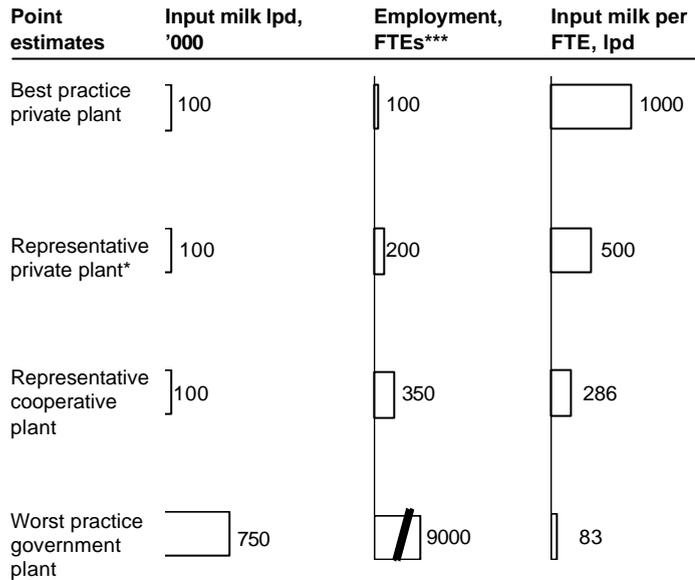
### CAUSAL FACTORS FOR CAPITAL PRODUCTIVITY DIFFERENCES IN MODERN SECTORS

Indexed to US=100



Source: Team analysis; Interviews

**STAFFING LEVELS IN DIFFERENT TYPES OF MILK PROCESSING PLANTS**



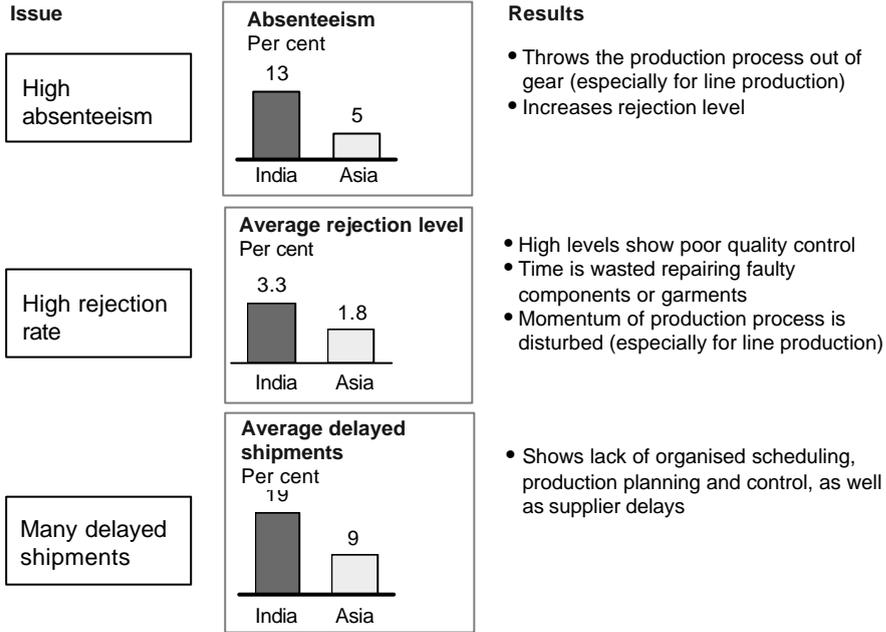
\* Estimates

\*\* Large scale plant (some economies of scale)

\*\*\* Full time equivalents

Source: Interviews; Team analysis

## IMPACT OF POOR O&T IN APPAREL

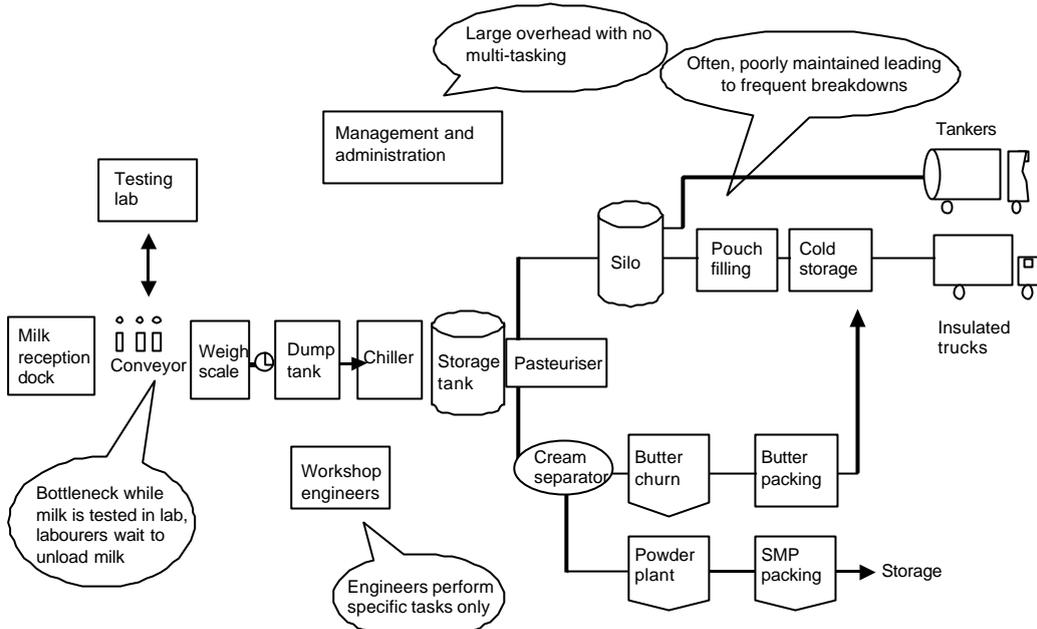


### Results

- Throws the production process out of gear (especially for line production)
- Increases rejection level
- High levels show poor quality control
- Time is wasted repairing faulty components or garments
- Momentum of production process is disturbed (especially for line production)
- Shows lack of organised scheduling, production planning and control, as well as supplier delays

Note: Asia includes Sri Lanka, Thailand, Malaysia, Indonesia, Hong Kong, South China, Bangladesh  
 Source: NIFT survey; American Apparel Manufacturers Association

**TYPICAL DAIRY PLANT\* LAYOUT AND EXAMPLES OF OFT\*\* PROBLEMS**

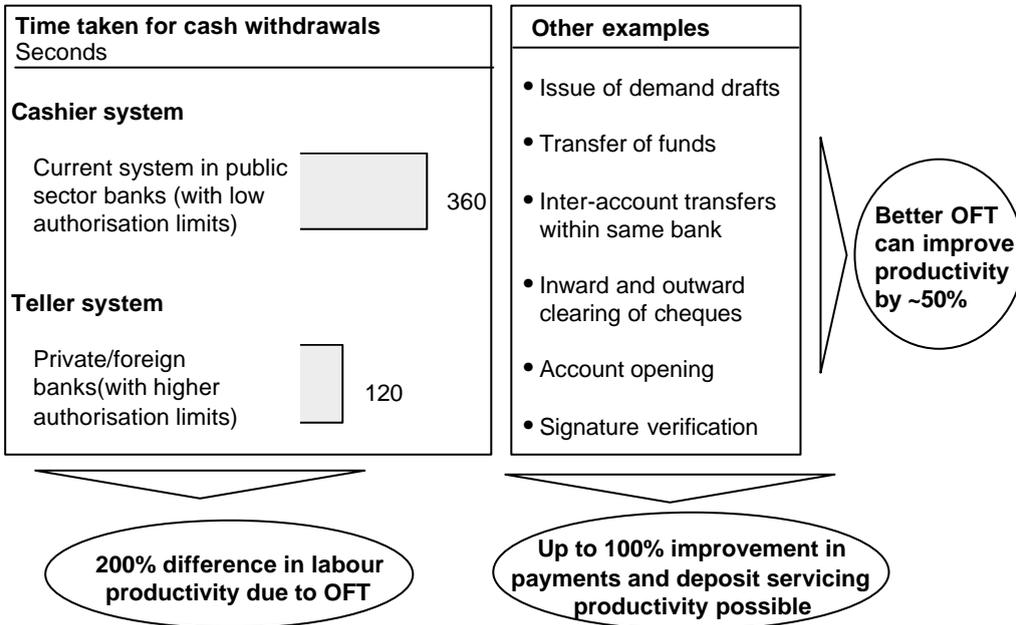


\* 100,000 lpd plant making toned milk, SMP, and butter

\*\* Organisation of functions and tasks

Source: Interviews

**POOR OFT\* IN RETAIL BANKING**



\* Organisation of functions and tasks

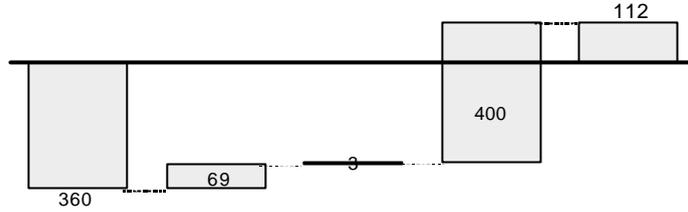
Source: Bank Survey, McKinsey Analysis

### LACK OF VIABLE INVESTMENT IN STEEL

Rs crore

**Concaster**

- Cost of equipment Rs 360 crore
- 7 years until major revamp
- Savings of 0.05 hours per tonne
- Quality improvement of 1.5%



**Steel shop automation\***

- Cost of equipment 202 crore
- 20-year life
- Quality improvement of 2% (conservative)
- Capacity of steel shop of 2 mtpa
- Reduce labour from 2500 to 500 (extreme)

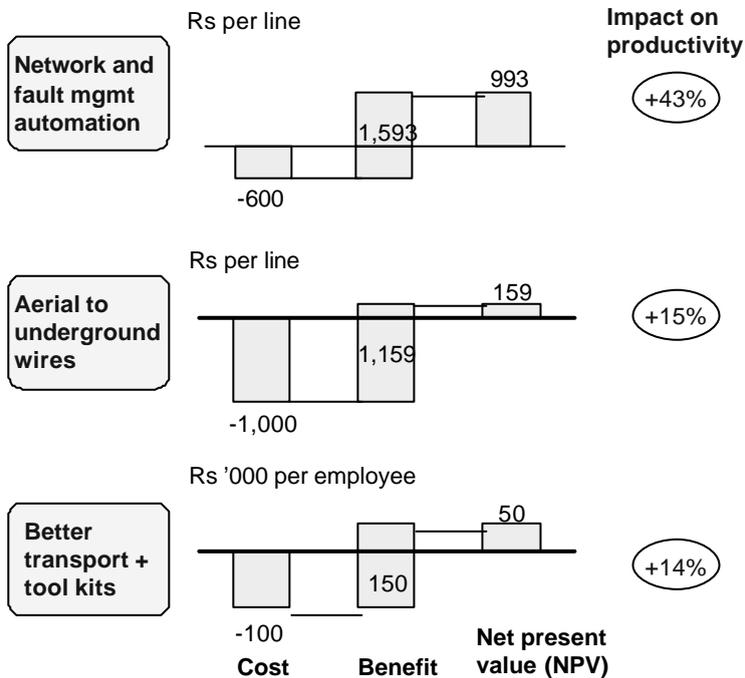


\* Includes control system for LD converters, subblance in LD converted, combined blowing  
 Note: Assumes WACC of 16%; cost of labour Rs42/hour

### LACK OF VIABLE INVESTMENT IN TELECOM

**Assumptions**

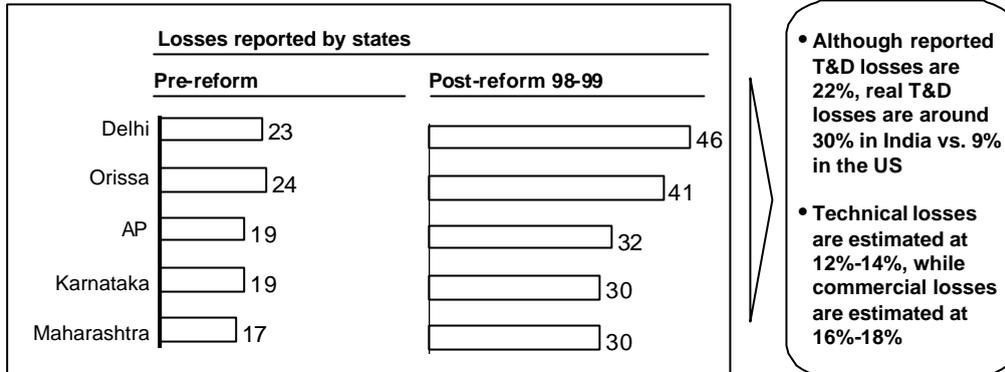
- Cost of capital: 16%
- Investment benefits reaped to perpetuity
- Salaries are constant to perpetuity



Source: Interviews; McKinsey estimates

Exhibit 4.19  
**LOSSES IN POWER T&D**  
 Per cent

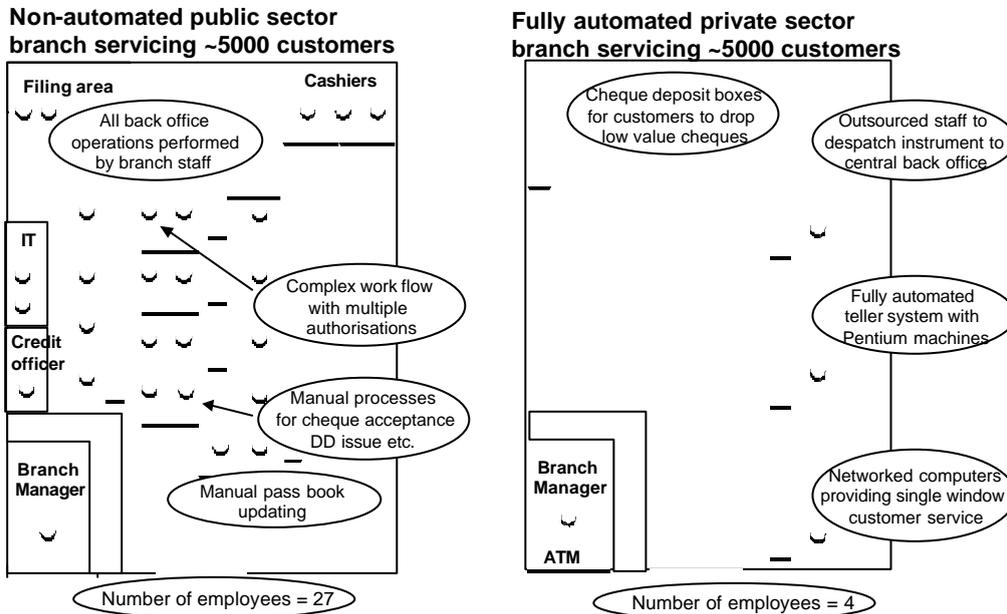
2000-08-31MB-ZXJ151



Source: Powerline; Press clippings; Interviews

Exhibit 4.20  
**COMPARISON OF OPERATIONS IN AUTOMATED AND NON-AUTOMATED BANK BRANCHES**

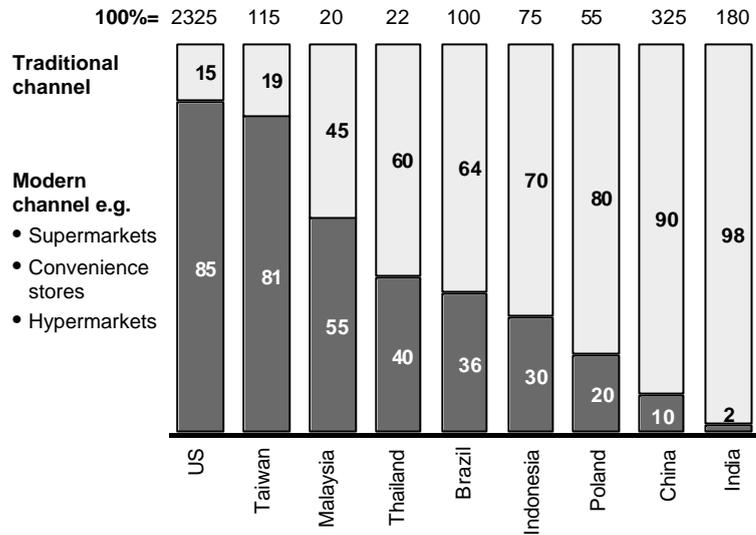
2000-08-31MB-ZXJ151



Source: Team analysis; Interviews

### PENETRATION OF MODERN RETAIL FORMATS

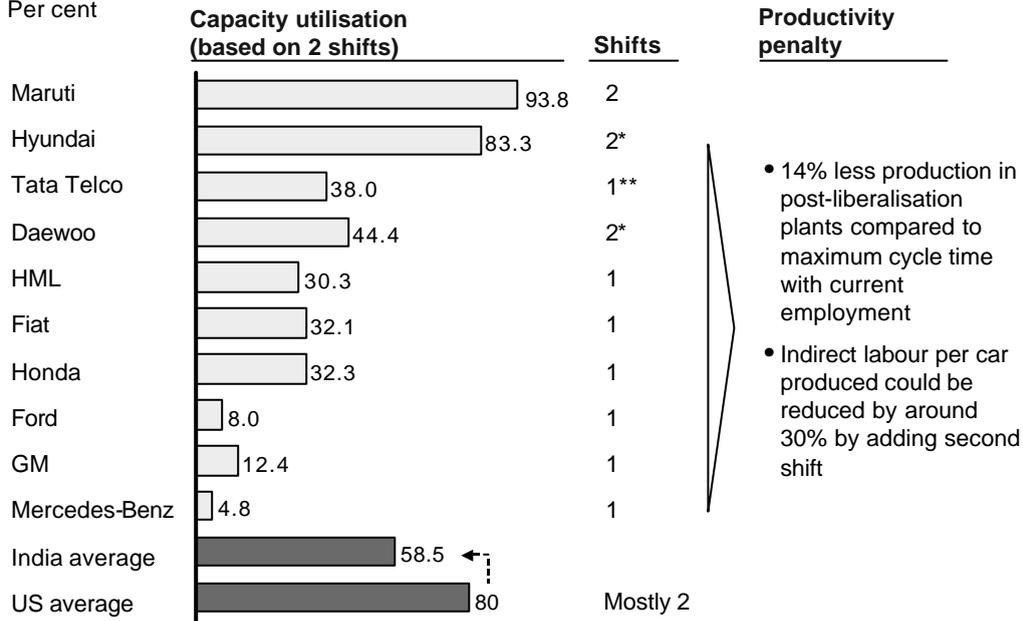
Per cent; US\$ billion



Source: Euromonitor

### CAPACITY UTILISATION OF AUTOMOTIVE PLANTS, 1999-00

Per cent

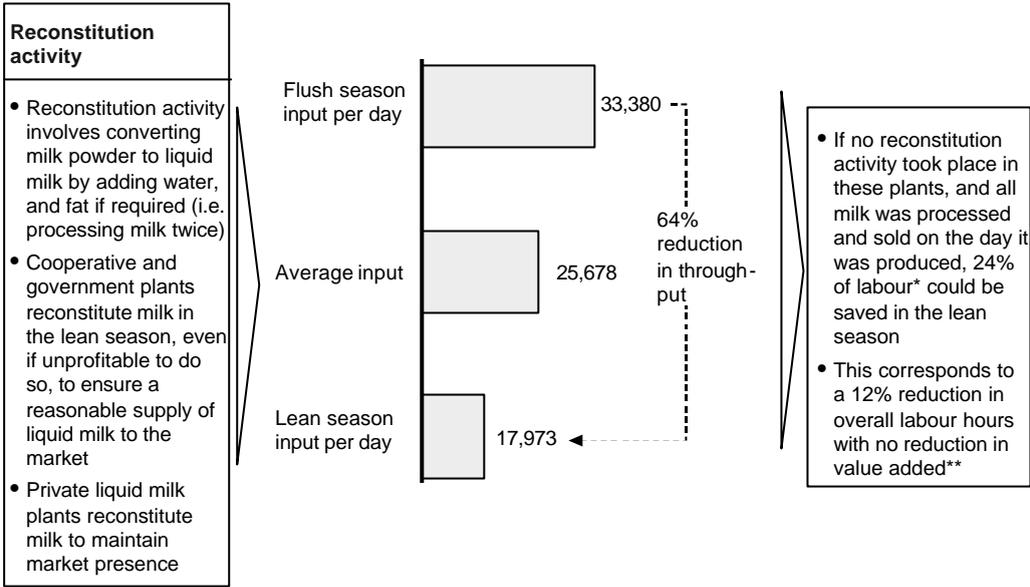


\* Started 2nd shift during 1999-2000

\*\* 2 shifts in press shop

Source: Interviews; Harbor Report; McKinsey Automotive Practice; SIAM; Press clippings

### PRODUCTIVITY PENALTY DUE TO MILK RECONSTITUTION IN FLUSH SEASON



\* Since 37% of labour is variable

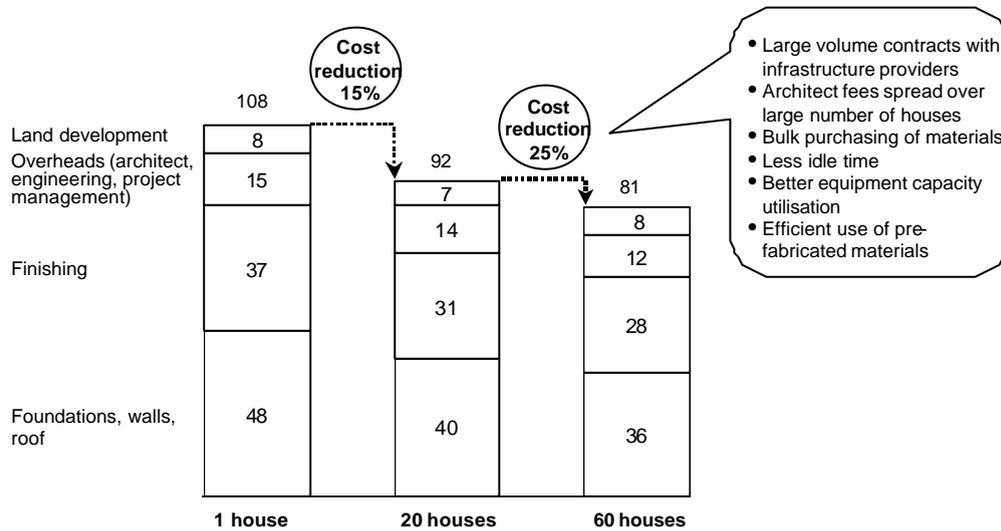
\*\* Assuming there is no demand constraint for liquid milk in the flush season

Source: Interviews

### LACK OF SCALE IN SFH\* (BRICK) CONSTRUCTION

Total cost\*\*, US\$ '000 at GDP PPP

FRANCE/GERMANY EXAMPLE



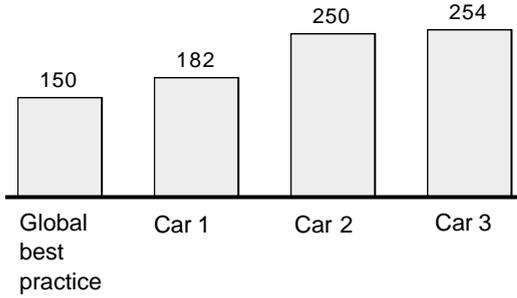
\* Single family homes

\*\*Example: "row" house, 110 m<sup>2</sup>

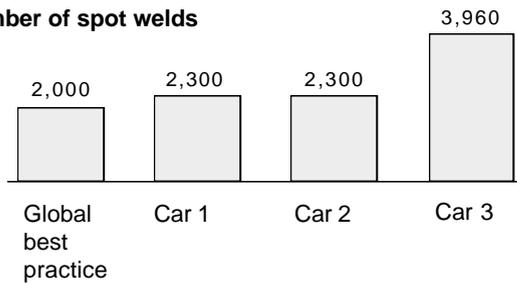
Source: MGI France/Germany report

**DFM OF SELECTED INDIAN SEGMENT-A CARS\***

**Number of body panels**



**Number of spot welds**



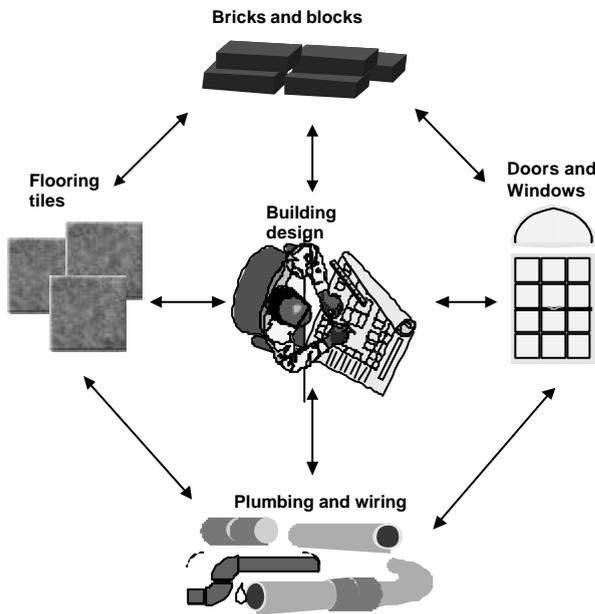
**Productivity penalty**

- Press: 31% (represents 4% of total employment)
- Body shop: 25% (represents 19% of total employment)

\* According to DRI-segmentation

Source: Interviews; McKinsey Automotive Practice

**BUILDING DESIGN AND MATERIALS IN HOUSING CONSTRUCTION**



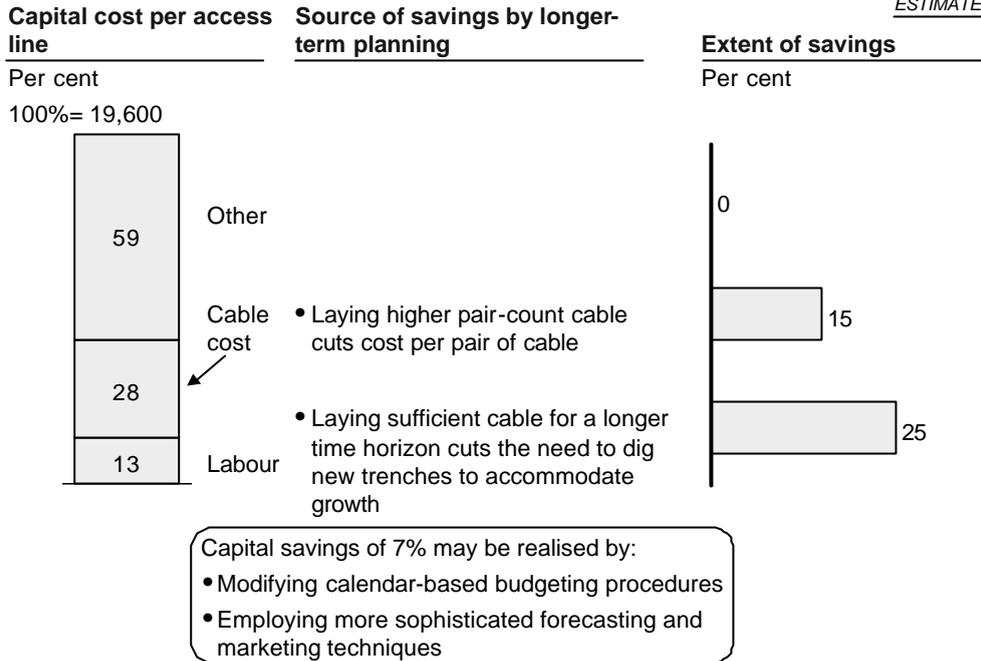
**Effect on productivity**

- Change in the way the contractor approaches construction: Assembly vs. craftsmanship
- Reduction of unnecessary re-work on site (e.g. breaking bricks, cutting through walls to install electrical wiring, etc.)
- Improves planning and reduces idle time as it limits interference across tasks (e.g. structural work and finishing work)
- Improves task specialisation and facilitates incentive-based payments

Source: Expert and company interviews

**EFFECT OF SHORT-SIGHTEDNESS IN TELECOM NETWORK PLANNING**

ESTIMATES



Source: Interviews; McKinsey estimates

**SUMMARY OF INDUSTRY DYNAMICS FACTORS LEADING TO LOW PRODUCTIVITY IN MODERN SECTORS**

● Important  
○ Less important  
— Not important

	Steel	Auto Assembly	Wheat	Dairy	Apparel	Telecom	Gen.	T&D	Housing	Banking	Retail	Software	Total
• Domestic competitive intensity	—	—	—	●	●	●	●	—	●	●	●	○	●
• Exposure to global best practice	○	○	—	—	●	—	—	—	—	○	●	—	○
• Non-level playing field	●	—	—	●	○	●	—	—	○	—	○	—	○

Source: Team analysis; Interviews

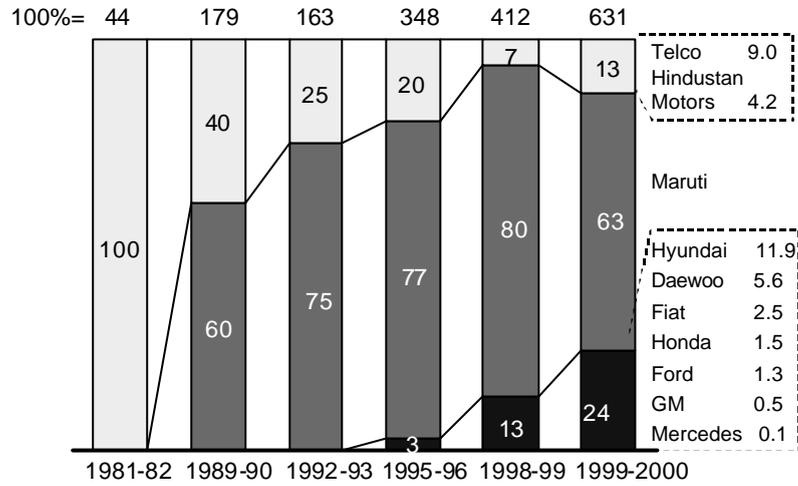
Exhibit 4.29

### PRODUCTION OF PASSENGER CARS

Per cent; 100% in '000 vehicles

2000-08-31MBZXJ151

Indian players\*  
Maruti  
Foreign players



\* Includes collaborations between Premier/Peugeot and Hindustan Motors/Mitsubishi

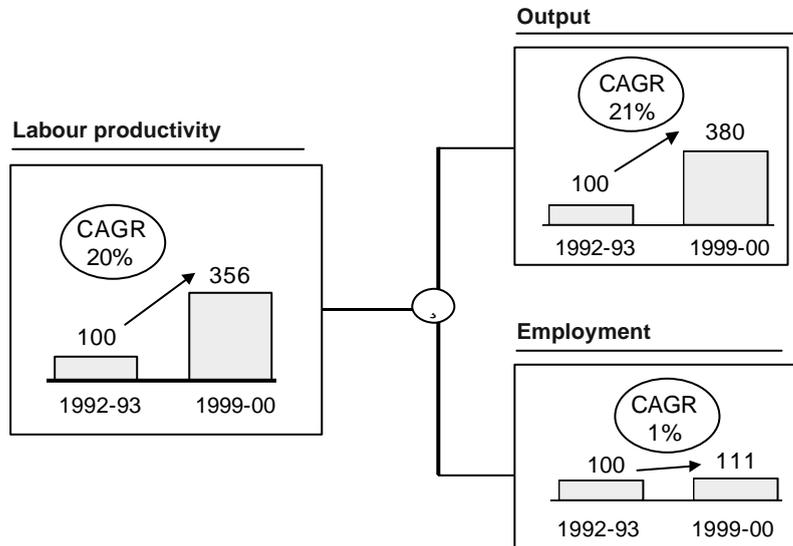
Source: SIAM; Press clippings

Exhibit 4.30

### PRODUCTIVITY GROWTH IN INDIAN PASSENGER CAR ASSEMBLY INDUSTRY

Equivalent cars per equivalent employee; Indexed to India=100 in 1992-93

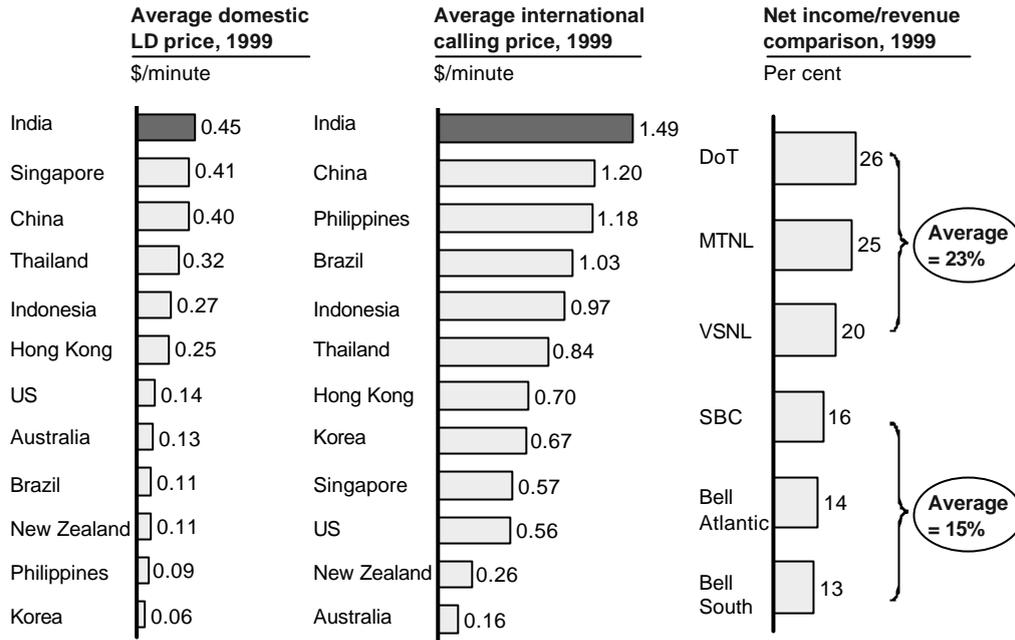
2000-08-31MBZXJ151



Source: Interviews; SIAM; Annual reports

**PRICES AND PROFITS IN TELECOM SERVICES**

ESTIMATES

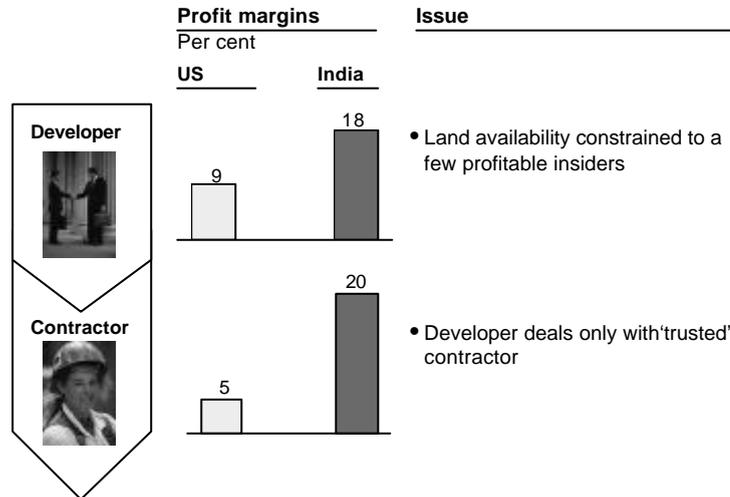


Source: MSDW; ITU; Pyramid Research; FCC

**PROFITABILITY IN HOUSING CONSTRUCTION**

MFH EXAMPLE

Per cent; Net profit margin



Source: Interviews; McKinsey analysis

Exhibit 4.33

**SUMMARY OF EXTERNAL FACTORS LEADING TO LOW CAPITAL PRODUCTIVITY**

2000-08-31MBZXJ151

- Important
- Less important
- Not important

	Power				Average
	Generation	T&D	Steel	Telecom	
• Macroeconomic barriers	—	—	—	—	
• Capital market barriers	—	—	○	—	—/○
• Government ownership	●	●	●	●	●
• Labor market barriers	—	—	—	—	
• Product/land market barriers	●	●	●	—	●
• Related industry barriers	○	—	○	—	○
• Infrastructure	—	—	—	—	

Source: Team analysis; Interviews

Exhibit 4.34

**SUMMARY OF EXTERNAL FACTORS LEADING TO LOW PRODUCTIVITY IN MODERN SECTORS**

2000-08-31MBZXJ151

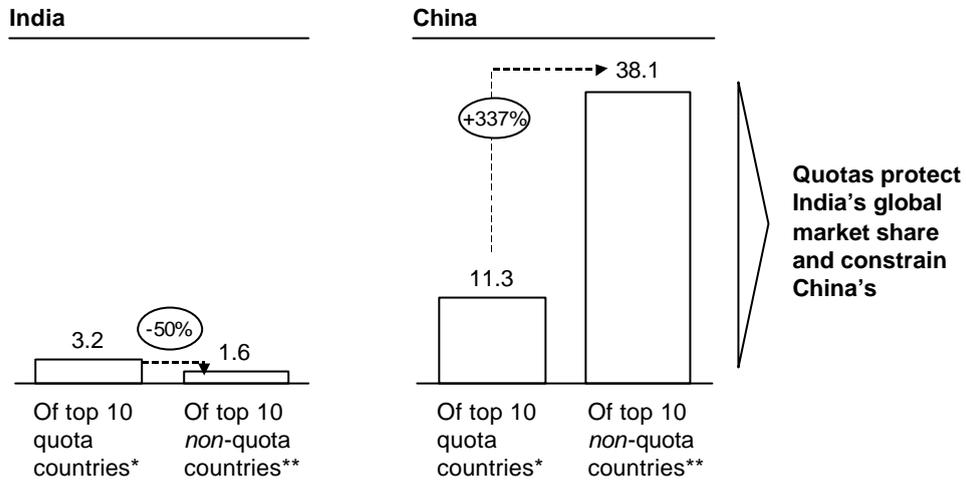
- Important
- Less important
- Not important

	Auto		Food Processing			Power			Banking	Retail	Software	Total	
	Steel	Assembly	Wheat	Dairy	Apparel	Telecom	Gen.	T&D					Housing
• Product market barriers	●	○	—	●	●	●	●	●	○	○	●	○	●
• Land market barriers	—	—	—	—	—	—	—	—	●	○	●	—	●
• Government ownership	●	—	—	●	—	●	●	●	—	●	—	—	●
• Labour market barriers	●	●	—	●	○	○	●	○	○	○	○	—	○
• Infrastructure	—	—	—	—	○	—	—	—	—	○	—	—	—
• Macroeconomic barriers	—	—	—	—	—	—	—	—	—	—	—	—	—
• Capital market barriers	—	—	—	—	—	—	—	—	—	—	—	—	—

Source: Team analysis; Interviews

### DISTRIBUTION OF APPAREL IMPORTS: 1998

Per cent of total imports



\* U.S., Germany, UK, France, Italy, Belgium, Canada, Spain, Austria, Denmark

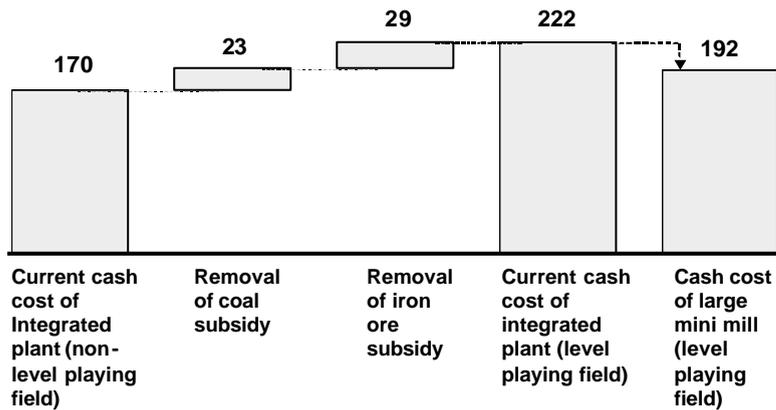
\*\* Japan, Netherlands, Switzerland, Sweden, Australia, Norway, Singapore, Poland, Korea, Chile

Source: UN International Trade Statistics

### NON-LEVEL PLAYING FIELD IN STEEL: COAL AND IRON ORE SUBSIDIES

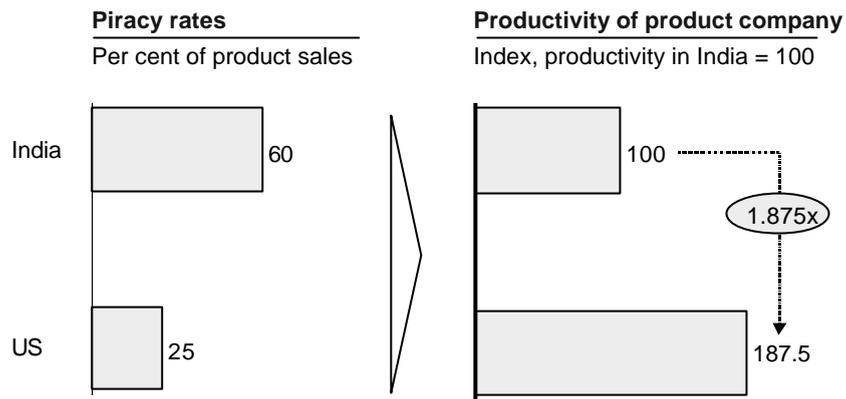
ESTIMATES

US\$ per ton of slab



Source: McKinsey analysis; Interviews

### IMPACT OF PIRACY ON PRODUCTIVITY OF PACKAGED SOFTWARE



**If Indian piracy rates went down to US levels, productivity of Indian software companies would rise by 88%**

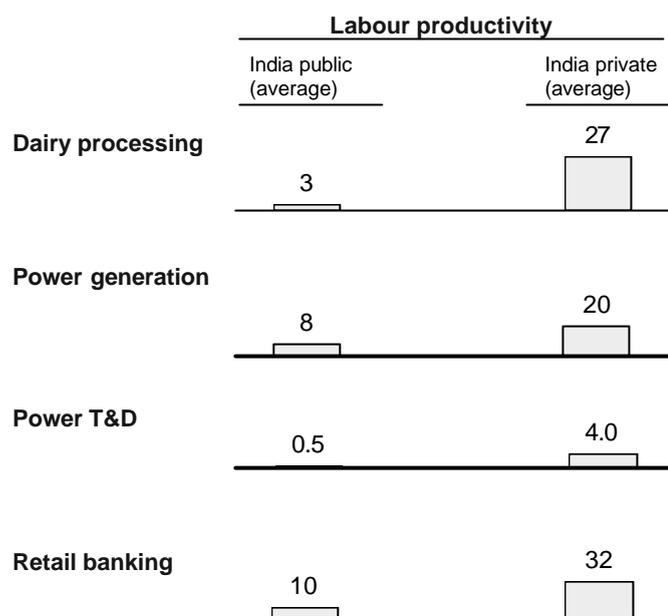
Source: NASSCOM; Press reports; McKinsey analysis

Exhibit 4.38

2000-08-31MBZXJ151

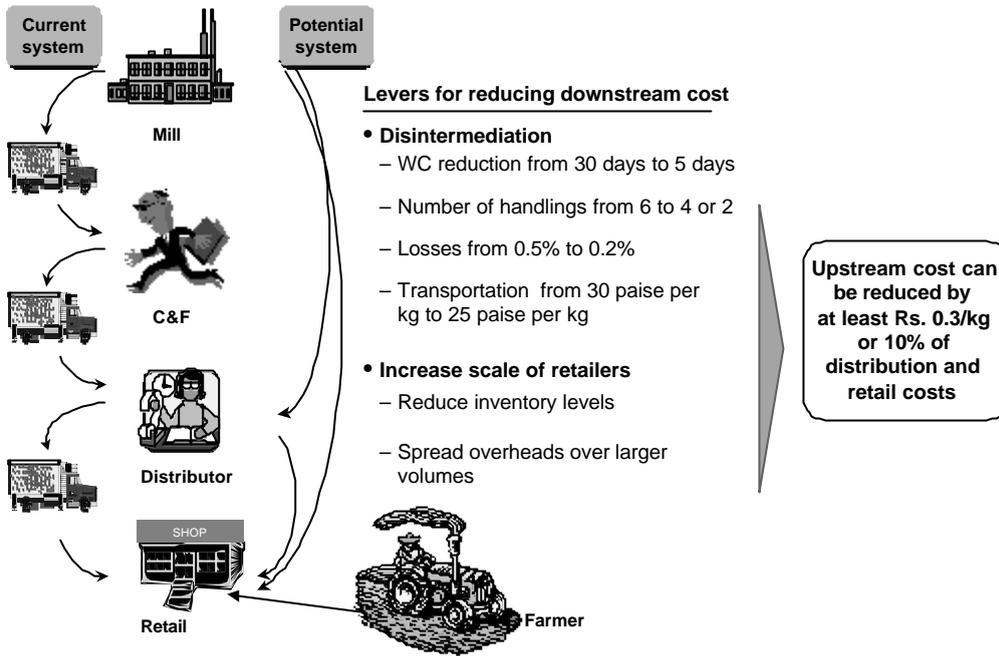
## GOVERNMENT OWNERSHIP HINDERS PRODUCTIVITY

Indexed to US=100 in 1998



Source: Bank source; CEA, Ministry of Planning; Interviews; McKinsey Analysis

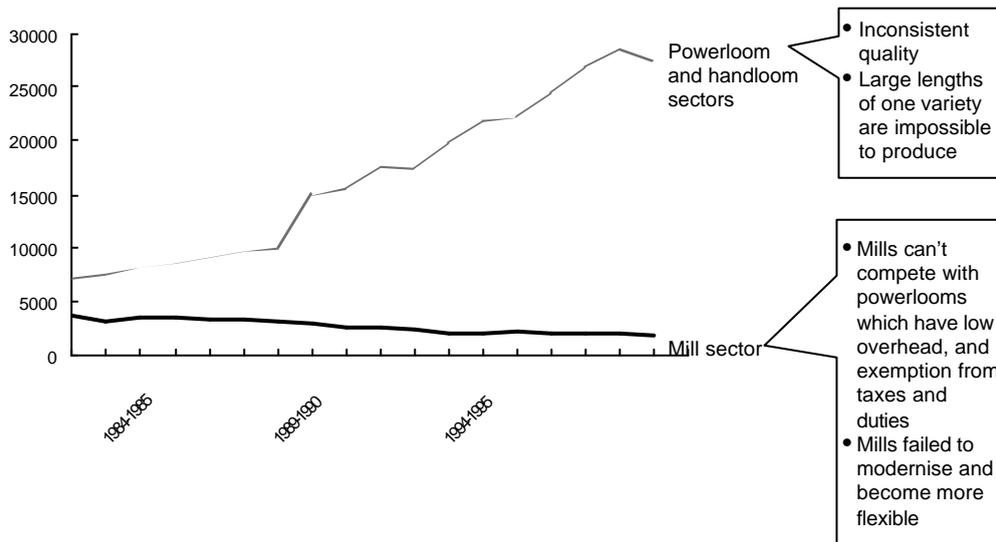
### DOWNSTREAM INDUSTRIES IN WHEAT MILLING



Source: Interviews; team analysis

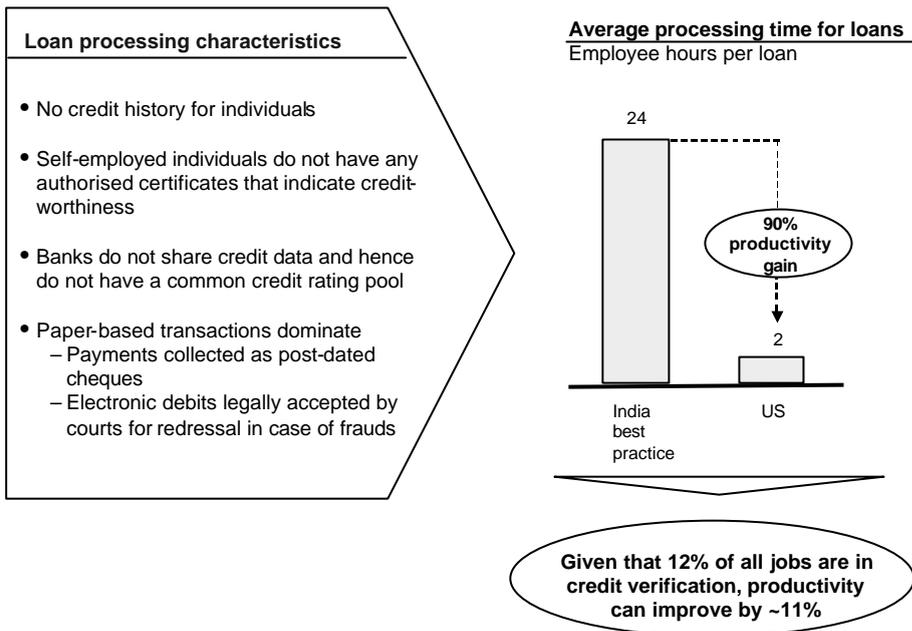
### SMALL-SCALE RESERVATION IN TEXTILES

Million sq m



Source: Ministry of Textiles

## POOR CREDIT RATING SYSTEMS IN RETAIL BANKING

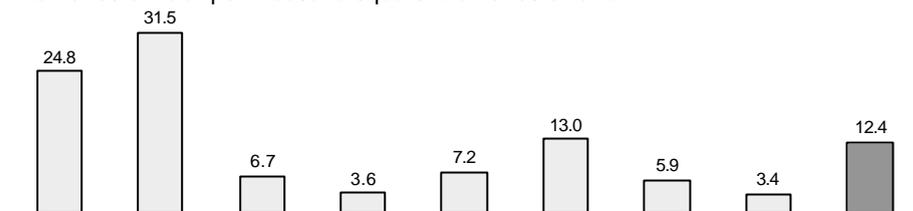


Source: Bank Survey; McKinsey analysis

## INTERNATIONAL INFRASTRUCTURE BENCHMARKS

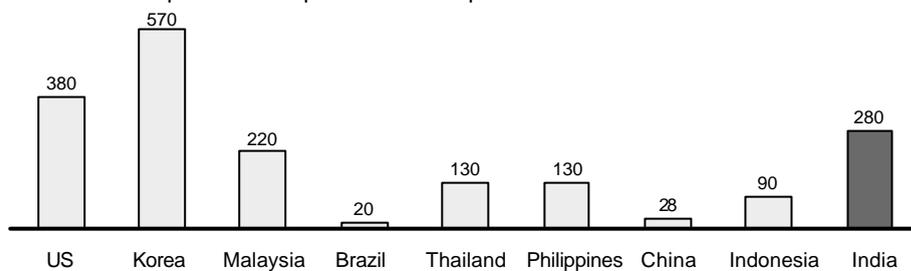
### Railroad density

Kilometres of track per thousand square kilometres of land



### Road density

Kilometres of paved roads per thousand square kilometres of land



Source: *The Economist*; World Development Indicators 1999.

# Policy Recommendations

India has two choices before it: Continue with economic growth of around 6 per cent a year or grow at 10 per cent per annum over the next 10 years to take the country to new levels of development and prosperity. The first option will create only 24 million jobs outside agriculture in the next 10 years and lead to an unemployment rate of 16 per cent. The second option will create 75 million jobs, which is enough to absorb the expected surge in the workforce and contain the unemployment rate at 7 per cent (**Exhibit 6.1**).

The second option is clearly the desirable one. But it will require improving productivity manifold, since that is the key to rapid growth. Encouragingly, the means to achieve this goal are at hand. Contrary to popular belief, it is not a lack of resources, either physical assets or human capital, which is holding India back. What is holding it back are barriers that prevent the effective utilisation of these resources – product market barriers, land market barriers and government ownership, which impact GDP growth by 2.3 per cent, 1.3 per cent and 0.7 per cent respectively (**Exhibit 6.2**). Apart from these, labour market barriers and lack of infrastructure also constrain growth, though their impact is significantly smaller. They affect the growth rate by only 0.3 per cent a year. We have described these barriers at length in the previous chapters. Here, we will focus on the prioritised actions that India needs to take to remove these barriers and the implementation challenges it must overcome.

What India needs is a broad-based reform programme focusing on 13 key actions that will collectively bridge close to 90 per cent of the gap between the current growth rate of 6 per cent and the target figure of 10 per cent. In this chapter, we describe the change programme that India must implement and the implementation challenges that it must overcome.

## **THE REFORM PROGRAMME**

In this section, we outline the 13 key actions that will collectively bridge most of the gap between the current growth rate and the target rate of 10 per cent. Actions 1-6 address the product market barriers, actions 7-9 deal with land market barriers, action 10 tackles the problems associated with government ownership and actions 11-13 address issues such as labour laws, transportation infrastructure and agricultural extension services.

## **1. Remove product reservation for small-scale industry**

The reservation of 836 products for manufacture by the small-scale industry (SSI) has a detrimental impact on output and productivity not only in the industries concerned, but also in the upstream and downstream industrial and services sectors. For example, we found that these reservations constrain the development of the domestic apparel sector and the retail sector. Moreover, the recent removal of quantitative restrictions, and the inclusion of 550 of the “reserved” items on the Free Import List, has created a peculiar situation – large and efficient manufacturers located in other countries can export products to the Indian market while Indian manufacturers are barred from capturing scale advantage while serving the domestic market.

To stimulate productivity and output growth and prevent Indian manufacturers from losing out to efficient, highly competitive foreign players, the government should remove the reservations in a phased manner, as described below:

- ¶ To maximise impact in the near term, the government should immediately de-reserve the 68 items (including garments, shoes, leather goods and hand tools) that account for 80 per cent of the production of all items on the reserved list (**Exhibit 6.3**).
- ¶ Around 500 items that are not among these but can be imported under the “Free Import List” should be liberalised within the next year, that is by the end of 2002. This will allow Indian manufacturers to gain scale and become competitive before import duties are reduced.
- ¶ The remaining items should be de-reserved by 2004.

## **2. Equalise sales tax and excise duties for all companies within a sector and strengthen enforcement**

The lower tax rates for small-scale industry combined with lax enforcement of these taxes among small and mid-sized players allow unproductive players to not only survive but also to compete with the more productive players. For instance, small-scale apparel producers manufacturing only for the domestic market do not have to pay the 16 per cent excise duty levied on products manufactured by larger players catering to both the export and the domestic market. Similarly, in the steel industry, tax evasion by sub-scale mini-mills is a key reason why these mills are able to survive despite their low productivity.

To address this issue, the government should:

- ¶ Equalise excise duties within a sector by removing the excise duty waiver granted to SSI and other sectors.

- ¶ Simplify the central and state sales tax structures by moving to a value-added tax system. A beginning in this regard has been made with the formation of a joint centre-states task force for sales tax reforms.
- ¶ Enforce excise and sales tax collection from small and mid-sized players by raising collection targets for tax department officials and giving them incentives to achieve the targets.

### **3. Establish an effective regulatory framework and strong regulatory bodies in the telecom and power sectors**

Fair and consistent regulatory frameworks in critical infrastructure sectors help attract investment and protect consumer interests. The government should reform the regulatory framework in the power and telecom sectors and set up strong regulatory bodies to enforce this framework:

- ¶ Review telecom regulation to make it clear and level: The development of the telecom sector has been slowed down by repeated changes in regulation. For example, the rules have repeatedly been changed in both basic and mobile services, making it difficult for players to size up the opportunity and develop sound strategies. This has discouraged investment. We believe that the policy framework should be redesigned to address the key issues (*see* Volume III, Chapter 6: Telecom):
  - Industry structure: Replace the existing technology and service based licensing scheme with a single licence for all telecom services.
  - Pricing: Raise the price caps on basic services and remove price caps on all telecom services in areas where there is “sufficient competition”.
  - Interconnection rules: As in the case of service licences, make interconnection rules independent of technology.
  - Equal access: To neutralise the incumbents’ inherent advantages, give all carriers equal access. This will involve guaranteeing number portability, ensuring that the incumbent is not the only long distance carrier, allowing consumers to choose between all long distance carriers with equal ease and allowing, but not mandating, unbundling of the local loop.
- ¶ Develop a regulatory framework for the power sector that drives out inefficiencies: Today, inefficiencies in all parts of the power sector – generation, transmission and distribution – are passed on to paying consumers or to the government that has to keep providing subsidies. As a result, Indian industrial consumers pay among the highest tariffs in the

world, and the subsidies to the power sector amount to approximately 1.5 per cent of GDP. To protect consumer interests and remove the burden on the treasury, the government should:

- Disaggregate State Electricity Boards into separate generation, transmission and distribution entities so that each can be regulated independently.
  - Privatised the power sector starting with the distribution companies (see action 10).
  - Allow direct purchase by industrial consumers after tariff rebalancing i.e., removing the high level of cross subsidization that exists today in the power sector.
  - Mandate that any additional generating capacity should be acquired at the cheapest possible price through competitive bidding. This will ensure that the SEBs and the central government power plants compete to supply power at the lowest possible price.
  - Move from the current cost plus regulation in which all the inefficiencies are transferred to the consumers to a performance-based regulation that provides the players with an incentive to reduce costs (e.g., price caps), for both distribution and transmission. Countries such as the UK and Argentina have adopted this regulation, which motivates producers to reduce costs.
- ¶ Create independent regulators to enforce the regulatory framework: To be able to effectively enforce the regulatory framework and to command the trust of the players in the industry, the regulators have to be – and have to be seen to be – independent. To guarantee the independence of the regulators, the government should ensure that:
- The regulators’ funding is not dependent on the executive decisions of the government. The funding should be fixed either by the legislature or be generated from a fee levied on industry participants.
  - The government does not have the power to dismiss members of the regulatory body. Dismissal of a member should require impeachment by the legislature or High Court/Supreme Court ratification.
  - The decisions of the regulatory body are binding on the government and not subject to its ratification. Specifically, if the government wants to provide any subsidies other than those mandated by the regulator, it should be required to do so through its budget.

#### **4. Remove all licensing and quasi-licensing restrictions that limit the number of players in an industry**

Licensing and quasi-licensing barriers exist in many sectors and constrain productivity and output growth by restricting new entrants.

In our dairy processing case study (*see* Volume II, Chapter 5: Dairy Processing), we have seen the competition-constraining effects of licensing through the Milk and Milk Products Order (MMPO). Similar barriers exist in many other sectors of the economy. They include branch licensing for foreign banks, sugar mill licensing and the requirement to invest in upstream refining in order to market petroleum products. All such licensing and quasi-licensing barriers that restrict competition should be removed.

#### **5. Reduce import duties to ASEAN levels (10 per cent) over next 5 years**

High import duties reduce the incentive to improve productivity and allow unproductive players to survive. For example, import duties in the steel sector have allowed unproductive sub-scale mini mills to survive and have reduced the pressure on the large mills to maximise their productivity. Similarly in the apparel sector, the absence of competitive pressure from global best practice players has contributed to the relative underdevelopment of the domestic apparel sector.

We propose that the government immediately announce, and subsequently adhere to, a schedule to reduce duties on all goods to 10 per cent (comparable to 1999-2000 ASEAN levels) by 2006. This, as we have seen in the steel and automotive sector studies, will give the players enough time to restructure and become competitive. This rate of duty reduction is consistent with that of Brazil in the early '90s and China's recently announced duty reduction plans (**Exhibit 6.4**).

To further ensure that the domestic players have enough time to equip themselves to face the intensified competition, the duty on capital goods and inputs can be reduced before the duty on value added products. Eventually, however, there should be a flat 10 per cent duty on all products.

#### **6. Remove ban on FDI in the retail sector and allow 100 per cent FDI in all sectors**

During our retail case study (*see* Volume III, Chapter 3: Retail), we found that restricting FDI is a key reason for the under-development of the sector. To unleash the potential of this sector and create jobs, it is vital that FDI in retail be allowed, with no limits on the equity share of the foreign investor. Retailing is a highly complex business, requiring a network of relationships with a large number of manufacturers, a complex supply chain with thousands of products, and

merchandising, display, pricing and promotions across hundreds of store locations. Global retailers already have the skills to manage these complexities. They are able to rapidly expand operations, given their experience in tailoring formats to the local environment and their rapidly expanding operations. The retail revolution in many emerging economies, in fact, has been started by global retailers such as Carrefour and Wal-Mart. As the sector develops, Indian retailers too can replicate the business systems being established by their global competitors and build their businesses faster.

While FDI is allowed in sectors such as telecom and insurance, it is still subject to limits, particularly on full ownership by foreign players. These limits, as we have seen in the telecom sector, constrain the growth of these sectors. The local equity markets and the pockets of the Indian players are not deep enough to provide the necessary equity commitment. Therefore, it is critical to allow 100 per cent FDI in all sectors except some strategic sectors like defence.

We expect that Indian players will still be inducted as joint venture partners by global players, but these decisions will be based on the skills, assets and relationships that they bring to the table rather than on binding regulatory restrictions.

## **7. Resolve unclear real estate titles**

The ownership of a large part of real estate in India is unclear, keeping it off the market and thereby creating land scarcity. According to some estimates, titles to almost 90 per cent of the country's real estate are unclear.

The result is high land prices and depressed economic growth and employment through the adverse impact on the construction and retail sectors directly and upstream manufacturing sectors such as apparel and food processing indirectly. In fact, if we remove the land market barriers, the housing construction and retail sectors alone could create 3.2 million and 8.5 million jobs respectively (*see* Volume III, Chapter 1: Housing Construction and Volume III, Chapter 3: Retail for details).

To address the issue of unclear titles, the government should:

- ¶ Rescind the laws and regulations that result in unclear titles. These include the Urban Land Ceiling and Regulation Act and restrictions on the sale of certain kinds of property (such as apartments constructed on land leased by the Delhi Development Authority, the main developer of public housing in the capital). Although the central government has repealed the Urban Land Ceiling and Regulation Act, few states have ratified it.

- ¶ Increase transparency about land ownership by computerising land records and making them available on the Internet. Starting this process with urban and semi-urban land will have the maximum impact on GDP growth since this will unshackle the growth of the retail and construction sectors.
- ¶ Set up special fast track courts to deal with property disputes. It is estimated that at the current rate, these cases will take a hundred years to be resolved. These courts should be required to resolve individual cases within 6 months.

## **8. Rationalise property taxes, stamp duties and user charges**

One of the main reasons for the scarcity of land in India is that local governments earn very little from property taxes and municipal charges, leaving them with little incentive or funds to develop suburban land.

Currently, the structure of property taxes, municipal charges and stamp duties is unbalanced. Property taxes and municipal charges are low and stamp duties are high. Property tax collected in Mumbai amounts to only 0.002 per cent of the estimated capital value of the buildings: The usual ratio in developed countries is around 1-2 per cent. On the other hand, stamp duties are high, amounting to 8-10 per cent of the value of a property compared to 2-3 per cent in developed countries. Similarly, water is supplied at 10 per cent of its economic cost.

This unbalanced system has two ill effects. One, local governments lack the financial means and incentives to develop much needed land. Two, buyers and sellers have an incentive to not register transactions leading to the problem of unclear titles (discussed earlier).

The subsidisation of municipal services does not benefit consumers. In fact, consumers face shortages – as the municipalities lack the funds to supply these services at low cost – and are forced to buy them from private providers. In Delhi, for example, residents spend five times the amount they pay the municipal corporation on buying water from private tankers. Ironically, it is the poor who suffer the most. In Mumbai, the residents of relatively prosperous localities in South Mumbai pay only Rs. 2-3 (approximately 5 cents) per kilolitre of water while those living in slums have to buy water at much higher rates.

To remedy this situation, the government should:

- ¶ Change the assessment base of property tax. Instead of basing it on “historical cost”, assessment should be based on the “capital value” of the property as fixed by the government for the area in which the property is located. Bangalore is already moving to an assessment of property tax based on capital value.

- ¶ Raise user charges on water and other municipal services to cover the economic cost of delivering these services.
- ¶ Lower stamp duties to 2-3 per cent. This can be done gradually as collections from property taxes and user charges increase so that government revenues are not affected.
- ¶ Consider privatising municipal services along the Buenos Aires, Argentina model.

## **9. Reform tenancy laws to bring rents in line with market value**

Obsolete tenancy and rent control laws keep a large part of urban real estate off the market. The freezing of rents at unrealistically low levels in Mumbai, for example, has raised rents for new properties to phenomenal levels while keeping rents for old but desirable properties very low. For example, in the posh Marine Drive area of Mumbai, an old tenant, who happens to be a large and profitable MNC, pays merely Rs. 200 per month for a property for which a new tenant would have to pay approximately Rs. 200,000.

Practices like this hamper the growth of domestic trade (retail, restaurants and hotels) and the construction sector by making it difficult for new players to enter.

To address this issue, the government should reform tenancy laws and allow rents for all properties to be aligned with market rates. Specifically, the government should:

- ¶ Allow the termination of old tenancies at the death of the tenant (as envisaged by the New Model Rent Control Act) or allow high, up to 100 per cent per annum, increases in rent.
- ¶ Remove restrictions on the escalation of property rentals for all tenancies. Currently, many states control the escalation of rents for properties that have been let out at low rates.
- ¶ Empower owners to reclaim their property at the end of the tenancy period. If the tenant does not have a valid lease agreement, allow the owner to evict him without any court procedures, with the help of the local police if required.

## **10. Privatisise all state and central Public Sector Units (PSUs)**

Experience in the telecom, power and retail banking sector demonstrates that government ownership leads to low capital and labour productivity (*see* Volume I, Chapter 4: Synthesis of Sector Findings). Government ownership is a key barrier

to productivity growth in the economy with the government accounting for 43 per cent of the country's capital stock and 40 per cent of total employment in the organised sector. Yet, India's privatisation programme has so far been a slow-starter. In fact, only two relatively small PSUs have been transferred to private management (**Exhibit 6.5**).

India can learn from the experience of countries that have managed privatisation in politically and socially acceptable ways. Poland, for example, has adopted the approach of divesting company ownership to employees and citizens at very low prices (**Exhibit 6.6**).

The Indian government should build support for privatisation by clearly communicating the economic rationale for the programme – the extremely low productivity of the resources deployed in the government sector. It should also speed up the privatisation process by:

- ¶ Enhancing the powers of the disinvestment ministry so that other government ministries cannot obstruct the privatisation process. Specifically, the administrative control of companies identified for privatisation should be transferred to the disinvestment ministry or some independent body as was done in Chile (where administrative control was transferred to CORFO) and East Germany (where Treuhandanstalt was given administrative control). Further, the disinvestment ministry should have the full authority to decide the disinvestment process that should be followed for the company. Several countries such as Chile and Brazil have conducted successful privatisation programmes by adopting a similar approach (**Exhibit 6.7**). Brazil, for example, realised US\$ 100 billion in privatisation proceeds over a 10-year period.
- ¶ Setting an aggressive target of privatising 30 companies every year for the next 3 years and focusing on the largest companies first. The government should start with the largest entities (e.g., large telecom and oil PSUs). Since most of the value is concentrated in a few large companies in select sectors, this will ensure that privatisation has a positive impact on the economy in a short period (**Exhibit 6.8**).

### **11. Reform labour laws by repealing Section 5- B of the Industrial Disputes Act and allowing flexibility in the use of contract labour**

Constraints on the rationalisation of labour inhibit economic growth and job creation. Players hesitate to hire labour that they will be unable to retrench them if business conditions change. This often leads to over-investment in labour saving automation or, worse, drives away investment, for example, in apparel (*see* Volume II, Chapter 3: Apparel). These effects are strongest in labour-intensive

industries such as apparel. Moreover, they reduce India's attractiveness as a manufacturing base for global markets and drive away investors to countries where the labour laws are not as severe.

To address this issue, the government should repeal Section 5-B of the Industrial Disputes Act mandating that companies with more than a certain number of workers obtain state government approval to rationalise their workforce. The recent Budget talks of raising the cut-off point from 100 to 1,000 but we recommend that this provision should not apply to any company. The government should, instead, establish a system that allows companies to let employees go by offering them a severance package. Such a system is in place in many countries. In the UK, for example, companies have to make a redundancy payment of between one and one-and-a-half weeks' salary for every year of service.

Productivity can also be increased across industries such as retail and steel if players are allowed flexibility in their use of contract labour. To this end, the government should amend the Contract Labour Act to allow the use of contract labour for all activities – not just activities of a temporary nature.

## **12. Transfer management of existing transport infrastructure to private players, and contract out construction and management of new infrastructure to private sector**

Bottlenecks in transport infrastructure in India are caused more by poor management than by a real physical shortage. For example, bottlenecks at Indian ports are the result of inefficient utilisation of berthing capacity, not a shortage of capacity. This is evident from the extremely high turnaround times for ships at the berths.

The government should take the following steps to rectify the problem:

- ¶ Lease the operation and maintenance of ports and airports to private players. The joint venture model, which has been successfully adopted at the new Cochin airport, can be implemented at all airports and ports across the country.
- ¶ Use BOT (Build, operate and transfer) contracts to develop and manage road infrastructure wherever feasible. In cases where the projects are not commercially viable, the contracts can be bid out to players demanding minimum subsidy.

## **13. Strengthen agricultural extension services**

There is significant potential for yield improvement in Indian agriculture. For example, we have found that wheat yield can improve by about 40 per cent while

dairy yield can increase as much as six-fold. Strong extension services to farmers will play a key role in this yield improvement, which in turn will increase rural incomes.

The extension services machinery has almost collapsed in most states. One of the main causes of this problem is that extension workers are government employees with limited pressure or incentive to perform. This problem can be addressed in three ways:

- ¶ Sub-contract the delivery of extension services to private parties selected by the village panchayats. The state agriculture universities can certify the private parties, with the village panchayats then choosing from among them.
- ¶ Encourage competition in upstream and downstream sectors. This will ensure that the players in this sector reach out and provide extension services to farmers. For instance, removing MMPO will encourage private players to reach out and provide extension services to dairy farmers. Similarly, allowing food processors to directly purchase from farmers and removing subsidies on farm inputs such as fertilisers and seeds will encourage upstream and downstream agricultural players to provide extension services to farmers.
- ¶ Improve the irrigation system by introducing usage-based water charges and transferring the operations and maintenance responsibility of the downstream irrigation system to elected bodies of water users.

## **THE IMPLEMENTATION CHALLENGE**

Mobilising broad support for the reforms by communicating their benefits and providing guidance and implementation support at all levels will be critical for the success of the change programme.

### **Building support by communicating the benefits of reform**

Many of the proposed reforms are likely to be resisted by groups with vested interests. Clearly communicating the need for reforms and their benefits to the Indian people will, therefore, be critical to ensure their smooth implementation. The communication programme should stress that the regulations being removed have failed to achieve their intended social objectives and have proved counter-productive in many cases. To illustrate, small-scale reservation has cost India many manufacturing jobs by preventing companies from being productive and, therefore, competitive in export markets. Similarly, tenancy laws, which were

designed to protect tenants, have driven up rentals and real estate prices, making good quality housing unaffordable for large sections of India's people.

Another important aspect to be emphasised is that these reforms will benefit all sections of society, not just the rich. It is imperative to point out that the programme is broad-based and does not depend on the trickle-down effect to benefit lower income groups and the poor. Instead, it will benefit every Indian by creating a virtuous cycle of GDP growth: For instance, millions of jobs will be created in construction, retail and manufacturing. This will increase wages (including in agriculture) and disposable income, and stimulate demand for goods and services. This greater demand will create opportunities for further investment, which will again create jobs. India will thus be well on its way to realising its potential.

### **Providing guidance and implementation support at all levels**

Of the total impact – increase in growth rate of approximately 4.5 per cent – about 55 per cent will be driven by reforms that fall under the ambit of the central government, while the balance will be driven by reforms carried out by the state governments (**Exhibit 6.9**). Almost all land market and power sector reforms fall under the ambit of state governments.

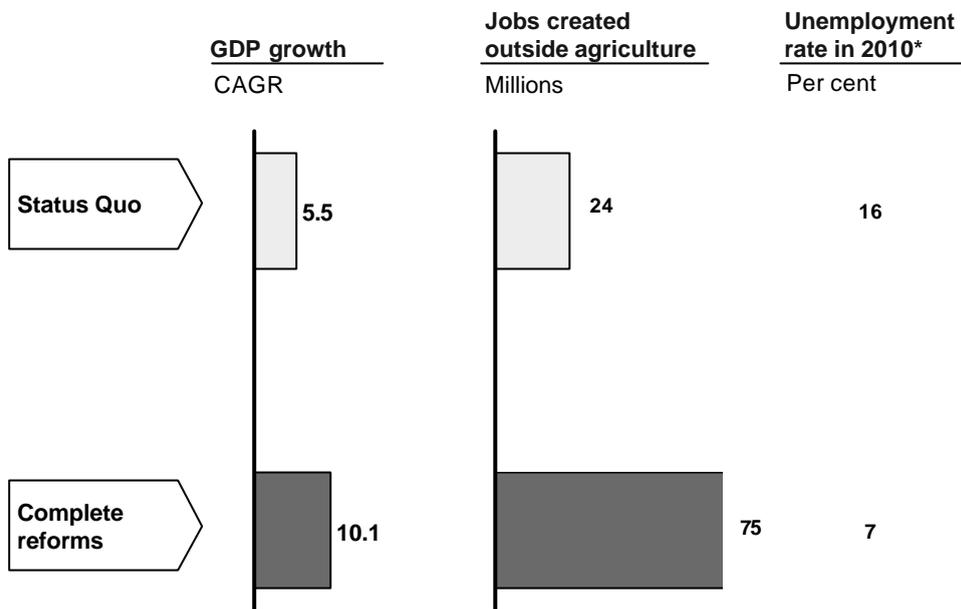
The central government should not only drive reforms in areas within its jurisdiction, but should also steer the state-level reforms. This will involve creating awareness among state governments on the critical areas for reform, helping design model laws and procedures that the state governments can replicate, and providing financial incentives to the states to implement reforms.

To play its role effectively, the central government should appoint a small team of senior cabinet ministers, under the direct supervision of the Prime Minister. This team should make the implementation of the top 13 actions its top priority.

A systematic onslaught against product and land market regulations, coupled with complete privatisation, will allow India to achieve a growth rate of 10 per cent a year. The benefits will be invaluable and only this level of growth will allow India to employ the millions of new people entering the workforce.

Exhibit 6.1

### IMPACT OF GROWTH RATE ON EMPLOYMENT

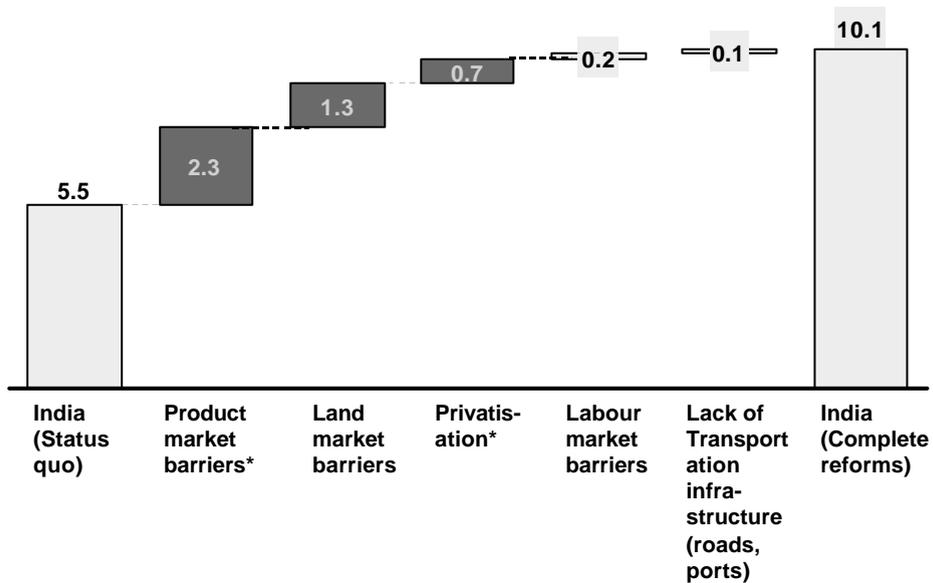


\* Current Daily Status. Assuming that labour participation rate remains constant  
 Source: McKinsey analysis

Exhibit 6.2

### BARRIERS TO ACHIEVING 10% GDP GROWTH

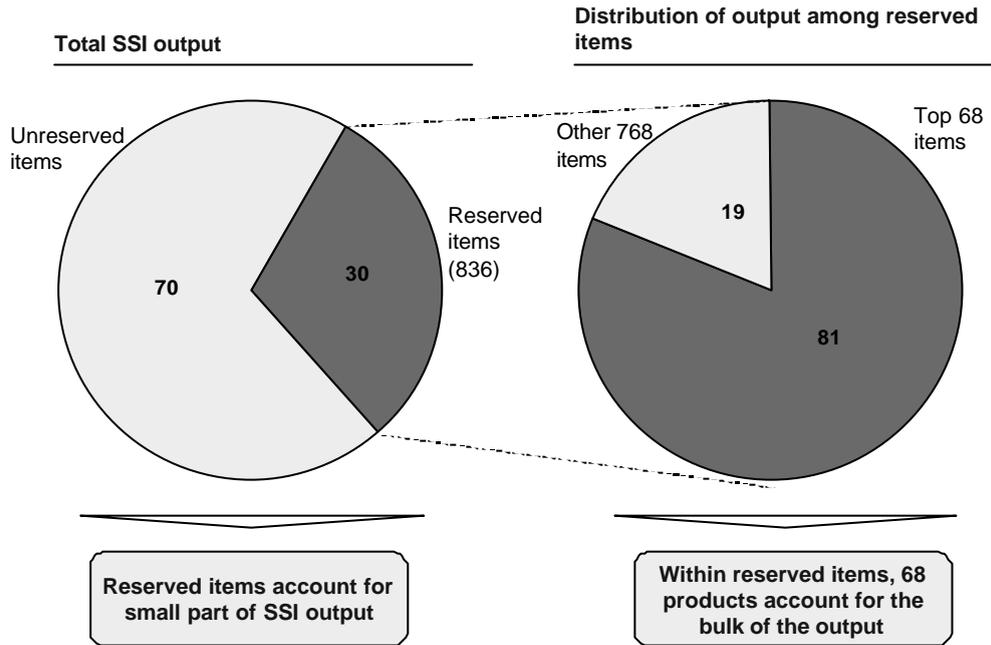
CAGR (2000-2010)



\* Includes power and telecommunications  
 Source: McKinsey analysis

Exhibit 6.3

## STRUCTURE OF THE SSI SECTOR



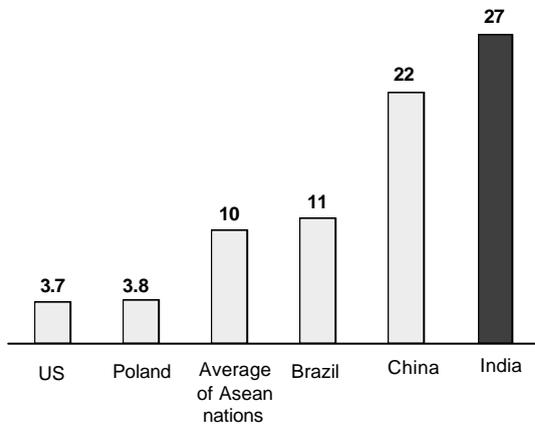
Source: Report of the Expert committee on SSI

Exhibit 6.4

## COMPARISON OF IMPORT DUTY LEVELS AND DUTY REDUCTION SCHEDULES FOLLOWED BY OTHER COUNTRIES

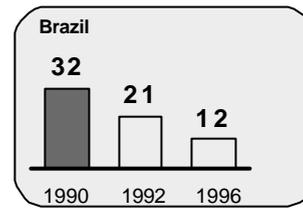
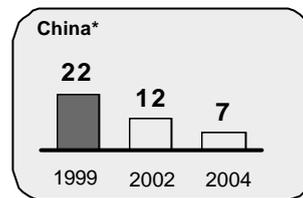
### Indian import duties are high

Per cent



### Other countries have reduced duties over 5 years

Per cent



\* As per the plans announced by Chinese officials  
Source: Country reports, WTO, Press articles

## PROFILE OF PSUs THAT HAVE BEEN PRIVATISED

Company	Sector	Revenue (Rs cr)	Profile
Modern Foods	Food processing	122	<ul style="list-style-type: none"> <li>• Small bread-making unit with 2000 employees</li> </ul>
Balco	Metals and mining - Aluminum	903	<ul style="list-style-type: none"> <li>• Turnover only 1/20 that of SAIL, the largest metals and mining player</li> </ul>

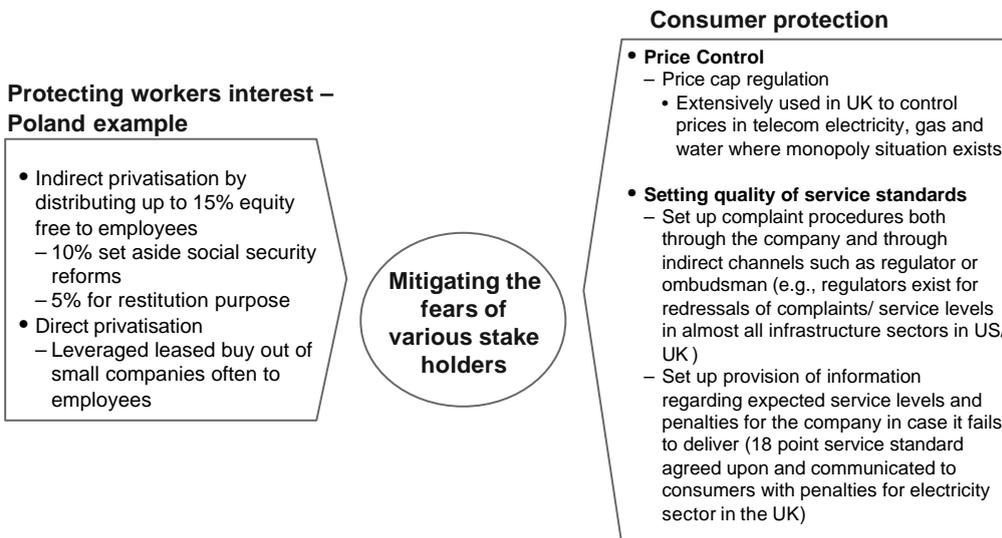


**Only two small PSUs  
have been privatised**

Source: LitSearch

5

## MANAGING PRIVATISATION IN A SOCIALLY AND POLITICALLY ACCEPTED WAY



Source: OECD Economic Surveys, McKinsey analysis

6

## SETTING UP AN INDEPENDENT EMPOWERED BODY HELPS SPEED UP PRIVATISATION PROCESS

### Brazil

National Privatisation Programme (PND)  
 • Inclusion of a company in the PND by a presidential decree

#### Decision making

National Privatisation Council (CND)  
 • Decision making arm responsible to the President  
 • Members include ministers of development, industry, commerce, finance and the ministry concerned

#### Execution

Administrative control of companies to be privatised transferred to Brazilian Development Bank (BNDES)  
 • Manager of National Privatisation Fund (FND)  
 • Administration: Manages, monitors and carries out the sale of companies included in the PND

### Chile

#### Decision making

• Sets privatisation strategy and decides on recommendations of privatisation committee  
 • Members include economy ministers, finance ministers, planning ministers, VP of CORFO and few other members that keep rotating

#### Privatisation committee

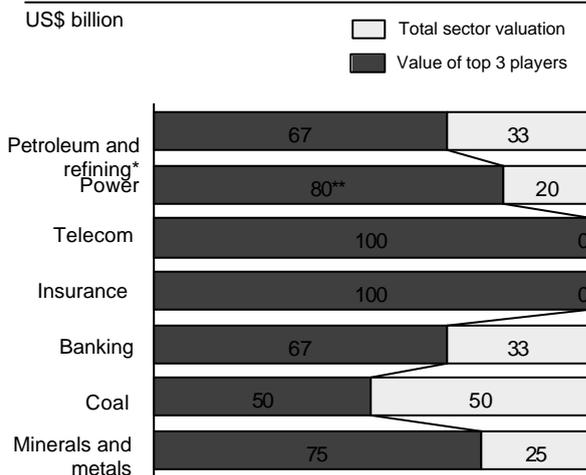
Administrative control of companies to be privatised transferred to the privatisation committee  
 • Recommends privatisation and oversees implementation  
 • Members include planning ministers, CORFO General Manager and 3 other senior CORFO executives

Source: World Bank, BNDES, Federal privatisation office Brazil

## INDIA NEEDS TO PRIORITISE ITS DIVESTMENT PROGRAMME

ESTIMATES

### Valuation of public sector entities – By sector



**Total value of Indian public sector estimated at nearly US\$ 140 – 150 billion**

**Within each sector the value is largely concentrated in top three players**

\* Assuming 74% divestment in ONGC

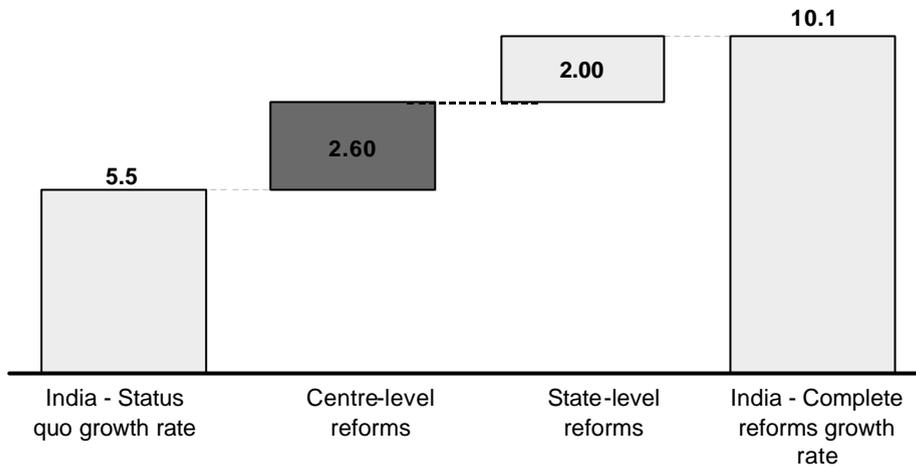
\*\* Estimated value of the SEBs

Source : CMIE, Divestment Commission report; McKinsey

Exhibit 6.9

## **BOTH CENTRAL AND STATE GOVERNMENTS WILL HAVE TO PLAY A ROLE IN DRIVING REFORMS**

CAGR (2000-2010)



Source: McKinsey analysis

# Apparel

## **SUMMARY**

Historically, the apparel sector has not realised its full growth and employment creation potential. Productivity in the sector has always been low and the sector has remained small. The productivity of Indian exporters is less than two-third that of Chinese exporters, while the productivity of Indian domestic manufacturers is 40 per cent lower than that of the Indian exporters. Consequently, Indian apparel production is less than one-third that of China, while its exports amount to less than one-seventh of China's exports.

Productivity in Indian plants is low because the plants are sub-scale, lack basic technology and are operated inefficiently. To address these issues, reforms need to be carried out on multiple fronts. To be more competitive in the export market, India needs to attract more FDI in the apparel sector. This involves liberalising Indian labour laws and reforming the upstream textile sector and improving the performance of Indian ports. To encourage productivity growth in the domestic sector, a level playing field needs to be created between small and large manufacturers, the downstream retail sector needs to be rationalised and import duties gradually reduced. To ensure a level playing field, identical labour laws and taxes need to be imposed on all players. Further, the large-scale players should be allowed to compete in all segments of the market – currently the knitted and hosiery segments are reserved for small scale players.

If these issues are addressed and the economy grows at 10 per cent a year – which is possible if our recommended reforms are adopted – the apparel sector will experience dramatic growth and employment creation. Output will grow almost three-fold and the sector will create approximately 2.4 million jobs. Specifically in the export sector, output will grow by 15 per cent a year while employment will grow by 6 per cent a year. Without these reforms, the Indian apparel sector will lose share in the export market as the developed countries eliminate import quotas, which currently provide the Indian apparel sector an assured market.

## **Productivity performance**

The productivity of the Indian apparel industry is approximately 16 per cent of US levels. Producers in this industry can be split into three segments: Tailors, who custom make clothing for the domestic market, domestic manufacturers and exporters. Productivity varies across these categories of players, ranging from 12 per cent for domestic tailors to 20 per cent for domestic manufacturers to 35 per cent for exporters. Exporters in China are at 55 per cent of US levels.

## **Operational reasons for low productivity**

Productivity in India is lower than in the US largely due to poor organisation of functions and tasks (OFT), low scale, lack of viable investment and format mix. Poor OFT is evidenced by factors such as high absenteeism in the factories and a high percentage of delayed shipments. We see a lack of viable investment both in basic technology among domestic producers as well as in specialised, high-tech machinery among exporters. Finally, scale is low with most factories in India having only 50 machines compared to successful factories in other countries (e.g., China) that have over 500.

## **Industry dynamics**

Low levels of competition characterise the apparel industry. Low competition in the domestic market is largely because of the regulations preventing the entry of large-scale domestic producers and the non-level playing field between small and large producers (e.g., different excise duties and taxes). In addition, the industry has very little exposure to best practice because of the lack of foreign investment in India (in contrast to China) as well as the imports barriers.

## **External factors responsible for low productivity**

The most important external barriers to productivity are product market regulations, such as small-scale reservation and quotas imposed on the developing nations by European countries and the US. Problems in related industries, notably textiles and retail, also contribute to the low productivity of the apparel industry. Lastly, restrictions in the labour market play a key role in deterring FDI, which would be an important tool in improving both the competitive intensity and productivity in the industry. For example, growth of the Chinese apparel industry has been spurred by FDI.

## **Industry outlook**

We believe that India can considerably improve the productivity of its apparel industry by removing the external barriers. If these reforms are carried out, we estimate that productivity can double, total output can increase almost three-fold and employment can increase by almost 50 per cent.

## **Policy recommendations**

The government needs to make a major effort to attract FDI in apparel exports, specifically by making retrenchment of labour easier, improving port infrastructure and removing red tape. Reforms are needed in the domestic market too: Remaining small scale reservation (in knit and hosiery) needs to be removed, the growth of the retail sector needs to be facilitated, the playing field between large and small producers levelled and import duties on apparel, textiles and machinery substantially reduced.

# Apparel

Apparel is India's second largest export segment (after textiles) and employs 4.3 million people. It is important to this study as it highlights the barriers that constrain FDI in export oriented sectors. Our study of the apparel industry considers only western style apparel, both ready-made and tailor-made. This segment accounts for approximately 60 per cent of apparel sales in India. We have excluded traditional style garments such as saris from our definition as they are unique to India and, therefore, not comparable across countries. In addition, garments such as saris consist of almost nothing more than the textile itself.

The rest of this chapter is divided into eight sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External reasons responsible for low productivity
- ¶ External factors limiting output growth
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

The Indian apparel industry had revenues of US\$ 19 billion in 1997, largely consisting of sales in the domestic market. Exports accounted for only US\$ 4 billion and represented 11 per cent of India's total exports. Even developed countries such as Germany and the US, with a labour cost disadvantage, exported twice as much apparel as India. China is the clear leader in apparel production. It produces thrice as much apparel as India and exports over seven times as much. **(Exhibit 3.1).**

This section maps the evolution and segmentation of the industry and explains the three main manufacturing methods used to produce garments.

## Industry evolution

Only one-fourth of India's total apparel output in 1997 was exported while three-fourth was consumed domestically.

- ¶ **Exports:** While India has significantly grown its exports from US\$ 1 billion in 1985 to US\$ 4 billion in 1998, it still has less than 2 per cent of the US\$ 210 billion world apparel trade market. In contrast, China and Hong Kong together accounted for almost 20 per cent of world exports in 1997 (**Exhibit 3.2**).

Apparel exports from India have grown over the past 15 years at a CAGR of 13 per cent, after world export production shifted to South Asia. However, India has grown slower than both Thailand and Indonesia, which have grown at 17 per cent, and China, which has grown at 21 per cent (**Exhibit 3.3**). China's growth is largely due to a shift in exports from quota countries to non-quota countries, such as Japan, and demonstrates China's strong competitive advantage. (Quotas are restrictions placed by the importing country on the amount of apparel they import from specific countries.) The majority of China's exports are to Hong Kong and Japan, both quota-free countries that have invested heavily in Chinese apparel companies over the past 10 years (**Exhibit 3.4**). In contrast, most of India's growth has been the result of increasing exports to the US, which is under heavy quota control (**Exhibit 3.5**).

- ¶ **Domestic sales:** The domestic market for western style apparel in India stood at around US\$ 16 billion in 2000 (**Exhibit 3.6**). Almost one-third of this market consisted of ready-made apparel (ready-made's share is higher in urban areas) while the remainder was tailor-made. The domestic market grew by about 2 per cent a year between 1990 and 2000, according to the Ministry of Textiles' Research Wing. The ready-made market share grew from 19 per cent to 38 per cent between 1990 and 2000, largely because of a dramatic price drop in ready-made clothing.

## Industry segmentation

Apparel is a fragmented and labour-intensive industry. With low capital and skill requirements, it is ideally suited to the early stages of industrialisation. To better understand the industry, we have segmented producers into three categories:

- ¶ **Tailors:** Currently, tailors undertake the bulk of production for the domestic market. A typical tailoring shop consists of a tailor who deals with customers (helping with design and measurement) and 3-4 workers

who stitch the clothes. Consumers generally provide the fabric, so the tailor has negligible inventory carrying costs. Since tailors have low fixed costs and pay lower wages, tailor-made clothing is cheaper than ready-made apparel.

- ¶ **Domestic manufacturers:** There are two types of domestic manufacturers: Small, mainly unorganised players who produce exclusively for the domestic market (and are restricted by law to investments below US\$ 200,000) and large players who export over 50 per cent of their output and are allowed to invest as much as they think appropriate to function efficiently. The unorganised players dominate the domestic market, resulting in a very fragmented industry. They sub-contract almost all their jobs and, on average, have only 20 permanent employees on their rolls. The larger manufacturers, who also produce for the domestic market, mainly target the branded segment, which constitutes only 20 per cent of domestic ready-made consumption.
- ¶ **Exporters:** Exporters are, on average, at least twice as large as domestic manufacturers, in terms of number of employees. There are two reasons for this: First, manufacturers who export over 50 per cent of their product are exempt from investment limits imposed by the government; second, sub-contracting among exporters is less prevalent than among domestic manufacturers, largely because retailers forbid the use of sub-contractors to maintain consistency and quality.

## **Manufacturing methods**

The production of a final garment consists of five steps (**Exhibit 3.7**). First the garment is designed, and production scheduled and planned. Then, the fabric and designs are decided, the fabric is marked and cut to fit the pattern. The next step, which constitutes the bulk of the work, consists of stitching the pieces together. Finally, the garment is finished, pressed and packed for shipment.

There are three principal manufacturing methods for apparel, with variants. The method used depends on the product type, quality level, order quantity and the level of technology and skills available (**Exhibit 3.8**).

- ¶ **Make through:** Here, the whole product is made by one operator – the standard method used by tailors in India. Since a single operator undertakes the whole process, little supervision and organisation are required. In addition, this method has a very low throughput time because only one unit has to be finished at a time to complete the order. The disadvantage of this system lies in the fact that the operator needs to

conduct all the operations required to produce the finished good and, hence, cannot have or learn any specialisation.

- ¶ **Assembly line:** This method is based on extreme division of labour. Its major advantage is that both workers and machines are specialised, allowing for a dramatic increase in productivity. In addition, the individual skills required by operators are greatly reduced. However, this method of production needs excellent organisational ability (e.g., to ensure that operations match the feed rate) so as to avoid idle time. Factors like variations in individual operator performance, absenteeism and machine breakdowns can easily upset the working schedule. In addition, this method has a large amount of work in progress, which makes it harder to handle style variations and dramatically increases the lead time associated with a finished batch of products.
- ¶ **Modular:** Modular formation consists of grouping tasks, such as the assembly of a collar, and assigning them to a module (a team of 5-30 persons working together). These workers are cross-trained and can, therefore, easily move across tasks. Compensation is based on the module's output instead of that of the individual worker. The key benefit of this method is the reduction in throughput time. However, the costs of switching to this method are very high as extensive training is required. Although this method is at the frontier in the US, it is not relevant to China and India yet. It is commonly used for high value-added, high fashion (and thus very time-sensitive) products.

## **PRODUCTIVITY PERFORMANCE**

Using the number of men's shirts produced per hour as the measure, we have estimated labour productivity in the Indian apparel industry to be at 16 per cent of US levels (**Exhibit 3.9**). Indian exporters are at 35 per cent productivity. In comparison, exporters in China are at 55 per cent of US levels. The US provides a benchmark for best practice in terms of labour productivity, given its high labour costs. However, very little production of shirts is done in the US nowadays. China provides an extremely relevant comparison, as it is the largest exporter of shirts in the world and has labour costs comparable to that of India.

We focus on men's shirts since they are the single largest apparel item exported by India. In addition, India is the third-largest exporter of shirts worldwide, and men's shirts are the fifth-largest item of apparel exported across the world, thereby comprising a significant part of international trade in apparel (**Exhibit 3.10**).

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

Format mix, poor organisation of functions and tasks (OFT), lack of viable investments – particularly in technology – and low scale are the main operational causes of the low productivity we see in India (**Exhibit 3.11**):

### **Poor OFT**

This accounts for 10 points of the productivity gap (**Exhibit 3.12**). Improving OFT will increase productivity levels by 63 per cent from the current levels. This issue applies more to manufacturers than tailors. Large-scale absenteeism, high rejection levels and delayed shipments point to poor management of Indian apparel factories. For instance, absenteeism results in unskilled operators having to do specialised jobs. Since they are not trained for these positions, they are slow and delay production.

Poor OFT is the main reason for the productivity gap between China and the US too. Although Chinese exporters have made a concerted effort to improve OFT as evidenced by their superiority over India, they still have a long way to go

### **Low investments in technology and automation**

This accounts for five points of the productivity gap. Increasing investments can improve productivity by 20 per cent, provided OFT is fixed. The lack of viable investments reduces efficiency, quality and delivery speed, and manifests itself in two ways:

- ¶ **Lack of basic technology:** The lack of basic technology to produce standard quality products applies mainly to domestic manufacturers. For example, many factories lack proper ironing equipment and adequate washing and drying facilities. The common use of hand washing and line drying often results in fading or shrinking.
- ¶ **Lack of specialised machinery:** Exporters lack high-tech machinery that can help speed up the production process (**Exhibit 3.13**). A good example of this is the spreading machine. This machine lays out the cloth to be cut in a manner that keeps it flat but does not stretch it. The same operation, when conducted manually, results in the cloth getting stretched. The problem deepens when further layers of fabric are added; and often, after the fabric is cut into separate pattern pieces, it contracts and introduces a distortion in the size of the final garment. Although machines such as the spreading machine provide major benefits to the

production process and are viable even at current labour costs, they are extremely rare in domestic factories.

There are some external factors that prevent manufacturers from adopting specialised machinery. Consider cutting room automation. The ability to automate the cutting of fabric depends on three things: 1). The type of fabric used in terms of roll length, quality, consistency in pattern and stability; 2). The cutting quality expectations of the buyer; and 3). Considerations of space and fabric savings. As such, the low quality of fabric produced in India is a deterrent to the adoption of cutting room automation.

Another consideration is the lack of air conditioning. Not only does it result in garment stains (as a result of sweating), which then need to be removed; it also decreases productivity as workers find it hard to work in intense heat. Poor working conditions also contribute to high turnover and absenteeism rates which both reduce productivity.

### **Supplier relations**

An underdeveloped supplier industry can impose productivity costs on its clients by delivering outputs with low quality. This factor accounts for less than 1 point of the gap and can improve productivity by 2 per cent. This issue applies only to domestic manufacturers, who mostly use domestic textiles from power looms. This fabric tends to have defects, which in turn increase the rejections that occur during production, thereby slowing down the process and lowering productivity.

### **Low scale of operations**

This accounts for 10 points of the gap and is the key cause of the difference in productivity between tailors and manufacturers, and between Indian and Chinese manufacturers. Average tailoring shops in India have 3-4 sewing machines in the back room, while domestic manufacturers have on average 20 machines exporters have around 50 machines. Compare this with China and Sri Lanka, where factories often have thousands of employees working under one roof. A 500-machine factory is the minimum size required to function efficiently and larger factories are even more efficient. However, manufacturers in India prefer to maintain a low number of permanent staff and use sub-contractors for the bulk of the production to avoid labour problems. In addition, the reservation for small-scale industry (discussed later) makes this method of doing business a requisite for producing in the domestic market.

One of the major sources of inefficiencies of small-scale plants is that large orders have to be split across factories in order to have them ready for delivery

in time. However, short production runs are much less productive as switching costs are high, machinery needs to be moved around and workers need to learn how to make the product. It can take 3-7 days, depending on the product, to achieve normal productivity. Larger factories have another advantage in that they can afford to invest in more efficient machinery and better training for managers and operators. Most training for workers happens in-house rather than externally. Therefore, good training in-house is key to high overall productivity in the factory.

### **Format mix**

This is by far the largest factor and accounts for 59 points of the productivity gap. It consists of the shift away from tailors and towards manufacturers. In developed countries, tailors produce made-to-order garments for the high end of the market and constitute a very small share of the industry. In India, tailors produce the vast majority of clothing for the mass market.

They are largely transition workers who are low skilled and have typically taken up their first job outside agriculture. The production process they adopt is inherently low on productivity. Also, since tailors have a very low opportunity cost of labour, they will survive as long as they can cover their variable costs (i.e., function almost at subsistence levels). This segment will go out of business only when wages rise enough to make them compete with manufacturers on costs.

## **INDUSTRY DYNAMICS**

Although there is strong competition within the segments, the segments rarely compete with each other (**Exhibit 3.14**). For example, tailors compete with one another quite intensively but face little threat from domestic manufacturers or the exporters producing for the domestic market. As a result, even low productivity segments such as tailors are able to survive in this industry. The lack of exposure to best practice too has a significant impact on productivity in India.

### **Little price-based competition**

Price-based competition between tailors and small manufacturers is low because manufacturers are disadvantaged by inefficient retail formats which make the retail selling price of ready-made apparel much higher than tailor-made apparel (**Exhibit 3.15**). In addition, very low labour costs allow tailors to undercut ready-made apparel prices.

Three factors keep price-based competition between small manufacturers and large-scale manufacturers low. First, reservations for small-scale industry (SSI) prevent large domestic manufacturers from entering the market. Second, large-scale exporters who also sell in the domestic market are at a disadvantage to small-scale domestic producers due to the lack of organised large-scale retail formats (see “External reasons responsible for low productivity” for more detail). Third, large-scale exporters do not compete directly with domestic manufacturers because they target the upper end branded market. Their competitive advantage lies in the fact that they can create a distinct brand and produce high quality products. Since this requires the use of imported machinery for which they must pay a high duty, they find it more profitable to serve the high end of the market from which they can extract a large quality and brand premium.

### **Exposure to foreign best practice**

India has not had the opportunity to gain much exposure to foreign best practice methods. There has been very little foreign direct investment (FDI) in this industry in India. In sharp contrast, China has benefited enormously from foreign investment, specifically from Hong Kong in the south (Guangdong) and Japan on the coast (Shanghai, Beijing). Taiwan and Korea have also heavily invested in the garment industry throughout China. All these countries have extensive experience in garment manufacturing but can no longer produce at home because of high labour costs. They are, therefore, able to pass on their know-how to companies in China. This knowledge transfer, as well as the infusion of capital, has dramatically improved the performance and competitiveness of this industry in China. Most of these countries have also invested in Thailand while Sri Lanka has received a reasonable amount of investment from the US. The lack of foreign investment in India is an enormous hindrance to its competitiveness in the global market.

In addition, the domestic market in India was till recently protected from imports through quantitative restrictions, in addition to a hefty duty of 35 per cent on all imported apparel products.

### **Non-level playing field**

The apparel industry is characterised by a non-level playing field, because of the implementation of differential rules among companies within India and the quotas imposed across countries.

- ¶ **Within India:** Although all manufacturing companies are supposed to pay a minimum wage, small domestic producers manage to avoid doing so and, hence, gain a cost advantage over large producers. Further, SSI

classification automatically exempts small players from paying excise duty

¶ **Across countries:** Quotas are the key cause of a non-level playing field across countries. For example, quotas artificially determine the amount of production to be done in India vis-à-vis China, thereby helping India to retain its market share despite being less competitive than China. Quotas are allocated to developing countries primarily by Europe and the US. Their allocation largely determines the export production potential across countries. Quotas are allocated (both in absolute terms and across categories) depending on what the country was producing when the quotas were first implemented. For example, India was producing very little bottom wear (pants, shorts, etc.) when quotas were first implemented. As a result, it has a very tight quota for bottom wear compared to China. This prevents the development of this segment and will put India in a weak competitive position when quotas are removed.

Concessions based on country of origin further exacerbate this issue. For example, China and Hong Kong are subject to a special arrangement where if even 40 per cent of the product is produced in Hong Kong and the remainder in China, Hong Kong may be cited as the country of origin. As a result, a large proportion of the production from southern China is exported using Hong Kong quotas.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

In this section, we discuss how external factors, such as government regulations and the working of related industries (**Exhibit 3.16**), result in low and stagnant productivity in the Indian apparel industry. These factors result in the different levels of productivity across the industry both within India as well as in China and the US (**Exhibit 3.17**). To relate the external factors to the operational causality, we look at the sources of potential productivity improvements, given current labour costs.

### **Quotas imposed by the developed world**

As we discussed in the previous section, quotas limit competition among countries and manufacturers. Buyers are forced to order from countries, and therefore companies, which have a good quota allocation and consequently base their choice first on quota availability and, then, on the competitive position of the company. This explains why China can maintain such a powerful position in the export market while still being far less productive than the US. Since Chinese exporters

have a guaranteed market share, they have little incentive to improve their productivity. This results in sustained low productivity throughout the industry. These quotas are imposed by developed countries like the US, Canada and the EU on imports of garments and textiles from developing countries. These quotas are administered through the Agreement on Textiles and Clothing (ATC), which mandates that all quotas must be phased out by 2005.

### **Small-scale reservation and FDI restriction**

These constrain both the output and productivity growth of domestic apparel producers. As mentioned earlier, reservations for small-scale industry restrict investment in fixed assets to about US\$ 200,000 for firms producing more than 50 per cent of their output for the domestic market. This regulation is constraining because setting up even a very basic 500-machine factory (the minimum size required to function effectively) requires a minimum investment of US\$ 700,000.

As part of the SSI regulation, FDI is limited to 24 per cent in firms that produce over 50 per cent of their output for the domestic market. This results in a limited transfer of skills and knowledge from foreign best practice and reduces technology adoption (foreign investors often provide the cash and insist on adoption of high-tech machinery that the factory would not otherwise bother to invest in). In addition, firms with investments of less than US\$ 200,000 are exempt from paying excise duty, which improves their cost position vis-à-vis larger manufacturers. This provides further protection to small-scale plants despite very low productivity. Though SSI reservation in the woven segment of the industry was removed in November 2000, it remains in the knitted and hosiery segments.

### **Little support from related industries**

Productivity of the Indian apparel industry is further hindered by the poor quality of fabric produced by the local textile industry. The fragmented nature of retailing in India also impedes the growth of apparel in India.

- ¶ **Textiles:** Large mills that can produce large quantities of quality fabric are very small in number and export most of their produce. The low quality mills that do exist are dying out. This is mainly because the thriving powerloom and handloom sectors enjoy several unfair advantages, despite the fact that they produce small lots of uneven and faulty fabric. For example, they pay no excise duty, avoid paying minimum wages and receive government subsidies (**Exhibit 3.18**). In

addition, zoning codes and labour laws make it difficult for the older mills to move to cheaper land and labour cost areas.

Most of the domestic fabric available to apparel manufacturers is, therefore, of poor quality. Exporters deal with this issue by importing textiles, which is time consuming and increases the lead time for order fulfilment. Domestic producers are affected even more dramatically as high duties prevent them from resorting to textile imports. The availability of mostly poor quality fabric also acts as a deterrent to FDI. All things being equal, a buyer will choose to produce in a country with a readily-accessible supply of textiles to cut down on turnaround time and minimise problems with customs clearance.

¶ **Retail:** The pressure for productivity increase on the domestic apparel industry is also dependent on retail consolidation. At present, however, the Indian retail market consists largely of small traditional stores (90 per cent) as opposed to department stores or specialty stores. Also, the retail industry has very high margins averaging 40 per cent, as opposed to 20 per cent at modern discounters in developed nations. This adds a large premium to the price of ready-made apparel, further weakening its position vis-a-vis tailor-made garments. This allows tailor-made apparel to control the bulk of the domestic market, despite being less productive.

Consolidation in the retail sector would put pressure on manufacturers to reduce costs. It would also force apparel manufacturers to consolidate, as large retailers prefer to be supplied by large manufacturers who provide national coverage and marketing. However, since the retail industry in India is fragmented, small manufacturers can survive by catering to small local retailers.

### **Stringent labour laws**

Strict labour laws in India make it very difficult to reduce employee strength. As a result, firms prefer to sub-contract rather than hire permanent labour. The incidence of sub-contracting in the apparel industry in India is markedly higher than in other countries. Unfortunately, this results in much lower productivity due to lack of specialised technology and sub-scale production. In addition, labour laws force retention of unproductive employees since it is possible to fire only the newest employees as opposed to the least productive. The enforcement of labour laws also varies according to firm size. For instance, although all firms are supposed to be subject to the minimum wage provision, the government only ensures that the larger firms pay minimum wages. This gives the small players another cost advantage.

In addition to the laws themselves, the fear of labour unrest caused by unions keeps factories from growing too big. As mentioned earlier, average factory size in India is far smaller than in countries with developed apparel industries. For example, one of the best practice apparel manufacturers in India has 6,000 employees and works them in groups of 300 across 20 factories, all within a few blocks of each other. The owner of this company admits that it would be far more efficient to have 3,000-4,000 employees under one roof, but he doesn't want to risk labour unrest. .

In addition to affecting productivity directly, labour laws also deter FDI. Foreign investors are wary of committing to a joint venture as their ability to exit an unsuccessful venture is constrained by laws that make it very difficult, costly and time consuming to shut down a factory (it can often take 2 years). In fact, it was this issue that made a large US apparel manufacturer decide to invest most of its production capacity in Sri Lanka instead of in India.

### **Imposition of high import duties**

Till recently, quantitative restrictions prevented the import of apparel from more productive lower cost countries. As a result, the domestic apparel market in India was protected and thus had less incentive to improve productivity. The restrictions have now been removed, but import duties on both the import of machinery as well as textiles remain, as high as 45 per cent<sup>1</sup>. These duties apply only to apparel manufactured for the domestic market. The reasoning behind the high duty is to protect the domestic machine manufacturing and textile industries. However, the apparel machine industry in India produces only low tech, poor quality machinery, which cannot act as a substitute for the advanced computer controlled equipment available in Japan and Germany. In addition, most of the textile industry produces poor quality powerloom fabric, which is no substitute for higher quality imported fabric. As such, these duties hinder technology upgrades at factories and prevent the use of high quality textiles.

### **Poor infrastructure**

Poor infrastructure in India is a strong deterrent to FDI and limits Indian manufacturers' exposure to best practice. Power outages cause lost time and quality problems. In addition, the high price of electricity deters adoption of air conditioning, the impact of which was mentioned earlier. The poor condition of the roads, meanwhile, makes it difficult to establish production in the countryside and make use of cheap rural labour.

---

<sup>1</sup> The basic duty charged is 25 per cent, on top of this another 16 per cent is charged as counter veiling duty (equivalent to the excise duty that would have to be paid if the machine was manufactured domestically), finally a special duty of 4 per cent is added on for a total of 45 per cent

## **EXTERNAL FACTORS LIMITING OUTPUT GROWTH**

Some productivity barriers mentioned in the previous section also affect output. We discuss these again, pointing specifically to how they affect output. In addition, we look at how distance to market and high tariffs on exports to the US and Europe have resulted in a significant decline in Asia's share of the US and European import market.

### **Unavailability of high-quality textiles**

As explained in the previous section, good quality mill fabric is difficult to obtain in India. This means that exporters are forced to import textiles, which is time consuming. All other things being equal, a buyer will choose to source from a country with a ready supply of textiles. Consequently, India will have problems growing its export market unless the textile market is improved.

### **Red tape**

Many procedures complicate and delay the import and export of products. Customs procedures and port facilities are the main culprits. For example, it takes an average of 9 months for exporters to get a duty free advance licence for export production (which allows them to import goods for export production without duty). The ports in India are also plagued by red tape; there are often major delays in carrying goods on and off the ships.

Goods have to arrive at the port 3-4 days ahead of the shipping date, thereby cutting into production time. Import of machinery, textiles and accessories is costly and time consuming. The delays caused by importing fabrics and accessories can cause major delays in the production schedule. All this deters FDI in apparel in India and reduces output.

### **Poor infrastructure**

Poor infrastructure in India is a strong deterrent for buyers planning to source products from India. Poor communication facilities make it difficult for overseas buyers to contact factories. This is a major problem since buyers need to be in constant touch with the manufacturers to convey instructions and changes in plan.

Further, while the capacity provided by Indian ports may be adequate for the current low level of exports, more efficient ports will be needed as India increases its exports. At present, there are very few ports like the New Bombay port that are efficient and can handle large volumes of shipments

## **Geography**

India's distance from Europe and the US makes it hard to compete on delivery times with Eastern Europe (while exporting to Europe) and Mexico and the Caribbean (while exporting to the US) (**Exhibits 3.19 & 3.20**). The revolution in retail is making short transport times critical. The development of electronic stock taking and reordering systems allows retailers to keep smaller stocks and rely on just-in-time delivery to replenish shelves, thereby drastically reducing the probability of stock outs and markdowns. Even seemingly standard products such as men's shirts are subject to these issues as fabric types, colours and patterns change continually. White shirts, for example, now make up less than 15 per cent of all shirts sold in the US, down from 72 per cent in the early 1960s.

## **Free trade agreements**

Many duty free trade areas have been formed in the last 10 years but none of them includes India (**Exhibit 3.21**). This will hinder India's export growth in these markets and make it less cost-competitive than countries such as Mexico, which are party to such agreements. (**Exhibit 3.22**). Realising the benefits provided by free trade agreements, both the US and EU nations have increased the pace at which they are entering into these agreements.

## **INDUSTRY OUTLOOK**

The apparel industry in India can witness significant growth over the next 10 years. This growth will be the result of an increase in production for both the export and the domestic market. The export market will experience a dramatic shift in production across countries in 2005 with the complete removal of quotas. Once this occurs, all countries will be in direct competition. The key question is how will India fare in a quota-free environment? In other words, are quotas hindering or protecting India's growth, and how will this change in the next 5 years? We believe that quotas are currently protecting India's growth and that unless India achieves major productivity improvements, it will have substantial problems competing effectively in 2005 when quotas are completely removed.

The domestic market is currently based on decentralised production (i.e., extensive use of sub-contracting). However, as the mass market for ready-made clothing evolves, demand for consistent quality across large volumes will either force the industry to improve productivity or will cause imports to rise.

To evaluate the outlook on output, productivity and employment, we consider two possible scenarios for the competitive environment: Status quo and reforms in all sectors.

For both scenarios, we need to estimate the future size of the world export market. Since this estimate is independent of what happens in India, we have used the same estimate for both scenarios. Our estimate shows an increase in world exports from its current level of US\$ 210 billion to US\$ 415 in 2010 (**Exhibit 3. 23**). We have derived this estimate by extrapolating the current growth rate of 10 per cent a year for the 2000-2005 period. At this point, we expect the bulk of apparel production to have shifted out of the developed countries. Once this shift happens, exports will continue to grow at the rate of increased consumption of apparel. We estimate this at 4 per cent a year for 2005-2010.

¶ **Status quo:** In this scenario, we estimate India's total apparel output to grow by around 5 per cent. Apparel productivity will grow at 3 per cent a year as a result of partial de-reservation and removal of import restrictions for the domestic industry and removal of quotas for exports. As a result, employment in apparel will increase only slightly, at less than 2 per cent a year.

- **Domestic:** We envisage the domestic market as follows:

- **Output.** In this scenario, output growth in the domestic market will be driven mainly by population growth. Per capita consumption will increase only slightly as per the last 10 years. The split of manufacturers and tailors will continue to evolve as it has done in the past. The domestic market will grow from US \$16 billion in 2000 to US\$ 25 billion in 2010.
- **Productivity.** Although we expect the de-reservation of the woven segment of the apparel industry to result in some productivity improvement, we do not expect to see a dramatic change unless retail is rationalised and India attracts FDI. Therefore, we expect to see a slight growth in the productivity of manufacturers from the current level of 20 per cent to 35 per cent of US levels, the current level of exporters in India. We expect the productivity of tailors to remain constant since this is an inherently low productivity format.

- **Export:** Our scenario for exports is as follows:

- **Output.** Under this scenario, we expect exports to grow to US\$ 7 billion from US\$ 5 billion. We get this figure by using India's current share of exports in non-quota countries and applying it to our estimate of total world exports in 2010. Since these countries

are free to import from anywhere, we assume that they will choose the best combination of cost and delivery time. India's performance is much worse in non-quota countries than in quota countries and we, therefore, estimate the market share of total exports to drop from 3.2 per cent to 1.6 per cent. Remarkably, China's performance in these markets is the opposite. China is performing very well in quota-free markets, a sign that it will do very well once quotas are removed (**Exhibit 3. 24**).

- Productivity. As quotas are removed in 2005, the productivity of exporters in India will increase from 35 per cent to 55 per cent, the current level of Chinese exporters. However, the barriers still in place will prevent India from becoming a world-class competitive producer of apparel.

¶ **Reforms in all sectors:** Under this scenario, the apparel industry will experience very rapid output growth of around 11 per cent a year, led by reforms in all sectors and an overall GDP growth of around 10 per cent. Productivity growth will touch around 7.5 per cent annually and employment in the sector will increase by 3.5 per cent a year (**Exhibit 3. 25**).

- **Domestic:** The domestic market will be freed of import restrictions and have lower import duties. Retail will be rationalised, which will bring down retail margins.
  - Output. Output will grow at 10 per cent CAGR for the next 10 years. Under this scenario, we expect India to exceed China's current consumption of apparel per capita since India's GDP per capita will exceed China's current level (**Exhibit 3. 26**). Given this prediction, we expect production in the domestic market to increase dramatically, mostly due to consumption growth in urban areas (**Exhibit 3. 27**). This was the case in China. The shift from tailors to manufacturers will continue at a faster pace in urban areas owing to reform in the retail market (**Exhibit 3. 28**), but tailors will still produce 20 per cent of output (down from 60 per cent today). In addition, as GDP per capita grows, people will be more time constrained and will increasingly value convenience. This factor will also contribute to increasing the market share of ready-made apparel. Furthermore, increasing land prices will increase costs for tailors. This projection is confirmed by the current situation in urban areas in China where there are very few tailors left.

- Productivity. Labour productivity will grow at 6 per cent CAGR for the next 10 years. With an open domestic market and rationalised retail, domestic manufacturers will be forced into improving productivity up to world standards or losing market share to imports. We expect productivity in the domestic market to increase from 14 per cent of the US to 26 per cent, a CAGR of 6 per cent. This will be driven completely by productivity improvements by manufacturers. We expect the productivity of tailors to remain constant because this production method is an inherently low productivity format.
- Employment. For this segment of the market, we expect employment to grow at 4 per cent a year over the next 10 years.
- **Export:** Our scenario for exports is as follows:
  - Output. Output will grow at 15 per cent CAGR over the next 10 years. To come to this conclusion, we first segment the key importing areas – US, Europe, Japan and “Others” – and then break down their imports into four categories: India, China, Free trade areas and “Others” (**Exhibit 3. 29**). We believe that India will find it difficult to take market share away from China, given the latter’s first mover advantage. In addition, despite a GDP per capita, which is twice as high as India, China keeps wages low by importing cheap uneducated labour from rural areas. For reasons mentioned earlier, we believe that imports from Free trade areas will continue to grow at a rapid pace. This leaves India only the “Others” category to compete with. Currently, companies in the US and Europe are sourcing from approximately 140 countries. This is largely due to the quota system, which forces them to seek out new countries with quota available.

We estimate that when quotas are removed, production in many of these countries will cease and migrate to the most efficient countries. As a result, we believe that if India becomes competitive, it will gain market share in this category. Using this methodology, we have estimated that India will have a 5 per cent (currently 2 per cent) share of the world market for apparel exports in 10 years, yielding an export value of US\$ 21 billion. By then, China will have a market share of 21 per cent (as opposed to 14 per cent now), yielding an export value of US\$ 87 billion.

- Productivity. Productivity will grow at 9 per cent per year over the next 10 years. When quotas are removed in 2005, the world production of apparel for export will shift to the most productive

companies. As India does not have a huge advantage in terms of wage rates (Bangladesh and Pakistan both have lower wages) to compete in this environment, it will need to improve productivity to world standards. We estimate an increase in productivity from 35 per cent to 80 per cent. This is above China's current productivity level of 55 per cent but below India's potential of 100.

- Employment in this sector is expected to grow at 6 per cent a year over the next 10 years.

## **POLICY RECOMMENDATIONS**

Improving the future outlook of the apparel industry should be a priority for the government. This industry is ideally suited to absorb labour from agriculture, as very few skills are required. In fact, skilled employees are mainly needed for cutting fabric and repairing sewing machines, and represent less than 3 per cent of the workforce. Under our full reform scenario, 2.4 million new jobs will be created.

Our policy recommendations focus on the most important external factors as well as on the main political economy issues that need to be addressed.

With the impending abolition of quotas in the world apparel trade, it is critical for the apparel industry to improve productivity in the next 10 years. Moreover, employment in the apparel industry plays a key role in the transition process from an agricultural-based to a modern economy. In India, most migration from rural areas will be composed of unskilled and sometimes illiterate workers who are likely to find suitable jobs only in sectors such as apparel, construction and retailing. These sectors often act as an entry step for rural workers migrating to cities in search of higher incomes.

The government has already taken a few steps in the right direction to achieve the large potential output and productivity growth in the apparel industry. The woven segment of the apparel industry was taken off the list of reserved industries in November 2000 and quantitative restrictions removed in 2001. However, many more actions need to be taken in the next 3 years to achieve India's potential (**Exhibits 3.30 and 3.31**).

- ¶ **Attract FDI:** One of the key priorities of the government should be to attract FDI both for the export and domestic markets. This was one of the major reasons for the spectacular growth of the apparel export industry in China. FDI in the domestic market will also infuse the spirit of competition that is currently lacking. Since FDI entering a country solely

for exports is very sensitive to differences across countries, three actions need to be taken to make India attractive to investors:

- **Change labour laws:** As laws stand, it often takes many years to shut down a factory. This is a strong deterrent for foreign investors who find it costly and time consuming to withdraw from unsuccessful ventures. Many other countries have dealt with labour problems in rather dramatic ways. Bangladesh has set up Export Processing Zones that specifically forbid the formation of trade unions and the declaration of strikes. In Indonesia, factory owners employ local military commanders to break up strikes. In China, unions are controlled by the state, preventing the emergence of an independent union movement.
  - **Improve infrastructure:** As we have seen, the infrastructure in India is very poor. An inefficient communications industry makes it very difficult for foreign investors to contact local partners; constant power outages result in lost production time; and delays at ports increase turnaround time for a shipment. In addition, the prevalence of red tape relating to import/export procedures complicates production and export in India. The most effective way to sort out these problems quickly would be to set up special export zones, which focus on ensuring high quality infrastructure and reducing red tape. China's success in the last decade is due largely to the creation of special economic zones.
  - **Improve textile availability by reforming the textile sector:** Domestic availability of high quality textiles is a major factor in foreign investors' decision of where to set up production facilities. Textiles available locally reduce the lead-time of the production cycle by cutting out the shipping time for the textiles. The textile industry in India is plagued by small-scale low quality producers of textiles (powerlooms). Reform in the textile sector needs to take place to replace these small-scale producers with large-scale, high quality mills. This means levelling the playing field between powerlooms and mills in terms of excise duties, labour laws, subsidies and taxes.
- ¶ **Reform the domestic market:** De-reservation of the woven sector in the apparel industry is a major step in the right direction. However, de-reservation also needs to be undertaken in the knitted and hosiery sectors. Moreover, de-reservation needs to be complemented by three other changes to ensure that more efficient, large-scale producers succeed. Retail needs to be rationalised, the playing field must be levelled in terms of taxes and labour laws and import duties need to be reduced:

- **Remove small-scale reservation:** Reservation needs to be removed in the knitted and hosiery segments of the industry. True, small companies protected from the entry of more efficient large-scale manufacturers will lose out in this, but consumers and efficient producers will benefit.
  - **Rationalise retail:** If companies such as Wal-Mart enter the domestic market, they will infuse competition in the domestic manufacturing sector by demanding high volumes of high quality products delivered on time at low cost. A player such as Wal-Mart will also dramatically reduce the margins on retail sales, thus making the selling price of ready-made apparel far more comparable with tailor-made. Large-scale manufacturers will be in a much better position to serve large retailers.
  - **Level the playing field:** To level the playing field, the government needs to ensure that excise tax is levied uniformly across producers. This will be particularly critical in terms of removing the legacy of small-scale reservation in the industry.
- ¶ **Reduce import duties:** The government should gradually (over the next 3-5 years) reduce the duty imposed on the import of apparel. In general, we recommend the import duties be reduced to ASEAN levels of 10 per cent. Further, duties on the import of textiles and machinery for domestic production should also be reduced. This will benefit consumers, who will be able to buy inexpensive, high quality apparel, and force Indian companies to improve productivity.

## Appendix 3A: Measuring productivity

Our “bottom-up” productivity estimates for each segment were based on information on output and employment for a specific project. Garment production consists of three stages referred to as CMT: cutting the fabric, making (sewing) the garment and trimming/finishing the garment. We have focused on measuring productivity only in the sewing room. We have used this measure because it is possible to attribute the output of a group of people to a particular style produced during a given period. In addition, it is the most labour-intensive part of the process, accounting for approximately 85 per cent of the workers in the factory.

As the majority of factories are multi-style factories and the spreading, cutting, sewing and finishing capabilities are not the same; it is difficult to allocate proportionate input of other department workforce to a particular style. This is largely due to the lack of work measurement practice in different departments, as well as the lack of attention to the importance of productivity improvements in the industry.

We have estimated productivity by segment and obtained an aggregate estimate for productivity in the sector. Due to the lack of aggregate sector data, we have based our estimates on extensive interviews and company visits to determine total output (number of garments) and total employment for each producer.

An issue we must consider when comparing output across manufacturers and countries is whether the product is similar. Ideally, we would like to know how long it takes various manufacturers to make the same shirt. However, in practice, the shirts made by tailors, domestic manufacturers and exporters differ. Below, we explain how we have addressed this issue.

When comparing exporters across countries, we have not made any adjustments because we believe that the quality is approximately the same across countries. This is because exporters are producing for brand name retailers who demand the same level of quality and consistency across all the factories they source from.

When comparing domestic manufacturers and exporters we find that the quality of exporters is better than that of domestic manufacturers, and hence a productivity penalty should be applied to domestic manufacturers because their output has lower value addition. On the other hand, they take longer to produce a shirt as they use very poor quality fabric compared to exporters. The use of fabric similar to export would boost their productivity. We take comfort in the fact that the two

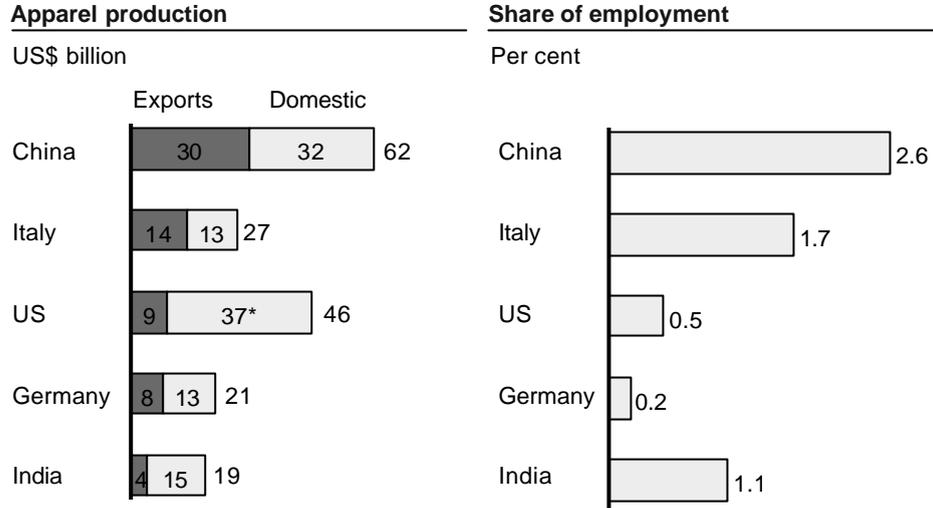
factors work in opposing directions. However, given our inability to measure these two factors, we have not made any adjustment.

The last comparison is between tailored shirts and domestic shirts. Again here we expect the manufactured shirts to be of better quality where quality is defined as sturdiness and wear. However, since the tailor-made shirt is made to fit, it has a higher value addition. As such, we do not make a quality adjustment between these two products to become competitive with the rest of the world.

The Garment Manufacturing Technology Group at the National Institute of Fashion Technology in Delhi provided a lot of the data we have used.

Exhibit 3.1

## CROSS COUNTRY COMPARISON OF APPAREL SECTOR – SIZE AND SHARE OF EMPLOYMENT



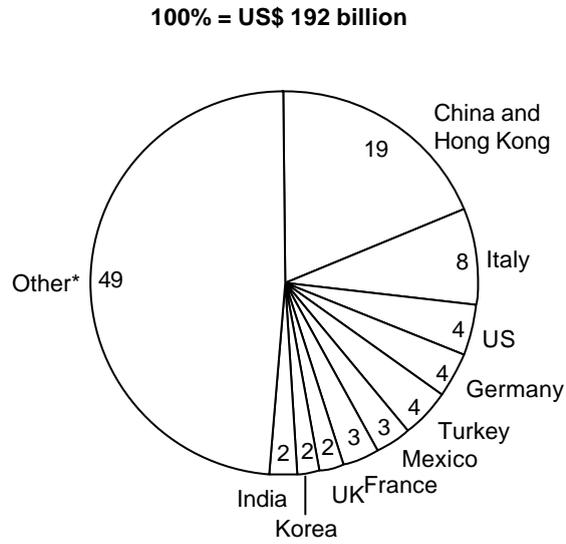
\* 70% is exported as cut parts for assembly to CBI, Mexico and Columbia

Source: Country sources, UN International Trade Statistics

Exhibit 3.2

### APPAREL EXPORTS BY COUNTRY: 1997

Per cent

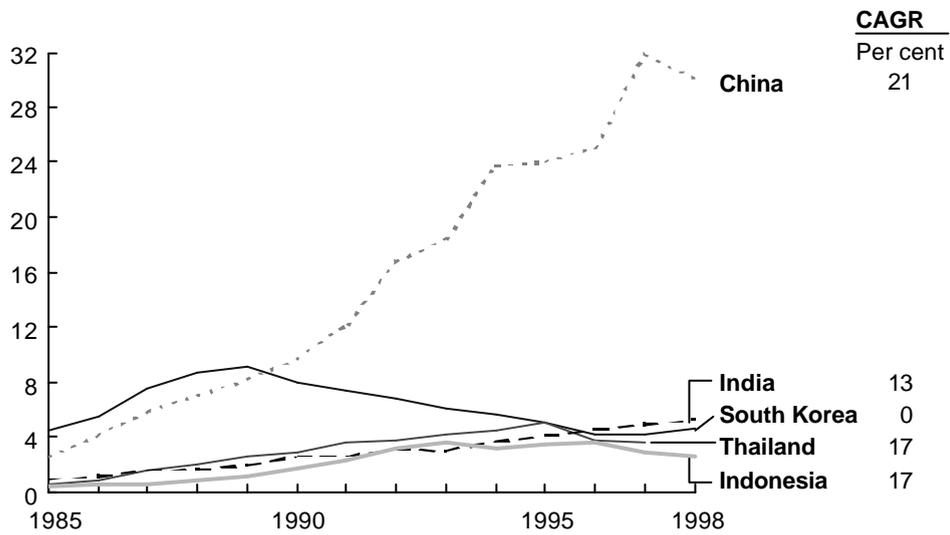


\* All the countries in the "other" category have less than 2% share of the market  
 Source: UN International Trade Statistics

Exhibit 3.3

### GROWTH OF APPAREL EXPORTS FROM ASIAN COUNTRIES

US\$ bn

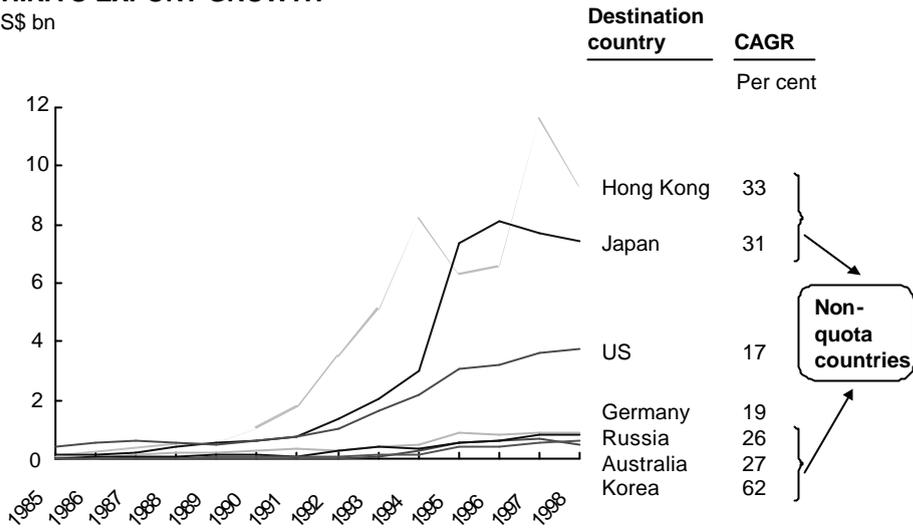


Source: Apparel Export Promotion Council

Exhibit 3.4

### CHINA'S EXPORT GROWTH

US\$ bn

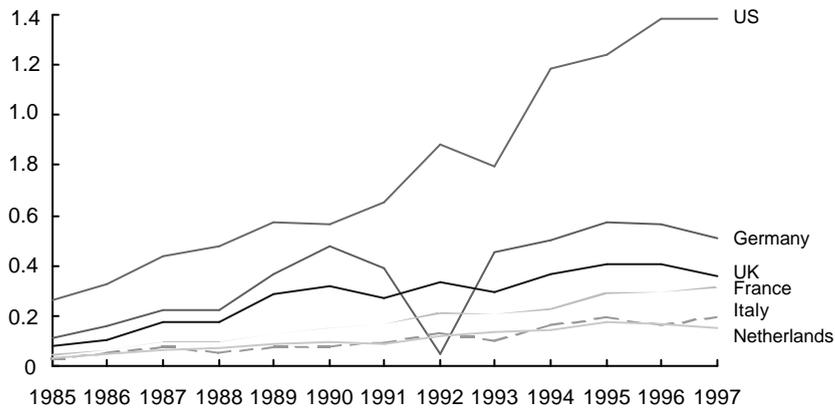


Source: China Foreign Trade Yearbook

Exhibit 3.5

### INDIA'S EXPORT GROWTH

US\$ bn

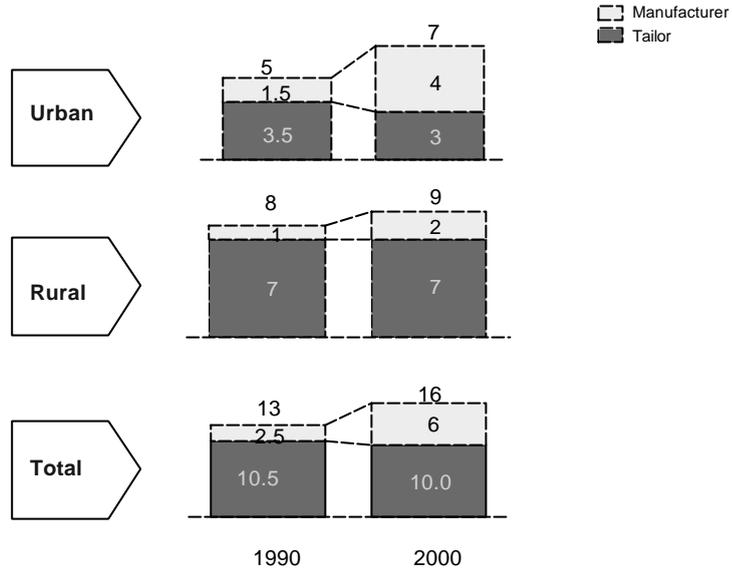


Source: Apparel Export Promotion Council

Exhibit 3.6

### EVOLUTION OF INDIA'S DOMESTIC MARKET: WESTERN STYLE APPAREL

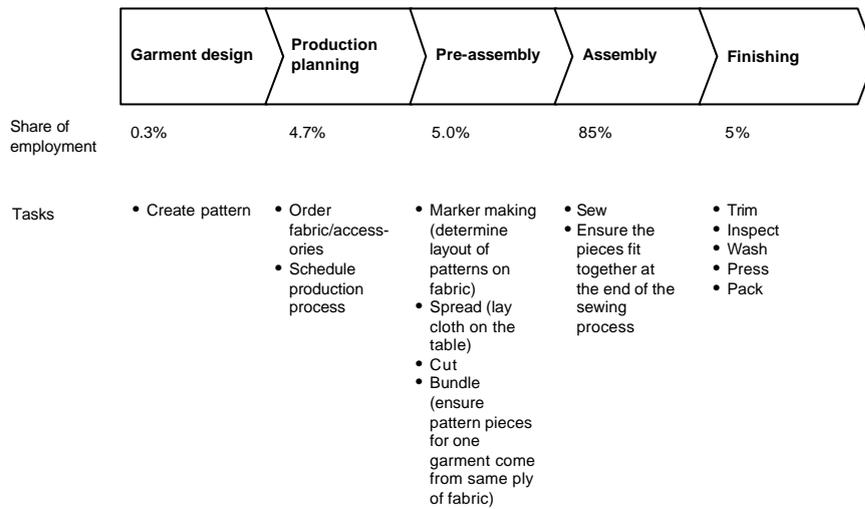
US\$ bn



Source: Market Research Wing, Ministry of Textiles

Exhibit 3.7

## APPAREL MANUFACTURING PROCESS IN INDIA



Source: Textiles Committee; Interviews

Exhibit 3.8

## MANUFACTURING METHODS

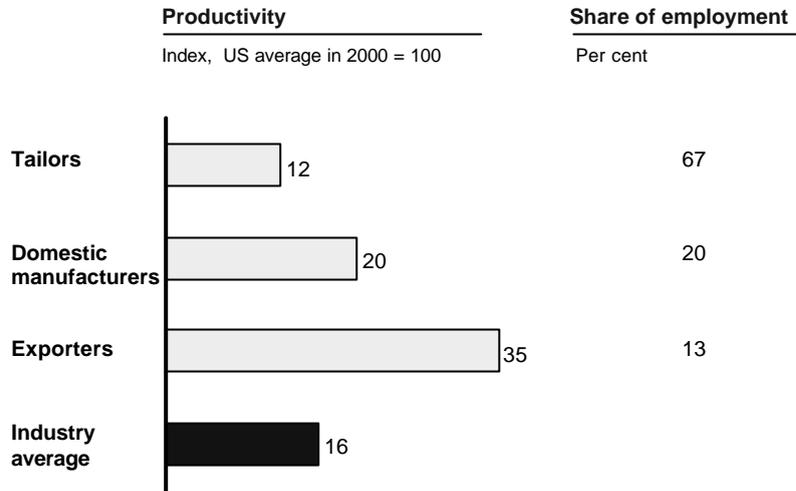
System	Description	Characteristics	Quality control	Ease of style change	Operator skill required	Investment required	Manufacturing segment
Make through	<ul style="list-style-type: none"> <li>• Whole garment is made by one operator</li> </ul>	<ul style="list-style-type: none"> <li>• Short runs</li> <li>• Little supervision</li> </ul>	○	●	●	○	<ul style="list-style-type: none"> <li>• India domestic standard practice</li> </ul>
Assembly line	<ul style="list-style-type: none"> <li>• Extreme division of labour</li> </ul>	<ul style="list-style-type: none"> <li>• Long runs</li> <li>• High supervision</li> <li>• Standard products</li> </ul>	●	○	◐	●	<ul style="list-style-type: none"> <li>• India best practice</li> <li>• US standard practice</li> </ul>
Modular	<ul style="list-style-type: none"> <li>• Employees are organised in groups to carry out complete operations for a family of products</li> </ul>	<ul style="list-style-type: none"> <li>• Short runs</li> <li>• High supervision</li> <li>• High value products</li> </ul>	●	●	●	◐	<ul style="list-style-type: none"> <li>• US best practice</li> </ul>

● High  
◐ Medium  
○ Low

Source: Interviews; *The Technology of Clothing Manufacture*, Carr and Latham

Exhibit 3.9

### PRODUCTIVITY AND EMPLOYMENT IN INDIAN APPAREL

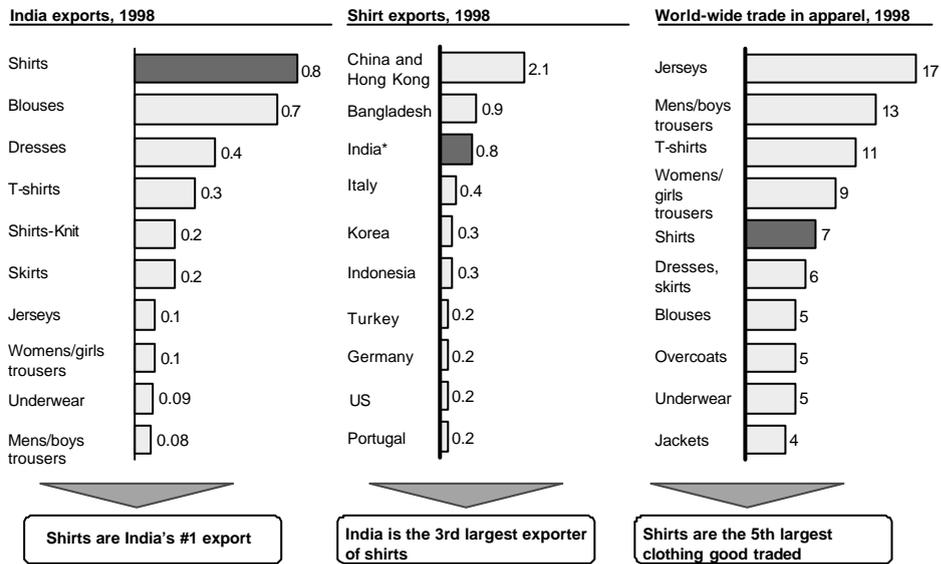


Source: Interviews; NIFT study

Exhibit 3.10

### IMPORTANCE OF SHIRTS IN INDIA'S APPAREL EXPORTS

US\$ bn



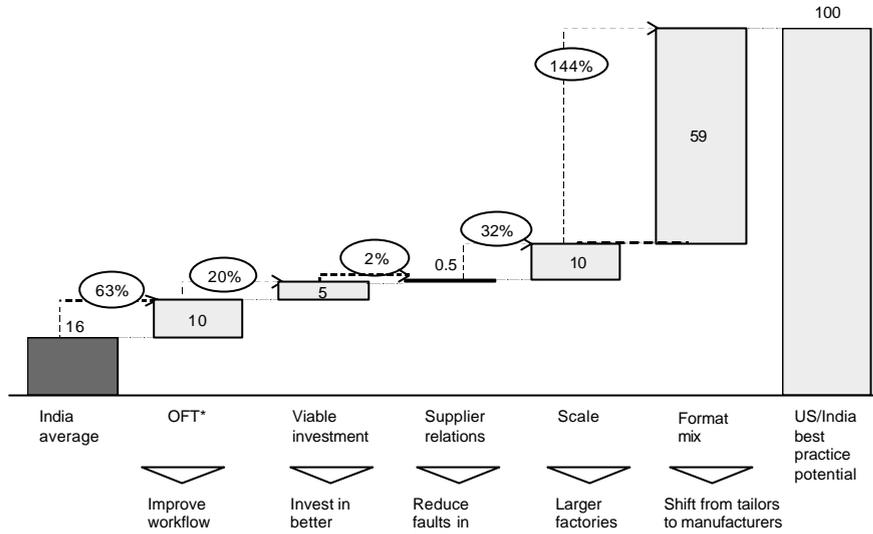
\* 1997

Source: UN International Trade Statistics

Exhibit 3.11

### OPERATIONAL REASONS FOR LOW PRODUCTIVITY

Index: US average in 2000 = 100

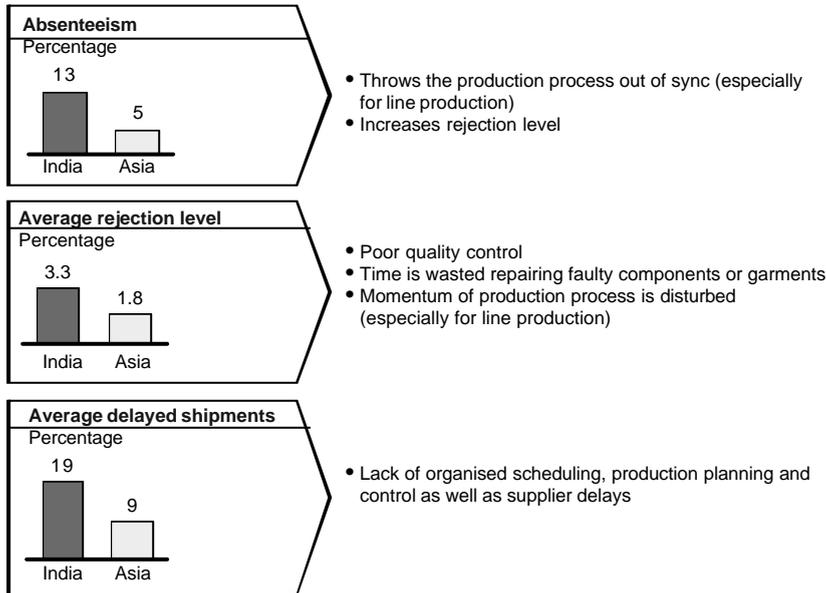


\* Organisation of functions and tasks

Source: Interviews; NIFT study

Exhibit 3.12

### IMPACT OF POOR ORGANISATION OF FUNCTIONS AND TASKS



Note: Asia includes Sri Lanka, Thailand, Malaysia, Indonesia, Hong Kong, South China, Bangladesh

Source: NIFT survey

Exhibit 3.13

## USE OF SPECIALISED TECHNOLOGY IN INDIAN APPAREL

- Commonly used
- ◐ Sometimes used
- Never used

Purpose	Description	Manufacturer		
		China best practice	India best practice	India domestic
• <b>Material handling</b>	• Conveyer systems transport material	◐	◐	○
• <b>Cutting</b>	• Electronic copies of layouts are sent to computer controlled cutting machines	●	◐	○
• <b>Spreading</b>	• Automatic spreading of fabric for cutting	●	◐	○
• <b>Automatic body press</b>	• Presses shirt in one shot	●	◐	○
• <b>Marking</b>	• Computers determine optimum arrangement of pattern pieces	●	◐	○
• <b>Stain removal</b>	• System of compressed air, steam and solvents	●	●	○
• <b>Quality control</b>	• Needle detection machine	●	●	○

• Cuts lead times  
 • Improves productivity  
 • Improves quality  
 • Improves consistency

Source: Bureau of Labour Statistics; Interviews

Exhibit 3.14

## INDUSTRY DYNAMICS

- High
- ◐ Medium
- Low

### Situation

#### Low domestic competitive intensity

- Little competition between tailors and manufacturers as a result of high retail margins
- Small scale reservation limits entry of large scale factories
- Little competition between domestic manufacturers and exporters

#### Low exposure to best practice

- Limited exposure to FDI
- Quantitative restriction and high duty on imports

#### Non-level playing field

- Differential enforcement of laws between small and large players
- Different rules apply to small and large players

### Importance

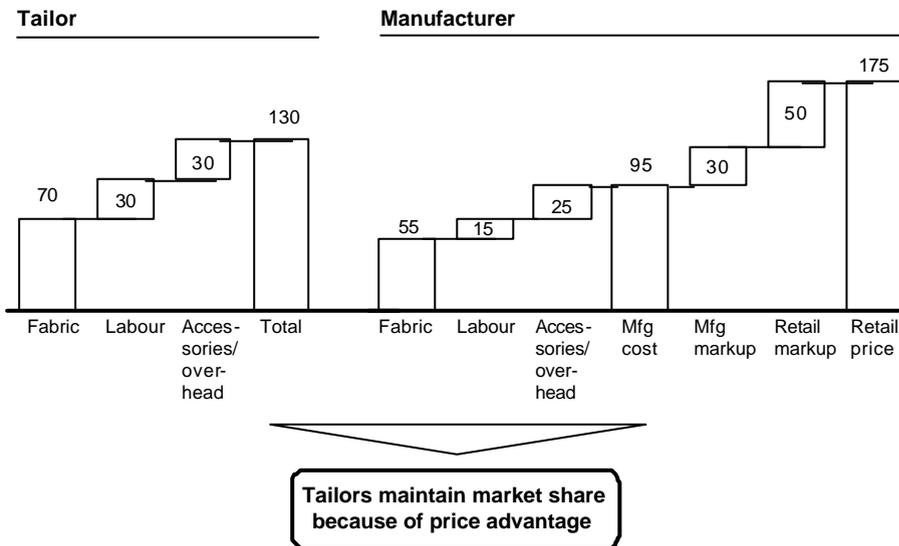


Source: Interviews

Exhibit 3.15

## COST COMPARISON OF READY-MADE VS. TAILOR-MADE SHIRTS

Rs. per shirt, 2000



Source: McKinsey analysis; Interviews

Exhibit 3.16

### SUMMARY OF EXTERNAL FACTORS

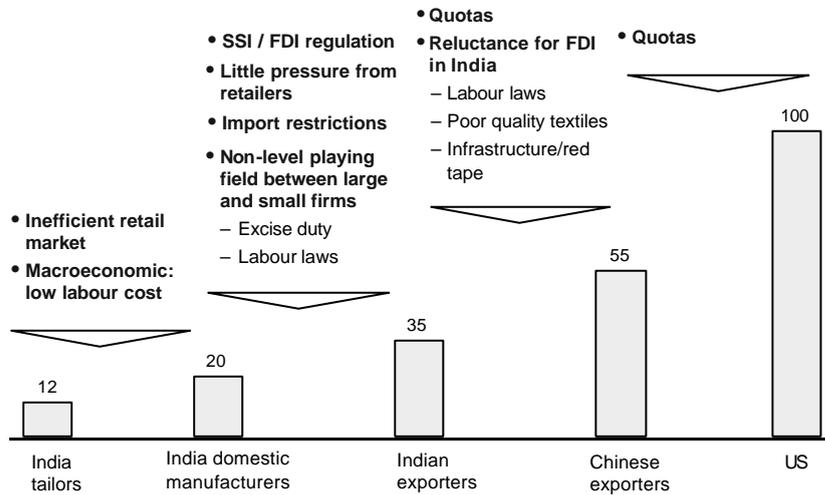
- Important
- Moderately important
- ✕ Not important

Factor	Export	Domestic
• Quotas	●	✕
• SSI/FDI regulation	✕	●
• Related industries		
– Textile	●	○
– Retail	✕	●
• Labour market	●	○
• Import restrictions	✕	●
• Import duty	✕	●
• Infrastructure	○	○

Exhibit 3.17

### EXTERNAL FACTORS EXPLAINING THE PRODUCTIVITY GAP

Index: US average in 2000 = 100

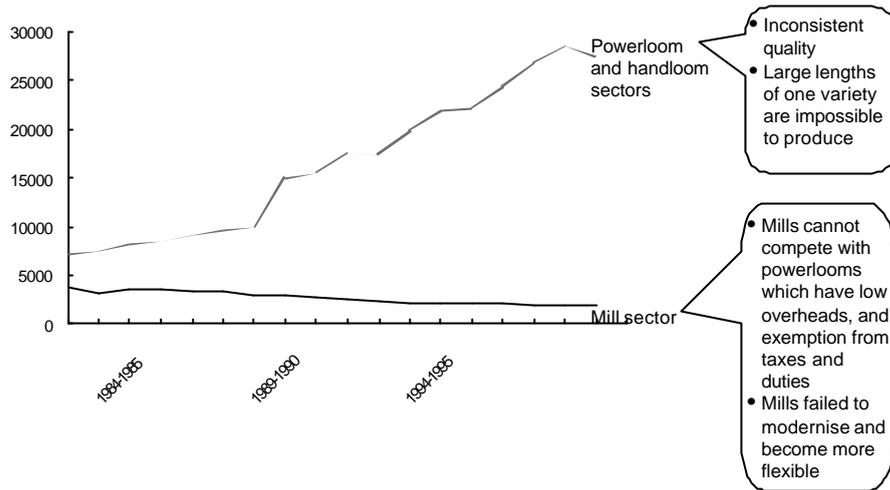


Source: McKinsey analysis; Interviews

Exhibit 3.18

### INDUSTRY STRUCTURE: TEXTILES IN INDIA

Million sq. m. output

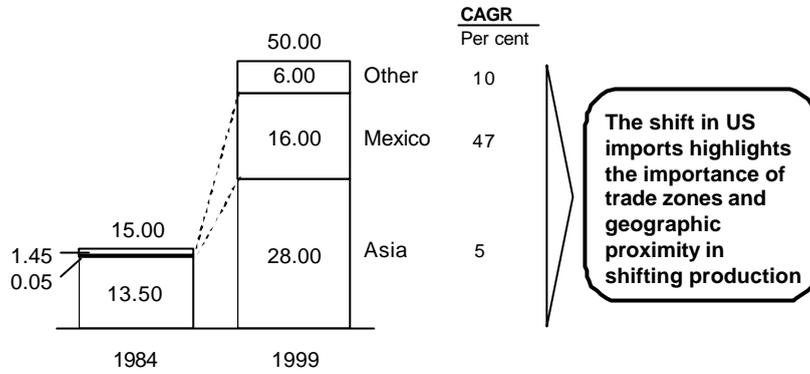


Source: Ministry of Textiles

Exhibit 3.19

### TRENDS IN US IMPORTS FROM MEXICO/CARIBBEAN

US\$ bn

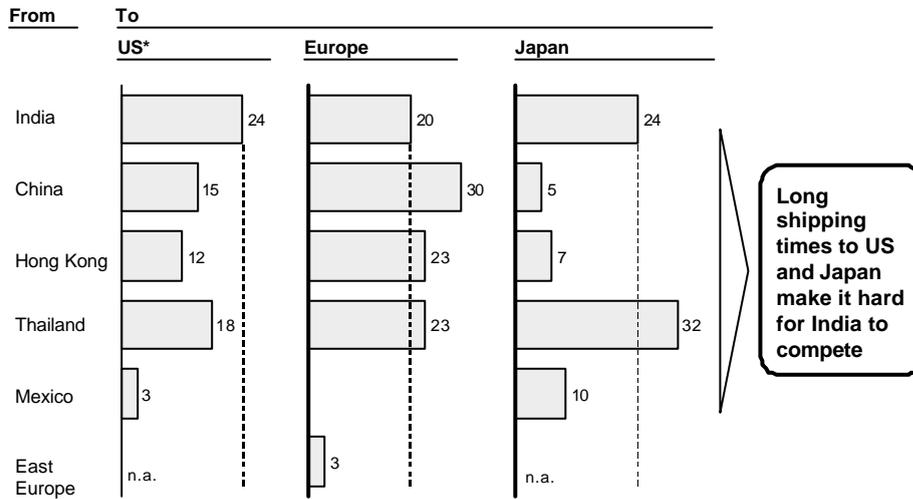


Source: UN International Trade Statistics

Exhibit 3.20

### COMPARISON OF AVERAGE DELIVERY TIMES

Days

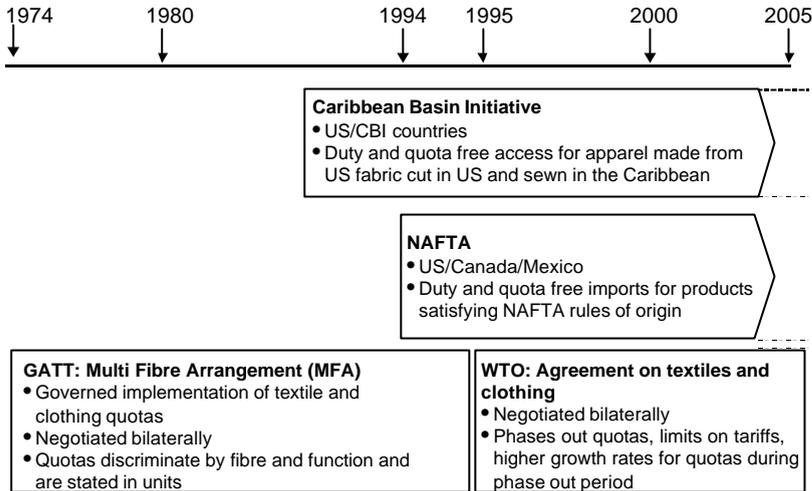


\* Minimum shipping time

Source: Interviews

Exhibit 3.21

### INTERNATIONAL AGREEMENTS THAT AFFECT APPAREL TRADE

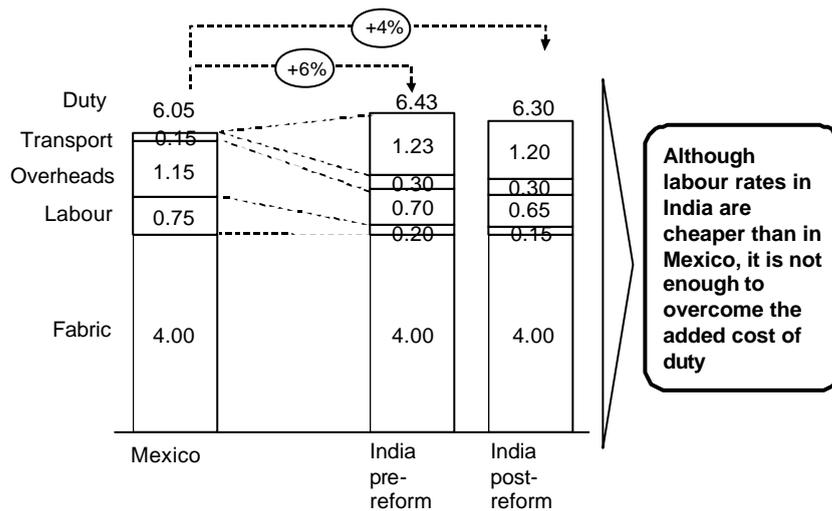


Source: WTO

Exhibit 3.22

### COST COMPARISON FOR A MANUFACTURED SHIRT SHIPPED TO THE US

US dollars/shirt, 2000

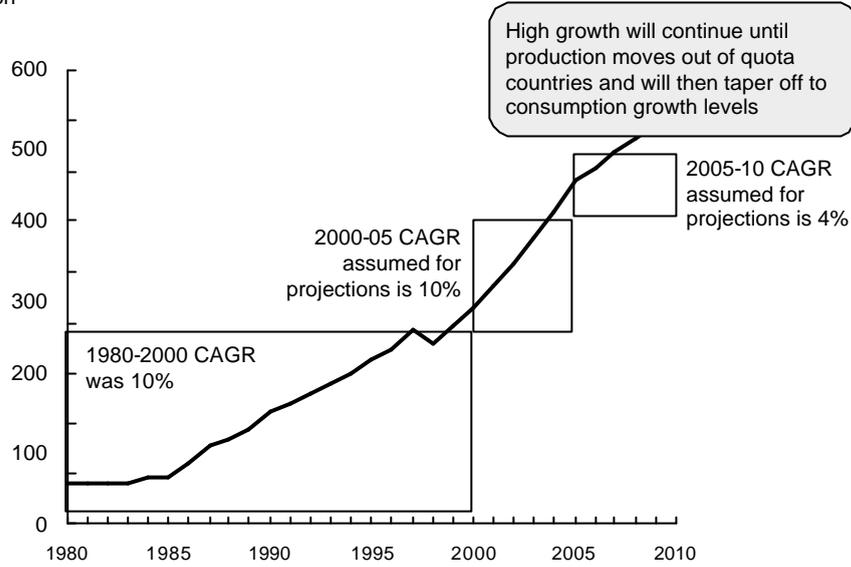


Source: McKinsey analysis

Exhibit 3.23

### EXPECTED EVOLUTION OF WORLD EXPORTS

US\$ bn

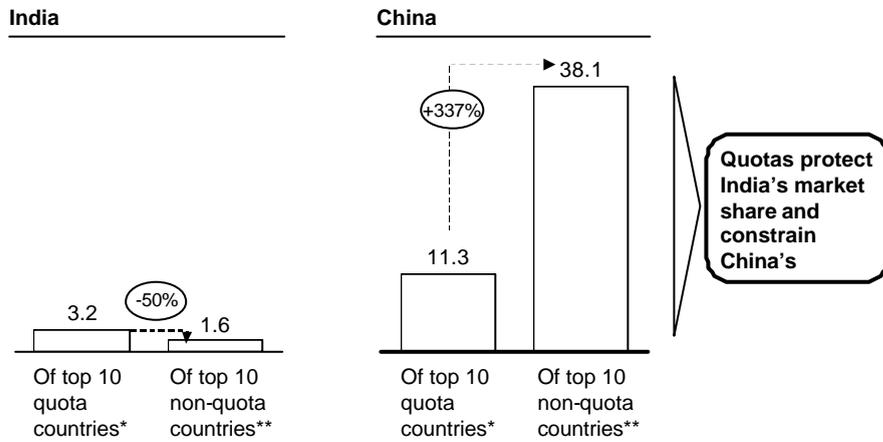


Source: UN International Trade Statistics

Exhibit 3.24

### COMPARISON OF INDIA AND CHINA'S SHARE OF IMPORTS OF KEY QUOTA AND NON QUOTA MARKETS, 1998

Per cent of total imports



\* US, Germany, UK, France, Italy, Belgium, Canada, Spain, Austria, Denmark

\*\* Japan, Netherlands, Switzerland, Sweden, Australia, Norway, Singapore, Poland, Korea, Chile

Source: UN International Trade Statistics

Exhibit 3.25

**FUTURE OUTLOOK: PRODUCTIVITY, OUTPUT AND EMPLOYMENT**

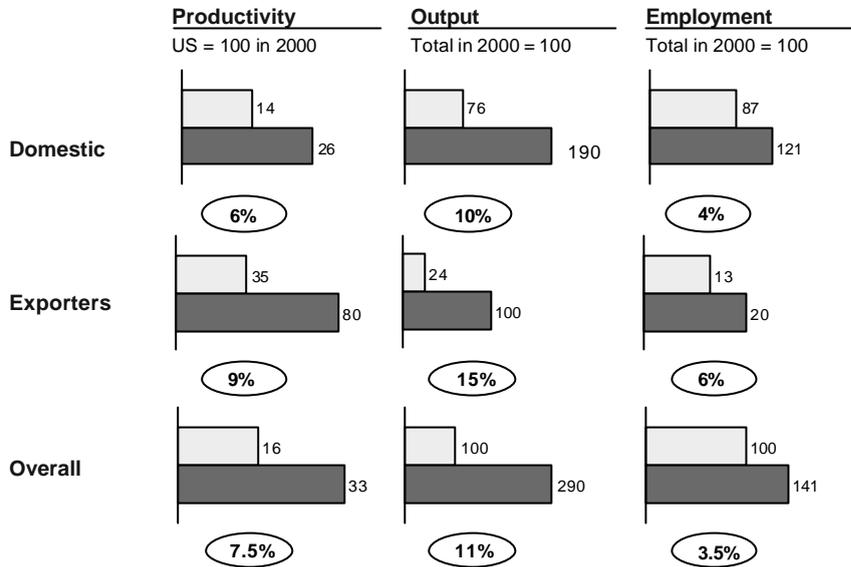
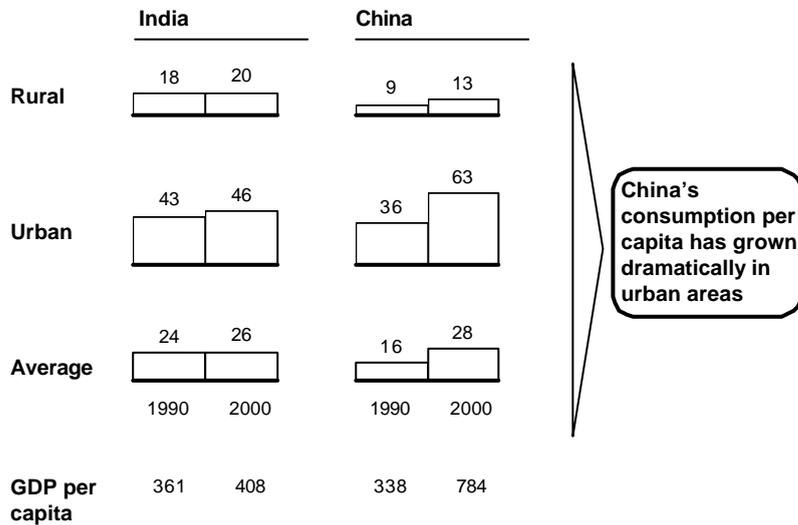


Exhibit 3.26

**DOMESTIC CONSUMPTION: ALL APPAREL**  
US\$/capita



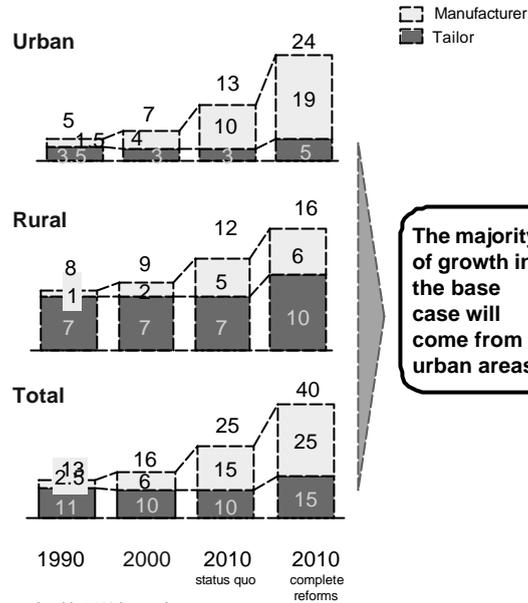
Note: Consumption in India is 40% traditional clothing, 60% western clothing; Consumption in India in square meters has increased by 5% over the period  
Source: Market Research Wing, Ministry of Textiles; China Statistical Yearbook

Exhibit 3.27

### EVOLUTION OF INDIA'S DOMESTIC MARKET: WESTERN STYLE APPAREL

US\$ bn

**Assumption**  
 As GDP per capita in 2010 in India exceeds China's current GDP per capita, India's urban apparel consumption will slightly exceed China's current level of consumption per capita



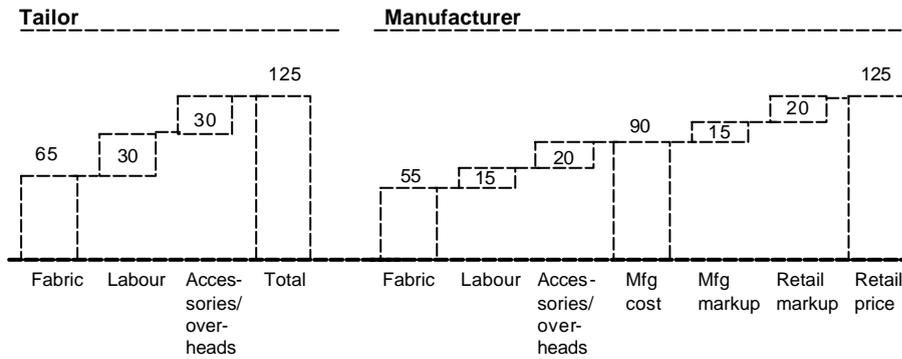
The majority of growth in the base case will come from urban areas

Note: 2010 estimate assumes 1.7% population growth with 70% in rural areas  
 Source: Market Research Wing, Ministry of Textiles

Exhibit 3.28

### COST COMPARISON FOR READY-MADE VS. TAILOR-MADE SHIRTS

Rs per shirt, 2010



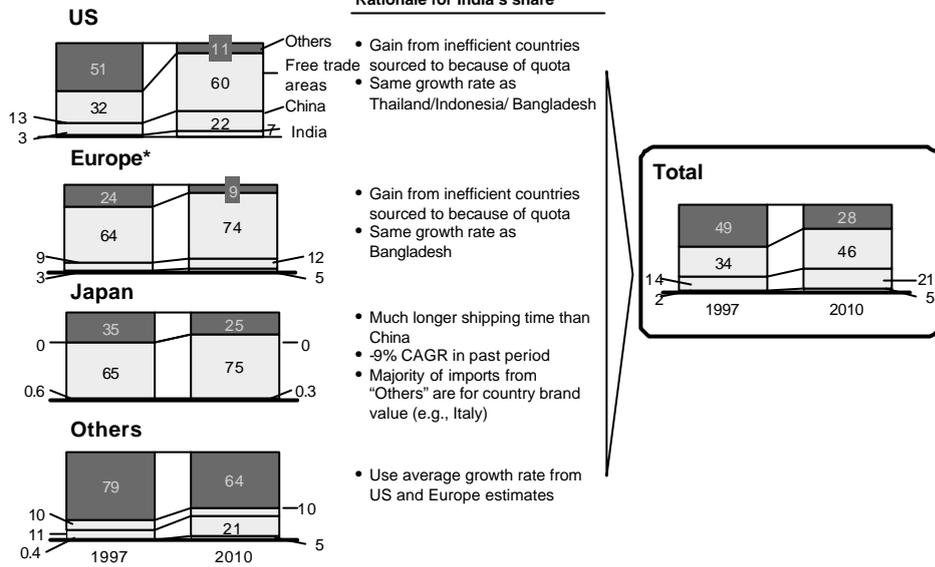
- Tailors will lose more market share as manufacturers' prices drop further.
- However, labour/overheads charge for tailors may also adjust downward due to surplus labour in India

Source: McKinsey analysis; Interviews

Exhibit 3.29

## APPAREL IMPORTS OF KEY MARKETS

Per cent



\* Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Portugal, Sweden, UK

Source: UN International Trade Statistics

Exhibit 3.30

## POLICY RECOMMENDATIONS

External factor	Recommendation	Potential impact
<b>• Product market</b>		
– SSI / FDI regulation	• Remove SSI in knitted and hosiery sectors	• Shift production away from inefficient, small scale manufacturers • Reduce price of apparel in India
– Import restrictions	• Reduce import duty gradually with a clearly laid out timeframe	• Shift production away from inefficient Indian producers to world-wide competitive producers
<b>• Labour market</b>		
– Labour laws	• Relax labour laws related to retrenchment of workers	• Increase productivity of workers by providing negative incentive for poor performance • Remove entry deterrent for FDI • Allow inefficient/obsolete textile mills to shut down

Exhibit 3.31

## POLICY RECOMMENDATIONS (CONTINUED)

External factor	Recommendation	Potential impact
<b>• Taxes</b>	• Implement excise tax uniformly across producers	• Reduce price advantage of unorganised sector (especially important to remove legacy of SSI)
<b>• Infrastructure</b>	• Invest in upgrading roads/ ports/communications/power in special export zones (encourage FDI as in China/Thailand)	• Remove entry deterrent for FDI • Facilitate movement of factories to rural areas to save on labour costs
<b>• Red tape</b>	• Streamline/simplify import/export procedures in special export zones	• Reduce delays at ports • Remove entry deterrent for FDI
<b>• Related industries</b>		
– Textile	– Relax zoning laws which prevent relocation and level playing field between mills and powerlooms	– Improve domestic textile sector thereby reducing lead times for apparel manufacturers – Remove entry deterrent for FDI
– Retail	– See retail case	– Retailer concentration will yield greater bargaining power and therefore force apparel manufacturers to rationalise

# Automotive Assembly

## **SUMMARY**

The automotive case illustrates how a sector can grow rapidly once barriers are removed. Our study treats 1983 – the year Maruti Udyog Limited was established – as the year of liberalisation, and segments all automotive assembly plants into pre- and post-liberalisation plants. The continuous liberalisation of the sector has led to an increasing growth in output, measured in vehicles produced. While output growth before 1983 was around 3 per cent a year, the growth rate in the passenger car segment rose to 17 per cent a year after Maruti's entry. After de-licensing in 1993, the growth rate further increased to 21 per cent a year while productivity grew at 20 per cent a year. With output growth outpacing productivity growth, employment in the sector also grew.

To ensure that productivity in the sector continues to grow rapidly, the government should liberalise labour laws, reduce tariffs and divest its stake in Maruti, the largest car manufacturer in the country.

If these actions are undertaken and the economy grows at 10 per cent per annum – which is possible if the recommended reform programme is pursued – the automotive sector will realise its productivity potential of 84 per cent of US levels, over the next 10 years. Output will grow by 16 per cent per annum and the sector will create 13,000 additional jobs.

## **Productivity performance**

Between 1992 and 1998, labour productivity of car assembly in India grew at 20 per cent a year, going from 7 per cent to 24 per cent of US levels in 1998. Maruti is India's best-practice company at 53 per cent of US levels, the other post-liberalisation plants are at 38 per cent, while pre-liberalisation plants average only 6 per cent. However, the labour productivity potential at current factor costs is high at 84 per cent of US levels.

## **Operational reasons for low productivity**

The main reasons for the productivity gap between pre- and post-liberalisation plants are surplus workers, poor organisation of functions and tasks, low morale and a poor work ethic. Pre-liberalisation plants have an additional disadvantage of outdated machinery and models. The gap between post-liberalisation plants and

average US plants is mainly due to the former's lower skill levels and experience, sub-optimal organisation of functions and tasks, lower scale and less automation.

### **Industry dynamics**

The lack of competitive intensity before delicensing, coupled with restrictions on FDI and imports, explains a large part of the productivity gap for both pre- and post-liberalisation plants. In addition, the ban on imports, that has only recently been lifted, led to the construction of unviable sub-scale plants. However, domestic competitive intensity is very high today with global best practice companies such as Suzuki, Honda and Toyota exposing Indian manufacturers to near best practice competition and forcing them to rapidly improve operations.

### **External factors responsible for low productivity**

This sector illustrates the positive impact of removing product market barriers on both productivity and output growth. An important barrier to even better performance is rigid labour market regulation, which hampers rationalisation of the workforce through retrenchment of surplus workers and introduction of lean production techniques. Government ownership and other product market regulations, such as import restrictions, high levels of indirect taxation and red tape, are less important barriers to productivity and output growth.

### **Industry outlook**

If barriers are removed across all sectors, labour productivity in automotive assembly can grow at around 12 per cent a year over the next 10 years allowing most manufacturers to reach a productivity potential of 84 per cent at current factor costs. Under this scenario, output of passenger cars can grow at around 16 per cent per year, based on the experience of successful developing countries. This will result in the creation of 13,000 additional jobs in the sector.

### **Policy recommendations**

To capture this output and productivity growth potential, the government should:

- ¶ Relax labour laws
- ¶ Reduce import tariffs and further relax FDI restrictions
- ¶ Relinquish government ownership of Maruti.

# Automotive Assembly

The automotive sector is a very important part of our study because it demonstrates the potential for growth in any sector if all barriers are removed. It also represents the potential of the manufacturing sector as a whole, given the low penetration of manufactured goods in India. At present, the Indian automotive industry is very small and employs a smaller number of people than do industries in benchmark countries such as Brazil and Korea. Its share of GDP in 1996-97 was only 0.7 per cent, compared to 2 per cent in Brazil and 2.9 per cent in Korea. Similarly, its share of total employment was only 0.1 per cent compared to 0.4 per cent in Brazil and 2 per cent in Korea (**Exhibit 4.1**).

Despite the relatively low cost of labour in India, the automotive industry has not yet contributed significantly to exports and accounts for only 2 per cent of all Indian exports, compared to 14 per cent in Brazil and 6.7 per cent in Korea.

A comparison of vehicle penetration in different countries reveals that India lags significantly behind countries with similar levels of GDP per capita, such as Pakistan or Nigeria (**Exhibit 4.2**). This under-penetration will become more severe if India's economy continues to grow and approaches GDP per capita levels of countries such as Egypt, Indonesia or the Philippines.

We have compared labour productivity in Indian passenger car assembly plants with that of US plants. We have adjusted for differences in vertical integration and focused on the key areas of car assembly: press shop, body shop, paint shop, assembly and indirect and support functions (**Exhibit 4.3**). Treating 1983 – the year Maruti was established – as the year of liberalisation, we have segmented all plants into pre- and post-liberalisation plants.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

The automotive industry in India has been progressively liberalised since 1983 (**Exhibit 4.4**). Maruti's market entry was the first step in liberalising a sector that had been heavily regulated for nearly three decades. This was followed by the entry of several companies, mostly Japanese and Koreans, into the commercial vehicle and components segments through joint ventures with Indian partners. The next major step towards liberalisation was the de-licensing of the sector in 1993, which allowed foreign companies to set up wholly-owned subsidiaries in India. The large size and growth potential of the Indian market, coupled with the inability to serve it through exports, caused many transnational companies to set up production facilities in India (**Exhibit 4.5**). In April 2001, the sector made a further transition towards an open market, as WTO commitments compelled the Indian government to abolish quantitative restrictions (QRs) on the import of vehicles.

The continuous liberalisation of the sector has led to an increasing growth in output, measured in vehicles produced. While output growth before 1983 was around 3 per cent per year, the growth rate in the passenger car segment rose to 17 per cent per year after Maruti's entry. After de-licensing in 1993, the growth rate further increased to 21 per cent a year (**Exhibit 4.6**).

## **PRODUCTIVITY PERFORMANCE**

The average labour productivity of passenger car plants in India is 24 per cent of car OEMs in the US (**Exhibit 4.7**). Maruti is currently the best practice company and achieves 53 per cent of US average productivity, while the other post-liberalisation plants achieve only 25 per cent. Pre-liberalisation plants display an average productivity of only 6 per cent.

Between 1992-93 and 1999-2000, productivity improvements of existing plants and the entry of more productive companies resulted in an increase in labour productivity of the passenger car segment by 20 per cent a year (**Exhibit 4.8**).

In comparing physical output, our study has not captured differences in profitability due to brand premium, which can be significant, especially for luxury cars. However, since the share of luxury cars produced in India is much lower than in benchmark countries such as the US, using a physical measure could overestimate the labour productivity.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

This section examines the reasons behind the productivity gaps between pre- and post-liberalisation plants and between post-liberalisation and US plants (**Exhibit 4.9**).

### **Reasons for productivity gap between pre- and post-liberalisation plants**

Post-liberalisation plants are over six times as productive as pre-liberalisation plants, mainly because of the large number of surplus workers in pre-liberalisation plants. The latter have surplus labour of around 50 per cent, even though employment levels have gone down significantly in recent years. Given their large number of surplus workers, these plants have not focused on improving the organisation of functions and tasks (OFT). Neither have they fully adopted basic lean production methods such as the Kanban system, line balancing, or takt-time, i.e., designing all process steps so that they take the same amount of time.

Other reasons for the productivity difference include the use of outdated machinery and technology. Some of the car models produced in pre-liberalisation plants were developed more than four decades ago and have not benefited from the latest design-for-manufacturing developments, which lead to significant labour savings in the production process.

In addition, the lack of incentives in the past has had a negative effect on the work ethic and morale of the workforce. Capacity and output regulation has made both management and the workforce complacent. Strong unions, backed by the government's pursuit of job creation, have displayed an antagonistic attitude towards the interests of companies, compelling them to enlarge the workforce even further.

### **Reasons for productivity gap between post-liberalisation and US plants**

Poor organisation of functions and tasks, coupled with a lack of experience and skill, lower average output volumes, and low automation account for the productivity gap between post-liberalisation and US plants.

- ¶ **Poor OFT and low skills:** Differences in OFT, coupled with training and skill differences in the workforce, account for approximately 17 percentage points of the difference between post-liberalisation plants and the US average. But there are substantial variations between old and new post-liberalisation plants.

At new post-liberalisation plants, a lack of training and skills results in lower productivity mainly through higher defects per car, lower first run-

through ratios and higher downtime of the line (**Exhibit 4.10**). A telling example is that of a press shop in a post-liberalisation plant that requires two shifts because it has a downtime of more than 50 per cent. In addition, the relative inexperience of the workforce has prevented manufacturers from fully delegating responsibilities to teams and ensuring comprehensive job rotation for workers. At the same time, productivity gaps due to a lack of skills could be a temporary phenomenon given the continuously improving performance indicators at the plants we visited. Plants have begun to offer the right incentives and adopt a participative management style to improve motivation and performance. In addition, companies report that Indian workers sent to Japan to work in best practice plants are able to match the performance of their Japanese counterparts.

The nascent state of new post-liberalisation plants also causes OFT differences. These plants have not had enough time to involve their employees in performance improvement processes such as Kaizen circles. We find, however, that lean manufacturing and continuous improvement principles and techniques are widespread in post-liberalisation plants (**Exhibit 4.11**). As a result, significant productivity improvements can be expected from these activities as they eliminate, simplify and better balance process steps.

At old post-liberalisation plants, poor OFT leads to significant productivity loss. The main cause of this is the late implementation of lean production techniques, as the focus in earlier years – when competitive pressure was low – was on achieving high volumes. A concentration on output prevented a zero-defect orientation. Even today, only a small share of cars leave the assembly line without defects or without needing additional rework. However, these older post-liberalisation plants have recently started improving their processes as well.

In contrast to new plants, older post-liberalisation plants carry an OFT penalty in their indirect functions. Staffing levels in several indirect functions such as engineering, vendor development or administration have not been rationalised following a reduction in workload due to computerisation and reduced sales.

In addition, older post-liberalisation plants suffer from lower skill levels. More than 20 per cent of their workforce consists of trainees, who usually perform regular tasks in the plant but have less than a year of

experience and typically leave after their apprenticeship is over<sup>1</sup>. Although this lowers productivity, companies prefer to use trainees because they are cheaper and more flexible in their working arrangements than permanent workers.

- ¶ **Design for manufacturing (DFM):** Sub-optimal DFM at many post-liberalisation plants results in a productivity penalty of approximately 7 percentage points. DFM involves taking into account the optimisation of the production process while developing a car, without compromising on quality. The most important levers are reduction in the number of body panels and welding spots and simplification of parts assembly.

Two kinds of productivity loss occur due to poor DFM: First, some of the models produced in post-liberalisation plants are not updated as often as in best practice countries. For example, we estimate that the Maruti 800 could be assembled in roughly 15 per cent less time if it were totally redesigned today (**Exhibit 4.12**). Second, some of the new models manufactured in India are not as efficiently designed as best practice cars. For instance, new models in developed countries have far fewer body panels and spot welds than do models in India (**Exhibit 4.13**). However, this aspect of the DFM penalty is not confined to India as these models are produced almost identically in their country of origin.

- ¶ **Supplier relations:** Poor supplier relations account for 4 percentage points of the productivity gap between post-liberalisation plants in India and average US plants. Supplier relations in India suffer from two problems (**Exhibit 4.14**):
  - **Infrequent and unreliable delivery:** In Japan, which is global best practice in this respect, parts are usually supplied just-in-time several times a day, directly to the line and are sometimes even assembled onto the body or car by the supplier. In India, however, a large share of the parts is delivered less often, and the reliability of supply is not as high as in the US or Japan. While road conditions aggravate the problem, Indian suppliers are also not as good as Japanese suppliers in ensuring timely delivery. However, the suppliers alone cannot be blamed for this issue, the OEMs too at fault. Several OEMs admit that they cannot forecast their production schedules in India as accurately as they can in best practice countries. .
  - **Poor product quality:** Indian suppliers also lag behind in product quality and consistency. While the rejection rates for parts in Japan

---

<sup>1</sup> When comparing labour productivity, we have assumed that trainees spent 30 per cent in non-productive training activities and adjusted hours worked for this.

are well below 100 parts per million (ppm), Indian OEMs report averages of 2,000-8,000 ppm.

Indian OEMs compensate for the difference in frequency and reliability of product delivery and in product quality by operating warehouses and stocking higher levels of inventory. If, however, parts are found missing or defective, there is additional rework, as these parts have to be assembled later on. In rare cases, where these missing parts cannot be assembled later, the line has to be stopped altogether. In one post-liberalisation OEM plant, 10 per cent of cars on average leave the line with either missing or defective parts.

In addition, lower product quality also creates a productivity penalty because of the need to inspect parts upon delivery. Whereas in India, almost all parts are inspected on a sample basis, high quality levels allow players to eliminate with this activity in Japan.

- ¶ **Scale/Utilisation:** Lower scale and utilisation of post-liberalisation plants constitutes a productivity penalty of roughly 17 points for these plants.

Excluding Maruti, the average output per plant is significantly lower in India than in the US, averaging only 25,000 cars in 1999-2000 compared to 191,000 in the US (**Exhibit 4.15**). This scale and utilisation disadvantage is most severely felt by plants that focus exclusively on the mid-sized car segment. While new producers of small cars such as Hyundai and Telco already achieve high volumes, mid-sized car manufacturers will not achieve minimum efficient scale, of around 100,000 vehicles per year, for many years. We expect that even by 2010, the average output of mid-sized cars per company will only be 14,000 to 26,000 cars, up from 7,500 today. This projection assumes that two new players, including Skoda, will enter the market and that the growth rate for the segment will continue to average 9-16 per cent a year.

Based on plant capacity with two shifts, the average plant utilisation in India is only 59 per cent compared to 80 per cent in the US (**Exhibit 4.16**). We estimate that post-liberalisation plants could increase their output in 1999-2000 by 14 per cent to achieve utilisation levels per shift comparable to the US without increasing the level of employment. This accounts for 10 percentage points of the productivity penalty.

Lower scale causes a productivity penalty mainly in indirect and production support functions. The adoption of lean production methods allows plants to adjust staffing to capacity in direct production functions without incurring a productivity penalty. Based on the employment in

these functions, we find that higher scale can improve productivity by almost 6 percentage points (**Exhibit 4.17**).

- ¶ **Automation:** Differences in automation explain 17 points of the productivity gap between Indian and US plants. Based on our interviews and plant visits, we estimate that best practice levels of automation in main operations could achieve high labour savings, for example, of as much as 42 per cent in the body shop (**Exhibit 4.18**). Most of the saving opportunities are in the body shop, where many Indian plants still operate almost completely manually whereas in global best practice plants almost all welding and clamping is automated.

However, given the low cost of labour in India, only 2 per cent of current employment can be economically replaced by automation. For further automation to be economically viable, wage levels would have to be significantly higher and output would have to rise to a level where plants operate two shifts.

## INDUSTRY DYNAMICS

The almost non-existent competition in the Indian car-making industry up to 1983 and the very limited competition thereafter meant that car makers had no exposure to best practice and no incentive to improve productivity – until the sector was liberalised in 1993. This section studies the industry dynamics over this time frame (**Exhibit 4.19**).

- ¶ **No competition:** Before 1983, domestic competition was virtually non-existent since there were only two players in the market. Production volumes were determined on a yearly basis by the government, and imports were prohibited. Since demand for passenger cars was always higher than the supply licensed by the government, customers had to wait for long periods for their car bookings to materialise. This complete lack of competition provided little incentive for producers to upgrade products and improve operations, and resulted in a considerable productivity gap compared to best practice plants in Japan and the US.
- ¶ **Limited competition:** Maruti's entry in 1983 changed the situation to some extent. But the large backlog of customer orders and strong market growth continued to cushion competitive pressure, allowing pre-liberalisation plants to keep production volumes high despite losing significant market share. Despite strong efforts in recent years, pre-liberalisation plants have not yet been able to close the productivity gap fully, so that the lack of competition before 1983 still explains part of the current gap.

Due to the superiority of its products, Maruti faced only minor competitive pressure before the entry of other foreign competitors. Capitalising on these advantages, it was able to quickly gain market share. This resulted in an almost monopolistic situation with Maruti accounting for more than 80 per cent of all passenger cars produced in India. Therefore, a large part of Maruti's productivity gap, which is due to outdated models and less efficient OFT, can be explained by the lack of competition till 1993, when the sector was delicensed.

- ¶ **High competition:** Competitive intensity has increased considerably in recent years and is no longer a barrier to productivity growth. Maruti's position in the Indian market is less dominant after the entry of foreign and Indian players and its market share has dropped to around 60 per cent (**Exhibit 4.20**). The increased competition has resulted in continuous price cuts by both Maruti and the new entrants, resulting in negative margins for new players and declining margins for Maruti (**Exhibit 4.21**).
- ¶ **Exposure to best practice competition:** Exposure to best practice competition has increased after liberalisation. Maruti's entry brought best practice know-how to India, but Maruti itself remained insulated from best practice competition since its only competitors, the pre-liberalisation plants, lagged far behind. Today, car manufacturers in India are more, but not yet fully, exposed to best practice competition although most global best practice manufacturers are operating here. This is because imports are still restricted and global best practice companies have not achieved their full potential in India. If imports were not restricted, several global manufacturers, especially those focusing on the mid-sized segment, could serve the Indian markets from their overseas plant. This would expose Indian plants to best practice competition.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

This section examines the regulatory or other factors that have hampered the productivity of the automotive sector either directly or through their effect on industry dynamics, and underlines the factors that constitute a barrier to future productivity growth.

### **Stringent labour laws**

Stringent labour legislation is the main external barrier to productivity growth. It has prevented plants from reducing surplus labour in the past and is the reason for some of the OFT problems mentioned above, primarily in pre-liberalisation plants.

Currently, companies that employ more than 100 employees have to seek state government approval to retrench workers. This is rarely granted due to political considerations. An alternative way to adjust the level of staffing is through voluntary retirement schemes (VRS), in which employees are offered severance payment if they leave voluntarily. Despite a number of successful such schemes in the automotive sector, the drawbacks associated with VRS have prevented the full adjustment of staffing to desired levels.

First, eligibility for VRS cannot be restricted to specific employees and could, therefore, result in the loss of high-performing workers. Second, the workers must agree to the scheme, and the union is usually involved. As a result, conditions differ between companies, depending largely on relations with the unions and their attitude. In the past, strong unions, backed by state governments in pursuit of job protection, have frequently either opposed VRS or demanded large severance packages. The large amounts required to induce workers to leave have constrained the speed of adjustment. Nevertheless, voluntary retirement is a viable scheme in which owners of pre-liberalisation plants should invest.

Another barrier to productivity improvement is the inability of companies to replace under-performing workers. This means that continued employment in the company is not contingent on satisfactory performance. This is responsible, in part, for the OFT problems mentioned above, especially in pre-liberalisation plants. The situation is further aggravated by strong unions, which oppose changes in the working methods required for the introduction of lean manufacturing.

Due to the effects of unionism and labour laws, companies that have been operating automotive manufacturing plants for many years have decided not to staff their new plants with surplus workers from their existing plants. To shield new plants from the old culture, these companies hire inexperienced workers from vocational schools and continue to induce surplus workers to leave with VRS.

### **Product market regulations**

Various controls on the industry, combined with trade restrictions, have adversely affected productivity in this sector.

- ¶ **Legacy of licensing and FDI restrictions:** Regulation of production volumes, market entry barriers for domestic producers and restrictions on FDI have severely constrained productivity growth by removing competitive pressure and preventing exposure to best practice, as we have seen in the earlier section. The phased removal of licensing and FDI restrictions after 1983 has led to a very rapid rise in output and productivity growth.

¶ **Restrictions on trade:** Import restrictions remain a barrier to productivity growth by protecting Indian-produced cars from competing with models produced in global best practice plants. This affects the mid-sized segment the most, as discussed previously.

¶ **Indirect taxation:** Both the level and structure of indirect taxation on cars affect productivity by reducing output. In India, indirect taxes comprising excise duties and state or local sales taxes increase the price of a car by up to 65 per cent above the ex-factory price. This is very high compared to prices in most developing and developed countries (**Exhibit 4.22**). It also reduces output as both new and used cars become less affordable for first-time buyers. Recently however, the government has announced a reduction in excise duty from 40 per cent to 32 per cent, which has led to substantial price cuts in cars, particularly in the mid-sized segment.

Reducing indirect taxation levels to those of the US or Japan will reduce the price of a car by more than 35 per cent. The resulting increase in output will reduce the productivity penalty associated with low scale and utilisation.

Despite the high rate of taxation, however, production of cars has grown by 21 per cent a year since de-licensing. Therefore, indirect taxation does not seem to be a big barrier to output growth. In addition, we are not in a position to determine within the scope of this study, whether the government's revenues through indirect taxation on cars can be raised more efficiently by alternative means.

¶ **Red tape:** The complexity of tax and labour rules, customs procedures and other interactions with government authorities forces Indian automotive companies to hire people solely to deal with these unnecessarily cumbersome tasks. While this is admittedly only a secondary issue, red tapism can also cause work stoppage. For example, customs clearance for urgently needed parts often takes up to 7 days because of red tape.

¶ **Capital/labour cost ratio:** Many forms of labour-saving automation employed in best practice companies are not economical in India where labour is cheaper and the use of capital more expensive than in Japan, the US or Europe. Capital is more expensive due to higher interest rates and customs duties of up to 25 per cent on imported capital goods. As a result, companies have no incentive to invest in labour-saving measures, and productivity suffers.

¶ **Government ownership:** Compared to sectors such as power or banking, the government's involvement in the automotive sector is

limited and does not include controlling stakes. The government currently holds a 50 per cent stake in Maruti as well as small indirect stakes in its components' manufacturers through Maruti's share of their equity. In the past, the government's influence on Maruti has led to lower productivity due to additional bureaucratic procedures and delayed decision-making. Since Maruti is now responding to increasing competitive pressure, government ownership has become only a secondary reason for its low productivity.

- ¶ **Upstream industries:** Although some of the delivery problems experienced by OEMs are caused by their inability to communicate and commit to early production schedules, some of the productivity penalty due to lower frequency and reliability of supplies is beyond the OEMs' control and, therefore, should be considered an external factor. However, this is not caused by existing barriers but is a legacy of past regulation. The arrival of many global players with best practice know-how has led to increased competitive pressure on suppliers to improve reliability, quality, and productivity.
- ¶ **Infrastructure:** Although India's poor infrastructure is often cited as a cause for many problems in Indian industry, we find it to be only a minor factor in explaining low productivity in automotive assembly. It does play a role, however, in the following way. Poor infrastructure lowers demand due to bad road conditions, and lowers the frequency and reliability of supplies. In addition, it leads to damages to cars during delivery, especially export delivery. These are higher in India than in other countries and constitute up to 1 per cent of the total cost of exports.

## INDUSTRY OUTLOOK

Given the low penetration of vehicles in India, the automotive sector has the potential for strong output growth. The gap between current levels of labour productivity and India's potential at current factor costs suggests that productivity growth can continue to remain high, though perhaps not as high as in the past. In this section, we describe three scenarios for the evolution of output, productivity and employment, assuming different changes in the regulatory environment: Status quo, reforms in automotive alone and reforms in all sectors (**Exhibit 4.23**).

- ¶ **Status quo:** In this scenario, we expect output to grow at 8 per cent a year and productivity to grow at 10 per cent a year, leading to an employment decline of 2 per cent a year (**Exhibit 4.24**). We assume that

GDP per capita<sup>2</sup> growth will remain at 4 per cent a year. Also, while QR on the import of vehicles will have to be removed in accordance with WTO regulations, we assume that customs duties for the import of parts and new vehicles will remain at the current levels for the next 10 years while customs duties for the import of used cars will be set at almost prohibitive levels.

The 10 per cent a year growth in productivity will occur through post-liberalisation plants reaching 65 per cent of US productivity levels and pre-liberalisation plants reaching 30 per cent.

- **Post-liberalisation plants** will improve skill levels by gaining experience and will continually improve their operations. However, we believe that not all of the OFT gap relative to the US will be closed by 2010. Lack of exposure to cost-competitive imports is likely to slow down improvement once new players in the Indian market have reached profitability and continue to benefit from strong market growth rates. In addition, government ownership will make it difficult to improve productivity at Maruti if this entails employment reduction. Therefore, we expect one-third of the OFT penalty, or 6 percentage points, to remain.

In the same way, most of today's gap is going to be closed by improvements in DFM (3 points), viable automation (1 point), and supplier relations (2 points). DFM will improve, since old models such as Maruti 800 are likely to be replaced by 2010. Also, the DFM penalty applied to new models is likely to be reduced as players improve.

Although suppliers will improve their quality and reliability levels, supplier relations in 2010 are still expected to lag behind US levels, mainly due to import protection of suppliers and poor infrastructure. If two new players enter the market, the average scale for Indian post-liberalisation plants will be around 142,000 vehicles per year. However, volumes for companies focusing on the mid-sized market will be considerably lower, at around 14,000 vehicles per year on an average. Due to high tariffs, these plants will be economical and will endure a scale and utilisation penalty of around 7 percentage points in 2010. Therefore, a gap of 19 points compared to the potential at current factor costs will remain and post-liberalisation plants will reach only 65 per cent of US productivity.

---

<sup>2</sup> Throughout this section, we refer to growth in GDP per capita in PPP terms. This differs from the growth in GDP per capita according to National Accounts statistics because each measure uses different relative prices to aggregate sectors to obtain the overall output. See Appendix 5A: Methodology for growth estimates in Volume I, Chapter 5: India's Growth Potential.

- **Pre-liberalisation plants** will enhance productivity by improving OFT, updating the machinery they use and the models they produce, and gradually reducing their surplus labour through VRS. This will allow them to close two-thirds of the current gap with post-liberalisation plants, and reach 30 per cent of US productivity levels by 2010. We expect the share of production of pre-liberalisation plants to remain constant between 2000 and 2010, at roughly 5 per cent of output.

Current output growth is fuelled by new, higher quality, competitively priced products from new entrants and pent-up demand after years of intense regulation of the sector. The impact of these effects should decrease over time. We estimate that India's demand will soon grow in relation to its GDP growth and foresee India growing at the rates Indonesia achieved between 1989 and 1997, when it grew in GDP per capita by 5.5 per cent a year. During this time, car sales in Indonesia grew at 11 per cent annually. Taking the same relationship between output and GDP per capita, we estimate that output can grow at 8 per cent, given India's current GDP per capita growth of 4 per cent. At this growth rate, India will achieve similar levels of both GDP per capita and sales of cars and light commercial vehicles per capita in 2010 as Indonesia did in 1997.

Since tariff protection for cars in this scenario is assumed to remain high, we believe that imports are likely to account for only 5-10 per cent of sales, as observed in Brazil with similar levels of tariff protection. Furthermore, we expect that this can be matched by exports. Production will, therefore, grow in line with sales. Since we expect productivity to grow faster than output, employment in passenger car assembly is likely to decline by around 2 per cent a year.

¶ **Reforms in automotive alone:** In this scenario, we assume that relaxations in labour laws will enable automotive plants to adjust staffing to output levels more flexibly, that the government will sell its stake in Maruti, and that customs duties will be reduced gradually until the phase-out in 2010. These reforms will result in faster productivity and output growth at 12 per cent and 10 per cent respectively, leading to an employment decline of 2 per cent a year (**Exhibit 4.25**).

- **Pre-liberalisation plants** will drive the 12 per cent annual growth in productivity. Freed from labour market constraints, these plants will significantly reduce their workforce over the next 2-3 years to the required minimum, improve OFT and roughly triple productivity by 2005. However, in the face of increased pressure from imports, they will also need to improve DFM and technology, for long-term viability. This will require significant investment, which does not

seem viable in all cases. Therefore, we expect at least one of the pre-liberalisation plants to close down by 2010. The other one will reach the current productivity of post-liberalisation plants, with better OFT, but most likely with less scale.

- **Post-liberalisation plants** will achieve productivity equal to 80 per cent of US levels. Productivity growth will be higher than in the “Status quo” scenario for two reasons: First, competition from imports will lead to marginally better improvements in OFT and DFM. Second, the scale penalty will be eliminated. Zero tariffs will make it unviable to operate sub-scale plants in India and plants that do not achieve scale will close down. We expect two manufacturers of mid-sized cars to stop producing in India. The remaining gap, between 80 and 100 per cent of US levels, is likely to be the result of differences in DFM and supplier relations.

Due to the exit of one pre-liberalisation plant, we assume that this segment’s share of production will halve to 2-3 per cent by 2010, resulting in an employment share of around 5 per cent. In this scenario, overall productivity in passenger car assembly in 2010 could be as high as 78 per cent of current US levels, implying an average productivity growth of around 12 per cent per year.

In this scenario, output growth is also likely to be higher because prices of cars produced in India will be 15 per cent lower on average than in the previous scenario. This is due to the removal of tariffs on imported parts, assuming that in 2010 OEMs locally source an average of 80 per cent of the content and suppliers locally source around 10 per cent of the content. In addition, the increase in labour productivity described above will reduce labour costs. A price elasticity of demand of 2 suggests an increase in sales by 30 per cent in 2010, resulting in an output growth of 12 per cent a year, higher than in Indonesia. However, going by Brazil’s experience, lower tariffs will increase imports to 25-30 per cent of sales. This cannot be matched fully by an increase in exports of 15-20 per cent of total production. As a result, output of Indian plants is expected to grow by 10 per cent annually.

- ¶ **Reforms in all sectors:** Reforms in all sectors will enable productivity in the automotive sector to grow by 12 per cent a year as GDP will grow at 10 per cent a year. By 2010, this growth rate will raise purchasing power in India to today’s Romanian or Russian levels. If this leads to a comparable level of vehicle sales per capita by 2010, car sales will grow at 18 per cent a year (**Exhibit 4.26**). As in the previous scenario, imported cars are likely to account for 25-30 per cent of these sales and the Indian car industry is expected to increase exports to 15-20 per cent

of production. As a result, output will grow at 16 per cent a year.

Due to the stronger increase in output, employment in this scenario is expected to increase by 4 per cent a year, creating around 13,000 new jobs by 2010 (**Exhibit 4.27**).

## **POLICY RECOMMENDATIONS**

Reforms in the automotive sector should focus on making labour laws more flexible and gradually reducing import protection. In addition, the government should sell its stake in Maruti and systematically eliminate red tape (**Exhibit 4.28**).

- ¶ **Relax labour laws:** The government should liberalise labour laws by simplifying procedures for retrenchment. Currently, the process is complex and companies need state government approval to retrench workers. This approval is often denied for political reasons. The government should establish a system that allows companies to retrench employees by giving them a standard severance package. In the UK, for example, companies have to make a redundancy payment of between 1 and 1½ weeks' salary for every year of service. Such a system would enable companies to reduce the workforce without having to seek the agreement of unions and workers. Further, companies should also be allowed to select the employees they wish to retrench.

The main opposition to such changes will come from unions. These will be concerned about the interests of the workers they represent, especially in pre-liberalisation plants where sizeable retrenchments can be expected. However, unions need to be made to understand that it is in their, and the workers', interests to support the reform programme. Overstaffed plants will be unable to achieve international productivity levels and become competitive unless they are allowed to adjust their workforce..

In addition, although current labour laws were intended to protect the workforce, they actually reduce employment in a number of cases. Companies refrain from increasing output and employment during peak demand, as they fear being burdened with surplus labour as demand slows down. Some plants even over-invest in automation to avoid the risks associated with hiring workers. Other efforts to keep the permanent staff low include the use of temporary workers, who are retrenched and replaced with other temporary workers before they can legally demand permanent employment.

- ¶ **Remove trade barriers and FDI restrictions:** The government should gradually phase out tariffs by 2010. This will ensure that the industry is

increasingly exposed to best practice, while giving new plants sufficient time to increase both scale and utilisation and close the productivity gap.

In light of the price difference between comparable models of small cars in India and other countries, current customs duties seem to provide high-volume car manufacturers with sufficient incentive to produce in India (**Exhibit 4.29**). While the ex-factory price is 22 per cent higher in India than in the country of origin, roughly 18 per cent of this is caused by customs duty paid either by the OEM or by Indian suppliers. Transportation costs make up the rest of the price difference.

A continuous reduction in trade protection will prevent stagnation in the domestic market and continue to drive product and productivity improvements. Brazil's experience is a case in point. Prior to 1990, car imports were not allowed into that country. As a result, Brazil's car industry, which consisted exclusively of large multinational companies, stagnated. However, after imports were allowed and tariffs gradually reduced to 20 per cent in 1995, the productivity of Brazilian car plants grew at an average of 16 per cent a year (**Exhibit 4.30**).

The time frame for the removal of tariffs should be determined on the basis of the plants' output volumes, as that is the key variable for viable operations in the presence of competition from imports. If two new players were to enter the market and no players exit; if the market were to grow between 9 and 16 per cent; if import volumes were to equal export volumes; and if Maruti's output were to remain constant, then the average output for the other manufacturers would be between 47,000 and 77,000 units per year in 5 years, and between 91,000 and 198,000 units in 10 years. Since minimum efficient scale with low automation is around 100,000 vehicles per year, the industry should phase out protection over a period of 10 years.

- ¶ **Relinquish government ownership:** The government should sell its stake in Maruti. Experience of other countries suggests that Maruti's market share will be very hard to sustain in a competitive market over the long term. In addition, the negative influence of government ownership is likely to worsen Maruti's future competitive position. Therefore, the longer the government takes to privatise Maruti, the lower the price it will realise for its stake.
- ¶ **Remove red tape:** The government should systematically scan and simplify all laws, procedures and interactions pertaining to the private sector. This will enable companies to focus their resources on improving products and processes.

## Appendix 4A: Measuring labour productivity

We have used a physical measure of labour productivity that compares equivalent cars produced per equivalent employee. In earlier MGI studies<sup>3</sup>, we measured the labour productivity of the automotive sector by using value-added per hour worked based on census data. However, we found this method would not provide accurate figures in the Indian context. The reasons are a lack of precision in passenger car census data and limited accuracy of the PPP exchange rates we require to compare value-added in different countries. Furthermore, we were unable to get estimates after 1997-98, because more recent census data was not available at the time of this study.

To enable comparisons of cars of different value and complexity, McKinsey's Automotive Practice has calculated standard norm times for average cars in each segment (**Exhibit 4.31**). We collected employment data through interviews and adjusted for differences in vertical integration and hours worked.

### **CAPITAL PRODUCTIVITY**

Our measure of capital productivity is “equivalent cars per dollar” of physical capital used. Since investment figures published by OEMs often include non-physical capital such as royalties and R&D and are distorted due to the high share of used equipment, we have estimated the capital stock “bottom-up”. First, we assessed the equipment and automation used in each post-liberalisation passenger vehicle plant through plant visits and interviews. We then used international equipment prices to value the equipment in the Indian plants visited and added the individual capital stocks. By comparing capital stocks, we have implicitly assumed the same lifetime for equipment in India and the US.

This methodology does not penalise Indian plants for overpaying for equipment due to custom duties, or benefit them for from using second hand or used equipment. Equipment is evaluated at international (US based) prices, and hence is equivalent to the use of an automotive investment goods PPP.

Due to the limited accuracy of this approach, we are only able to give a range for the current capital stock in the plants visited. Similar to our measure of labour productivity, this comparison does not capture differences in profitability due to

---

<sup>3</sup> See McKinsey Global Institute reports on automotive productivity in Germany and France, 1997, and in the UK, 1998

brand premium. As a result, it could overestimate the level of capital productivity of Indian post-liberalisation plants, which produce a lower share of high-margin luxury cars than the US.

## **PRODUCTIVITY RESULTS AND REASONS FOR DIFFERENCES**

Overall, the average capital productivity of Indian post-liberalisation plants is comparable to the US level, ranging from 86 per cent to 105 per cent with the Indian best practice company at 162-198 per cent of the US average (**Exhibit 4.32**).

This is the result of more capacity installed per unit of capital invested, ranging from 99 per cent to 121 per cent of the US average, mainly caused by less automation and lower environmental standards. This advantage however, is partly compensated for by lower scale of plants focusing on the mid-sized segment. In addition, the penalty in OFT and DFM described above reduces the production capacity, given the current equipment. The most important reason for lower capital productivity is lower capacity utilisation at 73 per cent of the US average.

## Appendix 4B: Measuring labour productivity of suppliers

Due to the heterogeneity of the parts sector with products ranging from highly complex to commodity-like items and the high number of players, we were not able to calculate aggregate figures for the entire industry. Instead, we estimated labour productivity for individual companies by comparing output per employee of the companies we interviewed and their foreign joint venture partners.

For parts producers, average productivity based on the interviews we conducted seems to be a little lower than for car OEMs, since most companies achieved between 10 and 20 per cent of their collaborator's productivity. In addition, our set of data points is skewed towards "better" Indian companies, which have entered a joint venture with a foreign partner and benefit from know-how transfer. The best practice supplier we interviewed achieved 45 per cent of its foreign counterpart's labour productivity.

### REASONS FOR PRODUCTIVITY DIFFERENCES FOR PARTS MANUFACTURERS

The importance of the reasons for productivity differences varies considerably depending on the characteristics of the parts produced as well as on the specifics of individual companies (**Exhibit 4.33**).

- ¶ **Organisation of functions and tasks:** Although most of the suppliers we interviewed can be considered best practice companies in India for the parts they produce, virtually all of them gained significant productivity improvements by more rigorously implementing lean production methods. Examples of these opportunities include changing the layout of the plant from process- to product orientation, using workers to operate more machines, better balancing the workload to reduce idle time, and focusing on "doing it right the first time". Most of the suppliers interviewed are already beginning to implement many of these changes, leading to significant, sometimes dramatic, improvements in productivity in recent years.

Similar to OEMs, some older plants suffer from low morale among the workforce, or even resist implementations of productivity improvements. For some companies, this was the reason for setting up new plants geographically removed from the old plants, despite encountering a scale

penalty. In these cases, old and new plants showed considerably different productivity levels.

It must be said however, that several companies have managed to overcome at least some of these difficulties by openly and intensively communicating with unions and employees. By giving employees more responsibility, involving them in continuous improvement activities, creating a motivating work atmosphere and aligning the incentives by introducing performance based payment systems, they were able to ensure full collaboration of unions and workers in productivity enhancing activities.

- ¶ **Automation:** Generally, productivity differences due to lower levels of automation were found to be very high for component production, which involves a high level of machining and simple assembly operations. These activities would be automated in high-wage countries but in India automation is not economical at prevalent factor costs. In some cases, productivity in India was 3-4 times lower due to differences in automation, compared to fully automated plants in best practice countries.

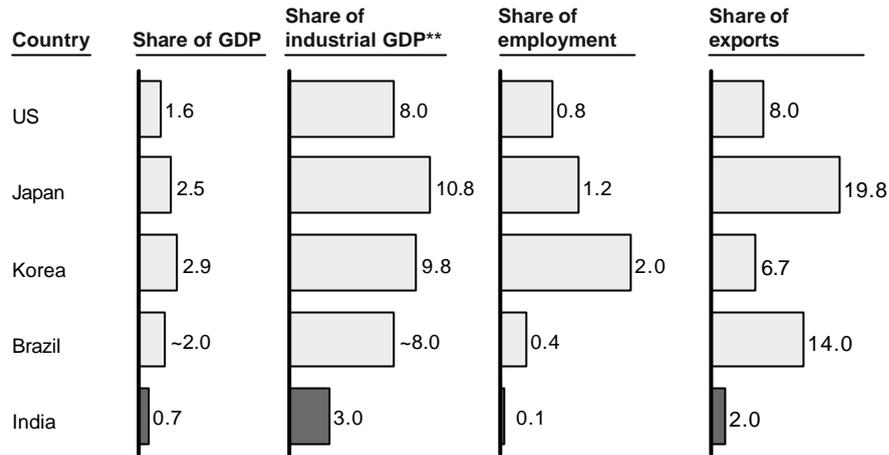
Similar to the organisation of functions and tasks, not all companies were found to have optimised automation by using it for all economically viable purposes. Low cost automation, in particular, such as simple unloading devices and updating and improvement of old machinery was found to be viable in several instances. Moreover, in the many cases where automation is not economical on purely labour saving grounds, it pays back through improvements in defects and rework or might even be necessary to achieve better product quality and the lower PPM-rates increasingly required by OEMs.

- ¶ **Scale/Utilisation:** Whereas low utilisation constitutes a major reason for lower productivity for parts manufacturers, which produce parts mainly for commercial vehicles, lower scale has been a major penalty in almost all companies visited. The average output volume in India is up to 20 times lower than for comparable parts in global best practice companies.

There are several reasons for this. First, for many parts, minimum efficient scale is higher than for OEMs, even in the Indian, low automation environment. Second, many companies have split their production facilities to serve new OEMs either because they formed new joint ventures with foreign suppliers, which have existing collaborations with the OEM, or because the OEM required geographic proximity. Also, as discussed above, some companies set up new plants in order to prevent unwanted work practices, adopted over the course of time, from affecting the new lines. Finally, most companies have not yet been able

to compensate for the low orders from the Indian market with significant export volumes, mainly because they focus on exporting niche variants that are no longer produced or have been phased out in plants in best practice countries.

**ECONOMIC SIGNIFICANCE OF THE AUTOMOTIVE SECTOR,\* 1996-97**  
Per cent

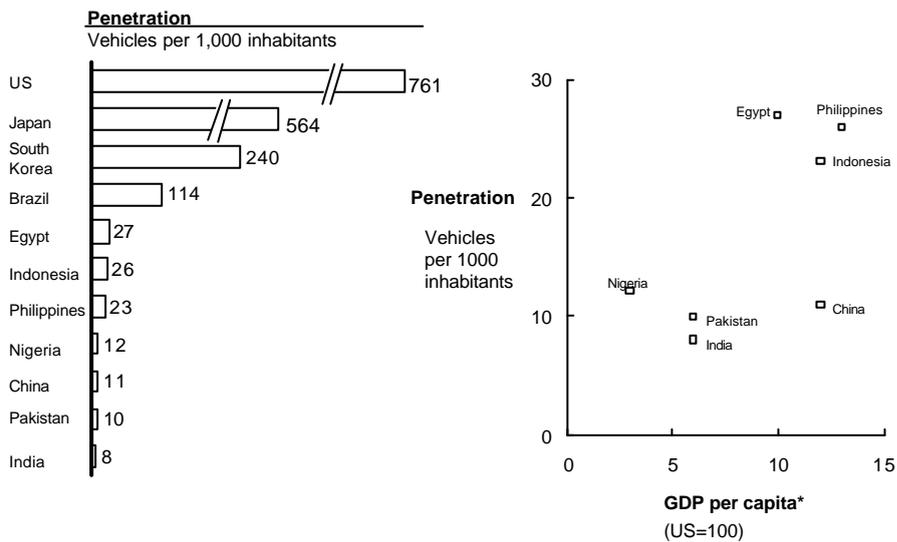


\* Includes parts and vehicles with four or more wheels, except tractors

\*\* Includes manufacturing, mining and utilities

Source: CSO, GDFT, MGI

**VEHICLE PENETRATION – INTERNATIONAL COMPARISON, 1998**



\* 1996, PPP-adjusted

Source: DRI, The Economist

### BUSINESS SYSTEM OF CAR ASSEMBLY

	Press shop	Body shop	Paint shop	Assembly/ testing	Indirect and support functions
<b>Activities</b>	<ul style="list-style-type: none"> <li>• Stamping of panels from steel coils</li> </ul>	<ul style="list-style-type: none"> <li>• Welding of body panels</li> </ul>	<ul style="list-style-type: none"> <li>• Cleaning, sealing and painting of car body</li> </ul>	<ul style="list-style-type: none"> <li>• Assembly and testing of car body and parts</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance</li> <li>• Quality control</li> <li>• Engineering</li> <li>• Material handling</li> <li>• Administration</li> </ul>
<b>Share of employment in India (%)*</b>	4	19	14	27	36
<b>Capital intensity</b>	<ul style="list-style-type: none"> <li>• High (Massive presses)</li> </ul>	<ul style="list-style-type: none"> <li>• Variable (Welding robots or manual)</li> </ul>	<ul style="list-style-type: none"> <li>• Medium-variable (Pre-treatment conveyors, ovens, paint robots)</li> </ul>	<ul style="list-style-type: none"> <li>• Low</li> </ul>	<ul style="list-style-type: none"> <li>• Low</li> </ul>

\* In 1999-2000 for post-liberalisation plants  
 Source: Interviews; McKinsey Automotive Practice

### ERA ANALYSIS OF INDIAN AUTOMOTIVE INDUSTRY

	Closed market: 1947-83	Japanisation: 1983-93	Transition to open market: 1993-2001
<b>Characteristics</b>	<ul style="list-style-type: none"> <li>• "Closed market" (licensing)</li> <li>• Growth limited by supply</li> <li>• Outdated models: Old versions of European cars, unchanged for decades</li> </ul>	<ul style="list-style-type: none"> <li>• Joint venture between Government of India and Suzuki in 1983 (Maruti)</li> <li>• JVs with Japanese companies in commercial vehicles and parts</li> </ul>	<ul style="list-style-type: none"> <li>• Passenger car production de-licensed in 1993</li> <li>• Most major manufacturers started operations in India</li> <li>• Imports allowed on a commercial basis from April 2001 (import tariff is currently 44%)</li> </ul>
<b>Players in passenger car segment</b>	<ul style="list-style-type: none"> <li>• Hindustan Motors</li> <li>• Premier</li> </ul>	<ul style="list-style-type: none"> <li>• Maruti</li> <li>• Hindustan Motors</li> <li>• Premier</li> </ul>	<ul style="list-style-type: none"> <li>• Maruti</li> <li>• Daewoo</li> <li>• Fiat/Premier</li> <li>• Hindu- • Hyundai • Daimler- stan • Mitsubishi- Chrysler Motors • Honda • Ford • Skoda • GM • Telco</li> </ul>

Source: EIU; SIAM; Interviews

**OVERVIEW OF PLAYERS IN THE INDIAN CAR INDUSTRY**

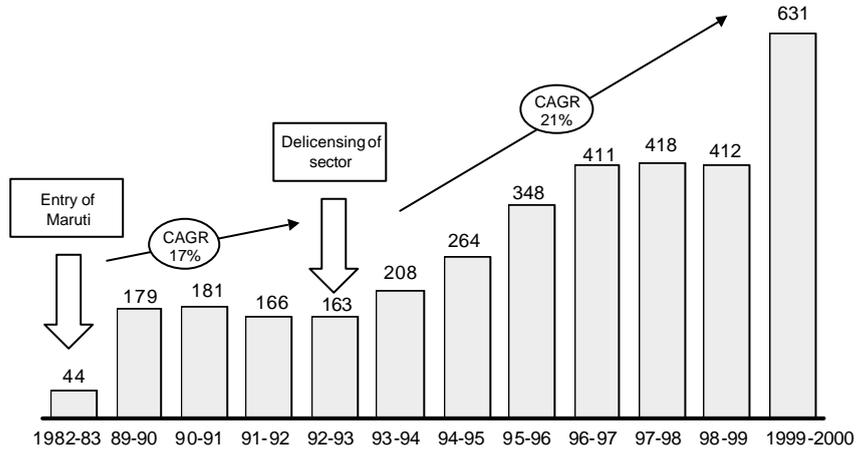
Company	Year when car production began in India	Car production in 1999-2000 '000 cars	Foreign partner	Foreign partner's equity Per cent
Maruti	1983	399	Suzuki	50
Hyundai	1998	75	Hyundai	100
Telco	1998	57	Daimler Chrysler	10
Daewoo	1995	36	Daewoo	93
Hindustan Motors	1942*	27	Mitsubishi	-
Fiat	1996	16	Fiat	95
Honda Siel	1997	10	Honda	95
Ford	1996	8	Ford	85
GM	1996	3	GM	100
Mercedes Benz	1995	0.4	Daimler Chrysler	86
Skoda	2000	0	Volkswagen	100

\* Year of incorporation

Source: SIAM; INFAC; press clippings

**PASSENGER CAR PRODUCTION IN INDIA**

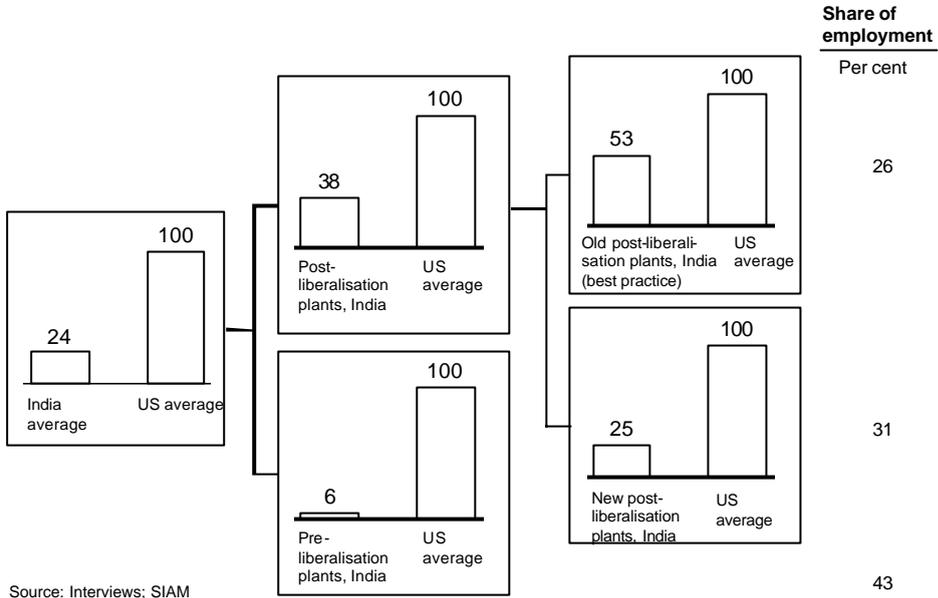
'000 cars



Source: SIAM; Interviews

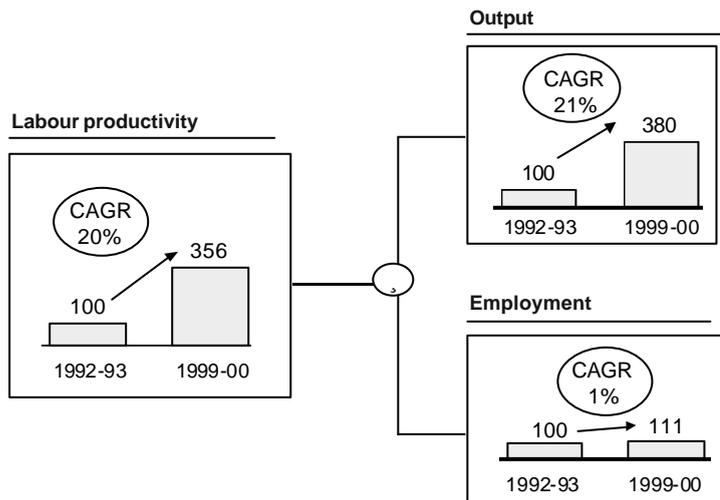
### LABOUR PRODUCTIVITY IN INDIAN CAR ASSEMBLY, 1999-2000

Equivalent cars per equivalent employee; Index, US average in 1998 = 100



### PRODUCTIVITY GROWTH IN INDIAN CAR ASSEMBLY

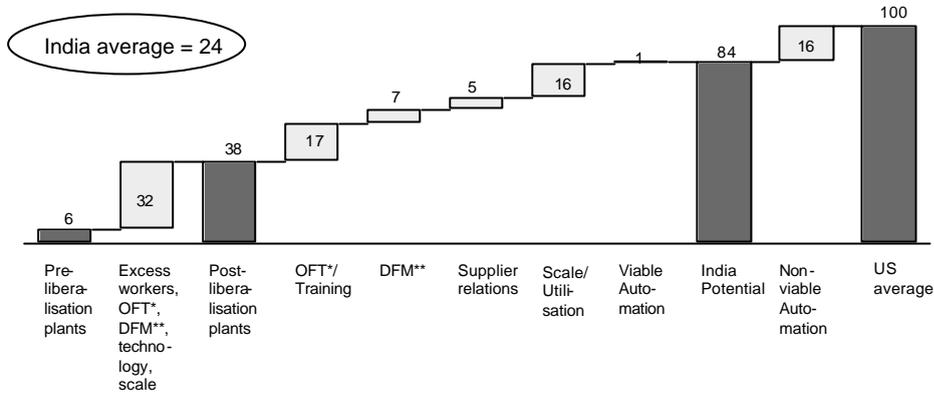
Equivalent cars per equivalent employee; Index, India in 1992-93 = 100



Source: Interviews; SIAM; Annual reports

### OPERATIONAL REASONS EXPLAINING PRODUCTIVITY GAP

Equivalent cars per equivalent employee; Index, US average in 1998 = 100



\* Organisation of functions and tasks  
 \*\* Design for manufacturing  
 Source: Interviews; SIAM; Harbor Report

### SKILL LEVELS IN POST-LIBERALISATION PLANTS

#### Differences in skill and experience

*"Lack of experience partly explains the productivity difference – we started mass production less than 2 years ago"*

*"We needed to launch a major change programme and invest significantly in training to improve the mindset and skills of our people"*

*"When we started production, we hired everybody directly out of vocational training instead of hiring experienced workers, whose work ethic had been spoiled by the organisational culture of other plants"*

#### Differences in performance

*"The share of cars taken off the line because of major problems is 5% compared to 0.2% in Japan"*

*"We are rapidly approaching levels on key performance indicators comparable to our Korean plants"*

*"Our main operational difference compared to Japan is downtime of the line"*

*"Our first-run-ok/defect rates are roughly 80% as good as in Korea"*

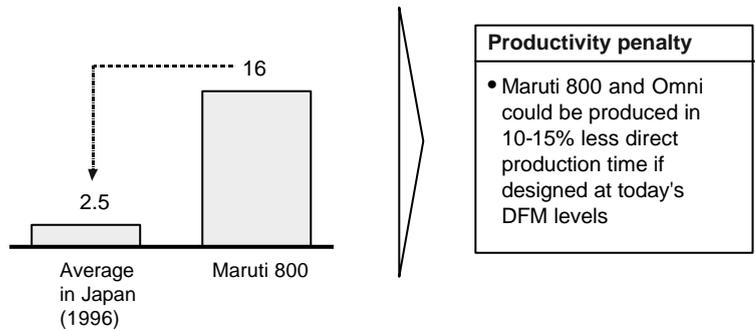
Source: Interviews

**ADOPTION OF LEAN PRODUCTION TECHNIQUES IN POST-LIBERALISATION PLANTS**

<u>Lean production technique</u>	<u>Adoption by post-liberalisation plants</u>	<u>Comments</u>
Continuous improvement process	✓	• Very high participation rates in all plants
Teamwork	Partial	• Teams of 10-15 are usually supervised by one supervisor • Responsibility for work organisation not always fully delegated to teams
Job rotation	Partial	• Rotation across shops has not yet been implemented
Kanban	✓	• Inventory levels at the line are minimal
Takt-time	✓	• All plants undertake efforts to minimise balance loss; no significant process inefficiencies visible during plant visits

Source: Interviews

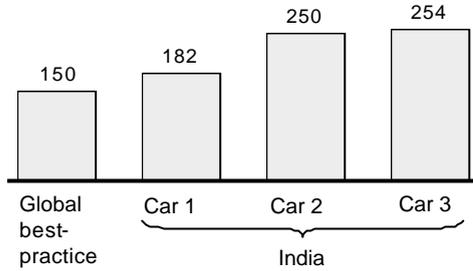
**DESIGN AGE OF CAR MODELS**  
Years



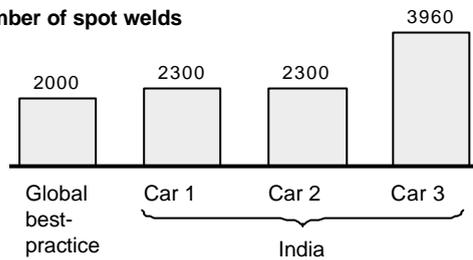
Source: Interviews; McKinsey Automotive Practice; IMVP

**DFM OF SELECT INDIAN SEGMENT A CARS\***

**Number of body panels**



**Number of spot welds**



**Productivity penalty**

- Press shop: 31% (represents 4% of total employment)
- Body shop : 25% (represents 19% of total employment)

\* According to DRI-segmentation

Source: Interviews; McKinsey Automotive Practice

**SUPPLIER RELATIONS ISSUES**

	<u>Japan</u>	<u>India</u>	<u>Productivity penalty for OEM (as % of employment)</u>
<b>Just-in-time delivery</b>	<ul style="list-style-type: none"> <li>• Delivery frequency is several times a day</li> <li>• No warehouse for parts</li> <li>• Suppliers are located or operate warehouses near OEM plants</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery frequency often less than once a day</li> <li>• Highly unreliable supplies (accidents, damages) and suppliers (don't keep schedule)</li> </ul>	<ul style="list-style-type: none"> <li>• Need to operate warehouse for parts (4-5%)*</li> <li>• Loss of production, if key parts are missing (3-4%)**</li> </ul>
<b>Product quality</b>	<ul style="list-style-type: none"> <li>• Rejection rates &lt;100 ppm on average</li> <li>• No inspection of incoming parts</li> <li>• Supplier problems are fixed with significant OEM involvement</li> </ul>	<ul style="list-style-type: none"> <li>• Rejection rates for Indian suppliers 2000-8000 ppm</li> <li>• Intensive inspection of incoming parts</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection of incoming parts (4-5%)*</li> <li>• Rework because of default parts (3-4%)**</li> <li>• Extra people for "chasing" suppliers (&lt;1%)</li> </ul>

\* Penalty for parts inspection and warehouse operation combined

\*\* Penalty for missing and default parts combined

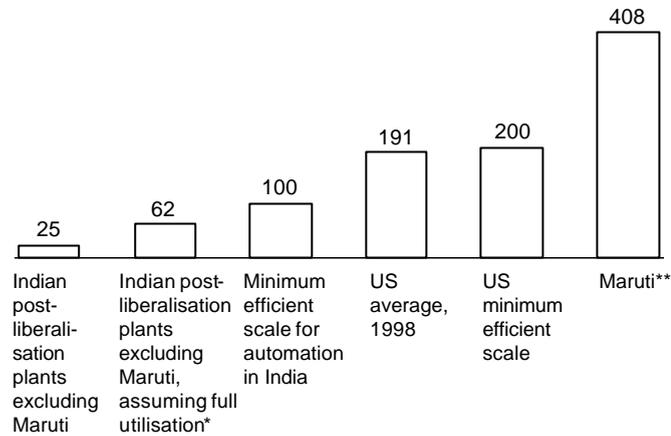
Source: Interviews; McKinsey Automotive Practice

Exhibit 4.15

2000-09-06MB-ZXJ151-Exh for final report

### SCALE OF PRODUCTION IN POST-LIBERALISATION PLANTS

'000 cars per plant



\* With two shifts

\*\* Including MUV

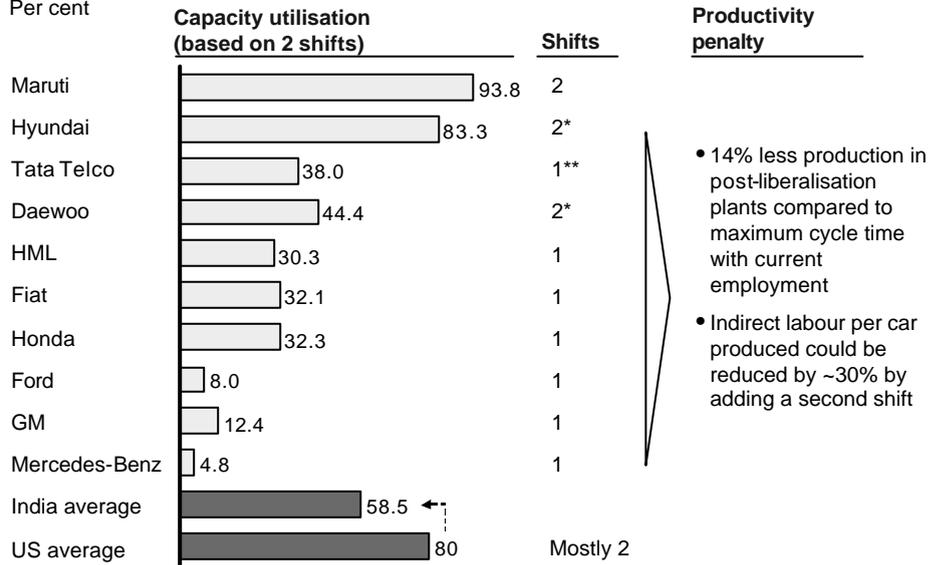
Source: Interviews; SIAM; Harbor Report

Exhibit 4.16

2000-09-06MB-ZXJ151-Exh for final report

### CAPACITY UTILISATION IN INDIAN PLANTS

Per cent



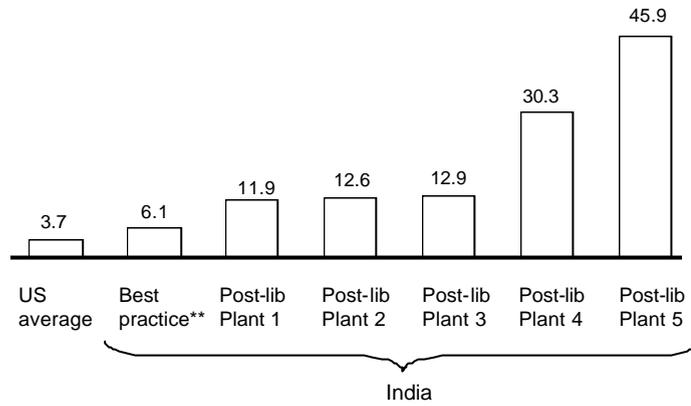
\* Started 2nd shift during 99-00

\*\* 2 shifts in press shop

Source: Interviews; Harbor Report; McKinsey Automotive Practice; SIAM; Press clippings

### INDIRECT LABOUR\* IN POST-LIBERALISATION PLANTS, 1999-2000

Hrs/car\*



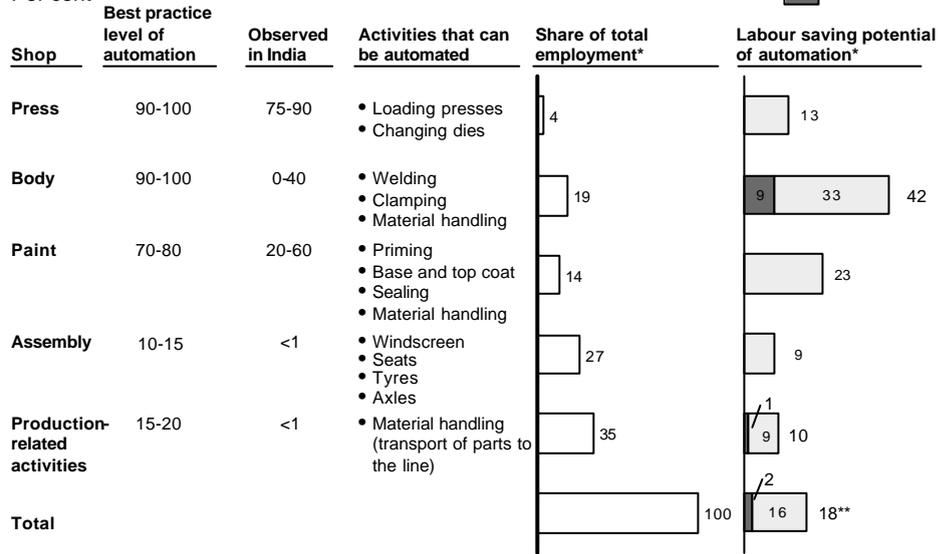
\* Excluding internal logistics (productivity penalty caused by automation and supplier relations)

\*\* Difference to US average mainly caused by OFT

Source: Interviews; McKinsey Automotive Practice

### LABOUR SAVINGS DUE TO AUTOMATION

Per cent



\* Based on sample of companies covering 98% of production in post-liberalisation plants in 1999-2000

\*\* Accounts for only 17 points of the productivity gap on Exhibit 10 due to order-independent presentation

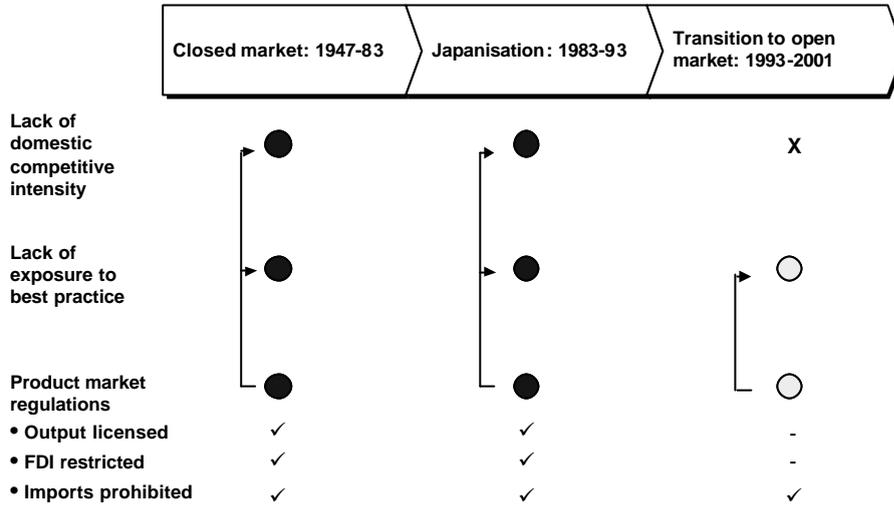
Source: Interviews; McKinsey Automotive Practice

Exhibit 4.19

### INDUSTRY DYNAMICS OVER TIME

2000-09-06MB-ZXJ151-Exh for final report

- High importance
- Low importance
- x Not important



Source: SIAM; INFAC; DGFT; McKinsey analysis

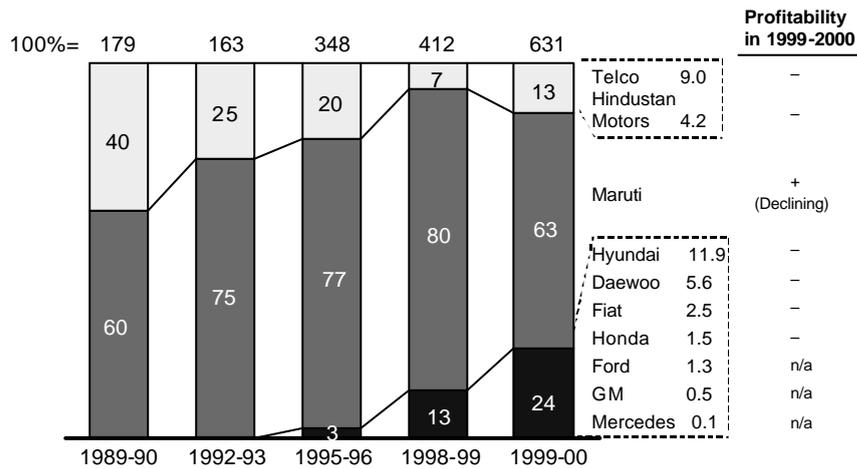
Exhibit 4.20

### PRODUCTION OF PASSENGER CARS

Per cent, '000 vehicles

2000-09-06MB-ZXJ151-Exh for final report

- Indian players\*
- Maruti
- Foreign players



\* Includes collaborations between Premier/Peugeot and Hindustan Motors/Mitsubishi

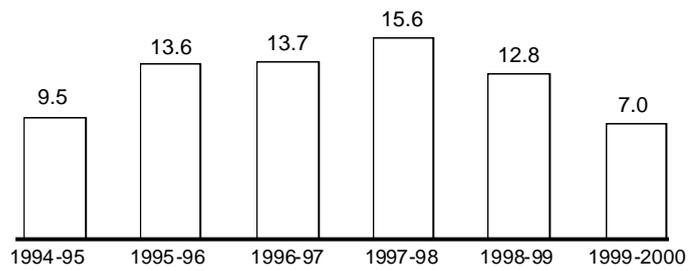
Source: SIAM; Press clippings

Exhibit 4.21

2000-09-06MB-ZXJ151-Exh for final report

### MARUTI'S PROFIT TREND

Profit before tax as per cent of net sales



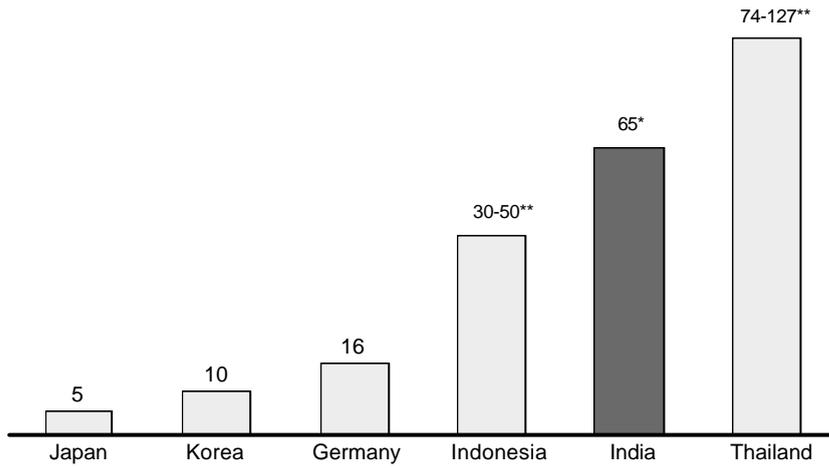
Source: Annual reports; McKinsey analysis

Exhibit 4.22

2000-09-06MB-ZXJ151-Exh for final report

### COMPARISON OF INDIRECT TAXATION ON CARS

Per cent of ex-factory gate price



\* Assuming 4% central sales tax and 12% local sales tax, octroi not included

\*\* Depending on size of engine

Source: Government publications

### FUTURE OUTLOOK FOR INDIAN AUTOMOTIVE ASSEMBLY

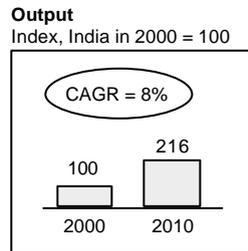
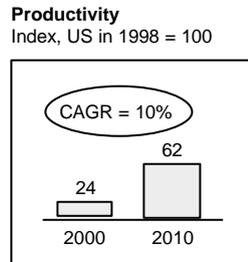
Scenarios for 2010	Productivity	Productivity	Output	Output	Employment
	Index, US 1998 = 100	CAGR Per cent	India 2000 = 100	CAGR Per cent	CAGR Per cent
Current level (2000)	24		100		
Scenario 1: Status Quo	62	10	237	9	-1
Scenario 2: Reform in automotive alone	78	12	259	10	-2
Scenario 3: Overall reform in all sectors	78	12	441	16	4

Source: McKinsey analysis

### FUTURE OUTLOOK – STATUS QUO

**Assumptions:**

- Output growth:** Passenger car output grows 8% per year, driven by GDP per capita growth (4%); similar to Indonesia 1989-97 (11% output growth with 5.5% GDP per capita)
- Relative market shares and productivity:**
  - Pre-liberalisation plants restructure, remain hampered by labour laws and reach 30% of today's US levels in 2010; their market share remains at 5%
  - Post-liberalisation plants improve their operations to reach 65% of US productivity. Tariff protection prevents them from reaching their full potential and also allows sub-scale plants in the mid-size segment to survive



Employment growth: -2% per year

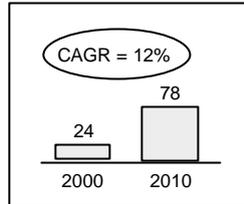
Source: McKinsey analysis

## FUTURE OUTLOOK – REFORMS IN AUTOMOTIVE ALONE

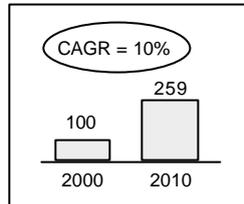
**Assumptions:**

- **Output growth:** Productivity improvement and lower prices due to lower tariffs lead to output growth of 10% per year
- **Relative market shares and productivity:**
  - Labour laws are liberalised, allowing pre-liberalisation plants to reach 38% of the US; one of the plants will exit due to import competition leading to market share of 2-3% for pre-liberalisation plants
  - Post-liberalisation plants are forced to improve to 80% of the US due to removal of tariffs. Sub-scale plants will exit, as imports are cheaper for global companies in the mid-size segment

**Productivity**  
Index, US in 1998 = 100

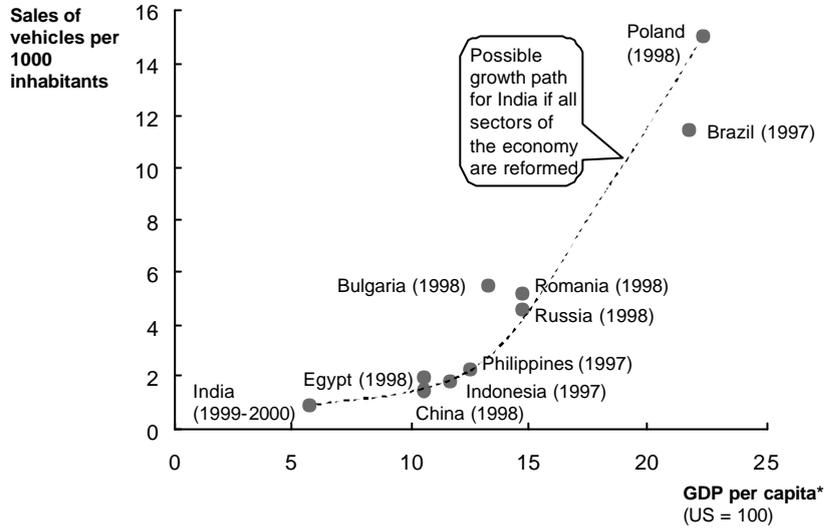


**Output**  
Index, India in 2000 = 100



Employment growth: -2% per year

### VEHICLE SALES AT DIFFERENT GDP PER CAPITA LEVELS



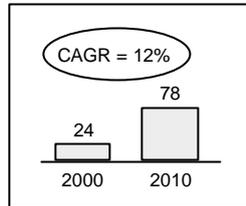
\* 1997, PPP-adjusted  
Source: DRI, *The Economist*

### FUTURE OUTLOOK – REFORMS IN ALL SECTORS

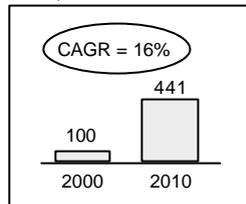
**Assumptions**

- **Output growth:** Higher GDP growth of 10% will lead to output growth of 16% per year
- **Relative market shares and productivity:**
  - Labour laws are liberalised, allowing pre-liberalisation plants to reach 38% of the US; one of the plants will exit due to import competition leading to market share of 2-3%
  - Post-liberalisation plants are forced to improve to 80% of the US due to removal of tariffs. Subscale plants exit, since exports are cheaper for global companies in mid-size segment

**Productivity**  
Index, US in 1998 = 100



**Output**  
Index, India in 2000 = 100



Employment growth: 4% per year

Source: McKinsey analysis

### POLICY RECOMMENDATIONS

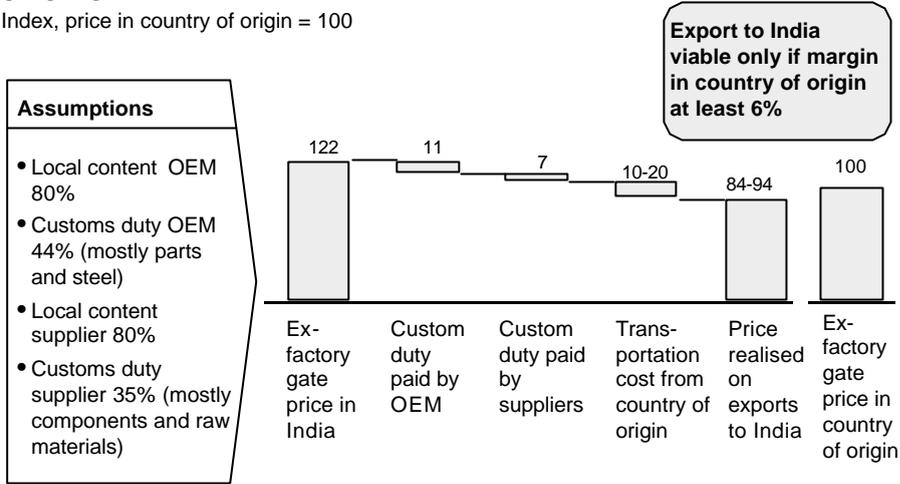
- High
- Medium
- Low

External factors		
Factor	Impact	Policy recommendation
• Labour laws	●	<ul style="list-style-type: none"> <li>• Remove mandatory state government approval for retrenchment (applicable to all companies with more than 1000 people)</li> <li>• Institute minimum severance payments in case of retrenchments (e.g. UK: 1-1.5 weekly salaries for every year worked)</li> </ul>
• Trade barriers	○	<ul style="list-style-type: none"> <li>• Protect domestic industry with tariff barriers after removal of quantitative restrictions – April 2001</li> <li>• Commit to and communicate step-wise removal of tariffs by 2010</li> </ul>
• Government ownership	○	<ul style="list-style-type: none"> <li>• Sell stake in Maruti as soon as possible</li> </ul>
• Red tape	○	<ul style="list-style-type: none"> <li>• Facilitate excise, tax, foreign trade and other laws to reduce unnecessary administrative efforts</li> </ul>

Source: Interviews; McKinsey analysis

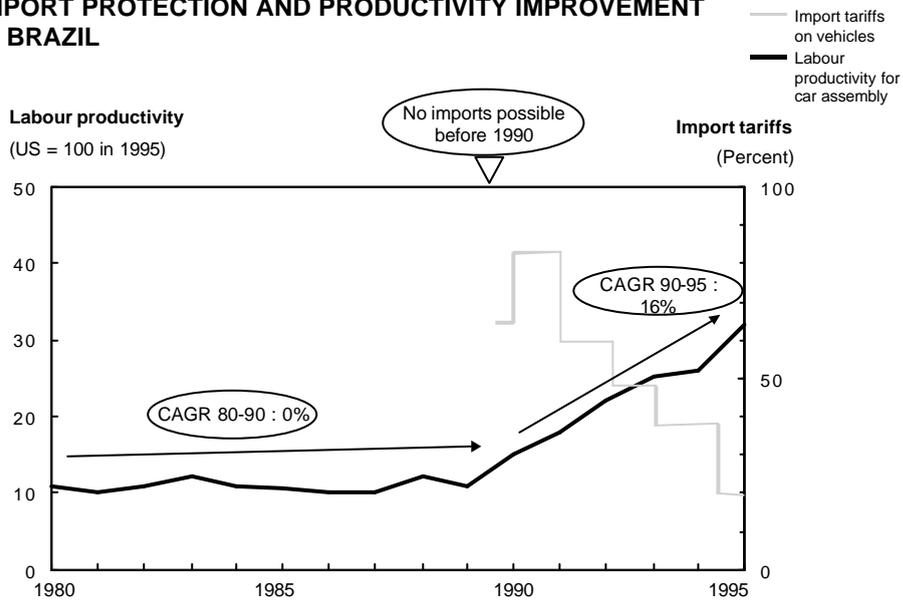
### PRICES OF SELECT SMALL CARS IN INDIA AND IN COUNTRY OF ORIGIN

Index, price in country of origin = 100



Source: Interviews; McKinsey Automotive Practice; INFAC

### IMPORT PROTECTION AND PRODUCTIVITY IMPROVEMENT IN BRAZIL



Source: MGI

**STANDARD NORM TIMES FOR CARS OF DIFFERENT SEGMENTS**

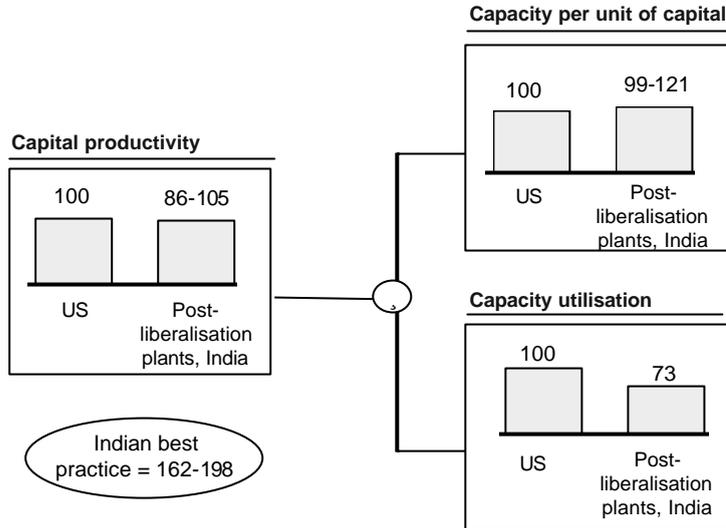
Indexed to D1=100

<u>DRI-Segment</u>	<u>Examples of cars in India</u>	<u>Standard norm time</u>	
Sub A*	Maruti 800, Omni	52	<b>Reasons for increased standard norm time with higher DRI-segment</b>  <b>Press:</b> More body panels  <b>Body:</b> More spot welds due to size and quality  <b>Paint:</b> Extra coat; increased touch-up and inspection for higher quality  <b>Assembly:</b> Higher number and more complex parts (power steering and brakes, electric window winder etc.)  <b>Indirect functions:</b> More parts, increased Quality Control, and engineering
A	Maruti Zen, Daewoo Matiz, Hyundai Santro	56	
B	Maruti Esteem	72	
C1	Hyundai Accent, Honda City	80	
C2	Mitsubishi Lancer	92	
D1	–	100	
D2	–	128	
E1	–	156	
E2	Mercedes-Benz E-class	184	

\* Not a standard DRI-segment; introduced here due to the unique value of Maruti 800 and Omni  
 Source: McKinsey Automotive Practice

### CAPITAL PRODUCTIVITY OF INDIAN POST-LIBERALISATION PLANTS – 1999-00\*

Equivalent cars per unit of capital; Index, US in 1998 = 100



\* Based on sample of companies covering 98% of production in post-liberalisation plants in 1999-2000  
Source: Interviews; SIAM

**CAUSES FOR LABOUR PRODUCTIVITY DIFFERENCES AT OPERATIONAL LEVEL – AUTOMOTIVE SUPPLIERS**

- High importance
- Medium importance
- x Low importance
- ( ) Percentage productivity improvement through removal of cause

<u>Operational factors</u>	<u>Importance of factor</u>	<u>Comments</u>
• Automation	● (40-66)	• Largely more important than for OEMs due to lower complexity of manual tasks
• OFT/Surplus workers	● (30-60)	<ul style="list-style-type: none"> <li>• All interviewees saw very significant improvement potential</li> <li>• Unionism has frequently prevented rapid introduction of lean production techniques</li> <li>• Companies built new plants just to create new culture</li> </ul>
• DFM	x	• Product development is either done by foreign JV partner or technology is bought
• Scale	● (45-51)	<ul style="list-style-type: none"> <li>• Production fragmented due to need for proximity to OEM, multitude of JVs, and multiple sourcing per part by OEMs</li> <li>• Productivity penalty caused by extra overhead and change over times</li> </ul>
• Utilisation	○ (10-25)	• Not very important in interviewed sample
Productivity	10-20	

Source: Interviews

# Dairy Farming

## **SUMMARY**

India is the world's largest producer of milk, and dairy farming is the single largest contributor to Indian GDP and employment. It constitutes 5 per cent of GDP and involves 70 million farming households. Though mostly carried out as a part-time activity in rural areas, dairy farming is the largest sector of the economy.

The productivity in the sector is six times below its potential at current factor costs. Poor yield (output per dairy animal) explains the gap between current and potential productivity. The yield is low due to inadequate dietary management, poor animal husbandry and poor quality animal mix.

Improving the quality of extension services available to the farmers is key to achieving this yield improvement. To ensure this, the government should encourage the development of milk marketing networks in rural areas and the setting up of milk processing plants. Both of these will lead to better extension services for farmers. To encourage the entry of new plants the MMPO (Milk and Milk Products Order) licensing regime should be removed. Further, the new plants should be allowed to directly collect milk from the villages.

If extension services were to be improved the dairy-processing sector could experience strong growth in the future. In fact, if the economy grew at 10 per cent per year, which is possible if our recommended reform programme is implemented, output in the sector could grow at 8 per cent per year over the next 10 years compared to 5 per cent at present.

## **Productivity performance**

Labour productivity in Indian dairy farming, at 0.6 per cent, is as much as six times below its potential. It is, however, growing at around 5 per cent per year. Poor yield (output per animal) accounts for this difference between current and potential yield. Part time dairy farmers based in rural areas, with only 1-3 animals each, farm over 90 per cent of the milch animals. These farmers have not mechanised any of the farming activities and are dependent entirely on manual labour.

## **Operational reasons for low productivity**

Labour productivity in this sector is determined by two factors: yield or the output per animal and the labour input per animal. Labour productivity, in general, can, therefore, be improved either by improving the yield or by reducing labour input per animal.

As we said earlier, labour productivity is low in India at only 0.6 per cent of US levels. This is because the yield per animal is low while the amount of labour input per animal is high. The yield per animal is low because of three reasons: the poor diet provided to the animal, poor animal husbandry practices and the lower yielding animal mix. The labour input per animal is high because the low labour costs make labour saving mechanisation unviable and the small herd sizes make it difficult to realise economies of scale.

Part of the gap between the current Indian productivity levels and the US levels can be bridged. In fact, Indian productivity can increase five times and reach 3.1 per cent of US levels. All of this productivity improvement would be driven by improvement in yield – through better diet management and animal husbandry practices and improvement in the animal mix. Improving productivity by reducing labour input per animal is, however, not possible because it requires either mechanisation that is unviable or larger scale herds which too is not feasible in the part time dairy farming format that predominates.

### **Industry dynamics**

Productivity in the sector remains below potential partly because there is limited price based competition and limited exposure to best practice. This is because the more productive players, urban commercial farmers, are not cost competitive with the relatively unproductive part time rural farmers. The cost of milk production in rural areas is lower than in urban areas because of the lower labour costs and cheaper fodder available in rural areas. As a result the more productive urban commercial farmers are unable to capture share from the less productive part time rural farmers.

It is important to note that the part time rural farmer format will remain the dominant format in the sector for at least the next 10 years.

### **External factors responsible for low productivity**

The two main barriers to growth among part time farmers are a lack of marketing/processing infrastructure and limited access to extension services. These factors limit yield growth. The examples of Gujarat and Maharashtra show that once a marketing infrastructure that links the villages directly with the processing plant is put in place yields per animal will almost double. The current interpretation of the MMPO creates designated milk sheds and limits the entry of new processors within any one milk shed. This ultimately restricts the possible marketing outlets for dairy farmers. Data shows that that both milk yields as well as the price paid to farmers increase as more market outlets come in.

Other, less important, barriers to productivity growth are the limited access to capital, the small average landholding pattern and the low opportunity cost of rural labour. These factors limit the average rural herd size growing from its current level of 2-5 animals.

### **Industry outlook**

If these barriers were to be removed, productivity and output growth could increase to 8 per cent per year, as compared to the current 5 per cent. This would take place as rural households graduated to keeping buffaloes and crossbred cows and employed better practices for feed/health. This increase in productivity would in turn translate into a consequent increase in the rural household income. Employment would remain the same as herd sizes would remain stable. At this level of output growth, per capita milk production could reach current Brazilian levels by 2010.

### **Policy recommendations**

The best way to encourage the establishment of a milk-marketing infrastructure in the rural areas is to allow the free entry of private and cooperative dairy processing plants. The government should, therefore, abolish the MMPO licensing regime that restricts the entry of new players. These players should be allowed to collect milk directly from villages.

Further, state governments should encourage small farmers to form societies or organisations that will help them to market their milk production in bulk. These organisations should be modelled on the proven, farmer owned and managed, “Anand model”.

Competition should be encouraged in milk procurement. This could be done by forming a village district cooperative society or establishing a private processor’s collection point in the village, giving farmers a choice between bulk marketing and the local trader. Such competition would lead to higher milk prices and improved extension services, together leading to higher yields and higher productivity.

# Dairy Farming

The dairy farming industry is important from the perspective of this study because it is a critical part of the Indian agricultural economy. Its importance stems from three factors. First, it provides income for small, rural farmers who are the poorest group of the Indian population. Second, milk and milk products are a critical part of the diet of the majority of Indians, providing an important source of protein given the prevalence of vegetarianism. Third, dairy farming complements other forms of agricultural activity. One instance of this is wheat farming: The fodder comes from the farm and part of the fertiliser manure comes from the cattle.

India is the largest producer of milk in the world and dairy farming is the single largest contributor to Indian GDP and employment, constituting as it does 5 per cent of GDP and involving 70 million farming households. This is equivalent to 12.6 per cent of total man-years of employment (**Exhibit 1.1**). However, per capita milk availability in India is still below the world average.

If the agricultural extension services are improved and our recommended reform programme implemented the dairy-processing sector could experience strong growth in the future. In effect, if the economy grew at 10 per cent per year, output in the sector could grow at as much as 8 per cent per year over the next 10 years.

For the purposes of this study we have confined our investigations of labour productivity to cow and buffalo dairy farming. We have not included goat, sheep and camel milk, which are also traded in India, since they make up less than 5 per cent of the total milk produced. We have defined output to include milk that is sold through the cooperative network or private trader networks as well as the milk consumed by the farming family.

For our measure of labour productivity, we have taken only those labour hours that are related directly to milch animal husbandry. We have not taken into account labour hours spent on draught animals, bulls or calves. We have also excluded the time spent idle by families in rural areas.

This chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics

- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

Indian production of raw milk has grown by 3.2 per cent per year since the 1950s and by 4.8 per cent since 1973 (**Exhibit 1.2**). Operation Flood and a favourable policy environment drove this five-fold output growth, or the “White Revolution” as it is called.

As a result, per capita availability of milk rose from 132 grams per person per day in 1950 to an estimated 217 grams by 1999. This increase came from higher yield per milch animal, which more than compensated for the slight fall in the number of milch animals per capita as the human population grew. Brazilian per capita milk production, by contrast, is 388 grams per day. Taken together, these figures suggest that there is still huge output growth potential.

## **PRODUCTIVITY PERFORMANCE**

Labour productivity in Indian dairy farming is estimated to be only 0.6 per cent of the US level. This is equivalent to the production of 0.6 kg of milk per labour hour worked (**Exhibit 1.3**). Although yields per milch animal are at only 10 per cent of US levels on average, the number of hours spent on each milch animal per day is as much as 16 times greater. Productivity is, however, continuing to grow at around 5 per cent per year, driven by the increasing yield per milch animal.

Dairy farming activity can be segmented into three groups (**Exhibit 1.4**). The vast majority of dairy activity is “part time” farming in rural areas where farmers own fewer than 5 milch animals and for whom dairy farming is a secondary activity. Over 90 per cent of milch animals are farmed in this segment. These farmers have very low productivity – about 0.5 per cent of US levels – due both to low yields and high labour hours per milch animal.

The second group is made up of full time, commercial dairy farmers who have herds of at least 10 animals and are usually located near urban milk markets. Most of these farmers milk their animals by hand and have an average productivity of around 1.6 per cent of US levels.

A very small minority of full time farmers (less than 1 per cent) has automated milking activity because they have invested in bucket milking machines. These are typically farmers with large herds of high yielding animals, situated in high wage

areas. Their productivity is around 5 per cent of US levels, a consequence of higher yield and fewer hours per milch animal.

There are also wide regional disparities in labour productivity mainly due to yield differences. For example, in Punjab, productivity is 1.6 per cent of US levels whereas in Orissa it is only 0.1 per cent. In addition, yield driven productivity growth is happening fastest in areas such as Punjab, where productivity is already relatively high.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

The gap that exists between the productivity an average part time farmer does achieve and the potential he/she could achieve is due to low yield (**Exhibit 1.5**). Yield improvements could improve the productivity of part time farmers by over 500 per cent from 0.5 per cent to 3.1 per cent of US productivity levels. Commercial farmers with large herds currently achieve productivity levels of 5.6 per cent since they expend far fewer hours per milch animal per day due to economies of scale in herd size and some automation. The remaining gap relative to US productivity levels is there because in the US fewer hours are expended on dairy activity owing to full automation and higher yields arising from the prevalence of high yielding exotic cows.

### **Improving yields**

The yield per milch animal per day is a function of the lactation yield and the length of the intercalving period. There are four main factors that influence these two variables: the species of the milch animal, the animal's diet, the quality of the husbandry, and the genetic quality of the animal, given its species (**Exhibit 1.6**).

- ¶ **Species:** The milch animal population in India overall consists of 48 per cent nondescript cows, 45 per cent buffaloes and only 7 per cent higher yielding crossbred cows. A typical part time dairy farmer has a few milch animals, either nondescript cows or buffaloes. This effectively sets the limit on the maximum yield a part time dairy farmer can achieve. A more productive part time farmer is likely to own higher yielding crossbred cows or high quality buffaloes.
- ¶ **Diet:** The part time farmer typically feeds his animals what is readily available, which is usually a by-product of his agricultural activity or what he can purchase locally. Milk yield is a direct function of protein and water inputs to the animal, and both are often lacking. The diet is usually a mix of dry fodder, green fodder and some form of concentrate, and is often low in digestible crude protein and total digestible nutrients. Further, the animals often do not get enough water. This is particularly true if water has to be accessed from a remote source and animals can be

taken there only 2 or 3 times a day. In contrast, the full time farmer is likely to feed his animals a yield-maximising diet mix and ensure free access to water.

¶ **Animal husbandry:** Since dairy farming is a secondary activity, farmers often pay scant attention to managing the overall health and pregnancy cycle of the milch animal. Part of the problem is that most part time farmers are unaware that useful information exists and, therefore, do not even make the effort to find out how they can improve their animal husbandry. Full time commercial farmers, on the other hand, focus all their attention on optimising lactation yields and minimising the intercalving period. As a result, the milch animal calves more regularly, produces more milk and is dry for a shorter time. These full time farmers are also more likely to have easier access to animal husbandry information.

¶ **Genetic quality:** There are huge variations in milch animal potential yield within a particular species. Part time farmers in rural areas have, over time, been breeding livestock for draught as well as dairy purposes. Their genetic quality often, therefore, does not allow high milk yields. For example, a buffalo may yield anything from 0.8 litres a day to 5.6 litres a day, depending on its genetic make up. In addition, the potential yield of crossbred cows is largely determined by the percentage of exotic blood in the animal. A crossbred cow with a high mix of exotic blood has high potential yield but is often difficult to rear at the village level.

There are considerable regional differences in average milch animal yield. For example, Punjab is at 25 per cent of US yields, compared with the Indian average of 10 per cent and the Orissa figure of 2 per cent. These differences stem from the average yield achieved by each species of milch animal and the mix of species of milch animal (**Exhibit 1.7**).

### **Decreasing labour hours**

Even after part time farmers reach their optimum potential productivity by improving yields, they remain less productive than the average, full time, mechanised farmer. This gap is due to the high number of labour hours that small farmers and their household members have to spend on each milch animal every day (**Exhibit 1.8**).

Typical daily activities include feeding, watering, cleaning the animals, cleaning the shed and equipment, milking the animals and marketing the milk. Even given the current low labour costs, there are economies of scale in automating all these activities except the actual milking. However, since the typical part time farmer

has only 1 to 3 animals it is impossible for him/her to enjoy these economies of scale.

Within the group of farmers with large herds, the reason for the productivity gap between non-mechanised and mechanised full time farmers is simply fewer labour hours per milch animal. Mechanised farmers use bucket milkers that reduce the hours required per milch animal. This can only be a viable investment if the farmer has a large enough herd size (more than 30 animals) and if local wage rates are above a threshold level (above Rs.8.75 rupees per hour – around twice the average wage rate for animal husbandry labour). We have observed this in a few pockets near urban areas. While only a small number of farms are currently mechanised, equipment manufacturers report sales growth rates of up to 40 per cent per year in areas where wage rates are high.

Achieving daily hours and yields per milch animal similar to those in the US will require changes, not viable in current Indian conditions for the following reasons: 1) Full automation of certain labour activities, such as feeding and cleaning, and further automation of milking through investment in a fully automated milking parlour is not viable given the current low labour costs; 2) The highest yielding milch animals, exotic cow breeds, cannot survive in the Indian climate and environment.

## **INDUSTRY DYNAMICS**

Overall, domestic competitive intensity is low and exposure to best practice dairy farming is limited. This is because the more productive formats such as semi-mechanised dairy farmers with larger herds have a higher per kg cost base than the less productive, part time, rural dairy farmers. And the more productive mechanised farmers are not gaining significant share, as the investment in mechanisation – bucket milking machines – is viable only in some areas. In fact, investment in large fully automated milking parlours is not economically viable in any part of India.

### **Lower production costs of the less productive, part time farmer**

Part time, rural dairy farmers have a lower production cost per kg than do full time farmers, who are typically located near urban areas (**Exhibit 1.9**). Mass market consumers always prefer to buy from the cheaper, part time farmer. This holds true even after including transportation costs and despite the higher typical conversion ratio (and therefore higher yields) of commercial farming milch animals. The difference in production cost per kg is around Rs.4 per litre, whereas transportation costs from rural to urban areas can be less than Rs.1 per litre for a

distance of 100 kilometres. There are three main reasons why part time farmers have lower production costs:

- ¶ **Low opportunity cost of rural labour:** A typical rural household has idle hours that it spends on dairy activity which are not valued at market labour rates. This is because there is vast rural underemployment and much of the labour engaged in dairy farming is female, and is required in the early mornings and evenings. This low opportunity cost of labour is expected to remain as it is until the idle hours in agriculture are eliminated or until households move out of agriculture altogether.
- ¶ **Cheap fodder:** Part time farmers value some components of the animal feed below market rates as they can grow it at no cost on their landholding, and have no opportunity to sell it elsewhere. Farmers can produce dry fodder as a by-product of their agricultural activity and grow green fodder on small parts of their land. They also have greater access to grazing land than do full time farmers. However, they do have to purchase concentrate at market rates.
- ¶ **Preferential access to capital:** The third and least important reason why some part time farmers have a lower per litre production cost is that they may have preferential access to capital. Under the IRDP (Integrated Rural Development Programme) farmers below the poverty line pay only 75 per cent of the cost of a pair of milch animals and also pay a lower interest rate.

### **Economics of the full time, commercial dairy farmer**

Full time farmers exist because they serve niche markets and capture downstream value (e.g., home delivery), obtaining a sufficiently high price per kg to cover their higher production costs (**Exhibit 1.10**).

Even for this group, it is only rarely viable to invest in automation given current low labour costs (**Exhibit 1.11**). Simple mechanisation, in the form of bucket milking, can be viable for farmers with, for example, herds of over 30 and in areas where the local hourly wage rate is over Rs.8.75. Fully automated milking parlours are not viable in India given current low labour costs. The average real hourly wage would have to quadruple before this level of automation begins to make sense even for herds of 100 animals or more.

There are also some elements of a non-level playing field that full time farmers in urban areas have to contend with. They some times have to face red tape from local authorities and higher interest rates than part time dairy farmers, who can, as mentioned earlier, buy two milch animals under the IRDP on favourable terms.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

We identified the external factors that were responsible for the shortfall between potential and current productivity and divided them into those that limit the productivity growth of part time farmers, and those that limit the productivity growth of full time farmers as compared to part time farmers (**Exhibit 1.12**). We found that the most significant of these were the former - those that limit the productivity growth of part time farmers.

### **Barriers limiting productivity growth among part time farmers**

The two main barriers to productivity growth among part time farmers are the lack of a marketing infrastructure and the lack of extension services. Both these barriers limit the yield obtained by part time farmers (**Exhibit 1.13**).

- ¶ **Lack of marketing infrastructure:** A choice of marketing channels ensures competition in milk procurement, raises the procurement price and, hence, provides the farmer with the greatest incentive to increase his animals' yields (**Exhibits 1.14 & 1.15**). Most often competition in milk procurement is between "district cooperative society"(DCS)-type collection points and local milk traders.

Despite the fact that they are often viable, only 14 per cent of villages currently have DCS-type collection points. Even in those villages where DCS do exist, farmer members are often dissatisfied with their functioning – primarily because of state interference (**Exhibit 1.16**). Farmers are most satisfied in areas where the State Milk Marketing Federation follows the "Anand" model and where government influence is minimal (**Exhibit 1.17**).

In a handful of villages, there are two or more DCS-type milk collectors (a state cooperative DCS and a private company collection point) as well as milk traders. In these villages, farmers tend to have access to the best extension services and produce correspondingly high yields. On average, in villages with two or more collection points, yields are nearly 30 per cent higher than in villages with only one DCS, which in turn are more than 40 per cent higher than the yields in villages with only milk traders.

- ¶ **Lack of extension services:** The lack of extension services for part time rural farmers is linked to the lack in choice of marketing channel. Farmers need to have an efficient system by which they can find out about services that will help them raise yields and be able to access them. Examples of extension services include providing farmers with timely and accurate information on animal health and husbandry and hygienic

practices. These services are most efficiently provided by upstream processors, either large private plants or cooperative plants, and will improve over time as more direct collection points are established.

Although state governments do provide some level of animal healthcare, the coverage and effectiveness is low. This is due to high overheads and ineffective fund utilisation. Other downstream agents such as milk traders provide very little in the way of extension services. This is because, as small-scale individual businessmen, they face limited demand and have no incentive to help farmers increase yields. In fact they may even actively discourage farmers from forming a DCS, through which extension services can be accessed, because that would destroy their livelihood. In many cases, milk traders provide the farmer with access to credit and obtain a captive milk supply by purchasing the milk at low prices and charging high effective interest rates.

Other factors that limit productivity growth among part time farmers include the limited access to capital, the small landholding pattern and the low opportunity cost of rural labour. These factors, however, are less significant. They limit productivity growth by limiting the herd size of part time farmers, thereby denying them the benefits of scale. Limited access to capital often prevents part time farmers from buying more animals. The average landholding pattern means households can only sustain fewer than 5 animals with the fodder they produce at a low opportunity cost. And the low opportunity cost of household labour relative to hired, rural labour means that only a very small herd can be managed by the family labour in their idle hours. Once labour is hired, a large part of the cost advantage of part time rural milk production is lost.

### **Barriers limiting productivity growth by slowing growth in market share of full time farmers**

The main barriers to the growth in market share of full time farmers are those that lead to a higher production cost per kg of milk, as described in the section on industry dynamics (**Exhibit 1.18**). These barriers include the low opportunity cost of labour and the landholding pattern available.

Other factors that limit the productivity of full time farmers are those that limit automation and those that limit yield per animal. Relative factor costs and tariffs and duties on milking machinery limit the degree of automation. The consumer preference for buffalo milk as well as the climatic conditions that make it difficult for high yielding cows to survive in India are two other factors limiting per animal yield among full time farmers.

Due to the way we have defined our productivity measure, it is unlikely that there are any barriers to output growth that do not affect productivity growth as well.

For example, an exogenous increase in the demand for milk, due to higher domestic demand or new export markets and higher milk prices, would lead to higher milk output because of increased average herd size, or higher average yielding milch animals. Either of these would raise productivity in the way described. It is unlikely that new households would begin dairy farming, as it is already such an intrinsic part of rural life for so many households.

## INDUSTRY OUTLOOK

Since part time dairy farming is synonymous with rural Indian life, its development is of crucial importance to millions of households. To evaluate the outlook for output, productivity and employment, we considered two possible future scenarios for its development: status quo and reforms in all sectors (**Exhibit 1.19**).

- ¶ **Status quo:** We found that in the status quo scenario, output and, hence, productivity would continue to grow at around 5 per cent a year driven by yield growth per animal. The number of households involved in dairy farming and the average herd size would remain unchanged (since the average landholding can support only 2 to 3 animals at the low opportunity cost of fodder), so the total number of hours spent would be stable.
- ¶ **Reforms in all sectors:** If the barriers to productivity growth among part time, rural farmers were removed – in other words if access to marketing channels and extension services improved – output growth and productivity growth could increase to 8 per cent per year, compared to the 5 per cent growth in the status quo scenario. This growth rate would still be lower than the 10 per cent per year productivity growth seen in Punjab in recent years but would nevertheless take India to Brazil's current level of per capita milk production by 2010.

Productivity would grow, as the milk yield per animal grows, through a combination of factors: better diet, improved management, genetic improvement and the gradual replacement of nondescript cows with buffaloes and crossbred cows. However, the number of households involved in dairy activity and the average herd size would likely remain unchanged, as would the number of hours spent on dairy farming.

Therefore, even if all existing barriers were removed, Indian dairy farming would reach only 1.2 per cent of US productivity levels by 2010, and create no new employment opportunities. This then emphasises the importance of the modern and transition sectors in driving India's future growth (*see* Volume 1, Chapter 5: India's Growth Potential). Dairy farming will, however, continue to play a critical role in the economic

life of 70 million households. As labour productivity increases through yield improvement, the country's poorest people will see their household incomes rise.

## **POLICY RECOMMENDATIONS**

Over the next 10-15 years, we recommend that policy makers focus on part time rural dairy farming, as this will remain the cost competitive and hence dominant format. This is also borne out by the experience of countries such as Brazil, where even though GDP per capita is four times as high as in India, productivity in dairy farming is at only 2 per cent of US levels (**Exhibit 1.20**). Focusing on part time rural dairy farming is also important because it is a much-needed source of income for a large number of poor households. The emphasis of our policy recommendations is, therefore, on removing the barriers to productivity growth among part time, rural farmers.

One way to promote productivity growth among part time rural farmers is to encourage the formation of farmer DCS and the entry of private plants to collect directly from villages. State governments can encourage the farmers to set up their own DCS-type collection points to ensure competition in milk procurement and increased access to extension services (**Exhibit 1.21**). The actual collection point can be cooperative-owned, or owned by a downstream private processor. New cooperative plants and large private plants, which would source directly from villages, would help in meeting this objective. As we have explained in the chapter on dairy processing (Volume 2, Chapter 5), the major barrier for the entry of the private processing plant is the MMPO.

The state should also ensure that existing and new DCS follow the "Anand" pattern, as recommended by the National Dairy Development Board and the World Bank in Operation Flood II. Through the Department of Animal Husbandry and Dairying, the state should inform farmers of the benefits of DCS formation, as these benefits may not be obvious to them and they may well be under pressure from milk traders who have good reason to try and prevent DCS formation (**Exhibit 1.22**).

In the long run, however, as the cost of labour and feed for part time farmers approaches market levels, policy makers should facilitate the move to full time farming. As labour and feed costs in part time, rural farming approach market value, the growth of productive full time formats should be helped along by removing administrative red tape and per animal license fees for commercial dairy farming at the local municipality level. Reducing import tariffs and excise duties on milking machinery will lead to faster automation of the milking process as it will become viable for more farmers sooner.

## Appendix 1A: Defining productivity

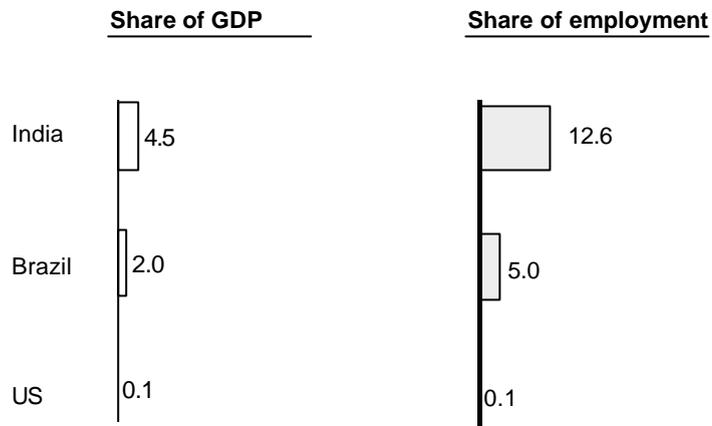
The definition of productivity that we have used in dairy farming is kilograms of milk produced per labour hour worked. This measure is divided into kilograms of milk produced per milch animal per day, divided by the number of labour hours spent on each milch animal per day.

The first is a measure of animal yield and is defined as an animal's lactation yield divided by the number of days in its intercalving period. The data is based on yield statistics from the Department of Animal Husbandry and Dairying, in the Ministry of Agriculture. We have also used sample data collected by organisations such as the National Council for Applied Economic Research and supplemented this with over 30 field trips. In order to make valid international comparisons, we adjusted the output measure to account for differing levels of fat and solid non-fat content in milk. These differences arose due to the relatively large share of buffalo milk in India.

The second is defined as the total number of hours spent on each milch animal per day. It includes both adult and child working hours and both male and female working hours, weighted equally. The data has been obtained by synthesising existing studies on the cost of dairy production, in which the cost of labour has been included. Dividing this cost by the estimated wage rate gives an estimate of total hours spent. This data has been verified against "bottom-up" academic studies of labour activities in dairy farming, and by evidence collected on field trips.

# DAIRY FARMING AS A SHARE OF GDP AND EMPLOYMENT

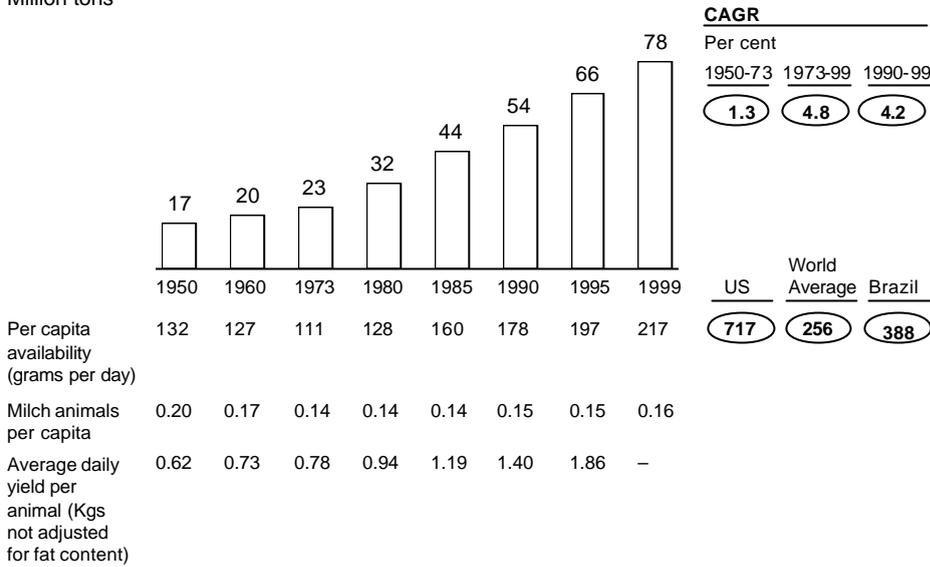
Per cent



Source: National Accounts Statistics, 1999; CSO; NASS; USDA; WEFA; Team analysis

### RAW MILK PRODUCTION 1950 - 1999

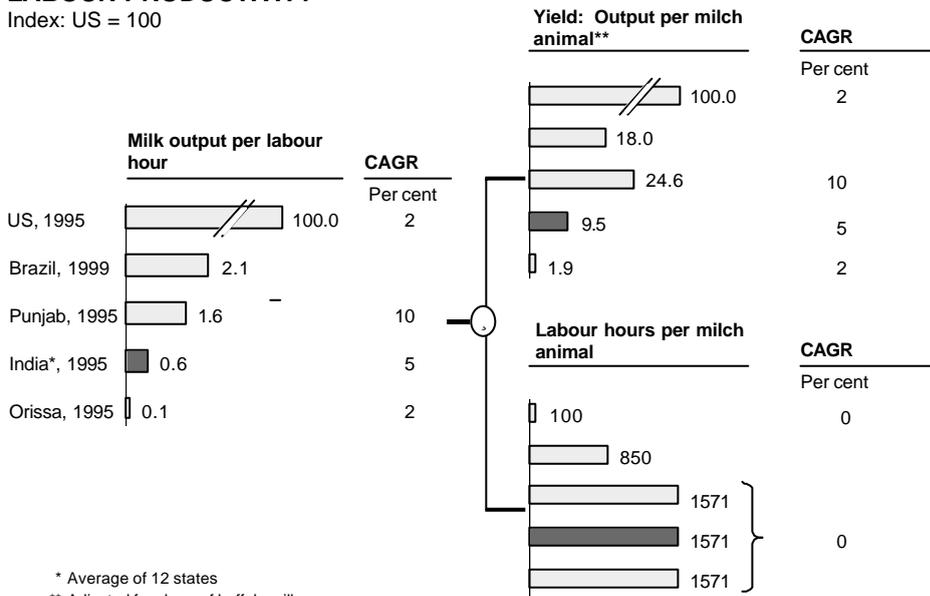
Million tons



Source: Department of Animal Husbandry and Dairying, Annual Report 1998/99; Basic Animal Husbandry Statistics, 1999; Team analysis

### LABOUR PRODUCTIVITY

Index: US = 100



\* Average of 12 states

\*\* Adjusted for share of buffalo milk

Source: Basic Animal Husbandry Statistics, 1999, DAHD; Brazilian Agricultural Council; Economic Research Service, USDA (The Structure of Dairy Markets: Past, Present, Future; 1997 Agricultural Resource Management study)

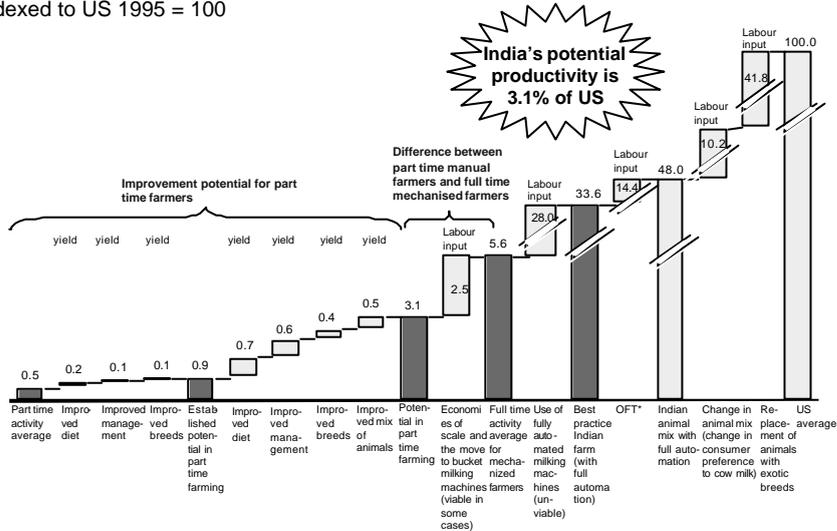
### SEGMENTATION OF DAIRY FARMING SECTOR

Segment	Number of milch animals per herd	Type of milch animals (%)	Share of milch animals (%)	Share of labour hours (%)	Milch animal yield per day (kg)	Labour hours per day	Labour productivity (kg/hour)	Labour productivity (% of US)	Segment growth
<b>Part time dairy farmers</b> (typically located in rural areas)	1-4 (average size: 2)	48% non descript cows 7% cross bred cows 45% buffaloes	92.0	93	1.66	2.2	0.75	<b>0.5</b>	→
<b>Full time, non mechanized dairy farmers</b> (typically located near urban markets)	5+ (average size: 10-15)	Cross bred cows and buffaloes	7.5	6.7	4.55	1.9	2.40	<b>1.6</b>	→
<b>Full time mechanized dairy farmers</b> (typically located near urban areas)	30+ (average size: 50)	High yielding cross bred cows and buffaloes	0.5	0.3	8.72	1.2	7.27	<b>5.0</b>	→
<b>Total</b>			<b>100</b>	<b>100</b>	<b>1.93</b>	<b>2.2</b>	<b>0.88</b>	<b>0.6</b>	

Source: Dairy India, Fifth Edition, 1997; Basic Animal Husbandry Statistics, 1999, DAHD

### OPERATIONAL FACTORS EXPLAINING THE PRODUCTIVITY GAP

Indexed to US 1995 = 100

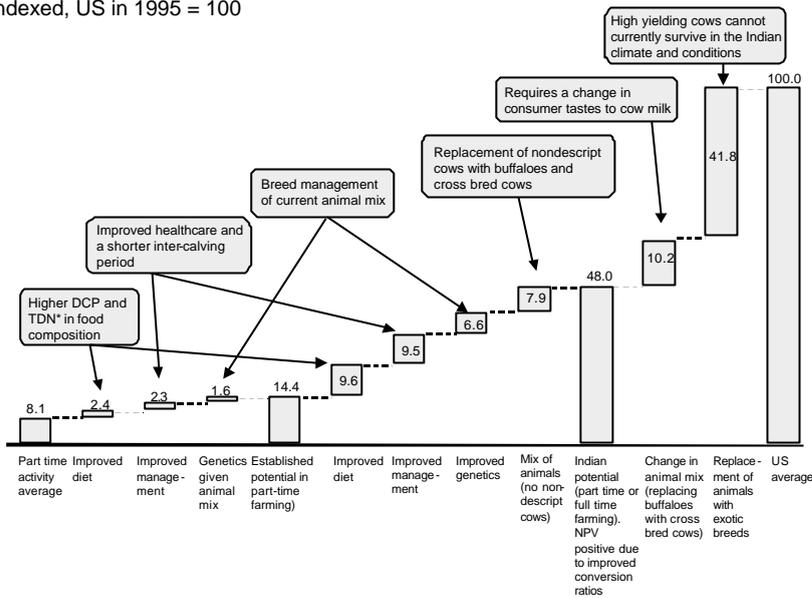


\* Organisation of functions and tasks

Source: Dairy India, Fifth Edition, 1997; Basic Animal Husbandry Statistics, 1999, DAHD; Interviews with dairy scientists at NDRI, Karnal; Team analysis

### FACTORS EXPLAINING LOW INDIAN AVERAGE YIELDS

Indexed, US in 1995 = 100

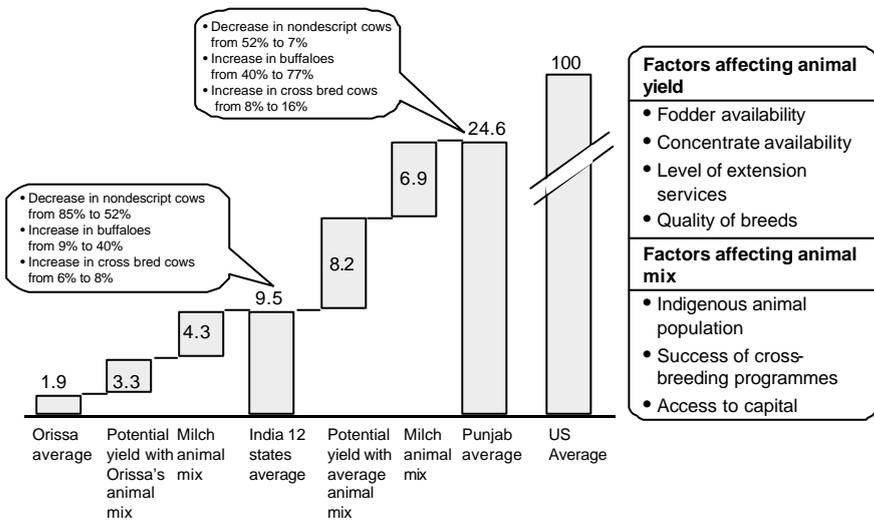


\* DCP (Digestible Crude Protein), TDN (Total Digestible Nutrients)

Source: Basic Animal Husbandry statistics, 1999; Interviews with dairy scientists at NDRI, Karnal; Team analysis

### REGIONAL DIFFERENCES IN YIELD, 1994-95

Kg per milch animal per day\*; index, US = 100

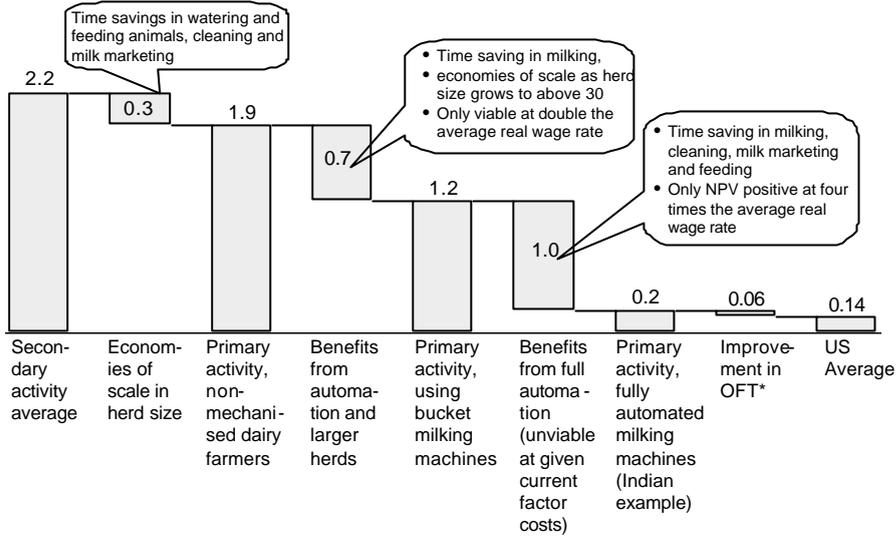


\* Adjusted for higher total solids content of buffalo milk

Source: Basic Animal Husbandry Statistics, 1999; Interviews with dairy scientists at NDRI, Karnal; Team analysis

### OPERATIONAL FACTORS EXPLAINING THE GAP IN LABOUR HOURS

Hours per day per animal



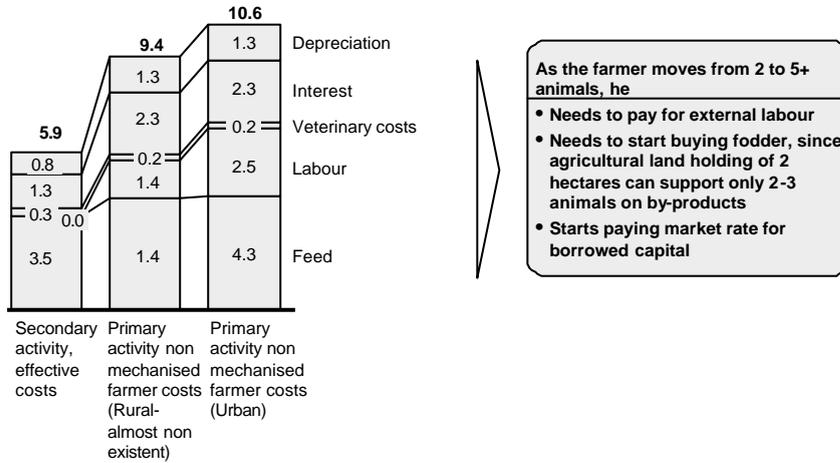
\* Organisation of functions and tasks

Source: Interviews with dairy farmers; Economic Research Services USDA (1997 Agricultural Resource Management Study)

### PRODUCTION COST OF MILK FOR COW FARMERS

Rs./kg

PUNJAB EXAMPLE FOR COW MILK

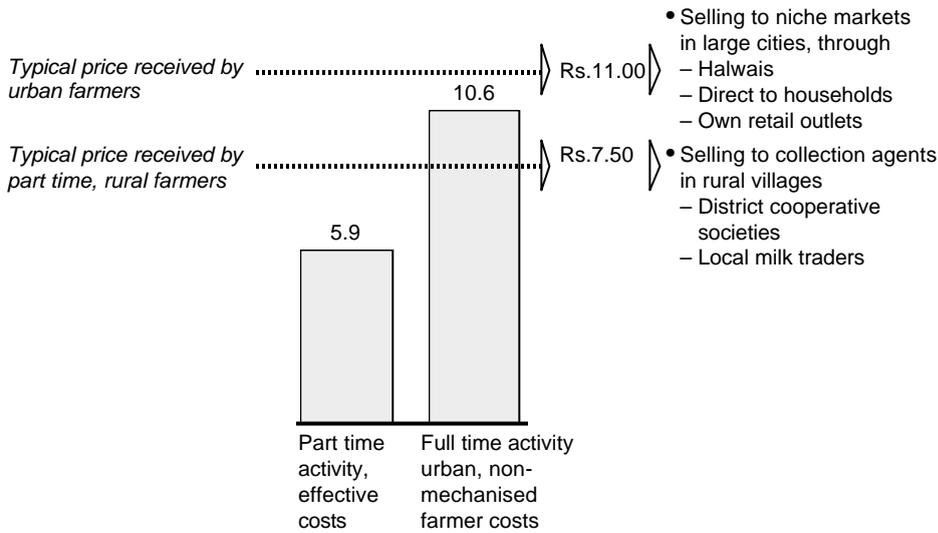


Source: PAU Daily Economics Bulletin, July 1999; NCAER, Evaluation of Operation Flood on Rural Dairy Sector, 1999; Basic Animal Husbandry Statistics, 1999, DAHD; Interviews; Team analysis

**PROFITABILITY OF PART TIME AND FULL TIME FARMERS**

Rs per liter

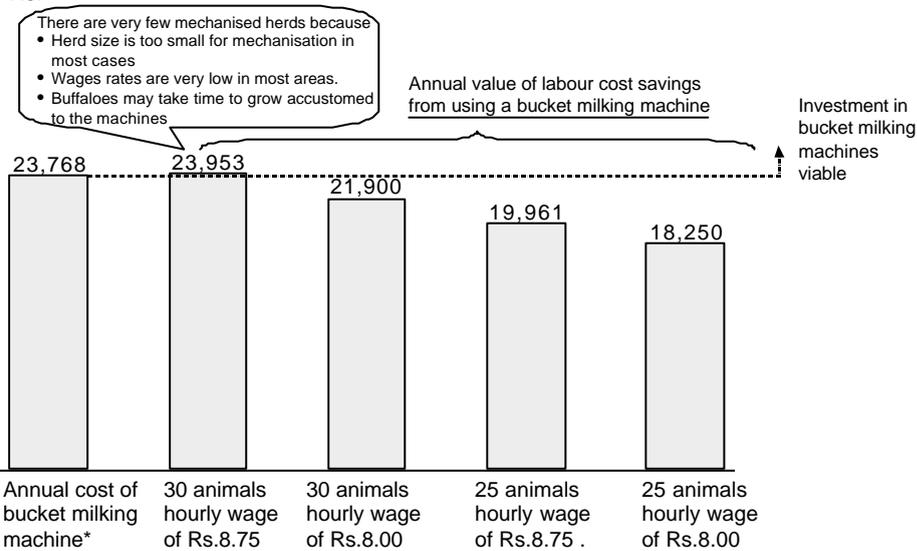
*PUNJAB EXAMPLE OF COW MILK*



Source: PAU Dairy Economics Bulletin, July 1999; NCAER; Evaluation of Operation Flood on Rural Dairy Sector, 1999; Basic Animal Husbandry Statistics, 1999, DAHD; Interviews; Team analysis

**ANNUAL COSTS ASSOCIATED WITH USE OF BUCKET MILKING MACHINES AND POTENTIAL LABOUR COST SAVINGS**

Rs.



\* Capital cost and depreciation of 0.1 million rupees for 3 units of bucket milking machines, at 15% interest over of 15 years

Source: Interviews

Exhibit 1.12

### EXTERNAL FACTORS LIMITING PRODUCTIVITY GROWTH AMONG PART TIME FARMERS

2000-07-17MB-ZXJ151(Dairy farm)  
 ● Important  
 ○ Moderately important  
 x Unimportant

External barrier	Comments	Importance of barrier in reaching current potential	Importance of barrier in reaching US levels (different factor costs)
• Lack of marketing channels	• No competition among marketing channels	●	x
• Lack of extension services	• Existing marketing channels provide very few services and state support is scarce	●	x
• Corporate governance of cooperatives	• Government interference results in bad management	●	x
• Limited access to capital	• In some rural areas	○	○
• Small average land holding	• Limits herd size as average land holding can support only 2-3 animals	○	●
• Low opportunity cost of rural labour (hired labour is relatively expensive)	• Labour hours are often those of housewife in morning and evening	○	●
• Import tariffs and excise duties on milking machinery	• Raises cost of equipment and hence wage threshold at which automation becomes viable	x	○
• Factor costs	• Capital costs are high relative to labour leading to less automation	x	●
• Consumer preference for buffalo milk	• Although crossbred cows are more productive than buffaloes, cow milk production may currently be demand constrained	x	●
• Climatic and environmental conditions	• The highest yielding exotic cows cannot survive in India	x	●

Exhibit 1.13

2000-07-17MB-ZXJ151(Dairy farm)

### DAIRY FARMING CAUSALITY – PART ONE

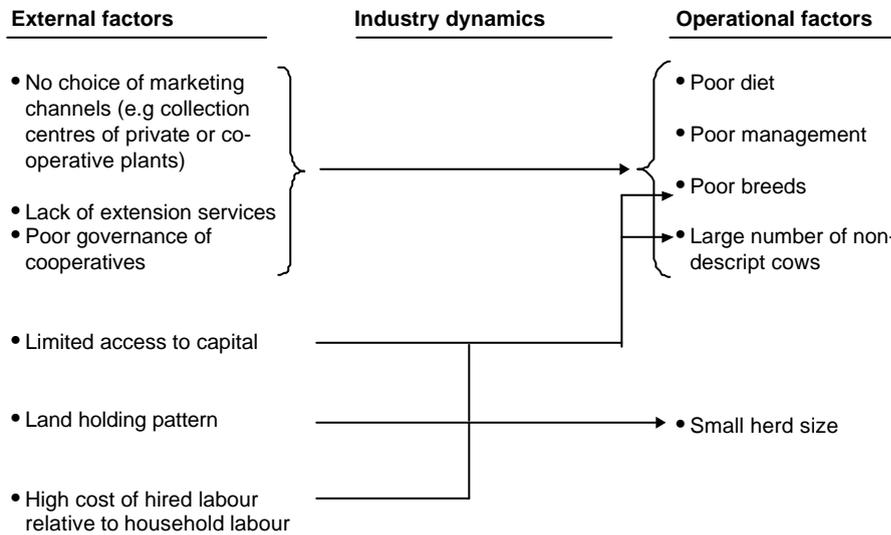
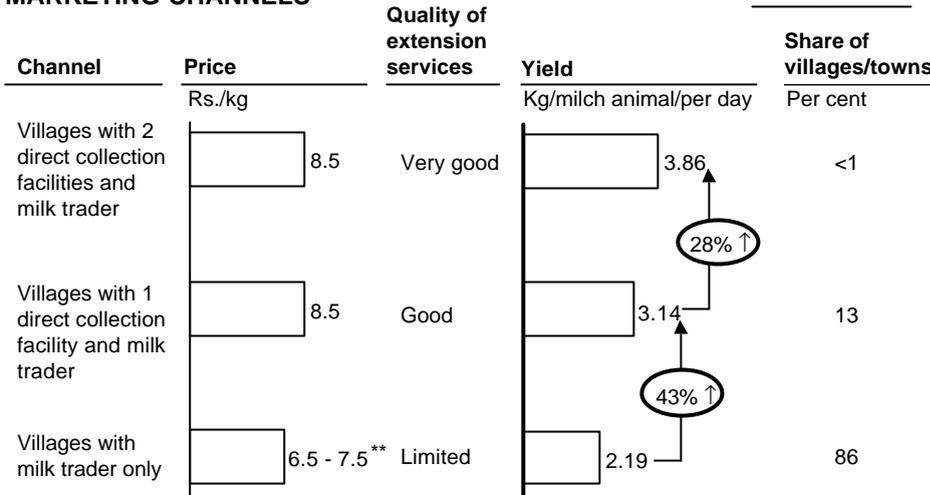


Exhibit 1.14

**IMPACT OF AVAILABILITY OF ALTERNATIVE MARKETING CHANNELS**

2000-07-17MB-ZKJ151(Dairy farm)

ILLUSTRATIVE OF NATIONAL AVERAGE



\* Buffalo milk example

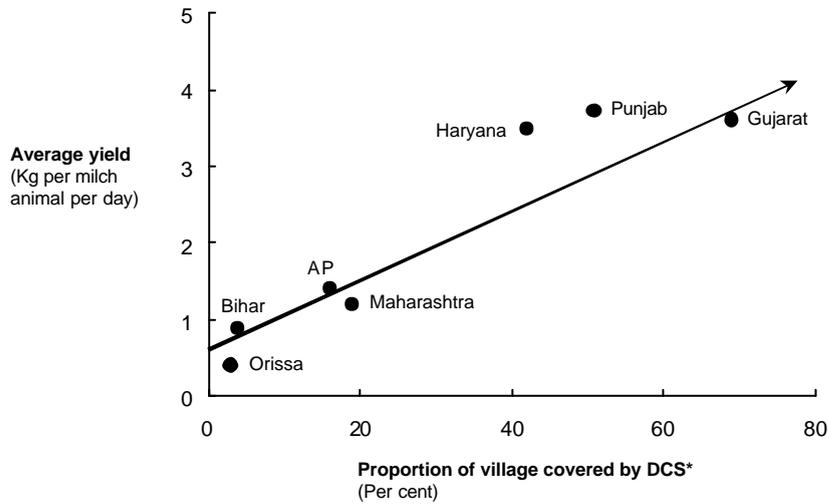
\*\* Estimate

Source: Basic Animal Husbandry Statistics, 1999; NCAER, Evaluation of Operation Flood on Rural Dairy Sector, 1999, 1991 census data; Interviews; Team analysis

Exhibit 1.15

**CORRELATION BETWEEN DISTRICT COOPERATIVE SOCIETY COVERAGE AND YIELD ACROSS STATES (1994-95)**

2000-07-17MB-ZKJ151(Dairy farm)

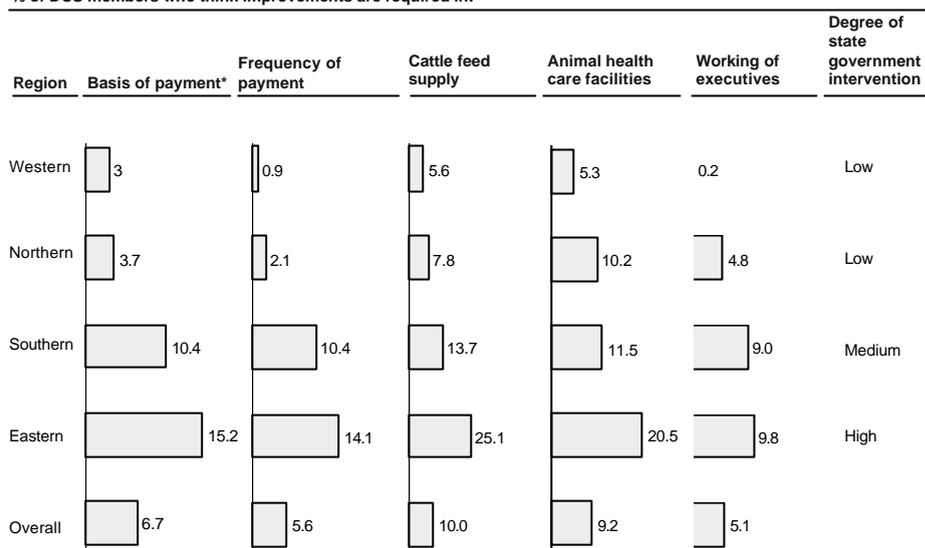


\* Other factors that affect yields between states are climatic conditions and difference in animal mix

Source: Basic Animal Husbandry Data 1999; Census 1991

### REASONS FOR THE MIXED SUCCESS RATE OF VILLAGE DCSs

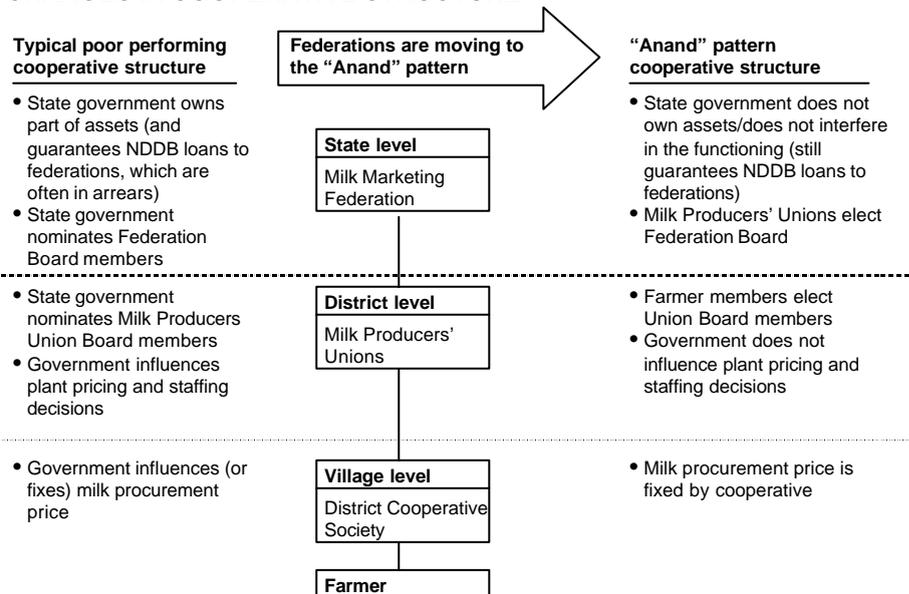
% of DCS members who think improvements are required in:



\* To account fat content, volume; cow vs. buffalo etc.

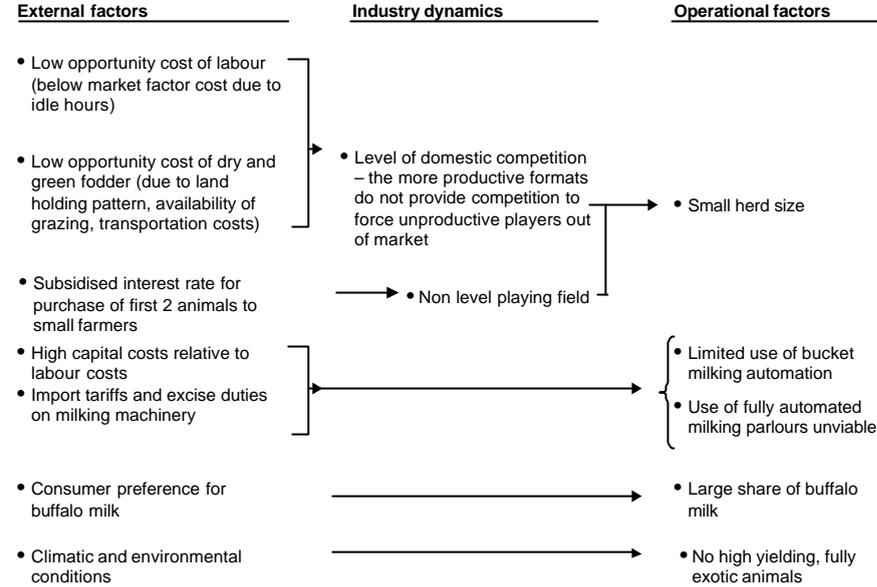
Source: NCAER, 'Impact Evaluation of Operation Flood on Rural Dairy Sector'

### CHANGES IN COOPERATIVE STRUCTURE



Source: World Bank Operations Evaluation Department, *India the Dairy Revolution*; 1998; Interviews

### EXTERNAL FACTORS LIMITING PRODUCTIVITY GROWTH AMONG FULL TIME FARMERS

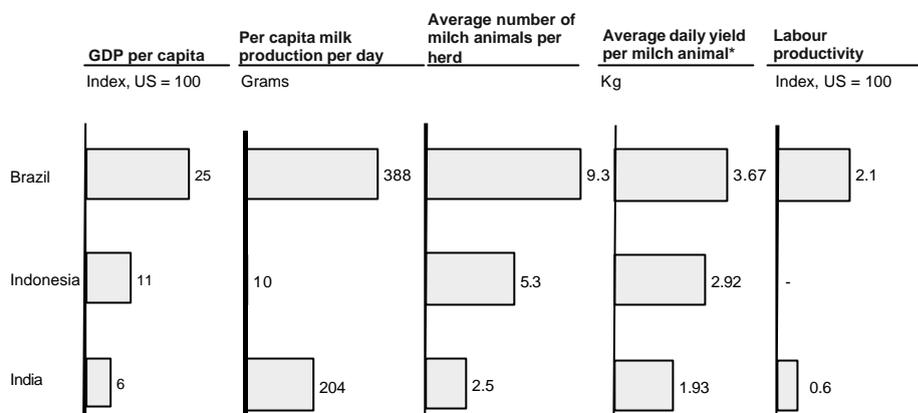


### FUTURE OUTLOOK IN DAIRY FARMING

Per cent per year

	Output growth	Productivity growth	Employment growth	Implication of barrier removal
<b>Status quo scenario</b>	5	5	0	Dairy farming will reach only 1.2% of US productivity levels by 2010
<b>Scenario after removal of external barriers</b>	8	8	0	
<b>Rationale</b>	<ul style="list-style-type: none"> <li>• 5% output growth continues recent trend</li> <li>• 8% output growth over 10 years takes India to the current Brazilian level of per capita production</li> </ul>	<ul style="list-style-type: none"> <li>• While number of animals per capita declines slowly, output growth reflects productivity growth</li> <li>• Once higher yielding animals become widespread (better genetics, diet &amp; management) productivity will rise, leading to output growth</li> </ul>	<ul style="list-style-type: none"> <li>• Hours remain constant at current trends</li> <li>• Hours per kg of milk produced fall as yield per animal increases but herd sizes remain the same, so employment remains constant</li> </ul>	

### DAIRY FARMING IN BRAZIL AND INDONESIA COMPARED TO INDIA



\* Adjusted for higher total solids content of buffalo milk

Source: Thailand Yearbook, 1997; Basic Animal Husbandry Statistics 1999, Department of Animal Husbandry and Dairying

### POLICY RECOMMENDATIONS

■ Most important

External Barrier	Recommendation
<ul style="list-style-type: none"> <li>Lack of marketing channels</li> <li>Lack of extension services</li> <li>Poor governance of cooperatives</li> </ul>	<ul style="list-style-type: none"> <li>Repeat MMPO licensing regime in milk processing sector – allow new private and cooperative plant entry</li> <li>Provide effective extension services through universities and Animal Husbandry Department.</li> <li>Encourage setting up of DCS on "Anand" pattern (without state ownership)</li> </ul>
<ul style="list-style-type: none"> <li>Limited access to capital</li> </ul>	<ul style="list-style-type: none"> <li>No action required (effect will decrease over time)</li> </ul>
<ul style="list-style-type: none"> <li>Differential rates of interests</li> </ul>	<ul style="list-style-type: none"> <li>Remove subsidies to farmers</li> </ul>
<ul style="list-style-type: none"> <li>Small average land holding</li> </ul>	<ul style="list-style-type: none"> <li>No action required in short run (see wheat case)</li> </ul>
<ul style="list-style-type: none"> <li>Low opportunity cost of rural labour</li> </ul>	<ul style="list-style-type: none"> <li>No action required (effect will decrease over time with job creation in the rest of the economy)</li> </ul>
<ul style="list-style-type: none"> <li>Import tariffs and excise duties on milking machinery</li> </ul>	<ul style="list-style-type: none"> <li>Reduce tariffs and duties</li> </ul>
<ul style="list-style-type: none"> <li>Factor costs</li> </ul>	<ul style="list-style-type: none"> <li>No sector specific action required (effect will decrease over time)</li> </ul>
<ul style="list-style-type: none"> <li>Consumer preference for buffalo milk</li> </ul>	<ul style="list-style-type: none"> <li>No action required (effect will decrease over time)</li> </ul>
<ul style="list-style-type: none"> <li>Climatic and environmental conditions</li> </ul>	<ul style="list-style-type: none"> <li>No action required (effect will decrease over time)</li> </ul>

**POLITICAL ECONOMY ISSUES RELATING TO RECOMMENDATIONS**

<b>Policy recommendations</b>	<b>Perceived losers</b>	<b>Losers' arguments</b>	<b>Counter arguments</b>	<b>Winners</b>
<ul style="list-style-type: none"> <li>Repeat MMPO licensing regime in milk processing sector</li> </ul>	<ul style="list-style-type: none"> <li>Incumbent processing plants</li> </ul>	<ul style="list-style-type: none"> <li>New plants will cherry pick, not investing in extension services</li> </ul>	<ul style="list-style-type: none"> <li>Where there is competition in procurement, extension services are best and yields are highest</li> </ul>	<ul style="list-style-type: none"> <li>Dairy farmers</li> <li>New entrants</li> </ul>
<ul style="list-style-type: none"> <li>Provide effective extension services through universities and Animal Husbandry Department.</li> <li>Encourage setting up of DCS on "Anand" pattern (without state ownership)</li> </ul>	<ul style="list-style-type: none"> <li>State government employees</li> <li>Milk traders</li> </ul>	<ul style="list-style-type: none"> <li>Need to influence milk procurement and retail prices</li> </ul>	<ul style="list-style-type: none"> <li>Farmers (and consumers) are better off under Anand pattern</li> </ul>	<ul style="list-style-type: none"> <li>Dairy farmers</li> </ul>
<ul style="list-style-type: none"> <li>Differential interest rates on loans</li> </ul>	<ul style="list-style-type: none"> <li>Part time farmers</li> </ul>	<ul style="list-style-type: none"> <li>Hinders entry of small new farmers</li> </ul>	<ul style="list-style-type: none"> <li>Part time rural farmer still has lowest per kg production cost</li> </ul>	<ul style="list-style-type: none"> <li>Commercial dairy farmers</li> </ul>
<ul style="list-style-type: none"> <li>Reduce tariffs and duties on milking machinery</li> </ul>	<ul style="list-style-type: none"> <li>Part time farmers</li> </ul>	<ul style="list-style-type: none"> <li>Takes employment away from rural farmers</li> </ul>	<ul style="list-style-type: none"> <li>At current labour ratios, mechanisation is not viable anyway</li> </ul>	<ul style="list-style-type: none"> <li>Commercial dairy farmers (in the future as labour rates rise)</li> </ul>

\* Government support is required as milk traders may use their influence (e.g. by acting as creditor to farmer) to prevent farmers forming a DCS, and farmers may not realize the benefits of doing so.

\*\* See dairy processing case

# Dairy Processing

## **SUMMARY**

The dairy processing sector in India has historically been small and relatively unproductive. In fact, only 14 per cent of the milk produced in the country is processed and the average productivity of the sector at 9 per cent of US levels. This is about 9 times below its potential, which is 79 per cent of US levels. There is, however, wide variation in the productivity of different categories of players. While the government plants perform at only 3 per cent of US levels, the cooperative plants and the registered private plants perform somewhat better at 15 per cent and 27 per cent of US levels respectively. In fact, some of the best practice private plants perform at 72 per cent of US levels.

The average productivity in the sector remains low because of a lack of pressure to improve. Competition is restricted and new entry and expansion of players are constrained by licensing conditions that ensure that new plants are not set up anywhere near the existing plants (i.e., in the milk shed area of the existing plant). This allows the incumbent plants a procurement monopoly in their milk shed (i.e., catchment) areas. Government support and subsidies to the cooperative and government-owned plants in the sector also help these players survive.

If the barriers to competition were removed and government support withdrawn, the sector would experience dramatic growth in output, productivity and employment. In fact, if these issues were addressed and the economy grew at 10 per cent per annum (which would happen if our recommended reforms are carried out), the registered sector's output could grow at as much as 20 per cent a year. Moreover, by 2010, 34 per cent of the milk produced in the country would be processed, as compared to the 14 per cent today. Productivity in the registered sector would grow at 11 per cent a year, reaching 46 per cent of US levels by 2010 from an average of 16 per cent today. Employment in the sector would grow at 9 per cent a year and the sector would create 100,000 jobs over the next 10 years. Equally importantly, the upstream dairy-farming sector would experience a positive spill over effect: Competition among dairy processors would ensure better prices as well as better extension services for the dairy farmers.

## **Productivity performance**

Liquid milk processing in India is carried out at registered and small non-registered plants. There are three categories of registered plants: cooperative,

private and government-owned plants. Productivity in the registered sector is at 16 per cent of US levels and is growing at 7 per cent a year. Despite a high output growth, the registered sector only procures 12 per cent of the total raw milk produced in India. Although within the sector private plants are twice as productive as cooperative-owned plants, which, in turn, are five times as productive as government-owned plants, all the categories perform well below potential. The productivity potential of the sector is 46 per cent of US levels. Non-registered plants have the lowest productivity in the industry: a mere 1 per cent of US levels.

### **Operational reasons for low productivity**

Overstaffing is the main reason for the gap between the productivity of government-owned (at 3 per cent of US levels) and cooperative plants (at 15 per cent of US levels). Excess workers in the cooperative plants and the tendency to employ more labour for extension services and other non-plant functions are responsible for the gap in productivity between cooperatives and private plants (at 27 per cent of US levels).

The gap between the current productivity of the average private plant and the potential of the industry (79 per cent of US levels) is present because of a variety of reasons: low capacity utilisation; poor organisation of functions and tasks (OFT) within the plant; and inadequate investment in viable automation.

### **Industry dynamics.**

A key characteristic of the sector is the lack of competitive pressure that would compel milk processors to improve their productivity levels. In fact, not only is the domestic competitive intensity in liquid milk procurement low in most areas, exposure to best practice competition is also limited. The domestic competitive intensity is low because most plants typically exercise a monopoly over local procurement and there is little price-based competition in the market on the retail side. And exposure to best practice competition is limited because the Milk and Milk Products Order (MMPO) restricts new entry. Over and above this, there are also some elements of a non-level playing field that exist between the cooperative/government plants and private plants in terms of financial support and managerial constraints.

### **External factors responsible for low productivity**

One of the most significant reasons for the continuing low productivity of this sector is poor governance. Owing to state interference, driven by the compulsion to place societal goals before economic ones, the sector is overstaffed. The subsidies enjoyed by the government and some cooperative plants allow this situation to persist. Two other hindrances to productivity growth are the way the MMPO has been used to discourage the entry of new cooperative and private

plants and the legacy left behind by previously passed labour laws and unionisation.

### **Industry outlook**

Removing these external barriers could lead to a productivity growth of 11 per cent a year, which would translate into an output growth of 20 per cent and employment growth of 9 per cent a year. This would, in turn, ensure that by 2010, 34 per cent of the milk produced in the country would be processed. An increase in the demand for processed milk will occur as the result of more raw milk being produced (*see* Volume 2, Chapter 1: Dairy Farming), lower prices (through productivity improvements) and a larger urban population. At this level of productivity growth, the registered sector will reach 46 per cent of US productivity levels by 2010 and create over 100,000 new jobs, more than doubling the current figure.

### **Policy recommendations.**

Productivity in the registered sector has been growing rapidly as a result of improved capacity utilisation and the entry of some new players. This has decreased the part that a legacy of labour laws, union powers and the licensing scheme had so far been playing. This has, in turn, decreased their contribution to the continuance of poor OFT in small-scale plants.

Nevertheless, large gains could still be made if competition were to increase. Based on our assessment of the current barriers to productivity growth, we recommend the following: Remove all remaining subsidies to cooperative and government-owned plants; prevent the MMPO from being a barrier to new entrants; encourage the growth of modern food retail formats.

- ¶ **Remove all remaining subsidies to cooperative and government-owned plants:** All subsidies to government and cooperative-owned plants that still remain should be removed. Also, state ownership and influence over these plants should be entirely removed by corporatising them. This will lead to an improvement in the way they will be governed.
- ¶ **Prevent the MMPO from being a barrier to new entrants:** Another key recommendation is that the MMPO should be stopped from barring the entry of new players. The entry of private plants will lead to greater competition and the introduction of new technologies. While this may initially be at the expense of the existing plants, two groups will benefit: local farmers, who will receive higher prices for their milk, and consumers, who will benefit from the lower prices that will be a result of productivity improvements.
- ¶ **Encourage the growth of modern retail formats:** Penetration of modern retail formats (e.g., supermarket chains) leads to increased

consumption of processed milk. Since large retail chains tend to purchase only from modern, large-scale processing plants, this will lead to an increase in competitive intensity in the processing sector.

# Dairy Processing

Dairy processing is important from this study's perspective for two reasons: It is one of the more important sectors of the economy because of its strong growth potential; and it helps us understand the food-processing sector as a whole. The food processing sector is of course critical both because it is a large sector of the economy in most countries and because it provides a marketing outlet to rural producers.

Dairy processing and the manufacture of milk products currently constitute 0.2 per cent of total output and 0.1 per cent of employment – approximately 238,000 employees or full-time equivalents (FTEs). Output has been growing at about 5 per cent a year since 1990 and is expected to grow still further since only 14 per cent of the raw milk produced is currently being processed (**Exhibit 5.1**).

The dairy-processing sector is particularly important since it highlights issues that are closely related to a certain part of the food-processing sector, i.e., products with short shelf lives such as fruits, vegetables, etc. In particular, given the short shelf life of milk and the consequential cold chain requirements, the dairy processing sector highlights the need for close inter-linkages between the farming, food processing and food retailing sectors.

For the purposes of this study our definition of dairy processing activity includes both liquid milk processing and the manufacture of all milk products, but excludes non-registered processing such as milk processing in homes and in small confectionery retailers such as *halwais*. This is consistent with the definition adopted by the National Accounts Statistics for measuring output and employment in the sector. We have used the data from the National Accounts Statistics for the whole industry. More detailed data for the registered dairy-processing sector has been taken from the Annual Survey of Industries (ASI). We also confirmed the aggregate data from a large number of plant visits.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity

- ¶ Industry outlook
- ¶ Policy recommendations.

## INDUSTRY OVERVIEW

Dairy processing can be divided into the registered and non-registered (commonly known as the organised and unorganised) sectors. The registered sector can be further subdivided into three sub-categories – government-owned, cooperative-owned and private. It accounts for 33 per cent of employment and approximately 85 per cent of processed milk: 26 million litres of milk is processed in the registered sector while only 5 million litres is processed in the non-registered sector.

The annual output growth of the registered sector at 12 per cent over the past 10 years has been high. Further, the accompanying annual employment growth of 5 per cent has also been encouraging. Output in the non-registered milk processing industry has been more or less constant.

Despite high output growth, the registered sector processes only 12 per cent of the raw milk that is produced. It has a capacity of nearly 50 million litres per day, but on average utilisation reaches a mere 50 per cent of that. The potential that needs to be realised, then, is incredibly large.

## PRODUCTIVITY PERFORMANCE

Although productivity growth in the registered sector of has been rapid at 7 per cent, labour productivity in Indian dairy processing is estimated at only 9 per cent of US levels: While total value added is around 37 per cent of that of the US, the total number of hours worked in India is four times as high. Productivity is estimated to be growing moderately at 4 per cent a year on average (**Exhibit 5.2**). This is because labour productivity in the sector is adversely affected by the dismal performance of government-owned plants.

Dairy processing is carried out at two kinds of locations – registered and non-registered plants. Productivity in the registered sector is higher and growing faster than productivity in the non-registered sector. The different categories of players are:

- ¶ **Registered plants:** The registered sector has a productivity that is 16 per cent of US levels and employs about 33 per cent of the labour employed in the dairy processing sector (**Exhibit 5.3**). Productivity in the registered sector has been growing relatively fast at 7 per cent per year (**Exhibit 5.4**). The registered sector comprises three sub-segments – private plants,

cooperative plants and government-owned plants. Significant variation in productivity exists across these sub-segments, with private plants being the most productive and government plants the most unproductive.

- **Privately-owned plants:** These plants have a productivity that is 27 per cent of US levels (and a total capacity of 19 million litres a day, although up to half of this is lying unused). Private plants employ around 8 per cent of the labour employed in the dairy processing sector and 30 per cent of all the milk processed is done so by these plants.
  - **Cooperative-owned plants:** These plants have a productivity that is 15 per cent of US levels (and a total capacity of 33 million litres per day). Cooperatives employ 19 per cent of the labour employed in the dairy processing sector and process 45 per cent of all the milk processed in the sector.
  - **Government-owned plants:** These plants have a productivity that is 3 per cent of US levels (and a total capacity of around 6 million litres per day). They employ around 6 per cent of the labour employed in the dairy processing sector and process a meagre 3 per cent of the milk processed.
- ¶ **Non-registered plants:** These plants are the many thousands of units that employ fewer than 20 people (or 10 people if the plant is mechanised) and process less than 10, 000 litres of raw milk per day. These units have a productivity that is only 1 per cent of the US. Around 65 per cent of all labour is employed in this segment.

The focus of our study is on the registered sector, which makes up over 85 per cent of output and over 30 per cent of employment in the dairy processing industry. Data is more readily available for the registered sector and, it is here, primarily, that future output growth is anticipated.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

As we said before, the productivity of the registered sector is 16 per cent of the US. And we estimate that the potential productivity at current factor costs is as high as 79 per cent of the US. This section describes the operational reasons for the gap between current productivity and its potential. It is divided into three sub-sections. First, we discuss the reasons for the gap between the government and cooperative plants, and the average private plant. Then, we discuss the reasons for the difference between the average private plant and the best practice private plants. Finally, we look at the difference in productivity between the best practice Indian private plant and the average US plant.

### **Difference in productivity between government and cooperative plants and average private plants**

There is a sizeable difference between the productivity of government plants at 3 per cent and the average cooperative plant, which is as much as five times that. However, both of these lag behind the productivity of the average private plant, which is 27 per cent. These differences are a product of the fact that there are a large number of excess workers in the government and average cooperative plants (**Exhibit 5.5**).

Moreover, cooperative and government plants tend to have greater involvement and, consequently, a higher share of employment in collection and extension activity (helping farmers with yield improvements, animal health related information) than do private plants. This is because all cooperatives collect their milk from the village level, unlike most private plants who get the farmers to deliver it to them. The plants that collect milk from the village level often employ field workers to supervise collection activities and transfer knowledge (about feed, breed, yield improvement, etc.) to farmers.

### **Difference in productivity between average and best practice private plants**

A large gap still exists between the average private plant (productivity of 27) and the best practice private plants (productivity of 72). The fact that several private plants in India are already operating at a productivity of 72 versus an average of 27 illustrates that large productivity increases are possible. The gap results from a combination of five factors: poor management of seasonal variation in milk procurement, low capacity utilisation, poor organisation of functions and tasks (OFT), lack of a network of chilling centres and inadequate investment in viable automation.

- ¶ **Poor management of seasonal variation:** The average private plant experiences higher seasonal variation in milk procurement than the best practice plant.

Most average private plants, in order to compensate for the shortfall of purchased raw milk in the lean season (i.e., the summer), reconstitute liquid milk from milk powder and fat. This means that labour is employed in the summer to process inputs that had already been processed when first procured in the flush season (**Exhibit 5.6**). However, average productivity is only likely to increase once all the liquid milk leaves the plant on the day it was processed, and labour can, as a consequence, be reduced in the lean summer months.

Best practice plants do two things differently. They actually reduce their output during the lean months if raw milk is not available. In so doing they also reduce their variable labour requirement. Second, they pay farmers higher prices for the raw milk they do need to procure in the lean season. As a result, the fixed labour (labour employed in unloading liquid milk) is better utilised, thereby raising the productivity of the plant (**Exhibit 5.7**).

- ¶ **Low capacity utilisation in the flush season:** In many plants, capacity utilisation, even in the flush season (October-March), is lower than the US average capacity utilisation (even after accounting for the fact that many licenses granted for private capacity are no longer in use and adjusting the figures accordingly). On average it is 69 per cent, whereas in the US it is 77 per cent. Raising utilisation to US levels would require a less than proportionate increase in labour, thereby resulting in a productivity gain.
- ¶ **Poor organisation of functions and tasks:** A large proportion of the difference between the average and best practice plants we visited can be explained by poor OFT (**Exhibit 5.8**). There is little multi-tasking by individuals, poor scheduling of cleaning activities and significant idle time due to bottlenecks in the process (e.g., while unloading milk). Part of this is caused by formal structures in unionised workforces (rigid union rules that do not allow multi-tasking), and part of it by the fact that relatively little attention is paid to reducing labour costs as they are typically a small component of total cost. Incentive based pay structures are rarely used. These structures could cut total labour costs by reducing hours while raising the average hourly wage rate.
- ¶ **Lack of a network of chilling centres:** In India, milk is collected from hundreds of farmers in several different villages. Since this milk is perishable, the plant needs several chilling centres in multiple locations. And since these chilling centres need to be staffed, labour productivity goes down. In the best practice private plant we visited, the plant-chilling unit was located in a milk shed where milk density was high. The plant could, therefore, operate at a reasonable level of capacity utilisation by sourcing from a network of intermediaries, avoiding the need to create chilling centres. In the US, milk is collected directly by the farmer in bulk chilling units at the farm (**Exhibit 5.9**), thus making additional labour superfluous.
- ¶ **Absence of viable automation:** The average private plants in India are now quite old and therefore do not have state-of-the-art modern technology and all the latest, automated, labour saving devices and machinery that best practice plants are now employing. Examples of these new technologies include electronic sequencing systems which

replace the older manual valve controls and “clean-in-place” maintenance systems which replace older systems that need to be dismantled to be cleaned (**Exhibit 5.10**). This results in a productivity penalty of as much as 8 percentage points.

### **Difference in productivity between best practice Indian and average US plants**

The remaining gap in productivity (between best practice at 72 and the US average of 100) can be explained by the fact that automation is not viable in the sector because labour costs in India are low, and also because some of the functions and tasks are poorly organised even in best practise plants. Instances where automation is unviable are: can unloading, automated packing and the automated stacking of packaged products.

Milk products manufacture is less productive in India than the US because there is less branding, relatively less automation than in liquid milk processing and fewer specialised plants (in India, most plants are combined liquid milk and products plants). The productivity gap characterised in our main analysis is the difference between liquid milk processing in India and in the US. However, in the US, dairy products manufacture is 33 per cent more productive than liquid milk manufacture. In India, our estimates suggest that there is little productivity difference between liquid milk and products manufacture. Thus, if we were to compare the productivity of all dairy products manufacture in India and the US, the productivity gap would be even larger than it is for liquid milk processing (**Exhibit 5.11**).

Some of the larger Indian plants can and do achieve productivity levels higher than those of the average US plant. This is because these plants are larger than the average US plant and, therefore, have advantages of scale over the average US plant. In fact, Indian plants that have a processing capacity of more than 500,000 litres per day can achieve as much as 150 per cent of US average productivity levels (**Exhibit 5.12**).

## **INDUSTRY DYNAMICS**

Productivity levels have remained low in the sector because competitive pressure, which typically drives players to improve productivity, has been limited. There is low domestic competitive intensity in liquid milk processing, limited exposure to best practice competition and some elements of a non-level playing field hindering the relative growth of the more productive private plants.

### **Low domestic competitive intensity**

Low domestic competitive intensity exists because many plants typically have a local procurement monopoly and there is little price-based competition in the market on the retail side.

The licensing regime ensures that new plants are not established close to existing plants (i.e., in the milk shed area of the existing plant). As it is not feasible for farmers to supply to plants located geographically far away from them, the local incumbent effectively has a procurement monopoly.

Similarly, the retail price in the local market is more or less determined by the local cooperative. Since many cooperatives operate under a mandate of providing reasonably priced milk to urban consumers (and receive some financial support from government agencies) they are not necessarily profit maximising when setting the price level. Registered processors do, however, face competition from non-registered processors and traders of raw milk.

### **Limited exposure to best practice**

The rate of exposure to best practice competition is slow, as new entry is restricted. Requests for licenses to set up new capacity and requests to expand capacity in existing dense milk-shed areas are regularly turned down. This automatically ensures that the existing plants do not get exposed to best practice competition and therefore do not face the pressure to improve. New plants, if allowed, would invest in best practice automation and would have a lean labour force. They would, therefore, be able to achieve higher productivity levels than the average plant.

### **Lack of a level playing field**

Another factor affecting the level of competition is the existence of the non-level playing field that exists between government/cooperative plants and private plants in terms of financial support and managerial constraints. The cash losses of government plants are subsidised/compensated for so that they can continue to meet their societal objectives – create jobs and supply reasonably priced milk. This direct subsidy is often equivalent to as much or more than 50 per cent of the value-added in the government milk plants (**Exhibit 5.13**).

Cooperative plants have, in the past, received large subsidies from state governments via the National Dairy Development Board (NDDB), in the form of grants and soft loans. The subsidies have now decreased substantially, as assets are almost fully depreciated and the state governments are increasingly short of cash.

## EXTERNAL BARRIERS RESPONSIBLE FOR LOW PRODUCTIVITY

In this section we discuss the external barriers that constrain productivity growth at the operation level, either directly or by distorting industry structure (**Exhibits 5.14-5.16**).

¶ **Poor governance of government and cooperative plants:** Government and cooperative plants work under a mandate to prioritise their societal goals above their economic ones and are prone to government interference in their operations. This adversely affects the quality of governance in these plants and leads to overstaffing (**Exhibit 5.17**) and price setting in milk procurement and retailing. Members of state governments often view these plants as employment generators and compel them to add workers even when they are overstaffed. Over a period of time, the number of employees burgeons and productivity drops dramatically.

It is important to note, however, that some state cooperative plants, which do not have excess workers, have achieved productivity levels close to those of the best practice private plants. These plants, notably those in the Gujarat and Punjab Milk Marketing Federations, have, however, not been troubled by state interference.

¶ **Interpretation of MMPO and existence of political lobbying:** Under the MMPO, governments have the power to issue milk-processing licenses. Although these licensing provisions were originally designed to ensure high levels of quality and hygiene in the industry, they are now being used to limit the entry of new cooperatives as well as private plants into milk shed areas. This is done by granting licenses based on the government's calculation of what the difference between the sizes of the "marketable milk surplus" in any area is, while keeping in mind the processing capacity that is already installed. This helps reduce the competitive pressure on incumbents and allows obsolete, sub-scale and inefficient players to survive.

¶ **Seasonal variation in milk production:** This seasonal variation is mainly due to the large proportion of buffaloes in the milch animal population. An additional reason for this variation is the fact that many processors, especially cooperatives, do not necessarily pay farmers high enough prices during the lean season, thereby reducing the incentive to increase production in the lean months. This compels many plants to undertake milk reconstitution activity and leads also to low capacity utilisation in the lean season. The variation in milk production is, however, decreasing as animal husbandry improves and the proportion of cows relative to buffaloes increases.

- ¶ **Fragmented upstream dairy farming:** The dairy-farming sector in India is very fragmented. Small rural dairy farmers, who own 1-3 cows, account for the bulk of milk production. This situation is likely to persist, as these farmers are more cost competitive than larger farmers in urban areas (*see* Volume 2, Chapter 1: Dairy Farming). The fragmented nature of dairy farming is, however, a significant barrier to productivity in the dairy processing sector as it limits the scale of dairy processing plants unless they are able to set up a network of chilling centres in their catchment area.
- ¶ **The legacy of the old licensing scheme:** This barrier is of medium significance to productivity growth. Currently, there are many sub-scale plants in low milk density areas that were awarded licenses in the old regime. Their low productivity leads to low capacity utilisation even in the flush season, and also to small scale.
- ¶ **Barriers to output growth in the registered sector:** These barriers limit output and, hence, limit the rate at which productivity can improve through higher utilisation of existing capacity and creation of new, more productive units. They include labour laws and unionisation in the registered sector (which also result in poor OFT) and higher taxes than those in the non-registered sector. Import tariffs on powdered milk also limit output growth by raising the cost of reconstitution from imported powder when domestic production of liquid milk falls. Finally, and importantly, the low penetration of large modern food retail formats (e.g., supermarkets) decreases the consumption of processed milk and, therefore, the output of the registered sector.

## INDUSTRY OUTLOOK

In order to evaluate the outlook for output, productivity and employment we considered two possible future scenarios for the sector's development: status quo; and reforms in all sectors (**Exhibit 5.18**).

- ¶ **Status quo:** Under this scenario, we found that productivity would continue to grow at 7 per cent a year driven by improved capacity utilisation and gradual improvement in OFT as new plants were set up. This would correspond to the continued output growth of 12 per cent a year and employment growth of 5 per cent a year.
- ¶ **Reforms in all sectors:** Under this scenario, we found that productivity could reach 79 per cent of US levels over the next 15 years. This is equivalent to an average productivity growth of 11 per cent a year. By

2010, India would have reached 46 per cent of current US productivity levels.

If this were so, output growth could increase to as much as 20 per cent a year. On the demand side, higher GDP per capita would lead to higher milk demand as it is an income elastic good at India's current income levels. Out of this increased demand for milk, the demand for processed milk would be proportionately greater because its prices would fall in comparison to raw milk as productivity in processing increased. In addition, the share of the urban population would continue to grow and urban dwellers demand processed milk. On the supply side, the increased demand would be met by higher throughput in existing capacity and the more rapid installation of new capacity.

This implies a rate of employment growth of 9 per cent a year. As a result, then, by 2010, over 100,000 new jobs would have been created in the registered sector, more than doubling current levels of employment.

## **POLICY IMPLICATIONS**

Current productivity growth in the registered sector is due to increased capacity utilisation and a small number of new, large plants (larger scale and improved automation) that have been installed, but there are still enormous gains to be made if competition were to increase. Indeed, at current factor costs, liquid milk plants have a potential productivity of 79 per cent of average US levels.

The three most important policy recommendations, then, are: first, to remove all remaining subsidies to cooperative and government-owned plants; second, to limit the power of the MMPO to prevent new plant entry; and, third, to encourage the growth of modern food retail formats (**Exhibits 5.19 and 5.20**).

- ¶ **Remove all remaining subsidies to cooperative and government-owned plants:** State governments should remove all remaining subsidies to government-owned and cooperative plants. Governance in government plants can be improved by corporatising the plants (as a first step towards transferring them to cooperative or private ownership). Corporate governance in cooperative plants will improve as more cooperative federations adopt the "Anand pattern", as recommended by the NDDB and the World Bank under Operation Flood II and III. For this to happen state governments must relinquish ownership and all influence over plant activities. Governance of cooperatives will further improve if the Cooperative Act is revised to allow managers more discretion and autonomy in decision making on behalf of cooperative members. The effect of these changes will be that cooperatives will have more pricing,

procurement and marketing flexibility and be able to retrench surplus employees. This will, in turn, result in ensuring that the dairy processing industry will include only the competitive and productive plants of the private and cooperative sector.

- ¶ **Limit the power of the MMPO to prevent new plant entry:** One way to facilitate the entry of new players is to restrict the ability of the MMPO to deny licensing requests based on milk marketing surplus in any milk shed. Licenses should only require a minimum standard of quality and hygiene. New entrants will increase competition and productivity in all areas and should be permitted entry, even at the eventual expense of the incumbent plant. Increased competition will benefit both the local farmers (who will receive higher prices for milk) and the consumers to whom productivity improvements will be passed on through lower milk retail prices. One reason for this is that the MMPO board, rather than comprising private, government and other representatives, has become part of the Department of Animal Husbandry and Dairying.

New entry was critical in promoting productivity growth both in the US and in Brazil. In the US, productivity growth during the 1940s to 1970s was driven by new technologies, which rapidly made existing plants obsolete. In Brazil, recent productivity growth has been led by the entry of best practice international dairy processors. These companies are building plants that comply with stringent quality regulations, capturing market share from low quality, unproductive and small-scale plants. In both the US and Brazil, the development of large scale retailers led to a demand for large scale plants which could fulfil large orders.

- ¶ **Encourage the growth of modern retail formats:** Penetration of modern retail formats (e.g., supermarket chains) leads to increased consumption of processed milk. Since large retail chains tend to purchase only from modern, large-scale processing plants, the competitive intensity will increase in the processing sector. (For detailed discussion and recommendations on how to spur the growth of modern retail formats, *see* Volume 3, Chapter 3: Retail.)

Encouraging output growth in the dairy processing sector, by improving capacity utilisation and eventually allowing new entrants, will increase the rate of productivity growth. Output growth can be aided by ensuring equal tax treatment of products in the registered and non-registered sectors. This will effectively mean removing sales tax from all dairy products. Another way of increasing output growth is to promote larger scale in retail, which will lead to new demand for bulk purchases.

## Appendix 5A: Calculating labour productivity

In order to calculate the productivity performance of the dairy-processing sector, we first defined the measure of productivity to be used. Second, we presented the overall and format specific productivity achieved.

The definition of labour productivity is US dollars value added per labour hour worked. We took value added in rupee terms for the registered sector as the value of output minus the cost of inputs (including utilities), as given in the Annual Survey of Industries. We then converted the value of output to US dollars using a wholesale milk price exchange rate and, similarly, the cost of inputs to US dollars, using a farm gate milk price exchange rate.

We computed labour hours in the registered sector as the total number of persons engaged in dairy processing activity multiplied by the estimated number of working hours a day (8) and working days per year (250).

The productivity of the dairy processing sector at the aggregate level was estimated from output and employment figures in the national accounts. The productivity of the non-registered sector was then estimated by subtracting registered sector output and employment from the total.

Value added per labour hour worked in the registered sector has been calculated as follows:

### **Value added**

The value of inputs to dairy processing has been converted to dollars using a PPP exchange rate based on raw milk prices. The value of output of dairy processing has been converted to dollars using a PPP exchange rate based on wholesale, pasteurised milk prices. Value added has been calculated by subtracting the dollar value of input from the dollar value of output.

Value of input	Rs.10, 731 crore
Raw milk PPP	Rs.7.12 per litre of whole fat cow milk in India US\$ 0.29 per litre of whole fat cow milk in the US Rs.24.21: \$ is the PPP adjusted raw milk exchange rate
	\$6399.3 million is the PPP adjusted value of inputs
Value of output	Rs.12, 279 crore

Wholesale milk PPP	Rs.11.6 per litre of pasteurised, toned milk in India \$0.60 per litre of pasteurised toned milk in the US Rs.19.19 per \$ is the PPP adjusted wholesale milk exchange rate
	US\$ 4431.8 million is the PPP adjusted value of output
Value added	US\$1967.5 million is the double deflated PPP adjusted value added figure in dollars for the Indian dairy processing industry

*Sources: CMIE, Financial Aggregates and Ratios, p.339; FAO website; interviews; CMIE price indices; Dairy Yearbook, USDA.*

### **Labour hours**

The number of man days worked by employees has been multiplied by 8 to calculate the total number of hours. For the remaining persons engaged, who are not employees, their yearly working hours have been estimated at 8 hours per day for 250 days per year.

Total persons engaged	80, 207
Employees	80, 082
Man days worked by employees ('000)	28, 943
Hours worked per man day (estimate)	8
Hours worked by employees ('000)	231, 544
Persons engaged who were not employees	125
Hours worked per year (estimate) (250 x 8)	
Hours worked for non-employees ('000)	250
Total hours worked ('000)	231, 794
Value added per hour	US\$ 8.49

*Source: CMIE Financial Aggregates and Ratios, p. 339.*

### **US labour productivity in liquid milk processing (1997)**

Value added	\$6,311 million
Employment	58,220
Hours worked per year (250 x 8)	
Total hours worked ('000)	116,434
Value added per hour	\$54.21

*Source: US Census Bureau, fluid milk manufacturing, p.7.*

**Indian dairy processing as a percentage of US liquid milk processing:  
15.66 per cent**

### DAIRY PROCESSING AS A SHARE OF GDP, EMPLOYMENT, AND OF RAW MILK PRODUCED

Percent

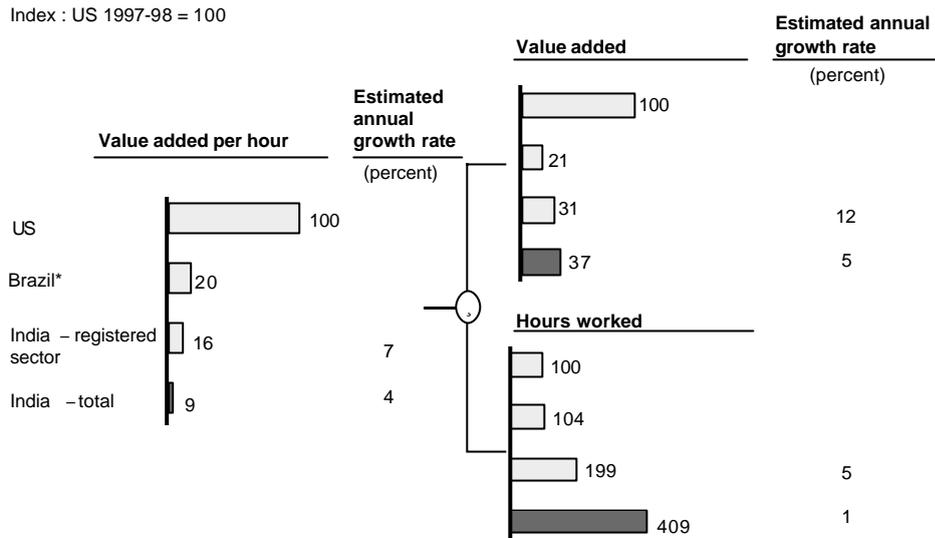


Source: National Accounts Statistics, 1999 CSO; NASS; USDA; WEFA; Dairy India, Fifth Edition, 1999; Interviews

Exhibit 5.2  
**LABOUR PRODUCTIVITY, 1997-98**

2001-07-11MB-ZXJ151(RD)

Index : US 1997-98 = 100



\* 1995 data, assumes hours worked per employee is equal to food processing industry average.

Source: ASI data, 1997-98; WIM; MIT Industrial Performance Center; New Series of National Accounts Statistics, CSO; Team analysis; FAO commodity price data; National Agricultural Statistical Services, CMIE commodity price index; MGI reports

Exhibit 5.3

2001-07-11MB-ZXJ151(RD)

**DAIRY PROCESSING SEGMENTATION**

Segment	Liquid milk input per day, 1999 Million litres	Value added* 1997-98 Rs crore	Employment 1997-98 FTEs, '000	Productivity 1997-98 Rs/hr	Productivity 1997-98 % of US	Productivity trend
Registered sector	Private plants	10.7	644	19.6	114	↑
	Cooperative	14.0	844	45.6	64	↑
	Government plants	1.0	60	15.0	14	↔
	<b>Total registered sector</b>	<b>25.7</b>	<b>1,548</b>	<b>80.2</b>	<b>67</b>	<b>16</b>
Non-registered processing units**	5.5	308	157.8	5	1	↔
<b>Grand total</b>	<b>31.2</b>	<b>1,856</b>	<b>238.0</b>	<b>39</b>	<b>9</b>	↑

\* Assuming value added is proportional to throughput by segment on average

\*\* Small milk processors of less than 10,000 lpd capacity

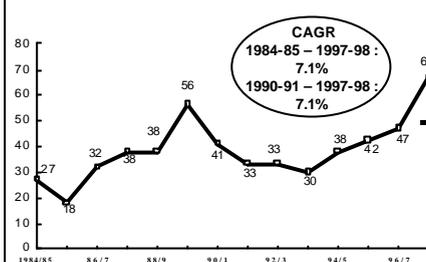
Source: ASI data, 1997-98; New Series of National Accounts Statistics, CSO; Team analysis

## PRODUCTIVITY GROWTH IN THE REGISTERED SECTOR

- Overall drivers**
- Value-added growth due to higher throughput
  - Employment growth is lower because average plant size is increasing
    - 3 new large plants (>75,000 lpd) built in last 3 years
    - Small plants closing down (e.g. 7 for sale in Delhi area)

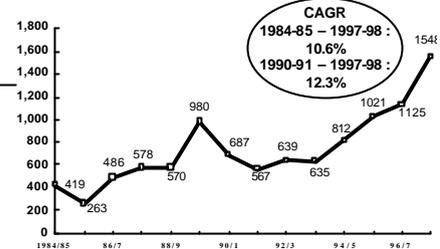
**Productivity, value added per hour**

Rs 1997-98 prices



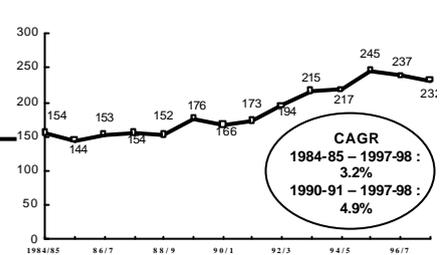
**Value added**

Rs crore, 1997-98 prices\*



**Hours worked**

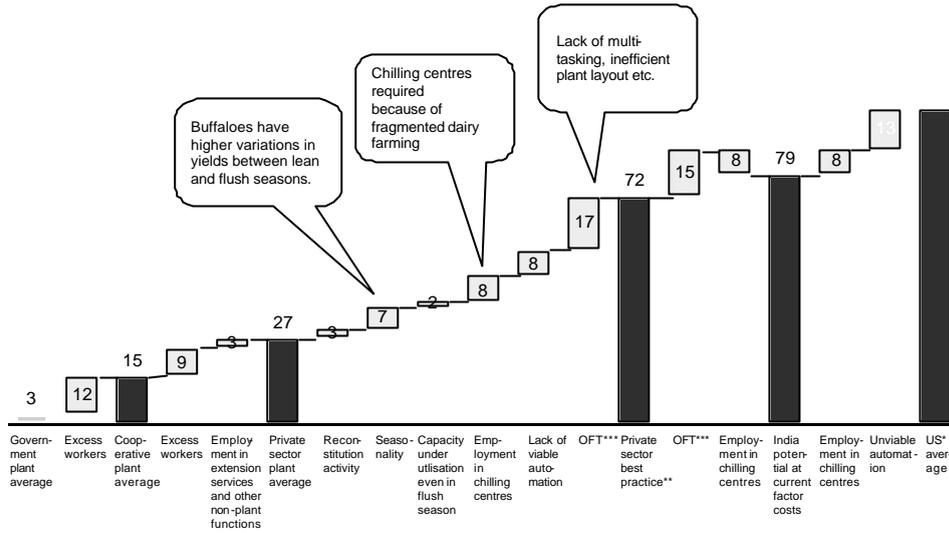
Million



\* Using CMIE dairy products annual deflator

Source: ASI data; Interviews

### OPERATIONAL FACTORS EXPLAINING THE PRODUCTIVITY GAP



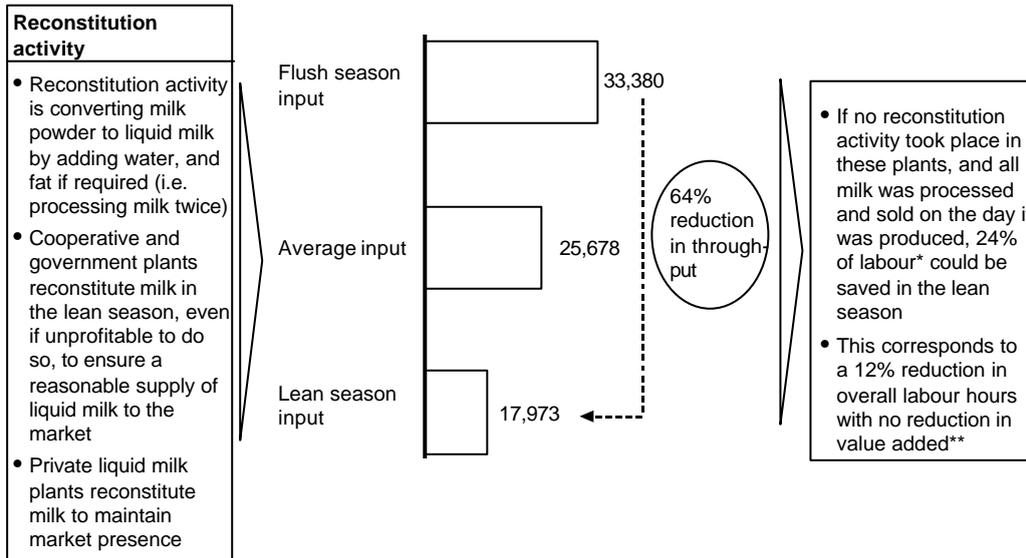
\* In average size liquid milk plants only

\*\* This particular plant had no chilling centres as was located in an exceptionally dense milk production area

\*\*\* Organisation of functions and tasks

Source: ASI data; Interviews; MGI Russia report; Department of Animal Husbandry and Dairying data; Team analysis

### PRODUCTIVITY PENALTY IN COOPERATIVE AND GOVERNMENT PLANTS DUE TO MILK RECONSTITUTION IN FLUSH SEASON l/day



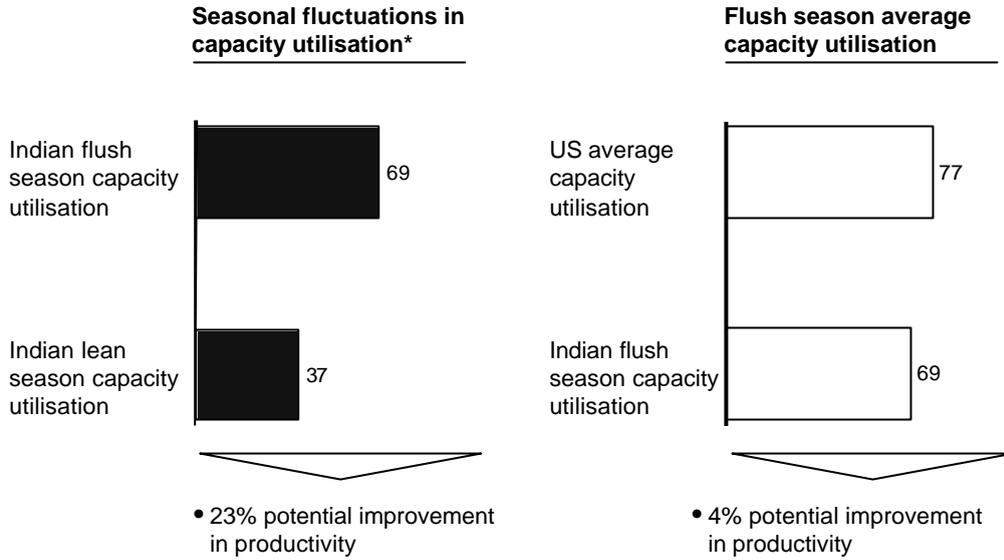
\* Since 37% of labour is variable

\*\* Assuming there is no demand constraint for liquid milk in the flush season

Source: Interviews

### PRODUCTIVITY IMPROVEMENT POTENTIAL FROM IMPROVED CAPACITY UTILISATION

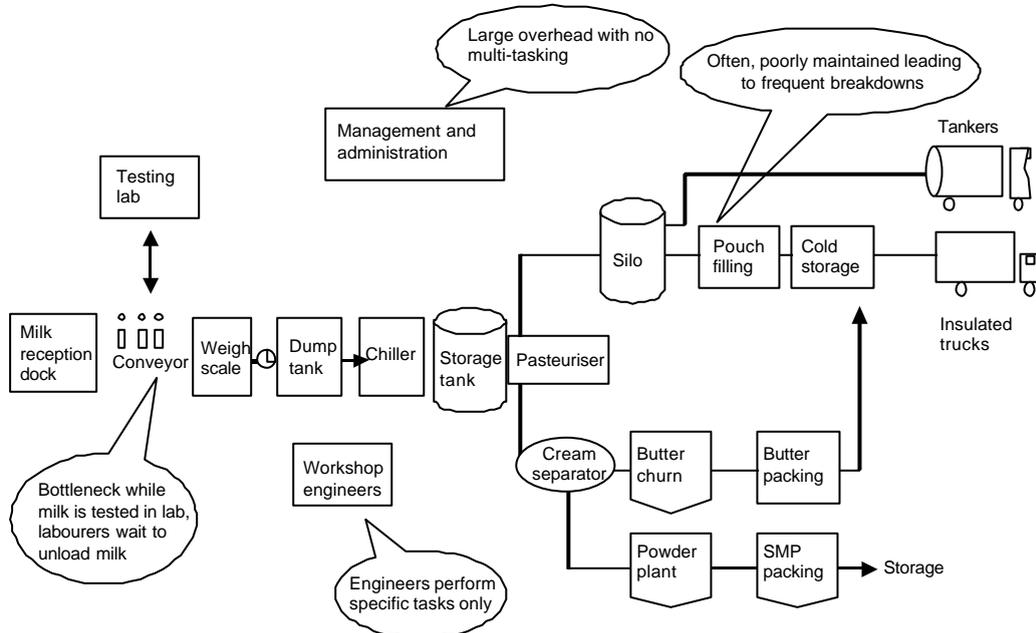
Percent



\* Adjusts for the fact that only 50% of registered private sector capacity is operational

Source: Department of Animal Husbandry data; interviews; MGI Russia report

### TYPICAL MILK PLANT\* LAYOUT AND EXAMPLES OF OFT\*\* PROBLEMS

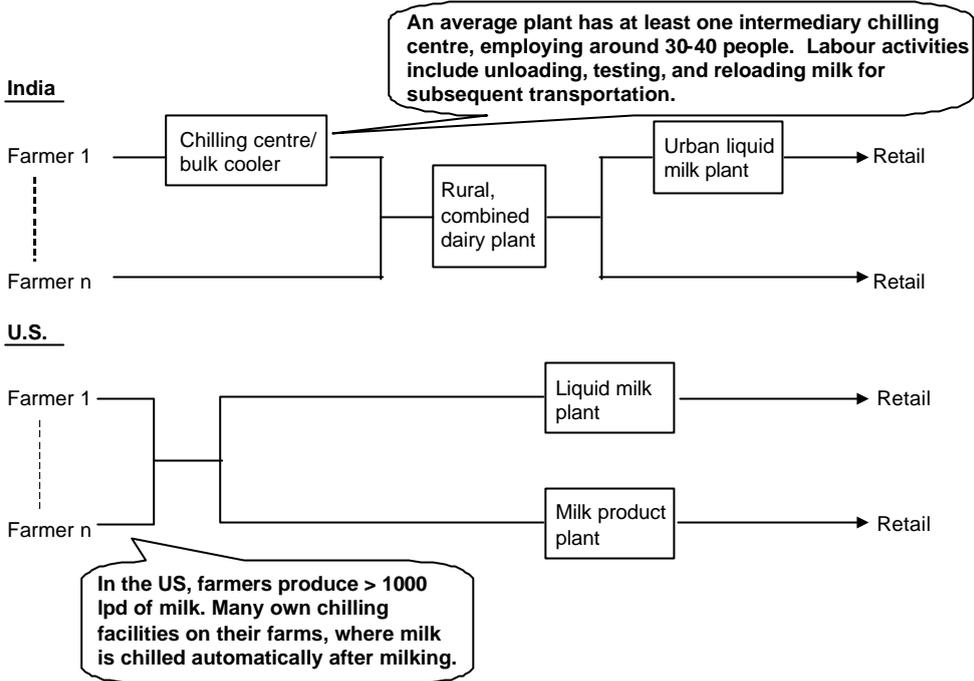


\* 100,000 lpd plant making toned milk, SMP, and butter

\*\* Organisation of functions and tasks

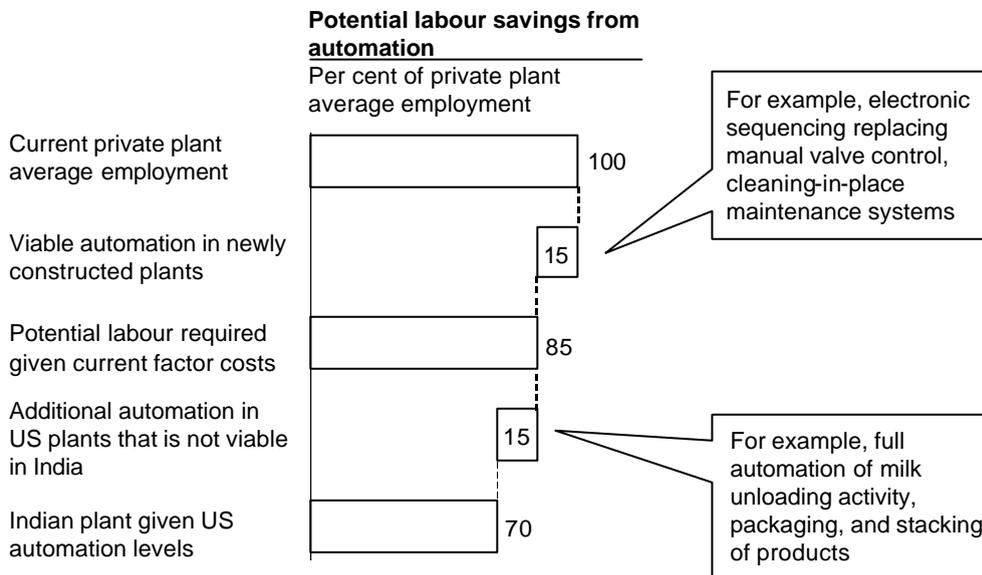
Source: Interviews

### THE NEED FOR CHILLING CENTRES



Source: Interviews

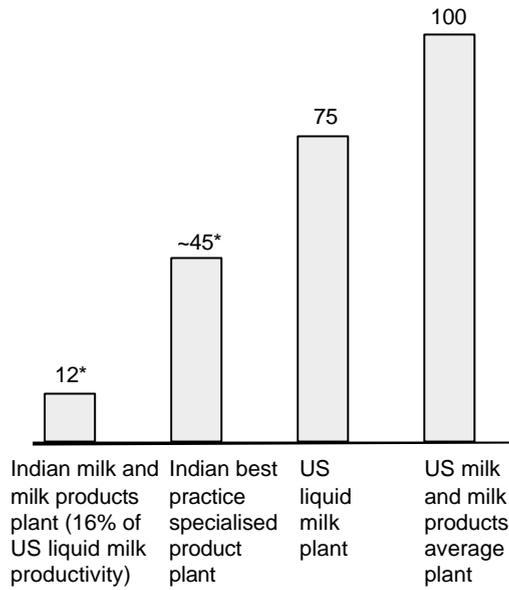
### PENALTIES CAUSED BY LOW LEVELS OF AUTOMATION



Source: Interviews

### RELATIVE PRODUCTIVITY OF MILK PRODUCTS MANUFACTURING

Index : US dairy products = 100



- Milk products manufacture in India is relatively less productive than in the US due to
  - Less branding (e.g. ghee is generally a commodity product)
  - Less automation (e.g. assembling boxes for packaged cheese by hand)
  - Fewer specialised plants in India – only a handful of product plants make only one product, there are many combined liquid milk and product plants)

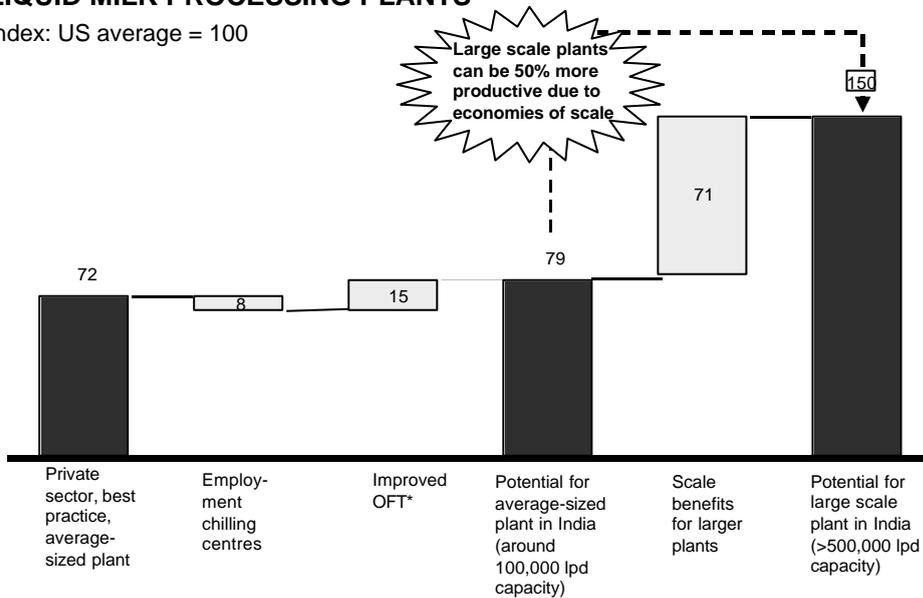
\* Estimates

Source: ASI data, 1997/98; Department of Animal Husbandry and Dairying data; Natural Agricultural Statistical Services, USDA; Interviews; Team analysis

### POTENTIAL PRODUCTIVITY LEVELS IN LARGE INDIAN LIQUID MILK PROCESSING PLANTS

BASED ON POINT ESTIMATES

Index: US average = 100



\* Organisation of functions and tasks

Source: Department of Animal Husbandry and Dairying data; ASI data; Interviews; MGI Russia report; US census report for Manufacturing Capacity Utilisation

**GOVERNMENT AND COOPERATIVE PLANT SUBSIDIES**ESTIMATES

	<u>Government plant subsidies</u>		<u>Cooperative plant government support</u>	
<b>Direct subsidies</b>	Value added per litre	Rs.1.50	Value added per litre	Rs.1.65
	Subsidy per litre	Rs.0.8	Subsidy per litre, 1971-97	Rs. 2.5
	Subsidy as a % of value added	53%	Subsidy as a % of value added, 1971-97	151%
			Current subsidy per litre	Rs. 0.0
<b>Hidden subsidies</b>	<ul style="list-style-type: none"> <li>• Land for plants and retail outlets</li> </ul>		<ul style="list-style-type: none"> <li>• Soft loans from NDDB, on which many federations are in arrears</li> <li>• Land for plants and retail outlets</li> </ul>	

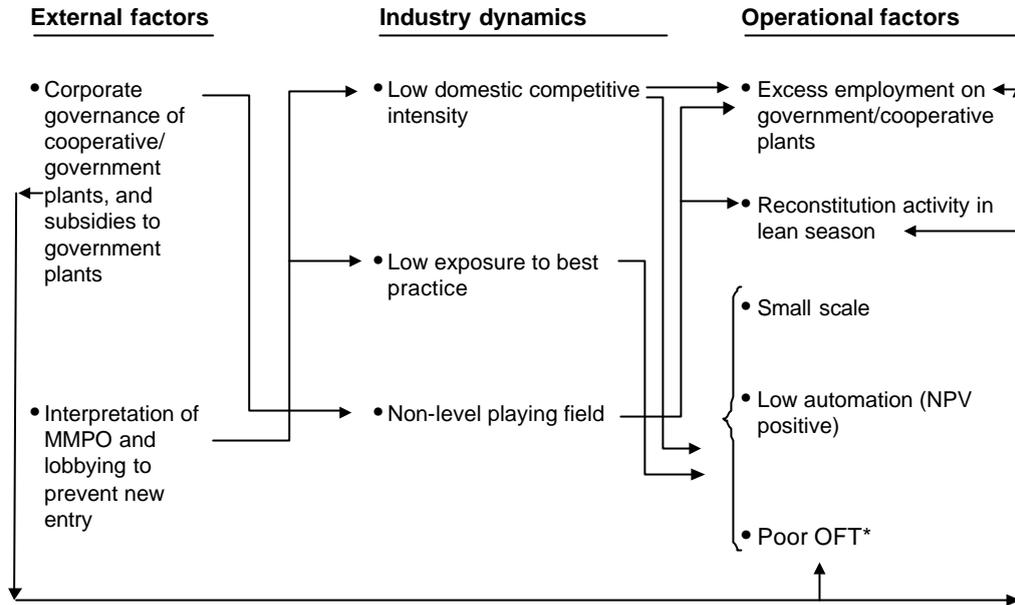
Source: Interviews; World Bank Operations Evaluation Department, *India: The Dairy Revolution*, 1998**EXTERNAL BARRIERS TO PRODUCTIVITY GROWTH IN DAIRY PROCESSING – SUMMARY**

○ High  
● Medium  
– Low

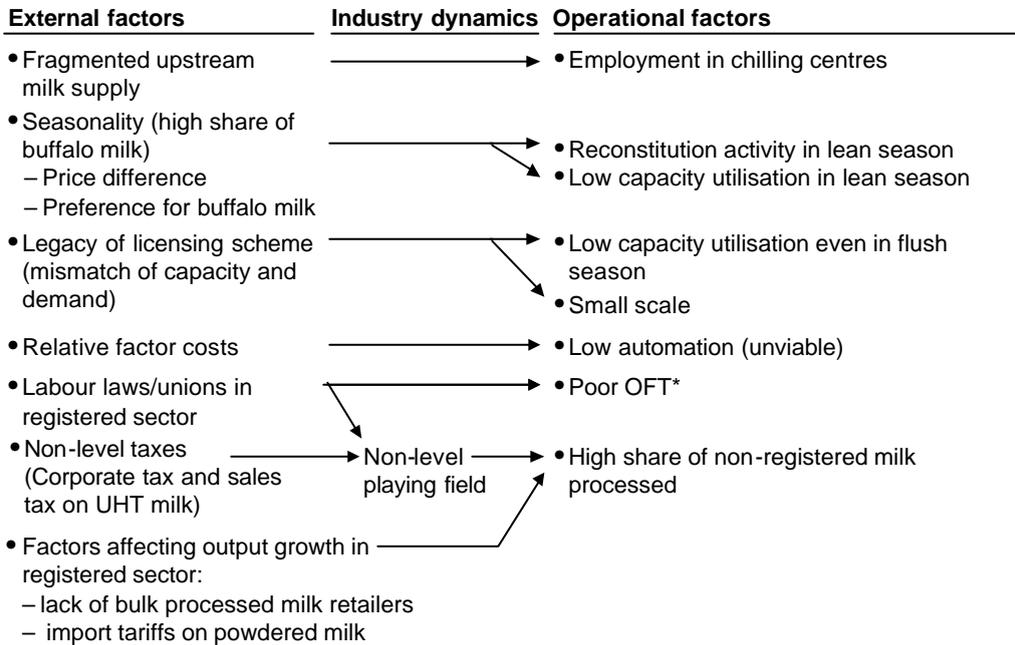
**Importance of barrier in reaching US levels (different factor costs)**

Barrier	Comments	Importance of barrier in reaching current potential	Importance of barrier in reaching US levels (different factor costs)
• Corporate governance of cooperative and government plants (including subsidies and soft loans)	• State financial support encourages excess employment and other managerial inefficiencies	○	–
• MMPO and its interpretation	• Licensing requirements for plant entry restrict competition	○	–
• Seasonality in milk production	• The fact that buffaloes are seasonal calvers leads to low capacity utilisation and reconstitution of milk	○ → ●	–
• Fragmentation of upstream milk supply	• Leads to need for chilling centres (in US chilling is done automatically at farm)	●	○
• Legacy of licensing scheme	• Many fragmented, subscale plants	● → –	–
• Relative factor costs	• Relative high price of capital leads to low automation	–	○
• Labour laws/unions	• Little multi-tasking leads to poor OFT* and overstaffing	○ → ●	–
• Non levels taxes	• Both sales tax on UHT milk and corporate/cooperative taxes hinder growth in registered sector	●	–
• Lack of bulk retailers	• Limits rate of output growth of registered sector and, hence, the rate of productivity growth due to improved capacity utilisation and new entry	–	–

### DAIRY PROCESSING FRAMEWORK – PART ONE



### DAIRY PROCESSING FRAMEWORK SUMMARY – PART TWO



## PENALTY FOR COOPERATIVE AND GOVERNMENT PLANTS DUE TO OVERSTAFFING

Point

estimates	Input milk '000 l per day	Employment FTEs	Input milk per FTE l per day / FTE
Best practice private plant	100	100	1000
Representative private plant*	100	200	500
Representative cooperative plant	100	350	286
Worst practice government plant	750	9000	83

- Expert interviews suggest that, on average, cooperative and government plants could function equally well with 50% of existing labour
- Excess employees may currently be
  - receiving a salary but not spending time in the plant
  - spending idle hours at the plant
- One cooperative plant manager explained that his employees were destroying value by drinking milk and instructed them to stay at home while he hired contract labour to staff the plant

\* Estimates

\*\* Large scale plant (some economies of scale)

Source: Interviews; Team analysis

## FUTURE OUTLOOK IN DAIRY PROCESSING

	Output growth	Productivity growth	Employment growth	Implication of barrier removal
<b>Status quo scenario</b>	12%	7%	5%	<ul style="list-style-type: none"> <li>• Dairy processing will reach 46% of US productivity levels by 2010</li> <li>• Over 100,000 new jobs will be created in the registered sector by 2010</li> </ul>
<b>Scenario after removal of external barriers</b>	20%	11%	9%	
<b>Rationale</b>	<ul style="list-style-type: none"> <li>• 12% output growth continues current trend</li> <li>• Higher raw milk production, a larger share of which will be processed, will lead growth of around 20%                             <ul style="list-style-type: none"> <li>– Demand led                                     <ul style="list-style-type: none"> <li>• Higher GDP per capita</li> <li>• Lower prices (due to productivity growth)</li> <li>• Higher urban population</li> </ul> </li> <li>– Supply led                                     <ul style="list-style-type: none"> <li>• Improved capacity utilisation</li> <li>• New entrv</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 7% productivity growth continues current trend</li> <li>• India potential productivity of 79% reached over a 15-years period                             <ul style="list-style-type: none"> <li>– Improved corporate governance</li> <li>– Improved capacity utilisation</li> <li>– New entry</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• 5% employment growth continues current trend</li> <li>• Higher output growth creates employment, despite the improvement in productivity</li> </ul>	<ul style="list-style-type: none"> <li>• 34% of all milk will be processed by 2010</li> </ul>

## POLICY RECOMMENDATIONS

Important

Barrier	Recommendations
<ul style="list-style-type: none"> <li>• Corporate governance of cooperative and government plants (including subsidies and soft loans)</li> <li>• MMPO and its interpretation</li> <li>• Lack of bulk retailers</li> </ul>	<ul style="list-style-type: none"> <li>• State governments should relinquish ownership and interference in cooperative plants</li> <li>• Corporatise government plants, thus removing subsidies</li> <li>• Remove managerial constraints implied in the cooperative act</li> <li>• Scrap licensing requirements for new entry</li> <li>• Encourage modern retail formats (See retail case)</li> </ul>
<ul style="list-style-type: none"> <li>• Non-level taxes (corporate tax and tax on UHT milk)</li> <li>• Fragmentation of upstream milk supply</li> <li>• Legacy of licensing scheme</li> <li>• Relative factor costs</li> <li>• Labour laws/Unions</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure equal tax treatment so as not to limit output growth in registered sector</li> <li>• No action required (fragmentation will remain in short term, as rural farmers have lower production costs)</li> <li>• No action required (legacy effect will reduce over time with new entry)</li> <li>• No action required (effect will decrease over time with new entry)</li> <li>• No action required (effect will decrease over time with new entry)</li> </ul>

## POLITICAL ECONOMY ISSUES RELATING TO RECOMMENDATIONS

Policy recommendations	Perceived losers	Losers' arguments	Counter arguments	Winners
<ul style="list-style-type: none"> <li>• State governments to corporatise and privatise government owned plants (removing subsidies)</li> </ul>	<ul style="list-style-type: none"> <li>• Urban milk consumers</li> </ul>	<ul style="list-style-type: none"> <li>• Milk price in urban areas will rise</li> </ul>	<ul style="list-style-type: none"> <li>• Increased competition will lead to efficient pricing</li> </ul>	<ul style="list-style-type: none"> <li>• Other milk processors</li> <li>• State governments (cut in subsidies)</li> </ul>
<ul style="list-style-type: none"> <li>• State government to relinquish ownership of, and influence over, all cooperative plants (removing hidden subsidies and managerial constraints implied in Cooperative Act)</li> </ul>	<ul style="list-style-type: none"> <li>• Rural dairy farmers (cooperative members)</li> <li>• Urban milk consumers</li> </ul>	<ul style="list-style-type: none"> <li>• Government role necessary to balance need for high procurement price and low retail price</li> </ul>	<ul style="list-style-type: none"> <li>• Increased competition will lead to competitive pricing</li> </ul>	<ul style="list-style-type: none"> <li>• Cooperative members</li> </ul>
<ul style="list-style-type: none"> <li>• Scrap licensing requirement for new entry; license only on quality &amp; hygiene standards,</li> </ul>	<ul style="list-style-type: none"> <li>• Incumbent plants</li> <li>• Existing co-operatives</li> </ul>	<ul style="list-style-type: none"> <li>• New entrants will cherry pick, not investing in extension services</li> </ul>	<ul style="list-style-type: none"> <li>• Extension services and yields are greatest in areas where processors compete with each other to procure milk (see dairy farming case)</li> </ul>	<ul style="list-style-type: none"> <li>• Dairy farmers</li> <li>• New entrants</li> </ul>

# Electric Power

## **SUMMARY**

The Indian power sector is characterised by near-bankrupt State Electricity Boards (SEBs), low tariffs for farmers and domestic consumers, excessively high tariffs for industrial consumers and high levels of transmission and distribution (T&D) losses resulting from widespread theft. Reforms aimed at unbundling and privatising the SEBs and having an independent regulator set the tariff are underway in some states, but there is still a long way to go.

These factors have caused the SEBs to suffer yearly and cumulative losses in excess of US\$ 2.5 billion and US\$ 9 billion respectively. As a result, the SEBs are bankrupt and are unable to attract investments. This is likely to exacerbate the existing power shortage of 8 per cent.

This study shows that if the SEBs were unbundled and privatised, managers – under the pressure of private owners – could wipe out their losses while retaining subsidised prices. A viable sector would again attract investments but, because of an increase in capital and labour productivity, would need US\$ 35 billion less in investment and no additional workers.

## **Productivity performance**

India's total factor productivity (TFP) is 34 per cent of US levels in generation and 4 per cent in transmission and distribution (T&D). This is quite low. Our calculations show that India could achieve a potential TFP of 86 per cent of US levels in generation and, due to much lower demand per consumer, 42 per cent in T&D at current consumption levels. In fact, some private players (both Indian and foreign best practice companies) are already achieving close to these levels.

## **Operational reasons for low productivity**

The main reasons for the low TFP in generation are poor management at SEBs, under-investment in renovation and maintenance (R&M), excess manpower and construction overruns. In T&D, losses from thefts, poor organisation and under-investment are the main causes of India achieving only a tenth of its TFP potential.

## **Industry dynamics**

Overall competition in power generation is extremely low. Although private players have been allowed to enter and compete in the power generation industry since 1991, very few have actually done so. This is because the SEBs, to whom they supply their electricity, do not have the money to pay them.

The T&D sector is dominated by the SEBs and, as in the US, has no competition because the “wires” are a natural monopoly. Unlike in some states of the US, India does not allow independent marketers or “suppliers” to buy electricity from T&D or generation companies and re-sell it to end-consumers.

## **External factors responsible for low productivity**

Two main external factors are responsible for the low productivity and output growth: (i) Government ownership, especially of distribution companies; and (ii) ineffective cost-plus regulation that does not remove inefficiencies in the sector. Both are being addressed, albeit very slowly.

Government ownership directly explains the losses and thefts in T&D, and the surplus manpower in both generation and T&D and the low capacity utilisation and high time and cost overruns in the construction of power plants. This has resulted in the losses of the SEBs exceeding US\$ 2.5 billion in 1999, as explained earlier, and has also lead to private generation players being reluctant to invest in generation. Private distribution players, on the other hand (e.g., in Mumbai), have significantly lower losses.

Further, poor regulation – coupled with the lack of independent regulators in many states – allows companies to pass on all costs (including the cost of thefts) to the consumers. For example, returns of 16.5 per cent are guaranteed at a very low load factor of 68.5 per cent in generation.

## **Industry outlook**

The current scenario will force the central and state governments to bail out the industry every few years by writing off the losses of the SEBs. Further, power shortages will only rise, as the government does not have the resources to invest the US\$ 10 billion required to build 5,000 MW of generating capacity every year and upgrade the T&D network. Nor is the private sector likely to step in, given the bankruptcy of the SEBs.

Under a “status quo” scenario, we expect consumption and capacity to grow at 5 per cent per year and employment to remain flat. Hence, productivity will grow at 5 per cent per year, electricity shortages will continue and brownouts will remain common.

With “full reforms” and a GDP growth of 10 per cent a year, we expect consumption to grow at 10.5 per cent a year. Generation capacity will grow at a slower 8.5 per cent a year due to reduction in T&D losses and higher capacity utilisation. Overall, employment will be reduced from 1 million to approximately 800,000, driven primarily by an increase in labour productivity in generation of 19 per cent a year and in T&D of 33 per cent a year. India’s power needs will be met, and will no longer be a constraint to economic growth.

In effect, the potential annual savings from increased efficiency in operations will amount to US\$ 5 billion, which is far greater than the current loss in the system of US\$ 3 billion per annum. In addition, over 25 per cent of the capital investment required to meet the higher future demand will be saved due to efficiencies in capital spending and higher capacity utilisation induced by competitive bidding for all plants.

### **Policy recommendations**

We recommend privatising generation and distribution, and changing regulations to encourage efficiency and increase competition. We suggest that these reforms be carried out in two phases.

In Phase 1(2002-2004), we recommend that the SEBs be unbundled and privatised, and that the central generation plants be privatised as well. Further, T&D operators should be regulated on an incentive sharing (e.g., price cap) basis. Finally, cross subsidies should be eliminated, and industrial and commercial customers should be charged lower prices to spur industrial growth.

In Phase 2 (2005-onwards), we recommend giving customers the freedom to choose their electricity suppliers, and generators the ability to sell directly to suppliers and consumers (driven by the delicensing of generation). This implies, of course, that third-party access to the T&D network is allowed.

Overcoming resistance to privatisation is crucial to reforming the power sector. Employees fearing job losses, farmers fearing loss of subsidised power, and bureaucrats and politicians fearing loss of entitlements and being anti-privatisation are bound to oppose and delay the reform process. The government must clearly communicate to all stakeholders that the gains from reforms – elimination of shortages and cheaper prices in the long run – far outweigh the perceived short-term losses and must firmly press ahead to achieve the potential in this sector.

# Electric Power

This case analyses the productivity improvement potential of the electric power sector in India, which is important because of its size and capital intensity. It accounts for approximately 1 per cent of India's GDP and 20 per cent of the government's investment expenditure. Furthermore, from the perspective of our study, the sector helps us understand the damaging effects of government ownership. We find that productivity in the sector is well below potential and the difference with US productivity levels is largely due to government ownership of the majority of the country's electric utilities.

The yearly losses of the power sector exceed 1.5 per cent of GDP, thus putting a tremendous strain on the finances of the government. This sector has the potential to attract large amounts of FDI if the problems in the sector are resolved.

The remainder of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## INDUSTRY OVERVIEW

The electric utility industry is very capital intensive and consists of two sub-sectors: Generation and T&D. This study focuses on those "core" utilities and independent power producers (IPPs) whose primary business is the generation and distribution of electricity to industrial, commercial, residential and agricultural consumers. These utilities account for approximately 90 per cent of total output in India and over 75 per cent of total output in the US (**Exhibit 2.1**). Co-generators, or companies that reuse heat produced by their industrial processes to generate electricity, account for the rest of the output. In this section, we discuss the size and structure of the industry.

## **Size of the industry**

India's generating capacity at the end of 2000 was approximately 100,000 MW. At current prices, this represents investments of approximately US\$ 100 billion in generation and approximately US\$ 50 billion in T&D.

Sales to consumers, net of officially reported losses and thefts, are estimated to be 0.3 Mwh per capita in India compared to 11 Mwh per capita in the US. This is 3 per cent of the US output on a per capita basis. This lower level of output per capita is primarily due to the lower GDP per capita of India (6 per cent of the US in PPP terms), the prevalent energy shortages (approximately 11 per cent<sup>1</sup>) and thefts (approximately 20-25 per cent of net generation, compared to less than 2 per cent in the US), which are not accounted for as sales but are nonetheless consumed.

Although generation capacity has been growing at 5 per cent a year for the last decade, there is still a shortage of energy as demand has been growing at approximately the same rate. In 1997, energy shortages exceeded 11 per cent and peaking shortages exceeded 18 per cent<sup>2</sup>. Due to these shortages, the quality of electricity reaching the consumer is very poor and outages, with daily load shedding, are common. Both voltage and frequency vary enormously, with the frequency often dropping to 48 Hz and the voltage to 190 V. This variation damages industrial equipment if voltage stabilisers or back up "gensets" are not used.

Approximately 68 per cent of the capital stock is in generation and 32 per cent in T&D. In the US, approximately 38 per cent of the capital stock is in T&D.

## **Industry structure**

At present, government-owned utilities dominate the industry. However, due to their low operational efficiencies and the lack of government funds, the government has allowed private investments in generation and is in the process of privatising the SEBs. Given below are details regarding the ownership of the utilities, the process of deregulation and the pricing structure in the industry.

Private companies were given permission to build power plants to supply electricity to the SEBs in 1991. However, very few private sector power plants have been constructed, as the SEBs are bankrupt. The industry is still mainly government owned, with the SEBs, central government-owned utilities and the private sector accounting for 58 per cent, 38 per cent and 6 per cent of the utilities'

---

<sup>1</sup> Electricity shortage is defined as the average energy demand not met during the year, divided by the average energy requirement. The US has minimal electricity shortage.

<sup>2</sup> Peaking shortage is defined as the energy shortage experienced when demand peaks, as a percentage of peak demand. The US is able to meet its peak demand.

generating capacity respectively. Both the private sector and the central government utilities are mandated by law to supply their output to the SEBs, and do not have any T&D operations<sup>3</sup>.

In effect, the SEBs are vertically integrated with a monopoly in the T&D sector, while – in the generation sector – they purchase a part of their power requirement from the central government and private utilities and produce the balance themselves.

The state governments have started the process of unbundling and privatising the SEBs. For example, Orissa has unbundled its SEB and privatised both generation and distribution. Overall, four states (Orissa, Haryana, Andhra Pradesh and Karnataka) have unbundled their SEBs. Further, independent regulators have also been introduced in 12 states to set the retail prices of electricity.

Industrial and commercial consumers cross-subsidise farmers and residential customers. Farmers in all states pay, on average, less than 10 per cent of the cost of producing electricity, whereas industrial customers pay at least 140 per cent of the cost of producing electricity. Despite this cross subsidy, all the SEBs taken together announced losses exceeding US\$ 2.5 billion in 1999, primarily due to high T&D losses.

## **PRODUCTIVITY PERFORMANCE**

India's total factor productivity (TFP) is 34 per cent of the US in generation and 4 per cent in T&D. Overall, the TFP is 19 per cent of US levels (**Exhibit 2.2**), which is substantially lower than the potential productivity of 55 per cent at current factor costs. Our calculations show that India could achieve a potential TFP of 86 per cent of US levels in generation and, due to much lower demand per consumer, 42 per cent in T&D at current consumption levels.

We have segmented the industry into SEBs, central government-owned utilities and best practice private players in order to capture the differences in productivity and understand the effects of differing ownership on both capital and labour productivity. We have also made quality adjustments (e.g., for power shortages) and taken into account vertical integration differences (e.g., dispatch of bills being outsourced in India). Details of the data sources used, the quality adjustments made, and the vertical adjustments covered for both capital and labour productivity are explained in **Appendix 2A**.

---

<sup>3</sup> Except in the cities of Mumbai, Calcutta, Surat, and Ahmedabad, where private companies were given licences to generate electricity and then supply it directly to end consumers.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

This section analyses the reasons for the difference in productivity between India and the US. It deals with the TFP differences in generation – between SEBs and best practice private Indian generators; between best practice Indian private generators and the Indian potential; and, finally, between the Indian potential and the US average. This is followed by a similar analysis of TFP differences in T&D.

### **TFP differences in generation**

The average TFP for generation is 34 per cent of the US (**Exhibit 2.3**). **Exhibit 2.4** summarises these differences in productivity.

**TFP differences between SEBs and best practice private Indian generators:** The three-fold difference between SEBs (at 27 per cent of US productivity) and best practice Indian generators (at 80 per cent of US productivity) is explained by both a lower capital and labour productivity vis-à-vis the US (**Exhibits 2.5 & 2.6**). Capital productivity in generation is lower because India creates less capacity with equivalent assets or rupees (due to construction overruns and over-engineering) (**Exhibit 2.7**) and due to lower capacity utilisation owing to poor organisation of functions and tasks (OFT) and inadequate investments in R&M (**Exhibit 2.8**). This lower capacity utilisation is reflected in higher outages in Indian plants (**Exhibit 2.9**). Labour productivity is lower due to excess labour, poor OFT and smaller scale. These are discussed in order of ease of implementation:

- ¶ **Excess manpower:** This contributes 30 points to the productivity gap. Overstaffing occurs in all areas, with a typical 500 MW thermal plant employing 100 people in the US, 500 people in a central government Indian utility and 2,000 people at an SEB. This is most prevalent in support functions like finance, administration, accounts and HR and in clerical and secretarial departments. For example, there is one support staff per MW in India compared to 0.1 per MW in the US. Overstaffing also exists in areas like security, where there are often over 100 people per plant compared to five persons in a US plant. Further, each Indian worker and operator in shift operations also has a “helper”, a redundant function that adds nothing to productivity.
- ¶ **Poor organisation of functions and tasks (OFT):** This accounts for 13 points of the TFP productivity gap and impacts capacity utilisation, deployment of manpower and cost to construct a plant. Best practice Indian private plants are as well organised as US plants. However, the SEBs have a low capacity utilisation, are overstaffed and over-engineered and often suffer from construction time overruns. This is the

result of low motivation, lack of adequate incentives and the job security of the management cadre.

- **Lower capacity utilisation (5 points):** Overall, the plant load factor (PLF) for SEBs is 60 per cent compared to 71 per cent for private and central government-owned plants. Three reasons in particular explain the low PLF of SEBs:
  - Poor maintenance results in more frequent plant outages, especially partial outages, at SEBs. While a large part of the partial outage is due to a lack of funds for R&M, poor management does play a vital part.
  - The time taken for planned maintenance at SEBs is higher than that for central government utilities. For example, it was higher by 50 per cent in thermal plants in 1997.
  - SEB managers are often unable to get coal on time while managers in many central government and private sector plants are able to do so, despite labouring under similar constraints.

The poor management of SEBs was starkly highlighted when a leading central government utility took over the management of three SEB plants. Without changing the workers and with only limited investments in plant renovation, the PLF in these plants rose by over 40 per cent instead of the expected 5-7 per cent.

- **Inefficient deployment of manpower (3 points):** Poor OFT also leads to lower TFP through overstaffing in operations and maintenance. This is prevalent in SEBs and to a lesser extent in central government plants.
  - In operations, despite having a control room, workers are placed in each area of the main plant e.g., boiler, turbine, and boiler feed pump. Similarly, operators can easily be shared between different units but this often does not happen.
  - In maintenance, people are organised rigidly by function e.g., electrical, mechanical, control and instrumentation. Best practice Indian plants, on the other hand, have organised multi-skilled crews by area. Further, employees handling breakdown maintenance can easily be shared between multiple units and neighbouring plants in the coal-producing region. This is currently not the case.
- **Over-engineering (2 points):** Redundancies and an absence of standardised plant designs are the two main examples of over-engineering. Many of the plants in India have redundancies such as

boiler feed pumps (either 2 x 100 per cent rating or 3 x 50 per cent rating, versus 2 x 60 per cent used internationally), ID pumps, FD fans, main pump, transformers and instrumentation equipment. Further, most Indian companies do not use a standardised plant design, which is both cheaper and more reliable. Instead, input parameters such as paint thickness, flue gas velocity in boiler, material to be used in chimneys etc. are specified in detail. We estimate that these two factors raise the cost of a plant by 4-5 per cent on average.

- **Construction overruns (3 points):** SEBs take an average of over 5 years to construct large coal plants, versus 3-4 years for best practice Indian plants. Lack of funds, delays in tendering and antiquated engineering, procurement and construction (EPC) practices are the main reasons for construction overruns.
  - A lack of funds, primarily at SEBs, leads to suppliers delaying construction until arrears are cleared. In 1997, Panipat Station IV in Haryana, GHTP Station 1 in Punjab, Suratgarh in Rajasthan, Rayalseema Station 2 in Andhra Pradesh and Tenughat Station 11 in Bihar, all cited paucity of funds as the reason for delays.
  - Both state and central government utilities often delay tendering or order re-tendering, sometimes due to vested interests e.g., both Rihand and Ramagundam stations have witnessed long delays in the finalisation of tenders.
  - Finally, utilities rarely appoint a turnkey contractor, preferring instead to give different packages to separate sub-contractors. One large utility used to give 40-50 packages to different sub-contractors leading to co-ordination problems in execution. However, over the last few years, this utility has consciously reduced the number of packages for a power plant to 8-10, cutting down average plant construction time from 5 years to less than 4 years.

¶ **Lack of viable investments:** SEBs suffer from lower capacity utilisation (3 points) and less use of technology, resulting in the need for more manpower (4 points).

- Investments in R&M would help to significantly improve the capacity utilisation (measured in terms of PLF) of approximately 20 per cent of Indian plants. These plants currently have a PLF of below 40 per cent compared to more than 90 per cent in best practice Indian plants and the US (**Exhibit 2.10**). Between 1984 and 1993, an R&M scheme – covering 164 stations with an output of 14,000 MW – helped raise

PLF by 7 per cent (from 46 per cent to 53 per cent), at a cost of Rs.10 billion. Building new plants would have cost at least 3-4 times as much. The primary reason for delaying R&M is a lack of funds at the state government level.

- The lack of modern control and instrumentation results in the need for more staff. In addition to the control room for the main plant, the majority of the plants in India have local control rooms for auxiliary plants such as the circulating water pump room, compressor room, coal handling plant and ash handling plant. In fact, even within the coal handling plant, the wagon tippler and stacker are not controlled from the local control room. Each of these local control rooms needs to be manned. Even assuming one person per auxiliary plant, this results in a minimum of 24 extra people on 4 shifts. Best practice plants in India, on the other hand, are able to control the entire operations from the central control room. In addition to saving manpower, this results in increased reliability.

¶ **Lack of viable scale:** This contributes 3 points to the productivity gap. Overall, 20 per cent of India's plants are below 210 MW in size. However, they require the same number of people in the control room and other areas of operations, as do the larger ones. Similarly, there is a scale issue in maintenance and support staff. If these plants had been of 500 MW size, they would have required 25 per cent fewer employees, adjusted for size.

**TFP differences between best practice Indian private generators and Indian potential:** India can potentially achieve a TFP of 86 per cent of US levels, up from the current 80 per cent of best practice Indian generators. The main factors responsible for the differences are supplier relations (poor quality and shortages of coal), lower capacity utilisation due to lack of adequate transmission lines and poor infrastructure. These factors are outside the control of best practice Indian generators and require improvements in infrastructure, suppliers and downstream industries. These are discussed in order of ease of implementation:

¶ **Supplier relations (Poor quality and shortage of coal):** This accounts for 3 points of the productivity gap. Poor quality coal (unwashed, large size, often with stones and shale) and shortages lead to lower capacity utilisation. Further, more labour is required to handle the unwashed, large sized coal. According to the Central Electricity Authority (CEA), coal shortage and the availability of poor quality or wet coal were responsible for forced and partial outages of 5-6 per cent, leading to lower capacity utilisation, in 1996.

Poor quality coal, in terms of extraneous material like shales, stones and broken metallic material, cause frequent breakdowns in the boilers. Further, the large size coal (greater than 200 mm) received by Indian plants requires primary and secondary crushers with attendant conveyor belts. This raises the cost of building the coal handling system. Finally, more labour is required in Indian plants to maintain the crushers and the longer conveyor belts, and to unload the coal, which is sometimes so large that it has to be “poked” into the coal handling system.

- ¶ **Lack of viable capital.** This accounts for 1 point of the productivity gap and is caused by a lack of transmission capacity, primarily in the eastern region, to wheel excess energy to deficit regions (**Exhibit 2.11**). For example, India’s largest power producer had a PLF of 45 per cent in the eastern region compared to 85 per cent in the rest of the India in 1998. This was primarily due to insufficient transmission lines with which to transmit the power to energy-deficit regions. Further, the CEA estimates that a national grid would be able to reduce generation capacity required by 3-4 per cent, i.e., 5,500 MW on a base of approximately 160,000 MW at the end of 2007. This investment is viable given that transmission costs are typically only 10 per cent of the total costs of the electrical system.
- ¶ **Lack of infrastructure.** This accounts for 2 per cent of the productivity gap, and is caused by the need to build roads, bridges, ports and other infrastructure to allow fuel to reach the power plant. This increases the project cost by an average of 4-5 per cent.

**TFP differences between Indian potential and the US average:** The difference between India’s potential TFP of 86 per cent and the US average is explained by factors out of India’s control: High ash content of coal, the large amount of work in progress due to faster growth rates and less labour-efficient gas plants because of the shortage of natural gas in the country.

- ¶ **Supplier relations (high ash content coal):** This accounts for 4 points of the productivity gap, and is due to the high ash content of 30-40 per cent of Indian coal versus 8-10 per cent of US coal. This large proportion of ash results in more coal needing to be handled, and more ash needing to be disposed of, thus necessitating larger and costlier coal and ash handling systems. It also results in lower capacity utilisation due to frequent breakdowns.
- ¶ **High growth rate of Indian generation capacity vis-à-vis the US:** This accounts for 5 points of the productivity gap, and is primarily caused by the higher growth rate of capacity addition in India versus the US, which leads to higher amount of capital work in progress.

- ¶ **Plant mix:** This contributes 5 points to the productivity gap, and is a result of India having a very low share of labour-efficient combined cycle gas plants (less than 3 per cent in 1999), compared to the US where approximately 25 per cent of the plants are gas fired or dual fired. This in turn is due to the negligible quantities of natural gas that India has in comparison to the US. Since gas-fired plants require less than half the employees per MW compared to coal-fired plants, this translates into approximately 13 per cent fewer employees.

### **TFP differences in T&D**

India's average SEBs are at 4 per cent (**Exhibits 9.12 & 9.13**), best practice Indian private companies are at 33 per cent (90 per cent capital productivity and 4.5 per cent labour productivity) and India's potential is at 45 per cent (100 per cent capital productivity and 9 per cent labour productivity) of TFP levels in the US. The operational factors explaining the TFP differences in T&D are summarised in **Exhibit 2.13**, capital productivity differences are explained in **Exhibit 2.14** and labour productivity differences are explained in **Exhibit 2.15**.

### **TFP differences between SEBs and best practice private Indian companies:**

Three factors account for the difference: Poor OFT (thefts/unmetered billing and inefficient deployment of employees), excess manpower and a lack of viable investments. These are discussed in order of ease of implementation:

- ¶ **Excess manpower:** This contributes 1 point to the productivity gap. Helpers and artisans, who are redundant, comprise 50-75 per cent of the line staff. Second, all sub-stations are manned, which is unnecessary. Third, as in generation, there is surplus manpower in functions such as HR, finance, accounts and clerical and secretarial support.
- ¶ **Poor OFT:** This is responsible for 22.5 points of the productivity gap. Large-scale theft, coupled with inadequate metering, and inefficient deployment of workers are examples of poor OFT.
- **Theft and inadequate metering:** Large-scale theft, along with inadequate metering, is estimated at 20-25 per cent of net generation (**Exhibit 2.16**) and is responsible for 22 points of the productivity gap. Best practice private Indian companies, on the other hand, have low levels of theft (approximately 2-3 per cent).

A large percentage of electricity is sold either without metering or through faulty meters. In Maharashtra, for example, it is estimated that approximately 30 per cent of consumers are billed in this way. Electricity to farmers and segments, such as the powerloom sector, is sold without metering on the basis of a fixed power rating (MW or

horsepower). It is thus often underestimated since there is no incentive for the user to consume less electricity for a fixed rating.

Given that an electronic meter costs less than US\$ 20-25, we estimate the one-time cost of installing these meters for all unmetered customers in India at approximately US\$ 600-700 million, compared to thefts of approximately US\$ 3 billion per year. Clearly the investment would yield positive results. We believe that these meters have not been installed owing to poor management.

- **Inefficient deployment of workers:** This contributes 0.5 points to the productivity gap and reduces labour productivity. Examples of poor OFT include excessive hierarchy in line staff (junior engineers, assistant linesmen, helpers), excessive administrative layers (sectors, sub-divisions, divisions, zones and circles), non-computerisation (e.g., of accounts/inventory) in some SEBs and rigid terms of service with no multi-tasking (for instance, meter readers do not dispatch bills or identify faults).

- ¶ **Lack of viable investments:** This accounts for 6 points of the productivity gap, and is a result of higher technical losses due to under-investment in T&D (5 per cent) and lower labour productivity due to lack of simple labour saving investments (1 per cent).

Under-investment in the T&D sector (32 per cent of total investments in India compared to 38 per cent in the US) is responsible for the higher technical losses in India of 10-12 per cent, compared to 9 per cent in the US. These higher losses are due to India having a higher proportion of low tension lines (the ratio of distribution lines to transmission /sub-transmission lines in India is 9:1 versus 5:1 in the US.) and a poorly maintained system. Building more expensive, high tension lines can reduce these losses. Other measures to reduce losses include adding capacitors to reduce the reactive power in the system.

Further, best practice companies in India use centralised billing systems, call centres for customer service and Supervisory Data Acquisition and Data Access (SCADA) in urban areas while SEBs typically do not. This results in TFP gains of 1 per cent.

### **TFP differences between best practice Indian companies and Indian**

**potential:** Best practice Indian T&D companies are closer to their potential than the SEBs. However, poor OFT (e.g., losses, thefts and inefficient deployment of manpower), lack of viable investments (e.g., hand-held meter reading instruments and under-investment in T&D) and excess manpower still plague these plants, although to a lesser extent than they do the SEBs. These are discussed in order of ease of implementation:

- ¶ **Excess manpower:** This accounts for 2 per cent of the productivity gap. Even in the private sector, firms have excess workers, especially in the staff functions. However, the overstaffing is much less than in the SEBs.
- ¶ **Poor OFT:** While the best practice plants suffer fewer thefts than do the SEBs, the higher levels of theft (4 points) and excessive hierarchy (1 point) contribute 5 points to the productivity gap. The best practice Indian company has T&D losses of 12 per cent compared to the US average of 9 per cent, which is primarily due to higher theft and hence results in TPF being 4 points lower.
- ¶ **Lack of viable investments:** This accounts for 2 points of the productivity gap. Insufficient use of meter reading instruments is one of the factors responsible for low labour (and, hence, low total factor) productivity. Currently, meters are read manually and the results punched into the computer systems. Apart from being inefficient, this causes high error rates, and requires data to be re-entered in up to 20 per cent of the cases. The use of hand-held meter reading equipment is likely to double the efficiency of meter readers from 100 readings per day to at least 200 per day.

Further, it will obviate the need for data entry operators to update the readings onto the server, and will dramatically reduce error rates. This investment is viable and would recover its investment in a few months since each hand-held meter reader costs approximately Rs.10,000-15,000, which is less than a meter reader's salary for a few months.

**TFP differences between Indian potential and the US average:** Low consumption per capita explains the difference between Indian best practice and the US average. Lack of non-viable capital at current factor costs and consumption levels raises India's capital productivity and reduces labour productivity, but has no impact on TFP.

- ¶ **Low per capita consumption:** This is the single largest factor and accounts for 58 points of the productivity gap, owing to lower labour productivity caused by low consumption per consumer. Consumption per consumer in India is approximately 10 times lower than in the US. As the number of employees required by a T&D operator is primarily dependent on the number of consumers, labour productivity in India would be 10 times lower than the US, other factors being equal.
- ¶ **Non-viable capital:** Insufficient use of technology – at sub-stations, in the maintenance of faults and for customer service – reduces labour productivity in India. However, since the investment is not viable, it does not impact TFP.

- Although the use of SCADA would allow one person to manage a cluster of sub-stations from a remote site, it is very rarely used to control remote sub-stations or to help identify faults in the lines. SCADA would also allow for fault diagnosis and lead to productivity gains and lower downtime in T&D lines. However, the low labour costs in India make the use of SCADA viable only in areas with high population density (i.e., urban areas).
- Work crews in India are rarely provided with transport. This increases the time taken to maintain lines and repair faults.
- Finally, customer queries are rarely handled through call centres or computerised service centres where account information on billing, payments and consumption is available.

## INDUSTRY DYNAMICS

Regulation in India does not encourage wholesale or retail competition in generation while the T&D sector, being a natural monopoly, has no competition in either India or the US.

There is very little wholesale competition (inter-utility buying and selling of electricity) in India, whereas the US has regulation that simulates competition at the wholesale level. **Exhibit 2.17** summarises the industry dynamics in generation. Further, retail competition in generation (where customers can choose whom they buy their electricity from) is non-existent in India, whereas in the US retail competition is encouraged in many states. Many other countries (e.g., large parts of Europe including the UK, Germany and Scandinavia) encourage retail competition as well.

There is very little domestic competition in wholesale generation because although private players have been allowed to enter the market and compete in generation since 1991, very few have actually done so; even when they have, their projects have tended to stagnate. The main difficulty is that the SEBs, to whom they have to sell their electricity, are bankrupt and cannot pay for their services.

The level of foreign competition in wholesale generation too is very low. However, exposure to foreign competition is not important since best practice Indian private generators (and a few SEBs) are operating close to their potential and at the same level as the international best practice present in India.

Wholesale competition is important and possible. In the US, the industry is highly competitive, with most states requiring Investor-Owned Utilities (IOUs) to either buy electricity from other players at their avoided cost (i.e., at the cost at which they would build plants themselves) or float tenders to award contracts at the

lowest cost. In India, SEBs and central government utilities can build plant themselves without resorting to competitive bidding. Even when they choose to build plants through competitive bidding, very few tenders reach financial closure since the SEBs are not creditworthy

Even with competitive bidding, there is effectively no choice for generating companies to choose their customers or for consumers to choose their suppliers. Allowing customers to choose their suppliers or “retail competition” has four elements:

- ¶ First, retail customers – both large and small – have the choice to buy electricity from any supplier, or distributor.
- ¶ Second, intermediaries, called suppliers, are allowed to sell electricity to retail customers and to provide metering and billing services to them. These intermediaries need not own any part of the distribution network but have to be provided with third party access to the network. They should also be allowed to trade in electricity.
- ¶ Third, generators are allowed to sell their output through financial contracts to distributors, suppliers or customers, rather than only to distribution companies, as at present.
- ¶ Fourth, a “power” pool dispatching electricity on the basis of lowest bids (or costs) from generators has to be set up (as explained in the recommendation section). This typically minimises the cost of electricity in the system.

Experience in other countries shows that electricity costs decrease (**Exhibit 2.18**) and the quality of service improves with the introduction of competition in the wholesale and retail segments (**Exhibit 2.19**). This has been observed in Chile, Norway, Argentina, and England and Wales.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

Poor corporate governance in the form of government ownership, primarily at SEBs, is the main external factor leading to low TFP in both generation and T&D. In generation, SEBs have the longest construction overruns and the lowest capacity utilisation, leading to a capital productivity in generation of 57 per cent against best practice of 85 per cent of US levels. Similarly, they employ an average of four persons per MW, compared to 1 person per MW at even the old private sector plants. In T&D, as mentioned earlier, thefts from SEBs are about 20-25 per cent compared to 2-3 per cent in best practice private sector companies. A poor regulatory framework, coupled with poor implementation, is the second factor responsible for low productivity (**Exhibit 2.20**).

Some secondary factors, such as government monopoly in the coal sector, excessive bureaucracy, and a non-level playing field for private sector capital goods producers, also contribute to low TFP.

### **Government ownership leading to poor governance of SEBs**

This leads to thefts, surplus staff, construction overruns, over-engineering, poor management, lack of evacuation capacity and under-investment in T&D and maintenance. SEBs, on average, perform much worse than other entities facing similar regulations. For instance, capital productivity in generation of SEBs is 57 per cent compared to 75 per cent at central government utilities, although both face a cost plus regulation. Similarly, T&D losses and thefts are approximately 35 per cent in India versus 11 per cent at best practice private companies. This is due to a lack of profit pressure, a lack of government funds for investment and a set of political and social compulsions.

¶ **Lack of profit pressure/poor oversight by shareholders.** Government ownership, especially in the form of a government department with political appointees, does not create pressure to avoid losses. Thus large-scale theft continues, with some states having losses as high as 50 per cent. T&D losses and thefts also have other consequences. They are the primary reason why the SEBs are bankrupt and do not invest adequately in maintenance and in T&D. Moreover, the lack of profit incentive also encourages over-engineering and construction cost over-runs, as the investment cost is not linked to the benefits accruing from over-engineering. As a result, the SEBs in 1999 suffered losses of over \$ 2 billion.

The central government generation plants are better run because they are corporatised (as compared to the SEBs, which are departments of the state government), and there is less interference from the government. For example, an independent body called the Public Enterprise Selection Board (PESB) appoints the senior managers of the central government public sector units.

¶ **Lack of government funds.** Due to the shortage of government funds, the state government does not recapitalise the losses of SEBs, which are primarily caused by theft. This prevents the SEBs from investing to upgrade existing plants or the T&D network.

¶ **Social/political compulsions.** The government's social objective of providing employment leads to overstaffing and constrains capital investments. Further, it forces the SEBs to write off dues from farmers and other sectors such as the powerloom sector.

## Poor regulatory framework

Poor tariff regulation and implementation has led to low productivity and, thereby, high prices for paying consumers. In India, regulations do not force SEBs and central government-owned generators to compete with private players for setting up additional capacity. Further, the lack of independent regulators, until recently, allowed SEBs to pass on any level of operating costs and the costs of losses and thefts to the consumer.

- ¶ **Wholesale tariff regulations:** While the US regulates wholesale electricity prices (i.e., the rate at which inter-utility electricity is traded), the regulations in India are much less stringent.

Two regulations in the US have led to pressure on wholesale tariffs. First, Investor-Owned Utilities (IOUs) were directed in 1978 to buy electricity from non-utilities at their “avoided” cost. Second, a majority of states required IOUs to float tenders for purchasing wholesale power. IOUs were allowed to build and operate their own generating capacity only if they could match the cost of the lowest bidder. Both these regulations effectively forced IOUs to build and operate plants efficiently if they wanted to add generating capacity.

In contrast, SEBs and the central government utilities can add capacity at will, without having to compete against private players. Till recently, even IPPs were contracted on a negotiated basis, rather than through competitive bidding. Though the competitive bidding regulation for IPPs has now come into effect, it has not been successful in ensuring competition since the credit worthiness of many of the SEBs is in doubt. Hence, only five of the more than 100 projects awarded to IPPs since 1991 have achieved financial closure.

Regulations governing the retail price of electricity are similar in the US and India (e.g., IOUs and SEBs are both governed by rate of return regulation). The difference between their performance (in addition to corporate governance) lies in the way that the regulation is implemented.

- ¶ **Poor implementation of existing regulations:** The lack of an independent regulator at both the central and state level is the primary reason for regulations being poorly implemented in India. Even when a regulator does exist, there is minimal pressure from the regulator to reduce prices.

In the US, Public Utility Commissions (PUCs) carefully scrutinise both cost and capital outlays of IOUs before agreeing on retail rate hikes. A key feature of the system is its openness to public scrutiny. Further, the PUCs take various steps to ensure that the IOUs are run efficiently. Examples include:

- Prohibiting an automatic fuel cost adjustment mechanism
- Including plant investments in the base rate computation only if they have determined that these investments have been both used and useful in providing electricity to consumers
- Disallowing capital work in progress and deferred taxes from the base rate.

In India, on the other hand, the rate of return regulation has not created pressure to reduce costs. The Electricity Supply Act allows SEBs to set their own retail tariffs so as to earn a 3 per cent rate of return on net assets. Thus, even when T&D losses are abnormally high (e.g., over 50 per cent in some states) and the SEB is overstaffed (e.g., 4 employees/MW), no disallowance is made for these costs. Similarly, at the central level, since no independent regulator existed in India till 1998, the CEA scrutinised the capital costs for power projects and set norms for operational costs. However, these norms were easily achievable. For example, the norm for plant load factor was set at a low 68.5 per cent. Similarly, there was minimal pressure to reduce operational and maintenance costs (e.g., O&M costs of 2 per cent of the capital cost of the project were allowed in the first year of operations and manpower norms were set at 1 employee/MW). Finally, although the CEA went into great detail on capital costs, over-engineering was still common.

Since their entry in 1999, the regulators at both the central and state level have not been able to bring down costs or increase efficiency substantially. For example, T&D losses are still above 40 per cent in states like Orissa or Delhi. Further, the norms for employee/MW still remain at 1.

### **Monopoly and government control of both coal and railways**

As both coal and the railways are government-controlled monopolies, coal supply often falls short of demand. In addition, the poor quality of unwashed coal causes frequent problems to boilers and other machinery. Finally, fuel linkage for coal is time-consuming. Privatising the coal industry will reduce many of these problems.

### **Requirement for non-statutory and dual approvals**

Numerous bureaucratic regulations in granting approvals cause inordinate delays e.g., both central and state approvals are needed for environmental and water clearance. Non-statutory clearance for fuel linkage, transportation of fuel and financing require the approval of the Department of Coal/Department of

Petroleum and Natural Gas, the Ministry of Railways, the Ministry of Shipping and Surface Transport, the CEA, the Department of Power and the Department of Economic Affairs.

### **Non-level playing field for private sector capital goods suppliers**

Purchase preference allows ill-qualified PSUs to match bids made by private firms, and to win contracts. Often these PSUs do not deliver on time. Similarly, Central PSUs get a 10 per cent price preference in all tenders, which adds to the cost of a project.

### **Indirect encouragement for intra-state, non-pithead projects**

The lack of clearly-defined wheeling agreements, the difficulty in setting up interstate projects and the benefits of using central government funding to set up power plants within a state encourage each state to vie for power plants. This leads to the setting up of more expensive non-pithead plants, and causes bottlenecks and delays in the transportation of coal because the already overburdened railways find it difficult to cope.

### **Factors limiting output growth**

All productivity barriers impact output indirectly, as raising productivity leads to a specific good becoming less expensive in real terms. In addition, some of the barriers mentioned above impact output directly. Government monopoly on distribution, for example, limits new generation capacity, as private players are loath to sell to bankrupt electricity boards. Thus, financial closure is extremely difficult to obtain. Similarly, poor governance of the government-owned SEBs causes large financial losses; the net impact is that the SEBs have no money to build new plants. Finally, the lack of a regulator leads to uneconomical tariffs. This last factor has also partly contributed to the poor financial health of some of the SEBs.

## **INDUSTRY OUTLOOK**

Here we discuss the impact of removing the barriers to productivity growth. We believe that private ownership and better regulation will lead to increased productivity and consumption. We discuss two scenarios: Status quo and reforms in all sectors. In the latter case, we assume that – owing to reforms in all sectors – growth in GDP will reach 10 per cent by 2010.

¶ **Status quo:** Under this scenario, we expect the broad trends of over the past few years to continue. Accordingly, consumption and capacity will grow at 5 per cent a year, employment will remain flat and productivity will grow at 5 per cent a year (**Exhibit 2.21**).

¶ **Reforms in all sectors:** Reforms will allow the electricity sector to become healthy and financially viable. It will attract investments to create an additional capacity of over 138,000 MW over the next 10 years thereby eliminating shortages. However, employment will fall from approximately 1 million to 0.8 million (**Exhibit 2.22**).

We expect a consumption growth of 10.5 per cent a year over the next 10 years, driven by a per capita consumption increase from 382 kwh per capita (inclusive of thefts) to 958 kwh/capita, and a population growth of 1.7 per cent per year. Our consumption estimate of 958 kwh per capita in 2010 is dependent on India reaching 15 per cent of US GDP per capita in PPP terms and on Indian consumption patterns being similar to countries like China, the Philippines and Thailand (**Exhibit 2.23**).

Although consumption will grow at 10.5 per cent a year, we estimate capacity addition to be 8 per cent a year, due to lower T&D losses and higher capacity utilisation. Other countries in similar stages of development, such as China, have been able to grow capacity at similar rates. For example, China grew its capacity at 7.5 per cent per year between 1980 and 1987.

- **TFP growth in generation:** This will be driven by labour productivity rising from 9 per cent to 52 per cent, an annual growth of 19 per cent and capital productivity rising from 65 per cent to 90 per cent, an annual growth of 3 per cent. The increase in labour productivity of generation will be driven by the central government utilities doubling their productivity to 40 per cent of the US, and the erstwhile SEBs reaching similar productivity levels. Other countries that have deregulated the power sector (such as the UK) have seen productivity in generation double over 4 years (**Exhibit 2.24**).

Competition in generation will increase capital productivity from 65 per cent to 90 per cent and the cost of constructing power plants will fall. This happened in Mexico when it introduced competition (**Exhibit 2.25**). Similarly, capacity utilisation will increase to US levels.

- **TFP growth in T&D:** In T&D, we believe TFP will increase from 4 per cent to 45 per cent. This will be driven by labour productivity increasing from 0.5 per cent to 9 per cent, at a rate of 33 per cent a

year, and capital productivity increasing from 12 per cent to 100 per cent, a rate of 23 per cent a year.

Growth in labour productivity of T&D will be driven by lower losses and thefts, an increase in the number of consumers and increased consumption per consumer. The experience of countries that have had high levels of thefts but have privatised and deregulated operations shows that it is possible to reduce thefts significantly in just a few years. In Argentina, T&D losses were reduced from 26 per cent in 1992 to 14 per cent in 1995 (**Exhibit 2.26**). Further, the projected increase in the number of consumers per employee of 7 per cent per year is only slightly higher than the 5 per cent per year of the last 6 years, due to saturation of consumers and thefts being reduced. Consumption per consumer has been estimated to increase at 3.5 per cent a year. This is higher than historical trends of 2 per cent a year due to higher GDP growth and industrial customers buying from utilities as opposed to setting up captive power plants.

Capital productivity in T&D will increase because of investments aimed at reducing T&D losses and thefts. As explained earlier, countries like Argentina have been able to bring down high levels of losses in a short period of time.

Achieving this higher level of capital and labour productivity will result in operational savings in excess of around \$ 5 billion per year at today's output level (**Exhibit 2.27**), and reduce capital expenditure by US\$ 32 billion (**Exhibit 2.28**) over the next 10 years. The operational savings will exceed the current yearly losses of the SEBs and the extra tariffs charged to industrial and commercial customers. In essence, the government can continue to subsidise agriculture, reduce the charges to the industrial sector, and make the SEBs profitable if it reduces thefts and improves labour productivity. Going a step further, if agricultural subsidies are removed, SEBs can make profits exceeding \$ 2 billion per year.

## **POLICY RECOMMENDATIONS**

India should privatise power generation and distribution and introduce regulation to make domestic industry more competitive. This should be done in two phases (**Exhibit 2.29**). In the first phase, the objective should be to unbundle the SEBs, privatise distribution and generation and create a well-regulated industry. In the second phase, competition should be allowed in the retail segment, with end-customers free to choose their electricity suppliers.

## Phase 1: 2001 to 2004 (Exhibits 9.30 & 9.31)

- ¶ Unbundle SEBs into transmission, distribution and generation entities
- ¶ Privatise generation and distribution
- ¶ Set up an independent regulatory authority to regulate the “wires” business through price cap and service standards
- ¶ Mandate competitive bidding for all capacity additions.
- ¶ Eliminate cross subsidies and provide for all subsidies through the budget.
- ¶ Create a national grid in the next 3-5 years
- ¶ Ensure timely fuel supply by reforming the coal sector
- ¶ Create a level playing field for capital goods producers, so that capacity is added at the cheapest cost
- ¶ Reduce the number of approvals required to set up a power plant (e.g., do away with the need for approvals from both the central government and the state government).

Details of some of these recommendations are given below.

- ¶ **Privatise, starting with distribution:** Solving the problems facing distribution is of utmost urgency, since it is difficult to attract investments in generation until the distribution sector is financially viable. Hence, distribution should be privatised first, followed by generation.

The finances of the SEBs should be restructured prior to privatisation to make them attractive to potential investors. This may require both state and central government debts (e.g., to central utilities, railways and coal companies) to be partially written off or restructured. Other measures could include converting a large part of the state government debt to equity, using part of the privatisation proceeds to retire debts or charging an explicit tax on sales of electricity to cover past losses of SEBs. We believe that the proceeds from privatisation of the distribution companies could help to repay a large part of the central government debts and help to write off receivables from customers. Valuing the distribution companies at approximately twice their yearly sales would imply an enterprise value of approximately \$ 25 billion, whereas dues to central government companies were approximately \$ 5 billion and revenue arrears were approximately \$ 10 billion in 1999. (See accompanying box for the other actions the government should take to ensure the privatisation process is successful).

## Adopting the correct process for successful privatisation

For privatisation to be successful, state governments and regulators should ensure that potential investors believe the SEBs can be made viable. State governments should present the true financial picture to likely buyers, and give them the freedom to improve operational efficiencies after privatisation. Prior to privatisation, regulators should set norms for a period of 3-5 years for operational parameters such as losses, thefts and employee expenses, so that potential investors do not go “blind” into a transaction.

Conveying the correct financial position of the SEBs to potential investors is more difficult than it appears, since the annual reports have not been prepared for a number of years for many SEBs, a large number of consumer bills are bogus, and a large proportion of customers are not metered. At the minimum, the gross profit or loss before operating expenses should be correctly estimated by metering the input to the distribution company (to calculate the quantity and price of electricity purchased by the distribution company) and by estimating the monthly cash collections from customers.

Further, the privatised company should have the right to launch a Voluntary Retirement Scheme (VRS) and change the terms of service of the employees in order to improve productivity. Ideally, the proceeds from the divestment process should be used to fund the VRS.

Finally, the distribution company should be allowed to offset payments to be made to the government transmission utility for purchase of power against non-receipt of monies from state government departments for electricity sold to them. This is essential because state government departments often do not pay their electricity bills.

Similarly, the generation sector should be privatised in order to improve corporate governance, especially at the SEBs. This will ensure efficiency gains as profit pressure increases and political interference decreases. It will also help to attract funds for generation. Finally, the government should ensure that there is adequate competition and no one generator is able to influence prices.

- ¶ **Improve the regulatory framework:** This requires changing regulations to promote efficiency, and setting up an independent regulatory authority in each state to enforce the regulations impartially. Our recommendations are to:

- Ensure that regulations are enacted requiring generation, transmission and distribution activities to be carried out independently, so as to allow them to be regulated differently.
- Mandate that any distribution company requiring additional generating capacity should acquire it at the cheapest possible price through competitive bidding. This would ensure that the SEBs and central government power plants also compete to supply power at the cheapest possible price. Although it might appear that this regulation is unnecessary since private T&D players will try to procure power at the cheapest possible rate, in practice there is no pressure on T&D operators to reduce the fuel cost if it is a “pass on” cost.
- Change the current rate of return regulation to performance-based regulation based on incentive sharing (price caps i.e., RPI-X), for both distribution and transmission, which motivates producers to reduce costs.

An independent regulator, both at the state and central level, is essential to ensure that costs are contained and tariffs kept low. Price caps on the “wires” business should be set for 3-5 years, so that companies have an incentive to actually reduce costs beyond the price cap and can hence increase their returns. The pricing should reflect the requirement for investments to be made for metering and strengthening the T&D system and for repayment of the past outstandings. While these two factors are likely to increase the retail price of electricity, other factors like reduction in T&D losses within 3-5 years (say, to 15 per cent) and the gains resulting from productivity increases will offset these increases.

- ¶ **Improve fuel linkage/supply:** First, the government should formulate a fuel policy based purely on economic rationale, rather than distort the market through tariffs. Currently naphtha is used instead of distillate no. 2 or HSD due to the differential duty structures, despite naphtha being technically inferior and highly inflammable, and requiring special storage facilities. Further, competition should be allowed in the coal industry to ensure that thermal plants receive an adequate quantity of coal with a higher calorific value than at present.

## **Phase 2: 2005 onwards**

In the second phase, each state government should delicense generation and allow end-customers the right to choose their own electricity suppliers, while the central government should create a power pool to facilitate merit order dispatch and trading of electricity (**Exhibit 2.32**). The experience of Argentina and Australia shows that deregulating supply and creating a power pool have significant impact

on both wholesale and retail prices, as explained earlier. The Phase 2 recommendations should be implemented only after adequate generation capacity is available in the country.

- ¶ **Freedom to supply, freedom to buy:** Suppliers should have the right to sell power directly to end-consumers, starting with large customers with a rating greater than 1 MW. Gradually, competition should be allowed in all customer segments. Similarly, suppliers should have the right to buy from distribution companies and generators, or through the power pool. This implies delicensing generation to allow generating companies to sell to suppliers of their choice, both within and outside the relevant state. It also implies that third party access to the “wires” is essential.
- ¶ **Creation of an electricity exchange:** Although retail competition ensures that a competitive market is created, it does not ensure that there is an organised way in which trading in electricity can take place on a “spot” basis. Since electricity cannot be stored, a spot market is essential to balance demand and supply mismatches on an ongoing basis. Thus, we recommend setting up an electricity exchange (or “pool”) to trade electricity. This dispatch of electricity on an ongoing basis will have to be managed by an independent system operator, who ensures that no generator is favoured in case of transmission capacity bottlenecks. However, this should not preclude suppliers and distributors from getting into long-term fixed rate contracts with generators. This will help dampen the boom and bust cycles associated with high fixed cost commodity businesses like generation.

We now discuss the importance of countering resistance to privatisation and product market reforms and outline how India should approach the task of reforming the power sector.

Opposition to reforms is to be expected. Employees fearing job losses, farmers dreading the loss of subsidised power, politicians convinced that privatisation is not the right solution, and politicians and bureaucrats fearing the loss of “entitlement” will oppose and delay the reform process. The government must clearly communicate the message that the gains from reforms – elimination of shortages and cheaper prices in the long run – far outweigh the perceived losses, and firmly press ahead to achieve the potential in this sector.

- ¶ **Employees and PSU unions will fear job losses due to privatisation:** This can be managed by reserving a part of the sale proceeds to create an attractive Voluntary Retirement Scheme (VRS) fund or retraining fund for displaced workers. It should also offer Employee Stock Option Plans (ESOPs) to employees to make privatisation attractive.

- ¶ **Farmers and politicians will resist the loss of subsidies:** The government should try a two-pronged approach to overcome this resistance. First, it should clearly communicate that the majority of the subsidy benefits today accrue to large farmers using lift irrigation systems. Second, it should increase aid to poor farmers by initiating a means-tested programme, rather than encouraging wasteful consumption by distorting the market price of electricity (also the subsidies can still be paid, directly from the government budget).
- ¶ **Some politicians and union leaders will say privatisation is not the right solution:** Some politicians and union leaders believe that it is government and bureaucratic interference that causes the poor performance of SEBs, and not government ownership. Hence, they feel that lack of interference, rather than privatisation, is the solution to improving performance. However, the government should acknowledge that its social obligations are at odds with the commercial interests of its utilities and divest its stake. Further, history shows that private utilities in India have fared better than government-owned utilities.
- ¶ **Management, bureaucrats and politicians will fear loss of privileges:** This loss of power is one of the most important factors that could delay power sector reforms, even after the government has decided in principle to privatise. One way to counter the delay that management and administrative departments could create is to transfer each company earmarked for privatisation to a divestment department that would be responsible for privatisation.

## Appendix 9A: Measuring capital and labour productivity

To measure capital and labour productivity in generation, we have used a physical measure of output for net generation (Mwh) per dollar of capital service and per hour worked, respectively. However, measuring capital and labour productivity in T&D demands the use of actual value added per unit of capital and labour. This is because using merely an output measure (units of electricity sold to consumers) would be grossly inaccurate as a proxy for value addition, primarily due to the much larger losses incurred in India as compared to the US. To calculate the value added for T&D in India, we have used the ratio of input electricity price to output electricity price in the T&D sector of the US. This avoids the errors in calculating value added by using distorted electricity prices in India.

For our calculation of capital stock and flow numbers, we have gathered capital expenditure over time, split by generation and T&D.

Given below are the data sources, quality adjustments, and vertical integration adjustments made to measure capital and labour productivity.

### CAPITAL PRODUCTIVITY

- ¶ **Data sources.** Our primary data sources for productivity estimates are the Annual Survey of Industry, the Planning Commission, the CEA, and aggregated balance sheets of the utilities. Interviews with turnkey contractors and leading manufacturers of capital goods equipment helped us construct a PPP for gross fixed capital formation for generation. The PPP is 85 per cent of the exchange rate, primarily due to the lower labour costs and lower cost of sourcing auxiliary equipment in India.
- ¶ **Quality adjustments.** The key difference in the quality of power in India and the US is that the former often faces power shortages, which are virtually non-existent in the latter. Due to these shortages, the load factor (i.e. average to peak load) is higher in India. We postulate that because of the higher load factor, other factors being equal, Indian generators could operate at a higher level of capacity utilisation than generators in the US. Hence we have scaled down the capacity utilisation factor for Indian generators to adjust for the higher load factor due to shortages.

Other areas of differences in quality include variation in voltage, frequency, and a higher probability of outages. We did not make adjustments for these second order effects, as we consider the primary cause of these effects to be the shortage of energy.

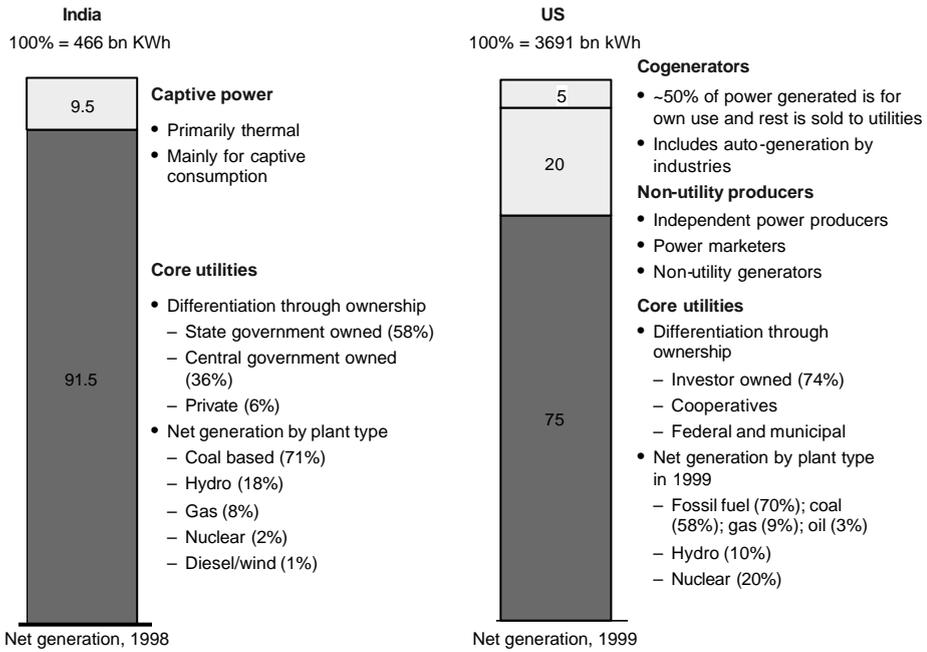
- ¶ **Vertical integration adjustments.** Due to differing environmental standards, plants in India do not require Flue Gas Desulphurisers and Denox plants. As a result, these plants are about 5-7 per cent cheaper. Hence the capital stock for India has been increased by an equivalent amount, to make the capital stock numbers comparable to the US.

## LABOUR PRODUCTIVITY

- ¶ **Data sources.** Interviews with eight utilities across the different segments allowed us to measure the labour productivity for both generation and for T&D. We confirmed these numbers with aggregate data on SEBs from the Planning Commission, and the balance sheets of various private and central utilities.
- ¶ **Quality adjustments.** The quality of the service, in terms of shortages, outages, and variations in voltage and frequency, is far worse than in the US. Further, customer queries take much longer to resolve. As we were not able to measure these differences, we have not adjusted for them.
- ¶ **Vertical integration adjustments.** Distributors in India bill agricultural consumers on horsepower and not on the electricity actually consumed. Hence the meter readers have to work less per consumer. On the other hand, bill dispatchers in India actually deliver bills to the homes of consumers as the postal system is unreliable. Both these factors were adjusted for while measuring labour productivity.

## STRUCTURE OF THE POWER SECTOR IN INDIA AND US

Per cent



Source: International Energy Authority (IEA); CMIE

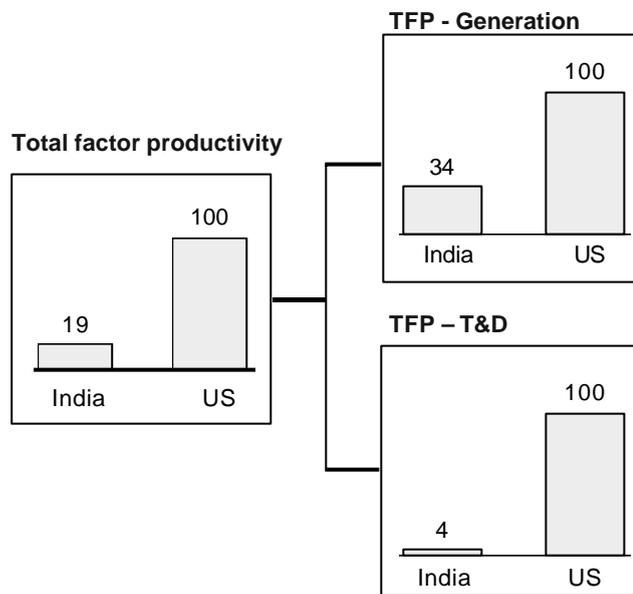


Exhibit 2.2

2001-07-13MB-ZXJ151-(Alkesh)-(SM)

## TOTAL FACTOR PRODUCTIVITY: INDIA VS. US

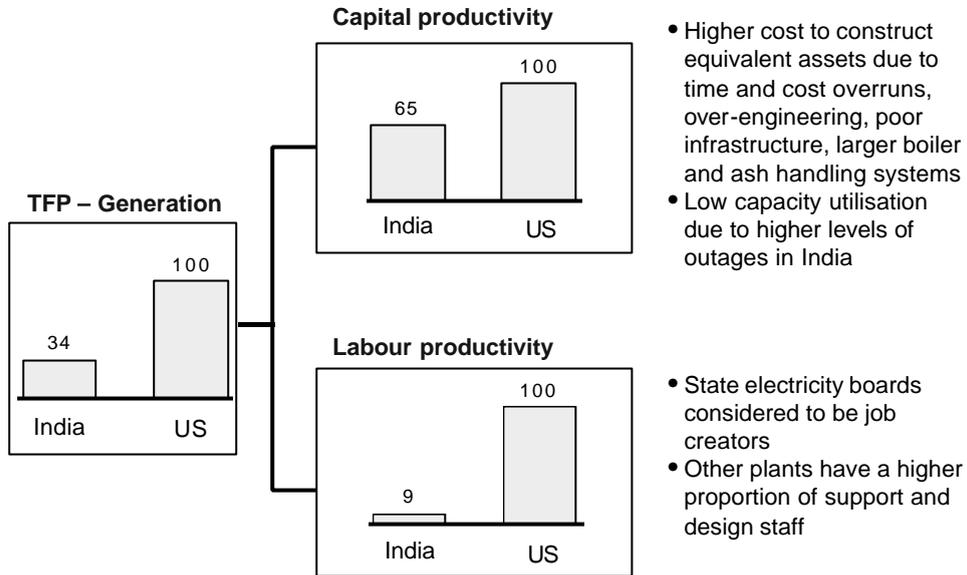
Index : US = 100



Source: CEA; MoP; Planning Commission; EIA; EEl Statistical Yearbook; Moody's; CMIE; ASI

### TOTAL FACTOR PRODUCTIVITY IN GENERATION

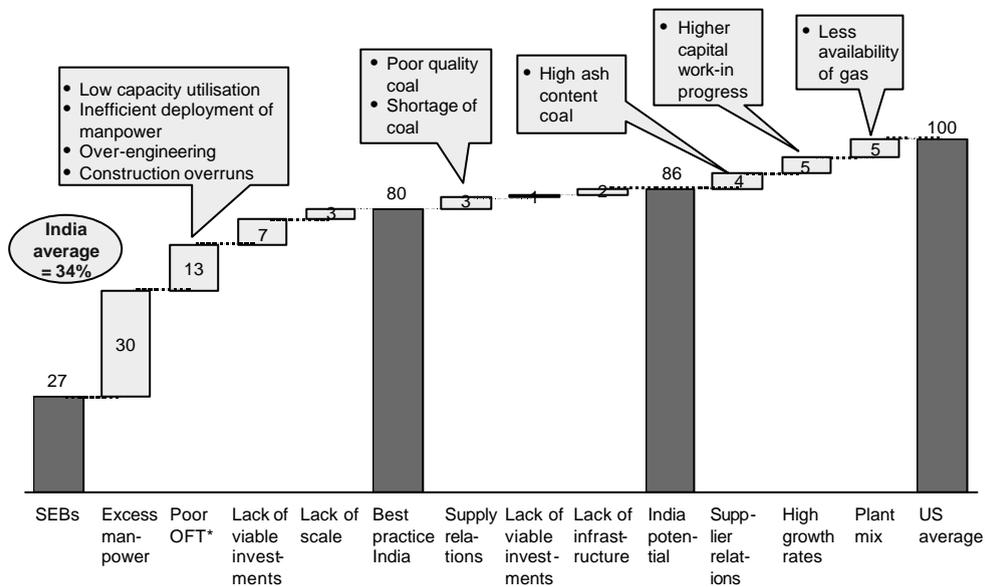
Index :US = 100



Source: Planning Commission; CEA; EIA; ASI; Interviews; McKinsey analysis

### OPERATIONAL REASONS FOR PRODUCTIVITY GAP – GENERATION

Index :US = 100



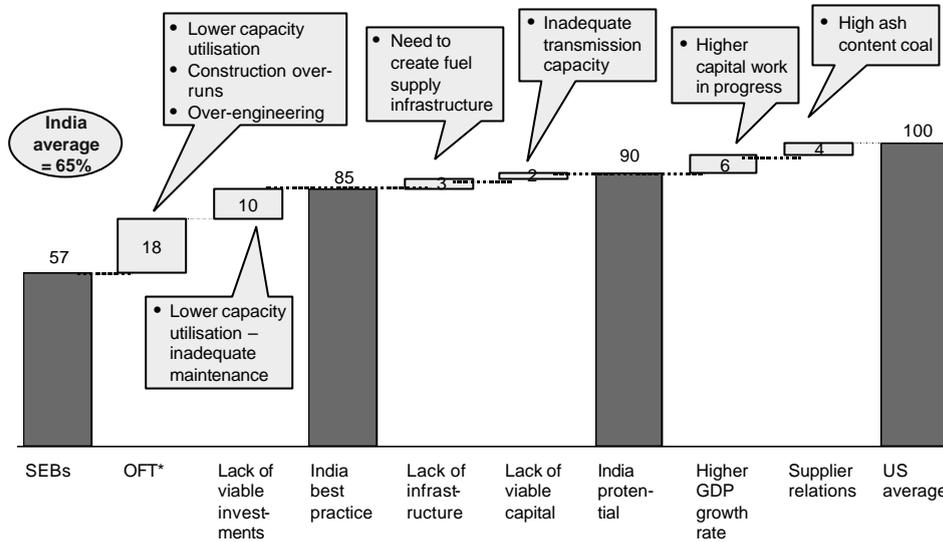
\* Organisation of functions and tasks

Source: Planning Commission; CEA; EIA; ASI; Interviews; McKinsey analysis

Exhibit 2.5

### OPERATIONAL REASONS FOR CAPITAL PRODUCTIVITY GAP – GENERATION

Index :US = 100



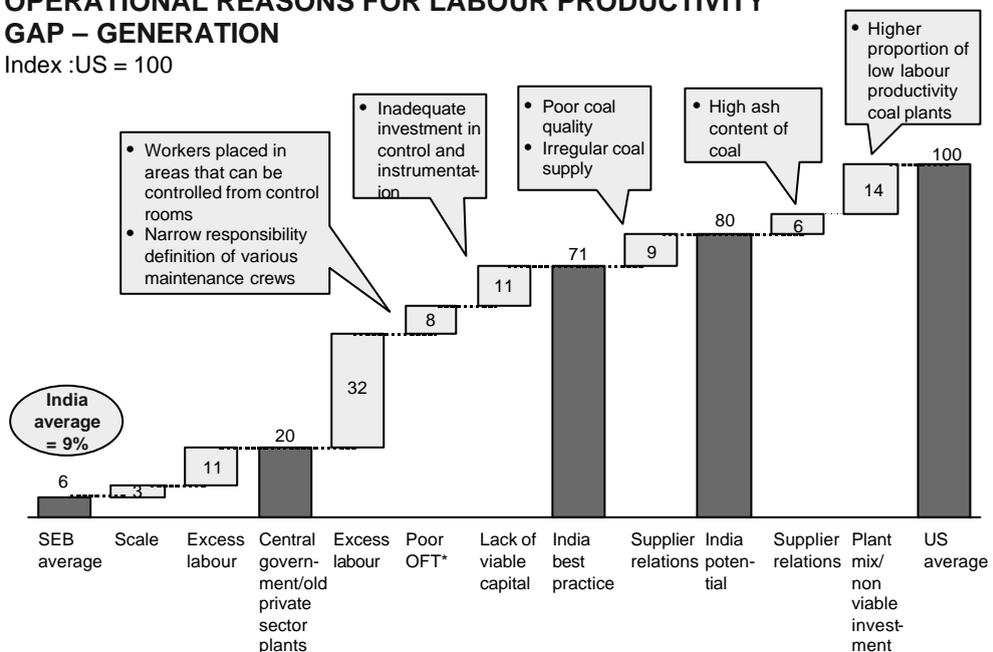
\* Organisation of functions and tasks

Source: Planning commission, CEA, EIA, ASI, Interviews, McKinsey analysis

Exhibit 2.6

### OPERATIONAL REASONS FOR LABOUR PRODUCTIVITY GAP – GENERATION

Index :US = 100



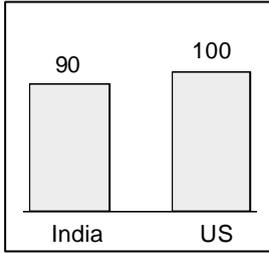
\* Organisation of functions and tasks

Source: Planning Commission; CEA; EIA; ASI; Interviews; McKinsey analysis

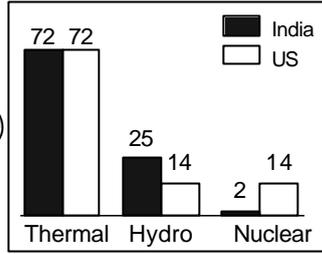
### COMPARISON OF GENERATION CAPACITY CREATED FOR EQUIVALENT FINANCIAL INVESTMENT

Index : US = 100

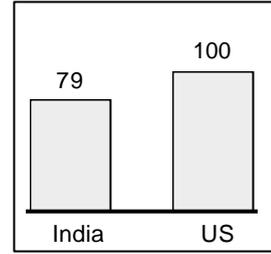
**Generation capacity created with assets, unadjusted**  
Index : US (1996) = 100



**Plant mix**  
Per cent



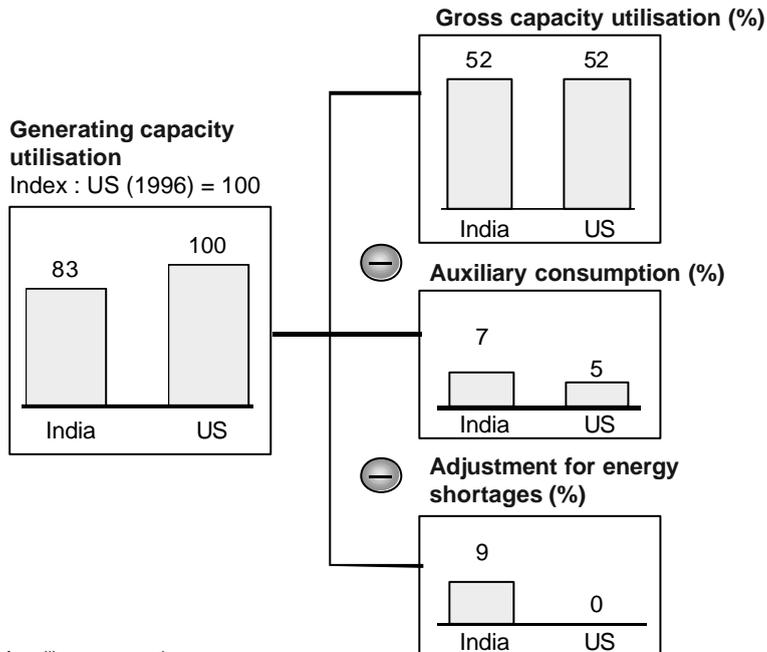
**Generation capacity created with assets, adjusted for plant mix**  
Index : US (1996) = 100



India's generation capacity per dollar invested is less than the US, despite fewer nuclear plants

Source: EIA; EEI; CMIE; Planning Commission; CEA; ASI

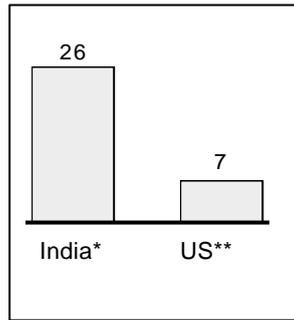
### GENERATING CAPACITY UTILISATION\*



\* Net of auxiliary consumption

Source: CEA; CMIE; EPRI; EIA; McKinsey Utility Practice

### OUTAGES IN THERMAL PLANTS 1996, Per cent



#### The higher outages in India are due to

- Breakdowns in boilers, generators and turbines (11%)
- Breakdowns in auxiliary equipment (4%)
- Problems in coal quality (5%)
- Others (6%)

\* Includes both forced and partial outages

\*\* Equivalent forced outage hours (including derated hours)

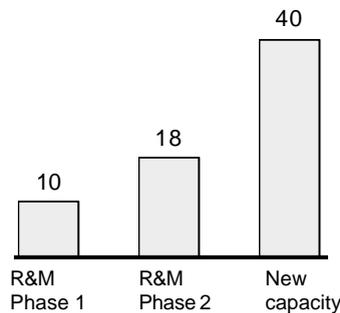
Source: CEA; NERC

### EFFECT OF RENOVATION AND MODERNISATION (R&M)

	Phase 1	Phase 2
	1985-93	1991 onwards
No. of power plants	34	46
Generating capacity (MW)	13,000	21,500
Cost (Rs. Bn)	12	25
Increase in PLF (%)	7	5
Generating capacity saved (MW)	1,200	1,400

#### Capital cost per MW: R&M vs. new capacity

Rs. Mn/MW

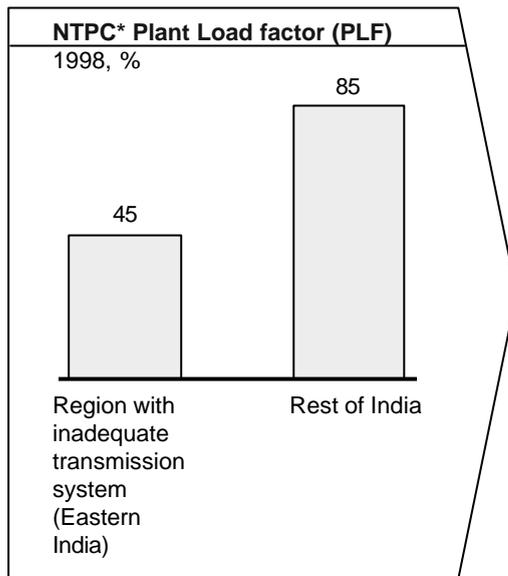


It is more economical to undertake a renovation & modernisation programme than to set up new capacity

Source: CEA; McKinsey analyses

## INADEQUACIES OF TRANSMISSION SYSTEM

NTPC EXAMPLES



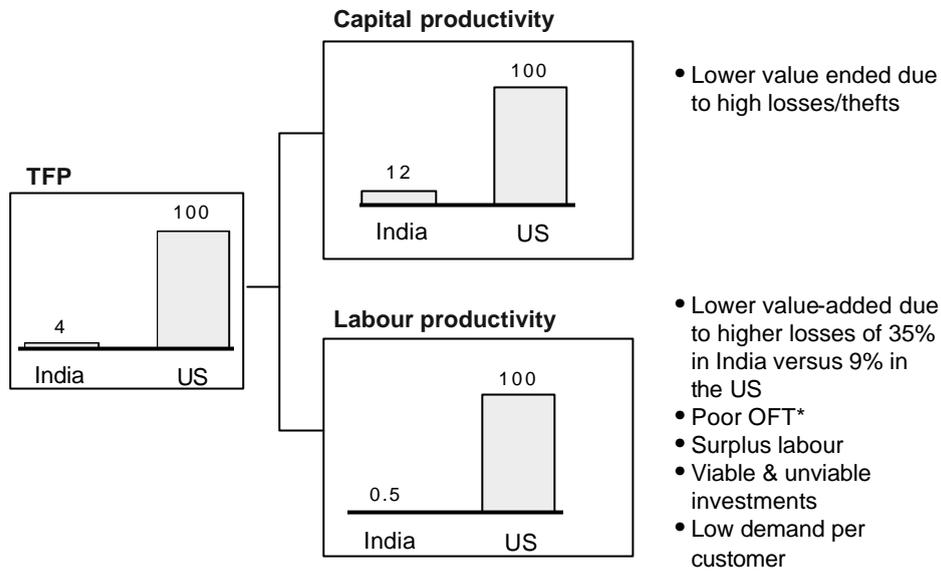
- NTPC's output would increase by 11% if PLF in eastern region equaled PLF in rest of India
- Study conducted by CEA\*\* shows that India can save 3%-4% of generating capacity if a national grid were available by 2007

\* National Thermal Corporation (NTPC) is India's largest power generator with approximately 20% of India's generating capacity

\*\* Central Electricity Authority

### TOTAL FACTOR PRODUCTIVITY (TFP) IN T&D

Index :US = 100

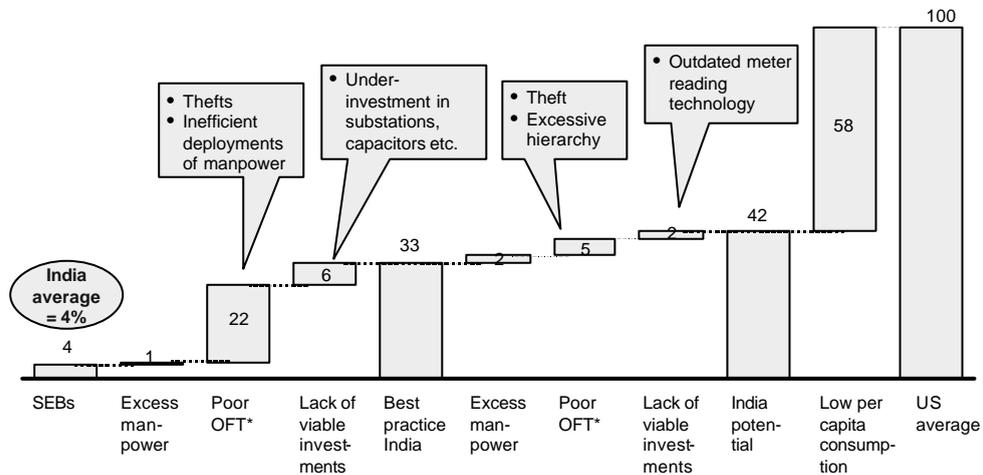


\* Organisation of functions and tasks

Source: Planning Commission; CEA; EIA; ASI; Interviews; McKinsey analysis

### OPERATIONAL REASONS FOR TOTAL FACTOR PRODUCTIVITY GAP – T&D

Index :US = 100



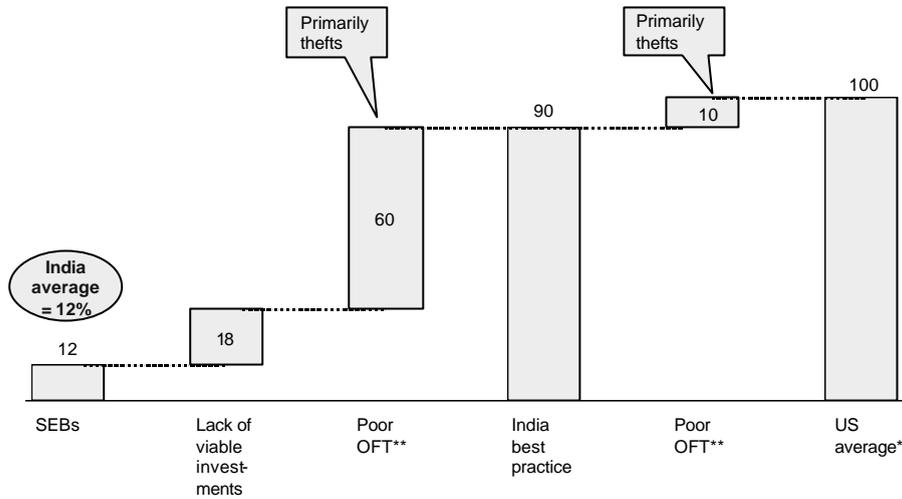
\* Organisation of functions and tasks

Source: CEA; CMIE; ASI; Planning Commission; EIA; Interviews; McKinsey analysis

Exhibit 2.14

### OPERATIONAL REASONS FOR CAPITAL PRODUCTIVITY GAP – T&D

Index :US = 100



\* Adjusted for lower capital productivity in the US as some investments are unviable in India (e.g. SCADA)

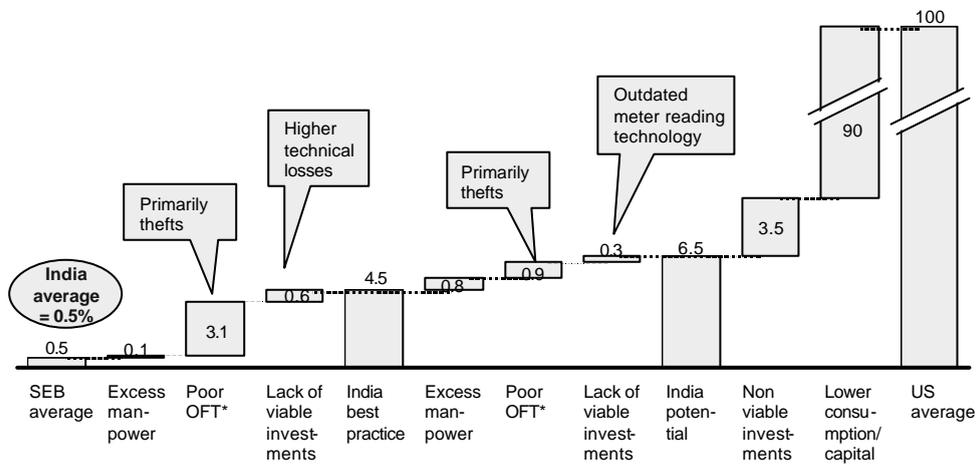
\*\* Organisation of functions and tasks

Source: CEA; CMIE; ASI; Planning Commission; EIA; Interviews; McKinsey analysis

Exhibit 2.15

### OPERATIONAL REASONS FOR LABOUR PRODUCTIVITY GAP – T&D

Index :US = 100

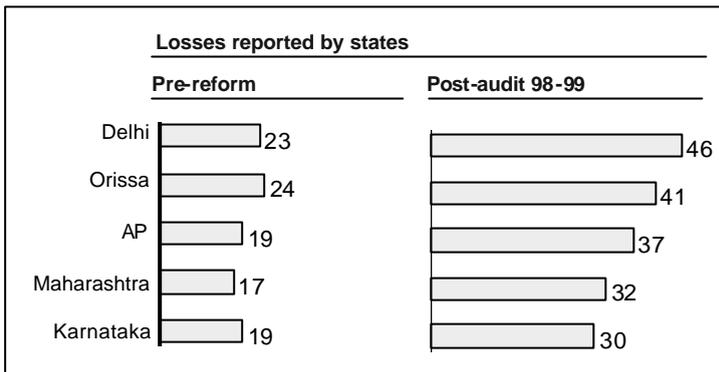


\* Organisation of functions and tasks

Source: CEA; CMIE; ASI; Planning Commission; EIA; Interviews; McKinsey analysis

## T&D LOSSES

Per cent



- Although reported T&D losses are 22%, real T&D losses are around 35% in India versus 9% in the US

- Technical losses are estimated at 10-12%, while commercial losses are estimated at 23-25%



Exhibit 2.17

## INDUSTRY DYNAMIC RESPONSIBLE FOR LOW TOTAL FACTOR PRODUCTIVITY

2001-07-13MB-ZXJ151-(Alkesh)-(SM)

- Important
- Somewhat Important
- ✕ Not Important

### Generation

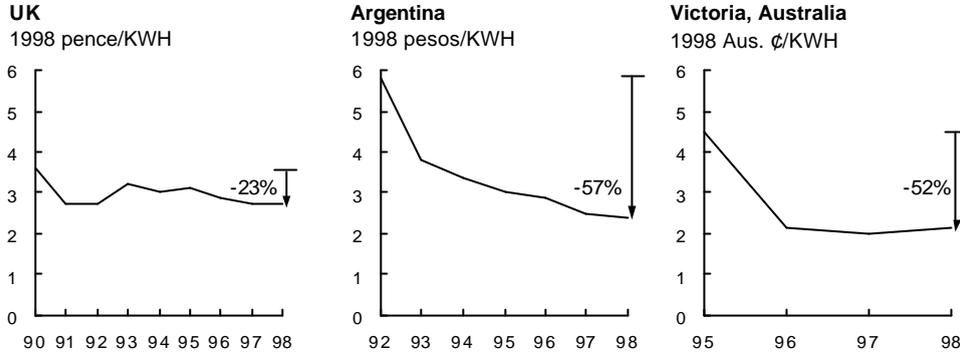
- Domestic competitive intensity
  - Low competition for wholesale tariffs as SEBs & central government utilities not part of competitive bidding process
  - IPP entry has been limited
  - No competition for retail customers
- ✕ Exposure to best practice
  - Not important as best practice Indian companies close to potential
- ✕ Non level playing field

### T&D

- ✕ Industry dynamics not important as it is a natural monopoly in all countries

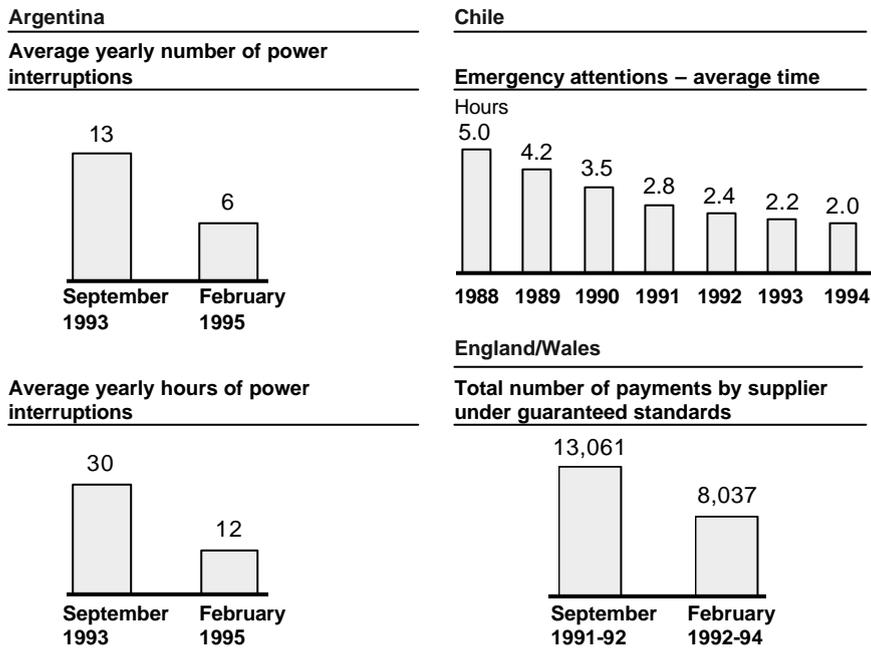
Source: McKinsey analysis

### SHARP DECLINE IN POOL PRICES Start of pool operation up to 1998



Source: OFFER; Cammesa; Victoria Power Exchange; IMG; McKinsey analysis

### SERVICE QUALITY IMPROVEMENTS SINCE DEREGULATION



Source: Regulators in Argentina, Chile, England & Wales; McKinsey analysis

**EXTERNAL FACTORS RESPONSIBLE FOR LOW TOTAL  
FACTOR PRODUCTIVITY IN GENERATION/ T&D : SUMMARY**

- High Importance
- Medium Importance
- × Low Importance



- Government ownership leading to poor corporate governance; primarily at state-owned electricity boards
  - Political/social compulsions
  - Lack of government funds for investment
  - Lack of profit pressure
  
- Product market imperfections
  - Lack of an independent regulator, until recently
  - Poor regulation
  - Non-level playing field
  - Requirement for multiple approvals/red tape
  
- Other factors
  - Government monopoly in coal
  - Delays in settling court cases
  - Corruption
  - Difficulty in importing alternative fuel historically
  - Poor quality of coal
  
- Related industry (T&D)
  
- Labour market barriers (caused mainly by government ownership)

Source: OFFER; Cammesa; Victoria Power Exchange; IMG; McKinsey analysis







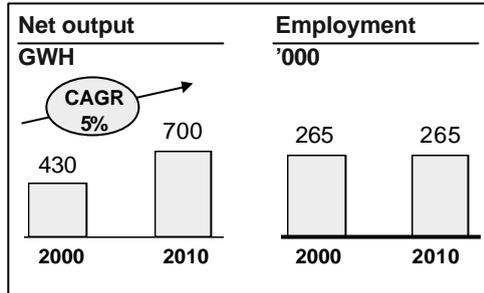


### FUTURE OUTLOOK: STATUS QUO SCENARIO

#### Assumptions

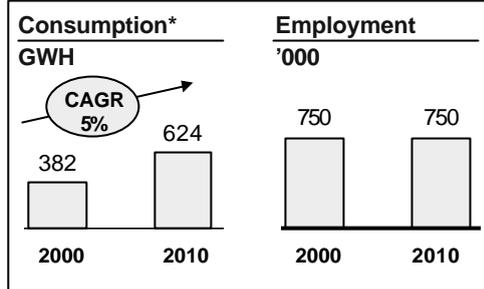
##### Generation

- Productivity increases at historical rate of 5% p.a.
- Net output increases at historical rate of approx. 5% p.a.



##### T&D

- Productivity increases at historical rate of 5% p.a.
- Consumption increases at historical rate of 5% p.a.



\* Inclusive of thefts. Technical T&D losses assumed to be 11% in both 2000 and 2010

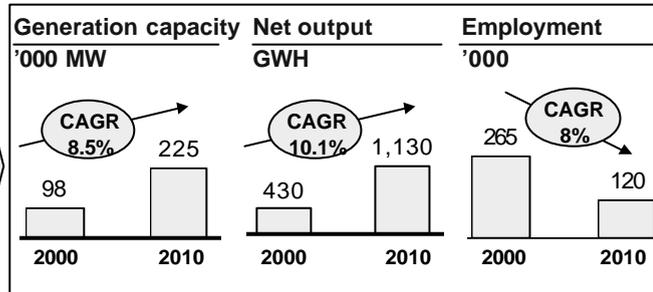
Source: Planning Commission; CMIE; McKinsey Analysis

### FUTURE OUTLOOK: FULL REFORMS SCENARIO

#### Assumptions

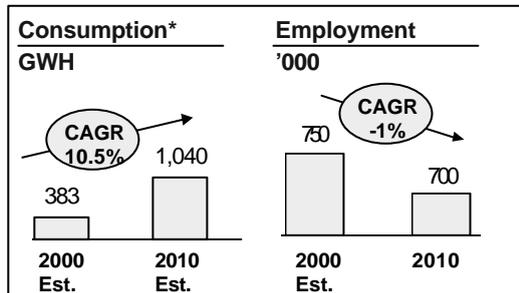
##### Generation

- Capital productivity increases from 65% to 90%
  - PLF increases from 54% to 61%
  - Auxiliary consumption reduces from 7% to 6%
- Labour productivity increases from 9% to 52%



##### T&D

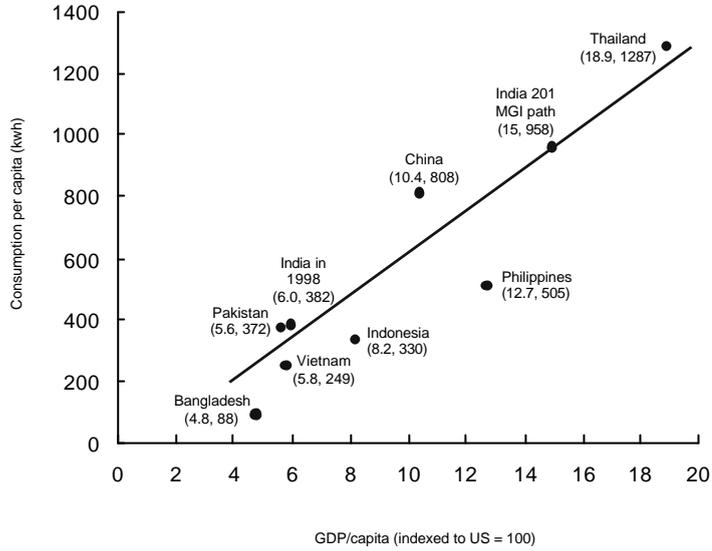
- Capital productivity increases from 12% to 100% of US levels
  - Thefts assumed to reduce to 0% in 2010
  - T&D losses reduce from 11% in 2000 to 8% in 2010
- Labour productivity increases from 0.5% to 9% of US levels
  - 0.5 to 3.3% due to reduction in losses
  - 3.3 to 6.5% due to OFT, viable capital
  - 6.5 to 9% due to increase in consumption per customer



\* Inclusive of theft

Source: CEA; ASI; Planning Commission; EIA; Interviews; McKinsey analysis

### RELATIONSHIP BETWEEN ELECTRICITY CONSUMPTION PER CAPITA AND GDP/CAPITA

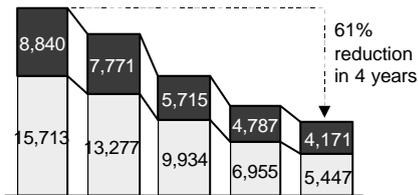


Source: EIA; EIU; McKinsey analysis

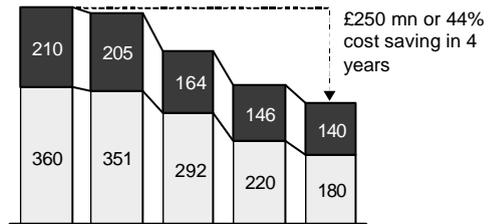
### PRODUCTIVITY GAINS OF UK GENERATORS\*\* 1991-1995

□ National Power  
■ PowerGen

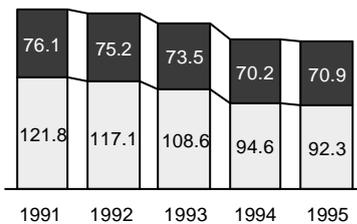
#### Number of employees



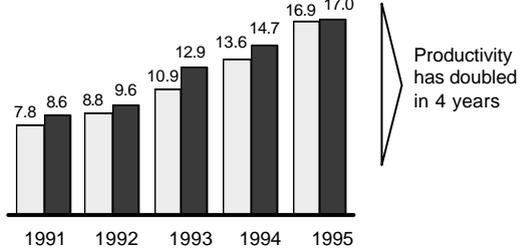
#### Employee costs\*



#### Output, Twh



#### Productivity, Gwh per employee

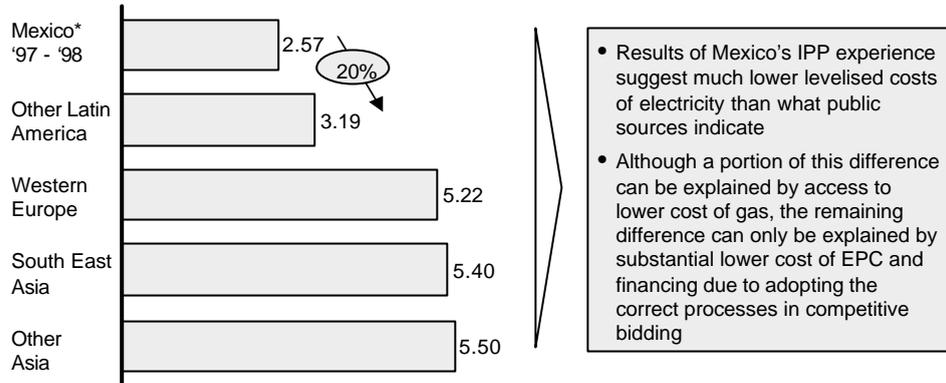


\* Wages, salaries, social security and pension costs for all employees (including directors)

\*\* National Power and PowerGen

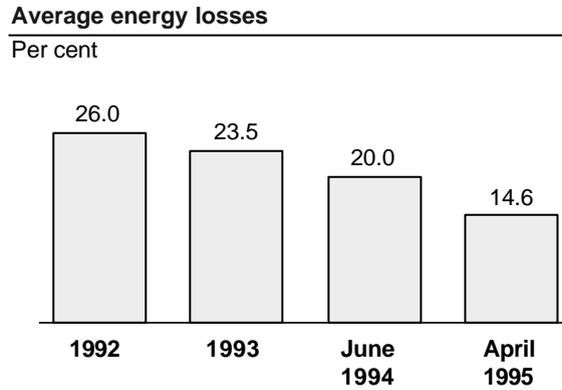
Source: Annual reports

**COST OF ELECTRICITY IN CCGT IPPs BY REGION OF THE WORLD**  
US¢/kwh



\* Weighted average of winning bids (1,600 Mw/4 projects)  
Source: McKinsey Private Power Database 1998

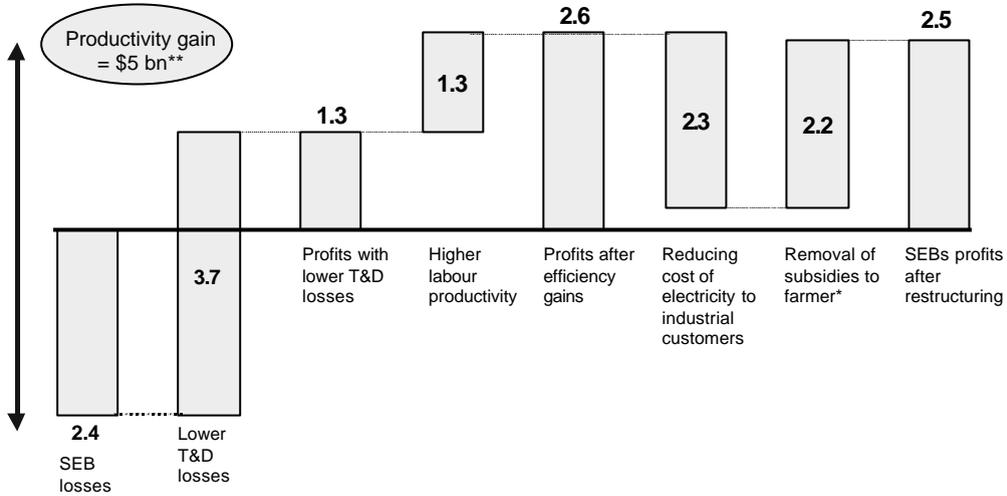
**PRIVATE DISTRIBUTORS: T&D LOSSES IN ARGENTINA**



- Actions**
- Increased number of field salesmen
  - Investments in theft control
  - Upgrading T&D network

Source: Edesur; Edenor

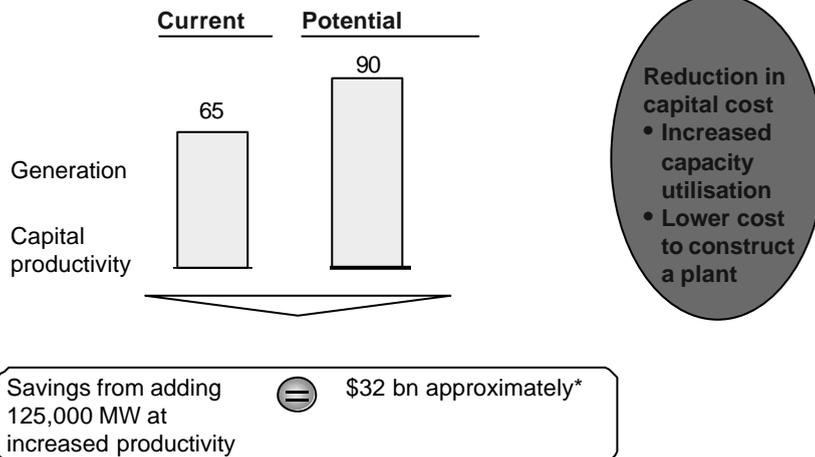
### FINANCIAL IMPLICATIONS OF RESTRUCTURING THE POWER SECTOR Bn, 1999



\* Assuming current T&D losses are 35% of which 12.5% are recorded as sales to farmers  
 \*\* \$1=Rs.45

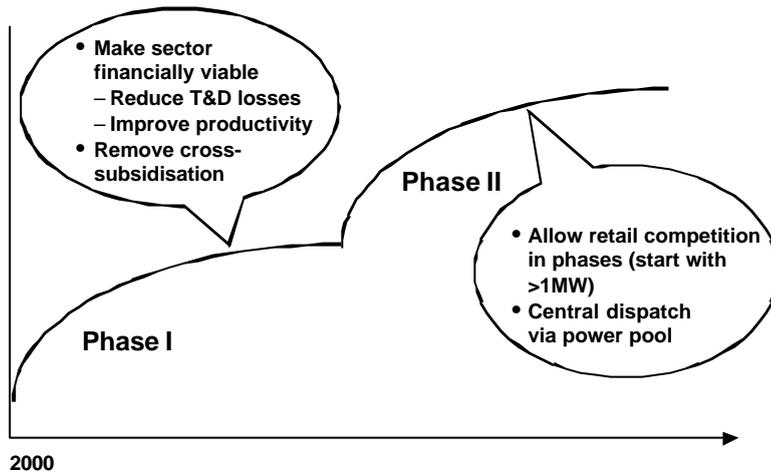
Source: Planning Commission; McKinsey analysis

### SAVINGS FROM IMPROVING CAPITAL PRODUCTIVITY Indexed to US (1996) = 100



\* Assumes 1 MW of capacity costs \$1 million currently  
 Source: McKinsey analysis

## RECOMMENDATIONS FOR THE ELECTRICITY SECTOR



**Recommendations**

- Unbundling
- Privatisation
- Better and independent regulation
- Delicensing generation
- Suppliers to sell to end customers
- Central dispatch with power pool

**PHASE I RECOMMENDATIONS TO IMPROVE PRODUCTIVITY**

<b>Area</b>	<b>Recommendation</b>
<b>Generation</b>	<ul style="list-style-type: none"> <li>• Unbundle and privatise existing generation assets; Allow new owners/management to change terms of service of existing employees to improve productivity</li> <li>• Do financial restructuring of SEB books prior to privatisation</li> <li>• Include central utilities/SEBs in competitive bidding process               <ul style="list-style-type: none"> <li>– Evaluate proposals with only one criterion: lowest NPV of utility payments</li> </ul> </li> </ul>
<b>Transmission</b>	<ul style="list-style-type: none"> <li>• Unbundle transmission activities of SEBs. Regulate through price caps and service standards</li> </ul>
<b>Distribution</b>	<ul style="list-style-type: none"> <li>• Unbundle and privatise distribution assets of SEBs               <ul style="list-style-type: none"> <li>– Allow change in terms of service/rationalisation post privatisation</li> </ul> </li> <li>• Regulate via price cap and service standards</li> <li>• Set ambitious targets for reduction in T&amp;D losses e.g., to 15% in 3 years</li> </ul>
<b>Pricing</b>	<ul style="list-style-type: none"> <li>• Eliminate cross-subsidisation in 3-5 years, to enable competition in the retail market</li> <li>• Replace current subsidies by direct means-tested subsidies from the state government</li> </ul>

**PHASE I RECOMMENDATIONS TO IMPROVE PRODUCTIVITY**

<b>Area</b>	<b>Recommendation</b>
<b>Capital goods suppliers</b>	<ul style="list-style-type: none"> <li>• Create a level playing field by removing purchase price preference for PSUs</li> </ul>
<b>Bureaucracy/ Red tape</b>	<ul style="list-style-type: none"> <li>• Remove requirement for multiple approvals (e.g. environment clearance and water availability from centre and state)</li> <li>• Eliminate techno-economic clearances for competitively bid projects</li> <li>• Create single window clearance for other approvals required from different ministers, e.g., land availability, fuel linkage, financing and transportation of coal</li> </ul>
<b>Fuel supply</b>	<ul style="list-style-type: none"> <li>• Allow private players/generators to develop coal mines</li> </ul>

**PHASE II RECOMMENDATIONS: RETAIL COMPETITION AND CENTRAL POWER POOL**

<b>Area</b>	<b>Recommendation</b>
<b>Generation</b>	<ul style="list-style-type: none"><li>• Delicense generation in all states. Allow generators to directly sell to a power pool or eligible customers</li></ul>
<b>Transmission</b>	<ul style="list-style-type: none"><li>• Keep transmission a regulated monopoly</li><li>• Clearly define wheeling terms</li></ul>
<b>Distribution</b>	<ul style="list-style-type: none"><li>• Allow third party access</li><li>• Retain 'wires' as a regulated monopoly business</li></ul>
<b>Markets/ suppliers</b>	<ul style="list-style-type: none"><li>• Allow suppliers to sell power directly to consumers, starting with large consumers (&gt;1MW), gradually extending to medium (&gt;0.1MW), and finally to all retail consumers</li></ul>
<b>Pricing</b>	<ul style="list-style-type: none"><li>• Create a central power pool that dispatches electricity on the basis of lowest bids</li><li>• Create a derivatives market (contract for differences market) that allows for bilateral contracts to be negotiated between generators and consumers, and hence controls price volatility</li></ul>

# Housing Construction

## **SUMMARY**

The housing construction sector in India is small and unproductive. The sector contributes only 1 per cent of GDP in India, as compared to 3 per cent in Russia and 6 per cent in Brazil. Labour productivity in the sector is less than one-fifth its potential.

There are two key reasons for the poor productivity performance of the sector. The first is the artificial scarcity of land created by various distortions in the land market. The second is the lack of standards for building materials and the poor enforcement of the standards that exist.

These factors create a situation where competition in housing construction is not based on construction costs, but is instead based on securing access to land and managing material costs. As a result, players are profitable despite the inefficient and unproductive construction practices.

If the land market barriers are removed and the material standards enforced, the sector will experience dramatic growth. In fact, if these issues were to be addressed and the economy were to grow at 10 per cent a year, the sector would grow at 14 per cent a year and create over 3.2 million jobs over the next 10 years.

## **Productivity performance**

At around 8 per cent of US levels, labour productivity in the Indian housing construction industry is currently lagging behind other developing countries such as Brazil, Poland and Korea. Indian brick home construction productivity, both for Multi-Family Homes (MFH) and Single-Family Homes (SFH), is around 15 per cent of US levels while productivity within the SFH-Mud segment is significantly lower at around 2 per cent of US levels.

The productivity potential in the SFH-Mud segment is inherently low as the nature of materials used limits the service value provided. In contrast, India's productivity potential at current factor costs for MFH and SFH-Brick segments is very high, at around 90 per cent of the US.

## **Operational reasons for low productivity**

At the operational level, poor organisation of functions and tasks (OFT), inefficient design for manufacturing (DFM) and lack of large-scale projects are the key reasons for the low labour productivity in this sector.

## **Industry dynamics**

The industry suffers from a lack of price-based competition. As a result, players are complacent and do not feel motivated enough to cut construction costs or improve productivity. This has resulted in poor operational efficiency. For instance, in the MFH segment, all players along the production chain, from developers onwards, are focusing their attention on issues such as gaining access to land and cutting material costs, rather than focusing on productivity at the sites. This decreases any incentive for the contractors and labour subcontractors to improve operations. In the SFH-Brick segment, on the other hand, price-based competition is low due to the shortage of professional builders. Owners who purchase the materials themselves and directly engage labour subcontractors typically build these dwellings. Competition is further reduced by the lack of cheaper large-scale developments. This is in stark contrast to the US where large-scale developments of SFH-Brick housing make up over 50 per cent of output.

## **External factors responsible for low productivity**

There are two main sets of reasons for the absence of price-based competition in the Indian housing industry. The first set comprises a great paucity of available land for construction; lack of clarity over who holds the titles for a vast majority of the landholdings; and a lack of infrastructural development in city suburbs (such as water and sewerage systems). This means that only those few developers who are already well established have access to this land. Moreover, the lack of clear titles makes collateral-based financing very difficult, thus reducing liquidity both in the primary and the secondary markets and further reducing activity and competition in the market.

The second set of factors includes not only a distinct lack of standards as far as building materials are concerned but also ineffective enforcement of the few standards that do exist. Maintaining and enforcing material standards would facilitate the dissemination of best practices and create greater transparency in the housing market thereby allowing consumers to compare prices. It would also make it more difficult for contractors to profit by sourcing cheap and sub-standard materials and compel them to focus on earning their profits by lowering labour costs.

## Industry outlook

If these barriers were removed, the housing construction sector could witness significant growth over the next 10 years. If all the sectors were reformed, and assuming that GDP grew at 10 per cent per year, we estimate that the housing sector would experience output growth of around 14 per cent per year. Higher economic growth and the resulting faster format mix evolution, i.e., a shift from mud to brick segments, would also increase productivity growth to 8 per cent per year from the current 2-3 per cent. As a result, employment in the sector would increase rapidly at around 6 per cent per year creating over 3.2 million new jobs over the next 10 years. And housing prices could fall by as much as 40 per cent.

## Policy recommendations

To achieve this considerable potential in output, productivity and employment growth, the following actions need to be taken:

- ¶ **Clarify ownership rights of land titles:** We propose four steps to achieve this. First, the state government needs to set up specialised courts to handle all land title disputes. Second, it must simplify and modernise the current registration system for land titles. Third, it should rescind the Urban Land Ceiling Act and, finally, it should lower the stamp duty, thus minimising tax evasion and reducing the costs associated with registering titles.
- ¶ **Increase collection from property tax and user charges:** Local governments should raise property taxes by de-linking them from currently controlled rents. The government should strengthen enforcement of property taxes and privatise water, sewerage and the electricity services that are still under its control.
- ¶ **Introduce modern standards for construction material and strengthen enforcement:** The central government should lead the initiative to introduce modern standards for construction materials and ensure the enforcement of these standards. To facilitate widespread disbursement, the government, via the National Housing Bank, should link public funding for housing to the adoption of these new standards. Finally, it should introduce consumer protection laws and establish special courts to safeguard buyers against the use of sub-standard materials.

# Housing Construction

For the purposes of this study, we have used the housing construction industry as representative of the entire construction industry – an understanding of the barriers to growth in the housing sector will contribute towards a better understanding of issues confronting the Indian construction sector.

The housing industry is also important because it directly addresses one of the basic needs of society – shelter. Improvements in productivity and output in the housing sector, i.e., lower prices and wider availability of affordable housing will therefore have a direct impact on the living standards of most Indians.

Our study reveals that productivity in this sector is well below potential. Currently, in spite of a severe housing shortage, the sector contributes only 1 per cent to India's output and employment and is growing slowly at 4 per cent per year. This is largely due to unclear titles of land, ineffective collection of property tax and user charges, and inefficient enforcement of standards on construction material.

Our definition of the housing construction industry encompasses all construction work done at a building site and includes: excavation/foundation, structure building, masonry/plastering and painting/finishing work. We have excluded land acquisition, property selling and renovation in our study of the sector (**Exhibit 1.1**).

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## INDUSTRY OVERVIEW

In comparison with most other countries, the Indian housing construction sector is small in terms of both output and employment. For instance, of the 4,000,000 people (Full Time Equivalents – FTEs) employed in this sector in 1993-94, as many as half were unskilled workers. Moreover, housing construction in India represents only around 1 per cent of both output and employment as opposed to the over 3 per cent of Russia, Korea and Brazil (**Exhibit 1.2**). The sector has also exhibited relatively slow growth of around 4 per cent in spite of the current low per capita stock and a severe housing shortage (**Exhibit 1.3**). Per capita housing stock in India stands at around 5 square metres per capita as compared to the over 19 square metres per capita of China and Russia (**Exhibit 1.4**). As a result, some sources estimate that the 1997 housing crisis occurred because they were short of as many as 33 million homes (**Exhibit 1.5**).<sup>1</sup> This problem is compounded by the poor quality of most Indian dwellings, which increases the need for replacement and upgrading.

### Participants in India's housing construction industry

The construction industry consists of numerous fragmented firms. Developers engage main contractors who, in order to maintain minimal overheads, subcontract most of the construction tasks to smaller, non-registered groups of workers. Although these subcontracted (mostly blue-collar) workers have some specialisation in their respective trades, almost none of them provides truly professional and specialised services to construction firms. The industry then is made up of developers, contractors, subcontractors and workers.

- ¶ **Developers:** Property developers, typically small landowners, start the construction process by commissioning construction work to contractors. The government and big corporations account for only a small share of housing construction as they develop large projects of multi-storied buildings. Developers devote most of their efforts to procuring land and obtaining building permits, cutting through multiple layers of red tape.
- ¶ **Contractors:** Main contractors, mostly small registered companies, are responsible for construction work at the site. After receiving the contract from the developer, main contractors typically subcontract all construction work and concentrate on top-level supervision and material procurement. In the case of individually built houses, the contractor's function is typically undertaken by the house-owner.

---

<sup>1</sup> The shortage of dwellings is measured as the difference between the number of habitable dwellings and the number of separate households. See "India Construction Statistics" (NICMAR, 1998) for more details

- ¶ **Labour subcontractors:** Labour subcontractors, ? mostly individual, non-registered entities, ? directly procure and engage the labour required at the site. Labour subcontractors are typically construction workers who have established themselves by enhancing their reputation in their local area or by following a main contractor from site to site. Although labour subcontractors are organised by trade, high labour turnover and lack of formal training severely limits their ability to provide truly specialised services.
- ¶ **Workers:** Workers are often recruited directly from villages by labour subcontractors who facilitate their migration to cities by providing finance and assuring employment. These workers often leave their families and small landholdings behind and return to their villages during the monsoon to participate in agricultural activities.

### **Industry segmentation**

We have divided the industry into three key segments: Multi-family homes, Single-family homes (Brick), and Single-family homes (Mud).

- ¶ **Multi-family homes (MFH):** This segment is composed of all apartment buildings located in urban areas. After accounting for quality differences across formats, we find that the segment constitutes approximately 16 per cent of total output. Output has grown by around 5 per cent since 1996, fuelled mainly by a rapid increase in demand for urban real estate.
- ¶ **Single-family housing built using modern materials (SFH-Brick):** This segment is composed almost entirely of single-plot individual houses built using brick and mortar or other modern construction materials (e.g., wood) by owner-builders, as there are virtually no large-scale, commercially built, SFH-Brick developments. The SFH-Brick segment constitutes approximately 49 per cent of total dwellings and 72 per cent of total output (after accounting for quality differences) and is concentrated in urban areas.
- ¶ **Single-family housing built using traditional materials (SFH-Mud):** This represents the “transition” segment of the Indian housing construction sector (*see* Volume I, Chapter 4: Synthesis of Sector Findings for details on the definition of transition segments). It includes individual houses built either partially or entirely with traditional materials such as mud, cardboard, straw, tin sheets and stones. In urban areas, the SFH-Mud segment includes slums and other temporary tenements. Although its share of total output is declining, the SFH-Mud segment still constitutes approximately 43 per cent of the total housing

units produced (12 per cent of total output, after accounting for quality differences) and 55 per cent of hours employed in housing construction.

## **PRODUCTIVITY PERFORMANCE**

We estimated that labour productivity in the Indian housing construction industry was around 8 per cent of US levels. The figures show that India's productivity is the lowest among the countries we have studied, lagging behind other developing countries such as Brazil, Poland and Korea, as well as developed countries such as the US, France and Germany (**Exhibit 1.6**).

As in the US, productivity performance in India does not vary significantly between the MFH and SFH-Brick segments (**Exhibit 1.7**). Indian MFH and SFH-Brick productivity is around 15 per cent of the US and anecdotal evidence suggests that it is growing relatively slowly, at not more than 3-4 per cent per year. In contrast, productivity levels within the SFH-Mud segment, which accounts for 55 per cent of employment, is significantly lower, averaging around 2 per cent of US levels and ranging from 1- 4 per cent. It is necessary to give a range of estimates for this segment due to the lack of comparability with construction methods common in our benchmark countries. Productivity in the SFH-Mud segment is also likely to be growing at a low rate. Most of the improvements are mainly driven by a faster construction mode resulting from a steadily decreasing amount of idle time for owners and higher alternative employment opportunities due to growth in the overall economy.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

Based on our causality analysis, we found that India's productivity potential at current factor costs is very high, at around 90 per cent of the US average in the MFH and SFH-Brick segments (**Exhibit 1.8**). Combining these results with the lower productivity potential of SFH-Mud, and using the current shares of each segment in the total, we found that the overall productivity potential was still as much as approximately 43 per cent for the housing sector as a whole (**Exhibit 1.9**). See **Appendix 1A** for detailed information about the operational causal factors in each format.

### **SFH-Mud segment**

Productivity in the SFH-Mud segment is low, only averaging 2 per cent of US levels. Improvement potential in the sector is also inherently limited – it can reach only 4 per cent of US levels. There are two reasons for this. The first of these is that the houses in this segment are built with materials that have low durability and

therefore need to be repaired almost every year. As a result, for an equivalent amount of work performed, mud-based constructions provide lower service value to the customer than brick-based constructions. Second, the nature of the building materials used also limits the scope of design for manufacturing (DFM), organisation of functions and tasks (OFT) and viable capital improvements. Materials such as mud, straw and cow dung are not amenable to standardisation, making task specialisation and modularisation of building design difficult.

## **MFH and SFH-Brick segments**

Productivity in both the MFH and SFH-Brick segments is at 15 per cent of US levels while the potential is as high as 90 per cent. Poor OFT and a lack of DFM are the two most important reasons for this gap between the actual and potential labour productivity of the MFH and SFH-Brick segments. In addition, the lack of large-scale projects and investments, both viable and non-viable, are responsible for the gap in productivity in the SFH-Brick segment. We describe each of these factors here, ranked by ease of implementation.

- ¶ **Poor OFT:** This accounts for around 19 percentage points of the productivity gap in the MFH and SFH-Brick segments. Improvements in OFT are largely within the control of contractors.

Organisational variations are driven by differences in project management, task specialisation and management across all levels of the construction process. Moreover, especially in rural areas, poor OFT is the result of a slower pace of construction. Improvements in OFT reduce idle time and enhance productivity at the task level. Achieving the full benefit of OFT improvements typically requires changes at the company level as well as structural changes in the industry as a whole through the specialisation of trades.

- **Poor project management:** Top-level scheduling and resource utilisation planning are important means of reducing idle time and costs on construction sites. Due to poor planning, tasks often have to be redone or take longer than planned, leading to both time and cost overruns. A foreign project manager, for instance, told us how he was able to complete a project in 15 per cent less time than that had been estimated by a top Indian firm solely because he employed better top-level planning. Although some top-level scheduling is done on paper, the plans thus developed are poor and seldom put into practice. Moreover, material and equipment deliveries are not planned in advance and workers often remain idle until the required resources are procured.

- **Lack of task specialisation/incentives:** Greater specialisation and a shift from a “per day” to a “per task” payment system could increase productivity at the task level. Currently, most workers in India are paid a fixed daily wage. This gives them little incentive to improve productivity. In a site experiment, a major MFH contractor reduced labour requirements by almost 40 per cent by using productivity-based incentives and increasing supervision (**Exhibit 1.10**). Moreover, although workers are generally organised by trade, greater specialisation would help them concentrate on a particular task, thereby reducing the costs incurred by switching tasks and resulting in increased efficiency. For example, instead of specialising in either brick layering or plastering, it is not uncommon to find masons in India performing both tasks for entire rooms. If they were each to concentrate on only one activity, task repetition would increase productivity and minimise idle time.

Although some specialisation and better incentives can be achieved at the company level, companies in most countries typically achieve full productivity benefits by outsourcing tasks to specialised firms. Specialised trade companies employ an adequate number of workers to perform a very specific, well-defined task on the construction site, thus achieving economies of scale. They also keep up with technological innovations and maintain a better-trained workforce. In India outsourcing is employed more as a means to evade labour laws than as a tool to improve productivity.

- **Lack of time pressure:** Construction in rural areas is typically carried out at a slower pace than its equivalent in urban areas. In rural areas, lack of financing restricts the entry of professional developers and forces owners to build houses one room at a time. One of our interviewees, for instance, took 12 years to build a three-roomed house since his funds came in only once a year – after the harvesting season. Moreover, owners (who act as developers and contractors) have fewer skills and are less capable of planning the construction process. The resulting productivity penalty fully explains the productivity gap between rural SFH-Brick and urban SFH-Mud constructions – productivity in rural SFH-Brick is 10 per cent of US levels while productivity in urban SFH-Mud constructions is 21 per cent of US levels.

¶ **Lack of DFM:** The lack of DFM accounts for approximately 24 percentage points of the productivity gap in the MFH and SFH-Brick segments. Improvements in DFM require that the coordination between the developer and the contractor improve. DFM changes the construction process from one of craftsmanship to one of assembly line. It involves

adopting a design for low-cost construction by using optimal design layout, modularity and standard, cost competitive, prefabricated materials. To reap all the benefits from DFM, changes need to take place at the company level as well as in upstream and related industries (**Exhibit 1.11**).

- **Inefficient design and lack of modularity:** Improvements in the design and modularity of a building involve optimising material sizes and construction processes in order to minimise interference during the various phases of construction. For example, the sizes and shapes of bricks, tiles, doors and windows should be taken into account at the design stage to avoid unnecessary rework at the site (e.g., breaking bricks and tiles at corners). Moreover, the construction process should avoid interference between masonry work and electrical and plumbing installations (e.g., cutting and re-plastering walls to install wires).
- **Lack of standardised and prefabricated materials for suppliers:** The use of standardised and prefabricated materials increases productivity by reducing complexity and facilitating task specialisation at the site. For example, brick sizes in India typically vary significantly even within a consignment, leading to additional levelling work when building and plastering walls. Similarly, if pre-cut and pre-threaded plumbing were used rather than the plain tubes currently used in India, it would not only reduce installation time but also allow each worker to concentrate on his particular task. Moreover, it would be most efficient if these tasks were undertaken at the material manufacturing plant.

¶ **Lack of scale:** The lack of scale in housing projects accounts for about a third of the productivity gap in the SFH-Brick segment. Only the entry of developers into this segment can improve scale.

As discussed earlier, most SFH-Brick houses in India are built one at a time rather than in large batches. Even in projects where a large number of dwellings are commissioned (e.g., townships), construction is usually divided among several small local contractors to evade labour benefit liabilities and taxes, and to gain the political goodwill of local communities. In contrast, over 70 per cent of SFH construction in best practice countries like the US and the Netherlands is made up of projects that deal with over 20 units each. Building on a larger scale results in savings by reducing the time spent on material procurement, reducing idle time, improving equipment utilisation and allowing greater use of prefabricated materials (**Exhibit 1.12**).

¶ **Lack of viable investments:** Inadequate investment in construction equipment accounts for around 9 percentage points of the productivity

gap in the MFH and SFH-Brick segments. It is the contractors who typically decide the equipment to be used in a project. Basic hand tools and small equipment are rarely used in Indian construction (**Exhibit 1.13**) even though investment in this equipment is economically viable despite current low labour costs. In fact, the initial investment can usually be recovered in just one project (**Exhibit 1.14**). For example, most material in India is currently transported on the heads of the workers as opposed to wheelbarrows, the ubiquitous mode of transportation in countries such as Brazil. In shuttering, most of the wood used is prepared using manual tools instead of the more efficient circular saws and electric surface planers. In painting, exterior walls are still painted with standard brushes rather than roll-brushes or paint sprayers. When confronted with the savings potential of adopting such tools, the typical response of Indian managers interviewed is, “Nobody thinks about saving labour in this business”.

- ¶ **Existence of non-viable investments:** Equipment such as tower cranes in MFH and conveyor belts in SFH-Brick is not used in India as it is not economically viable given the low labour costs (**Exhibit 1.15**). This, however, accounts for only around 9 points of the productivity gap in the MFH and SFH-Brick segments.
- ¶ **Lack of physical strength:** The average Indian blue-collar worker is much weaker than his US counterpart and this too leads to low productivity. This, however, accounts for just 1 percentage point of the productivity gap in the MFH and SFH-Brick segments. Indian workers, due to their lower body mass, are able to work for shorter periods than their Brazilian and US counterparts. This is further exacerbated by the fact that these workers are directly exposed to extreme weather conditions and suffer poor dietary conditions, since they belong to the poorer sections of society (**Exhibit 1.16**).

## INDUSTRY DYNAMICS

Competition among existing players in the housing construction industry in India is largely based on factors other than construction cost. In such an environment, the pressure to cut construction costs and improve efficiency is weakened. Most companies exhibit low productivity but are neither driven out of the market nor forced to improve their performance. Moreover, a non-level playing field also distorts competition in the SFH segment to the advantage of single-plot SFH-Brick and SFH-Mud dwellings. Finally, although international contractors are virtually absent in India, the lack of international best practice players is not significant enough to explain productivity differences, as construction remains largely a domestic sector even in best practice countries. Moreover, industry fragmentation

limits the competitive pressure that could be introduced by a few big international players and increases the importance of strong competition within the domestic market.

In this section we look at the effect of low domestic competitive intensity on the three segments in the housing sector and briefly discuss the effect of a non-level playing field on productivity.

### **Domestic competitive intensity**

Low domestic competitive intensity affects every player in each segment of the industry differently.

- ¶ **Multi-family Homes – MFH:** There is minimal price-based competition in the Indian MFH segment. Starting with developers, players along the production chain focus their attention on every issue but productivity at the site (**Exhibit 1.17**).
- **Developers:** Most Indian developers focus most of their efforts on land procurement, clearing red tape and “push” selling, paying little attention to building design and putting minimal pressure on contractors to reduce costs. They are able to maintain high profits by getting favourable land deals and not abiding by building/zoning laws. Despite high profits, competitors are unable to enter the market because of the scarcity of land and a lack of clarity about property rights on existing land titles. Only a few well-connected developers are able to overcome these obstacles.
  - Average profit margins for developers have been quite high at around 20-25 per cent. Although profit margins are volatile due to real estate price fluctuations, they have not fallen below 15-20 per cent (compared to 5-8 per cent margins in the US), and have even reached peaks of over 50 per cent during a boom in the market.
  - Rather than lowering construction costs, developers typically compete on getting better land deals, more favourable financing terms and better price negotiations with customers in order to maintain their profit margins. Under current land price conditions in India, higher gains are to be made through smart real estate dealings (given the imperfections of the land market) rather than through lowering construction costs (**Exhibit 1.18**).
  - Entry into the development business is severely restricted by the problems present in obtaining land for construction. As a result, customers interested in a particular location are likely to have little choice (including the lack of a secondary market in houses),

thereby limiting competition to the few developers who manage to successfully procure land in the area.

- **Contractors:** Indian contractors usually achieve high profit margins and focus most of their efforts on material procurement, paying little attention to site design (i.e., DFM), project management (i.e., OFT) and cost savings through investment in viable capital.
  - Contractors are shielded from price competition by their trust-based relationships with complacent developers who do not exert much pressure to increase productivity at the site. Contractors usually maintain a shortlist of architects/developers for whom they work repeatedly. Developers, shielded from price-based competition, prefer to work with contractors who have proven financial and manpower capabilities and have been known to complete the work on time as well as have the right connections to source cheap materials.
  - The lack of competition in the sector is indicated by the persistently high margins among contractors as compared to international benchmarks (**Exhibit 1.19**). In a well-functioning market, high profits would not be sustainable because higher competition from new entrants would dilute them. The recent reduction in profits is the result of a market downturn rather than structural changes that will increase competition in the sector.
  - Contractors mainly compete on material costs either through tax evasion or through the usage of poorer quality materials (which is possible given the poor supervision of complacent developers). Moreover, in many cases, developers could even be joining hands with the contractors against the uninformed consumer. Complicity in providing poorer quality material strengthens the relationship between developers and their preferred contractors, further reducing competition among contractors (**Exhibit 1.20**).
- **Labour subcontractors:** The lack of competition along the production chain results in scarcely any pressure on labour subcontractors to improve productivity. Labour subcontractors, who are mainly responsible for improving OFT at the task level, usually make high profits by withholding labour benefits to their workers (**Exhibit 1.21**). Profit margins average around 40 per cent (around US\$ 450 per month) in an industry with no capital requirement. In addition to earning high profits, labour subcontractors face little competition as they always end up working for the same contractor. Contractors already enjoying high profits only care about the fact that

the subcontractor will deliver the required manpower at all times, leveraging contacts in his native village.

- ¶ **Single-family Homes – SFH-Brick:** Price-based competition is low in the SFH-Brick segment as well. In this segment, it is the small landowners who typically build dwellings – they purchase the material and directly engage the labour subcontractors. Owners’ participation in the construction process limits competition in two ways.
- First, by directly affecting the planning and design phases, as they typically lack the expertise to perform such tasks efficiently, and hamper productivity through poorer OFT and less efficient DFM.
  - Second, by placing little pressure to perform efficiently on labour subcontractors who are typically selected on the basis of trust and with local references. Less pressure on subcontractors further hampers OFT and reduces their incentive to invest in economically viable hand-tools. In most cases, owners are engaged in construction only once in their lifetimes and, hence, are unlikely to have the experience to distinguish between good and bad subcontractors. Moreover, owners also lack industry knowledge and, thus, are unaware of inefficiencies that may potentially take place at the subcontractor level (**Exhibit 1.22**).

In addition, low competition in the SFH-Brick segment is due to the lack of cheaper large-scale developments, which also directly affects scale at the operational level. Being potentially much cheaper, large-scale developments would put pressure on the housing market, thereby helping to replace owner-built homes with those that are professionally built. Large-scale SFH-Brick developments are virtually non-existent in India, while they make up over 50 per cent of output in the US.

- ¶ **Single-family homes – SFH-Mud:** The low opportunity costs associated with construction in rural areas restrict the penetration of SFH-Brick houses in these areas. Owners and family members often participate in the construction of SFH-Mud dwellings in rural areas. Family work, which typically accounts for around 75 per cent of total labour costs, costs the owner nothing. Moreover, and in contrast to modern materials such as bricks and cement, most of the material used in SFH-Mud construction is freely available in rural areas (e.g., mud, cow dung, straw). As a result, penetration of the more productive SFH-Brick dwellings is severely limited in rural areas as they are unable to compete on a cash cost basis with the less productive but much cheaper SFH-Mud construction. Due to the nature of these low opportunity costs, SFH-Mud in rural areas (83 per cent of total employment in SFH-Mud) is only likely to disappear in the long term, once economic growth increases

urban migration and productivity in rural areas is increased through the possibility of alternative employment.

### **Non-level playing field**

Evasion of tax and labour laws gives an advantage to small-scale SFH-Brick developments rather than to the more productive large-scale variety. Small-scale developments are less visible and contractors find it easier to evade taxes and social benefit payments to workers. As a result, even in projects with a significant number of total dwellings (e.g., industrial townships), developers find it cheaper to allocate the project in smaller contracts of less than 20 dwellings each.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

In this section we discuss how external factors (e.g., regulations that could be changed by the government) act upon each other to result in low and stagnant productivity in the Indian housing industry (**Exhibit 1.23**). To relate the external factors to operational causality, we look at the sources of the difference between current productivity and potential productivity given current low labour costs. Here, we will focus our discussion on productivity improvements within each format, and discuss the conditions under which a format mix is likely to evolve in the section on the outlook for the industry that follows.

The three main reasons why we do not see price-based competition, the key to higher productivity/output growth, in the Indian housing industry are: first, the lack of clear titles for the vast majority of landholdings in India; second, the lack of infrastructure development in the city suburbs; and third, the lack of standards for building materials and the absence of enforcement of the few existing standards. Other factors include rent control, strong tenancy rights, high stamp duty, red tape and corruption, excise duty on prefabricated materials and the lack of enforcement of labour laws. **Exhibits 1.24 & 1.25** summarise the relative importance of external factors for the MFH and the SFH-Brick formats.

- ¶ **Unclear land titles:** Unclear property rights for rural and urban land remains a major issue throughout India. It is a complex and knotty problem and has been exacerbated because of a variety of reasons: a cumbersome land registration procedure; a high stamp duty; the existence of complex tenancy laws; and the existence of the Urban Land Ceiling Act (*see Appendix 1B* for further details.)

The lack of clear titles affects price-based competition in the MFH and SFH-Brick segments in two ways: first and foremost, it limits land access to a few organised developers; and second, it makes collateral-based financing very difficult, thereby decreasing the number of transactions in

both primary and secondary markets. Fewer transactions limit price information for consumers and further reduce competitive intensity among developers.

- **Limited land access to a few organised developers:** As a result of unclear titles, organised developers devote most of their time to sorting out legal issues and cutting through red tape to ensure that theirs are quality projects. Given the importance of personal contacts and knowledge, only a few, well connected developers or large landowners (e.g., industrial conglomerates) thrive in this environment, making their profits on the basis of offering clear titles as opposed to lower prices. In the case of the SFH-Brick segment, unclear titles also make it difficult for organised developers to consolidate large plots of land thus limiting production of large-scale developments. Later in the chapter, we will discuss how the supply of clear land is also limited by the lack of suburban infrastructure development.
  - **Limited collateral -based financing:** Unclear titles severely reduce the housing stock that can be used as collateral and limit housing financing only to those owners with proper titles. The manager of a new (best-practice) mortgage bank cited the lack of clear titles as the main factor hampering his market growth. Limited housing financing affects price-based competition in two ways: first, it reduces the number of price comparisons available to customers by limiting new construction activities and the size of the secondary market in India (**Exhibit 1.26**). Besides increasing the choices available to consumers, the presence of a secondary market also puts pressure on MFH developers by increasing the supply of cheaper (used/remodelled) houses. Second, the lack of financing hampers productivity by forcing owners to build their houses “one room at the time”. For example, an urban owner currently building his own house said that he had saved for over 20 years before being able to move out of his ancestral home.
- ¶ **Lack of infrastructural development in suburban areas:** The amount of clear land available to organised developers is also restricted by the lack of government financed suburban developments. In contrast to India, local governments in many countries, including the US and the UAE, usually finance new infrastructure through sufficiently high user charges and property taxes from newly developed areas.

The lack of suburban infrastructural development negatively impacts the housing market in as much as unclear titles do. New construction is restricted to within city limits. This severely limits, more than do unclear titles, the availability of large-scale, suburban developments of SFH-Brick, which require large land lots at the city’s edges.

Low revenues due to inefficient property tax collection and subsidised user charges reduce the local government's incentive and capacity to finance new infrastructure (**Exhibit 1.27**). Besides affecting the economic feasibility of new infrastructure projects, these factors contribute to the dire financial straits of local governments, limiting their ability to raise funds even for profitable infrastructure investments.

- **Inefficient property tax collection:** Inefficient property tax collection in India decreases local government incentives to build new infrastructure. Property tax collection, a key source of revenue for infrastructure financing in other countries, is low in India for two reasons: outdated valuations and corruption. In city centres, property valuations for tax purposes are usually outdated and often linked to the controlled rents paid by existing tenants. In city suburbs, where rents are not controlled, property tax collection is low due to greater tax evasion encouraged by corrupt petty officials and a higher share of unauthorised construction (e.g., slums).
- **Subsidised user charges for utilities:** User charges in India are mostly subsidised and not related to the real cost of providing infrastructure services. Water and sewerage services are typically government owned and pricing decisions are often taken on political rather than economic grounds. Similar issues affect electrical services where, despite private participation, political interference and corruption result in theft and low revenue collection (*see* Volume III, Chapter 2: Electric Power). Together with property taxes, user charges are usually the main source of revenue for infrastructure development and, therefore, inefficient collection directly affects local government incentives to invest in new infrastructure.
- **Other factors affecting local governments' ability to develop new infrastructure:** Financial mismanagement has often resulted in widespread deficits and mounting debt for most local governments. Low revenue collection (including property taxes and user charges) and high current expenditures (e.g., salaries to employees and subsidies) severely restrict their ability to repay outstanding debt. As a result, financial institutions are unwilling to lend additional funds to local governments even if projects are economically viable. The recent successful bonds issued by the Ahmedabad and Surat Municipal Corporations are a case in point. Complete financial restructuring, including increased property tax collection, as well as privatisation of water services were vital in securing these funds. Moreover, explicit guarantees from international financial institutions (e.g., USAID) played a crucial role in increasing the Corporations' credit ratings, thereby lowering financial costs. Finally, and as a result

of mounting debt, local governments cannot finance new infrastructure through the sale of publicly owned land. Investors, who distrust the government's commitment to use the funds for new infrastructure, are not willing to pay higher prices for land that is not fully developed.

¶ **Lack of standards for construction materials:** Introducing certain minimum standards would facilitate the dissemination of best practice (with competition among developers as a prerequisite), increase information available to consumers and facilitate housing financing. Moreover, enforced standards would also make it tougher for contractors to focus on sourcing cheap lower quality materials as opposed to lowering labour costs. We nevertheless believe that this factor is relatively less important than the previous two, since higher competitive pressure among developers would go a long way in disciplining contractors and could even lead to a natural emergence of construction standards.

- Standardisation will force contractors to lower labour costs instead of using cheaper, sub-standard materials to make substantial profits. Currently, contractors bribe the engineers and architects who are employed by (complacent) developers to influence them in their choice of supplier and the quality of material used at the site. The resulting complicity between contractors and developers when using sub-standard material deepens their relationship and shields contractors from future competition. In other countries, developers, pushed by increasing competition, use additional means to monitor contractors (e.g., quantity surveyors) and ensure their compliance with quality standards. In India, developers are becoming more complacent about poor quality since they are still able to overcharge uninformed customers who have little available choices in the market.
- Standardisation limits the quality differences in the material content of houses in the market. In a naturally fragmented industry such as construction, this facilitates price comparisons for consumers and increases price-based competition among developers.
- Finally, standardisation of construction materials also facilitates the emergence of bank financing. In Brazil and the US, banks use construction norms and standards in their credit rating procedures for mortgage lending. In this process, banks play a key role in reducing production costs and weeding out substandard products.

¶ **Prevalence of rent control/tenant laws:** Rent control and stringent tenant laws reduce competition among MFH developers in two ways: First, they directly hamper the size of the rental market by artificially

freezing the availability of houses in city centres. Second, rent control and other tenancy laws demotivate people from constructing houses that they would have to put out on rent. As in the case of the secondary housing market, availability of rental accommodation will further increase pressure on developers.

- ¶ **Lack of enforcement of labour laws:** The lack of enforcement of labour laws limits competition among labour subcontractors. Contractors typically engage labour subcontractors to evade labour laws and save on having to pay social benefits to workers. In this system, labour relationships are weak and workers often return to their villages at the time of the harvest to help with agricultural tasks. As a result, the contractors prefer to keep the same subcontractors who have already proved their ability to add to the manpower when required, by leveraging relationships with workers in their native villages. Moreover, as in the case of sub-standard material, complicity in evading labour laws further strengthens the relationship between contractors and labour subcontractors, shielding the latter from future competition.
- ¶ **Lack of tax enforcement:** In the SFH-Brick segment, profiting through tax evasion also contributes to the lack of large-scale projects. Although less productive, small-scale projects are cheaper as they are less visible and, hence, it is easier for the developer to evade its tax liabilities.
- ¶ **Prevalence of red tape/corruption:** Red tape and corruption stand in the way of obtaining building permits and directly hamper OFT. Frequent site inspections and regulatory harassment often result in work stoppages, making work planning difficult.
- ¶ **Existence of excise duty for prefabricated components:** High excise duty discourages the use of better-designed, prefabricated components and encourages vertical integration at the site. As a result, components such as doors and windows are usually fabricated at the site, affecting quality and reducing specialisation. Similarly, excise duty often makes ready-mixed concrete non-economical even in projects where large quantities of concrete are required (this effect is not included in our viability calculations).

## INDUSTRY OUTLOOK

The housing construction sector could witness significant growth over the next 10 years. This growth would be the result of both an increase in the number of dwellings built and an improvement in their size and quality. Growth in the

number of dwellings will be especially high given the current housing shortage and ongoing migration to urban areas.

In order to evaluate the outlook on output, productivity and employment, we have considered three possible future scenarios for the competitive environment: Status quo, reforms in housing construction alone and reforms in all sectors (*see* Volume I, Chapter 4: Synthesis of Sector Findings):

¶ **Status quo:** In this scenario, we estimated that India's per capita output and productivity would continue to grow at its current rates of around 4 per cent and 2-3 per cent per year respectively. As a result, employment would increase only slightly, at less than 2 per cent per year.

- Productivity growth in the MFH and SFH (Brick) segments would be driven by continued improvements in project planning and supervision at the site. Furthermore, slowly rising incomes in rural areas would also enhance productivity through the ongoing increased penetration of the SFH-Brick segments.
- New construction within city limits as well as upgrading of dwellings in rural areas would ensure continued output growth in housing. Despite this growth, the housing stock within city limits would be likely to continue to deteriorate, mainly as a result of a lack of land for new construction. Moreover, new developments in city suburbs would be likely to remain limited due to the local governments' continued inability to finance new infrastructure development. Finally, given current population growth rates, the severe housing shortage would be likely to remain while slums would continue to increase, driven by the rising number of rural migrants who would be unable to find cheap accommodation in large cities.

¶ **Reforms in housing construction alone:** In this scenario, land titles would be cleared, local governments would improve their financial conditions (mainly due to higher property taxes and user charge collection), and well-enforced standards for construction materials would be introduced. These reforms, together with the removal of the remaining barriers, would result in faster productivity and output growth of around 8 per cent and 6 per cent per year, respectively. As a result, employment would decrease by 2 per cent per year over the next 10 years, thereby destroying close to 800,000 jobs.

- Increased competition throughout the industry would drive productivity growth in the MFH and SFH-Brick segments. Greater pressure on developers and contractors would likely lead to rapid improvements in project planning, improved building design, investment in viable capital, and increased use of standardised

construction material. Under this scenario, productivity in the SFH-Mud segment would increase only slightly as a result of better financing leading to better planning and a higher share of the urban mode of construction. Finally, the format mix would also improve under this scenario as a result of faster upgrading of SFH-Mud dwellings and lower penetration of slums in large cities.

- Output growth would be the result of increased demand following lower land costs, improved financing and higher investment in the rental market. Despite these changes, the lack of reforms in other key sectors of the economy would be likely to limit the potential benefits of reforms on output. As a result, we estimated that the Indian housing sector would grow at around 6 per cent (compared to the current 4 per cent) thereby increasing its share of total GDP only slightly from 1 per cent to around 1.5 per cent (closer to Korea and Brazil).

¶ **Reforms in all sectors:** In this scenario, GDP will grow at 10 per cent a year while the housing sector will experience very rapid output growth of around 14 per cent a year. Higher economic growth and the resulting format mix evolution would also increase productivity growth which we would expect to reach around 8 per cent per year from the current 2-3 per cent. As a result, employment in the sector would also increase rapidly at around 6 per cent per year creating over 3.2 million new jobs over the next 10 years.

- As in the previous scenario, productivity in both MFH and SFH-Brick segments would also be spurred on by improvements in OFT and DFM. As a result, productivity in these segments would increase at around 7 per cent per year, reaching around 28 per cent of US average levels by 2010. Rapid productivity growth is not unusual in housing construction once key barriers to land development are lifted. For example, starting from conditions similar to current Indian conditions, a Brazilian best practice company was able to achieve productivity growth of up to 12 per cent per year over a period of 12 years after reforms increased housing loans and new standards were introduced (**Exhibit 1.28**).

Under this scenario, productivity in the SFH-Mud segment would also rise, albeit slowly, driven by quicker construction due to increased financing. Finally, the format mix would also improve following a decrease in the penetration of the SFH-Mud segment led by overall economic growth as well as an increase in financing. (**Exhibit 1.29**).

- Output growth would be the fastest under this scenario, averaging around 14 per cent per year, as reforms in other sectors would allow housing to achieve the full benefits of sector-specific reforms. This

rapid growth in output is also consistent with the experience of other countries. For example, under similar conditions, Thailand's construction sector grew at around 14 per cent per year between 1989 and 95, mainly as a result of widespread economic reforms and increased foreign investment in real estate.

As a result of rapid output growth, the housing industry's share of total employment would double to reach levels closer to international benchmarks of around 2 per cent in 2010 from the current 1 per cent. Despite this increase, our estimate for employment growth can be considered conservative as housing still accounts for over 3 per cent of GDP in developing countries such as Russia, Brazil and Korea.

## **POLICY RECOMMENDATIONS**

Our policy recommendations focus on the most important external factors as well as on the main political economy issues that need to be addressed.

A productive and growing housing construction sector is critical for the economy. Low housing penetration (in terms of square metres per capita) and poor housing conditions have severely affected the living conditions of most Indians. Moreover, employment in this sector plays a key role in the transition process from an agricultural economy to a modern one. In India, most migration from rural areas will comprise unskilled and sometimes illiterate workers who are likely to find suitable jobs only in sectors such as construction and retailing. These sectors often act as a port of entry into cities for migrating rural workers in search of higher incomes.

To achieve the considerable potential in output, productivity and employment growth, state governments would need to solve the land titles issue and improve their revenues from property taxes and user charges to finance new infrastructure development. The central government should lead the effort in introducing modern and well-enforced standards for construction materials. In what follows, we will discuss specific policy steps that the government should take in order to tackle each of these issues. We will also point out key concerns that could be raised by potential stakeholders (**Exhibit 1.30**).

- ¶ **Clarify ownership rights of land titles:** In order to solve the unclear ownership rights on land titles, the government must expedite all the existing land dispute cases, which are languishing in courts all over the country. This will not only clear up the disputes but, as a result, also ease the huge burden being shouldered by the courts at present. The government should, therefore:

- **Set up specialised courts to handle land title disputes:** These courts should have an explicit fast-track time limit to solve each case, with well-defined arbitration procedures in case of appeal. A similar system was adopted in post-reunification East Germany to resolve the land claim issues arising from land expropriation under the communist regime.
  - **Simplify and modernise the current registration system for land titles:** In particular, it should streamline the land registration procedure by eliminating the intermediate (validation) steps. This simplification, together with the computerisation of registered land titles, would then limit the manipulation of titles at different levels.
  - **Rescind the Urban Land Ceiling Act.**
  - **Lower the stamp duty:** Reduced revenues from stamp duties should not affect government finances, as they should be more than compensated for by increased property tax collection.
- ¶ **Increase collection from property tax and user charges:** The central government and state governments must collaborate to achieve increased revenues. Governments should:
- **De-link property taxes from currently controlled rents:** Instead, property values should be based on market prices and assessed by professional and independent property valuers.
  - **Minimise evasion of property taxes:** Higher pay to government officials, computerised land records, and clearer valuation would go a long way in solving this problem.
  - **Privatise water, sewerage and the remaining electricity services:** Privatisation will eliminate pricing distortions thereby increasing user charge collection (*see* Volume III, Chapter 2: Electric Power).

The main perceived losers from an increase in property taxes and user charges are current property owners who are enjoying low user charges and subsidised property taxes (especially in city centres). These groups claim that they are paying excessively heavy taxes and charges for the poor infrastructure services they receive. These claims can be countered in two ways: First, as a result of the increased revenue collection, quality infrastructure services will lead to a revaluation of existing properties. Second, the current situation is not sustainable and property owners would anyway pay the costs of government deficits through higher taxes (such as stamp duty) and higher interest and inflation rates.

- ¶ **Introduce modern and well-enforced standards for construction material:** The central government should lead this initiative. A special

committee of international and domestic experts as well as domestic developers and builders should be formed to address this issue. The government should set specific objectives and deadlines for the committee. To facilitate the widespread enforcement of standards, the central government should:

- **Link public funding for housing to the use of these new standards:** It should do this through the National Housing Bank so that it is reflected in all government-owned housing finance institutions. The government will thus set an example that can be followed by private housing finance bodies.
- **Introduce consumer protection laws and special courts:** These will help to safeguard buyers against the use of sub-standard materials by developers. In Brazil, the introduction of such courts has dramatically increased consumer awareness, thereby intensifying pressure upon developers.

Unproductive contractors, who make their living by compromising on the quality of materials, are likely to resist the introduction of well-enforced standards. Architects and engineers, who work for developers but are often bribed by contractors, will also lobby against such standards. These groups will claim that standardised and prefabricated materials are more expensive and therefore will increase construction costs. These claims can be countered. First, standardisation facilitates the dissemination of best practice and therefore decreases construction costs. Second, introduction of standards will also facilitate housing loans thereby increasing demand and potential business for contractors. And finally, prefabricated materials are potentially cheaper as they will enjoy economies of scale and higher quality compared to locally manufactured, non-standardised materials.

## Appendix 1A: Measuring productivity and output

In this case, we began by estimating productivity by segment and obtaining an aggregate productivity estimate for the sector. Due to the lack of aggregate sector data, our estimates have been developed bottom-up.

We conducted extensive interviews and company visits in order to determine total output (in square metres) and total employment, and hence productivity for specific projects. The gap in productivity between India and the US provided a framework for identifying the operational causes of low productivity. Using this set of causal factors we went on to investigate the external causes of low productivity and, hence, the barriers to higher productivity growth. Higher productivity leads to lower output costs that translate into lower prices and output growth.

Our “bottom-up” productivity estimates for each segment are based on information on output and employment for specific projects, and adjusted for differences in quality, content, and vertical integration between India and the US (**Exhibit 1.31**). We followed the following three steps in order to determine this.

- ¶ As the absolute number of square metres did not capture quality differences, we weighted the output according to average quality differences between Indian and US output. In the case of MFH and SFH-Brick, we estimated the price discounts per square metre across high, medium and low end segments in India (**Exhibits 1.32 & 1.33**). For each segment, this was done by estimating the price discount of an average square metre of Indian construction relative to an average square metre of US construction. For the SFH-Mud segment, we accounted for the increased material and labour inputs required to maintain/rebuild the dwelling after each monsoon (**Exhibit 1.34**).
- ¶ As the amount of construction performed per square metre of floor also depends on the wall content of dwellings, we increased physical Indian output to account for the average additional square metres resulting from a higher number of partition walls.
- ¶ Finally, adjustments were also made to account for those additional tasks that would be performed on-site in India but typically outsourced in the US. For example, components such as doors, windows, are typically built

on-site in India while they would be purchased ready-made in countries like Brazil and the US.

## Appendix 1B: Land titles

There are four reasons that exacerbate the complexities that surround land titles in India. They are the following:

### **Cumbersome land registration procedures**

To avoid the inconvenience of going through numerous bureaucratic channels and providing a variety of documentary evidence (e.g., income tax, will), owners sometimes do not complete the land registration process. The cumbersome procedure, together with the lack of computerisation of title records, allows the manipulation of titles at one stage (e.g., tehsildar) without it being necessarily reflected at other stages of the process.

### **Strong tenancy rights**

The due process of law required by the Indian legal system, in particular, establishes lengthy procedures that need to be followed before removing occupants from a particular portion of property. As a result, both legal as well as illegal occupants gain de facto rights on the property they occupy, increasing the time and paperwork needed before the real owner can fully exercise his right to sell the property.

### **High stamp duty.**

Multiple ownership of land often arises when buyers, in an attempt to save high stamp duty costs, avoid registering their land. In these situations, sellers sometimes take advantage of the situation and re-sell the property more than once.

### **Urban Land Ceiling Act**

This also contributes to multiple land ownership and unclear titles. In most urban areas, the Urban Land Ceiling Act restricts land ownership to less than 500 square metres. In an attempt to keep their large plots, owners sometimes break up their landholdings, registering them under different variations of their names. At the time of future land sale, however, these inconsistencies in the name of ownership often result in long legal proceedings, as courts have to corroborate the owner's identity.

Exhibit 1.1

## HOUSING CONSTRUCTION INDUSTRY CHAIN – CASE SCOPE

 Case scope

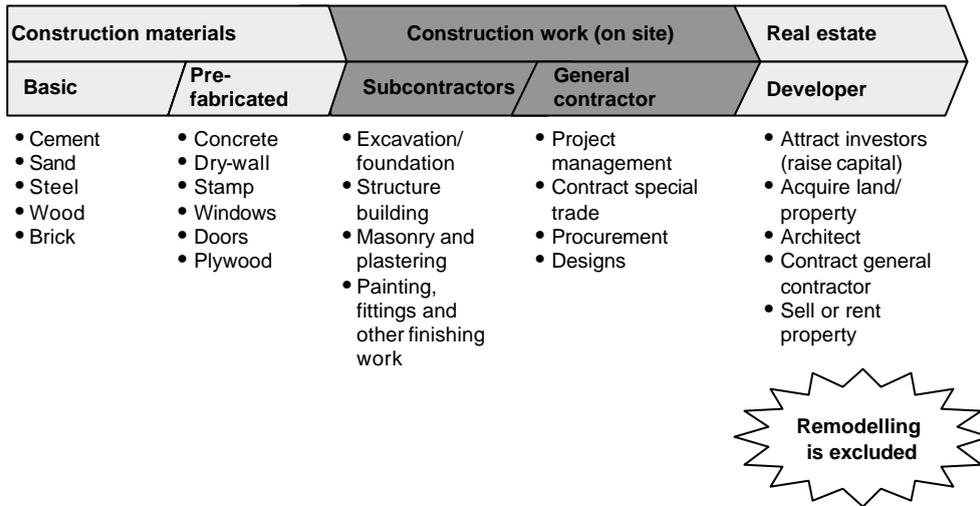


Exhibit 1.2

## SIZE OF CONSTRUCTION SECTOR



\* Data for 1993-94

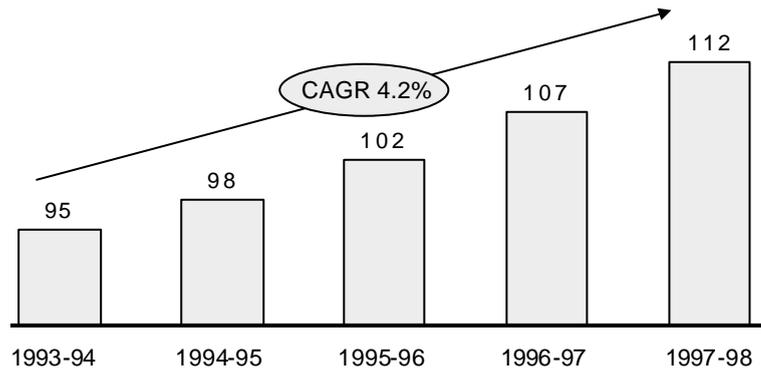
Source: MGI reports; NICMAR; CSO

2

Exhibit 1.3

## HOUSING CONSTRUCTION OUTPUT TREND

Value added; Rs. bn in 1993-94 prices

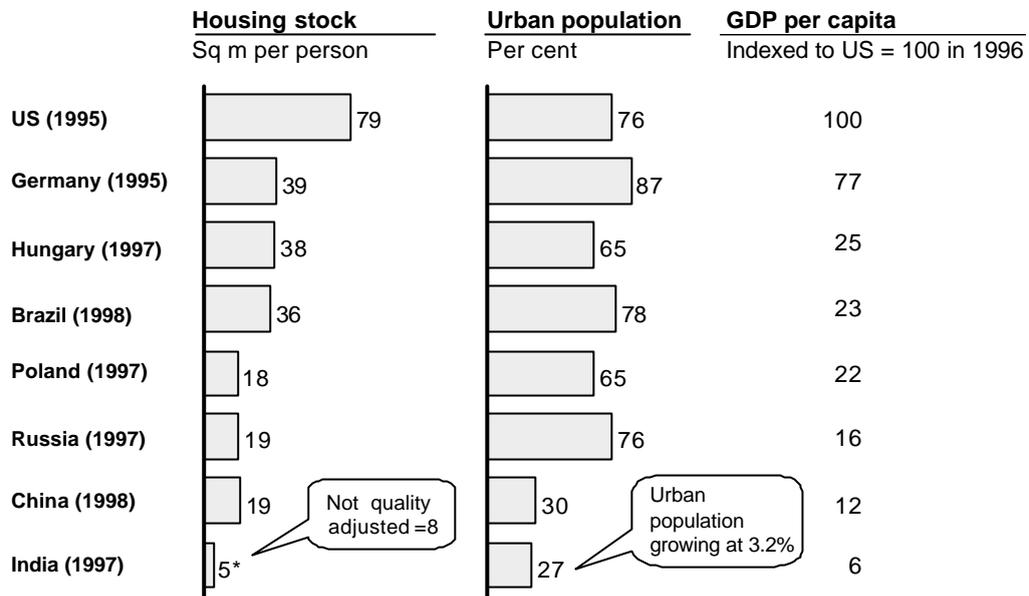


Source: CSO; McKinsey analysis

3

Exhibit 1.4

### HOUSING STOCK – CROSS COUNTRY COMPARISON



\* Estimate

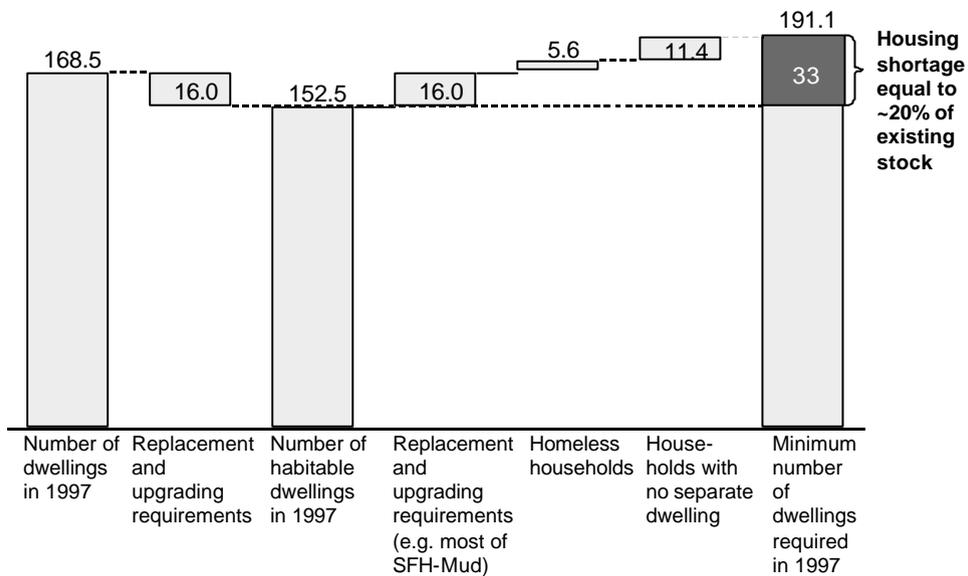
Source: McKinsey Global Institute; NICMAR (India Construction Statistics, 1998); *The Economist*

4

Exhibit 1.5

### HOUSING SHORTAGE IN INDIA, 1997

Million dwellings



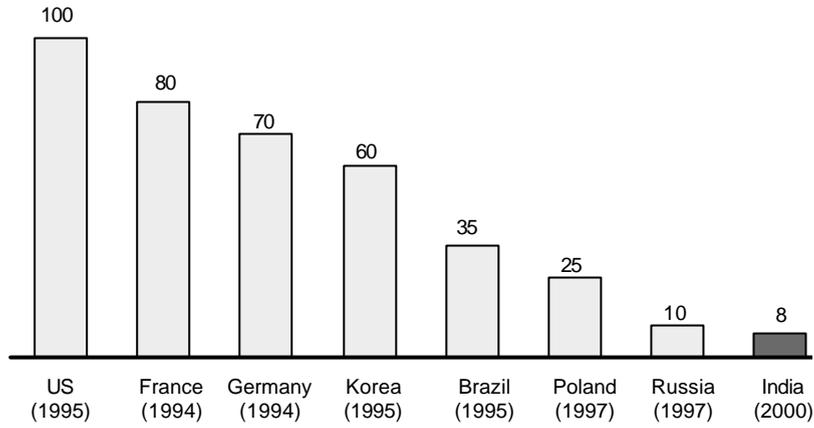
Source: NICMAR (India Construction Statistics, 1998)

5

Exhibit 1.6

### INTERNATIONAL COMPARISONS OF LABOUR PRODUCTIVITY IN RESIDENTIAL CONSTRUCTION

Indexed of output per labour hour\*: US average = 100

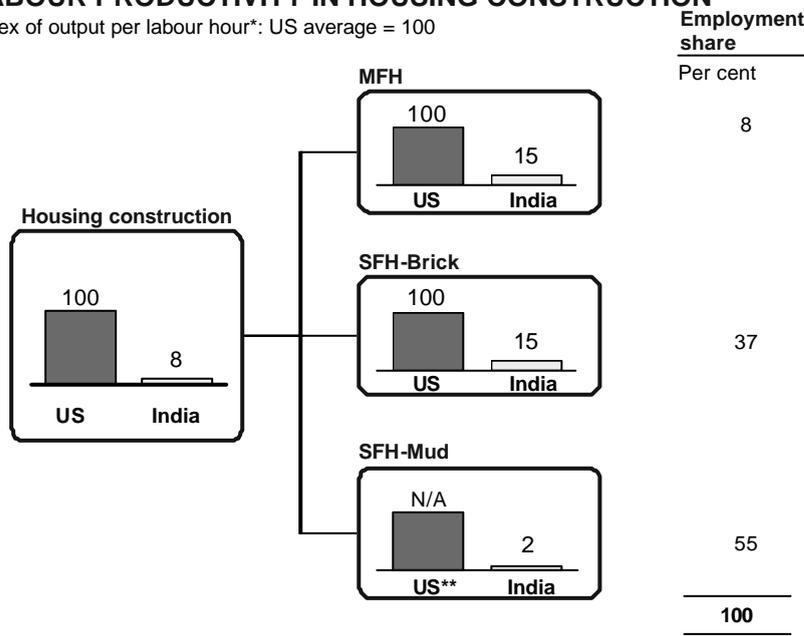


\* Measured as square metre of construction (quality adjusted) per 1000 hours labour input  
Source: MGI reports

Exhibit 1.7

### LABOUR PRODUCTIVITY IN HOUSING CONSTRUCTION

Index of output per labour hour\*: US average = 100

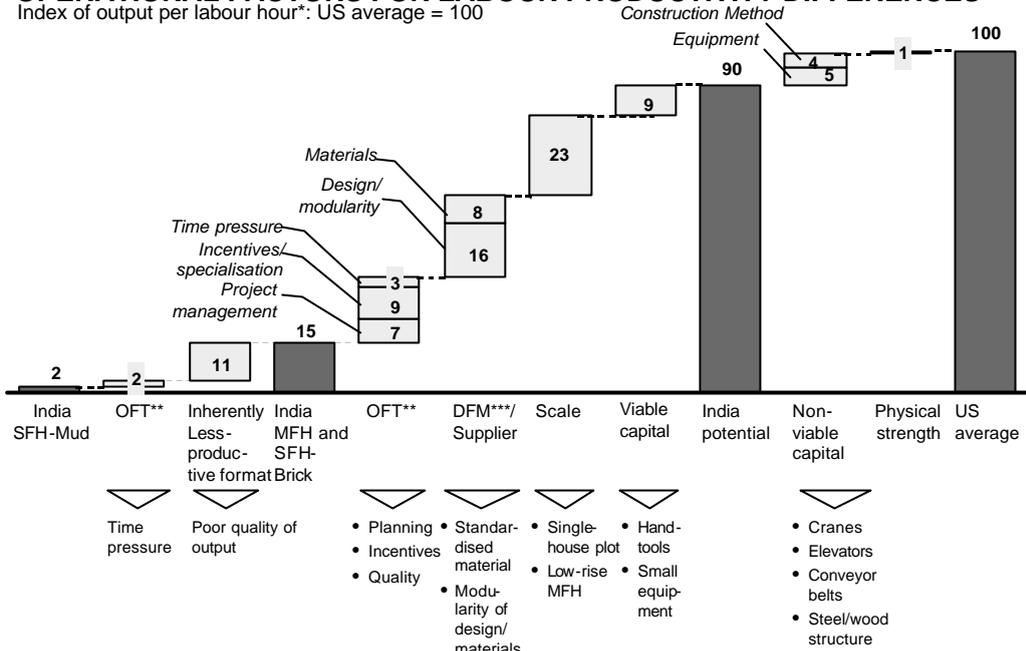


\* Measured as square metre of construction (quality adjusted) per 1000 hours of labour input  
\*\* Mud-house construction in the US  
Source: Interviews; NSSO; McKinsey analysis

Exhibit 1.8

### OPERATIONAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES

Index of output per labour hour\*: US average = 100

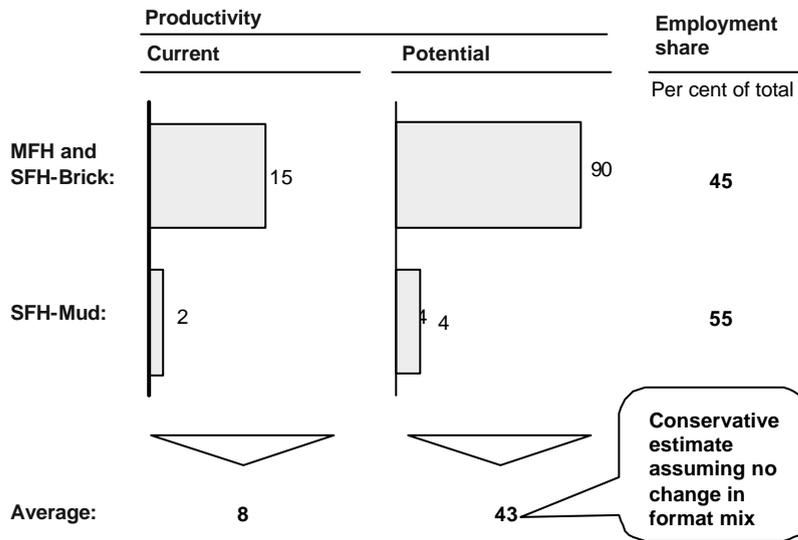


\* Measured as square metre of output (quality adjusted) per 1000 hours of labour input  
 \*\* Organisation of functions and tasks  
 \*\*\* Design for manufacturing  
 Source: Interviews, McKinsey analysis

Exhibit 1.9

### LABOUR PRODUCTIVITY POTENTIAL – HOUSING CONSTRUCTION

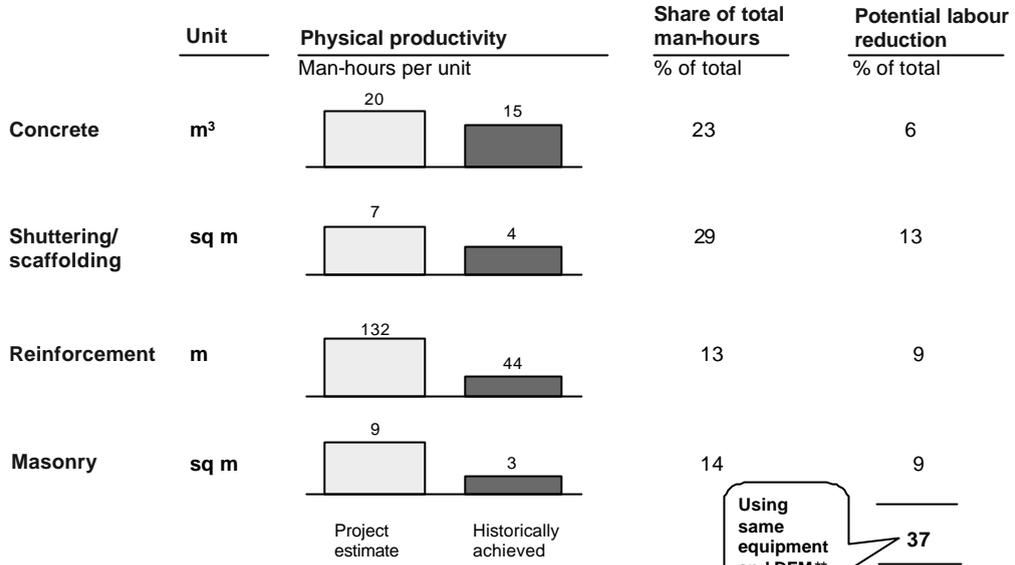
Index of output per labour hour\*: US average = 100



\* Measured as square metre of output (quality adjusted) per 1000 hours of labour input  
 Source: Interviews, McKinsey analysis

Exhibit 1.10

## OFT\* – POTENTIAL TASK PRODUCTIVITY IMPROVEMENTS FOR A MAJOR MFH CONTRACTOR



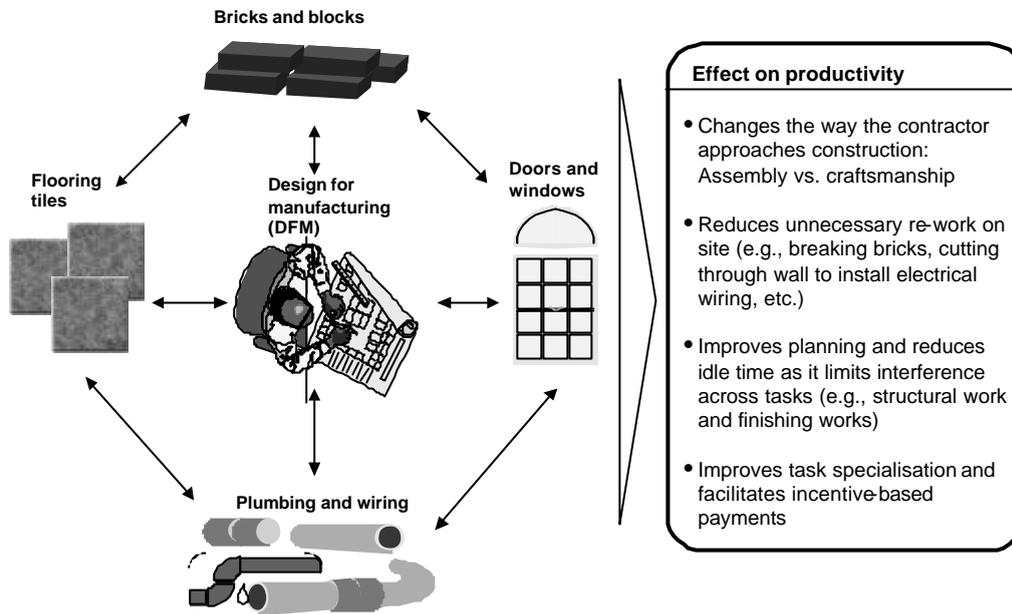
\* Organisation of functions and tasks

\*\* Design for manufacturing

Source: Company interviews

Exhibit 1.11

## USE OF DESIGN FOR MANUFACTURING AND STANDARD MATERIALS



Source: Expert and company interviews

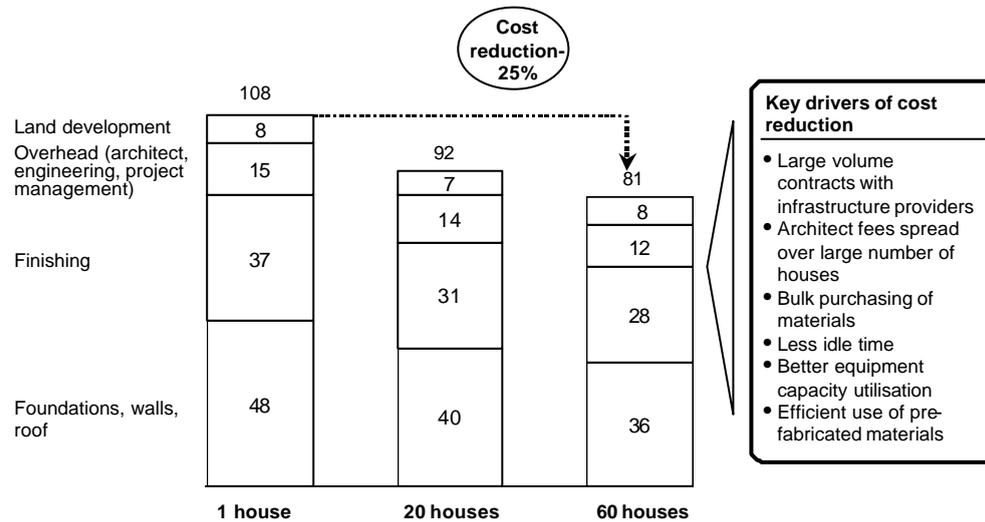
11

Exhibit 1.12

## LACK OF SCALE: SFH-BRICK MODEL \*

Total cost; US\$ '000 at GDP PPP

FRANCE/GERMANY EXAMPLE



\* Example: "row" house, 110 m<sup>2</sup>  
Source: MGI France/Germany report

12

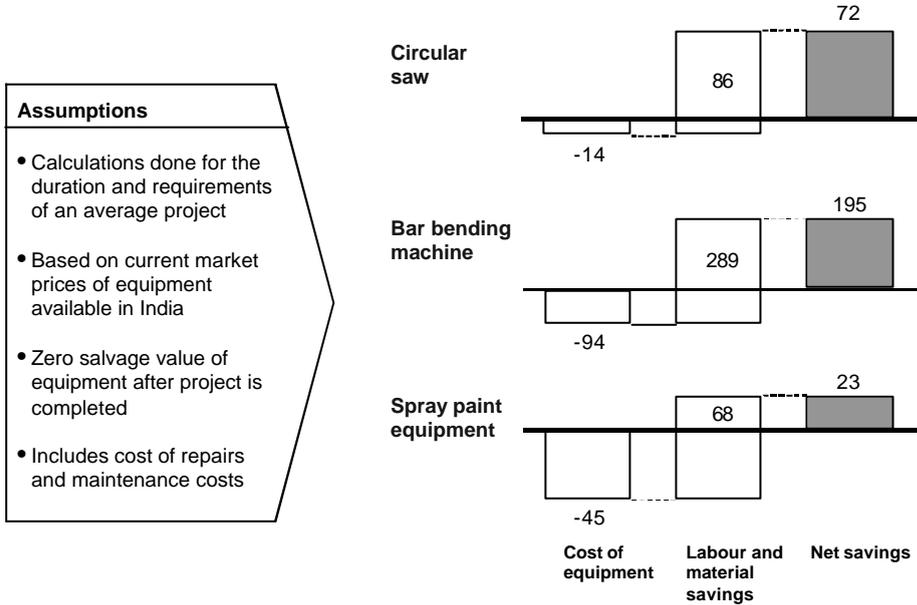
**CAPITAL INTENSITY: MECHANISATION AND TOOLING**

Equipment commonly used in the US	Usage in India	Indian gap	Currently viable in India	
• Crane	Low	• Workers used to carry weight across floors	• No	Used only for MFH> 10-15 floors
• Elevators – Material – Labour	Medium Low	• Workers used to carry weight across floors	• MFH only	
• Tools – Paint spray – Bar bender – Electric drill – Circular saw – Wheelbarrow	Medium	• “Manual” energy more frequently used instead of mechanical or electrical tools	• Yes	Viable for both MFH and SFH

Source: Interviews; MGI Brazil report

**LACK OF VIABLE CAPITAL**

Rs '000 for 18-month project

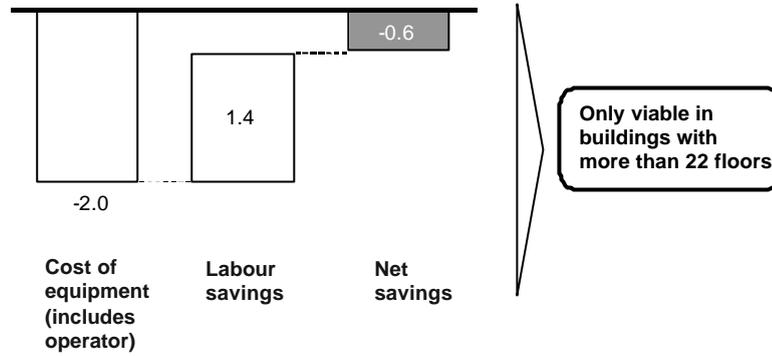


Source: Interviews; McKinsey analysis

### NON-VIABLE CAPITAL

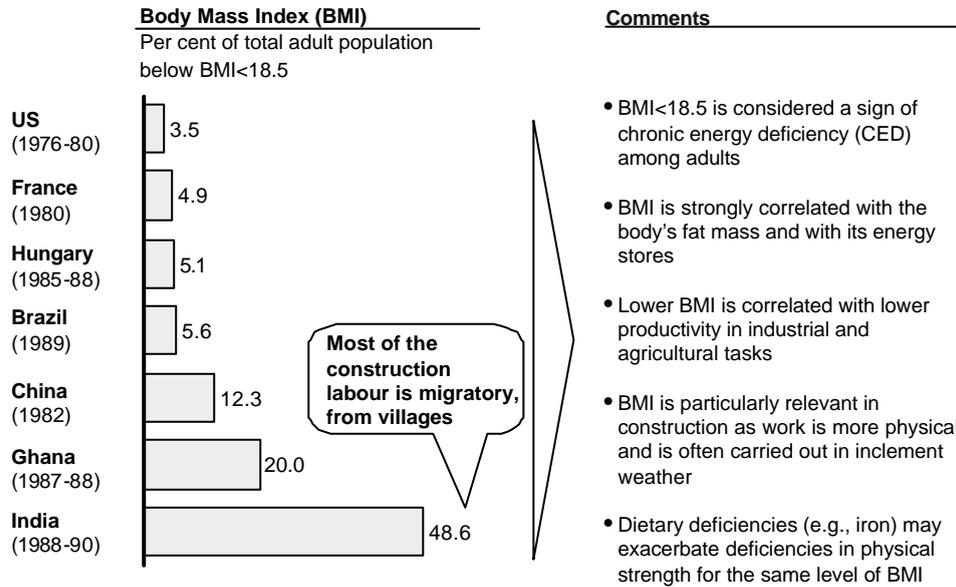
US\$ '000 per month

#### Tower crane (30 metres x 1 ton)



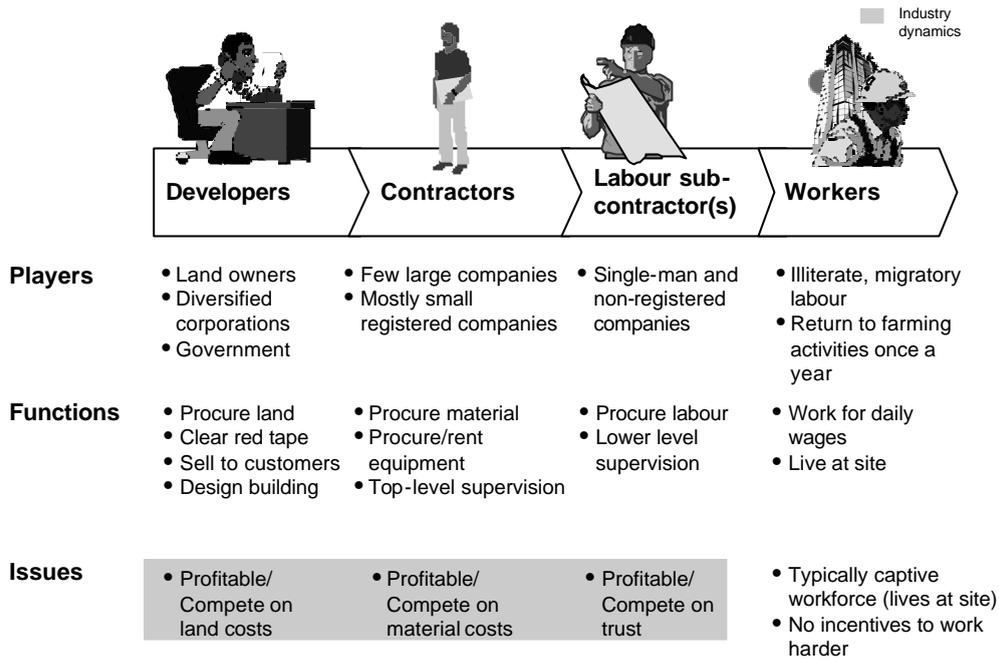
Source: Interviews; MGI Brazil report

### PHYSICAL STRENGTH OF LABOUR – CROSS COUNTRY COMPARISON



Source: Shetty and James, "Body Mass Index - A Measure of Energy Deficiency in Adults" (FAO Food and Nutrition Paper 56, 1994)

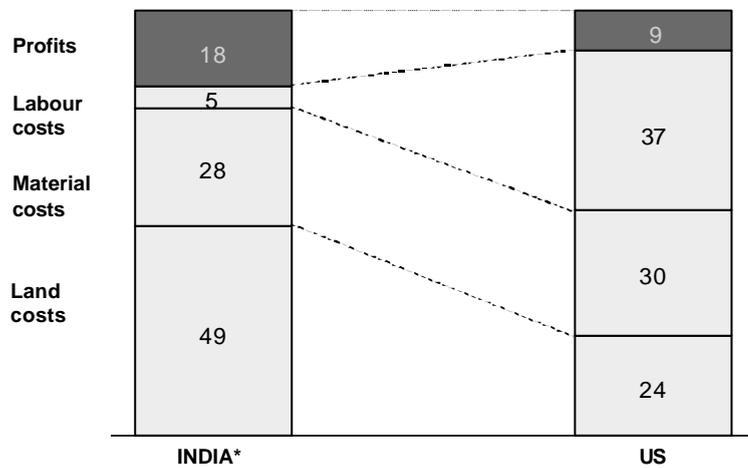
### INDUSTRY PLAYERS – MFH



Source: Interviews

### PROFITABILITY OF DEVELOPERS – MFH

Per cent of total cost per square foot



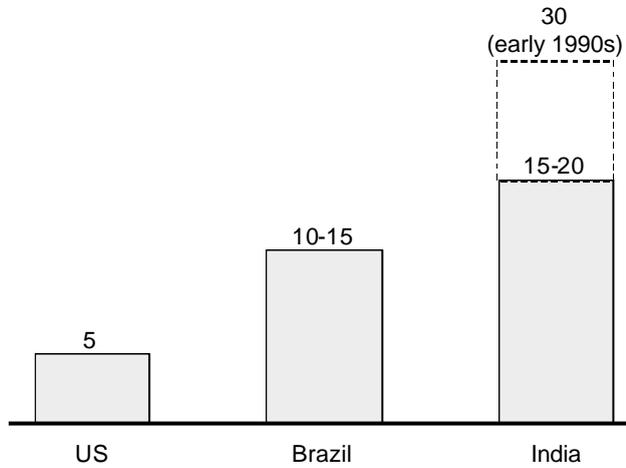
\* Figures correspond to suburbs of Mumbai

Source: National Association of Homebuilders Survey; Interviews; McKinsey

Exhibit 1.19

## PROFITABILITY OF CONTRACTORS – MFH

Per cent; net profit margin



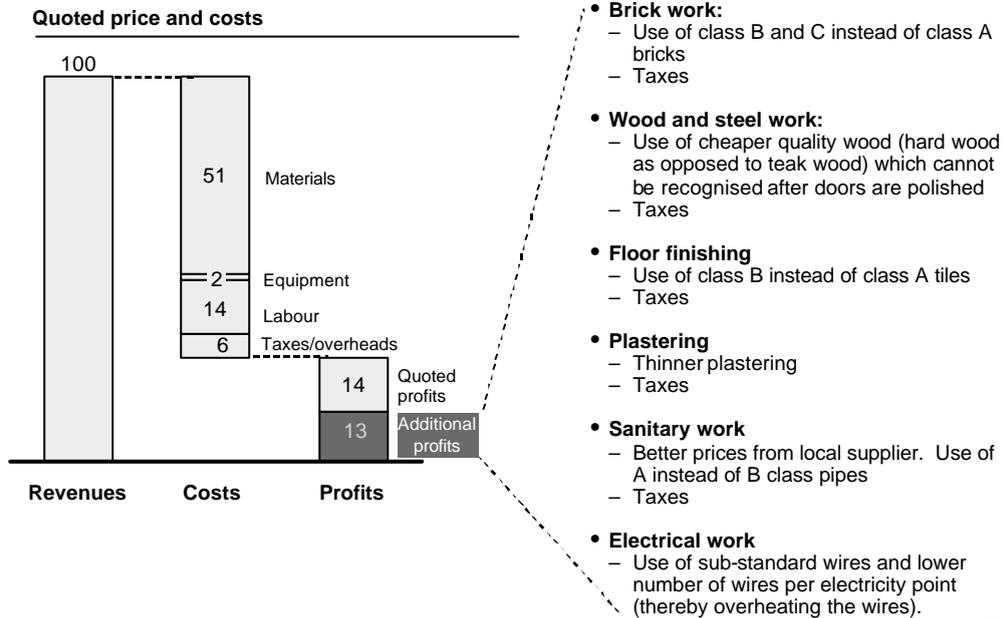
Source: Interviews; McKinsey

19

Exhibit 1.20

## SOURCES OF PROFITS FOR CONTRACTORS

Indexed to total revenues = 100



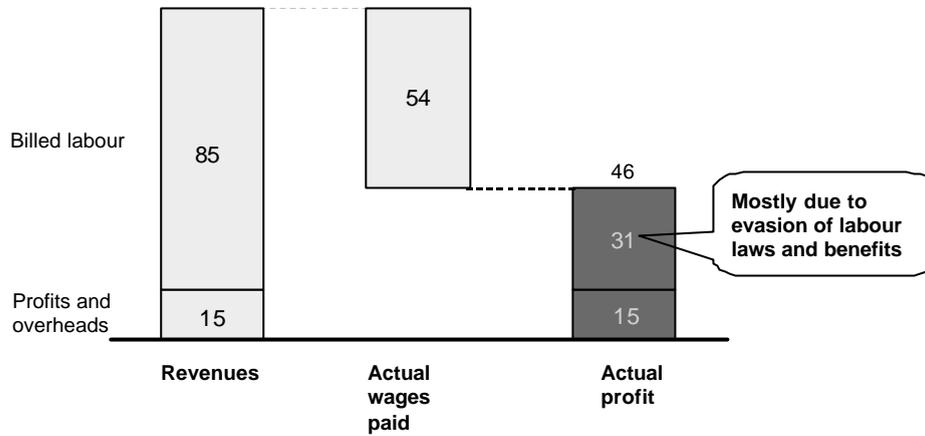
Source: Interviews, McKinsey

20

Exhibit 1.21

## PROFITABILITY OF LABOUR SUBCONTRACTORS

Indexed to total revenues = 100

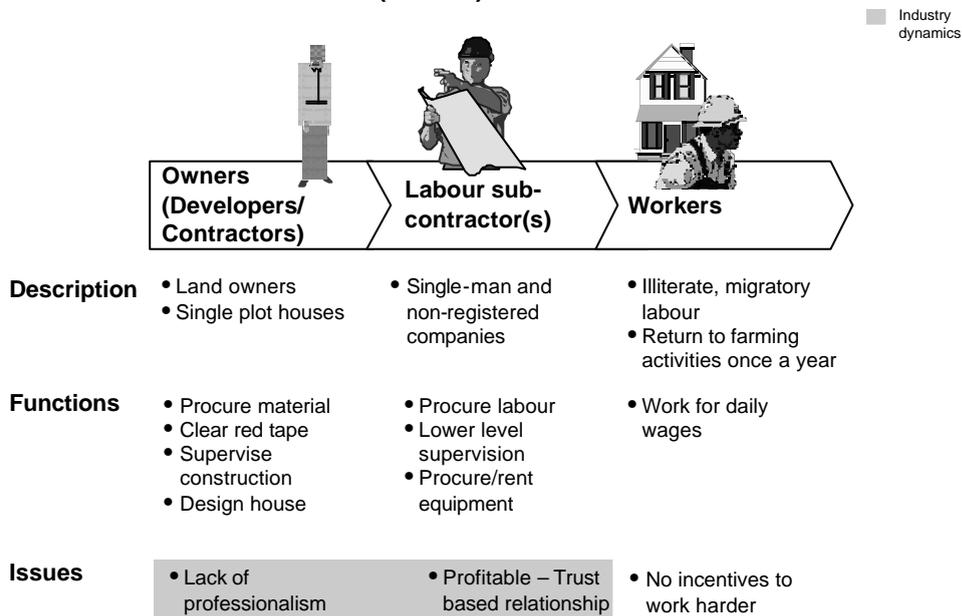


Source: Interviews, McKinsey

21

Exhibit 1.22

## INDUSTRY PLAYERS – SFH (BRICK)



Source: Interviews

22

Exhibit 1.23

## EXTERNAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES – SUMMARY

External factors	Industry overall	MFH	SFH		Legend
			Brick	Mud	
<b>Macroeconomic barriers</b> <ul style="list-style-type: none"> <li>• Low income/low labour cost</li> <li>• Country risk</li> </ul>	-	-	-	-	<ul style="list-style-type: none"> <li>● 20% impact or more</li> <li>○ 5% to 20% impact</li> <li>- Less than 5% impact</li> </ul>
<b>Labour barriers</b> <ul style="list-style-type: none"> <li>• Lack of labour laws enforcement</li> <li>• Threat of unionisation</li> <li>• Literacy rates</li> </ul>	○	○	○	-	
<b>Capital market barriers</b>	→	→	→	-	<ul style="list-style-type: none"> <li>• Lack of land to build in suburbs limits competition among developers</li> <li>• Limit competition among labor subcontractors</li> <li>• Limit competition among developers by limiting available land and housing financing</li> </ul>
<b>Product and land market barriers</b> <ul style="list-style-type: none"> <li>• Unclear titles</li> <li>• Government ownership of land</li> <li>• Rent control/Tenant laws</li> <li>• Land restrictions/Zoning laws</li> <li>• Excise duty on pre fabricated material</li> <li>• Lack of tax enforcement</li> <li>• Red tape/corruption</li> </ul>	●	●	●	●	
<b>Related industry barriers</b> <ul style="list-style-type: none"> <li>• Lack of standardisation of material</li> </ul>	●	●	●	-	<ul style="list-style-type: none"> <li>• Use of substandard material hampers DFM</li> <li>• Makes planning difficult</li> </ul>
<b>Other barriers</b>	-	-	-	-	
<ul style="list-style-type: none"> <li>• Productivity (current)</li> <li>• Productivity (potential)</li> </ul>	8 44	15 86	15 91	2 4	

Exhibit 1.24

## EXTERNAL FACTOR ANALYSIS ROADMAP – MFH

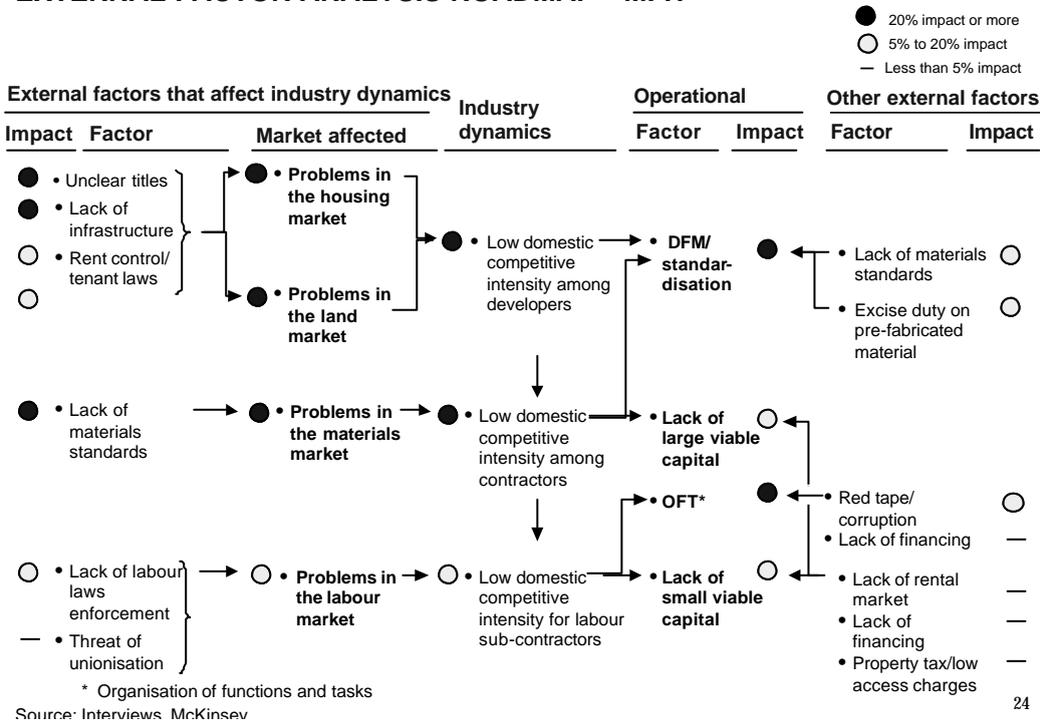
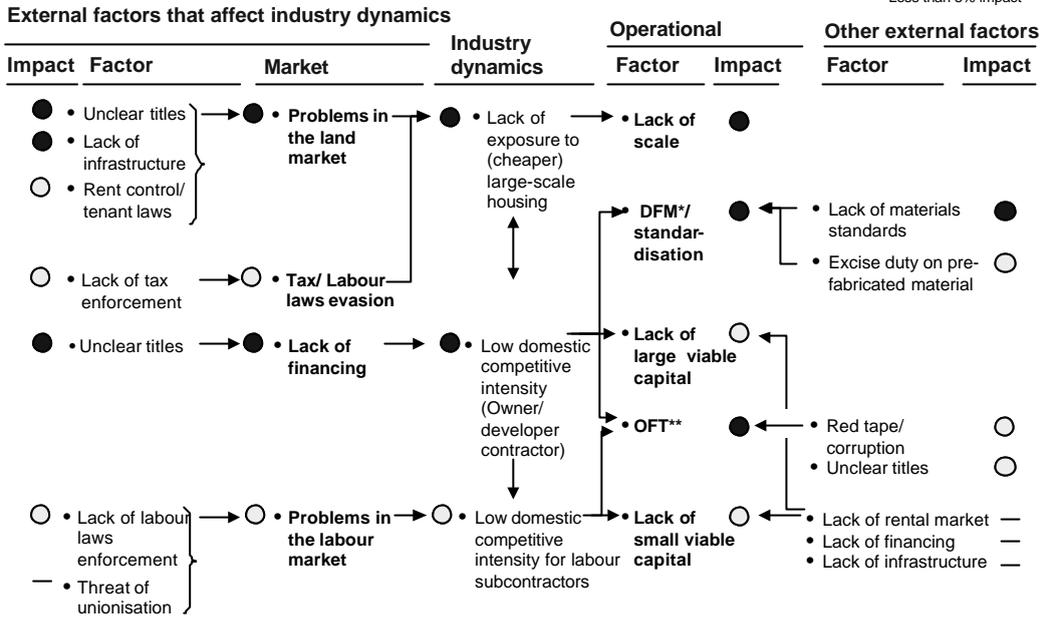


Exhibit 1.25

## EXTERNAL FACTOR ANALYSIS ROADMAP – SFH (BRICK)

- 20% impact or more
- 5% to 20% impact
- Less than 5% impact



\* Design for manufacturing

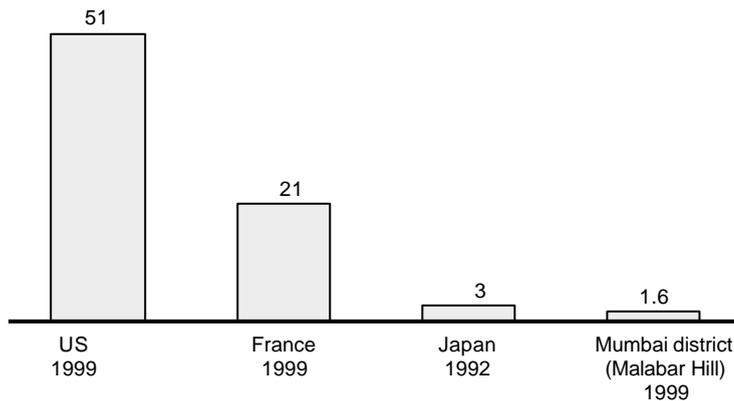
\*\* Organisation of functions and tasks

Source: Interviews, McKinsey

Exhibit 1.26

## DEPTH OF SECONDARY MARKET

Number of existing houses sold /1000 dwellings

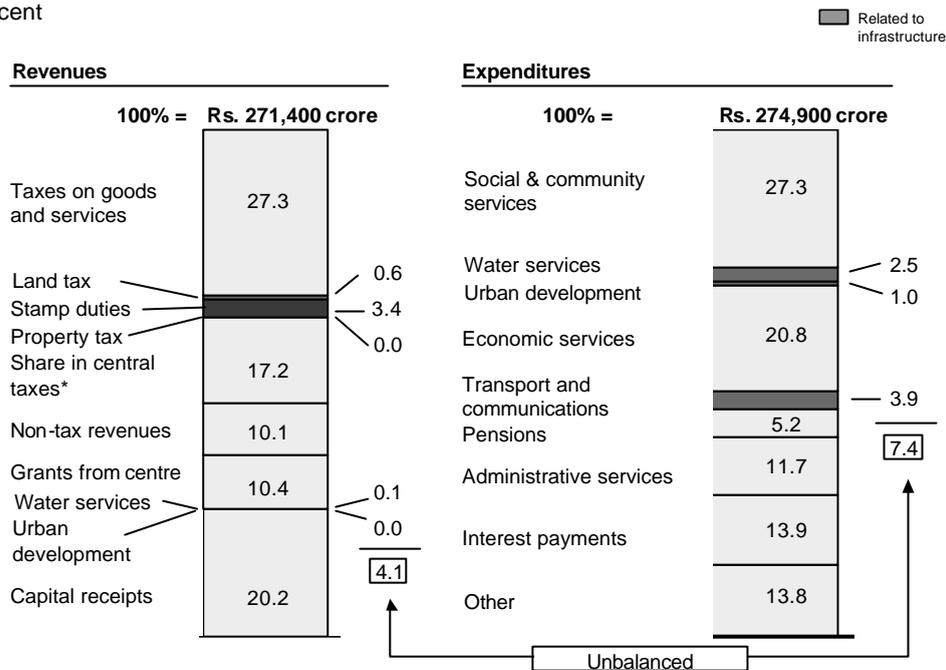


Source: MGI Japan, Colliers Jardine

Exhibit 1.27

## STATE GOVERNMENT FINANCES, 1998-99

Per cent



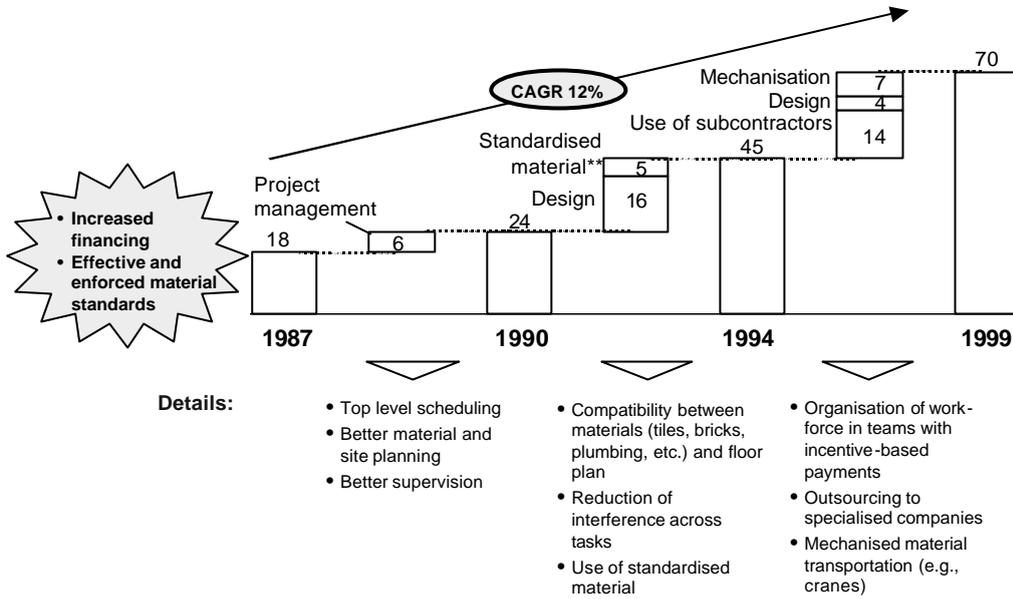
Source: CMIE; Urban Finance, March 1999 (National Institute for Urban Affairs)





### PRODUCTIVITY EVOLUTION FOR A MAJOR MFH CONTRACTOR IN BRAZIL

Index of output per labour hour\*: US average = 100



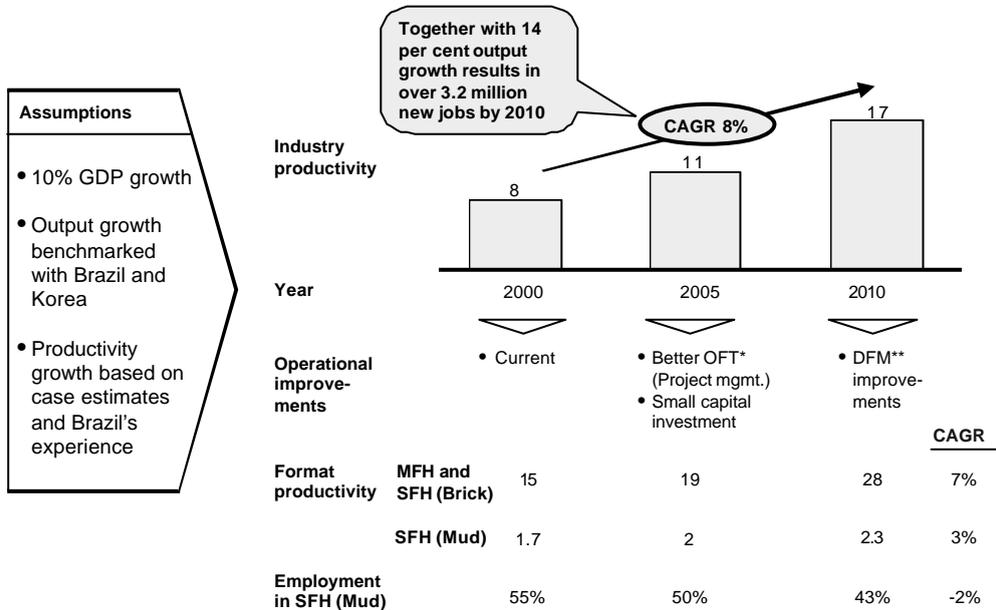
\* Measured as square metre of output (quality of adjusted) per 1000 hours of labour input

\*\* Includes some pre-fabricated material

Source: MGI Brazil report

### LABOUR PRODUCTIVITY POTENTIAL IN INDIAN HOUSING CONSTRUCTION

Indexed to US = 100; sq m per '000 hours (adjusted)



\*Organisation of functions and tasks

\*\* Design for manufacturing

Source: Interviews; McKinsey analysis

## POLITICAL ECONOMY ISSUES AND POLICY RECOMMENDATIONS

External Factor				
Impact	Factor	Winners	Losers	Policy recommendation
●	• Unclear titles	• Land owners	• Petty officials/ illegal owners	<ul style="list-style-type: none"> <li>• Lower stamp duty</li> <li>• Simplify registration procedures</li> <li>• Establish a new fast-track court to solve pending land litigation cases</li> <li>• Rescind Urban Land Ceiling Act</li> </ul>
●	• Lack of sub-urban infrastructure development	• Suburban dwellers/ rural migrants	• Current subsidised tax payers	<ul style="list-style-type: none"> <li>• De-link property tax from rent control &amp; adopt market-driven valuation system for property</li> <li>• Reduce tax evasion in city suburbs</li> <li>• Privatise water/sewerage/electricity services</li> </ul>
●	• Lack of material standards	• Housing customers	• Low quality contractors	<ul style="list-style-type: none"> <li>• Adopt western materials standards</li> <li>• Link public housing financing to use of standards</li> <li>• Establish consumer protection laws linked to new (fast-track) courts</li> </ul>
○	• Rent control/ tenant laws	• Rural migrants/ home owners	• Current tenants	• Liberalise rents
○	• Red tape/corruption	• Housing customers	• Petty officials	<ul style="list-style-type: none"> <li>• Simplify building codes</li> <li>• Introduce single-window clearance for building permits</li> </ul>

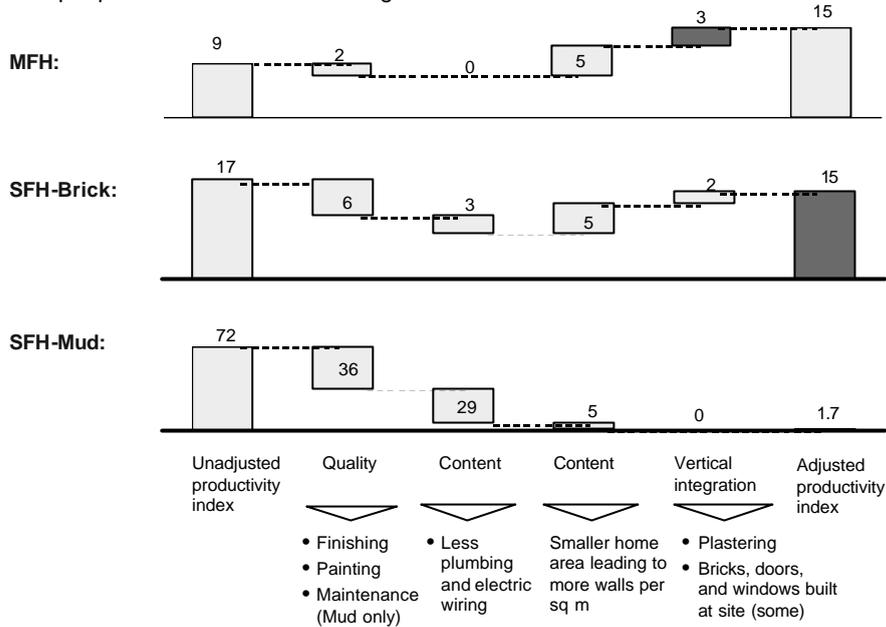
● 20% impact or more  
○ 5% to 20% impact  
— Less than 5% impact

Source: Expert interviews; MGI analysis

Exhibit 1.31

### LABOUR PRODUCTIVITY ADJUSTMENTS

Index output per labour hour\*: US average = 100



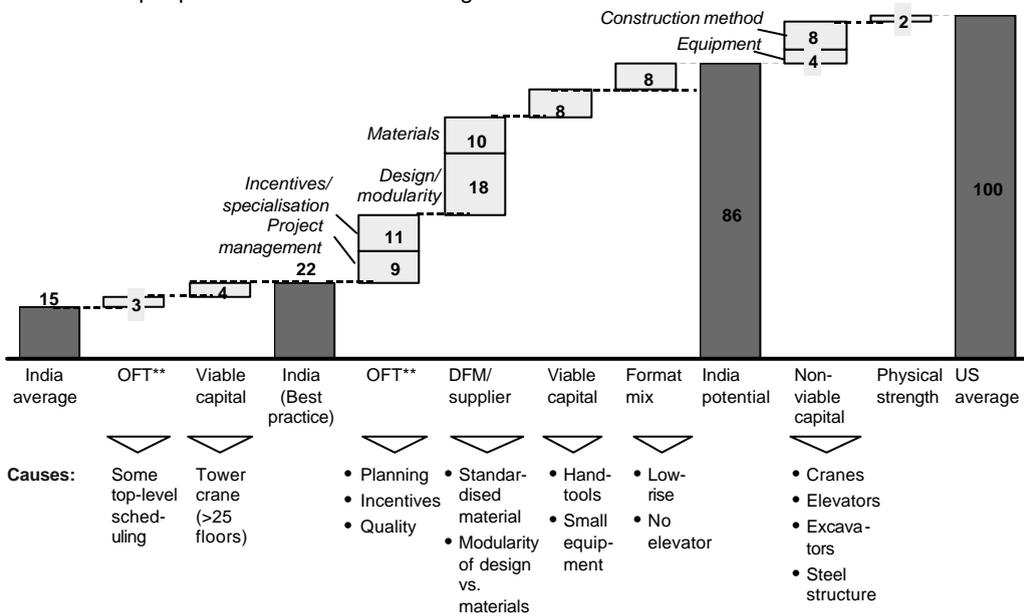
\* Measured as square metre of output (quality adjusted) per 1000 hours of labour input

Source: Interviews; McKinsey analysis

Exhibit 1.32

### CAUSES FOR LABOUR PRODUCTIVITY DIFFERENCES – MFH

Index of output per labour hour\*: US average = 100



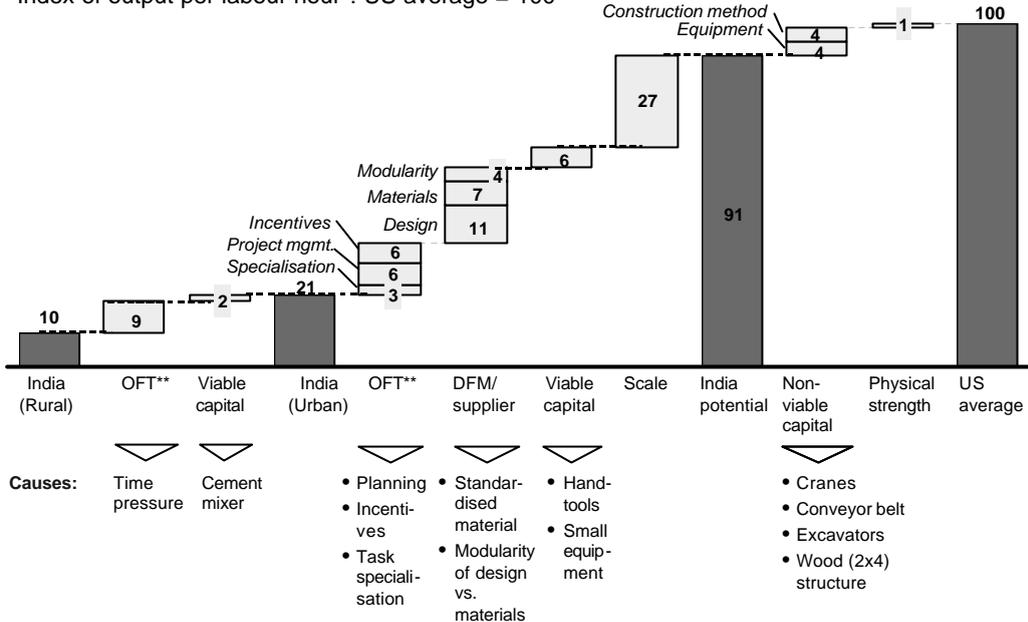
\* Measured as square metre of output (quality adjusted) per 1000 hours of labour input

\*\* Organisation of functions and tasks

Source: Interviews; McKinsey analysis

### CAUSES FOR LABOUR PRODUCTIVITY DIFFERENCES – SFH (BRICK)

Index of output per labour hour\*: US average = 100



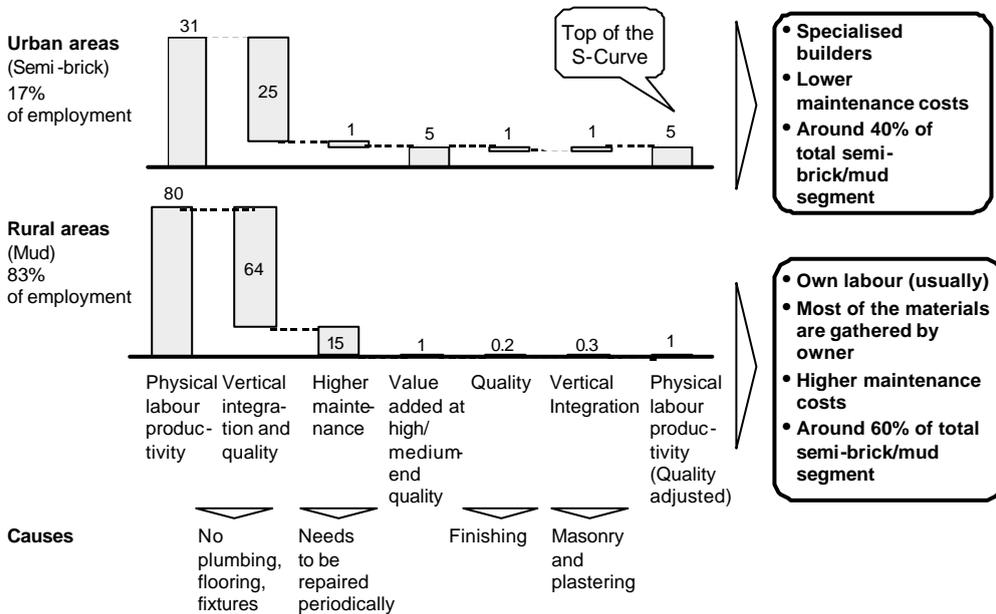
\* Measured as square metre of output (quality adjusted) per 1000 hours of labour input

\*\* Organisation of functions and tasks

Source: Interviews; McKinsey analysis

### LABOUR PRODUCTIVITY ADJUSTMENTS – SFH (MUD)

Index of output per labour hour\*: US average = 100



\* Measured as square metre of output (quality adjusted) per 1000 hours of labour input

Source: Interviews; McKinsey analysis

# Retail Banking

## **SUMMARY**

Retail banks are the most important intermediaries in mobilising public savings and directing them into investments in either government-owned or private enterprises. This sector has been heavily regulated in the past and is still dominated by government-owned public banks. These banks have an 81 per cent market share while the new private banks, which entered the market after 1994, have a 4 per cent market share and are growing aggressively. Foreign banks and old private banks constitute the remaining 15 per cent of the industry.

The industry has gone through one round of deregulation in the 1990s when the new private banks were introduced and interest rates on deposit accounts were decontrolled. However, with the majority of the sector still under the control of public banks, the benefits of private banks entering at high productivity levels has not extended to the majority of India's population.

Improving the productivity of public banks is critical not only to the retail banking sector but to most of the real economy. We believe that the sector can increase its productivity performance and ensure its continued growth if reforms such as bank privatisation, interest rate deregulation and setting up credit bureaus are carried out. These reforms can reduce the cost of intermediating capital in the economy by as much as 1 per cent. Further, the sector will experience dramatic growth in output and productivity. In fact, if these reforms are carried out in the banking sector and the economy grows at 10 per cent – which is possible if our recommended reform programme is implemented – output in the retail banking sector will grow at 12 per cent a year while productivity will grow from 12 per cent to 62 per cent of US levels over the next 10 years. Employment in the sector will, however, decline at 6 per cent a year.

## **Productivity performance**

The retail banking sector in India is currently performing well below its potential: productivity is only 12 per cent of US levels though it has the potential to reach 90 per cent. Public banks are the worst performers with productivity levels of only 10 per cent of the US. Private banks (including foreign banks) perform better with average productivity levels of 32 per cent of US levels. The best practice private banks, in fact, are at 55 per cent of US levels. Productivity in the sector also varies across products. Productivity levels are lowest in payments – 4 per cent of US

levels, and highest in deposits – 27 per cent of US levels. Productivity in loans is at 11 per cent of US levels.

### **Operational reasons for low productivity**

At the operational level, the main reasons for the productivity gap between the average (12 per cent of US levels) and best practice banks in India (55 per cent of US levels) are the poor organisation of functions and tasks in bank branches, the inadequate automation of branches and the lack of centralisation of back office operations. The gap between the best practice Indian banks and the US banks is due to five factors: lack of scale, absence of credit bureaus, inadequate automation of the check clearing system, low penetration of new channels such as ATMs and call centres and a payment mix that is biased towards cash transactions. Most of these operational issues can be addressed even in the Indian market and retail banks can achieve 90 per cent of US productivity levels.

### **Industry dynamics**

Many of the operational factors are a legacy of the low competition that has been a feature of the industry in the past. The level of domestic competition has traditionally been low, primarily due to product market restrictions on licences for new banks and interest rates. Since their removal, competitive intensity has been growing in the most affluent urban areas following the entry of new private banks, which offer much better services as well as higher interest rates for term deposits.

### **External factors responsible for low productivity**

The main external factor limiting the productivity of Indian banks is the government ownership of public banks. Government ownership reduces the profit incentive for bank managements, directly hindering productivity growth. This is aggravated by the expectation of being recapitalised against the current high levels of non-performing loans. In combination with crippling labour settlements that limit automation and retrenchment of employees, this has resulted in a very low level of productivity. Other factors such as the remaining interest rate restrictions, the government monopoly on telecom, lack of credit bureaus and unclear property titles (which make it difficult for banks to lend against property) also lead to low productivity, although to a lesser extent. Contrary to popular belief, external factors such as the obligation for public banks to serve rural customers, branch restrictions on foreign banks, the poor postal infrastructure, tax evasions and low income levels do not impact productivity significantly.

## **Industry outlook**

Privatisation of public sector banks, relaxation of interest rate restrictions and improvements in telecom, credit rating and judicial infrastructure – combined with overall reform in all the other sectors – can lead to a 12 per cent growth in output and 18 per cent growth in productivity over the next 10 years. The improvement in productivity of public banks alone – from 10 per cent to 60 per cent – can, over 10 years, lead to savings of up to US\$ 2.5 billion every year. This, in turn, can reduce interest rates in the economy by more than 1 per cent.

## **Policy recommendations**

To address the issue of low productivity in retail banking, the government should:

- ¶ **Privatise public banks:** The government should privatise the public banks as soon as possible and allow them to reach their potential productivity levels.
- ¶ **Complete interest rate deregulation:** The government should lift restrictions on interest rates for savings and current accounts as well as the constraints on small loans.
- ¶ **Set up credit bureaus:** The government should allow the entry of credit bureaus to collect and report consumer credit history.

# Retail Banking

Retail banking represents nearly 45 per cent of India's financial savings base (**Exhibit 4.1**) and is a key intermediary in channelling retail savings into corporate and government investment. The retail banking case is important to the study as it represents the financial services sector, the performance of which determines how effectively the country can mobilise savings and allocate capital.

The retail banking sector in India is currently performing well below its potential: productivity is only 12 per cent of US levels though it has the potential to reach 90 per cent. At an operational level, the sector suffers from overstaffing, poorly designed processes and inadequate centralisation and automation.

While average productivity levels are poor, there are some strong performers among the new private players who entered the sector in the 1990s. These players run lean and efficient operations; they have invested in automation and are already operating at 55 per cent of US productivity levels. Over time – as they build scale, develop new efficient channels, develop stronger credit rating infrastructure and further automate their processes – their productivity is expected to rise to 90 per cent of US levels, the peak productivity potential in India.

Overall, however, the sector is dominated by poor-performing public sector banks, which have an 81 per cent share of deposits. These banks operate under bureaucratic constraints that limit productivity and provide little incentive to focus on productivity. Growth is also constrained by interest rate regulations, the slow judicial system and unclear property titles, lack of credit rating information and distortions in the telecom regulatory framework.

If these barriers are removed and the economy grows by 10 per cent per annum, the banking sector will see 18 per cent annual growth in productivity and 12 per cent growth in output per year. As a result, employment in the sector will decline by 6 per cent per annum.

The rest of the chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity

- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

The banking industry can be divided into three segments – depository institutions (commercial banks, savings banks, cooperative banks), non-depository or specialised institutions (non-banking financial institutions) and securities firms (brokerages). Our study focuses on commercial banks, which account for over 85 per cent of the employment and 70 per cent of retail deposits in banks. In order to be able to compare with benchmark countries, we have not included other institutions such as cooperative banks, securities firms and NBFIs.

The industry is dominated by public sector institutions, which were created by the nationalisation of the larger banks in 1969 and 1980.

### **Output levels**

Output levels in India are very low compared to benchmark countries. This is because retail banking output grows much faster than GDP and countries with higher GDP per capita have disproportionately higher retail banking output levels. Annual payment transactions per capita in India are 15 times lower than in Brazil and nearly 90 times lower than in the US, while loans are 17 times lower than in the US. Due to the Indian propensity to save, the gap is smaller for the number of deposit accounts per capita where US levels are only four times that of India (**Exhibit 4.2**).

Retail deposits dominate India's retail banking industry, with the total retail deposit base amounting to over US\$ 130 billion, which is more than 75 per cent of the retail financial savings base in India. Retail loans, on the other hand, are very nascent with the total retail loan portfolio amounting to less than US\$ 20 billion. Of this, nearly US\$ 10 billion are agricultural loans. Mortgages are very small and are mostly from the Housing Development Finance Corporation (HDFC), a development financial institution. Retail banks, led by the foreign banks, have started offering mortgages only in the last 10 years.

### **Industry evolution**

Despite the entry of new private banks, public banks dominate Indian retail banking. Public banks account for over 85 per cent of the employment and 81 per cent of the deposit base of India's commercial banks (**Exhibit 4.3**). Prior to 1969,

all banks except the State Bank of India (SBI) and its seven associate banks were private. In 1969, the Nationalisation Act converted the country's 14 largest private banks into public banks with the objective of increasing rural penetration and increasing credit to the rural population. In 1980, another six banks were nationalised, leaving only the small regional banks private.

The number of bank branches has gone up radically since nationalisation – with the total number of branches growing from 8,832 in 1969 to 65,000 in 1999 and the share of rural branches increasing from 22 per cent to 52 per cent.

The old private banks, meanwhile, have remained small and have a market share of only 8.5 per cent. The foreign banks have stagnated; their branches have increased from 130 in 1969 to only 175 in 1999, and their market share has actually decreased from 7.5 per cent in 1994 to 6.5 per cent in 1999.

In 1993, as part of overall financial sector reforms, licences were given to nine new private sector banks. These have grown aggressively at nearly 75 per cent a year to capture around 4 per cent market share by 1999.

## **PRODUCTIVITY PERFORMANCE**

Productivity in the retail banking industry is well below potential. The average productivity in the sector is only 12 per cent of US levels, while the potential is 90 per cent. The public sector banks are the worst performers with productivity levels at 10 per cent of US levels. The private sector players perform better, with an average productivity of 32 per cent, and the best private sector players have reached 55 per cent of US productivity levels (**Exhibit 4.4**).

Productivity is uniformly low for all retail banking products. Productivity in payment transactions, the most important product category, is at 4 per cent; productivity in loans stands at 11 per cent and reaches 27 per cent of US levels in deposit servicing (**Exhibit 4.5**). Productivity has grown by about 2 per cent a year since 1995 following very low output growth of around 2 per cent and stagnant employment, a consequence of the recruitment freeze in public banks over the last 10 years.

Measuring and comparing retail banking productivity across countries is difficult. The only meaningful way is to use physical measures of output like number of transactions (*see* **Appendix 4A**). It is important to note that these physical measures of output do not take into account Non-Performing Assets (NPAs) in retail lending, which are as high as 10 per cent in India compared to less than 5 per cent in the US.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

The average productivity of Indian banks is 12 per cent of US levels. A large part of the gap between Indian and US levels can be bridged even with the current costs of labour and capital, and Indian banks can perform at 90 per cent of US levels. In fact, as mentioned before, the best practice banks are already performing at 55 per cent of US levels. Average productivity is low because of the low productivity of the public sector banks. Insufficient branch automation, inefficient centralisation and sub-optimal organisation of functions and tasks (OFT) are the key reasons for low productivity in public banks (**Exhibit 4.6**).

### **Reasons for the productivity difference between public and the best Indian private banks**

The five-fold difference in productivity between public banks and the best Indian private banks stems from the combination of operational factors such as inadequate branch automation and centralisation of back office operations and the sub-optimal organisation of functions and tasks (e.g., the inefficient design of workflow in executing a cash withdrawal). Staffing levels in non-automated public bank branches, for instance, are significantly higher than those in modern, fully automated branches (**Exhibit 4.7**). This is particularly important because almost 90 per cent of the employees in any bank are employed in the branches (as opposed to the corporate office).

- ¶ **Overstaffing:** Eliminating excess workers (defined as the number of people who can be eliminated without changing the workflow) will increase the productivity of public banks by at least 10 per cent. In the past, most public sector banks have focused on employment generation, leading to overstaffing in branches. In our interviews, branch managers readily admitted to having redundant staff in front desk operations, back office clearing operations and in credit, especially in the larger branches. In the latest round of Voluntary Retirement Schemes (VRS), banks have shed around 10 per cent of their staff within 2-3 months, confirming our estimates of excess labour. Besides overstaffing of core banking employees, the banks also have too many subordinate staff on their rolls. However, we do not include them in the productivity calculations since US banks typically outsource these functions.
- ¶ **Rural branch penalty:** Rural banking imposes a 10 per cent penalty on public sector banks. As described earlier, over 50 per cent of the 65,000 bank branches in India are in rural areas (defined as areas where the population level is below 10,000). Given that many rural customers are illiterate, the front desk staff spend time filling out bank slips and helping customers complete transactions. The staff also have to visit villages to ensure that loan repayments are made on time. These factors lead to a 20

per cent productivity penalty for rural branches (**Exhibit 4.8**), which translates into a 10 per cent penalty at the aggregate level.

However, we must note that once the public banks move to the productivity level of the private banks, they will also reconfigure their rural branches to take advantage of centralisation benefits which will automatically compensate for the literacy levels. With the use of technology, the productivity gap due to literacy differences will be bridged. For example, banks can start adopting mobile vans with connectivity to their networks to do loan marketing and collection jobs.

¶ **Sub-optimal OFT:** Improving OFT in branches will increase the productivity of public banks by more than 50 per cent without necessitating any investment in information technology. The most recurrent and important organisational problem in public sector banks is the lack of authority vested in employees. This is particularly evident in cash withdrawals; completing a transaction requires cashiers in public banks (with no authorisation power) to make thrice as much effort as tellers in private banks who have authorised credit limits for cash payments (**Exhibit 4.9**). The other activities where the front desk staff are not authorised to make decisions are: clearing cheques, issuing demand drafts, effecting telegraphic and electronic funds transfers, opening accounts and approving retail credits. Credit, in particular, needs multiple (sometimes as many as five) approvals compared to one in the best Indian private banks.

¶ **Inadequate branch automation and centralisation of back office operations:** Automating and centralising key repetitive processes – which even at current low labour costs would be viable – will more than double the productivity of public retail banks, once the organisational problems mentioned earlier are rectified (**Exhibit 4.10**). This will take them to the level of the best private Indian banks – or even beyond, given their scale advantage. Despite the tremendous impact that automation can have on productivity, fewer than 5,000 of the over 45,000 public bank branches are automated.

Even within these “fully computerised” branches, service levels are very poor. Most computers are stand-alone terminals (not connected to a central network), making it difficult to gain efficiencies through multi-tasking. For example, in most public sector bank branches, a customer has to go to three different windows to get a cheque cleared, withdraw cash and make enquiries about loans. In contrast, the best Indian private banks are able to offer all these services from a single window through channels ranging from the branch to the Internet to mobile phones.

We estimate that investments in automation are economically viable at current labour costs. For instance, automating a branch will cost US\$ 10,000-US\$ 20,000 but will cut annual employee costs by a similar amount. As a result, the payback period for these investments is less than 2 years. The processes that will gain most from automation and centralisation are:

- **Cheque clearing:** Productivity can improve five-fold by moving from the manual operation that is currently followed by public banks in several cities to a fully centralised operation adopted by the best Indian private banks. In a centralised configuration, cheques can be collected directly from collection boxes and taken to a centralised processing centre, eliminating the need for collection and dispatch clerks at bank branches. Similarly, for clearing, there will be no need to dispatch checks to individual branches for verifying signatures. A central database will have all the customers' signatures, which a central team of cheque processing specialists can look up before debiting accounts. Only return cheques will need to be tracked by the relevant branch employees (**Exhibits 4.11 & 4.12**).
- **Account opening:** The account opening process can be automated to a great extent in a centralised back office. Customer information can be directly delivered to the centralised back office, where all documents are imaged. All processing after this point is done by account opening specialists who process 60-65 applications every day compared to the 15-20 done at a public sector bank branch.
- **Query handling:** Specialists in centralised call centres are about 10 times more productive than branch employees in handling customer queries. In combination with automatic responses, a call centre specialist can handle up to 300 queries every day compared to about 30 by a branch, owing to standardised responses and easier/quicker access to relevant customer information.
- **Loan processing:** Scanning documents and transmitting images to a centralised processing centre can accelerate the loan underwriting process. For example, a bank can have its credit appraisal specialists stationed at a central location, but have agents and lawyers stationed at the customer's location. Credit verification and legal approval can then be obtained rapidly, using documents transmitted through the telecom network.

## **Reasons for the productivity difference between the best Indian private banks and US banks**

The main factors responsible for the gap between best practice Indian banks and US banks are the low scale in transaction volumes, an inefficient nationwide cheque clearing mechanism, a lack of credit rating infrastructure, telecom regulations slowing down the migration of customer calls to call centres, and a payment mix which is heavily biased towards labour-intensive cash transactions. Most of this gap can be bridged even at current costs of labour and capital and productivity can rise to 90 per cent of US levels. The 10 per cent gap that cannot be bridged is due to the payment mix and part of the investment in clearing and channel infrastructure not being viable.

- ¶ **Low scale in transaction volumes:** The best private banks in India are still very small because they have been in operation for only 4 years. They have fewer than 100 branches and process only 100,000 transactions per day in comparison with over 1 million transactions for US banks. This leads to higher overheads and more employees in the centralised back office per transaction, resulting in an overall productivity penalty of around 12 per cent (**Exhibit 4.13**). At the current growth rate, private banks will reach the US average scale of operations in less than 5 years and will automatically gain scale advantages.
- ¶ **Inefficient credit rating mechanisms:** There are no credit bureaus in India to process customer information and provide credit history to banks. As a result, branch employees spend a lot of time making credit decisions, resulting in a productivity loss in loan processing. For example, the process can easily take 4 weeks for a mortgage (compared to 2 days in the US) and about a week for an automobile or agricultural loan. Due to the extra time spent per case, even the best private banks in India face an overall productivity penalty of about 10 per cent (**Exhibit 4.14**).
- ¶ **Inefficient cheque clearing mechanism:** The cheque clearing mechanism in India is labour-intensive, resulting in a productivity penalty of about 7 per cent. Currently, clearing involves a three-step process: collection of cheques, manual or automated clearing at the clearing houses, and manual verification of signatures before debiting the accounts.

The inefficiencies in the system are at two levels. First, automated clearing using Magnetic Ink Character Recognition (MICR) reader-sorter machines is restricted to the top 20 centres in India. This is because the volumes of cheques cleared do not justify investments in automation at very small centres. (Each reader sorter machine costs US\$ 2 million-3 million). Nor can clearing be aggregated in district

headquarters as it is in the US because the postal system is not as reliable. Second, even in automated clearing centres, cheques are physically distributed to individual issuing banks where employees physically verify the authenticity of each cheque before clearing it. This is more labour-intensive than the US system, where cheques below a certain limit are cleared automatically with no manual intervention (**Exhibit 4.15**).

- ¶ **Low penetration of new channels:** The use of new, more productive channels such as ATMs, call centres and the Internet is still very nascent, resulting in a productivity penalty of 12 per cent. For instance, the penetration of ATMs in India is very low, with fewer than 1,500 ATMs in the whole of India compared to over 180,000 in the US. Although the best practice banks own most of the ATMs in India, the absence of an inter-bank network of ATMs in most cities limits the usage of this highly productive channel. Again, best practice banks are unable to shift all their customer queries to centralised call centres because of restrictions by the long distance telecom provider on interconnecting customers through leased lines. As a result, a large part of customer query handling has to be done at the branches at one-tenth the productivity of call centres (**Exhibit 4.16**).
- ¶ **Payment mix:** The payment mix productivity penalty in India arises from the high volume of labour-intensive cash transactions that are processed at the teller. Approximately, 42 per cent of the transactions of even the best practice banks are cash transactions against only 3 per cent in the US, leading to a penalty of 4 per cent on the overall productivity of Indian best practice banks (**Exhibit 4.17**).

## INDUSTRY DYNAMICS

Low competitive intensity is the key factor responsible for the low productivity in the sector. Following the partial delicensing of the sector and interest rate deregulation in 1995, competition in the sector has been growing, fuelled by the entry of new private retail banks. However, three factors still limit the competitive intensity in the Indian retail banking sector: interest rate regulations on checking accounts, the predominance of government-owned public sector banks in all semi-urban and rural areas and restrictions on licences for foreign banks.

The private banks are highly productive and provide adequate exposure to best practices. The playing field between private and public banks is also level with no additional restrictions imposed on either segment (**Exhibit 4.18**).

## **Low but increasing domestic competitive intensity**

Public sector banks, which dominate the sector, have not traditionally competed on price. The Reserve Bank of India (RBI) did not grant new bank licences until 1993 or set the interest rates on deposits and loans until 1995. This low level of domestic competitive intensity began to change with the entry of the new private banks and with the gradual deregulation of interest rates. For example, in addition to offering much better services, the new private banks offer nearly 11 per cent interest for a fixed deposit with a 1-year maturity, against the 9.5 per cent offered by public banks (**Exhibit 4.19**). New private banks are also growing their branch networks at a very high rate, leading to nearly 75 per cent average yearly growth rate in deposits (**Exhibit 4.20**).

Despite this, competition is still not intense for the stronger public banks. This is because the new private banks are still small and active only in select urban and metropolitan areas and because there are a few extremely weak public sector banks against which the strong public sector banks are gaining market share. This situation is, however, expected to change and the public banks will soon face stronger competition for two reasons. First, the new private banks will soon expand to the most profitable semi-urban and rural areas; second, the most profitable customers of the public banks will shift large volumes of business to the private banks as they gain credibility.

Foreign banks are restricted from opening branches freely in India. Each new branch requires an RBI licence, which is difficult to obtain. This has led to sub-scale operations for the foreign banks, which have decided to “cherry-pick” customers and provide exclusive services to a limited high value customer pool. The small scale of these operations results in low competition intensity for the public and private banks.

## **Exposure to best practice**

Foreign banks are unable to operate at best practice productivity levels due to the already-mentioned restrictions. However, given that the best practice Indian private banks are nearing India’s potential, relaxing restrictions on foreign banks is unlikely to affect Indian productivity levels significantly. A similar situation can be observed in Brazil, where the best private banks – Bradesco and Itau – are following best practice with productivity levels better than the US average, after adjusting for Brazil’s unfavourable payment mix<sup>1</sup>.

---

<sup>1</sup> Please refer to the McKinsey Global Institute report on retail banking productivity in Brazil, 1997

## **Non-level playing field**

A more or less level playing field exists given that public sector banks are not favoured over private banks. In fact, public sector banks are somewhat penalised by having to maintain a rural branch network. However, as discussed earlier, even this factor accounts for only a very small fraction of the productivity gap between public and private banks.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

Government ownership is the most important external factor explaining the low productivity in the sector. It is directly responsible for the low productivity of the public sector banks, which account for over 85 per cent of the employment in the sector. Other significant reasons for the low productivity of the sector are: restrictions on checking accounts, regulations protecting government-owned incumbents in the telecom sector, unclear property title registrations and lack of reliable credit information. Contrary to popular belief, restrictions on foreign banks, low income levels, poor education and lack of infrastructure are not significant factors in explaining the productivity gap (**Exhibit 4.21**).

## **Government ownership and its labour market consequences**

Given the current competitive conditions, we estimate that full privatisation alone will allow and eventually force the public banks to increase their labour productivity at least three-fold. Government ownership reduces the overall level of productivity in several ways. First, public banks have little financial incentive or pressure to increase productivity. Second, they are subject to bureaucratic and restrictive government monitoring processes. Third, the government has been incapable/unwilling to confront the powerful labour unions, which impose internal barriers to increasing productivity. Although these restrictions on productivity are put in place in the name of pursuing social objectives, they are unjustified, as we will see later in the Industry Outlook and Policy Recommendations.

- ¶ **Lack of financial incentive/pressure to increase productivity:** Since public banks are government-owned, the management is unlikely to be rewarded for maximising profits by improving productivity, especially if it means layoffs and the risk of social unrest. Furthermore, financial losses are unlikely to carry negative consequences as we have seen in the past; successive rounds of government recapitalisation have bailed out bankrupt public banks (**Exhibit 4.22**). This “moral hazard” is not unique to India; it has been observed in many other countries, including Brazil and France, where public banks under-performed for several years while the government continued to subsidise them.

¶ **Restrictive monitoring by government/ bureaucracy:** Government ownership introduces bureaucratic procedures and operating norms that hamper productivity. These include restrictive recruiting practices (such as the ability to hire only candidates who have cleared a bank examination as opposed to business school students) and continuous monitoring of bank officers by overzealous vigilance officials. This results in a performance management system that cannot reward good performers and, instead, demotivates the workforce. While the recruitment restrictions have been relaxed recently, top management selection and tenure are still influenced by the central government bureaucracy.

¶ **Crippling labour settlements:** The labour unions, of which the All-India Bank Employees' Association (AIBEA) is the largest, are politically well connected and, hence, very strong. As a result, public banks are unable or unwilling to negotiate too hard with them, leading to settlements that prevent the banks from reducing excess workforce, improving the organisation, or automating and centralising operations (**Exhibit 4.23**). For example, the unions refuse to accept greater responsibility for the front desk staff and prefer very low authorisation limits. This disinclination for making decisions also stems from the fact that the Central Vigilance Commission can subject any decision to investigation, with the concomitant potential for scandal and social stigma.

Public sector bank managements do not have the power to retrench employees and, therefore, have to resort to VRS if they want to improve productivity. This has two disadvantages: First, it is very expensive, costing as much as US\$ 4 billion-5 billion for all public banks at the rate of US\$ 5,000 to US\$ 20,000 per employee; and second, it does not allow management to choose which employees to retrench.

Union settlements also prevent efficient bank automation. Currently, banks can automate branches provided the employees are not retrenched. Given this situation, banks are hesitant to make IT investments in the first place. Further, banks are allowed to set up ATMs equivalent to only 0.5 per cent of their branches, leading to a very small number of ATMs for the public banks.

### **Interest rate restrictions**

The RBI has in the past set interest rates on all bank products and granted bank licences selectively. Although many interest rates have been deregulated over the last few years, some are still controlled. For instance, the RBI prohibits banks from offering any interest on checking accounts for small businesses

(current accounts) and offering more than 4.5 per cent interest on checking accounts for retail customers (savings accounts). Similarly, the interest rates on loans smaller than Rs. 25,000 are fixed at 12 per cent and between Rs. 25,000 and Rs. 200,000 at 13.5 per cent. Although these restrictions have not stopped new private banks from rapidly attracting wealthier customers on the basis of better service and higher rates paid on fixed term retail deposits, they can restrict their growth into the mass market where the demand for liquidity is high.

### **Government monopoly on telecom**

The government has a monopoly on long distance telecommunications in India. In order to preserve revenues, the monopoly player (the Department of Telecommunications) does not allow banks to interconnect customers on to their leased lines. As a result, banks cannot centralise their call centres and have to deal unproductively with a lot of customer queries at the branches. This problem is being addressed at present, albeit slowly (**Exhibit 4.24**).

### **Ineffective judicial system and unclear property titles**

The judicial system in India is under pressure, with a huge backlog of pending cases. As a result, a bank cannot expect to get speedy legal redress of disputes on loan recoveries and frauds. This naturally results in an environment where bank officers are over-cautious and spend an inordinate amount of time making credit decisions. Furthermore, unclear property titles make it very difficult for banks to lend against property, resulting in an underdeveloped mortgage market.

### **Lack of reliable credit information**

The lack of reliable credit information in India directly reduces productivity in retail banking. In the US, the Fair Credit Reporting Act of 1971 allows credit bureaus to release customer histories to organisations that have a legitimate need to determine a customer's creditworthiness. Customer histories include data on the total outstanding debt by source, a complete payment history on each loan and information about current and previous employment. In India, regulation on such credit bureaus is not clear, with the result that such data exists only with a small number of the foreign banks and is limited to their own customer databases. However, HDFC and SBI have recently agreed to setting up a Credit Information Bureau along with international partners and are just awaiting regulatory clearance.

## Relatively unimportant factors

Contrary to public opinion, the factors mentioned here have not been found to be very important in explaining why the retail banking system in India is ten times less productive than in the US. Collectively, they penalise Indian bank productivity by less than 20 per cent.

- ¶ **Rural branch regulation:** The compulsion to maintain rural branches is often mentioned as a key impediment to higher efficiency for public banks but our analysis has shown that it penalises the productivity of public banks by less than 10 per cent.
- ¶ **Remaining restrictions on foreign banks:** Foreign banks are not allowed to open branches freely across the country if they are not incorporated in India. Each branch that is opened needs a special licence from the RBI (**Exhibit 4.25**). Earlier, this also applied to every ATM opened by a foreign bank but this has now been relaxed. As a result, foreign banks are aggressively growing their ATM networks and are trying to increase their reach without investing in new branches. However, it is not clear how far they will succeed given the fact that many customers in India, as in most other countries, feel uncomfortable without a bank branch close to them (**Exhibit 4.26**).
- ¶ **Unreliable post office:** Since investing in the automation of clearing houses in all centres is not economical at current factor costs, it is important that banks be able to aggregate cheques at centralised locations, such as district headquarters. The difficulty here is that the postal system is not geared up to deliver cheques reliably and quickly across long distances.
- ¶ **Poor education and low-income levels:** As we saw earlier, cashiers in rural branches often need to fill in the transaction applications of illiterate customers. Moreover, as private banks expand their services to the mass market, they are likely to find it difficult to shift the customer base from labour-intensive cash transactions to more productive cheques and electronic transactions. However as shown earlier, the productivity penalty resulting from these factors is less than 10 per cent.
- ¶ **Tax evasion:** Tax evasion is very high in India, leading to a disproportionately high level of labour-intensive cash transactions in the banking system payment mix.

## INDUSTRY OUTLOOK

The retail banking sector is expected to witness significant growth over the next 10 years, provided the sector is reformed completely. Output growth will be a result of both an increase in the number of customers using the banking system as well as an increase in the number of transactions per customer. Growth in cheques, electronic payments and credit products will be especially high, given their current low levels of penetration.

The growth rate will depend on the nature of the reforms carried out within the sector and across the Indian economy. We have developed a perspective on the evolution of the sector under three scenarios: Status quo, reforms in retail alone and reforms in all sectors (**Exhibit 4.27**).

¶ **Status quo:** In this scenario, we expect retail banking output to grow at 5 per cent and productivity to grow at 6 per cent, with a decline of 1 per cent per year in employment (**Exhibit 4.28**). GDP per capita<sup>2</sup> will continue to grow at the current levels of 4 per cent a year. Growth in payments will be driven by continued strong (30 per cent per year) growth in credit cards for the next 5 years. This is consistent with the growth in cards observed in countries like Thailand and Indonesia. Given the relatively small base of 3 million cards, the overall output growth will increase to about 5 per cent a year in transaction volume terms.

As a result, the public banks will improve their productivity, without doing a great deal, by 5 per cent every year to reach 16 per cent of US levels in 2010 from their current level of 10 per cent. We believe there will be no immediate response from the public banks to the aggressive growth plans of the private banks, leading to a reduction of the former's market share from 81 per cent to around 70 per cent.

The new private banks are likely to grow at an average rate of 20 per cent every year, similar to the growth rates observed in Brazil. They will capture around 15 per cent market share, while the old private banks and foreign banks will retain 15 per cent share. With the new private banks gaining scale and migrating their customers to new channels, their productivity will rise to a level close to India's potential of 90 per cent of the US average.

Combining public and private banks, productivity will grow by 6 per cent annually, and given 5 per cent output growth, employment will continue to decline slowly at about 1 per cent every year.

---

<sup>2</sup> Throughout this section we refer to growth in GDP per capita in PPP terms. This differs from the growth in GDP per capita according to National Accounts statistics because each measure uses different relative prices to aggregate sectors to obtain the overall output. See "Methodology for growth estimates" in the chapter, India's Growth Potential (Volume I, Chapter 5).

¶ **Reforms in retail banking alone:** In this scenario, the public banks will be privatised, the telecom, judicial and credit rating infrastructure will improve and interest rates will be totally deregulated. We expect output and productivity to grow at 7 per cent and 18 per cent a year respectively, leading to an 11 per cent reduction in employment every year.

With no restrictions, public banks will increase productivity to almost 60 per cent of US levels by retrenching excess workers, improving OFT and completing the computerisation/centralisation of key products and processes within 3 to 5 years. In Argentina, after the sector was deregulated, most state-owned banks achieved this transformation within 5 years. With the continued rapid growth of new productive private banks (using the same assumptions as in the previous scenario), this will lead to an overall productivity growth of about 18 per cent. Output will not change significantly from the previous scenario however, as GDP per capita will continue to grow at the current 4 per cent. The only impact on output will come from the introduction of innovative products as banks become more competitive. Therefore, as output grows at about 7 per cent, there will be a reduction in retail banking employment of about 11 per cent every year (**Exhibit 4.29**).

¶ **Reforms in all sectors:** In this scenario, the GDP growth rate will increase to about 10 per cent a year as all sectors undergo reform (*see* Volume I, Chapter 5: India's Growth Potential). Consequently, retail banking will experience extremely rapid output growth. There will be an explosion in the number of payment transactions with Point of Sale (POS) machine transactions in retail modern stores, electronic debits for loan repayments and electronic payments for utilities.

The number of payment transactions typically increases much faster than GDP; Brazil has 15 times more payment transactions per capita than India while its GDP per capita is only four times higher. The increase in payment transactions will thus be the key driver of retail banking employment growth since it accounts for half the banking employment. Assuming that India matches Brazil's current level of payments per capita when it reaches Brazil's current GDP per capita level, the overall output growth rate will be around 12 per cent. This estimate is also based on the expectation that mortgages and consumer loans will continue to grow at 30 per cent a year, from a very low level.

Productivity growth will be very similar to that in the previous scenario at around 18 per cent. As a result, employment will decline by 6 per cent every year (**Exhibit 4.30**).

## POLICY RECOMMENDATIONS

It is critical to have a productive and innovative retail banking sector. Several countries have seen a reduction in banking intermediation costs as the sector opens up and becomes more productive. While the objective of nationalisation was to provide banking services to the masses, government ownership and management is blocking productivity growth. Currently, almost half the retail bank deposits are used to finance the government's budget deficit or government-sponsored priority lending schemes. A productive and innovative private banking sector would allow India to better allocate the relatively large pool of domestic savings.

To address the productivity issues in the sector, the government needs to privatise the publicly-owned banks and help them restructure as soon as possible. The government should also complete the deregulation of interest rates, introduce regulations that make it easier to collect and report credit history, provide deposit insurance to private banks' account holders, repeal regulations that artificially raise telecom costs and address the issue of unclear land titles.

These recommendations are described in this section in detail:

- ¶ **Privatise public banks:** The government should privatise the public banks as soon as possible to enable them to restructure and improve their productivity levels. However, many public banks have a very high level of NPA and, therefore, will not attract many buyers in their current condition. The average publicly-reported NPA level for public banks is around 10 per cent of advances, i.e., US\$ 10 billion. However, this does not reflect the true levels of NPAs because reporting norms for NPAs in India are more lenient than those specified internationally. According to Indian norms, for example, loans are declared doubtful only if repayments have not been received for two quarters, compared to the international norm of one quarter. As a result, many sources estimate that the real NPA level could be as high as US\$ 14 billion-15 billion, amounting to an additional 0.5 per cent in intermediation cost for the Indian banking system.

Given this situation, it will be very difficult for the government to privatise public banks with NPA problems. One approach to rectify the problem is to construct a separate Asset Reconstruction Company (ARC) and aggregate all the NPAs of the banks into it. This approach has been adopted in several countries, notably in Germany and the US, where state-guaranteed agencies have funded the ARC. Another approach is for the government to undertake a one-shot recapitalisation of the banks, which can be paid for from the privatisation revenue, as was done in Korea. Adopting a similar approach, the government could fund the ARC in addition to offering a generous VRS from the privatisation proceeds.

While privatised public banks will undoubtedly have to shed employees, many of these people could take up other jobs in private banks or in growing sectors like insurance. This is feasible as most employees in the public banks have at least 10 years' experience. Where this is not possible, employees can be given attractive voluntary retirement/departure benefits, ranging from 2 months' to as much as 3 years' salary, as per the prevailing government policy. Those employees who remain in the public banks will also gain as their salaries become comparable with salaries in private banks, which are at present two to three times higher. This has already happened in some public banks where salaries have risen following the successful implementation of VRS schemes.

The government might be concerned that privatised public banks will shut down many unprofitable rural branches. The point to note here is that most of these branches are unprofitable only at current levels of productivity and bad debts (**Exhibit 4.31**). If these banks improve their productivity by making their branches leaner and if the political compulsions to make bad credit decisions are removed, most rural branches can be run profitably (**Exhibit 4.32**).

- ¶ **Complete interest rate deregulation:** The government should complete the deregulation of interest rates by lifting the restrictions on interest rates for savings and current accounts as well as the constraints on small loans. The recent cut in the provident fund interest rate is a step in the right direction.
- ¶ **Set up credit bureaus:** The government should pass regulations similar to the Fair Credit Reporting Act in the US allowing the entry of credit bureaus to collect and report consumer credit history. It should also clearly regulate the exchange of information among entities such as banks, utilities, mobile phone service providers and the credit bureaus.
- ¶ **Provide banking deposit insurance to private bank accounts:** Since public sector banks enjoy government backing, the risk of depositing funds with them is low. However, after privatisation, all banks should be extended insurance for retail deposits.
- ¶ **Improve access to telecommunication infrastructure:** The government should put in place regulation that encourages a competitive telecommunications industry to ensure that banks can operate ATMs and network their branches reliably. It should prevail upon the Department of Telecommunications to allow internal switching of calls by banks to promote the use of call centres (*see* Volume III, Chapter 6: Telecommunications for more detailed recommendations)

¶ **Resolve property title disputes rapidly:** The government should institute special courts to deal with issues related to unclear property titles and civil disputes so that it becomes easier for banks to start offering mortgages to retail customers. Otherwise, with the current backlog of cases and the existing legal infrastructure, it can take over 20 years for a case to come up for trial. Courts also need to be strengthened to be able to provide for rapid foreclosure of loans against properties, vehicles and other assets.

## Appendix 4A: Measuring output and input data

We have constructed the output and input data for India's retail banking sector using a combination of RBI data and a detailed bank survey conducted across different segments of banks, complemented by over 25 interviews with branch managers from various bank segments. The data for other countries were collected from secondary sources such as national banking associations and BIS statistics, and were supplemented and verified for accuracy with McKinsey retail banking experts and client data.

### Output

We have used physical measures of output in three categories:

- ¶ **Transactions:** This includes checks cleared, electronic payments, cash withdrawals at ATMs and tellers, bill payments at banks and direct debits
- ¶ **Deposits:** This includes the total number of checking, savings and current accounts at the end of a year.
- ¶ **Loans:** This includes the total number of loans through overdraft protections, credit cards, instalment loans, mortgages and other forms of credit at the end of a year. It also includes the large number of agricultural loans made in India under the priority sector.

We have estimated output for the sector as a whole using RBI data for checks cleared and electronic transactions along with special statistics on deposit accounts and loan accounts. We have estimated cash output based on interviews with bank managers and retail customers and have verified with experts for accuracy.

We have made specific adjustment for different segments based on the bank survey that the McKinsey Global Institute conducted among public, private and foreign banks. Over 100 branches participated in the survey and over 25 branch managers were interviewed to understand branch level productivity across the different segments.

### Input

We have measured input in terms of total hours worked in retail banking. This was calculated by multiplying the number of employees in retail banking by hours worked per employee. We did not take into account the employees involved in non-core activities from total employment.

We adjusted the hours worked per Full Time Equivalent (FTE) to account for part-time workers in different countries. The total employment was then divided among the three major areas of payment transactions, deposits and loans, based upon the

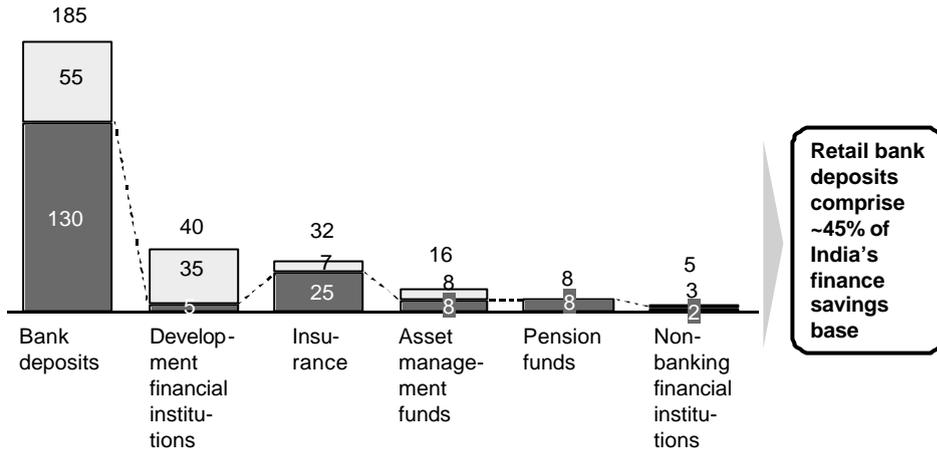
percentage of employment involved in each. We arrived at this based on the levels in the branches sampled in the bank survey.

Exhibit 4.1

### FINANCIAL SAVINGS BASE IN INDIA

US\$ billion, 1999

■ Estimates of retail component



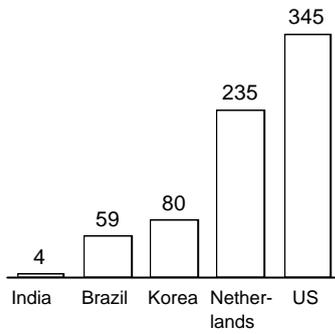
Source: RBI Report on *Trends in Currency and Finance*; McKinsey analysis

Exhibit 4.2

### RETAIL BANKING OUTPUT – CROSS COUNTRY COMPARISON

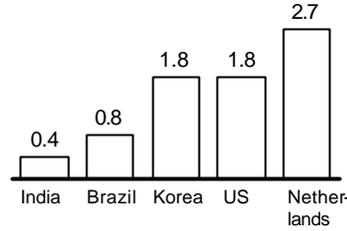
#### Payment output per capita

Number of payments per year per inhabitant



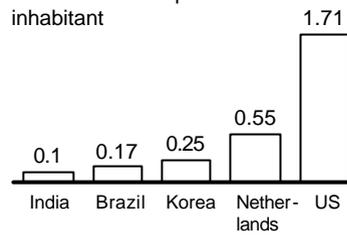
#### Deposits output per capita

Number of deposits per inhabitant



#### Loans output per capita

Number of loans per inhabitant

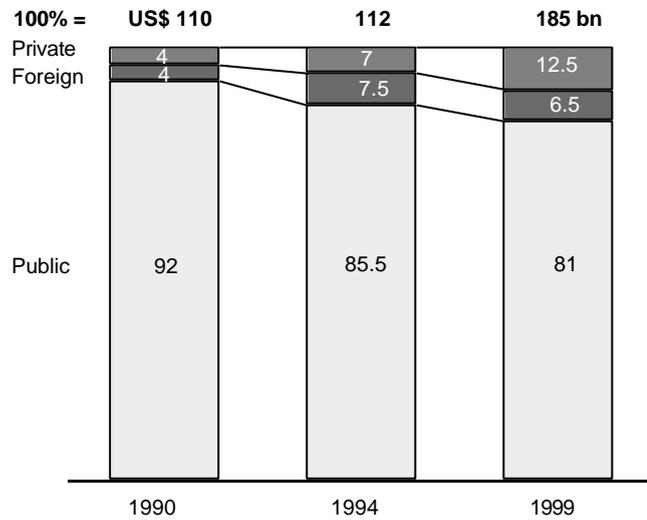


Source: RBI special statistics; McKinsey analysis

Exhibit 4.3

### TREND IN DISTRIBUTION OF DEPOSITS

Per cent, share of total deposits\*



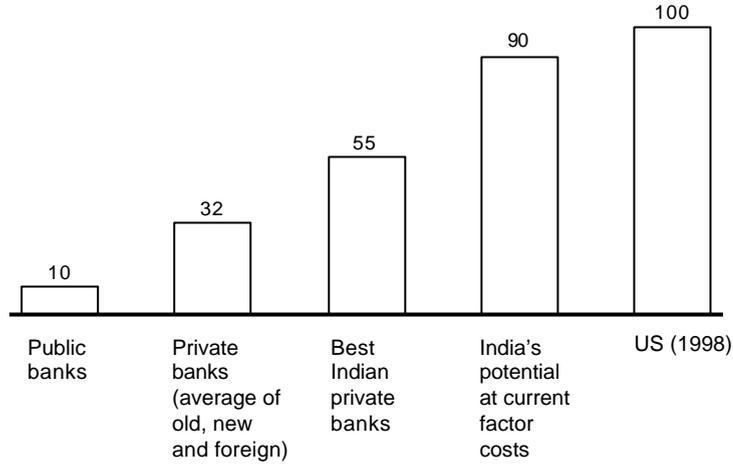
\* Approximately 70% of total deposits are retail deposits

Source: IBA; McKinsey analysis

Exhibit 4.4

**PRODUCTIVITY LEVELS OF BANKS IN INDIA**

Index, US 1998 = 100

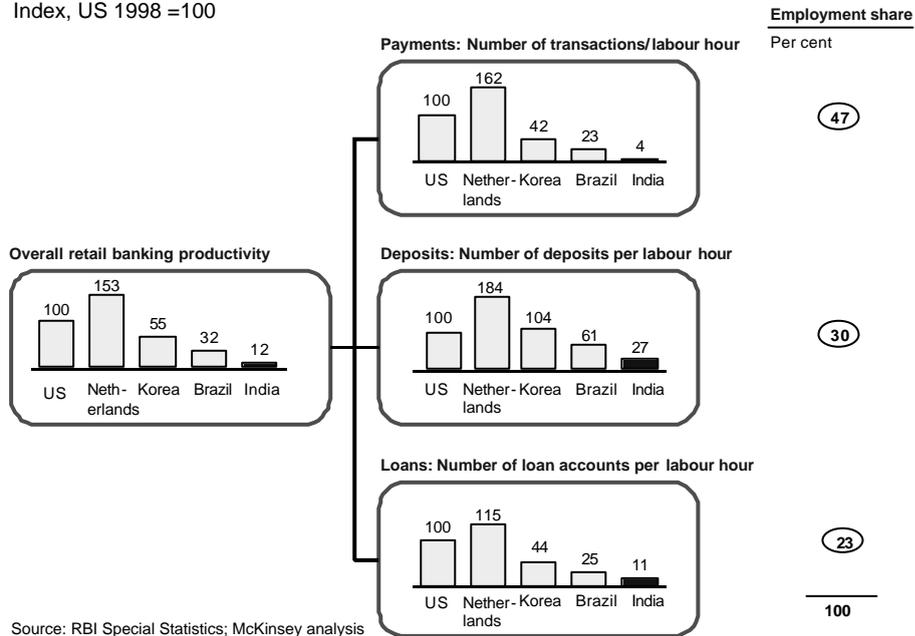


Source: Bank survey; McKinsey analysis

Exhibit 4.5

**RETAIL BANKING LABOUR PRODUCTIVITY**

Index, US 1998 = 100

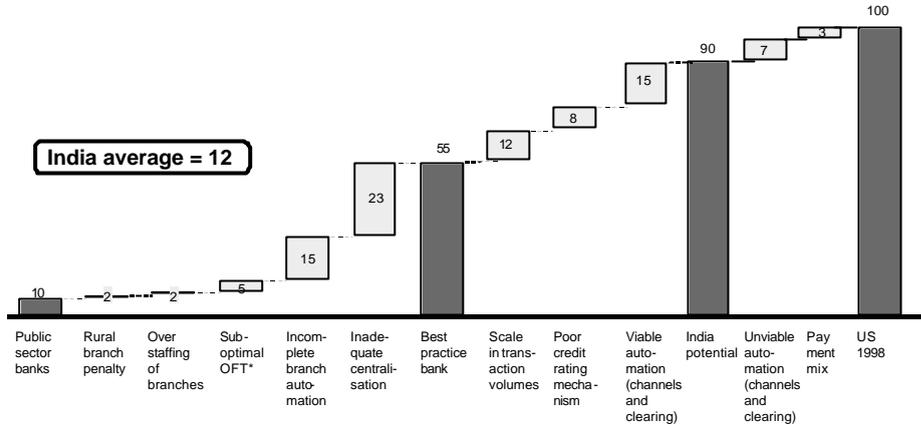


Source: RBI Special Statistics; McKinsey analysis

Exhibit 4.6

### OPERATIONAL REASONS FOR PRODUCTIVITY GAP

Index; US in 1998 = 100



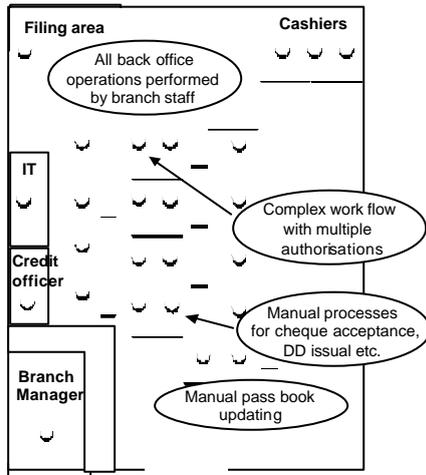
\* Organisation of functions and tasks

Source: Bank survey; McKinsey analysis

Exhibit 4.7

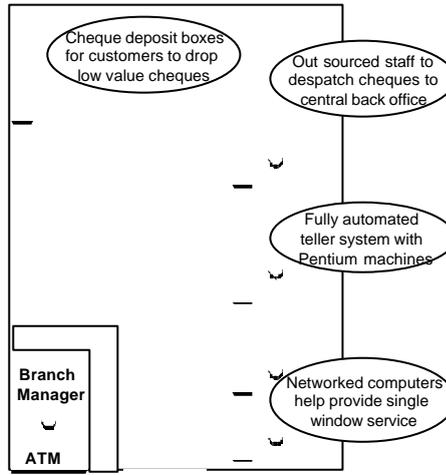
### STAFFING IN PUBLIC AND PRIVATE BANKS

#### Non-automated public sector branch



Number of employees = 25

#### Best practice private branch



Number of employees = 5

Note : Both branches serve approximately 5000 customers

Source: Bank survey

Exhibit 4.8

### BURDEN OF RURAL BRANCHES ON PUBLIC SECTOR BANKS

*"My staff spend 20% of their time writing out slips and cheques for illiterate customers and getting their thumb impressions"*

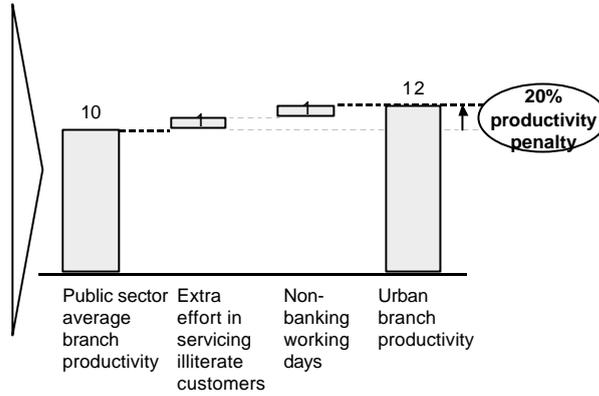
- Rural branch manager,  
Large public sector bank

*"One day a week is designated non-banking working day, when we go from village to village, trying to collect loan repayments and encouraging villagers to come and bank with us"*

- Chief manager,  
Large public sector bank

#### Productivity of public sector banks

Index; US 1998 = 100

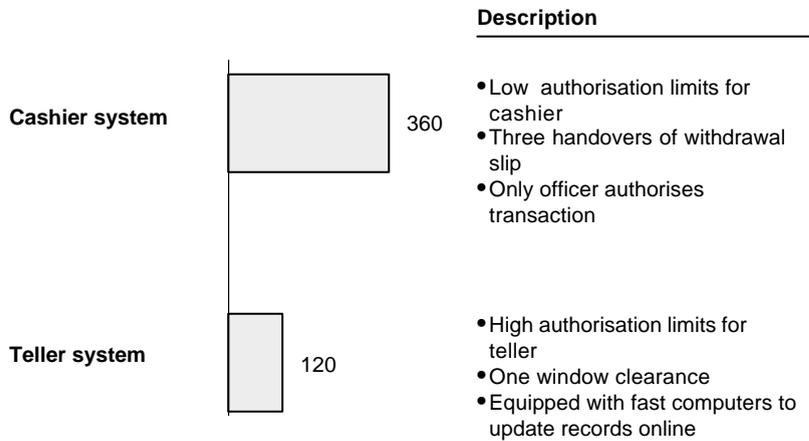


Source: Bank survey; McKinsey analysis

Exhibit 4.9

### TIME TAKEN FOR CASH WITHDRAWALS

Seconds per transaction



Source: Bank survey; McKinsey analysis

Exhibit 4.10

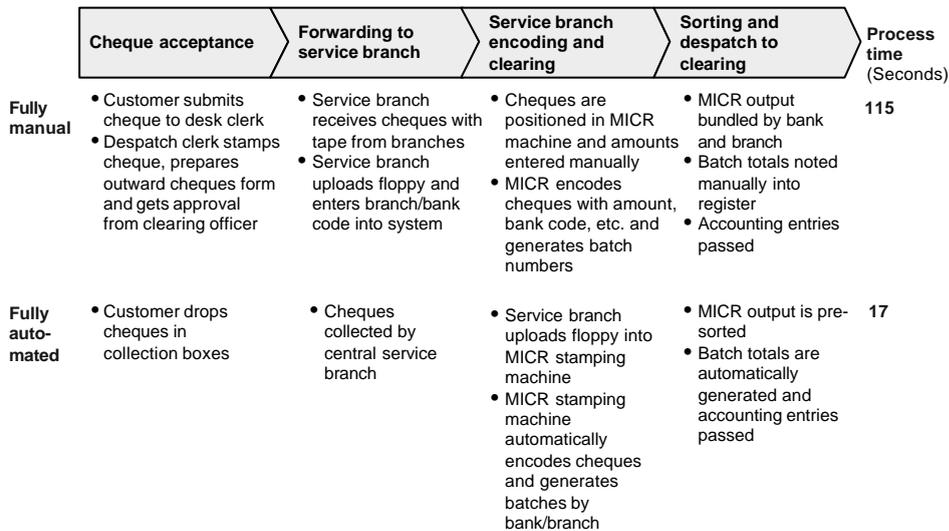
## AUTOMATION OF PUBLIC SECTOR BANK BRANCHES

Key activities affected by automation	Labour inputs	
	Manual	Computerised
• Crediting individual accounts during outward clearing	2	1
• Debiting individual accounts while inward cheques are presented	2	1
• Signature verification during inward cheque clearing	2	1
• Reconciliation of branch accounts at the end of day (including preparation of Day Book)	1	0
• Reconciliation of branch account with service branch/other branches	2	1
• Preparation of statements along with instruments sent between branches	2	1
	11	5

Source: Bank Survey; McKinsey analysis

Exhibit 4.11

## COMBINED IMPACT OF AUTOMATION AND CENTRALISATION – OUTWARD CHEQUE CLEARING EXAMPLE



Source: Bank survey; McKinsey analysis

Exhibit 4.12

### COMBINED IMPACT OF AUTOMATION AND CENTRALISATION – INWARD CHEQUE CLEARING EXAMPLE

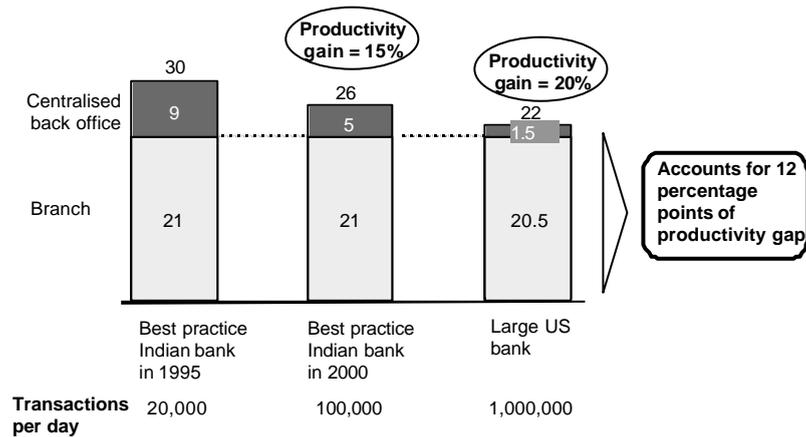
	Cheque collection from clearing	Receipt of cheques at branches/ processing centre	Verification of signatures and cheque details	Return referrals with customers	Process time (Seconds)
<b>Fully manual</b>	<ul style="list-style-type: none"> <li>Paper tape and cheques collected by service branch</li> <li>Cheques sorted by branch and despatched to branches</li> </ul>	<ul style="list-style-type: none"> <li>Cheques received and sorted out to verify if they match the tape</li> </ul>	<ul style="list-style-type: none"> <li>Manual verification of cheque signatures, words and figures using signature cards</li> <li>Manual debiting of all clear accounts</li> </ul>	<ul style="list-style-type: none"> <li>Manual identification of no balance accounts</li> <li>Individuals contacted by branches and cheque returned/ cleared</li> </ul>	<b>110</b>
<b>Fully auto-mated</b>	<ul style="list-style-type: none"> <li>Floppy and cheques delivered to central processing centre</li> </ul>	<ul style="list-style-type: none"> <li>Automatic upload of cheque numbers into centralised system at processing centre</li> </ul>	<ul style="list-style-type: none"> <li>Centralised verifying of cheques against scanned images of signatures</li> <li>Automatic debit of all clear accounts with funds</li> </ul>	<ul style="list-style-type: none"> <li>Automatic highlighting of no balance accounts</li> <li>Return cheques notified to branches via e-mail</li> <li>Branches check with account holders and respond with advice</li> </ul>	<b>30</b>

Source: Bank survey; McKinsey analysis

Exhibit 4.13

### VARIATION IN BACK OFFICE EMPLOYMENT WITH SCALE

Number of adjusted employees per million transactions



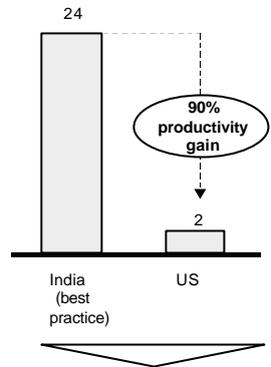
Source: Bank survey; ABA Retail Banking Report, 1999; McKinsey analysis

### CREDIT RATING INFRASTRUCTURE

**Loan processing characteristics**

- No credit history for individuals
- Self-employed individuals do not have any authorised certificates that indicate credit worthiness
- Banks do not share credit data and hence do not have a common credit rating pool
- Paper based transactions dominant
  - Payments collected as post-dated cheques
  - Electronic debits not recognised by courts for redressal in case of frauds

**Average processing time for loans**  
Employee hours per loan



**Given that 12% of all jobs are in credit verification, overall productivity can improve by ~10%**

Source: Bank survey; McKinsey analysis

### COMPARISON OF CHEQUE CLEARING IN INDIA AND THE US

→ Physical flow  
--> Electronic flow

**Best practice (India)**

```

    graph LR
      Branches -- cheques --> ClearingHouse[Clearing house]
      ClearingHouse -- cheques --> CPC[CPC]
    
```

- Cheques are transported physically from clearing to each branch/cheque processing centre (CPC)
- Physical cheques are verified for signature, correct words, and figures, etc.
- Return cheques are followed-up (~5% of all cheques issued) and credit given using manual judgement
- Cleared cheques are stitched and stored for future reference

**Vs**

**US practice**

```

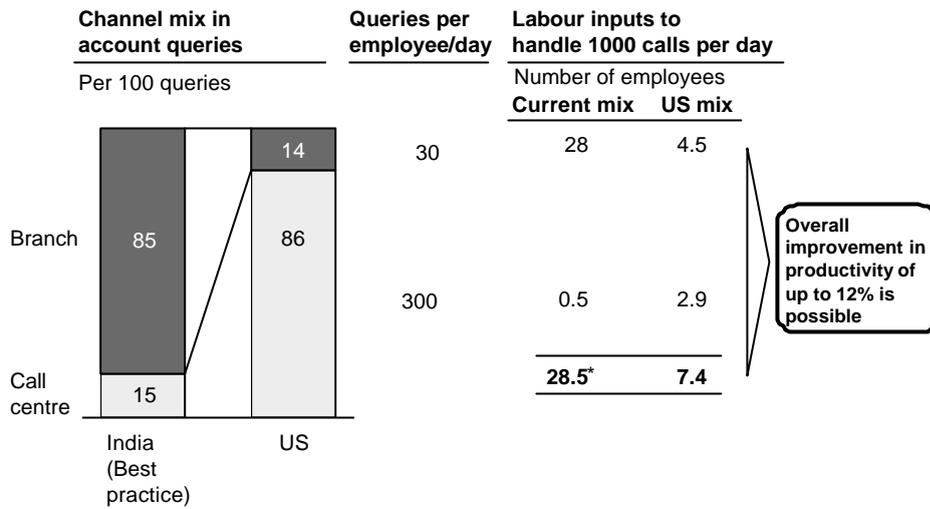
    graph LR
      Lockbox -- cheques --> ClearingHouse[Clearing house]
      ClearingHouse -. electronic information .-> Branches
    
```

- Cheques are mailed to lockboxes, opened and sent to clearing automatically
- Cheques are not physically sent to branches from clearing – only electronic information flows
- Algorithms determine whether to clear cheques with insufficient funds or not
- Cheques are not stored but mailed back to customers

Source: Bank survey; McKinsey analysis

Exhibit 4.16

### IMPACT OF CUSTOMERS USING TRADITIONAL CHANNELS – ACCOUNT QUERY EXAMPLE



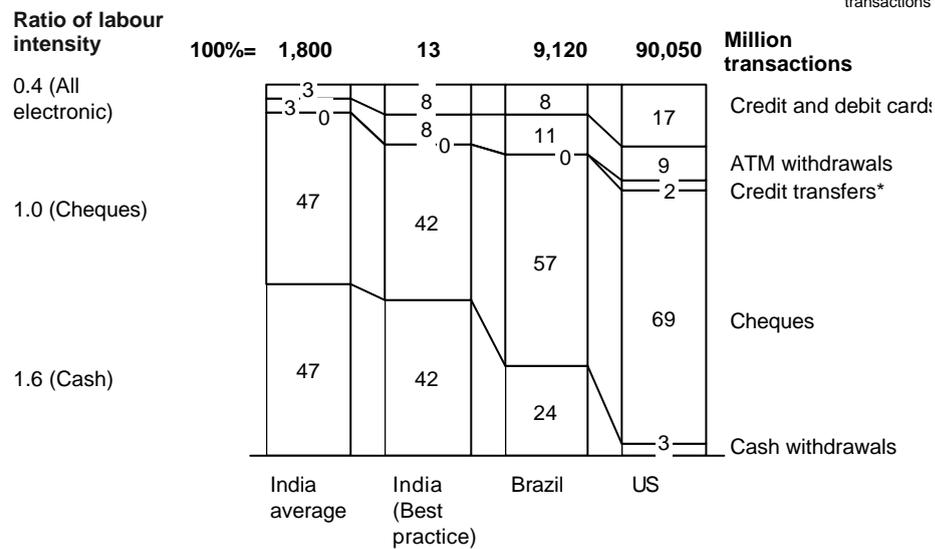
\* Constituting about 15% of employment in banks

Source: Bank Survey, ABA Retail Banking Report, 1999; McKinsey analysis

Exhibit 4.17

### PAYMENT MIX

Per cent



\* Includes both paper based and paper less credit transfers

Source: McKinsey analysis

## INDUSTRY DYNAMICS

Factor	Importance of factor
<ul style="list-style-type: none"> <li>● <b>Low Domestic competitive intensity</b> <ul style="list-style-type: none"> <li>– Private banks growing rapidly and starting to exert pressure on the strong public banks</li> <li>– Competition only in metropolitan and top urban centres where private banks have started operations</li> <li>– Price based competition in deposit interest rates</li> <li>– Slowly emerging competition for loan rates</li> <li>– Competition restricted in chequeing account rates</li> </ul> </li> </ul>	●
<ul style="list-style-type: none"> <li>○ <b>Lack of exposure to best practice</b> <ul style="list-style-type: none"> <li>– Foreign players not granted branch licences to expand</li> </ul> </li> </ul>	○
<ul style="list-style-type: none"> <li>✕ <b>Non-level playing field</b></li> </ul>	✕

Source: Bank survey; McKinsey analysis

## INTEREST RATES ON TERM DEPOSITS

Interest rates on term deposits (1-2 year tenure)	Comments	
Per cent		
Non-bank Finance Companies	11-15	<ul style="list-style-type: none"> <li>● Perceived to be higher risk investments than banks – decreasing in popularity</li> </ul>
Post office/public provident fund (4 year tenure)	11	<ul style="list-style-type: none"> <li>● Tax benefits – no tax up to Rs. 60,000 on interest income</li> </ul>
Private banks	10.9	<ul style="list-style-type: none"> <li>● Based on 24 private banks (old + new) - focused on large urban areas</li> </ul>
Foreign banks	10.5	<ul style="list-style-type: none"> <li>● Based on 14 foreign banks - focused on large urban areas</li> </ul>
Weak public banks	9.6	<ul style="list-style-type: none"> <li>● Based on 16 weak public banks</li> </ul>
Strong public banks	9.2	<ul style="list-style-type: none"> <li>● Based on 3 strong public banks</li> </ul>
364 day T-bill rate	9.0	<ul style="list-style-type: none"> <li>● Risk free rate</li> </ul>

Source: Indiainfoline; Walletwatch; Press reports

Exhibit 4.20

## GROWTH OF NEW PRIVATE\* BANKS

Bank	Deposit base	Growth in deposits, CAGR (1996-1999)	Number of branches (1999)	Growth of branches, CAGR (1995-1999)
	US\$ million	Per cent		Per cent
ICICI Bank	1450	103	55	96
HDFC Bank	1400	78	94	81
Indusind Bank	1200	53	26	48
Global Trust Bank	980	46	55	90
UTI Bank	725	49	35	71
IDBI Bank	655	512	17	157
Centurion Bank	510	115	31	84
Bank of Punjab	455	85	15	71

\* Granted licences in 1993; started operations in 1995  
Source: IBA; McKinsey analysis

Exhibit 4.21

## EXTERNAL FACTORS IN LABOUR PRODUCTIVITY DIFFERENCES – SUMMARY

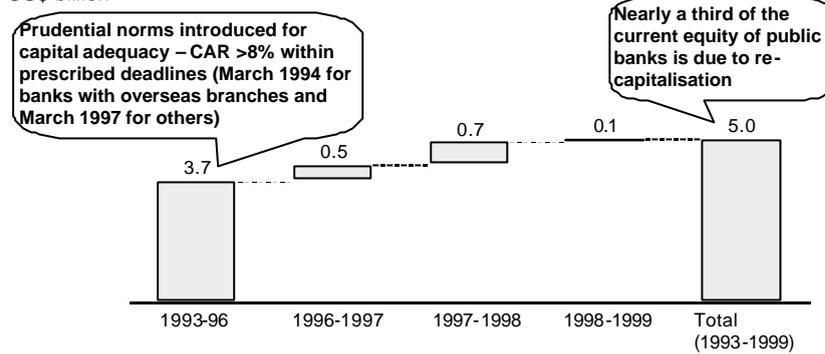
- **Government ownership and labour market consequences**
  - Continuous re-capitalisation of weak public banks
  - Ineffective automation of public bank networks
  - Labour union settlements prevent full branch automation of public sector banks as well as higher authorisation limits for branch staff
- → ○ **Product market regulations**
  - Interest rates on savings account for retail customers restricted to 4.5% and chequing account for small businesses restricted to 0%
  - Restrictions on branch licenses prevent foreign banks from expanding rapidly
  - Obligation of Indian banks to open rural branches
- **Related industry barriers**
  - Telecom access restricted by Government-owned monopoly player
  - Poor judicial infrastructure leading to unclear property titles
  - Absence of credit bureaus limits growth of retail lending
- **Infrastructure barriers**
  - Poor postal infrastructure prevents centralised automated clearing
- × **Macroeconomic barriers**
  - Poor education and low income leading to dominance of cash
- × **Other specific market factors**
  - Tax evasion through cash transactions

● High importance  
○ Medium importance  
× Low importance  
Importance of factor

Source: Bank survey; Interviews with IBA; McKinsey analysis

## RECAPITALISATION OF PUBLIC SECTOR BANKS BY THE GOVERNMENT

US\$ billion



Re-capitalised banks	1993-96	1996-1997	1997-1998	1998-1999
<ul style="list-style-type: none"> <li>• Bank of India</li> <li>• Syndicate Bank</li> <li>• UCO Bank</li> <li>• Central Bank of India</li> <li>• Indian Overseas Bank</li> <li>• Allahabad Bank</li> <li>• Indian Bank</li> <li>• 12 others*</li> </ul>	<ul style="list-style-type: none"> <li>• Central Bank of India</li> <li>• United Bank of India</li> <li>• Vijaya Bank</li> <li>• Andhra Bank</li> <li>• Punjab &amp; Sind Bank</li> <li>• UCO Bank</li> </ul>	<ul style="list-style-type: none"> <li>• Indian Bank</li> <li>• Canara Bank</li> <li>• UCO Bank</li> </ul>	<ul style="list-style-type: none"> <li>• Indian Bank</li> <li>• UCO Bank</li> <li>• United Bank of India</li> </ul>	

\* To small extents (<0.1 US\$ billion per bank)  
Source: INFAC; RBI; McKinsey analysis

## UNION SETTLEMENTS AND THEIR IMPACT ON BANKS

Key labour settlement issues	Resulting impact on public sector banks
<p><b>Branch automation</b></p> <ul style="list-style-type: none"> <li>• Only branches with &gt;750 transactions per day can be computerised; in addition 0.5% of branches can be automated every year</li> <li>• Number of ATMs a bank can install &lt;0.5% of the number of branches</li> <li>• Note counting machines can be used in 1 branch for every 100 branches in a zone</li> </ul> <p><b>Authorisation limits</b></p> <ul style="list-style-type: none"> <li>• Only cash withdrawals up to Rs.1000 can be approved by cashiers – others need approval by an officer</li> <li>• No cheque can be cleared without an officer's authorisation</li> </ul> <p><b>Retrenchment</b></p> <ul style="list-style-type: none"> <li>• No employee can be retrenched due to computerisation</li> <li>• All transfers have to be within the same city</li> </ul>	<ul style="list-style-type: none"> <li>• Less than 10% of branches can be automated</li> <li>• Management not interested in full automation (no cost savings unless manpower can be reduced)</li> <li>• Most banks cannot install more than 10 ATMs across the whole of India</li> <li>• Most branches do not have note counting machines</li> </ul>

Source: Labour settlements (IBA and Bank Unions); McKinsey analysis

## GOVERNMENT MONOPOLY OVER TELECOM

### Current policy

- Call cannot be transferred from a public to a private network.
- Customer cannot call a centrally located number without incurring long distance charges

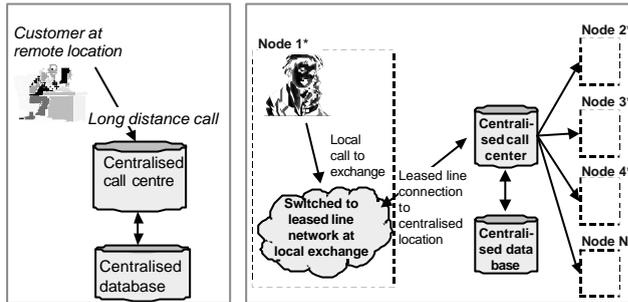
### Recent changes (since March 2000)

*"DoT has eased regulations allowing case-by-case permission to switch from a public network to a private network. We understand many banks are negotiating for inbound call centres"*

– Call centre vendor

*"We are putting up a pan-India call centre. We have received permission from DoT to do this"*

– Best practice bank executive



Source: Interviews; press reports

- Customers regularly call branches with queries
- Best practice banks are only now in the process of setting up centralised call centres

## REMAINING BANK LICENSING RESTRICTIONS

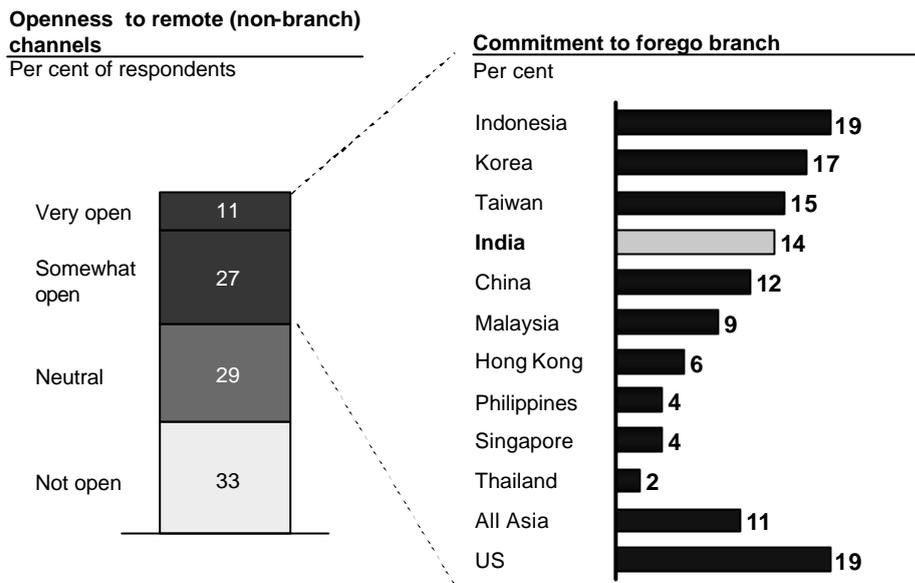
	Private sector bank	Foreign bank
<b>Equity participation by a foreign bank</b>	<ul style="list-style-type: none"> <li>• Restricted to 20% of the private sector bank's outstanding equity*</li> <li>• Total foreign shareholding can go up to 40%</li> </ul>	<ul style="list-style-type: none"> <li>• Invest minimum capital of US\$ 10 million each for first two branches and US\$ 5 million for the third branch</li> </ul>
<b>Branch policy</b>	<ul style="list-style-type: none"> <li>• Branch licences freely available</li> <li>• Bank to fulfil requirements on location of branches in rural and semi-urban areas - urban to (semi-urban+rural) branch ratio of 3:1</li> </ul>	<ul style="list-style-type: none"> <li>• RBI has followed a restrictive policy on branch licensing</li> </ul>
<b>Bank licences</b>	<ul style="list-style-type: none"> <li>• Opened for private participation only in 1992-93 and granted to 9 players with significant past financial services experience</li> <li>• No new private banks can get licences thereafter</li> <li>• Any merger/acquisition has to have prior RBI approval</li> </ul>	

\* Foreign banks with existing branches are not allowed to hold stake in private sector banks

Source: RBI publications; newspaper articles

Exhibit 4.26

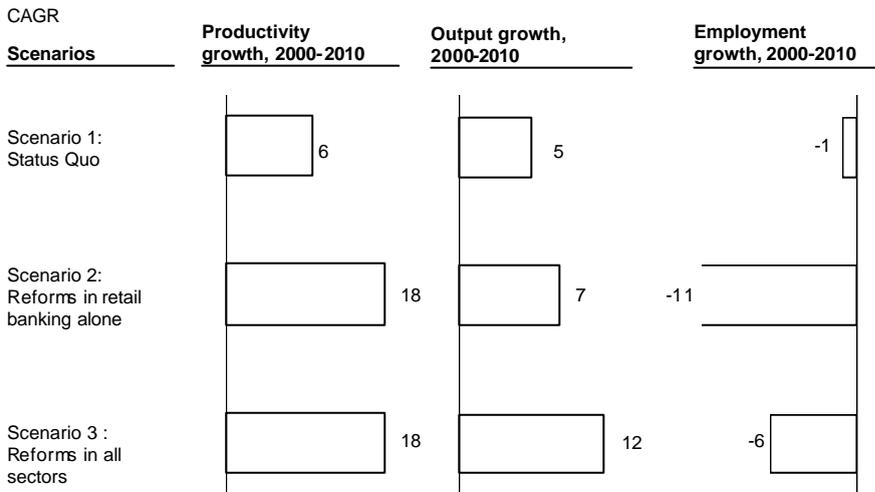
### CUSTOMER PREFERENCES FOR BRANCH BANKING



Source: McKinsey Asia Personal Financial Services Survey, 1999

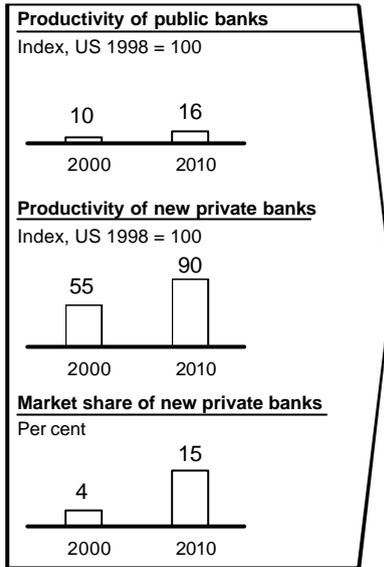
Exhibit 4.27

### FUTURE OUTLOOK FOR THE INDIAN BANKING SECTOR

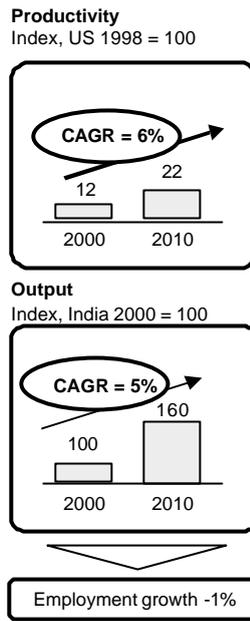


Source: McKinsey analysis

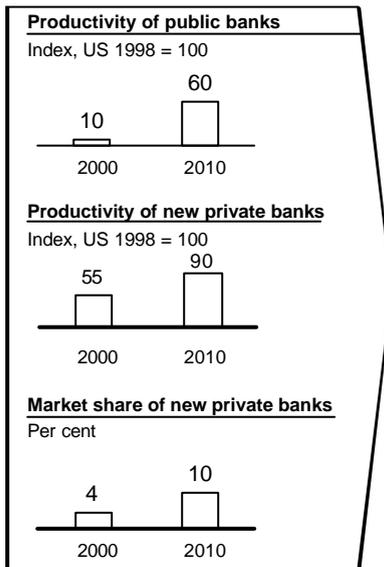
### FUTURE OUTLOOK - STATUS QUO



Source: McKinsey analysis



### FUTURE OUTLOOK - REFORMS IN RETAIL BANKING ALONE



Source: McKinsey analysis

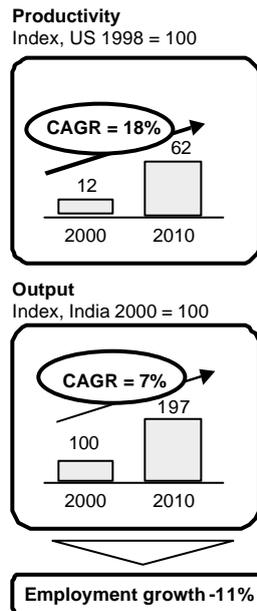
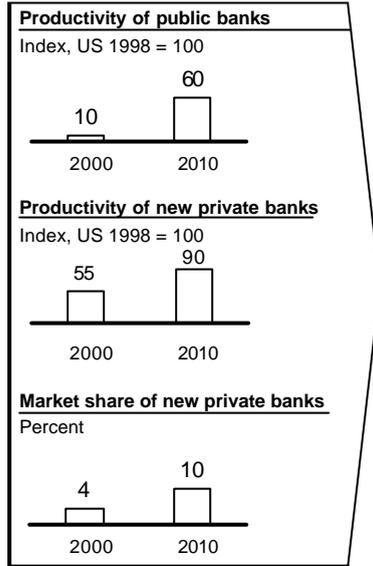


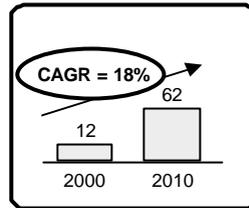
Exhibit 4.30

## FUTURE OUTLOOK - REFORMS IN ALL SECTORS

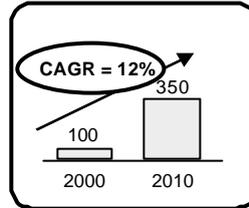


Source: McKinsey analysis

**Productivity**  
Index, US 1998 = 100



**Output**  
Index, India 2000 = 100

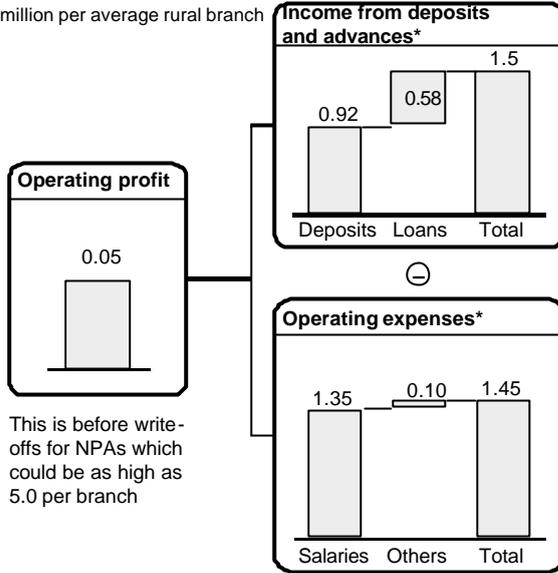


Employment growth - 6%

Exhibit 4.31

### RURAL BRANCH ECONOMICS

Rs. million per average rural branch



#### Assumptions

- Average deposit size per branch = Rs.37 million\*
- Average overall spread = 5.1%\*\*
- Average spread on deposits = 2.5% (10.5% T-bills - 8% cost of funds)
- Average spread on loans = 2.5% (14% average yield - 10.5% T-bills rate)

- Average employees per branch = 9

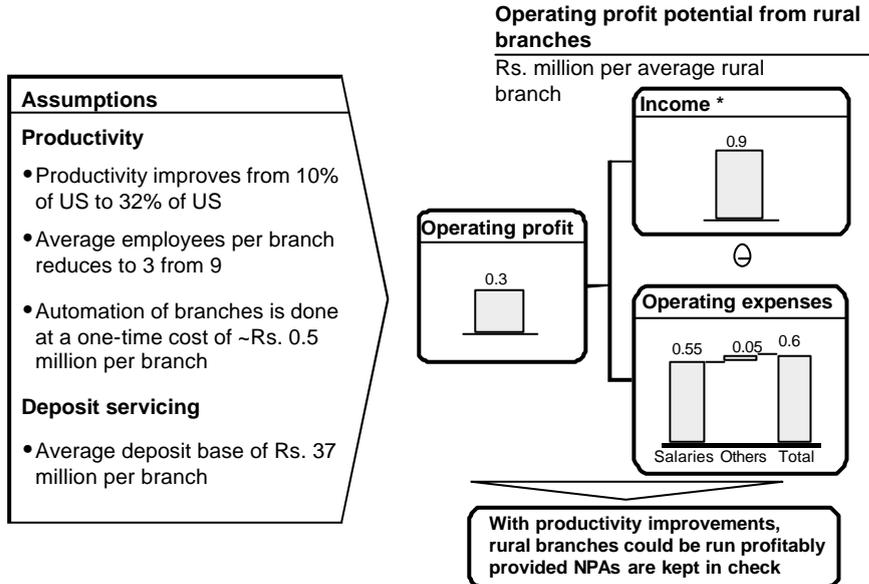
\* Based on average of 45 branches surveyed, prior to write-offs

\*\* Based on average spread of all public banks

Source: Bank survey; Interviews; McKinsey analysis

Exhibit 4.32

### POTENTIAL PROFITABILITY OF RURAL BANKING



\* Assuming a deposits spread of 2.5% (10.5% Government T-bill rate of 1-3 year maturity - 8%, cost of deposits)

Source: Interviews; McKinsey analysis



# Retail

## **SUMMARY**

Retail is an extremely important sector in the economy, but has been overlooked by India's policy-makers. The sector, with reforms, is capable of creating 8 million jobs in the next 10 years and providing job opportunities for people transitioning from agriculture. Further, as the sector develops, prices of goods will fall, thereby raising the standard of living of people across the economy.

Productivity in the sector is low at present, largely because of the very low penetration (only 2 per cent) of modern formats like supermarkets and hypermarkets. These formats not only raise the productivity of the retail sector, they also drive the restructuring of the upstream supply chain – leading to the rapid development of sectors like food processing. Furthermore, by transferring the efficiency gains to consumers through lower prices, they stimulate demand in the economy and raise the standards of living.

To unleash the potential of this sector, three reforms are essential. First, FDI should be allowed in the sector. Experience across the developing world demonstrates that FDI plays a critical role in the development of modern formats. Global retailers, with the benefit of their experience, can rapidly expand operations and tailor successful formats to the local environment. Second, land market barriers that create an artificial scarcity of land, thereby raising land prices, should be addressed. Third, constraints in upstream sectors – such as SSI (small-scale industry) reservation and restrictions on food grain movement – should be removed to allow retailers to create efficient supply chains.

If these barriers are removed and the economy grows at 10 per cent per annum – which is possible if our recommended reform programme is pursued – the retail sector will experience dramatic growth and employment creation. In fact, output in the sector will increase approximately three and a half times and productivity will rise approximately two and a half times.

## **Productivity performance**

Labour productivity in Indian retail is low, at 6 per cent of US levels. The performance of non-food retailing, at 8 per cent, has been marginally better than that of food retailing, at 5 per cent. The productivity performance of even the modern formats is not distinctive. For instance, supermarkets, which could be the

cheapest providers of food in urban areas, are a recent phenomenon in India and currently record a productivity of about 20 per cent against their potential of 90 per cent. The same is true for other modern formats such as specialty chains and department stores.

### **Operational reasons for low productivity**

Variation in productivity between India and the US can be explained by two sets of factors – first, a format mix in India that is heavily skewed towards inherently less productive formats such as street vendors; and second, factors that lead to differences in performance of the same formats (e.g., supermarkets) in the two countries, such as low scale of operations, poor merchandising and marketing skills and inefficient organisation of functions and tasks.

### **Industry dynamics**

Moderate levels of domestic competition and negligible exposure to global best practice characterise retail trade in India. In particular, and unlike in most other rapidly growing developing economies, counter stores in urban areas have not been exposed to price-based competition from best practice supermarkets and hypermarkets. The consequent reduction in pressure to perform, results in poor quality service being provided to consumers.

### **External factors responsible for low productivity**

Four key external factors impede improved productivity: First, the ban on Foreign Direct Investment (FDI) in the sector makes it difficult to access best practice skills. Second, differential enforcement of tax and labour laws benefit only counter stores. Third, underdeveloped upstream industries add costs to, and complicate sourcing for, modern retail formats. Finally, unavailability of appropriate real estate due to generous tenancy laws and unclear land titles act as entry barriers for organised players.

Some additional, though less important, factors also adversely affect the productivity performance of retail. For instance, poor urban infrastructure hampers the growth of suburban shopping options, multiple legislative requirements and the accompanying bureaucracy are irritants to modern retailers and the need to educate consumers about the benefits of modern formats increases costs.

### **Industry outlook**

With reforms in all sectors, Indian retail has the potential to increase productivity by nearly 2.5 times, increase output by 12 per cent a year, and create 8 million

jobs. Modern formats such as supermarkets can grow to take a 30 per cent share of urban output and reach 90 per cent of US productivity levels. Transition formats such as street vendors will keep an 80 per cent share of employment and will remain at 4 per cent productivity. This is because of the inherently low productivity of these formats and the lack of alternative job opportunities.

### **Policy recommendations**

To reform the sector, the government needs to allow FDI to attract skills into the country, create an environment that facilitates the growth of retail (e.g., deregulate the processing sector, resolve real estate issues and reduce bureaucracy) and remove operational disadvantages faced by supermarkets versus counter stores (flexible labour laws and tax issues).

# Retail

Retail, with a worldwide total sales of US\$ 6.6 trillion, is the world's largest private industry, ahead of financial industries (US\$ 5.1 trillion) and engineering (US\$ 3.2 trillion). In India too, the industry is large, accounting for 10-11 per cent of GDP and generating 6 per cent of total employment (**Exhibit 3.1**). Annual retail sales in India are estimated at US\$ 180 billion and have been growing at 5 per cent annually in real terms. This growth is expected to continue, driven by increased rural consumption and a shift towards spending on higher value-added goods.

Retail has the potential to generate employment both within the sector, as well as in upstream activities such as food processing, distribution and logistics. At 6 per cent, the share of employment in retail is relatively low in India – compared to 12 per cent in Poland, 14 per cent in Brazil and 16-17 per cent in the US. In addition to increased employment and supply chain efficiency, the evolution of the industry will provide superior value to customers, thereby encouraging further consumption.

Our study reveals that productivity in this sector is well below potential. This is largely due to the very low penetration of modern, cost-effective formats (such as supermarkets), a lack of exposure to global best practices, differential tax and labour laws and underdeveloped upstream industries.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

In our study, we have focused on food (excluding restaurants) and non-food retailing. In non-food retailing, we have concentrated on textiles and apparel, footwear and consumer durables. The food and non-food segments that we have

studied together account for 80 per cent of total retail sales and a similar share of overall retail employment (**Exhibit 3.2**). Within the segments covered, food retailing accounts for the largest share, with 88 per cent of sales and 80 per cent of employment.

With close to 12 million outlets, the country has the highest retail outlet density in the world. While both traditional formats (we refer to them as transition formats in this study) and modern formats exist in India, the former dominate the market (**Exhibits 3.3 & 3.4**). Only 2 per cent of retail sales in India flow through formats such as supermarkets and specialty chains. This is much lower than the share in other developing and Asian markets (**Exhibit 3.5**). The bulk of food sales (60 per cent) in India flows through urban and rural counter stores and an additional 35 per cent through street markets and vendors. Less than 1 per cent of food and 6-7 per cent of non-food categories, such as apparel and footwear, are sold through supermarkets, department stores and specialty chains (**Exhibit 3.6**).

Transition formats, such as rural counter stores, kiosks, street markets and vendors, have low productivity potential because of their unorganised systems and processes. These formats have emerged largely due to the absence of alternative employment and typically require employees with very low skills. These formats can, and do, serve to absorb agricultural<sup>1</sup> labour. They are, however, very important as they account for two-thirds of the sector's output. There are four main transition formats in India:

- ¶ **Rural counter stores:** Indian retail is dominated by family-run counter (*kirana*) stores that stock a range of branded/unbranded items. Rural counter stores are multi-purpose stores and sell items of essential need, both food and non-food. These stores are often located in rural homes and serve to supplement the family's income from agriculture.
- ¶ **Kiosks:** These small, pavement stalls stock a limited range of food and beverage items. Kiosks are convenient for impulse or emergency purchases, and are located in busy commercial and market areas.
- ¶ **Street markets:** Held at fixed centres in urban and rural areas on a daily or weekly basis, street markets comprise multiple stalls (often more than 200) selling a wide range of food and non-food products. These markets compete on both variety and price, and also sell counterfeit goods and smuggled items. Street markets have traditionally acted as a place for social gathering. The bazaars in Poland and open-air wholesale markets in Russia are the foreign equivalents of this format.

---

<sup>1</sup> For a detailed discussion on transition and modern employment and their likely evolution, please see chapters 4, Volume I: Synthesis of Sector Findings and Chapter 5, Volume I: India's Growth Potential

¶ **Street vendors:** These are mobile retailers, providing perishable food items (milk, eggs, vegetables and fruit) at the customer's doorstep. While their prices are higher than alternative retail channels, they compete on convenience.

## **Industry evolution**

India's retail environment has changed in the last 6-7 years. There have been changes both on the demand and the supply front.

On the demand front, customers have begun spending more as incomes rise and brand consciousness increases. They have begun demanding a better shopping experience as global media exposes them to different lifestyles. Consumer research shows that households in metropolitan cities are gravitating towards supermarkets and other modern retail channels.

On the supply front, a number of organised retailers have entered the trade in the last 5 years (**Exhibit 3.7**). These include large Indian business groups such as the Tatas, RPG, the Rahejas and Piramal, as well as MNC brands in apparel, footwear and durables. The entry into retailing by MNC brands has driven the growth of specialty chains and upgraded the standards of existing multi-brand outlets. South India – most notably Chennai, and, to a lesser extent, Bangalore and Hyderabad – has emerged as a centre of organised retailing. In fact in Chennai, nearly 20 per cent of food sales now flow through supermarkets and an equal share of “durables” is sold through specialty chains such as Viveks. Until now, competition in the sector has been largely local with large global retailers such as Carrefour and Wal-Mart absent.

Modern formats, such as supermarkets, department stores and specialty chains, have begun to crop up over the past few years. These formats have high productivity potential and are found in most developed and many developing economies.

¶ **Supermarkets/Hypermarkets:** These are large (20,000 square feet plus) self-service stores selling a variety of products at discounted prices. The best practice chains in this format are Carrefour (France), Wal-Mart (US), Kroger (US), Tesco (UK) and Metro (Germany). Supermarkets tend to be located in key residential markets and malls, and offer competitive prices due to economies of scale in logistics and purchasing. This format is new to India and only three supermarket chains of note exist – Foodworld, Nilgiri's and Subhiksha. Indian supermarkets are smaller than those in other countries, with fewer cash registers and sizes that are at least a fifth of the global players' selling area (3,000-4,000 sq ft versus 20,000-25,000 sq ft).

- ¶ **Department stores:** These large stores primarily retail non-food items such as apparel, footwear and household products. They stock multiple brands across product categories, though some of them focus on their own store label (e.g., Marks & Spencer's St. Michael). Department stores are found on high streets and as anchors of shopping malls. Several local department store chains have opened shop in India in the past 5 years (e.g., Shoppers Stop, Westside and Ebony).
- ¶ **Specialty chains:** These retail outlets focus on a particular brand or product category, usually non-food items, and are located on high streets and in shopping malls. While most specialty chains compete on service, a segment called “category killers” offers price as an advantage (Toys ‘R’ Us is a good example of a category killer). Examples of specialty chains include Gap, Levi’s and Benetton. This format has seen the highest levels of adoption in India, with several chains establishing a strong presence, typically through franchising, e.g., Lacoste and Benetton.
- ¶ **Urban counter stores:** These small family-run stores dominate food and non-food retailing and are found in both residential and commercial markets in towns and cities. The food stores stock a wide range of branded and unbranded food items. They typically have a loyal clientele bound to them by personal relationships and the convenience of credit and home delivery. Non-food counter stores typically stock multiple local brands. Even though urban counter stores have existed for decades, we have included them in the category of modern formats given that they have more organised systems and processes (than kiosks) and provide stable employment.

The experience of other developing economies suggests that the transformation of retail from an unorganised sector to an organised sector can be rapid. Organised retail grew from 10 per cent to over 35 per cent in Thailand and Brazil, and to 20 per cent in Poland and 10 per cent in China over an 8-15 year period (**Exhibit 3.8**). The key drivers of this change were entry of best practice foreign retailers, the freeing of real estate markets and growth in income.

## **PRODUCTIVITY PERFORMANCE**

The labour productivity of retail in India is low at 6 per cent of US levels. This figure is 5 per cent for food retailing and 8 per cent for non-food retailing (**Exhibit 3.9**). In comparison, productivity of food retailing in Brazil is 14 per cent and of non-food retailing in Poland is 25 per cent.

¶ **Food retailing productivity:**<sup>2</sup> Transition formats reduce the average productivity of food retailing in India (**Exhibit 3.10**).

- Supermarkets and convenience stores account for less than 1 per cent of employment and are at 20 per cent of US productivity. This is much lower than their potential of 90 per cent. Only the best practice Indian player has a productivity of 53 per cent of US levels, which is almost three times the Indian average
- Transition formats, especially street markets and vendors, are a significant drag on productivity. They account for 50 per cent of the labour hours spent in retail and are at 3-4 per cent of US productivity. This is similar to Brazil, where modern formats are at 48 per cent of US levels, but the much lower productivity of street bazaars and vendors reduces the industry average to 14 per cent.

¶ **Non-food retailing productivity:**<sup>3</sup> Modern formats display low productivity compared to US levels but they are slightly higher than that of the transition formats (**Exhibit 3.11**).

- Department stores, specialty chains and upscale multi-brands employ a mere 2.5 per cent of total non-food retail employment and average 24 per cent of US productivity. The specialty store average is 24 per cent versus 123 per cent in the US. The best Indian specialty chain stands at 53 per cent. Department stores and upscale multi-brand stores perform at 16 per cent of US levels. Urban counter stores are at 8 per cent and employ around 68 per cent of the total non-food retail employment.
- Transition formats account for around 30 per cent of non-food retail employment and are at 6 per cent of US productivity.

### **Rural versus urban productivity**

Rural retail employment accounts for about 60 per cent of total employment in the sector. Productivity of retail businesses in rural areas is around 60-65 per cent that of urban centres (**Exhibit 3.12**).

The lower labour productivity of rural formats (essentially counter stores) can be explained by the lower sales per outlet and the longer hours worked. The lower sales (Rs.1,000 per day in rural areas versus Rs.7,000 for stores in large urban

---

<sup>2</sup> All estimates for productivity of individual formats in this section are indexed to the US average productivity levels for food retail

<sup>3</sup> Estimates for format productivity for both India and the US are indexed to the US average productivity for non-food retailing

areas) can be attributed to lower rural purchasing power, self-consumption of agri-produce and a tendency among village-folk to purchase from cities. Given that rural households typically purchase expensive items from towns, village stores tend to stock items of regular consumption such as food (tea, sugar)<sup>4</sup>, small household goods (bulbs, wires), plus stationery and limited items of clothing. The long working hours observed are because of the low opportunity cost of the labour involved.

### **Productivity growth**

Growth in labour productivity has been close to 5 per cent in real terms over 1990-97. This mirrors the growth in retail output (5-6 per cent), with retail employment growing at about 1.2 per cent (**Exhibit 3.13**). The official statistics present a picture of stagnant rural employment with a 3 per cent year-on-year growth in urban employment. This is also reflected in the growth in number of retail outlets, with outlets in urban areas increasing by 4-5 per cent per year.

We believe that the number of rural outlets and, thereby, rural retail employment too has grown in the 1990s. It has been independently estimated that the number of rural outlets grew at 2.5 per cent between 1995 and 1997. This is similar to the rate at which agricultural productivity has grown, and hence the rate at which labour has been released from this sector. This indicates that a reasonable proportion of the freed labour hours seem to have gone into rural retail (due to a lack of alternatives), confirming that it is transitional in nature.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

A large productivity gap exists in retail – 95 per cent in the case of food retailing and 91 per cent for non-food retail. This is driven by two factors – a format mix that is heavily skewed towards transition formats, and poor operational performance (productivity) of modern formats.

### **Unfavourable format mix**

As we discussed briefly in the section on productivity performance, channels such as supermarkets, department stores and specialty chains account for only 2 per cent of retail output. This leads to lower overall/sector productivity, as counter stores are 2-3 times less productive.

---

<sup>4</sup> Cereals, milk, vegetables are usually self-consumed; not purchased from retail outlets

Supermarkets and specialty chains are more productive than counter stores for two reasons – they leverage their volumes to drive costs down and possess superior skills. The larger volumes or scale of modern retailers make it possible for them to bargain for lower unit costs not only while procuring, but also while distributing and marketing. In addition, supermarkets and specialty stores possess strong skills supported by technology in the front end (i.e., merchandising and marketing) as well as in the back end (i.e., managing the supply chain and inventory).

A key reason why supermarkets have not grown share rapidly, especially in food retail, is the underdeveloped nature of upstream industries. The relatively higher price proposition of supermarkets versus counter stores will be a key determinant of the sector's evolution. Currently, supermarkets are not able to capture the benefits of larger scale due to a fragmented supply chain and a sub-scale processing sector. They are also penalised by the current operating environment, which favours counter stores (e.g., tax and labour laws). Consequently, prices in Indian supermarkets are slightly higher than those of counter stores – a quick survey in Delhi indicated that supermarkets were 2-3 per cent more expensive for a set of branded FMCG products (**Exhibit 3.14**) – while in other countries, supermarkets are about 10 per cent cheaper than counter stores. As large food retailers in India begin passing on the benefits of better purchasing to customers in the form of lower prices, they will be able to capture share more rapidly.

### **Poor productivity in modern formats**

We now explain why modern formats in India and the US have such different productivity levels, what they are doing differently and how this affects performance. As we find similar operational factors for food and non-food retail, we will discuss, in depth, the reasons for the productivity gap for two key food formats – supermarkets and counter stores.

We have made upward adjustments in the productivity of Indian supermarkets to account for the differences in their upstream environment vis-à-vis that enjoyed by large food retailers in the US. Supermarkets in India experience a productivity penalty due to: 1) The fragmented and inefficient supply chain that raises the cost of procurement; and 2) the need to maintain competitive price levels vis-à-vis cheaper counter stores. This leads to a lower level of value add when compared with firms such as Wal-Mart, which source directly from processors. The supply chain for food in India (for both branded and unbranded goods) has two to three more intermediaries on an average, compared with similar chains in more developed markets (**Exhibit 3.15**). This is because of market regulations (constraints on food grain movement across states, inability to purchase directly from farmers, etc.), regulations that slow down the growth of large processors and the fragmented nature of retail.

¶ **Supermarkets:** An inefficient organisation of functions and tasks, poor merchandising and marketing skills, low scale of operations and poor supplier relations account for the bulk of the 83 percentage point gap in supermarket productivity between India and the US (**Exhibit 3.16**).

- **Organisation of functions and tasks (OFT):** Most Indian supermarkets can double their productivity by improving the organisation of tasks and rationalising the workforce. The average supermarket in India has many more employees than a US supermarket due to the limited use of multi-tasking and part-time help to meet peak hour needs as well as non-standard layouts that reduce efficiency. In contrast, India's best practice supermarket ensures that its sales personnel play multi-faceted roles and undergo in-house training prior to joining. A quarter of the sales staff works only part-time, putting in 4-6 hours a day during peak shopping hours. The supermarket also has a scientifically designed layout that it tries to adhere to across the chain. Consequently, this chain has a much lower productivity penalty of 7 percentage points compared to average supermarkets which have a productivity penalty of 20 percentage points
- **Merchandising and marketing:** Poor merchandising and marketing skills and absence of private labels among Indian supermarkets have led to lower sales per store and account for 27 percentage points of the productivity gap.
  - **Skills:** Indian supermarkets do not focus on systematically understanding the purchasing patterns of consumers to determine the products to stock and the targeted promotions to undertake. The same applies to factors such as store layouts and ambience. A couple of players have begun to address this issue by defining clear strategies for pricing as well as building customer traffic and loyalty. For instance, a Chennai-based supermarket chain offers a price discount of 8-9 per cent on an average and seeks to keep its regular customers informed of good buys through fortnightly newsletters.
  - **Private label/product mix:** A second aspect of merchandising and marketing is the share of revenues from private labels<sup>5</sup>. Supermarket chains in the US enjoy a larger share of sales from private/store labels that earn them higher margins. This factor, plus a product and sales mix skewed towards higher value items, earns them 3-4 per cent higher margins. Building a strong private label

---

<sup>5</sup> A private or store label is the brand developed and promoted by the retailer. This is a rising trend in most developed markets

should be a key priority for supermarkets in India. Groceries, fresh fruit and vegetables and ready-to-eat items are the focus segments for this, and a couple of players are planning to set up kitchens to cater to this demand. Doing this should further improve productivity performance by 4 per cent.

- **Scale:** Supermarkets in India currently have a low scale of operations both in terms of number of stores and size per store, and this leads to a productivity penalty of 13 percentage points (10 points for the best practice supermarket). The larger supermarket chains in India have 30-40 stores compared to the 1,000-store average observed in the US. Supermarkets in the US are also much larger than their counterparts in India. Higher scale makes it possible for retailers to use fixed labour (such as purchasing, marketing and administration) more expediently as well as use their bargaining power to buy cheaper and rationalise logistics upstream.
- **Supplier relations:** Sourcing from multiple sub-scale suppliers is a key issue for supermarkets in India, and explains about 10 percentage points of the productivity gap versus the US.
  - **Lack of strategic purchasing:** Large food retailers in India can lower costs by rationalising the vendor base, and undertaking strategic collaborations with processors and FMCG companies (**Exhibits 3.17 & 3.18**). Supermarkets in India procure from a large number of vendors, across regions. For instance, the best practice player has 1,600-1,700 vendors – over 400 per region. As a consequence, a retailer needs a large sourcing and quality control team, which raises the costs of procurement. Focusing on fewer national suppliers wherever possible can reduce the sourcing complexity, which will also help meet the cost/quality needs. McDonald's in India is a good example of best practice in supply chain management. The company works with one carefully selected vendor per item, sets quality and cost targets and helps the vendor upgrade operations systematically.

Supermarkets can also lower costs or increase value add by entering into strategic deals with upstream players. These initiatives include collaborating with food processors in purchasing as well as manufacturing private label goods, and engineering strategic relationships with branded goods companies aimed at increasing sales and reducing distribution costs (benefit shared by both parties). This is already beginning to happen. For instance, a supermarket chain purchases wheat along with an atta company to lower costs, and has succeeded in entering marketing/ promotional deals with several branded goods players.

- **Limited adoption of best practices by upstream players:** Food processors in India are typically small and unorganised. The business systems of these processors as well as of the large FMCG companies are not configured to meet the needs of large retailers. This imposes a penalty on retailers, adding costs and forcing them to engage in additional non-core activities. For instance, most local processors as well as some national and multinational food manufacturers do not bar code their products. As this is essential for supermarkets, which use scanning equipment for billing, it becomes necessary for the retailers to undertake this activity, adding to their costs.
  - **Inability to meet delivery schedules:** Manufacturers are unable to meet the full delivery requirements of large retailers, which leads to stock-outs in stores (as retailers operate on a “just in time” basis). This occurs because the manufacturers also service larger buyers such as supermarket chains through their existing, multi-layered, distribution channel where product shortages and delays are frequent. This should change as organised retailers form an increasing share of FMCG company revenues.
  - **Low demand/income:** Lower income levels and, hence, lower consumption among Indian customers limit the size of average purchases, leading to lower productivity at the cashier. This factor explains the 13 percentage point gap between India’s best practice and the US average.
- ¶ **Urban counter stores:** Urban counter stores in India are five times less productive than US mom-and-pop stores (**Exhibit 3.19**). This difference can be attributed to the following factors:
- **OFT:** Indian counter stores do not use part-time labour and multi-tasking, which would help them double productivity.
  - **Merchandising and marketing:** Counter stores in India lack the skills to better align stocking patterns and promotions to consumer needs. In addition, they have not faced the sort of competitive pressure that would force them to raise their standards. In other countries, to survive competition from supermarkets, counter stores have opted to focus on product or service niches. For instance, in France, gourmet cheese stores and farm-fresh vegetable stores thrive in the vicinity of supermarkets. In New York, Korean grocery stores stay open all 24 hours to provide added convenience to customers. In India, we see early signs in Chennai, where competition from supermarkets is the highest (17 per cent of sales) and larger counter

stores have begun stocking imported or non-food items to differentiate their merchandise from supermarkets.

- **Supplier relations:** Counter stores can increase productivity by 4-5 percentage points by buying more strategically and benefit from the simplification of the supply chain brought about by the entry of large retailers and food processors. Buying in bulk and availing of cash discounts can help improve margins.
- **Capital intensity:** The service proposition of counter stores in India involves a much higher consumption of labour hours than a mom-and-pop in the US. This is because an Indian counter store does much more in-store customer handling and home deliveries than a US mom-and-pop store, which focuses on providing a clean environment for self-service. The key reasons for this difference are the low labour costs in India, the small size of the stores and the sale of products such as loose grains and oil that do not lend themselves to self-service.
- **Scale and low-income:** The low entry barriers for counter stores, combined with low income levels, leads to low capacity utilisation. Entry into retail for small players is relatively easy – licensing is not an issue, product sourcing is not restricted, labour is easily accessible and residential property can be used as the store. This phenomenon, however, does not affect supermarkets for which there is still latent demand.

We believe that urban counter stores in India can triple productivity and reach 30-35 per cent of US levels by addressing OFT issues and improving sourcing and marketing skills.

The operational factors explaining the productivity gap between India and the US for non-food formats are very similar (**Exhibit 3.20**). For specialty chains and department stores in India, the key issues are the limited development of the upstream (apparel) industry, poor merchandising skills and low scale. These modern formats need to spend significant time and effort on sourcing from small scale, unsophisticated manufacturers (*see* Volume II, Chapter 3: Apparel).

Overall in the sector, the high share of transition formats drives low productivity vis-à-vis the US (**Exhibit 3.21**). Even if modern formats grow share in urban areas and improve productivity, India's overall productivity will remain restricted because the transition formats are limited in their productivity potential. We expect transition productivity to remain at the current 4 per cent because of low barriers to entry and many idle hours in agriculture.

## INDUSTRY DYNAMICS

Competitive behaviour in Indian retail is characterised by lack of exposure to best practice skills as well as an implicit subsidy for counter stores through differential enforcement of laws. In addition, despite a large number of players, we see an absence of price-based competition (particularly in food). Minimal high-quality competition and absence of skills have led to a lack of pressure to perform – resulting in low and relatively stagnant productivity levels compared to the potential (**Exhibit 3.22**).

### Low domestic competition

Low competition has contributed to low productivity and lower quality of service.

- ¶ **Food retailing:** Competition among stores is limited because each counter store typically has an established clientele based on personal relationships and, often, credit. This situation is aggravated by a lack of competitive pressure from modern formats.
- ¶ **Non-food retailing:** On the non-food side too, competition among retailers is moderate. Price is frequently used as a tool to increase sales, with even small stand-alone shops beginning to advertise locally. In this segment, the customer's ties to a particular retailer are weaker due to lower frequency of interaction. There is also greater organised competition in non-food retailing – from branded specialty chains – that is reflected in its superior productivity performance compared to food.

### Lack of exposure to best practice

Competition in Indian retail is almost entirely domestic, and exposure to global best practice retailers is negligible. On the food side, only one foreign retailer – Dairy Farm – is present in India through a joint venture with a local player. However, none of the world's top 10 food retailers is present. On the non-food side, we have seen the entry of specialty chain stores such as Benetton, Nike, Reebok and Lacoste. The large discounters, category killers and best practice department stores (Toys 'R' Us, Circuit City, Macy's, etc) are absent.

The absence of best practice skills is critical, given the complexity of successfully managing a retail business. Retailers need expertise to manage back-end activities such as sourcing and inventory management, as well as the front-end functions of merchandising, promotions and customer service. The complexity arises when retailers need to manage a large number of SKUs and suppliers, as well as ensure no stock-outs while maintaining low inventory levels. The issue of skills is particularly relevant for India, as the majority of large format retailers have no prior experience in the industry.

Consequently, it is likely that in the absence of best practice experienced players, the retail transition will take a long time as players lacking skills and experience are less willing to take risks and will, therefore, take longer to ramp up operations. In fact this is already happening, with retailers opting for less investment-intensive and, therefore, less risky propositions.

### **Non-level playing field issues**

Counter stores in India have several advantages vis-à-vis large chain retailers. This is due to differential implementation of laws (labour, taxation) and differential access to resources (both availability and price of real estate and labour, in particular). These factors have inhibited the entry as well as expansion of modern retailers. We discuss these issues in greater depth in the next section.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

Low productivity in the retail sector has been driven by restrictions on FDI, under-developed upstream industries, non-level playing field issues, the supply and cost of real estate, and India's low per capita income (**Exhibit 3.23**). Productivity has also been affected by secondary factors such as a rudimentary urban infrastructure, red-tapism and varied customer preferences.

### **Restrictions on foreign direct investment (FDI)**

FDI has been a key contributor to the rapid evolution of retail in other developing economies such as Thailand, Poland and China (**Exhibit 3.24**). In Thailand, seven of the top 10 retailers enjoy foreign equity and the list includes names such as Makro, Carrefour and 7-Eleven. Modern formats made their appearance in Poland and China in the '90s primarily because of the entry of global chains. Global retailers, with the benefit of their experience, can rapidly expand operations and tailor successful formats to the local environment.

In India, FDI is not permitted in pure retailing though MNC retailers can participate in wholesale trade as well as operate retail businesses through local franchisees (Benetton, Reebok, Lacoste). This impacts food retailing more, as franchising is tougher to manage in this segment given the bigger formats and larger number of SKUs that complicate sourcing and merchandising. In addition, the requirements of customer service in this segment are higher – need to manage perishable products, frequent promotions – and demand expertise of nature most Indian players have yet to acquire. Dairy Farm is the only foreign food retailer present in India and was permitted entry during a regulatory window (1993-95).

## Underdeveloped upstream

The absence of well-developed upstream industries (e.g., processing and distribution logistics) raises retailing costs by 4-5 per cent. This, in turn, has been due to the reservation of large parts of food processing and garment manufacture for the small scale in the past<sup>6</sup>, which has also hindered the development of support industries (**Exhibit 3.25**).

¶ **Food:** Here, two key problems exist – lack of large-scale processors and the poor quality of distribution infrastructure.

Large, organised players account for only 25 per cent of the food processing output in India. The small-scale industry (SSI) accounts for 33 per cent of the output while the unorganised, traditional manufacturers produce the remaining 42 per cent. While SSI reservation has been progressively relaxed, some products remain restricted (including bread, confectionery, etc.) and the legacy effect is strong. Food processors are, therefore, not able to reap the benefits of scale (cost) or invest in brand building. Also, food processors are absent in key segments such as fruit and vegetables and dry groceries.

Distribution of most food items involves multiple intermediaries, high cycle times and wastage during transportation and storage. The distribution infrastructure is the weakest in the fruit and vegetables chain, where the absence of a cold chain and convenient marketing channels leads to huge wastage. Also, the number of brands/ products available is limited. As a result, retailers need to deal with multiple, small vendors and undertake some non-core activities (such as cleaning groceries and bar coding products).

Global food retailers perceive India's underdeveloped supply chain as a critical barrier. They will not invest in India unless they can source a large portion of their requirements locally at the right quality. This is essential if they are to reap economies of scale and leverage their merchandising skills. For example, in China, Carrefour now has 22 hypermarkets after just 4 years of operations, and sources 90 per cent of its goods locally.

¶ **Non-food:** On the non-food side, large segments of domestic apparel and shoe manufacturing<sup>7</sup> are reserved for small-scale manufacturers. Consequently, product sourcing becomes difficult for retailers of branded goods and own store labels, who have to deal with issues such as poor

---

<sup>6</sup> Garment manufacturing has been opened to non-SSI units a couple of months ago. This move should help retailers though the legacy effect will prevail for a while

<sup>7</sup> Units exporting over 50 per cent of their output are permitted to manufacture for the domestic market as well

quality, low volumes and higher costs. Large formats such as department stores find it difficult to source sufficient brands to stock, as well as quality merchandise for their store labels.

### **Non-level playing field issues**

Tax and labour law advantages give counter stores a benefit (lower costs) of 3-4 per cent of sales, which translates into a 15-20 per cent benefit in gross margins (**Exhibit 3.26**). The advantages stem from four factors:

- ¶ **Differential tax payments:** These arise due to higher tax rates for organised retailers as well as tax evasion by counter stores. Income tax rates differ for the two formats – large retail chains are taxed at the corporate rate and need to pay 38.5 per cent of their income as tax, while lower individual income tax rates are applied to the counter stores. Also, we find that most counter store operators do not pay income tax at all, and sometimes even evade sales tax. The non-enforcement of laws applies in other situations as well, such as in the control over the sale of counterfeit products and adherence to labour laws (discussed in the next section).
- ¶ **Varying tax rates across states:** In addition to the benefits accruing to counter stores from non-enforcement of laws, the existing tax structure actually imposes a penalty on retail chains operating in multiple areas. The current sales tax structure is characterised by differences in rates across states plus the imposition of an additional central levy on inter-state sales. On top of this, a tax (octroi) is levied on the movement of goods from one district to another. This practice negatively impacts retail chains, as a higher proportion of their merchandise is sourced from outside the state of operation.
- ¶ **Differential enforcement of labour laws:** Labour laws in India limit the hours of work for a retail employee to eight hours, require that a shop be closed one day a week and suggest the minimum wages to be paid. Organised retailers typically adhere to these norms, while counter stores are open almost throughout the year with an average working day per employee amounting to 12-13 hours.
- ¶ **Non-payment of market rates for inputs:** A critical cost advantage for counter stores arises from the fact that they typically pay lower rates for key inputs (i.e., land and utilities) than do supermarkets. Counter store operators either own the premises in which they operate or pay a nominal rent (set years earlier) that is far lower than the actual market value of the property. Most counter stores also save on power costs, paying

residential rates that are nearly half the commercial rates paid by modern retail chains.

### **Supply and cost of real estate**

This factor severely restricts the spread of the large, modern retail formats. Location is a key factor in deciding a retail outlet's success. In India, retailers find it difficult to acquire land of the right size at the right location, particularly in the large cities. This explains why many of the early entrants into retailing have been real estate players (Shoppers Stop, Globus) or players with access to property (Foodworld, Crossroads). Real estate issues impact larger formats more, which explains the slow growth of department store and malls relative to specialty chains.

Several issues distort the real estate market – laws heavily skewed towards tenants, restrictive zoning legislation, non-availability of government-owned land combined with fragmented ownership of privately held property, and disorganised transactions due to a lack of clear titles and transparency.

- ¶ **Pro-tenant laws:** In the past, rent laws have favoured tenants, making owners wary of renting out their property. It is difficult to recover rented properties from tenants or to increase rents, and land disputes stay pending in courts for years. The limited commercial land that is available is taken by counter store operators, who have been in the trade for generations and often lack alternative occupations (therefore limiting supply into the market).
- ¶ **Zoning laws:** Zoning laws restrict the supply of real estate as well as attach constraints to property development for retail. In the master plans of most cities, land is clearly demarcated for various purposes – agricultural, industrial, residential and commercial – and it is extremely difficult to convert land earmarked for other purposes to retail/commercial use. However, zoning laws vary by state. So, while land conversions for commercial use is nearly impossible in Delhi, the governments in some southern states are more flexible.
- ¶ **Non-availability of government land, combined with fragmented private holdings:** These factors make it difficult for retailers to acquire large plots of land both within the city and in the suburbs. The local authorities typically own large tracts of vacant land both in city centres and in the suburbs, and auction this land in lots only at infrequent intervals. This constrains supply and pushes up real estate prices. Meanwhile, private holdings are typically small, due to which real estate developers need to consolidate land owned by multiple individuals,

which is an arduous task. In the suburbs, the absence of infrastructure further reduces the land available that can be used for commercial use.

¶ **Lack of transparency:** The real estate market in India is extremely disorganised and is marked by a lack of information on prices and clearly established ownership titles. Since information about this market is disaggregated, i.e., with individual brokers, even similar, adjacent plots often command different rentals. Jointly-held properties and complex sub-letting arrangements further complicate ownership rights. Finally, high property taxes drive owners to demand a significant part of the payment in cash and without records. All these factors make access to real estate for organised players a complex task (*see* Volume III, Chapter 1: Housing Construction).

Real estate availability's impact on the development of retail can be judged from the experience of South India. A key stimulus for the retail boom in Chennai and Bangalore has been their lower property costs when compared to cities like Mumbai and Delhi (**Exhibit 3.27**).

### **Low income**

India's per capita income is 6 per cent of US levels at purchasing power parity, leading to low consumption. On the input side, cash costs are low given that counter stores are typically family run (with some hired help), and family labour is either not assigned any value or lacks alternative occupations. This will change as alternative employment opportunities emerge with economic growth and education.

Insufficient demand is likely to hold back the establishment of modern retail formats in rural areas. Currently, rural needs are met through small, general-purpose village stores and weekly street markets (*haats*). These *haats* are extremely low-cost formats catering to the requirements of about 15 villages and providing a variety of goods and services – from food grains to entertainment. A hypermarket/supermarket would the daily sales potential from this catchment area to be low, and catering to a larger radius difficult, given the connectivity problems. In addition to low demand, modern formats would also find sourcing difficult as a large share of local merchandise (brands plus counterfeits) is consumed in rural areas. Finally, competing with the social/entertainment proposition of the existing channel would be tough.

## Poor urban infrastructure

Most Indian cities suffer from bad roads, poor transport and face power and water shortage. This impacts the growth of suburban shopping options negatively, making it difficult for retail developments to come up and for consumers to get there conveniently. This factor is already important in cities such as Delhi and Mumbai where real estate costs in the city centre are prohibitive (causing a move to the suburbs). This trend is likely to spread to other urban centres as well.

The inadequate levels of urban infrastructure can be attributed to bankrupt local governments. The majority of municipal agencies in the country have limited funds to invest in infrastructure. Collections from property taxes and user charges, that are typically used to finance infrastructure, are low. In fact, most municipalities depend on the state government for 50-60 per cent of their expenditure. The low property taxes stem from low rental values as well as tax evasion, while political/social considerations have led to utility prices that are lower than the cost of providing these services. As a result, municipal authorities find it difficult to raise external funding for infrastructure projects. The success achieved by a few municipal corporations in raising external funds can be attributed to their addressing the issues mentioned earlier, i.e. restructuring finances, privatising utilities, and even obtaining guarantees from international financial institutions (*see* Volume III, Chapter 1: Housing Construction for details).

A direct consequence of poor urban infrastructure is the slow growth in suburban shopping, even in cities such as Delhi and Mumbai where land prices in city centres are prohibitive. In fact, retail developers find that they have to invest in constructing approach roads and arranging for their own water supply, often without support from the local government.

This is very different from the experience of other countries. For instance, in Bangkok, where large retail developments have come up in the suburbs (due to lack of affordable land in the city), the government and private developers have jointly developed the necessary infrastructure. The local authority has provided the infrastructure up to the boundary of the housing and retail development, while the internal roads and power cables have been the developers' responsibility. Poor urban infrastructure in India also leads to retailers choosing "multiple small formats" versus "a few larger stores". We thus find 3,000-4,000 square feet neighbourhood supermarkets instead of the 20,000 square feet stores in developed markets.

## **Bureaucracy/legislation**

Retail operations need to obtain multiple licences and permits, ranging from a basic trading licence to product specific licences to pollution clearances. Each individual retail outlet has to acquire these, even if it is part of a chain. These factors are irritants, and add time and cost to the process of establishing a retail chain. The following comments are indicative of the problem:

*“There are over 12 licences to be obtained per store...we have a separate division handling this”* – Head of a chain store

*“The project time could have been reduced by 6 months if the local authorities had been more helpful”* — A mall developer

## **Customer preferences**

Given India’s size and the presence of diverse cultures, there are significant regional variations in product preferences. This tends to complicate sourcing. In addition, customers perceive modern formats as more expensive than the traditional, transition formats, especially in food retailing.

## **Factors affecting output**

Some of the productivity barriers such as restrictions on FDI, unavailability of appropriate real estate and low income also affect output (**Exhibit 3.28**) by slowing down the expansion of existing modern players and hampering the entry of new ones. Output is also affected by capital market barriers. Retail being a complicated business has implications on the availability of funds through nationalised banks (the bulk of supply). Lack of expertise on the part on banks in understanding the retail business leads to their shying away from lending to this business or else lending at a higher rate of interest.

## **INDUSTRY OUTLOOK**

In this section, we discuss the outlook for the retail sector in India. We present three scenarios for the sector – status quo, reforms in retail alone and reforms in all sectors – and discuss the productivity and output growth potential for each, also drawing implications for employment generation (**Exhibits 3.29 & 3.30**).

- ¶ **Status quo:** Assuming that the economy grows as it has over the past 6 to 7 years (with no reforms in retail), we see retail productivity growing at 4.3 per cent a year, and increasing by 50 per cent by 2010 (from 6 to 9 per cent). In this scenario of low output and productivity growth,

employment in retail continues to grow as in the past (at 1.2 per cent a year) (**Exhibit 3.31**).

- **Format mix evolution:** In this scenario, the shift in format mix is gradual and supermarkets, department stores and specialty chains grow to 6 per cent share of sales (8 per cent of value-add) by 2010 from a base of 2 per cent. This assumes that they expand at the rate at which they have been growing in the past few years. We expect the shift towards such formats only in urban areas, with supermarkets/hypermarkets accounting for 6 per cent of urban food sales in 2010, and specialty chains and department stores enjoying a 15 per cent share. Retail in rural areas remains virtually unchanged.
  - **Productivity growth:** We expect labour productivity to grow at a slightly lower rate than the increase in value added – 4.3 per cent versus 5.5 per cent. At this growth rate, the sector productivity increases 1.5 times, from the current 6 per cent to 9 per cent. For this to happen, we assume that the supermarkets almost double their productivity – as they increase scale, improve operations, and refine their offerings – to reach 35 per cent on average. However, these retailers are unable to achieve their full potential, given their lack of experience and specialist skills and limited competitive pressure. Counter stores improve their performance purely due to sales increases, the impact of which is higher in urban areas.
  - **Output growth:** GDP continues to grow at 6 per cent per year. This leads to a 4.5 per cent growth in retail sales. The experience of other countries indicates that growth in retail sales slightly lags behind that of the GDP.
  - **Employment growth:** In the status quo scenario, employment continues to grow at the rate of 1.2 per cent a year creating nearly 4 million additional jobs.
- ¶ **Reforms in retail alone:** In this scenario, we assume that retail and its related industries are completely reformed, while the rest of the economy continues along its existing growth path. The improvement in productivity brought on by the entry of modern retailers and better operational performance of the incumbents just about matches the growth in output, leading to a more or less stable employment situation. (**Exhibit 3.32**).
- **Format evolution:** In this scenario, the retail sector evolves rapidly, with modern retail channels growing their share to 16 per cent (20 per cent in value added terms) by 203. Poland underwent a similar transition (from 0 to 20 per cent in 8 years) in the 1990s, because of

favourable policy changes, such as permitting FDI into the sector, controlling the problem of counterfeit goods and liberalising the real estate market. Similar broad-based sector reforms should make this possible in India as well.

- **Productivity growth:** Full-scale retail reforms will almost double the sector's productivity, from 6 to 11 per cent of US levels. Supermarkets will achieve close to their potential – 70 per cent - by the restructuring of the supply chain and the introduction of more flexible laws. This seems plausible given that modern formats in Poland achieved this level as the sector underwent similar reforms. Urban counter store productivity will improve by a factor of 2 because of competition from supermarkets and income growth. Transition formats will only see a marginal improvement in productivity – the benefits of increased competitive pressures and sales growth being balanced by the potential absorption of labour hours released from agriculture.
  - **Output growth:** The historical GDP growth rate of 6 per cent will continue provided the non-retail sectors continue to grow as they have in the past. We assume that the restructuring of retail and the consequent entry of multiple large retailers (including global majors) increases the growth in retail sales to the rate of GDP (6 per cent). Retail value added grows faster than GDP as more productive modern firms rapidly capture share.
  - **Employment growth:** Employment grows only marginally – 0.2 per cent per year – as productivity growth matches that of value added. The latter primarily depends on overall economic growth, which is the same as in the status quo scenario.
- ¶ **Reforms in all sectors:** The third scenario is one where reforms are more or less simultaneously undertaken in all critical sectors of the economy, leading to a high GDP (and retail) growth rate. Here, the growth in value added outstrips the increase in productivity leading to an increase in retail employment (**Exhibit 3.33**).
- **Format evolution:** In this case, the transformation of retail is more rapid than where only retail is reformed. This is because the higher income growth (10 per cent GDP, 8.6 per cent per capita) attracts more retailers to enter the market and encourages incumbents to expand faster. Consequently, supermarkets, department stores and specialty chains account for close to 25 per cent of retail sales (30 per cent of retail value add) by 203. While it seems high, this figure is achievable since a 10 per cent growth in GDP will help India reach a standard of living similar to that of Indonesia and Thailand in the

early 1990s. The share of modern formats in retail is 30 per cent for Indonesia and 40 per cent for Thailand. Meanwhile, transition formats grow at around 3 per cent a year as increasing incomes among the poorer segments of the population raises the demand for transition retail. This was observed in Thailand where transition retail grew at around 7 per cent a year as the country's GDP per capita grew from 5.5 to 15 in PPP terms.

- **Productivity growth:** In this scenario, productivity of retail in India will grow from 6 to 14-15 per cent. This is the result of modern retailers achieving close to their potential and counter stores improving productivity due to competition and income growth.
- **Output growth:** Given that GDP will grow at around 10 per cent for a sustained period of time, retail sales will grow at a similar rate over 2000-2010, with value added increasing faster at over 12 per cent.
- **Employment growth:** We expect employment in retail to increase by over 3 per cent – from 20.5 million persons to 28 million. Most of the new jobs will be in the transition formats initially – mainly street vendors/ markets. However, a significant part (approximately 1 million) will be in modern formats like supermarkets and specialty stores.

## POLICY RECOMMENDATIONS

This section discussed the policy changes that are needed to ensure that Indian retail significantly improves its productivity (**Exhibit 3.34**). While doing this, we try to identify the stakeholders in the process of retail change, understand their viewpoint and their relevance as potential bottlenecks, and finally define how best to address their issues (if needed) in the solution.

- ¶ **Permit FDI in retail:** FDI has played a key role in the rapid development of high quality retail in several other developing countries. Allowing global retailers to invest in this sector would attract best practice players into India. Several retailers (such as Tesco, Marks & Spencer and Toys 'R' Us) have already evinced an interest in building businesses here.

The counter stores are likely to be most threatened by the introduction of FDI. The small trader lobby has been vocal on the issue of not permitting FDI into retail, and has successfully ensured that policy on this front is unchanged. The lobby is based on the premise that modern retail will impact the livelihood of millions of small family-run retail businesses.

However, as we have seen, if broad-based reforms are executed we are likely to see both employment in retail and retail spending increase.

¶ **Remove bottlenecks in the supply chain:** To adequately develop the upstream, policy makers need to do away with the constraints on processing, manufacturing and distribution.

- **Relax SSI reservation:** The reservation of large sub-segments for the small scale renders the processing sector, particularly in food and apparel, inefficient. Therefore, the first step should be to continue to relax restrictions and permit larger, more efficient players to enter these sectors. While the incumbent small-scale firms might oppose such a move, it should be emphasised that this will allow small-scale firms to increase scale and become far more productive and competitive.
- **Remove distribution constraints:** Allow retailers to buy directly from farmers and remove restrictions on food grain movement across states. Encouraging additional investment in distribution infrastructure (such as cold chains and silos) will help remove constraints.

¶ **Organise the market for real estate:** Here the objective is to ensure a regular supply of real estate for retail and to ensure transparency in dealings. To ensure buoyant supply, policy makers need to act on four fronts:

- **Ensure proper rent laws:** Linking rents to market value will ease out businesses surviving on uneconomic rental rates (e.g., shops in Connaught Place in Delhi). Strict enforcement of rental laws will make landowners more confident of getting their property back. This in turn will lead to a rationalisation of retail land prices. The challenge here will be executing this change as we have seen in the past few years when the government has tried to introduce the concept.
- **Make zoning laws more flexible:** The government needs to be more flexible with zoning laws and ensure that usage norms take into account both demand and supply without upsetting the balance, both in urban and suburban areas.
- **Restructure finances of municipal bodies:** The responsibility for providing adequate local infrastructure rests with local governments. To improve their finances, these governments first need to enforce property tax collection to raise funds for infrastructure development. Second, as we saw in the power case study (Chapter 9, Volume III: Power), the issue of subsidised user charges needs to be addressed to attract fresh investment.

- **Increase land supply:** City administrations need to bring government-owned land into the market more regularly. This will encourage and aid large-scale developments both in the suburbs and within cities (*see* Volume III, Chapter 1: Housing Construction).
- ¶ **Simplify the tax structure:** The government should ensure adoption of a uniform sales tax rate across states, and with time, introduce Value-Added Taxation (VAT). It should also eliminate octroi wherever it is levied. These policy changes are already being considered, and all the states have already accepted the move to a uniform sales tax structure in principle.
- ¶ **Ensure greater flexibility of labour laws:** Permitting flexibility in the use of labour without doing away with the benefits accruing to them will permit retailers to better organise operations and improve capacity utilisation. This will include permitting retail businesses to stay open all days of the week, encouraging use of part-time labour, etc. Some southern states have already begun this at the request of modern retailers.
- ¶ **Better enforce tax collection from small retailers:** As we have discussed earlier, small retailers in India derive several benefits from non-enforcement of labour and taxation laws. While it will be difficult for the enforcement mechanism to regularly monitor labour use and electricity consumption by the millions of small counter stores, it will definitely need to improve tax collection from them.
- ¶ **Ensure single-window clearance for retail chains:** State governments should make all licences and permits for retail available through a single agency, at least at the city level. Providing one-time licences for multiple stores in a chain will ease the bureaucratic hurdle experienced by modern retailers.

The state/local government bureaucracy is a critical stakeholder in retail. Several important changes needed in the retail environment imply a loss of power for government officials. These comprise better enforcement of laws among small counter stores, simplification of legislation and loss of tax revenue from sales and octroi levies. While the legislative change might be easier to initiate, a behavioural change will take longer.

## Appendix 3A: Measuring labour productivity

We have used value added per hour worked as the measure of retail labour productivity. The value added is calculated as the value of sales minus the cost of goods sold.

$$\begin{aligned} \text{Productivity} &= \frac{\text{Sector value added}}{\text{Number of hours worked}} \\ &= \frac{\text{Sales} - \text{COGS (Cost of goods sold)}}{\text{Number of hours worked}} \end{aligned}$$

To ensure comparability, we have used a PPP conversion to arrive at Indian productivity in US \$ terms. We used the GDP PPP for food retail, and a specially constructed PPP for non-food. On the non-food front, we compared the value-added of modern formats that offer similar services in India and in the US. This gave us a retail PPP to compare the value add of all formats.

In addition to interviewing retailers, we have done extensive market research to determine the format mix for India, as well as the productivity estimates for various retail formats in both food and non-food. We have worked with one of India's leading research agencies, ORG-MARG, to obtain this information. To arrive at the format mix, we have conducted separate consumer surveys in rural and urban areas to understand the consumer's shopping preferences for food and non-food items<sup>8</sup>. For the urban areas, we have used the Retail Census conducted by ORG in 1995, as well as its update in 1998. Finally, we surveyed retailers (across formats and product categories) to understand their operations and obtain estimates of labour productivity<sup>9</sup>. This survey supported the retailer interviews we undertook. In total, we contacted more than 250 retailers in both the food and non-food categories.

---

<sup>8</sup> The consumer surveys have been conducted with a sub-set of ORG-MARG's panel in rural and urban areas. The rural survey covered 2500 households across the four states of UP, Tamil Nadu, Punjab, and West Bengal. The urban survey encompassed 1250 households in the four base metros (New Delhi, Mumbai, Calcutta and Chennai)

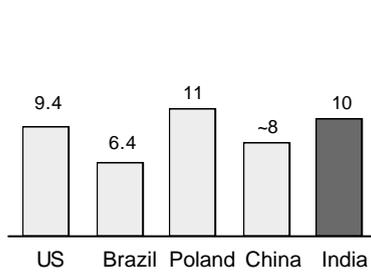
<sup>9</sup> The retailer survey was conducted in 4 cities – 2 metros (Chennai and Delhi) and 2 mini-metros (Ludhiana and Indore).

Exhibit 3.1

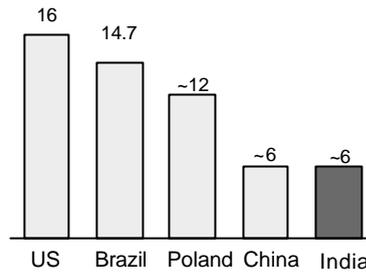
**IMPORTANCE OF THE RETAIL SECTOR – INDIA AND OTHER COUNTRIES, 1997**

Per cent

**Share of retail in GDP**



**Share of retail in employment**



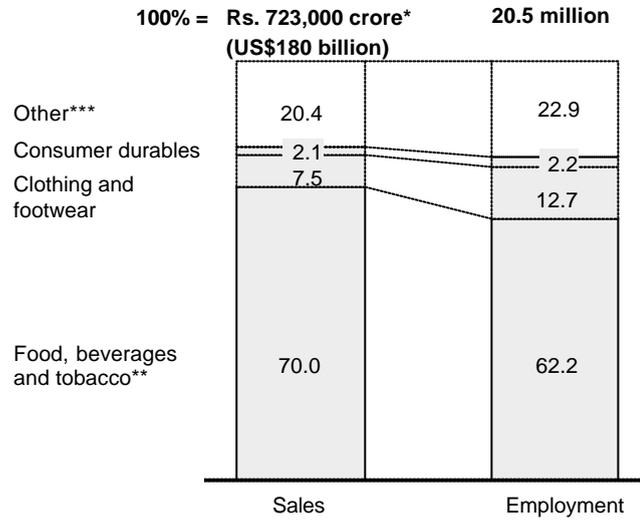
<b>Retail sales (\$ bn)</b>	<b>2325</b>	<b>100</b>	<b>~60</b>	<b>325</b>	<b>180</b>	<b>Retail employment (mn)</b>	<b>21</b>	<b>9</b>	<b>2</b>	<b>~40</b>	<b>~20</b>
-----------------------------	-------------	------------	------------	------------	------------	-------------------------------	-----------	----------	----------	------------	------------

Source: Central Statistical Organisation (India); China statistical yearbook; US economic census; MGI

Exhibit 3.2

**KEY RETAIL SEGMENTS, 1997**  
Per cent

Covered in study



\* At current prices; only expenditure on goods included

\*\* Beverages and tobacco covered as adjuncts to food

\*\*\* Includes fuel, furniture, books, stationery etc.

Source: CSO

Exhibit 3.3

**FORMAT DEFINITION: MODERN RETAIL FORMATS**

Format	Definition	Value proposition			Examples	
		Large selection	High service	Low price	India	Other countries
<b>Hyper/Super markets</b>	Large, self-service stores primarily selling food items	✓		✓	<ul style="list-style-type: none"> <li>Foodworld</li> <li>Nilgiri's</li> <li>Subhiksha</li> </ul>	<ul style="list-style-type: none"> <li>Wal-Mart</li> <li>Kroger</li> <li>Tesco</li> <li>Carrefour</li> </ul>
<b>Convenience stores</b>	Small food stores, open long hours and catering to basic needs		✓		<ul style="list-style-type: none"> <li>Convenio</li> </ul>	<ul style="list-style-type: none"> <li>7-Eleven</li> </ul>
<b>Department stores</b>	Large stores retailing branded goods in multiple non-food categories	✓	✓		<ul style="list-style-type: none"> <li>Shoppers Stop</li> <li>Ebony</li> <li>Westside</li> <li>Globus</li> <li>Pantaloons</li> </ul>	<ul style="list-style-type: none"> <li>Saks</li> <li>Marks &amp; Spencer</li> <li>JC Penny</li> <li>Macy</li> </ul>
<b>Specialty chains</b>	Chain stores focusing on a brand or product category		✓	✓*	<ul style="list-style-type: none"> <li>Benetton</li> <li>Levi's</li> <li>Bata</li> <li>Arrow</li> </ul>	<ul style="list-style-type: none"> <li>Gap</li> <li>Toys 'R' Us</li> <li>Benetton</li> <li>Circuit City</li> </ul>
<b>Upscale multi-brand</b>	Upgraded mom & pop stores selling branded general merchandise	✓	✓		<ul style="list-style-type: none"> <li>Snowwhite Square</li> </ul>	-
<b>Counter stores-urban</b>	Family-run stores		✓	✓	<ul style="list-style-type: none"> <li>'Kirana' stores</li> </ul>	<ul style="list-style-type: none"> <li>Neighbourhood mom &amp; pop stores</li> </ul>

\* Category killers

Exhibit 3.4

**FORMAT DEFINITION: TRADITIONAL RETAIL FORMATS\***

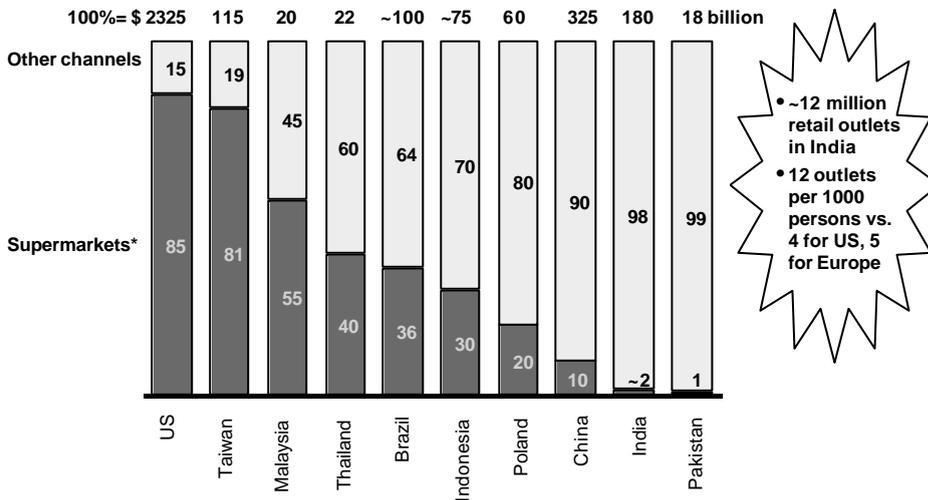
Format	Definition	Value proposition			Examples	
		Large selection	High service	Low price	India	Other countries
<b>Counter stores - rural</b>	Food: Family run stores, selling essentially food items		✓ • Credit • Home delivery	✓	• 'Kirana' stores	• Neighborhood mom & pop stores
	Non food: Retail multiple-often local-brands			✓		
<b>Kiosks</b>	Pavement stalls selling limited variety of food and beverages		✓		• Paan shops	
<b>Street markets</b>	Regular markets held at fixed centres retailing food and general merchandise items	✓		✓	• Village haats	• Bazaars (Poland) • Wholesale markets (Russia)
<b>Street vendors</b>	Mobile retailers essentially selling perishable food items - fruits, vegetables, milk, eggs, etc.		✓		• Vegetable vendors	-

\* Segment also includes government channels and consumer co-operatives

Exhibit 3.5

**SHARE OF SUPERMARKETS\* ACROSS COUNTRIES, 1998**

Per cent

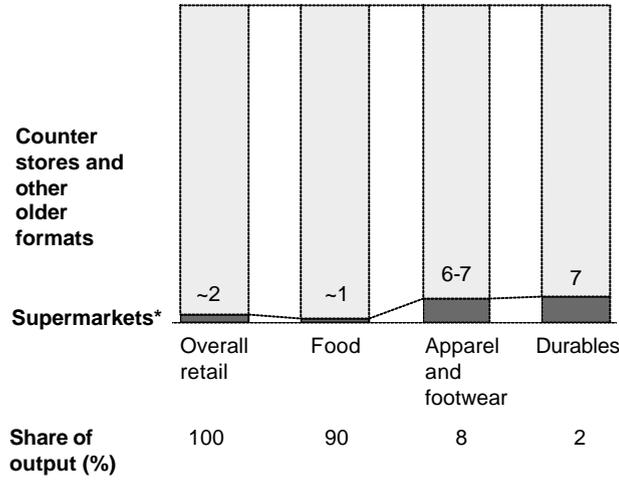


\* Includes supermarkets, hypermarkets, department stores and specialty chains

Source: Euromonitor

Exhibit 3.6

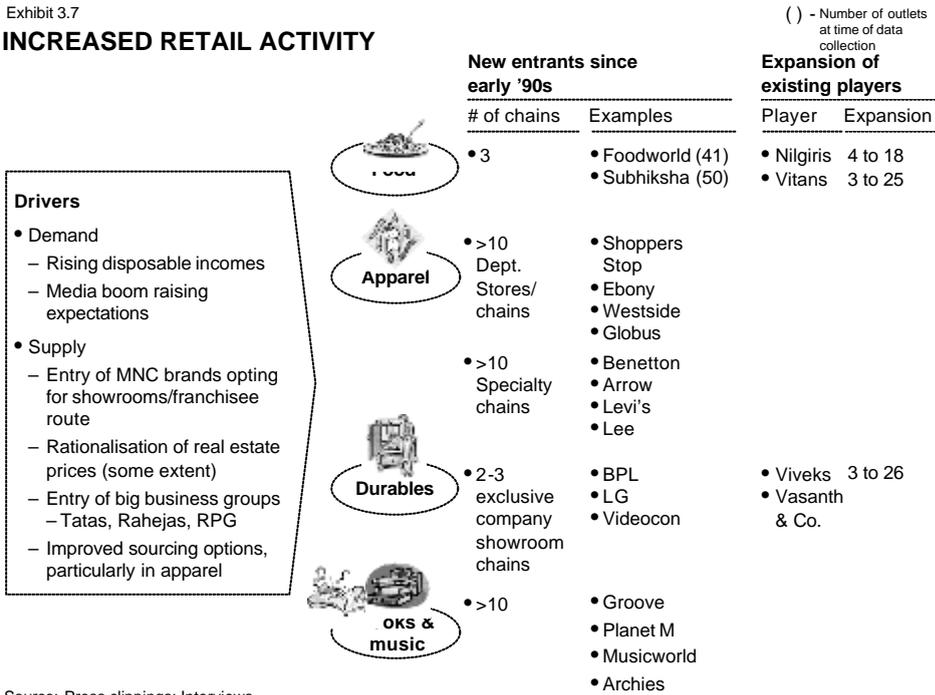
### PENETRATION OF SUPERMARKETS BY CATEGORY



\* Includes hypermarkets convenience stores and specialty chains  
 Source: Interviews; CSO; ORG-Rural consumer panel; ORG-retail census

Exhibit 3.7

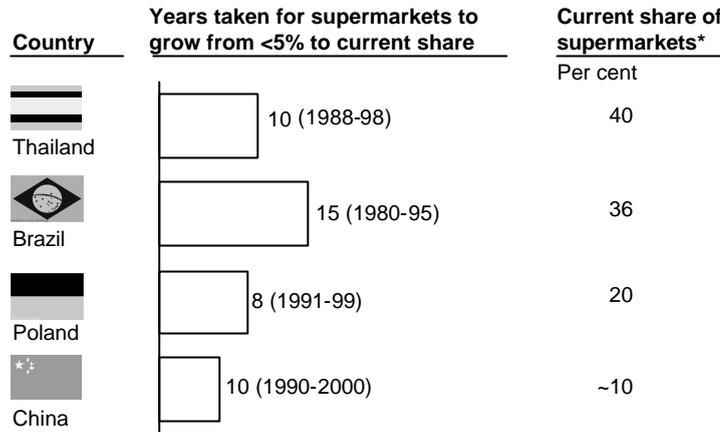
### INCREASED RETAIL ACTIVITY



Source: Press clippings; Interviews

Exhibit 3.8

### SPEED OF TRANSITION OF RETAIL IN BENCHMARK COUNTRIES



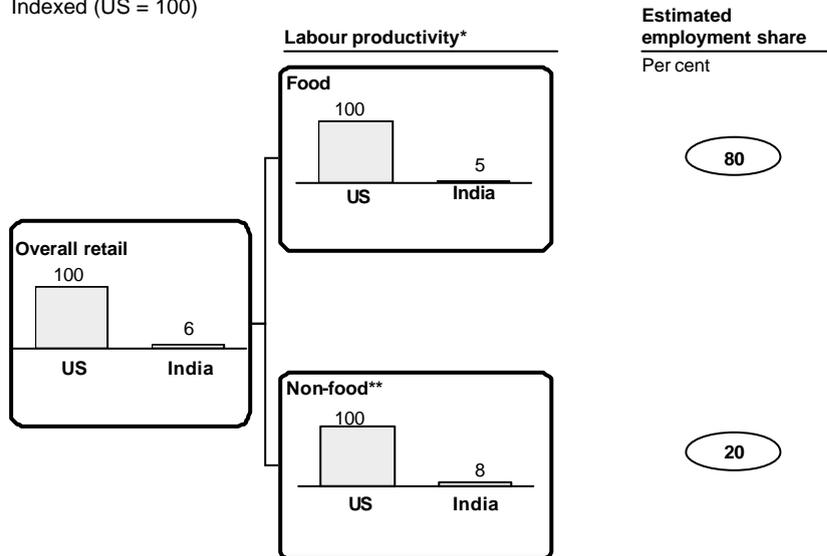
**India still at 2% five years after first signs of activity**

\* Includes hypermarkets, convenience stores and specialty chains  
Source: MGI; team analysis

Exhibit 3.9

### SUMMARY OF PRODUCTIVITY PERFORMANCE IN RETAIL

Indexed (US = 100)



\* Productivity defined as value added per labour hour. Rupees value added converted to \$ using GDP PPP for each segment. Special apparel PPP used as proxy for non-food retailing

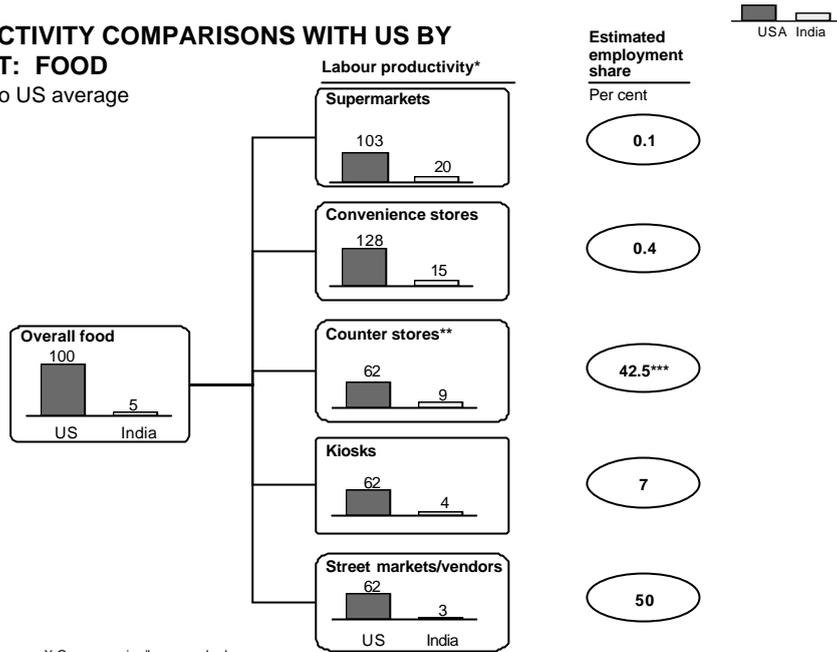
\*\* Apparel, footwear and durables

Source: Interviews; CSO New series (Employment Breakup); ORG-MARG Retailer Survey

Exhibit 3.10

**PRODUCTIVITY COMPARISONS WITH US BY  
FORMAT: FOOD**

Indexed to US average



\* Sales turnover X Gross margins/hours worked

\*\* Rural counter stores are a transition format, while urban counter stores are modern

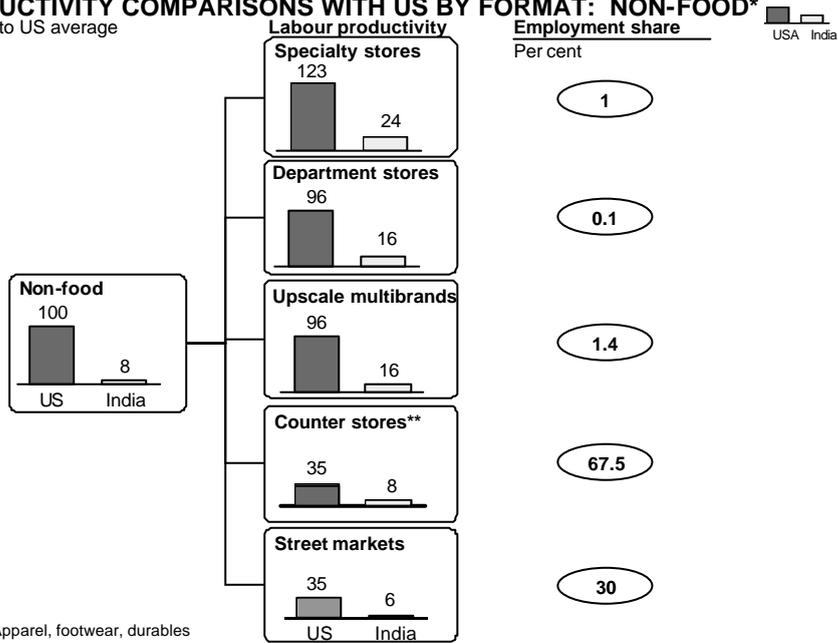
\*\*\* Includes 2.2% of government

Source: Interviews: MGI analysis: ORG-MARG

Exhibit 3.11

**PRODUCTIVITY COMPARISONS WITH US BY FORMAT: NON-FOOD\***

Indexed to US average



\* Apparel, footwear, durables

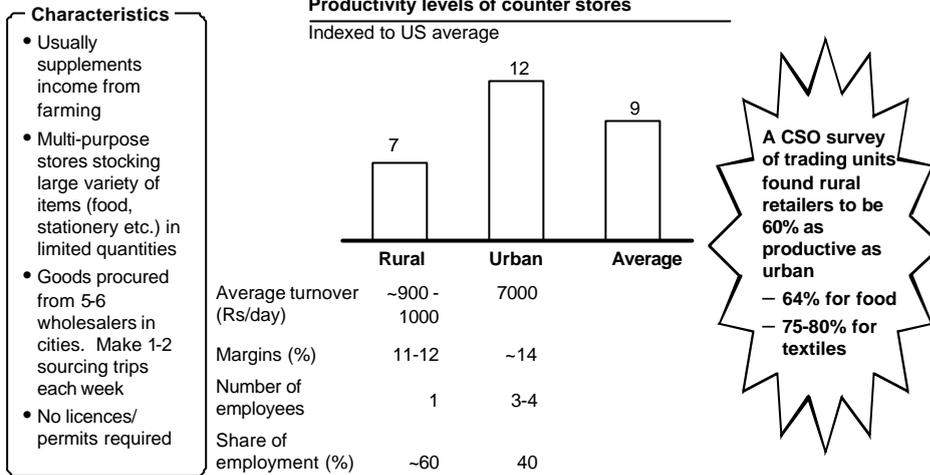
\*\* Rural counter stores are transition format, while urban ones are modern

Source: Interviews: ORG-MARG Retailer survey

Exhibit 3.12

### PRODUCTIVITY OF RURAL RETAILERS

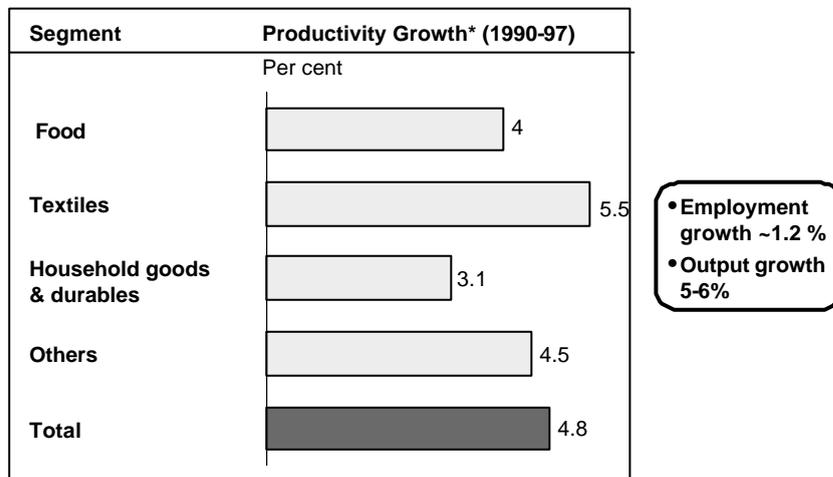
ESTIMATES



Source: Interviews; team analysis

Exhibit 3.13

### ESTIMATES OF LABOUR PRODUCTIVITY GROWTH

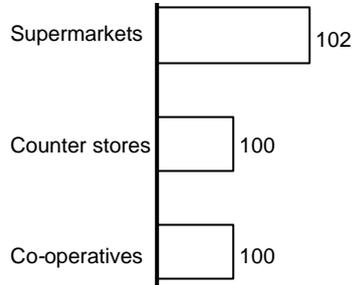


\* Value-added at real prices(1990)  
Source: NSSO surveys; team analysis

Exhibit 3.14

### COMPARISONS OF FOOD PRICES ACROSS RETAIL FORMATS

**Comparative prices of basket of goods\*: Branded**  
Counter stores = 100



Leading supermarkets have well defined pricing strategies

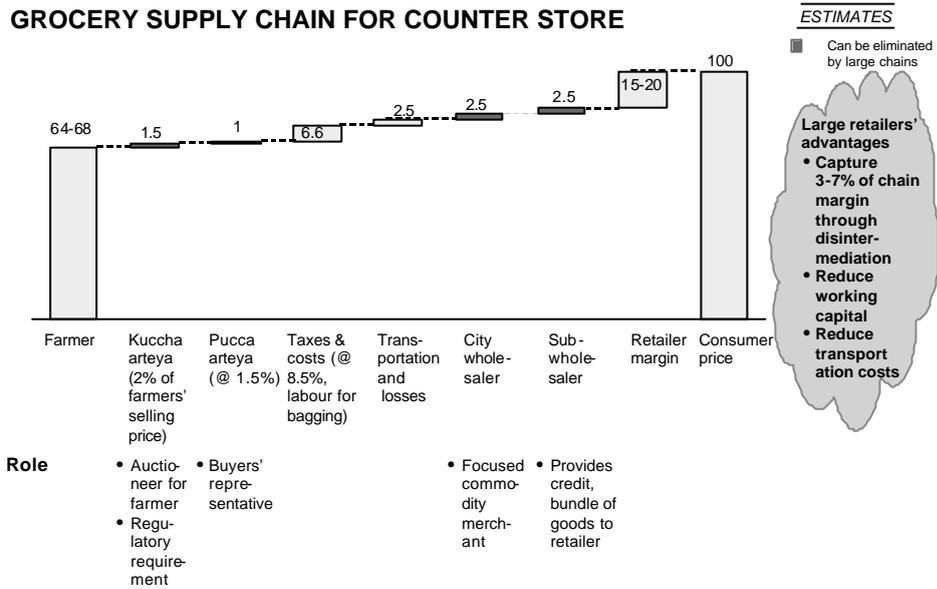
- **Foodworld**
  - Lowest price in market for key 5 SKUs in any category
  - “Our aim is to give customers a 14-15% saving on their monthly basket”
- **Subhiksha**
  - Average 9% discount on MRP
  - Publishes a fortnightly newsletter with comparative prices and special promotions

\* 13 branded food and FMCG products

Source: Interviews

Exhibit 3.15

### GROCERY SUPPLY CHAIN FOR COUNTER STORE

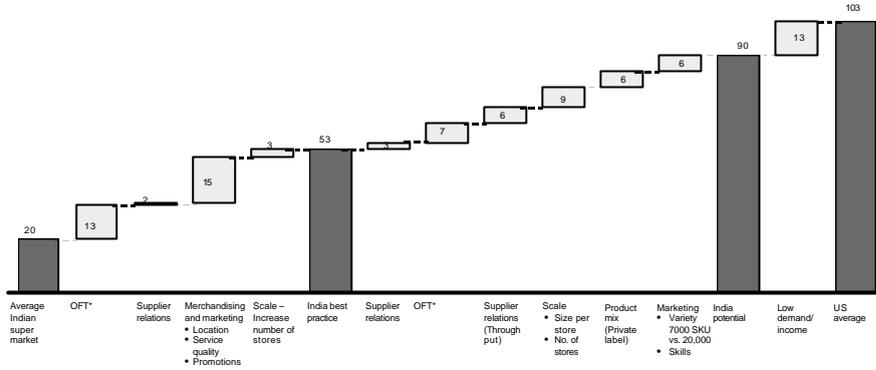


Source: Interviews; team analyses

Exhibit 3.16

### OPERATIONAL REASONS EXPLAINING THE PRODUCTIVITY GAP IN SUPERMARKETS

ESTIMATES



\* Organisation of functions and tasks

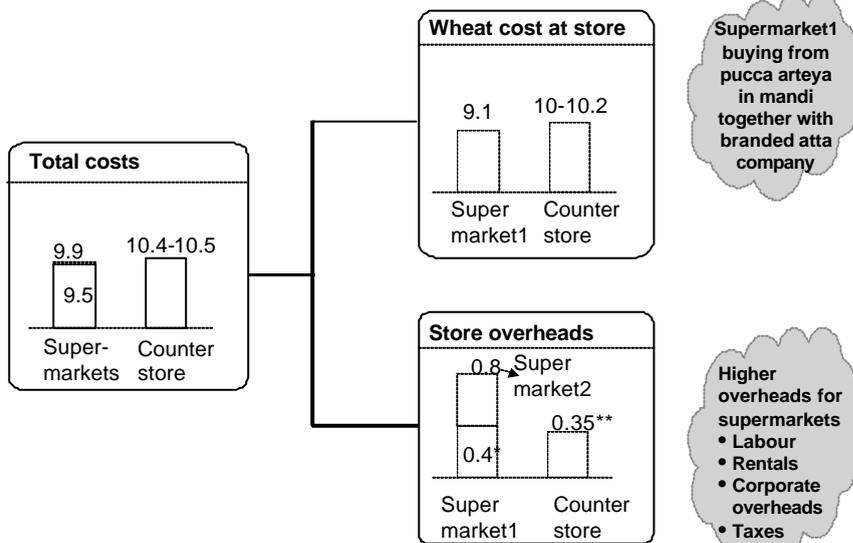
Source: Interviews; team analysis

Exhibit 3.17

### COMPARISON OF COSTS ACROSS FORMATS

Rs/kg

WHEAT EXAMPLE:  
CHENNAI



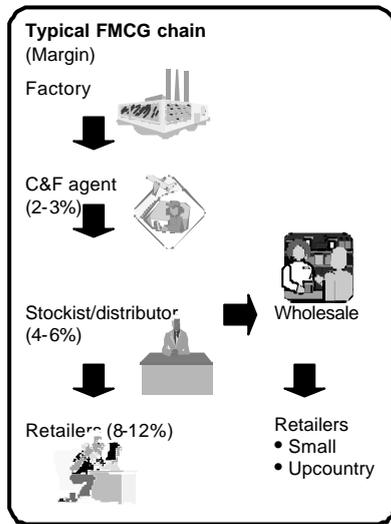
\* Including depreciation, not including interest and taxes

\*\* Owners salary accounted for at level of hired employee

Source: Interviews; team analyses

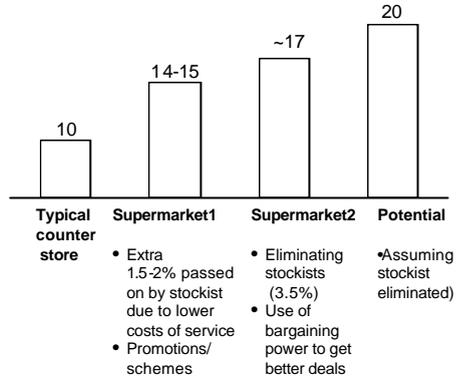
Exhibit 3.18

### COMPARISON OF COSTS ACROSS FORMATS: BRANDED GOODS



#### Gross margin on FMCG products

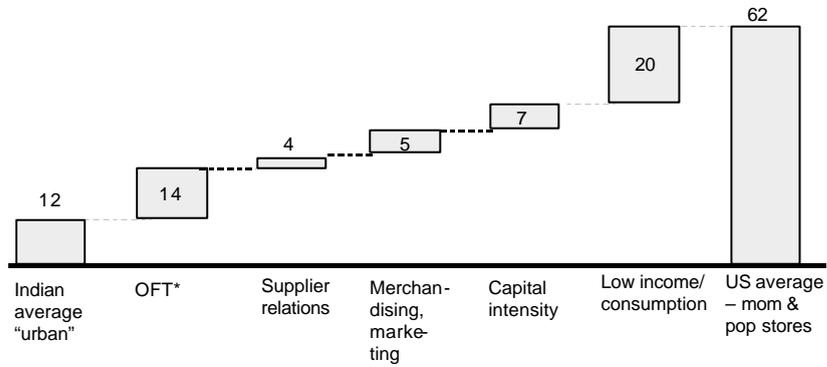
Per cent



Source: Interviews

Exhibit 3.19

### OPERATIONAL REASONS EXPLAINING THE PRODUCTIVITY GAP IN COUNTER STORES



\* Organisation of functions and tasks

Source: Interviews

Exhibit 3.20

### SUMMARY OF OPERATIONAL REASONS EXPLAINING PRODUCTIVITY GAP

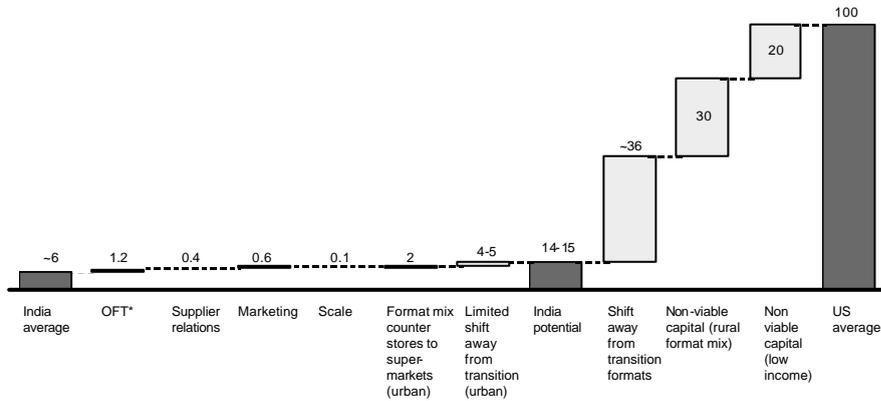
— Low  
○ Medium  
● High

Factors	Importance			Overall
	Supermarkets	Counter stores	Non-food	
• Operations				
– OFT*	●	●	●	●
– Capital intensity, technology use	–	○	–	–
– DFM**	–	–	–	–
– Capacity utilisation	–	–	–	–
– Supplier relations	●	○	○	○
– Marketing, merchandising	●	●	○	○
– Labour trainability	–	–	–	–
• Product/format mix	●	●	●	●
• Production factors				
– Lack of scale, viable investment	–	–	–	–
– Non-viable investment (low income)	–	–	–	●

\* Organisation of functions and tasks  
\*\* Design for manufacturing

Exhibit 3.21

### OPERATIONAL REASONS EXPLAINING PRODUCTIVITY GAP IN OVERALL RETAIL



\* Organisation of functions and tasks

Source: Literature searches; team analysis

Exhibit 3.22

## INDUSTRY DYNAMICS – KEY FACTORS FOR PRODUCTIVITY GAP

- Important
- Moderate importance
- x Unimportant

Factor	Food Retail	Non-food Retail	Importance
<b>Domestic competitive intensity</b>	<ul style="list-style-type: none"> <li>• Low                             <ul style="list-style-type: none"> <li>– Limited price based competition</li> <li>– Each counter store has established clientele often tied by credit</li> <li>– Absence of large scale competitors</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Moderate                             <ul style="list-style-type: none"> <li>– Greater competition - brands, specialty chains</li> <li>– Lower customer loyalty vs. food retail</li> </ul> </li> </ul>	●
<b>Exposure to best practice</b>	<ul style="list-style-type: none"> <li>• Low due to the absence of large global retailers</li> </ul>	<ul style="list-style-type: none"> <li>• Low                             <ul style="list-style-type: none"> <li>– Entry of branders-cum-retailers</li> <li>– Absence of global players</li> </ul> </li> </ul>	●
<b>Non-level playing field</b>	<ul style="list-style-type: none"> <li>• Moderate                             <ul style="list-style-type: none"> <li>– 'Non-enforcement' of laws for smaller retailers; tax, labor</li> <li>– Easier access to real estate for traditional retailers</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Low to moderate</li> </ul>	○

Source: Interviews

Exhibit 3.23

## EXTERNAL FACTORS EXPLAINING PRODUCTIVITY GAP

- Important
- Moderate importance
- × Unimportant

Factors	Importance	Description
• Macro economic barriers	×	
• Capital market barriers	×	• Access to capital
• Government ownership	×	
• Labor market barriers	○	• Restrictive laws, differential enforcement
• Product market barriers	●	• Restrictions on FDI • Non-level playing field e.g tax • Bureaucracy, legislation
• Land market barriers	●	• High cost of real estate
• Related industry barriers	●	• Underdeveloped upstream
• Infrastructure	×	
• Macroeconomic conditions – low demand	●	• Low incomes i.e smaller consumption basket

Exhibit 3.24

## ROLE OF FDI IN RETAIL EVOLUTION IN OTHER COUNTRIES

Country	Salience of FDI presence in retail	Examples	Attitude towards FDI
 Thailand	• 7 of top 10 retailers have significant foreign involvement	• Makro • 7-Eleven • Carrefour • Casino • Royal Ahold • Jusco	• Majority foreign ownership in retail permitted; limit to be raised to 100% under WTO
 China	• 3 of top 10 retailers have foreign equity	• Carrefour • Wal-Mart • 7-Eleven • Giordano • Nike	• Permitted since 1992 • Constraints – Only through JV, with local partners holding majority stake – Restricted to key cities and provincial capitals
 Poland	• 7 foreign hypermarket operators present • Specialty segment dominated by foreign chains	• Carrefour • Tesco • IKEA • Levi's	• FDI permitted since 1992
 Brazil	• Top 3 players (30% share) have foreign equity	• Carrefour • Casino • Ahold	• FDI permitted

**FDI in pure retail not permitted in India**

- Local players learning a complex business
  - Sourcing
  - Merchandising
  - Inventory management
- Risk averse behaviour  
“We opted for supermarkets instead of hypermarkets due to the risk”
  - Indian retailer

Source: MGI

Exhibit 3.25

## UNDERDEVELOPED UPSTREAM INDUSTRIES

Category	Characteristics	Implications for modern retail
Food processing	<ul style="list-style-type: none"><li>• Small scale/unorganised units account for 75% of output</li><li>• ~17 items reserved for SSI e.g., bread, confectionery*, pickles and chutneys</li></ul>	<ul style="list-style-type: none"><li>• Limited brands, products available</li><li>• Complexity in sourcing</li><li>• Higher product and sourcing costs – difficult to build scale</li><li>• Permits tax evasion by small retailers</li></ul>
Apparel	<ul style="list-style-type: none"><li>• Manufacture for domestic market reserved for SSI**</li></ul>	

\* Excluding chocolates, toffees

\*\* Large units that export more than 50% of their output are allowed to sell the balance in the domestic market

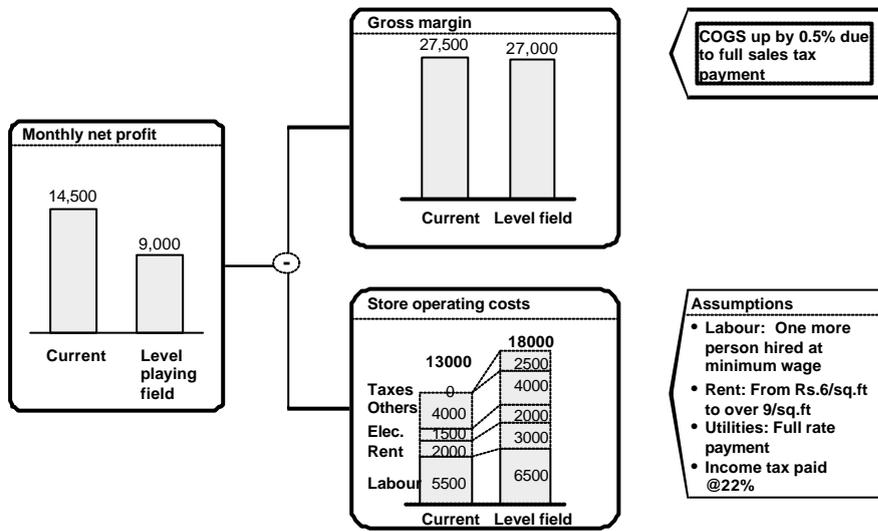
Source: Report of expert committee on small enterprises; literature search

Exhibit 3.26

### COST IMPLICATIONS OF NON-LEVEL PLAYING FIELD FOR COUNTER STORES

URBAN  
EXAMPLE

Rs. per month

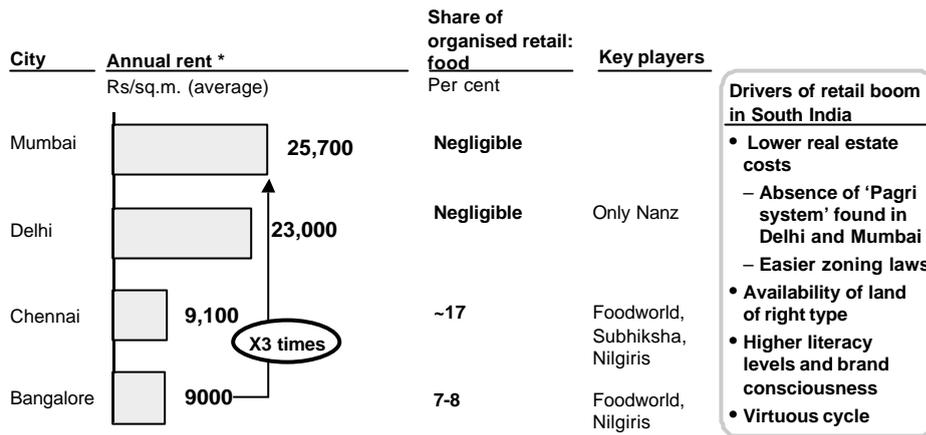


Source: Interviews



Exhibit 3.27

## REAL ESTATE PRICES IN KEY INDIAN CITIES



\* Central Business District

Source: Colliers Jardine, Asia Pacific property trends; Literature searches; interviews



Exhibit 3.28

**EXTERNAL BARRIERS CONSTRAINING OUTPUT**

- Important
- Moderately important
- × Unimportant

<u>Factors</u>	<u>Productivity barrier</u>	<u>Output barrier</u>
• Macro economic barriers (e.g., inflation)	×	×
• Capital market	×	○
• Government ownership	×	×
• Labour market	○	×/○
• Product market barriers	●	●
• Landed market barriers	●	●
• Related industry barriers	●	●
• Infrastructure	×	○
• Macroeconomic conditions – low demand	●	●

Exhibit 3.29

**DEFINITION OF SCENARIOS FOR THE FUTURE OUTLOOK OF RETAIL**

<u>Element</u>	<u>Scenario 1 Status quo</u>	<u>Scenario 2 Reforms in retail alone</u>	<u>Scenario 3 Full economic reforms</u>
<b>GDP growth rate (per capita, %)</b>	4	4	8.6
<b>Retail output growth (per cent)</b>	4.5	6	10
<b>Policy changes undertaken</b>	<ul style="list-style-type: none"> <li>• Uniform sales tax</li> <li>• Retail recognised as industry</li> </ul>	<ul style="list-style-type: none"> <li>• FDI permitted</li> <li>• Rent Control Act enforced</li> <li>• Flexible labour laws introduced</li> <li>• SSI relaxed; other sourcing constraints eliminated</li> <li>• Incentive for infrastructure development</li> <li>• Availability of govt. land</li> </ul>	<ul style="list-style-type: none"> <li>• Scenario 2 reforms</li> <li>• All other sectors reformed</li> </ul>
<b>Share of modern formats (per cent)</b>			
• Value added	8	20	30
• Sales	6	16	23

Exhibit 3.30

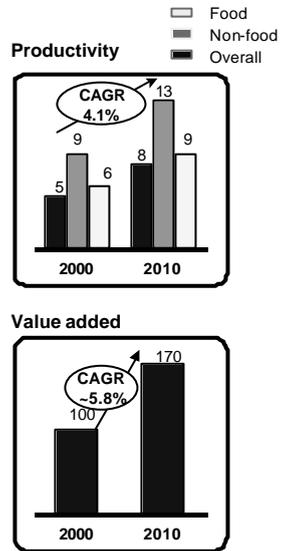
### FUTURE OUTLOOK FOR INDIAN RETAIL

Scenarios	Productivity indexed to US average	Retail value added, CAGR (per capita) Per cent	Employment CAGR Per cent
Current	6	4	1.2
Status quo	9	4	1.2
Retail reformed	11	4.9	0.2
Full economic reform	14	11	3.2

Exhibit 3.31

### FUTURE OUTLOOK - STATUS QUO

Assumptions
<ul style="list-style-type: none"> <li> <b>Output growth</b> <ul style="list-style-type: none"> <li>- GDP per capita continues to grow at 4.2% per year</li> <li>- Retail sales maintain past growth rate of 4.5% per year; as seen in other countries, sales growth lags GDP growth slightly</li> <li>- Value-added in retail grows faster at 5.5% (4.0% in per capita terms)</li> </ul> </li> <li> <b>Format evolution</b> <ul style="list-style-type: none"> <li>- Modern formats achieve 8% share (6% of sales)- as retailers expand and new firms enter; driven by non-food and specialty chains in particular</li> <li>- Supermarkets/hypermarkets obtain 6% share of urban food sales (8% of value added); specialty chains and department stores grow share to 10% and 7.5% respectively</li> <li>- Rural retailing remains unchanged</li> </ul> </li> <li> <b>Productivity evolution</b> <ul style="list-style-type: none"> <li>- Modern formats double productivity - lack of skills amongst local retailers and weak competition keep performance lower than potential</li> <li>- Counter store productivity grows with sales</li> </ul> </li> </ul>



Source: Team analysis

Exhibit 3.32

### FUTURE OUTLOOK – REFORMS IN RETAIL ALONE

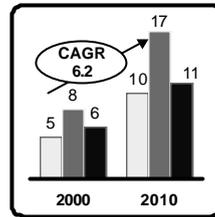
**Assumptions**

- Output growth**
  - GDP per capita continues to grow at 4.2% per year as only retail undergoes reforms
  - Retail sales match GDP growth and value added in retail grows at 6.5% per year as modern formats gain share
- Format evolution**
  - Modern formats grow share to 20%(16% of sales) in 10 years - similar to what Poland achieved when it restructured its retail sector
  - Supermarkets account for 30% of urban food sales and specialty chains and department stores for 25% and 15% of output respectively
- Productivity evolution**
  - Modern formats achieve 70% of US average as best practice players enter industry as seen in other countries
  - Urban counter stores double productivity, driven to perform under pressure
  - Rural counter stores increase productivity by 50% due to some indirect pressure but driven by growing demand and consumption

Source:Team analysis

Food  
Non-food  
Overall

Productivity



Value added

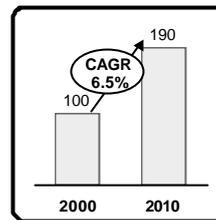


Exhibit 3.33

### FUTURE OUTLOOK – REFORMS IN ALL SECTORS

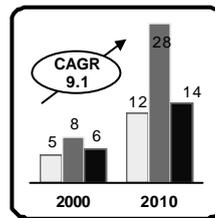
**Assumptions**

- Output growth**
  - GDP per capita grows at 8.6% per year driven by reforms across sectors
  - Retail value added grows at close to 12.5% per year (11% per capita)
- Format evolution**
  - Modern retailers grow share to 30% - similar shares seen in countries with comparable per capita incomes (Indonesia and Thailand)
  - 30% of urban food sales and 35% of non-food sales to be accounted for by modern retailers
- Productivity evolution**
  - Modern formats achieve close to potential (80% of US) driven by the presence of global best practice players
  - Urban counter stores increase productivity (32% of US) with rising incomes and pressure from supermarkets

Source:Team analysis

Food  
Non-food  
Overall

Productivity growth



Value added

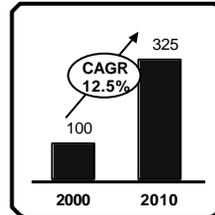


Exhibit 3.34

## POLICY RECOMMENDATIONS

### Suggested change

---

**Attract skills**

1. Permit FDI in retail

**Create  
support  
infrastructure**

2. Remove supply chain bottlenecks

- SSI restrictions
- Constraints on food grain movement and direct purchase from farmers

3. Introduce single window clearance for retail at local level

4. Remove land market barriers

- Liberalise tenancy laws
- Make zoning laws more flexible
- Restructure finances of municipal bodies to facilitate development of urban infrastructure
- Release government land for development

**Ensure level  
playing field**

5. Simplify tax structure

- Uniform sales tax
- Eliminate octroi

6. Allow greater flexibility in labour laws

7. Strengthen enforcement of laws and tax collection among small retailers

# Software

## SUMMARY

Software services and product development has been one of India's most successful industries in the last 5 years. Accounting for 0.6 per cent of India's GDP and 0.1 per cent of employment, the sector has grown rapidly from a handful of companies in the late 1980s to over a thousand large companies and hundreds of thousands of employees today. While the US\$ 2.2 billion output (excluding "onsite" services) of this sector is equally provided by its exports and domestic markets, two-thirds of its 210,000 employees work in the domestic market and only a third in the export market. This sector is the most productive, relative to the US, of all the sectors we have studied and is an excellent case example of how companies can almost optimise their productivity potential in the absence of product market barriers and government ownership.

We believe that the sector can increase its productivity performance still further and ensure its continued growth if a few reforms are carried out. Specifically, the government should:

- ¶ **Increase the output of high quality software students:** The government should increase capacity in high quality universities and ensure that there is no bottleneck to the continued growth of the industry.
- ¶ **Attract high quality teaching talent:** The government should improve the compensation structure and put in place mechanisms to attract and retain high quality software teaching talent.
- ¶ **Upgrade urban infrastructure in software hubs:** The government should invest in upgrading the infrastructure in software hubs and make them world-class cities. This will reduce the attrition to other countries and ensure sustained growth in the industry.

If these reforms are carried out and if the economy grows at 10 per cent a year, which we expect if our recommended reform programme is undertaken, the software sector will continue on its aggressive growth path and become a US\$ 46 billion industry by 2010.

## **Productivity performance**

The software industry has the highest productivity levels of all the sectors studied. Its overall productivity is estimated to be 44 per cent of US levels. While the productivity in software services is 50 per cent, the overall productivity is brought down by the poor performance of software product companies, which are at 12 per cent of US levels.

The productivity levels of best practice companies in services are as much as 100 per cent of the US average. In fact their onsite operations in the US and other countries can reach productivity levels of almost 150 per cent, which is comparable to the productivity levels of large services companies in the US such as Accenture or EDS.

## **Operational reasons for low productivity**

At the operational level, we look separately at the reasons for the productivity gap between average and best practice companies in India for each segment – services and products.

For services companies, the main reasons for this gap are: (a) poor organisation of functions and tasks (OFT) within software development centres; (b) lower value-added product mix on average; and (c) lack of a good brand name. Given India's significant advantage as a source of low-cost software professionals, it is likely to continue to dominate the lower-value end of the global software services market. Therefore, even though several companies will reach productivity levels comparable to or even exceeding the US average, there will always be many more at the lower end, thus keeping India's productivity largely at current levels, increasing marginally to reflect the improved OFT and branding.

For products companies, the main reason for low productivity is the lack of scale. Software product companies enjoy increasing returns to scale and hence Indian companies have to improve their scale of operations in order to improve their productivity. This is very consistent with our findings from Russia and France where products companies suffer from the same scale disadvantages.

## **Industry dynamics**

On analysing the dynamics of the industry, it becomes clear that the main reason for the low productivity of Indian companies as compared to the US is the absence of entry barriers to the industry. As a result, despite increasing competition in the market and the adoption of global best practices in quality and process

standardisation by best practice companies, there will be new companies with low cost labour entering the low-value end of the market. While this will keep the productivity level low, it will also sustain the aggressive growth of the export industry, which thrives on the high labour cost differential between India and the developed world.

### **External factors responsible for low productivity**

Although the biggest external barrier to growth in productivity for the Indian software services industry is the low wage level, it is also the single most favourable factor for growth in output and will continue to allow Indian services companies to grow at an aggressive growth rate of almost 30 per cent a year for the next 10 years.

In the products segment, the lack of a sophisticated, domestic end-user industry (due to problems associated with the rest of the modern sector industries) makes it very difficult for Indian companies to achieve minimum scale and become globally competitive. The poor enforcement of Intellectual Property Rights legislation is another factor constraining the growth of the products industry. Furthermore, although the supply of software professionals has so far not been a hindrance to the industry's continued growth, it could well become its biggest barrier.

### **Industry outlook**

The export potential of the Indian software industry (excluding onsite services) is estimated to reach around US\$ 25 billion by 2010. India is likely to gain a 50 per cent share of the legacy services market as well as make an aggressive entry into new generation services. The domestic market is expected to grow at nearly 30 per cent a year, reaching US\$ 21 billion by 2010. This phenomenal growth is expected to lead to the creation of over 2 million additional entry-level jobs and an increase in demand for experienced project managers from the current level of 50,000 to over 200,000. The current output of Indian universities and private training institutes might be able to meet the demand for entry-level programmers. However, the migration of experienced professionals to the US and other developed markets could lead to a shortage of project leaders and managers by 2010, thus severely hampering growth.

### **Policy recommendations**

The output of software professionals from the educational system has to be increased dramatically to meet the growing needs of the Indian industry.

Increasing the admission quota in engineering colleges for disciplines like computer science and encouraging the creation of private colleges focusing on computer science would help build a workforce large enough to match demand. The government should also take initiatives to attract and retain high quality talent to teach software courses in the universities. Improving the urban infrastructure in software hubs would also help retain this workforce in India.

# Software

The software case is important from the perspective of this study because it profiles the success of an industry that has so far been free of product market barriers and government ownership. Although the industry has grown at over 50 per cent every year for the last 5 years and created thousands of high paying jobs, competition from other countries has been increasing. Keeping this in mind, it is important to study the productivity levels in the industry, the competitive dynamics and the external factors affecting output and productivity growth in order to understand whether the current growth is sustainable or not.

Software productivity in India is the highest across all the sectors studied. It does, however, lag behind its potential. This is primarily due to the low cost of entry-level programmers in India. As a result, even though Indian best practice companies are continuously improving their productivity to match global levels, new companies continue to enter at low levels of productivity. While this does ensure that productivity remains low, it is also the key reason behind the explosive growth of the industry and will continue to sustain such growth over the next 5-10 years.

Although the industry is typically divided into two distinct segments – the domestic market and the export market – for the purposes of this study we have focused on the domestic market. This includes the offshore market – that part of the market outside India, which can be serviced by professionals working out of India and encompasses approximately 40 per cent of the export market in terms of revenues and 70 per cent in terms of employment. The rest of the export market is accounted for by “onsite services”, which are services rendered by software professionals from Indian companies working in other countries. Although Indian companies would probably consider this a significant proportion of revenue, we have excluded it from our calculations because it is part of the software industry of the end-user country. We must note, however, that onsite services could help significantly in financing India’s trade deficit through the transfer of corporate and personal savings.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance

- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

Software contributes about 0.6 per cent to India's GDP and accounts for 0.1 per cent of India's employment. The industry grew dramatically, at over 50 per cent a year, over a 5-year period, to reach US\$ 2.2 billion by 1999. Furthermore, by 2000, it was estimated to have reached as much as US \$3.1 billion (**Exhibit 5.1**). This included a growth rate of 68 per cent in exports and about 32 per cent in the domestic market.

The software industry in India (both the domestic and offshore markets) is segmented into products and services (which account for 82 per cent of employment). The services segment dominates the market and has done so since 1996 when the demand for Y2K services first exploded. The number of services companies grew rapidly from just a handful in 1995 to over 1,000 in 1999. Today, services account for over 75 per cent of output (**Exhibit 5.2**). As a result of this uneven and rapid growth in the services segment, there has been a complete lack of focus on the products and packaged software segments. The lack of a well-developed domestic industry has also played its part in limiting the growth of products companies.

## **PRODUCTIVITY PERFORMANCE**

The labour productivity of Indian software companies is at 44 per cent of US levels (**Exhibit 5.3**). This is driven by the services companies, which even in 1998 were at productivity levels of US\$ 58,000 per year per person, 50 per cent of US levels in the services segment. While this is the highest productivity level seen across all the sectors studied, individual services companies have the potential to reach much higher levels: 100 per cent of US levels. In fact, best practice companies in India already match the US average.

Products companies on the other hand are at much lower levels of productivity, at only 12 per cent of the US average of US\$ 305,000 per year per person. We must note, however, that the US average for products is much higher than the US average for services companies, which is only US\$ 115,000 per year per person. This is because products companies like Microsoft have increasing returns to scale and very high levels of productivity. Notwithstanding this, Indian companies are still performing far below their potential, which we have estimated to be 50 per cent of the US average.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

This section explains the main reasons for the differences in productivity at the operational level. Since the issues that surround software services and products at the operational level are entirely different, we will need to look at each of them separately.

### **Low productivity in software services**

The productivity of the average Indian services company is only half that of best practice companies (which are at US levels). This difference in productivity is caused by a number of operational factors acting simultaneously (**Exhibit 5.4**). The most important of these are: (a) differences in the organisation of functions and tasks (e.g., the average capacity utilisation of billable employees); (b) the ratio of senior resources to entry-level programmers and the standardisation of processes; (c) the product mix of the average Indian company which is biased towards low value-added work; and (d) the lack of a global brand name for average Indian companies. We discuss each of these operational factors in detail (listed in order of ease of implementation for individual companies):

- ¶ **Organisation of functions and tasks (OFT):** While Indian companies have focused on growth, average capacity utilisation in Indian companies has been at around 65 per cent compared to 80 per cent in best practice companies. Another element of OFT that has resulted in penalising Indian companies is the higher attrition rates of employees, which are driven by the low wage levels in India combined with the intense demand for software professionals (**Exhibit 5.5**). Although the problem is widespread, it is only best practice Indian companies that have succeeded in addressing it by designing attractive employee retention programmes including stock options and performance-linked bonuses.

¶ **Product mix differences:** Indian companies pay a heavy productivity penalty for the high component of low value-added services in their product mix. The penalty arises because almost a third of their revenues are generated from the domestic services market, which is intrinsically lower value added. In addition, Indian companies are unable to move up the value ladder in the export market for a variety of reasons.

- **Lack of investment in IT:** The Indian end-user industry has traditionally not invested in IT. As a result, the domestic services market is characterised by old and commoditised technologies, leading to low charge rates. For example, one software CEO complained about the fact that most Indian banks are still web-enabling their current businesses and are very far from operational Internet banking. Other CEOs cite examples of large government-owned companies that are only now implementing ERP systems, which at present are commoditised and command very low charge rates.
- **Lower value-added segments:** Moreover, Indian companies also compete in inherently lower value-added segments of the global services market. This happens for two reasons. First, it is easier for clients to outsource parts of the value chain that are related to the maintenance of large mainframe systems and other legacy systems, where technology is stable and projects have long timeframes. The portfolios of Indian companies are, therefore, dominated by such projects. Second, Indian companies typically face a shortage of senior resources like project managers and domain experts. They are thus less equipped to do higher value added activities like developing IT strategy or creating high-level design parameters for projects. Currently, the average Indian company has one project leader per 15 entry-level programmers, compared to one per eight in best practice companies.

We should note, however, that the pressure of rising wages for good software talent puts continuous pressure on software companies to constantly climb the value ladder and improve on average charge rates. As a result, we expect that although companies will keep moving up the value ladder, there will at the same time be a constant stream of new companies coming in at the lower end, employing lower cost resources and providing lower value-added services. The net result of this will be that average productivity will continue to be low, driven by a lower value-added product mix. Paradoxically, however, this helps the current healthy output growth of the Indian

software industry and will continue to do so until wage rates in India cease to be the lowest in the world.

¶ **Branding premium:** Companies have traditionally outsourced their IT requirements to services companies in their own countries. While cross-border outsourcing is now becoming more popular, Indian companies on average still suffer from a lack of brand recognition. Two important reasons for this are:

- **Weak front-end sales teams:** Indian companies have weak front-end sales teams, which lack skills in consultative selling and have low domain knowledge. These teams are also typically not culturally sensitive and as a result come across poorly to clients in Europe and North America which are the major markets
- **Risk perception:** Many companies in the West have still not changed their perception that outsourcing to a country like India, which is halfway across the world, is risky. To overcome this perceived risk, average Indian companies have to continue to offer a discount on the rates that an average company in the same geography would offer. Only leading Indian companies have managed to deal with this by having front-end organisations in each geography.

Consequently, very few Indian companies have managed to shed the image of themselves as low-cost body shops and branded themselves in the eyes of customers as companies that can understand business problems and provide technology solutions.

### **Low productivity in software products**

Productivity in Indian products companies is 12 per cent of the equivalent US levels. Productivity growth in products is almost entirely driven by increasing returns to scale. Therefore, most of the gap is accounted for by the small size of Indian products companies vis-à-vis large US products companies like Microsoft and Oracle (**Exhibit 5.6**). Best practice Indian companies, which focus primarily on the exports market, are at 20 per cent of US levels. The key difference between such companies and the US average is scale. We explain this in more detail.

¶ **Low scale in the domestic market:** On average, domestic products companies are extremely small and sub-scale, which accounts for their low productivity. The difference in productivity between a company focused on products for the domestic market and one focused on the exports market is as high as 10 percentage points of the US average. This

can be linked directly, as will be discussed later, to the inadequate piracy laws in India.

- ¶ **Low scale in export-focused companies:** Productivity of best practice Indian products companies is only 20 per cent of the US average. This is despite the fact that they are completely export focused. The key reason for this is that Indian companies are sub-scale even when compared to small companies in the US and other developed markets. As a result, they lack the market intelligence of companies in the West, leading to long product lifecycles and obsolete products. This further preys upon their market intelligence, and a vicious cycle is set in motion. There is also a direct penalty because Indian companies have smaller distribution networks. For example, an ERP products company based in India has a network of about 20 branches around the world, while a comparable small-sized company in the US has a network twice as large. This situation is expected to improve over the next few years as Indian companies grow in size and build strong marketing teams in developed markets. Early moves are already visible as Indian companies attempt to acquire companies with strong sales and marketing teams in the US and other markets.

Smaller companies in the West have productivity levels that are 50 per cent of the US average (**Exhibit 5.7**). The systems software and mass markets are dominated by a few big names such as Microsoft, Oracle and SAP, which result in raising the overall industry average. As a consequence, it is extremely difficult, even for products companies based in developed markets, to reach the US average because the big players have virtually locked them out of these attractive market segments. In fact it would take significant investment by a products company to get even a foothold in the operating systems market or the desktop packaged goods mass market. It is unlikely that Indian companies will be able to afford such an investment over the next 10 years. Therefore, they are likely to be limited in potential to about 50 per cent of the US average productivity. .

## **INDUSTRY DYNAMICS**

Driven by the ever-higher wages being offered for the best programmers, best practice Indian companies continue to improve their productivity levels and charge higher rates. However, due to the low cost of labour at the entry level, companies continue to enter the low end of the value ladder. As a result, despite increasing competition at the high end and sufficient exposure to best practice, average

Indian productivity remains almost constant at its current low level (**Exhibit 5.8**).

- ¶ **Low but growing competitive intensity:** As discussed earlier, Indian companies set prices that are at a discount when compared to international prices to attract developed-market clients looking to outsource their IT requirements. Although these clients do not yet feel the pressure to cut costs and improve productivity because of low wages in India, this is changing gradually as emoluments for high-quality software programmers rise. Best practice companies that employ large numbers of software engineers are under pressure to keep increasing their productivity levels. This is necessary for them to maintain their current margins, especially as wages are increasing by more than 20 to 25 per cent every year (**Exhibit 5.9**). Adding to this pressure is the scarcity of good quality experienced talent to lead project teams and carry out top-level design work.
- ¶ **Adequate exposure to best practice:** Most large Indian services companies have achieved very high levels of process standardisation, often better than the US average. Over three-fourths of the companies worldwide to have achieved CMM Level 5 certification (the highest level of the most widely accepted certification issued by Carnegie Mellon University, achieved so far) are Indian. Large global players like Microsoft, Oracle and Cisco are also setting up large software development centres in India. Lack of exposure to global best practice is therefore clearly not responsible for the lower productivity levels of Indian services companies.
- ¶ **Low barriers to entry:** Given the abundance of low cost programming talent in India, we expect small Indian companies to continue to enter at the lowest end of services. Entering as a low cost competitor is the easiest option for such companies, which do not have strong capabilities in any industry or technology domain. As a result, while there will be best practice companies that reach and exceed US productivity levels, the average for India will continue to remain at the current low level.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

In this section we discuss how external factors combine to keep productivity in India low, when compared to that of the US. Low wages is the single largest external factor contributing to India's continued low productivity and,

simultaneously and paradoxically, high output growth. Another very important external factor is the lack of a sophisticated end-user industry, which results in the small scale of Indian products companies as well as the low value-added product mix of services companies. These factors, together with the high piracy rate in India, are responsible for the low productivity of Indian companies (**Exhibit 5.10**).

¶ **Macro-economic conditions – low wages:** India has a large supply of English-speaking software professionals, available at very low wage rates compared to the worldwide average. As a result, India is well positioned to provide outsourced software services to the world market. Given its low-cost position, it is also favourably positioned vis-à-vis countries like Ireland and Mexico that are also competing for the outsourced services market. Therefore, the Indian product mix will continue to consist mainly of maintenance work on mainframe systems and other legacy systems, which is typically outsourced. Given that these are low value-added areas, average productivity levels will continue to be low.

¶ **Related industry barriers – lack of a sophisticated end-user industry:** The Indian end-user industry is not very sophisticated in its use of IT. In fact, overall IT expenditure contributes not more than 0.5 per cent of GDP compared to over 4 per cent in the US (**Exhibit 5.11**). Since most of the modern sector is government owned, the adoption of IT in business and manufacturing processes has been slow, and many companies in India are still catching up with their counterparts in the developed world in terms of IT-enabling their business processes. As a result, the software services requirements of most of these companies is still largely in basic data processing and ERP implementation, which command lower charge rates as they have become commoditised services. This, in turn, leads to a lower value-added product mix for those Indian companies that serve the domestic market.

A well-developed end-user industry is also critical to the development of the products industry. It has been observed worldwide that countries that have very advanced end-user industries have also developed the best software products in that area. For example, the UK is reputed to have the best financial software products while France is noteworthy for its airline software. The fact that India does not have a sophisticated end-user industry in any area is therefore a natural disadvantage for products companies, since they remain sub-scale as a consequence.

¶ **Product market barriers – lack of enforcement of IPR:** Piracy rates in India are 60 per cent, which is substantially higher than the US rates of

25 per cent. This is primarily due to the weak enforcement of Intellectual Property Rights (IPR) laws. Piracy translates into lost revenues for products companies. If piracy rates were brought down to US levels, products companies could be 87.5 per cent more productive (**Exhibit 5.12**). While the direct impact of this would be a virtual doubling of current productivity in products, the indirect impact would be even greater – higher returns on investments in research and development, increase in scale and dramatically improved productivity.

While the factors listed earlier affect current productivity levels, we expect the shortage of experienced software professionals to be the biggest external barrier to the continued strong growth of the industry.

At current growth rates, India will require around 2 million entry-level programmers and 200,000 high quality senior resources by 2010. We expect the Indian industry to grow at nearly 30 per cent a year to reach US\$ 46 billion by 2010. This will be accompanied by a marginal increase in productivity of around 7 per cent, for the reasons discussed earlier. Consequently, employment will grow at 23 per cent a year leading to a requirement of over 2 million entry-level programmers by 2010 (**Exhibit 5.13**).

However, at the current levels of output of computer science and engineering graduates, we estimate a shortfall of almost 35 per cent in meeting the demand for senior resources. Of the 95,000 new, high quality professionals that graduate annually from Indian colleges, only 35,000 are likely to be available to software companies each year (**Exhibit 5.14**). The addition of these 35,000 new graduates each year to the current stock of around 100,000 programmers will be insufficient to meet the demand for 200,000 project leaders in 2010 as a large percentage are likely to emigrate to other countries. Even the government's current plans for education will yield only modest increases and are unlikely to meet the expected demand. The situation is further aggravated by the fact that companies from developed markets (particularly the US) have started luring away large sections of this pool for their home markets (**Exhibit 5.15**). The rapid rise in wages of senior resources is an indication of their increasing scarcity. For instance, while average software wages grew by 25 per cent in 2000, the wages of senior resources increased by more than 60 per cent.

## **INDUSTRY OUTLOOK**

The Indian software industry has enormous potential to grow from its current size of US\$ 2.2 billion (excluding onsite services) to nearly US\$ 46 billion by 2010.

India's competitive advantage over other countries positions it very well vis a vis the export services market which is expected to grow to over US\$ 25 billion by 2010. The low levels of IT proliferation in the domestic end-user industry also promise an attractive growth rate of nearly 30 per cent for the next 10 years. As a result, the domestic software industry could reach US\$ 21 billion by 2010.

### **Growth in the export market (excluding onsite work)**

The worldwide IT services market is growing at the rate of 8 per cent in real terms and is expected to reach about US\$ 721 billion by 2003 and US\$ 910 billion by 2010. Of this, about 54 per cent will consist of hardware maintenance, IT management and other services that cannot be outsourced. The remaining 46 per cent will form the market relevant for Indian companies and comprise legacy services (7 per cent) and new generation services (39 per cent) (**Exhibit 5.16**).

- ¶ **Legacy services:** These services include the maintenance of mainframe and client server systems and migration from legacy systems to new generation systems. Only 50 per cent of this US\$ 70 billion market can be outsourced and therefore the market available to Indian companies is around US\$ 35 billion. Of this, only US\$ 25 billion will be available for offshore outsourcing. This space is largely commoditised and demands large teams of programmers who can code in older programming languages like COBOL. This has led to very low charge rates for these services. India therefore has a comparative advantage vis-à-vis other countries in these services because of its large supply of low cost software professionals.

India's share in this market will depend primarily on the availability of software professionals, and could be as high as 50 per cent. Going by purely economic considerations, India could capture as much as 90 per cent. However, Fortune 500 companies, which account for most of the global IT outsourcing market, are unlikely to outsource all their IT requirements to India because of what they perceive as the risk attached to outsourcing to India. As a result, we do not expect India to gain more than a 50 per cent share of this market.

- ¶ **New generation services:** These include Internet application integration services, ERP/EAS services, maintenance of packaged applications and implementation of components/packages. Of this US\$ 355 billion market, we expect only about 50 per cent to be outsourced. Hence the available market for Indian companies will be around US\$ 180 billion. Indian companies have only recently started competing in this market

and have already captured about a 1 per cent share. McKinsey estimates that India is well positioned to capture a 15 per cent share of this market by 2010. Indian companies would have to grow their new generation businesses at 30 per cent, on average, to do this. The target is ambitious, but Indian companies have achieved similar targets in the past when they first entered the legacy services business arena.

Therefore, assuming that the availability of software professionals does not become a constraint, Indian companies can expect a total export potential of US\$ 25 billion from both legacy and new generation services by 2010.

### **Growth in the domestic market**

The domestic market in India has been growing at over 30 per cent per year in real terms over the last 5 years. While increasing usage of IT in the Indian end-user industry has driven this, the IT-spend of the Indian corporate and government sectors is still far below the world average. For instance, although financial services are the largest user of IT services worldwide, Indian banks spend as little as 1.1 per cent of their revenue on IT while the US banks spend 6 times as much. Similarly, the government, often a driver of software services growth in many other markets, has not invested enough in computerising its departments and making them more efficient. Assuming that complete reform will take place in all sectors of the economy and that GDP will grow at 10 per cent per year<sup>1</sup>, we expect IT spending in all sectors to increase to 2 per cent of GDP. This will bring it on par with more developed countries. The domestic software industry can thus be expected to grow to over US\$ 20 billion by 2010.

### **Growth in future scenarios**

Given the large quantum of demand from the international and domestic markets, the real constraint to output growth going forward, as was evident in the section on external barriers, will be the shortage of high quality software professionals. We describe two likely scenarios and draw the implications of not investing in increasing the output of software professionals for India:

- ¶ **Status quo:** For this scenario, we have assumed that there will be no change in the current rate of supply of software professionals. Productivity is expected to continue to grow at 7 per cent per year (as it has in the last 5 years) so that charge rates approximately double over 10

---

<sup>1</sup> Please refer to Volume I, Chapter 5: India's Growth Potential, for a discussion on complete reforms.

years. Under the output assumptions, India would need over 2 million entry-level software programmers by 2010 and around 200,000 experienced programmers/ project leaders. However, as discussed earlier, under the status quo scenario, the number of experienced professionals available by 2010 would only be 125,000. This implies that growth would be curtailed and the Indian software output would be limited to US\$ 28.5 billion by 2010.

- ¶ **Reforms in all sectors:** In this scenario, the educational system would be reformed to ensure that the growth of the software sector was not hampered by the lack of quality professionals. Productivity would grow as in the previous scenario at 7 per cent per year and output would reach US\$ 46 billion. The industry would be able to employ over 2 million entry-level programmers and over 200,000 experienced managers.

## **POLICY RECOMMENDATIONS**

The growth of the software industry in the past has been aided by good policy. However, the biggest bottleneck to its future growth is the availability of good software talent. To deal with this, the government and industry should focus on increasing the capacity for software programmers in colleges, attract the best talent to train them and improve the infrastructure in software hubs to retain this trained pool of programmers. We make three key recommendations:

- ¶ **Increase capacity:** Ensure that there are a sufficient number of students graduating out of colleges to provide a base of at least 200,000 high quality software professionals by 2010. These professionals should be able to lead and manage teams of entry-level programmers and carry out high-level design and strategy work. At current levels, the educational system yields only 35,000 such professionals every year. This needs to be increased to at least 50,000 to 60,000 a year by undertaking several targeted measures. The output of premier engineering colleges (the IITs, the Regional Engineering Colleges and the State Engineering Colleges) and good quality private colleges needs to be increased significantly. Private colleges should be encouraged to introduce courses targeted at building software skills and banks should be encouraged to provide educational loans for such courses. Private training institutes like NIIT and Aptech have already begun to do this. They would however need to increase the quality and scale of their operations if they are to serve as substitutes to full-time graduate courses.

- ¶ **Attract talent:** Colleges should also ensure that their faculty consists of top calibre software talent. To be able to attract the right talent, the compensation policy for teachers must be revised to make it attractive enough for quality software professionals to switch from line jobs to teaching jobs.
- ¶ **Upgrade software hubs:** Finally, infrastructure (power, telecom, roads and airports) needs to be upgraded to world standards in the top software hubs and metropolitan centres. The government will need to ensure that India has a critical mass of software hubs, which offer world-class living standards in order to ensure that the attraction of the developed world is somewhat dulled. Some best practice companies have already built world-class campuses in cities like Bangalore and have succeeded in retaining high quality talent.

## Appendix 5A: Measuring productivity

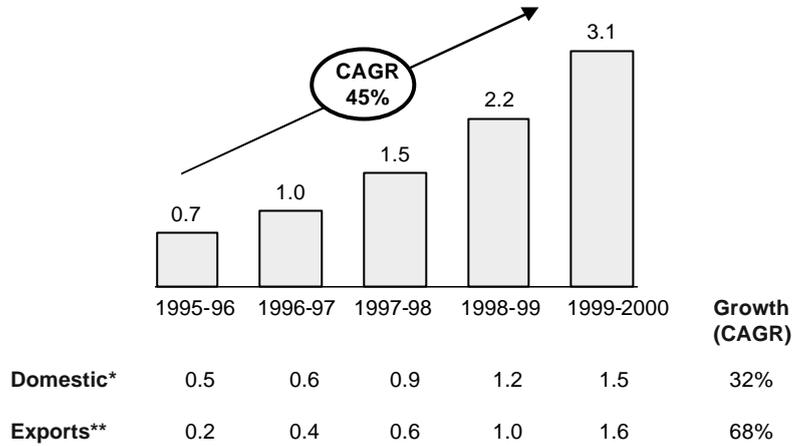
When measuring and comparing software productivity across countries, it is simplest and most effective to compare the productivity in terms of the value added. Physical measures (such as kilo lines of code per day) have limitations because of the prevalence of multiple programming languages and technologies. We therefore measured productivity in US\$ per person per hour and adjusted for differences in PPP. This adjustment was required because of the huge differences in wages between the US and India for the same quality of work. For example, a C++ programmer in the US earns around US\$ 75 per hour while an equally qualified programmer in India makes only US\$ 5.5 per hour for the same job. While this vast gap is closing as wages in India increase, it will be several years before they reach US levels. We, therefore, derived a specific PPP for the software sector based on wage rates in the US and in India (**Exhibit 5.17**).

We also had to separately account for the fact that Indian companies have grown at a significantly higher rate than the US average. For instance, US companies have grown at around 8 per cent, while Indian companies have grown at over 45 per cent in employment terms. This leads to a natural productivity penalty because Indian companies have a greater percentage of new employees (who cannot be billed for the first 3-6 months) on their rolls.

Exhibit 5.1

### REVENUES OF THE INDIAN SOFTWARE INDUSTRY

US\$ billion



\* Includes only the value-added component of products and packages that are imported and distributed

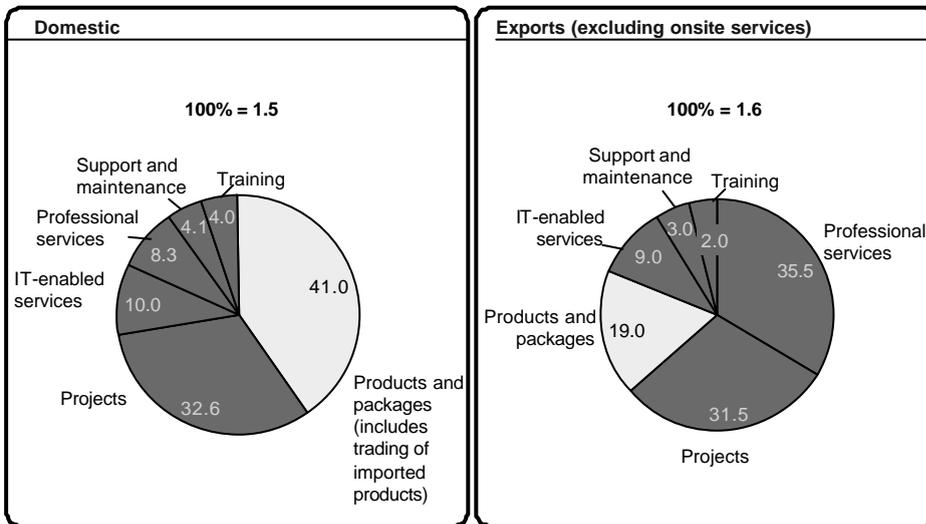
\*\* Excludes the contribution from "onsite" services and focuses on offshore revenues

Source: NASSCOM

Exhibit 5.2

### SEGMENTATION OF INDIA'S SOFTWARE MARKET, 2000

US\$ billion, per cent

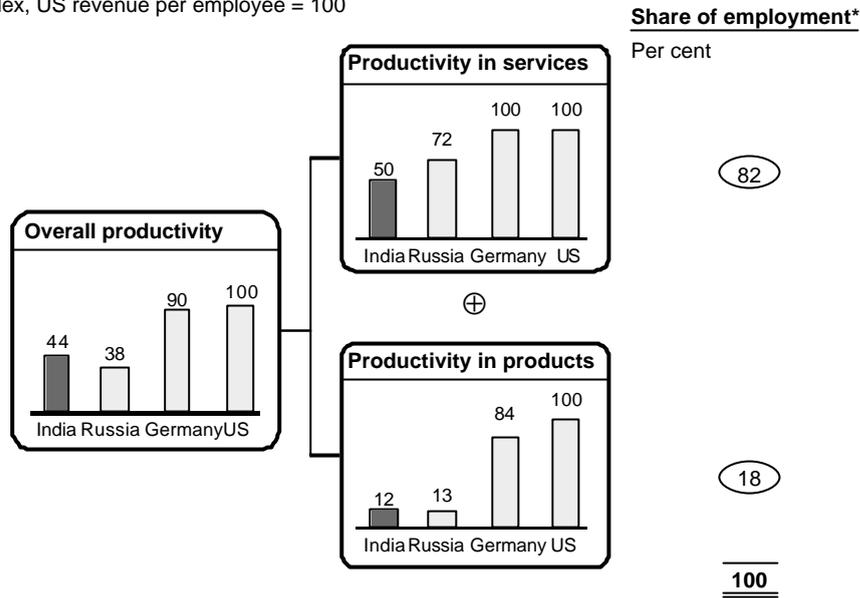


Source: The IT Software and Services Industry in India - Strategic Review 2001, NASSCOM; McKinsey Analysis

Exhibit 5.3

### PRODUCTIVITY OF INDIAN SOFTWARE COMPANIES

Index, US revenue per employee = 100



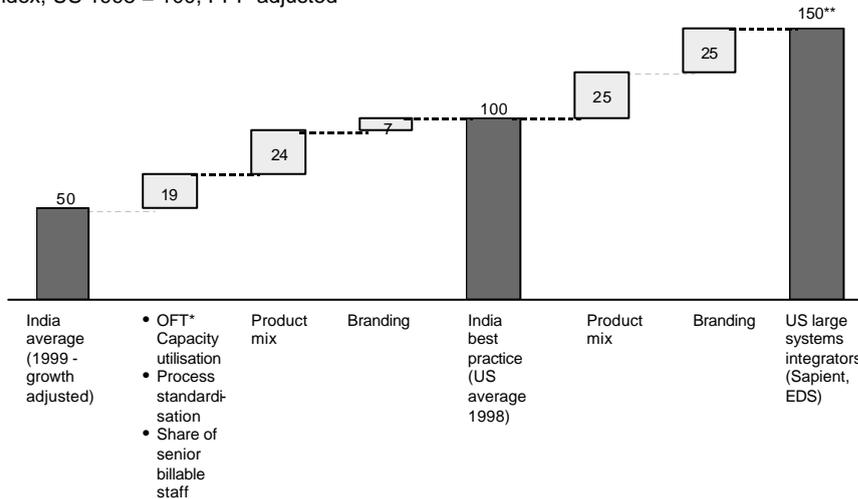
\* Excludes employees of Indian companies outside India in onsite services

Source: NASSCOM directory; IDC black book; McKinsey analysis

Exhibit 5.4

### OPERATIONAL FACTORS EXPLAINING PRODUCTIVITY DIFFERENCES IN SOFTWARE SERVICES

Index, US 1998 = 100, PPP adjusted



\* Organisation of functions and tasks

\*\* Onsite productivity of Indian companies in the US and other countries matches that of large companies like Sapient and EDS driven by very high capacity utilisation

Source: Interviews; NASSCOM; Analyst reports; McKinsey analysis

Exhibit 5.5

## PENALTY DUE TO HIGH ATTRITION

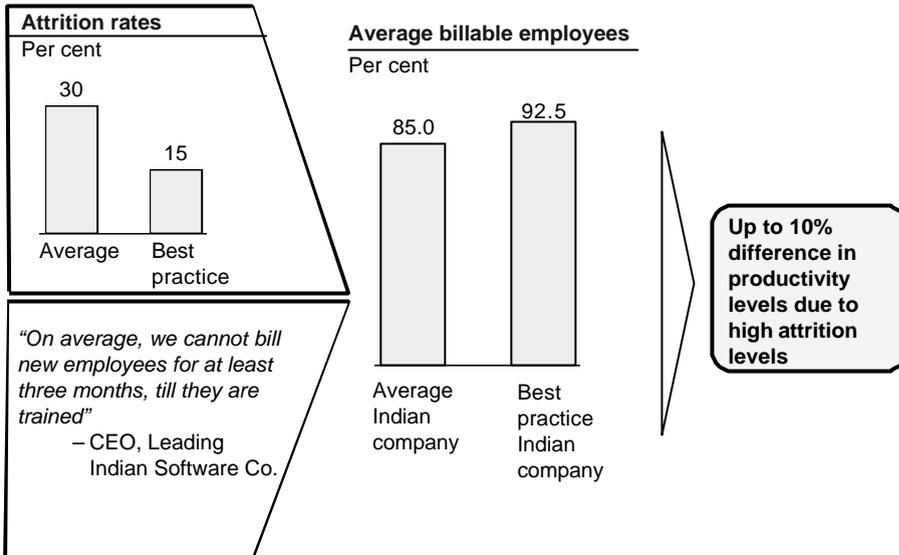
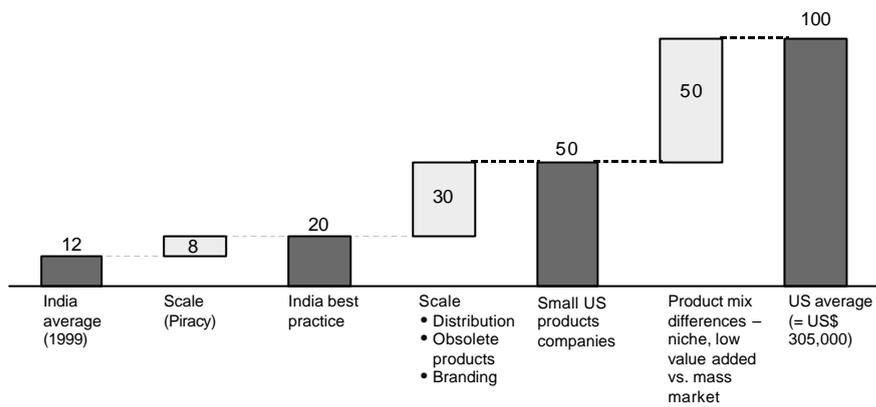


Exhibit 5.6

## OPERATIONAL FACTORS EXPLAINING PRODUCTIVITY DIFFERENCES IN SOFTWARE PRODUCTS

Index, US 1998 = 100, PPP adjusted



Source: Interviews; McKinsey analysis

Exhibit 5.7

## PRODUCTIVITY OF SMALL US PRODUCTS COMPANIES

### Small products company in the US

#### Product mix

- ERP applications for medium-sized enterprises

#### Key activities

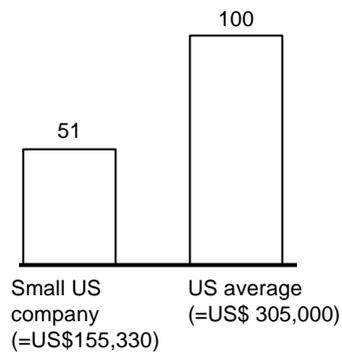
- Design, development and marketing of client server/ERP software

#### Revenues

- Annual revenues of US\$ 115 million

### Productivity (Revenue per employee per year)

Index, US average = 100



Source: Web pages, McKinsey analysis

Exhibit 5.8

## INDUSTRY DYNAMICS

- High importance
- Medium importance
- × Low importance

Industry dynamics	Importance of factor	Rationale
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Competition for export market</div>	○	<ul style="list-style-type: none"> <li>• High profit margins (25% net margin) and large size of export market have kept players focused on revenue growth in the past. However, rising wage costs are forcing large players to focus on profitability</li> </ul>
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Exposure to best practice</div>	×	<ul style="list-style-type: none"> <li>• Many MNCs have set up operations in India</li> <li>• 7 out of the 12 companies in the world with SEI CMM level 5 certification are Indian</li> </ul>

Source: MSDW; Goldman Sachs; Interviews; McKinsey Analysis

Exhibit 5.9

## WAGE COSTS IN SOFTWARE SERVICES COMPANIES

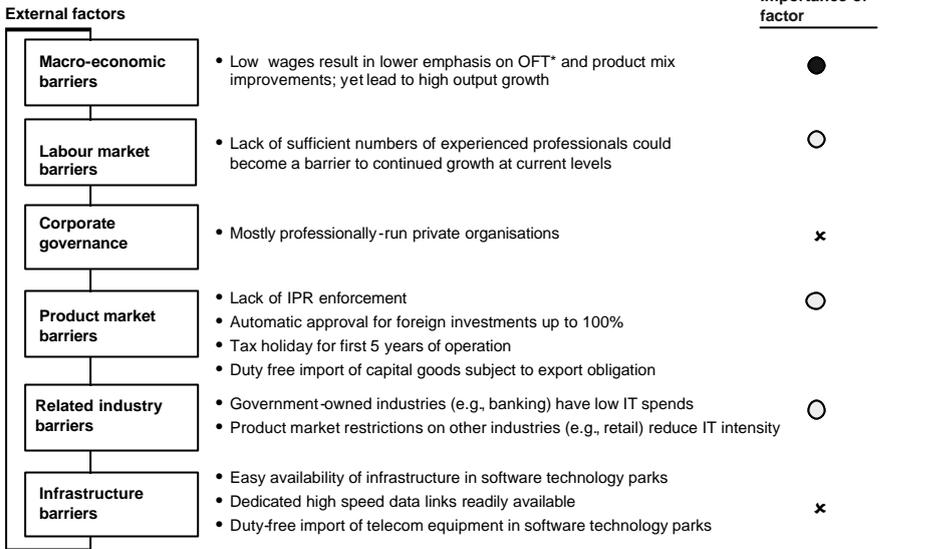
Company	Wage cost, 1996 US\$/year/per person	Growth Per year	Comments
Sonata Software	4,700	63	<i>"Employee costs in IT companies are rising at 20-25% per annum"</i> – HR compensation expert
Rolta Software	2,500	57	
Silverline	1875	24	<i>"Out of 29 firms surveyed, 15 reported a higher rate of growth in salaries than in revenues"</i> – Salary survey of Indian software firms
BFL Software	6000*	13	

\* 1998 figures

Source: Annual reports; Interviews with HR consultants; McKinsey analysis

Exhibit 5.10

## EXTERNAL FACTORS EXPLAINING LABOUR PRODUCTIVITY DIFFERENCES

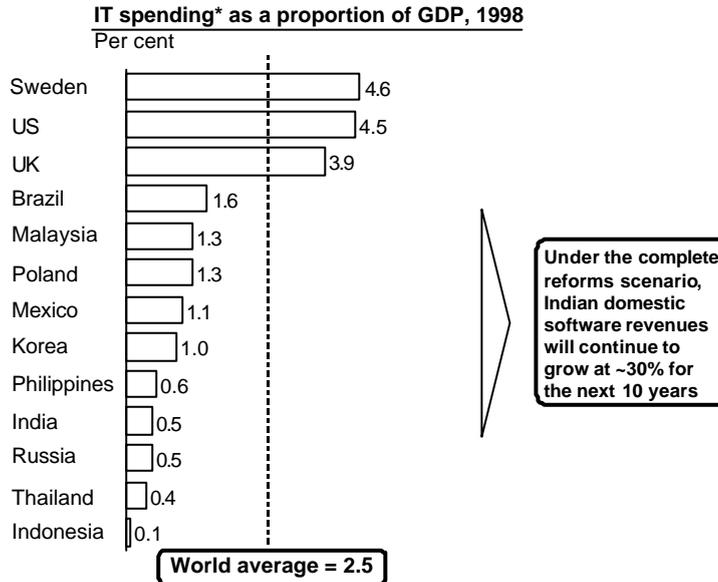


\* Organisation of functions and tasks

Source: MSDW; Goldman Sachs; NASSCOM; Interviews; McKinsey analysis

Exhibit 5.11

## CROSS-COUNTRY COMPARISON OF IT SPENDING

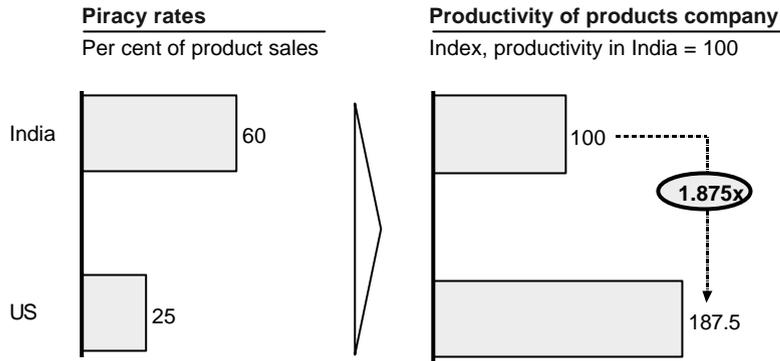


\* Software and IT services

Source: IDC; July 2000 World Almanac and Consensus Forecasts; McKinsey Analysis

Exhibit 5.12

### IMPACT OF PIRACY ON PRODUCTIVITY OF INDIAN PRODUCTS COMPANIES

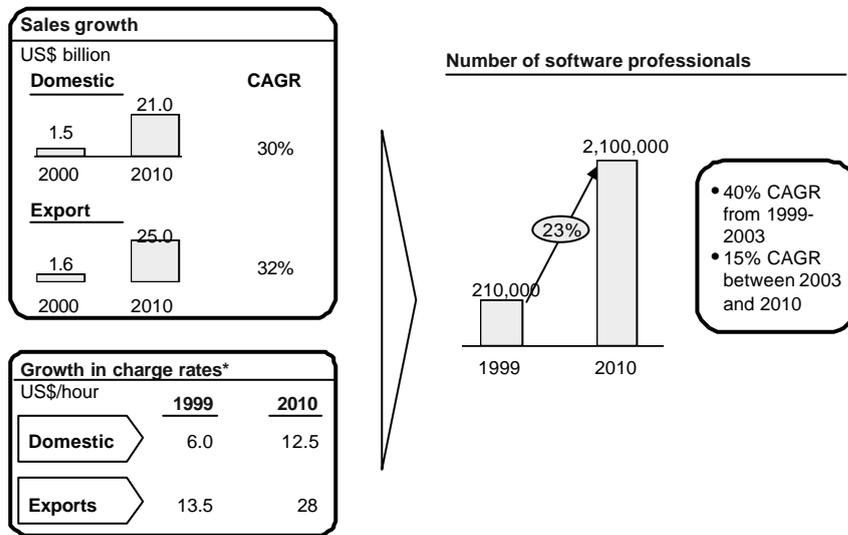


**If Indian piracy rates went down to US levels, Indian products companies would gain in productivity by 87.5%**

Source: NASSCOM; Press reports; McKinsey analysis

Exhibit 5.13

### EXPECTED DEMAND FOR SOFTWARE PROFESSIONALS IN INDIA



- 40% CAGR from 1999-2003
- 15% CAGR between 2003 and 2010

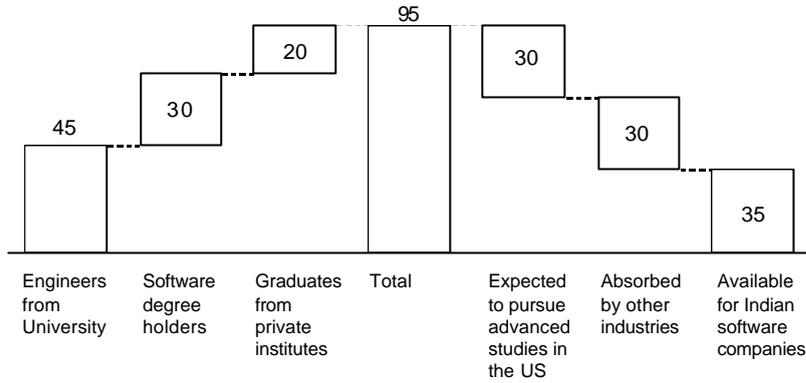
\* Surrogate for the growth in productivity

Source: McKinsey analysis

Exhibit 5.14

### ANNUAL SUPPLY OF HIGH QUALITY SOFTWARE PROFESSIONALS

Thousands, 2000 base



\* Qualified to lead projects and programmes in cutting-edge technologies

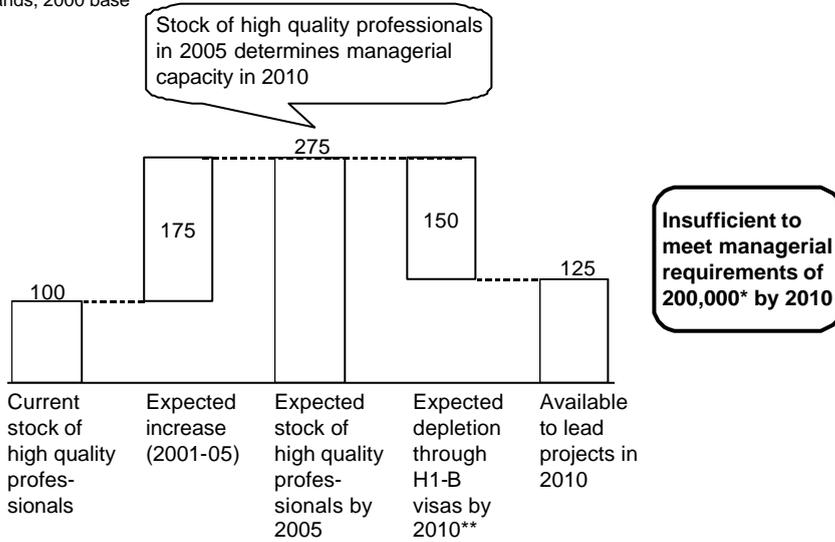
Source: Indiainfoline; Press clippings; Manpower profile of India; Interviews; McKinsey analysis

Exhibit 5.15

### MANAGERIAL CONSTRAINT TO GROWTH OF SOFTWARE INDUSTRY PROFESSIONALS

ESTIMATES

Thousands, 2000 base



\* Assuming every manager/project leader can manage 10 entry level programmers (current levels)

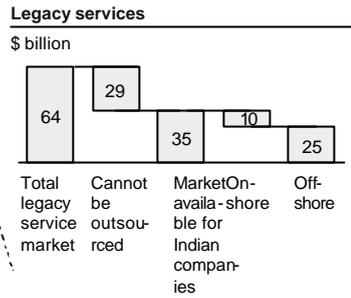
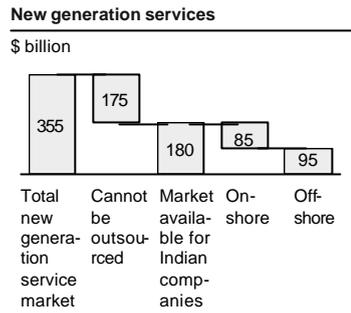
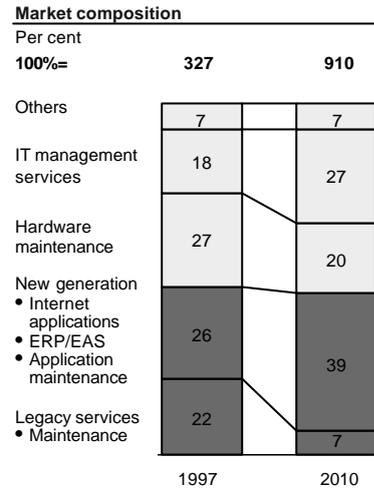
\*\* May be partly offset countered by the flow of professionals back to India

Source: Indiainfoline; Press clippings; Interviews; McKinsey analysis

# PROJECTIONS FOR GLOBAL IT SERVICES OUTPUT

US\$ billion, per cent

■ Relevant to India

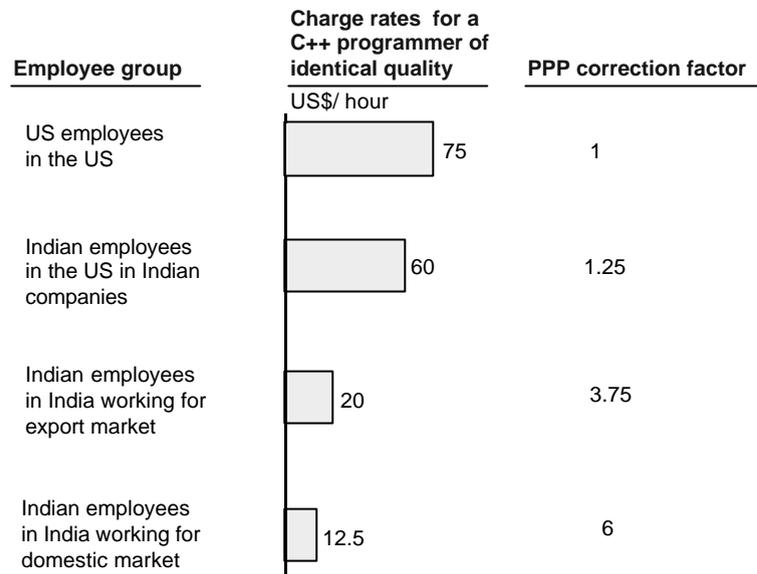


**Total market available for offshore Indian companies = US\$ 120 bn**

Source: Dataquest; NASSCOM; McKinsey analysis

Exhibit 5.17

### PPP ADJUSTMENT FOR SOFTWARE SERVICES IN INDIA



Source: Press reports; Analyst reports; Interviews; McKinsey Analysis

# Steel

## **SUMMARY**

Although the steel sector was opened up in 1992, it has remained small and unproductive. The per capita consumption of steel in India is only 26 kg per capita – about one-fourth that of China. The average total factor productivity of the sector is only 25 per cent of US levels, even though it has the potential to reach 94 per cent. The key factors responsible for the low productivity are government ownership of the large incumbents, the presence of many fundamentally unproductive small mini mills and the sector's lack of adequate exposure to competition from imports.

We recommend that government-owned players be privatised, import duties reduced and tax enforcement, power collections and product quality standards strengthened.

If these reforms are carried out and GDP growth touches 10 per cent a year – which is possible if our recommended reforms are carried out – we expect the sector to experience significant growth in output. Output will grow at 12 per cent per annum from the current 24 million tons to 75 million tons per year by 2010, as steel consumption increases to 64 kg per capita per year. Despite the output growth, employment in the sector will decline at 8 per cent per annum from 377,000 employees to 185,000 employees by 2010.

## **Productivity performance**

We estimate the total factor productivity (TFP) of the Indian steel industry to be around 25 per cent of US levels, with labour productivity at around 11 per cent and capital productivity at around 39 per cent of US levels. This is lower than developing countries such as Brazil and Korea and developed countries such as the US and Japan. However, India's potential productivity is very high. At current factor costs, India's TFP potential is 94 per cent that of the US. Both integrated blast furnace producers (IBFPs) and large mini mills have a capital productivity potential that is 100 per cent of the US average.

Moreover, productivity varies significantly across different segments in the industry. Large mini mills have an average labour productivity of 76 per cent of

US levels, IBFPs have an average labour productivity of 17 per cent and small mini mills have a mere 5 per cent.

### **Operational reasons for low productivity**

There are several factors responsible for India's low productivity in steel. The key operational factors include poor organisation of functions and tasks (OFT) in plant operations and plant construction, low capacity utilisation and sub-scale operations, particularly in the small mini mill sector.

### **Industry dynamics**

A non-level playing field allows operational inefficiencies to persist in the sector. Both the small mini mills and IBFPs benefit from the existence of the non-level playing field. The small mini mills compete by avoiding energy payments, evading tax payments and operating in a quality-insensitive construction market. It is only because of these advantages that these mills are able to survive. IBFPs reap the benefits of the non-level playing field by way of subsidies – both directly, in the form of restructuring packages, and indirectly, in the form of long-term coal and iron ore mining rights. These advantages reduce the pressure on the IBFPs to maximise their productivity.

Import tariffs further shield the domestic industry from exposure to international competition, thereby limiting competitive pressure.

### **External factors responsible for low productivity**

There are five main reasons why TFP remains low in the Indian steel industry. First, government ownership limits the incentive for the country's largest steel producers to increase productivity. Second, poor governance of state-owned banks (the main providers of debt to steel plants) and the lack of enforcement of minority shareholder rights result in huge time and cost overruns. Third, product market barriers restrict price-based competition with global best practice steel producers and contribute to the existing non-level playing field. Fourth, barriers in related industries, particularly power and construction, contribute to the creation of a non-level playing field. Finally, labour market rigidities limit the rate at which individual companies can reorganise their workforce.

### **Industry outlook**

If the current barriers are removed and the economy grows at 10 per cent, we estimate output over the next 10 years to grow at about 12 per cent a year, i.e., from 24 million tons today to 75 million tons in 2010. Productivity will grow at 21

per cent and employment will decrease by 8 per cent (from 377,000 to 185,000 by 2010).

### **Policy recommendations**

In order to achieve these large productivity and output gains in the steel industry, India needs to privatise its state-owned steel companies and financial institutions. In addition, the government should enforce tax payments and remove the barriers standing in the way of productivity growth in the construction and power sectors.

The most important policy recommendations are:

- ¶ **Privatise government steel companies:** Government-owned steel plants, banks and insurance companies need to be privatised. To make these institutions attractive to investors, the government should restructure these companies prior to privatisation.
- ¶ **Reduce import duties:** To ensure continued exposure to best practice, the government should eliminate current import duties of 30 per cent by 2010. A gradual reduction in duties over a 10-year period will result in a corresponding decrease in the domestic price of steel, forcing producers to increase their productivity in order to continue making a profit.
- ¶ **Eliminate subsidies:** Subsidies to government companies must immediately be removed. This is essential for levelling the playing field and allowing fair competition between the players.
- ¶ **Enforce more efficient tax collection:** The government should enforce better collection of taxes and remove the non-level playing field that benefits small players.
- ¶ **Enforce better standards of building and infrastructure construction:** Better enforcement of building standards and the creation of consumer protection laws and consumer representation agencies are necessary to prevent the sale of sub-standard steel products.
- ¶ **Carry out reforms in the power sector:** Reforming the power sector, especially the privatisation of distribution, will ensure prevention of power thefts, thereby leveling the playing field between large and small players.
- ¶ **Relax labour laws:** To accelerate productivity growth in steel, the government should relax the restrictions on retrenchment. The government should, instead, establish a system that allows companies to let employees go by offering them a severance package.

# Steel

The steel manufacturing industry is important from this study's perspective for three reasons. First, it is an important part of the economy: it not only directly accounts for about 1.3 per cent of GDP, it also has a bearing on how the consumer goods and downstream infrastructure sectors develop. Second, it is representative of all heavy manufacturing industries. And, finally, it is illustrative of how government ownership of some large players in an industry can stunt the productivity and growth of that industry despite the presence of private players.

The total factor productivity of the steel industry remains a mere 25 per cent of US levels even though its potential is as much as 94 per cent. This indicates that both labour and capital productivity are below potential. Labour productivity is only 11 per cent of US levels while its potential is 89 per cent and capital productivity is 39 per cent of US levels while its potential is 100 per cent.

The reason for this is two-fold. First, the small mini-mills, which account for 26 per cent of the output and 58 per cent of the employment of the sector, are inherently unproductive formats that should ideally have been driven out of the market by competition. Second, all players in the industry – Integrated Blast Furnace Plants (IBFPs), large mini mills and small mini mills – are performing well below their potential productivity. The main reasons for this poor performance are over staffing, poor management of projects and plant operations, low capacity utilisation and lack of investment in viable equipment.

The industry lacks a level playing field and does not experience competition from global players through imported steel products. This allows the unproductive players to survive. Both small mini mills and IBFPs benefit from this “non-level playing field”. The small mini mills remain competitive by evading taxes and power tariffs and cutting corners on product quality, while low cost long-term leases on raw materials advantage the IBFPs.

There are five main external factors for the low competitive intensity and non-level playing field in the steel industry, and, as a result of these, the low productivity. They include government ownership, poor governance, lack of enforcement of rights, labour market rigidities, among others.

If these barriers were removed and the economy were to grow at 10 per cent per annum, the output of the sector would increase 3 times over a 10-year period from 24 million tons to 75 million tons (a growth of 12 per cent per annum). Despite this dramatic output growth, however, employment would decline by 50 per cent from 377,000 to 185,000 employees, as productivity would increase faster than

output – 21 per cent per year compared to 12 per cent per year. In this scenario, an additional 46-mtpa capacity would be set up in India. India would be able to set this up much more efficiently than it has been able in the past – saving US\$ 4 billion in the capital spending on capacity creation in the process.

For the purposes of this study, we have defined the steel industry as inclusive of everything from the processing of raw materials (e.g., sintering of ore and coke making) to the rolling and coating of steel. Thus, raw-material processing, iron-making, steel making, casting, hot and cold rolling and coating of steel are all included. Upstream mining activities (e.g., iron ore and coal mining) and downstream transformation activities (e.g., wire drawing) are not included in the scope of this study (**Exhibit 6.1**).

The remainder of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

Steel consumption levels in India are relatively low – merely 26 kg per capita per year. Most of the demand is met by domestic production, which stands at 24 million tons per year. The sector has three categories of players – Integrated Blast Furnace plants (IBFPs), large mini mills and small mini mills. The IBFPs are the largest category, accounting for almost 60 per cent of the sector’s output, and are made up of mainly government-owned incumbents.

### **Industry evolution**

Before the liberalisation of the economy in 1992, the steel industry was highly regulated and licenses were required for the production, purchase and sale of steel (**Exhibit 6.2**). During this period, the government artificially moderated both prices and production levels. The inability of companies to increase production in response to demand often resulted in product shortages. Large-scale production licenses were granted only to government-owned SAIL and privately owned Tata

Steel. Besides these large players, very small, induction furnace based mills were set up freely as they did not require any license and were able to fill temporary capacity shortages created by government control over large players. The lack of competition, combined with the fact that the largest player was government-owned (they were very profitable at that time), resulted in an extremely unproductive industry.

After liberalisation, the industry witnessed the entry of several large private players. The removal of most licensing requirements, reduction in import duties and government subsidies resulted in competition that forced some efficiency increases and labour rationalisation in large plants. In addition, smaller mills started to find it impossible to compete with the more efficient new entrants and so began to exit.

Given its GDP per capita, India's current steel output, consumption and employment seem to be in line with those of benchmark countries. India's per capita steel consumption is 26 kg per capita per year. The trade intensity in the sector is low and consumption is satisfied largely by domestic production – which is 24 million tons per year. Overall, India is only a marginal net importer of steel, importing mainly high value cold rolled steel for the automotive industry. Exports of Indian steel, which account for a mere 4 per cent of total production, are mostly lower value hot rolled coils, which are exported to several countries including the US. This contrasts starkly with countries such as Korea and Russia where exports account for as much as 42 per cent and 61 per cent of total production, respectively.

### **Product segmentation**

While the Indian steel industry produces most types of steel, its product mix is skewed towards lower-value long products used mainly in the construction industry (**Exhibit 6.3**). The main products produced in India are:

- ¶ **Semis:** These are intermediate products and are often sold by IBFPs to small mini mills and rolling mills to be rolled into finished steel. While some countries export semis (e.g., Russia), India uses them in the domestic industry as inputs for higher value-added long and flat products.
- ¶ **Long products:** These include products such as rails, rods, bars and structurals. The biggest user of such products is the construction industry. Long products are the largest steel category produced in India accounting for around 56 per cent of total production.
- ¶ **Flat products:** These are the most value-added of the basic steel products. They can be hot rolled, cold rolled, galvanised or coated, and are typically used in the manufacture of cars and white goods. This

category, usually the largest product category produced in developed countries, is relatively small in India, accounting for only 44 per cent of total production as compared to 68 per cent in the US.

### **Industry segmentation**

The Indian steel industry consists of three main segments (**Exhibit 6.4**). The first of these is the integrated blast furnace plants. Established in the pre-liberalisation era, these plants still form the largest segment in the steel industry. The second is the large mini mills, which have entered the industry post-liberalisation. These are typically efficient plants focused on producing high value steel products using electric arc furnaces. And, finally, the third segment is made up of the mini mills and rolling mills. These sub-scale plants are largely a legacy of the pre-liberalisation era when the government granted only limited-scale licenses.

- ¶ **Integrated blast furnace plants:** These plants form the bulk of the industry. Accounting for around 59 per cent of the value created by the steel industry, this segment employs around 40 per cent of the steel workforce (**Exhibit 6.5**). Partly owned and run by the government, they were all established in the pre-liberalisation period. As a result of poor planning and overspending, these plants suffer from a paucity of rolling capacity and, consequently, often sell semis to third party rolling mills. The players in this segment have been changing their focus from long products, which used to form the bulk of production, to high value flat products.
- ¶ **Large mini mills:** These new plants account for 15 per cent of the value created by the steel industry and employ only 2 per cent of the workforce to achieve this. They produce mainly flat products, especially hot rolled coils. A significant proportion of their output is exported. All the plants in this segment are privately owned.
- ¶ **Small mini mills:** Although many of these sub-scale mini mills and rolling mills have gone out of business over the last few years, the segment still accounts for 26 per cent of the value created by the steel industry. In addition, this segment is also the biggest employer, employing around 58 per cent of the steel workforce. Production consists mainly of low value, often very sub-standard, long products, typically purchased by the local construction industry. The players more often than not survive only by dint of stealing electricity and evading taxes. However, some niche players are able to compete by producing high value specialised products such as spring steel.

## **PRODUCTIVITY PERFORMANCE**

Total factor productivity in the Indian steel industry is about 25 per cent of the US average (**Exhibit 6.6**), with labour productivity at around 11 per cent and capital productivity at around 39 per cent (**Exhibit 6.7**). At these levels, India's productivity is the lowest among the countries we have studied.

Labour productivity levels, in India, vary significantly by segment (**Exhibit 6.8**). The labour productivity of the IBFPs is around 17 per cent of US levels. While restructuring programmes have increased this productivity significantly over the past few years, it is still very low. The labour productivity of the large mini mills is significantly higher at around 76 per cent of the US average. This segment includes the best practice player in India with a labour productivity of around 125 per cent of the US average. Even though the average is relatively high in this segment, labour productivity continues to vary by player since some plants are currently in the process of increasing production levels up to the rated plant capacity. Labour productivity of small mini mills is the lowest in the industry, at only 5 per cent of US levels. Their productivity is inherently limited by their lack of scale.

Since liberalisation, labour productivity in the Indian steel industry has increased significantly with the entry of new players, mainly large mini mills. While output has grown steadily after deregulation in 1992, labour productivity has remained constant at around 7 per cent of US levels between 1992 and 1996 and grown at 16 per cent a year thereafter (**Exhibit 6.9**). In the period between 1992 and 1996, many new players entered the market, thereby increasing employment as well as output. After 1996 productivity took a positive turn. Employment fell from 486,000 to 377,000 people and labour productivity rose at an average 16 per cent a year to its current level of 11 per cent.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

Based on our causality analysis, the potential total factor productivity (TFP) of the Indian steel industry is estimated at 94 per cent of the US average, compared to the current productivity of 25 per cent (**Exhibit 6.10**). The gap reflects the fact that both labour and capital productivity are below potential. Labour productivity is only 11 per cent of US levels while its potential is as much as 89 per cent. Capital productivity is only 39 per cent and its potential is 100 per cent. The key operational factors responsible for the current low TFP in Indian steel plants are poor organisation of functions and tasks (OFT), low capacity utilisation and under-scale operations, particularly in the small mini mill sector.

In the remainder of this section we will describe in more detail how each of these operational factors affect TFP (**Exhibits 6.11-6.15**). We will begin with the factors that are easiest to address.

- ¶ **Excess workers:** Surplus workers account for around 4 percentage points of the TFP gap, as much as 45 per cent of the total workforce of IBFPs and impose a significant burden on productivity. The presence of thousands of surplus workers – workers who are idle all day – is evident even on a quick visit to the IBFPs.
- ¶ **Poor OFT:** It affects both labour and capital productivity and accounts for 18 per cent of the TFP gap between India and the US. Poor OFT is an issue both at the plant operation and the plant construction stage.
  - **Poor OFT in operations:** At the operations stage, poor OFT is apparent from the sub-optimal operation of equipment, lack of multi-tasking and poor centralised planning. The sub-optimal operation of existing equipment reduces the quality of output and hence lowers the value added per ton produced by a particular plant. The lack of multi-tasking and poor centralised planning increase the amount of labour required for a particular task.
    - **Sub-optimal optimisation of equipment:** Inefficient handling of existing automation results in sub-optimal conditions, lowering the quality of steel produced by Indian plants. Automated equipment requires significant ongoing attention to ensure that all settings are optimised for a particular plant. Small changes in settings can result in significant differences in the chemical composition and physical properties of the steel produced. Moreover, improved optimisation of steel equipment requires properly trained machine operators. For example, the reason plants operate below their rated capacity is because the layout is inefficient or the speed is lower than it should be. Also, sometimes sub-optimal settings for casting and rolling equipment may lead to excessive impurities thereby lowering the quality of finished steel.
    - **Lack of multi-tasking:** Multi-tasking makes the workforce more flexible and leads to better utilisation of its time. For example, in the steel shop of an IBFP plant, there were 27 separately defined roles. Each person did only those tasks that were defined as part of that role. A worker assigned to clean one side of a machine would not clean the other side, even if he had time on his hands. Following a restructuring programme, this plant cut the number of roles from 27 to 6 resulting in an immediate reduction in manpower of over 15 per cent.

- **Lack of centralised planning:** Increasing coordination across plant functions leads to better utilisation of equipment and people. For instance, there were 17 maintenance points scattered around an IBFP plant with no coordination between them. This resulted in massive load imbalances. Some points were overburdened and needed to hire contract labour while others were idle. The consolidation to only four centrally controlled maintenance points slashed maintenance manpower requirements by over 28 per cent.
- **Poor OFT in construction:** Poor OFT in plant construction leads to inefficient capital stock creation, thereby lowering capital productivity. This is the result of two factors: project overruns and over-invoicing of equipment.
  - **Project overruns:** Construction of a steel plant in India typically takes 1 ½ to 2 ½ times longer than it would take for an equivalent plant in the US. According to engineering consultants, plants that are scheduled to take three years to build can often end up taking seven. This leads to increased administration and project management costs as well as higher interest payments on borrowed capital.
  - **Over-invoicing:** Over-invoicing of imported equipment is a common business practice today. In practice, controlling shareholders set up trading companies that are used as intermediaries. These companies over-invoice the purchase of foreign equipment. This leads to a less efficient formation of steel-making stock, as the total investment required for each unit of capacity is inflated.
- ¶ **Poor capacity utilisation:** This accounts for around 18 points of the TFP gap and lowers capital as well as labour productivity.

The average US plant operates at 90 per cent capacity. In contrast, the average Indian IBFP runs at 84 per cent, the large mini mill at 66 per cent and the small mini mill at only 31 per cent.

- **IBFPs:** Sub-optimal running of equipment and excessive downtime are the main reasons for the IBFPs' low capacity utilisation. Sub-optimal running of a plant results in decreased throughput, which prevents the plant from reaching its rated capacity. The time wasted in fixing faults and between production runs, in turn, reduces the time available for producing steel.
- **Large mini mills:** Low capacity utilisation is likely to be temporary until these new plants ramp up production and reach their rated

capacity. The main impediment to reaching rated capacity is under-investment in plant equipment due to fund constraints.

- **Small mini mills:** There has been a decrease in their utilisation over the past few years as a result of stronger competition from larger, more efficient players.

Most plants could dramatically increase their rated capacity by “debottlenecking” their current operations. By debottlenecking we mean making any investment that will increase the capacity of the plant at a lower cost per ton than that of building a new plant. For example, in a plant that has surplus melting capacity, it would be more cost effective to debottleneck current operations by adding additional casting and rolling capacity than to build a new plant.

- ¶ **Lack of scale:** This accounts for around 18 percentage points of the TFP gap and succeeds in lowering both labour and capital productivity.

Indian steel plants are extremely sub-scale, especially the small mini-mills. The average plant capacity of the small mini mill segment in India is only 0.1 million tons per year compared with an average capacity of 1.3 million tons for the typical US mini mill (**Exhibit 6.16**). In addition, some Indian plants in the IBFP segment have capacities of 2-3 mtpa – much lower than the average US IBFP capacity of around 4 million tons per year.

- ¶ **Lack of viable investments:** This accounts for around 11 points of the TFP gap.

Viable investments fall into two categories: Output enhancing investments (i.e., those that increase the quantity or improve the quality of the output) and labour-saving automation (i.e., those that decrease the number of man-hours required to produce each ton of steel).

Indian plants have, however, not started making these investments even though they have been proven viable. For instance, many plants still use ingot casting rather than continuous casting; and open/twin hearth technologies as opposed to basic oxygen furnaces (BOFs).

If they were to invest in continuous casting machines and automation in steel melting shops, they would require less labour while simultaneously improving the quality and consistency of the steel they produced (**Exhibit 6.17**). Moreover, investments in cold rolling facilities would also sufficiently increase the value of the steel produced to justify the investment required (**Exhibit 6.18**).

- ¶ **Lack of non-viable investments:** This accounts for around 6 points of the TFP gap. Although these investments do increase quality and hence

value added, they are not viable precisely because the mini-mills themselves are not viable under fair competition. The cost of these investments per ton of steel produced is significantly lower in large plants and therefore becomes economically viable (**Exhibit 6.19**). So the issue is not that these investments are not viable due to factor costs, but that they are not viable because of the lack of scale in small mini-mills. Labour saving investments include automated roll shifters and cranes on the factory floor. For example, a crane for a small mini mill would cost roughly the same as that for an IBFP, but in a small mini mill it would be heavily under utilised, resulting in a higher cost per ton of steel produced.

## **INDUSTRY DYNAMICS**

As mentioned before, prior to liberalisation, the steel industry was controlled and heavily protected by the government. Prices of both steel and its inputs were administered and protected by high import duties. The only new entrants allowed into the industry were small mini mills. Despite massive inefficiencies, no players exited the industry and government-owned players were often subsidised.

Competitive intensity in the industry increased significantly after liberalisation in 1992. The price of steel began to decline (**Exhibit 6.20**) as a result of the entry of many new players, a reduction in import duties (**Exhibit 6.21**) and worldwide overcapacity in steel production. As a result, most players were forced to improve the efficiency of their operations. IBFPs started to rationalise their operations following the sharp decrease in their market share since 1992. Large mini mills with their lean and western style operations successfully gained market share by keeping their costs low despite the distortedly high Indian electricity prices. Finally, small mini mills slowly started going out of business as a result of the fierce competition from large players.

Although productivity growth since liberalisation has been relatively rapid, significant barriers to competition still remain, limiting managers' incentives to further improve efficiency. The problem is two fold: A non-level playing field for different industry segments gives unproductive players (i.e., small mini-mills) an edge, allowing them to remain in business and compete with more productive players; and the remaining import tariffs continue to shield domestic competitors from the threat of foreign competition and exposure to international best practice.

### **Lack of a level playing field**

There are several factors that go towards creating a non-level playing field, which, in turn, allows unproductive players to compete. Most of these factors benefit the

small mini mills and some benefit the IBFPs. This non-level playing field is the reason why small mini mills and rolling mills are still in business today, despite competition from more productive large mini mills.

¶ **Factors benefiting small mini mills:** Energy thefts, tax evasion and local builders' lack of concern for quality are keeping unproductive small mini mills in business. The cash cost of producing one ton of liquid steel in a typical large mini mill (including transportation costs of finished products to the same site where the small mini-mills operate and sell, e.g., from Gujarat to Punjab) is around US\$ 279 (**Exhibit 6.22**). On the other hand, the cost of producing the same quality of liquid steel in a small mini mill in Punjab is around US\$ 364. Tax evasion, tax subsidies, power thefts, and poor concern for quality save small mini mills around US\$ 97, resulting in an effective cost of US\$ 267 per ton of liquid steel. If its advantages were to be removed, then the unproductive small mini mills would be unable to compete against the large mini mills, even within their local market, and would, as a result, be forced out of business.

- **Energy thefts:** Energy thefts reduce the cost of small mini mills by around 15 per cent. Electricity is a major input for small mini mills, and is needed to run electric arc furnaces to melt the scrap. It is common for small mini mills to steal a proportion of the electricity they use. In one of the mini mills we visited, for instance, we actually saw the workers hooking up power cables to overhead pylons to bypass the billing meters. Local inspectors and government officials are often bribed to turn a blind eye to this overt theft. Such practices can give small mini mills a significant advantage over large mini mills, which are more “visible” and therefore less likely to steal electricity.
- **Insufficient concern over quality:** The biggest customer of small mini mills is the local construction industry. The tendency of local builders to cut costs at the expense of quality and the lack of strict enforcement of building codes creates a large market for sub-standard steel (*see* Volume 3, Chapter 1: Housing Construction). Small mini mills that produce sub-standard products and save money on processing and input costs serve this market. The importance of product branding and a desire to develop a reputation for quality deter larger players from serving it.
- **Tax evasion:** Non-level taxes decrease the cost of small mini-mills by around 8 per cent. Small mini mills often avoid taxes by under-declaring their sales figures. Again, local officials are often bribed and turn a blind eye to this tax evasion. These tax savings give small mini mills an unfair advantage over both larger players and more ethical

ones. Thus, even though new, small players are less productive, these substantial savings allow them to undercut established players on price.

- ¶ **Factors benefiting IBFPs:** Subsidised inputs, especially cheap iron ore and coal, as well as direct subsidies for government-owned plants, such as cheap loans and bail-out packages, allow IBFPs to be competitive, despite their low productivity.
- **Iron ore and coal mining:** Long-term mine leases provide IBFPs with iron ore and coal at their variable cost of production, reducing costs by around 15 per cent (**Exhibit 6.23**). This lower cost gives them an advantage over both large mini mills and steel imports. The cash cost of one ton of slab produced by a large mini mill is approximately US\$ 195. The equivalent cost at a typical IBFP is only US\$ 170 per ton of slab. However, if this iron ore and coal were to be priced at market rates, the cost of one ton of slab produced by an IBFP would jump to US\$ 222, making IBFPs less competitive than large mini mills. These indirect subsidies have helped IBFPs remain competitive, despite lower productivity. If they were removed then IBFPs would be forced to improve productivity in order to remain competitive.
  - **Government subsidies:** Subsidising projects and bailout packages for government-owned steel plants allow these plants to survive even though they are less productive than most large private players.

### **Lack of exposure to best practice**

Import duties on finished steel continue to keep the domestic price of steel in India significantly higher than the international price (**Exhibit 6.24**). Without import duties, the landed costs (including freight) of an imported ton of steel slab would be around US\$ 180. This cost would compete favourably with most of the steel currently produced by domestic Indian players. However, the import duty of US\$ 39 provides a buffer for domestic steel producers, thereby limiting the competitive pressure on plant managers from more productive international steel producers.

### **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

In this section we have delineated the external factors that lead to sub-optimal productivity in the Indian steel industry. We have also summarised how far each of these factors is responsible for the gap between potential and actual labour and capital productivity.

Despite recent liberalisation efforts, TFP remains low in the Indian steel industry (**Exhibits 6.25 & 6.26**). As already enumerated, there are six factors that explain low TFP in the Indian steel industry. They are:

¶ **Government ownership of steel companies:** This leads to lower productivity in both labour and capital.

The pursuit of the government's social objective of employment creation has led to massive over-employment, resulting in the poor labour productivity of government-owned plants. Moreover, these plants are continuously rescued from financial trouble through bailout packages and their operational inefficiencies regularly subsidised, thus allowing them to survive without massive restructuring.

As a result of the government's societal objectives, steel plants have, over the years, been used as employment creation tools. In particular, prior to an election in the country, the plants were in the habit of employing thousands of extra workers to win votes for the government. Many of these workers now sit idle for much of the day, greatly reducing labour productivity. Similarly, the government's employment creation objectives have also reduced the managers' incentives to improve OFT. As one plant engineer stated, "If you have to employ all these people, then you might as well use them."

A similar argument holds true for the lack of investment in viable capital. If a plant is forced to retain all its workers it has no incentive to make labour saving investments in automation

Moreover, government ownership contributes to low capital productivity. Lack of quick decision-making and long bureaucratic procedures for tendering results in large time over-runs when building or modifying steel plants. Lack of clear project accountability coupled with corruption leads to over-invoicing of equipment.

¶ **Governance of state-owned banks and minority shareholder rights:** State-owned banks are often important financiers of private projects. Lack of profit pressure on bank officials results in minimal pressure on steel plant promoters to generate a return on the capital that they borrow. As a result, time and cost overruns are common and equipment over-invoicing also occurs.

There is no enforcement of minority shareholders rights. This allows promoters of private steel plants to get away with time and cost overruns as well as over-invoicing of imported equipment. The costs of these inefficiencies are ultimately borne by the minority shareholders who are left with non-performing shares. Government-owned banks and insurance companies, who, again, have little incentive to perform, hold

many of these shares. The cost of this is, therefore, ultimately passed on to the taxpayer.

- ¶ **Product market barriers:** There are two important product market barriers. The first of these is import duties, which limit exposure to international best practice steel players. The second is tax evasion by small players, which creates a non-level playing field, giving them an advantage over larger, more productive players. Tax subsidies given to government companies also create a non-level playing field resulting once more in a disadvantage for private players.
- **Import duties:** Despite their reduction after 1992, from close to 75 per cent to around 25-30 per cent, import duties still protect the Indian industry from the threat of foreign players. As a result, Indian players are sheltered from price-based competition with global best practice players. This only serves to reduce the incentive for Indian players to increase the efficiency of their plant operations and make economically viable investments.
  - **Tax subsidies and tax evasion:** Heavy subsidies given to new companies in underdeveloped areas lead to the proliferation of small-scale players. Moreover, small mini mills commonly evade taxes by under-declaring their sales. This gives them an unfair advantage that allows them to survive and compete unfairly against larger, more “visible” players.
- ¶ **Related industry barriers:** Three related industries – power, construction and mining – contribute towards creating a non-level playing field for the steel industry. This non-level playing field allows small, fundamentally uncompetitive mini mills to survive and also reduces the pressure on IBFPs to achieve their full productivity potential.
- **Power industry:** The power industry creates a non-level playing field for the steel industry in two ways: First, some small mini mills steal power, thereby reducing their costs by over 15 per cent. Second, inefficiencies in the Indian power sector result in artificially high electricity costs creating an advantage for IBFPs who use blast furnaces in their production process. Most large mini mills have overcome high electricity costs by investing in captive power generation facilities.
  - **Construction industry:** The lack of concern for quality steel by developers and contractors and the lack of enforcement of strict building standards benefit many of the small mini mills and rolling mills that typically serve only their local construction markets. Larger

players would not produce sub-standard steel because it would damage their brand.

- **Iron ore and coal mining industry:** The government has granted long-term leases on iron ore and coalmines to the IBFPs. This enables them to obtain iron ore and coal at variable costs allowing them to compete successfully with currently more productive large mini mills and foreign imports. Under a free market scenario the mines would be free to sell their ore and coal on the international market and realise much higher prices.

¶ **Labour market barriers:** Labour market barriers do not lower the productivity potential of the steel industry. They do, however, affect how rapidly the industry can achieve this potential.

While it is difficult to fire workers except on disciplinary grounds, the workforce can be rationalised using voluntary retirement schemes (VRS). This has been exemplified by the recent success of such schemes in various IBFPs. For example, Tata Steel has reduced more than 20,000 workers over the last 4-5 years and SAIL has reduced close to 15,000 workers and plans to reduce 55,000 more (30 per cent of its workforce) over the next 3-5 years. A more efficient labour market such as that of the US – where labour retrenchment is allowed – coupled with privatisation of government-owned companies would enable the Indian steel industry to quickly reach its potential labour productivity.

## INDUSTRY OUTLOOK

We expect the domestic steel sector to grow. Growing domestic demand will be met largely through domestic production and imports will play only a marginal role. The rate of growth of the industry will depend on the nature of the reforms carried out within the sector and across the Indian economy. Keeping this in mind, we have developed a perspective on the evolution of the sector under three differing scenarios. On the issue of technology, we expect both IBFPs and DRI based mini mills to be competitive in India.

In this section we describe the evolution of the sector in these three scenarios, lay out the rationale for the relatively small role of imports and assess the different technology options.

## Scenarios

To evaluate the outlook on output, productivity, and employment, we considered three possible future scenarios: status quo; reforms in steel alone; and reforms in all sectors (*see* Volume I, Chapter 4: Synthesis of Sector Findings).

- ¶ **Status quo:** In this scenario, we estimated that India's GDP per capita would continue to grow at the current rate of around 4 per cent a year. Under such conditions, steel output would grow at 5 per cent overall, while productivity would also grow at 5 per cent resulting in no change in employment.
- Annual consumption per capita would increase from 26 to 34 kg per capita resulting in an overall output increase of 5 per cent a year, from 24 to 41 million tons a year. Under these conditions, there would only be a marginal increase in the average value of each ton of steel produced. The reason for this is two fold. First, many small mini mills producing sub-standard steel would remain in business. Second, demand for white goods and cars would not increase enough to significantly boost domestic production of cold rolled products.
  - Under the status quo scenario, the productivity of the steel industry would reach 19 per cent of US levels. Although productivity grew at 16 per cent in the past, it is likely to taper down to 5 per cent in the future as we do not expect any new, more productive large players to enter the industry as they did after deregulation in 1992. The small mini mills would remain in the market, supported by non-level taxes and energy payments. Increased output and some ongoing reduction in surplus workers would increase productivity of large mini mills from 76 to 90 per cent of US levels and productivity of IBFPs from 17 to 25 per cent. Productivity improvements would primarily be driven by the ongoing plant reorganisation being forced by the current non-profitability of most players. As a result, employment would remain the same at around 377,000 people.
- ¶ **Reforms in steel alone:** In this scenario, India's GDP per capita would again continue to grow at 4 per cent a year and related industry barriers would not be removed. As a result, we estimated that output would grow at 6 per cent, productivity at 16 per cent and employment would decline at 9 per cent per year.
- Annual consumption per capita would increase from 26 to 34 kg per capita resulting in an overall output growth of 5 per cent a year, from 24 to 41 million tons a year. In addition, improvements in the quality of steel produced would further increase output by 0.8 percentage points. This would be the result of sub-standard players being forced

to exit the industry, thus improving the average quality of steel produced.

- Steel industry productivity would rise from 11 to 50 per cent of US levels. In this scenario, we estimated that 55 per cent of small mini mills would close down, mainly due to an increase in competition from larger players who would become more productive due to reforms in the sector. All additional capacity would be created as the result of a combination of debottlenecking of the existing IBFPs and large mini mills as well as by building new, large DRI-based mini mills and IBFPs. Experts estimate that since many plants were designed without concern for maintaining equal capacity in each process, the scope for debottlenecking Indian plants is as high as a 50 per cent increase in capacity. Most of the sub-standard small mini mills would therefore exit the industry, and those that remained would be forced to improve their productivity. In this scenario, all segments would be likely to achieve their potential productivity, thereby increasing productivity by around 16 per cent per year. As a result, employment would fall from 377,000 to 154,000 people, a decline of 9 per cent a year.

¶ **Reforms in all sectors:** In this scenario, India's GDP would grow at around 10 per cent per year. As a result, we estimated that output would grow at 12 per cent, productivity at 21 per cent reaching 78 per cent and employment decrease at 8 per cent a year (**Exhibit 6.27**).

- Annual consumption per capita would increase from 26 to 64 kg per capita resulting in an output growth of 12 per cent a year, from 24 to 75 million tons a year. In addition, the improved quality of steel produced would further increase output growth by 1 percentage point. This quality improvement would be mainly the result of sub-standard players exiting the industry and an increase in demand for high value steel from the automotive and white goods industries. This growth of 12 per cent a year is more than feasible since, during the 1960s, Japan and Korea grew their steel outputs by 17 and 18 per cent respectively (**Exhibit 6.28**).

An additional driver of consumption in this scenario will be reforms in the construction sector. This sector is currently output constrained. Reforms in this sector would remove these constraints and unleash an unmet demand for housing, increasing the demand for steel. The increased demand for quality steel would force small mini mills out of business and increase the value addition of the steel industry. Similarly, if the power sector were reformed, the construction of new power generation plants to meet the increased power demand would also drive the demand for steel.

- Steel industry productivity would rise from 11 to 78 per cent of US levels. In this scenario, we estimated that 80 per cent of small mini mills would close due to the levelling off of the playing field. Tax subsidies would be removed, tax collection would be better enforced, power thefts would be prevented, power prices made economic and the market for sub-standard steel eliminated. The small mini mills that remained would mostly be players competing in niche markets, such as spring steel or galvanised steel. All additional capacity would be created by debottlenecking the existing IBFPs and large mini mills as well as by building new, large DRI-based mini mills and IBFPs. As in the previous scenario, all segments would be likely to achieve their potential productivity, thereby increasing productivity at around 21 per cent per year. As a result, employment would fall from 377,000 to 185,000 people, a decline of 8 per cent per year.
- Current capacity in India is approximately 46 million tons per year, of which 19 mtpa is from the IBFPs, 6.5 mtpa from the large mini mills and 20.7 from the small mini mills. We estimated that an additional 12 mtpa could be created by debottlenecking the existing capacity but 80 per cent of the small mini mills would have to be shut down. Our complete reforms scenario would result in an additional capacity requirement of 46 mtpa by 2010 (**Exhibit 6.29**).

### **Steel imports**

If reforms in the steel sector are implemented, we estimate that the increase in consumption will be met mostly through increased domestic production rather than increased steel imports. Imports will not be able to compete with the potential lower costs of newer, more productive, large Indian plants. However, import levels may rise in the short term while new capacity is being built.

An analysis of the cost structure of steel producers at their productivity potential reveals that Indian steel is likely to be cheaper than imports from low cost countries such as Korea (**Exhibit 6.30**). Including freight but excluding duty, typical cash costs of imports stand at around US\$ 180-190 per ton of slab. On the other hand, the full cost (including capital) of a new plant in India could be around US\$ 185. Under this scenario, Indian domestic producers would compete favourably, especially if we were to take into account the currency risks inherent in importing steel.

There may, however, be a short-term increase in steel imports. This is because the closure of the small mini mills and the increase in domestic demand for steel will create a large demand for new capacity. Until new capacity is built, imports of steel may rise to meet this demand.

## New capacity

Given that new capacity will need to be built in India, we have made some preliminary assessments of which technology options would be most effective in India under a scenario of full reforms. In our cost comparisons we have assumed that all new plants operate at their productivity potential and that all inputs are priced economically.

¶ **Estimates of future costs of each technology:** According to our analysis, both DRI-based mini mills and integrated blast furnace plants (IBFPs) are likely to be the two cheapest technologies for the Indian steel industry. We considered three technology options, namely, IBFPs, DRI-based mini mills and scrap-based mini mills. In eastern India, cost estimates show that IBFPs are likely to be marginally cheaper due to their close proximity to coal and iron ore mines (**Exhibit 6.31**). In western India, DRI-based mini mills are likely to be marginally cheaper due to higher gas availability. The capital costs of these two options are not dissimilar (**Exhibit 6.32**). The small difference in the relative costs of the two technologies may mean that DRI-based mini mills become cheaper in eastern India if the cost of capital rises from the current value of 16 per cent to 19 per cent or higher. This should be taken into consideration in a country where capital is scarce and may become scarcer going forward if, for example, the country risk rises. Scrap-based mini mills are not cost effective in India due to the high price of scrap.

Despite obvious differences, we feel that these estimates are not significant enough to warrant a definitive assessment of the cheapest technology at each location. The builder of any new plant will need to base his technology decision on several things, including the location of the market he wishes to serve, the logistics of material handling and any long term input supply contracts he can negotiate.

Moreover, our analysis is very sensitive to the prices of inputs. A change of more than around 15 per cent in the price of most major inputs can make one technology cheaper than the other (**Exhibits 6.33 & 6.34**).

¶ **Estimates of economic pricing of inputs:** Our analysis is based on the assumption that the plants are ideally efficient and inputs economically priced. Current administered prices often provide highly subsidised input prices to the steel industry, artificially lowering steel costs. We have made estimates of the economic prices for the major inputs to steel production (**Exhibits 6.35 & 6.36**).

In our calculation of economic prices, we have assumed equal bargaining power for the steel producer and the input provider. The economic prices are set by international standards, accounting for the freight costs to

deliver the input to the international market. These are different in the east and west of India. In the east the mines are further inland, thus inputs incur a higher freight cost to reach the coast. There are two outer bounds to the economic price. The upper bound is calculated assuming that all the bargaining power resides with the input supplier. The lower bound is calculated by assuming that all the power resides with the steel producer. The actual price is somewhere in between, depending on the relative bargaining power and negotiating skill of each player. As steel producers gain more power, IBFPs will become more viable in the east of India and DRI-based mini mills will become more viable in the west (**Exhibit 6.37**).

For example, the current international price of iron ore lump landed in Calcutta is around US\$ 29 and the freight cost to bring it to the steel plant, which is located next to the Indian iron ore mine, is US\$ 7. If all the bargaining power were to rest with the iron ore mine, then the cheapest alternative would be for the steel plant to import the ore from abroad. This would cost US\$ 36 and set the upper bound. However, if power were to rest with the steel producer and the only alternative market for the iron ore mine were to be the international one, then the value realised by the iron ore mine would be the international price, US\$ 29, minus the cost of delivering it to a foreign port, US\$ 14. In this case the mine would realise only US\$ 13 and this would set the lower limit. We have estimated the price to be mid-way between the two, at US\$ 24.5.

## **POLICY RECOMMENDATIONS**

To achieve large productivity and output gains in the steel industry, India needs to privatise its state-owned enterprises. In addition, the government should remove tax subsidies, enforce better tax collection and remove barriers in the construction and power sectors to level the playing field in the industry.

We will now discuss specific policy steps that the government should take to tackle each of these issues. We will also highlight key concerns that will be raised by the potential stakeholders (if any) for each of these issues, as well as potential counter arguments.

- ¶ **Privatise government steel companies:** Government-owned steel plants need to be privatised. To make these institutions attractive to investors, the government should restructure these companies prior to privatisation. This may require certain debts to be partially written off or restructured. Other measures could include converting a large part of the state government debt to equity and using part of the privatisation proceeds to

retire debts. We believe that the proceeds from the privatisation of companies could easily help repay some of the debts and write off receivables from customers.

Some politicians and union leaders believe that it is government and bureaucratic interference, and not government ownership per se, that causes the poor performance of state-owned enterprises. They therefore believe that a lack of interference, and not privatisation, is the solution to improving performance. In our view, however, the government should acknowledge that it has a conflict of interest in owning commercial entities, as its social obligations and the commercial interests of the companies it owns are at odds with each other. Hence, it has no option but to divest its stake. Moreover, the facts show that private steel plants in India have fared better than government-owned ones.

- ¶ **Privatise government banks and insurance companies:** To eliminate time and cost overruns and equipment over-invoicing, which is now a common business practice, it is essential to privatise the state-owned banks. Profit pressures in the private sector will ensure that bank managers undertake due diligence to control the time and cost overruns as well as the over-invoicing.
- ¶ **Reduce import duties:** To ensure continued exposure to best practice, the government should eliminate current import duties of 30 per cent by 2010. This will give existing players enough time to improve OFT, retrench surplus workers and make viable investments. We estimate that it will take 10 years for players to reach their potential. A gradual reduction in duties over a 10-year period will result in a corresponding decrease in the domestic price of steel, forcing producers to increase their productivity in order to continue making a profit.
- ¶ **Eliminate subsidies:** Subsidies to government companies must be removed to level the playing field and allow fair competition between different players.
- ¶ **Enforce more efficient tax collection:** The government should enforce better collection of taxes and remove the non-level playing field that benefits small players. This can be done by increasing the salaries of tax officials and imposing heavier penalties for corruption. Second, the tax authorities need to become more aware and vigilant about tax evasion. One way to do this is for the authorities to increase their awareness of companies' real, as opposed to stated, sales. They can do this by measuring companies' input, for example electricity usage, which will give an indication of their output. Encouraging anonymous reporting of tax evasion could also be effective.

- ¶ **Enforce better standards of building and infrastructure construction:** Better enforcement of building standards and the creation of consumer protection laws and consumer representation agencies are necessary to prevent the sale of sub-standard steel products. The lack of enforcement of standards in Indian construction is the result of insufficient competition between developers and builders (*see* Volume III, Chapter 1: Housing Construction). Sub-standard building materials are very commonly used and can have a devastating effect as demonstrated by the innumerable buildings that collapsed during the recent Gujarat earthquake tragedy.
- ¶ **Reform the power sector:** Currently the smaller and less productive players are able to survive by evading power and tax payments. Evading power payments gives them significant advantage over larger players. Reforming power sector, especially the privatisation of distribution, will ensure prevention of power thefts, thereby leveling the playing field between large and small players. Preventing the theft of power also requires the introduction of centralised metering using tamperproof meters (*see* Volume III, Chapter 2: Electric Power).
- ¶ **Relax labour laws:** To accelerate productivity growth in steel, the government should lift the labour laws restricting retrenchment. The government should instead establish a system that allows companies to let employees go by offering them a severance package. Such a system is in place in many countries. In the UK, for example, companies have to make a redundancy payment of between one and one-and-a-half weeks' salary for every year of service. Productivity can also be increased if players are allowed flexibility in their use of contract labour. To this end, the government should amend the Contract Labour Act to allow the use of contract labour for all activities, and not just activities of a temporary nature.

## Appendix 6A: Calculating total factor productivity

We used total factor productivity as a measure of productivity in the steel sector. TFP is the weighted average of labour and capital productivity in the sector.

To define the operational causes of low productivity, we compared the productivity levels of India and the US and systematically identified the different factors that explained the gap between the two. Using this set of causal factors we went on to investigate the external causes of low productivity and, hence, the barriers to productivity growth. Higher productivity leads to lower output costs that, in turn, translate into a growth in output and a lowering of prices. We assessed the impact of different policy scenarios on productivity, output and employment and completed the case by evaluating the investment requirements and technology choices that the industry was likely to face going forward.

Our productivity estimates were based on aggregate sector data as well as extensive interviews and company visits. Industry figures were based on official industry output and employment statistics. Our “bottom-up” productivity estimates for each segment were based on information on output and employment for individual plants.

Employment figures were corrected to exclude those jobs performed by Indian steel plant employees that are not a part of US steel plants (**Exhibit 6.38**), e.g., jobs of doctors, schoolteachers and social workers.

Capital stock was defined as the dollar value of equipment and buildings currently invested in the industry. Aggregate figures for capital stock were calculated using the gross fixed capital formation (GFCF) series from the CSO. These nominal figures were deflated using an inflation index calculated from several interviews with industry experts. Real figures in rupees were then converted into US dollars using a PPP (Purchasing Power Parity) for steel-making equipment calculated through interviews with steel plant design engineers.

Physical output figures were adjusted to reflect differences in value-added vis-à-vis our benchmark countries. In particular, we adjusted the physical output figures to account for three main factors (**Exhibit 6.39**):

- ¶ **Quality difference:** An average 16 per cent penalty was applied to Indian steel.

- The quality penalty applied to steel produced by large Indian players was around 10 per cent. We based this on the price differentials for Indian and US steel in international markets. This difference was driven by two key elements. First, there were the differences in the average quality of steel produced by these players, particularly in their chemical composition. Second, the greater likelihood of Indian steel being below the agreed upon specification on delivery.
  - The quality penalty applied to steel produced by small Indian players was around 30 per cent. This differential was based on the cost structure information obtained from expert interviews. Small mini mills typically produce substandard products that are purchased by the local construction industry. Many rolling mills process scrap without even melting it, and ship-breaking scrap is often rolled directly into a “finished” product.
- ¶ **Product mix:** A 4 per cent penalty was applied on account of differences in product mix. On average, India produces lower value-added products than the US. Typically, cold rolled flats have higher value added than long products. To adjust these differences, a value-added index was calculated for each product and then applied to the mix of products produced in India and the countries benchmarked.
- ¶ **Vertical integration:** A penalty of 3 per cent was applied to adjust for the differences in vertical integration. The proportion of steel produced using mini mills in India is greater than in the US, resulting in a productivity penalty (**Exhibit 6.40**). Mini mills add less value per ton of finished steel than integrated plants since they start production from scrap, an already semi-processed product.

## Appendix 6B: Estimating demand

Given the 1.7 per cent population growth forecast, steel consumption was calculated using a steel intensity curve relating GDP per capita and steel consumption per capita across countries. In order to improve the fit, we limited our curve to countries with a GDP per capita of less than 30 per cent of the US. We also excluded planned economies from our sample to avoid distortions from state-directed investment in heavy industries in these countries (**Exhibit 6.41**).

We found that the relationship between GDP per capita and steel consumption per capita was influenced by two main drivers:

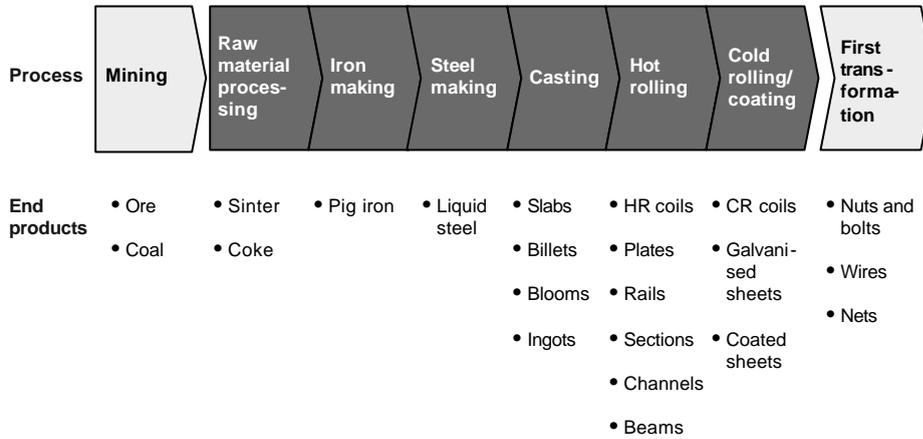
- ¶ **Infrastructure development:** In the GDP range that India is about to enter, countries typically undergo a period of massive infrastructure development (power plants, ports, roads, bridges, construction). Most infrastructure projects require large quantities of steel; hence the demand for steel will increase over the next 10 years.
- ¶ **Demand for cars and white goods:** Again, in the GDP range that India is about to enter, the percentage of the population that can afford cars and white goods increases dramatically. Given that these products have a large steel component, an increase in domestic production of these products will also boost the demand for steel.

Further, consumers will demand a higher quality of steel and the demand pattern will swing away from low value long products towards higher value-added products such as cold rolled sheets for cars and white goods.

Exhibit 6.1

## SCOPE OF THE VALUE CHAIN ANALYSED

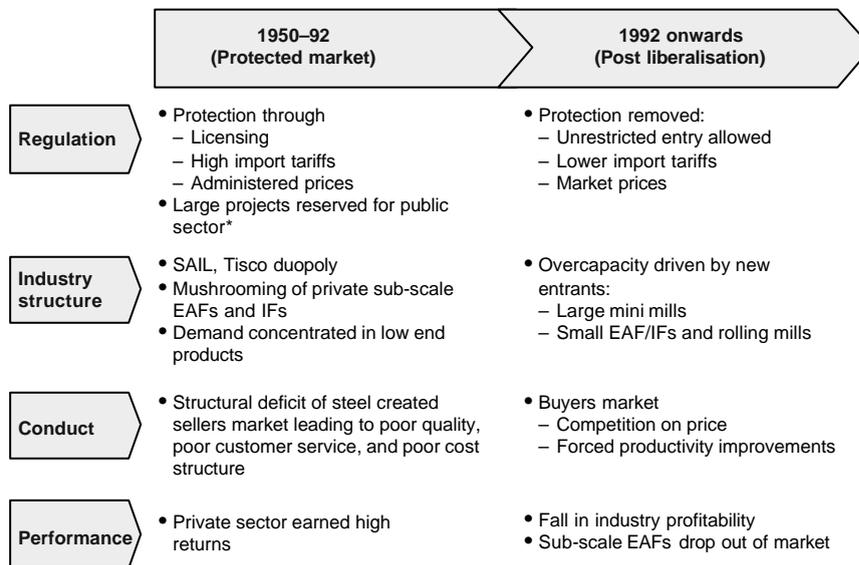
 Included



Source: McKinsey analysis

Exhibit 6.2

## INDIAN STEEL INDUSTRY DEVELOPMENT



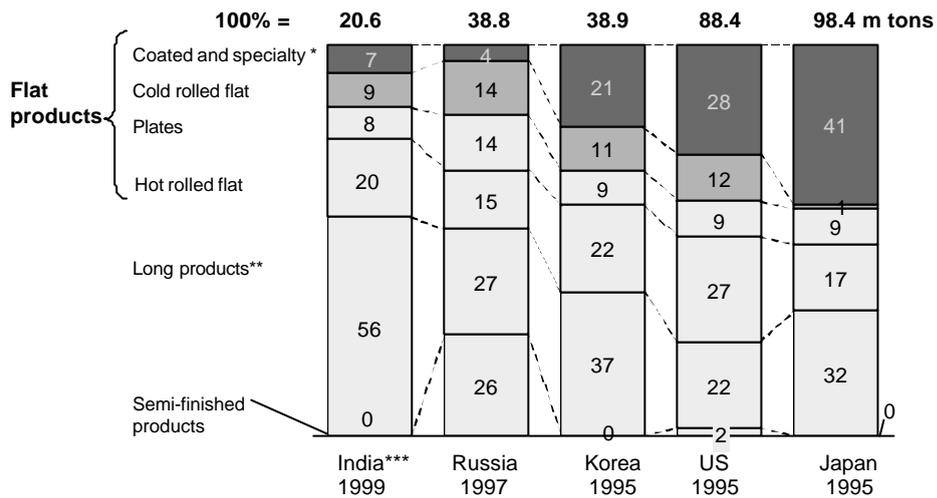
\* Except Tata Steel which was also granted large scale permission

Exhibit 6.3

**PRODUCT MIX**

Per cent of tons of finished steel\*\*\* products produced

High value  
Medium value  
Low value



\* Includes stainless, galvanised tin plate, other specialty products

\*\* Includes wire rod, sections, seamless tubes, rails, reinforcement bars, bars

\*\*\* Tons of finished steel adjusted for double accounting

Source: INFAC; MGI Russia study

Exhibit 6.4

### SEGMENTATION OF INDIAN STEEL INDUSTRY

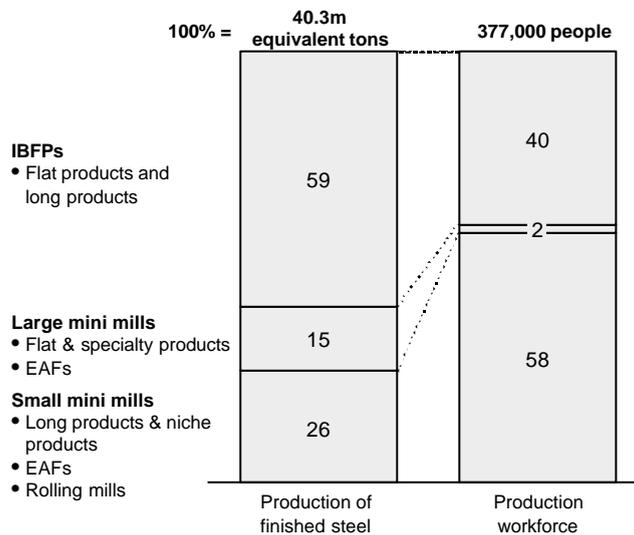
	<u>Integrated blast furnace plants</u>	<u>Large mini mills</u>	<u>Small mini mills and rolling mills</u>
<b>Raw materials</b>	Iron ore, coke	Iron ore, electricity	Scrap, semis, electricity
<b>Production/Capacity</b>	2m to 4m tons	0.5m to 2m tons	Less than 0.5m tons Often less than 0.1m tons
<b>Technology/ Equipment</b>	Complex production flow (Blast furnace → Basic oxygen furnace → Casting → Rolling)	Single production line (DRI/HBI/COREX → Electric arc furnace → Continuous casting → Rolling)	Single production line (Electric arc furnace/ Induction furnace → Rolling) or just hot rolling
<b>Product range</b>	Wide variety of flat and long products including higher value-added products	Mainly high value flat products	Mainly long products of low quality
<b>Markets</b>	Domestic and global markets	Domestic and global markets	Mainly local markets
<b>Investment level</b>	Requires high investments (Almost twice than that of mini mills for equivalent capacity)	Medium – high investments to install and maintain	Typically small investment

Source: McKinsey analysis; Expert interviews

Exhibit 6.5

### THE INDIAN STEEL INDUSTRY, 1999

Per cent of value added

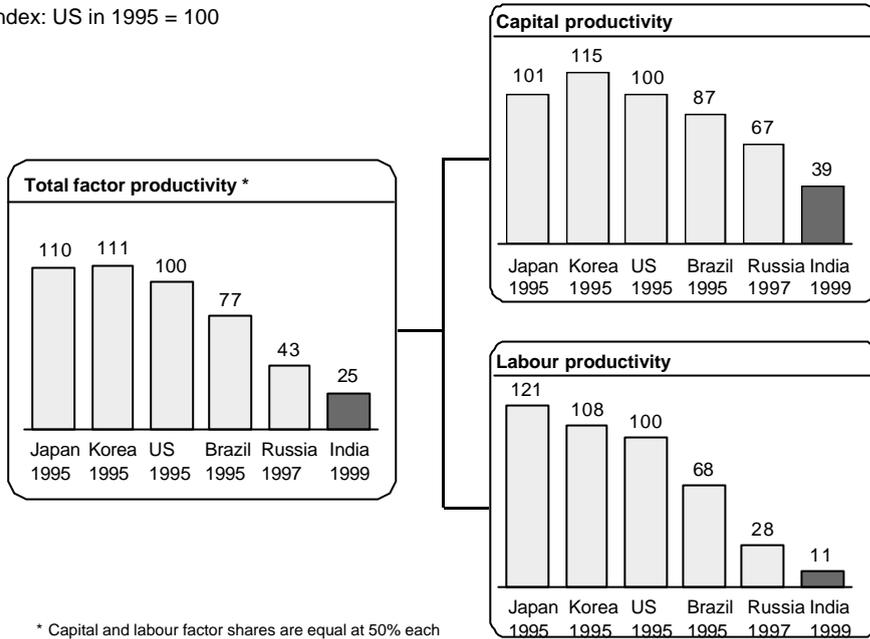


Source: INFAC; Annual reports; Ministry of Steel; Interviews; India infoline

Exhibit 6.6

### STEEL INDUSTRY PRODUCTIVITY BY COUNTRY

Index: US in 1995 = 100



\* Capital and labour factor shares are equal at 50% each  
 Source: Industry associations; VDH; James King

Exhibit 6.7

### STEEL INDUSTRY CAPITAL PRODUCTIVITY: INDIA vs. US

Index: US in 1995 = 100

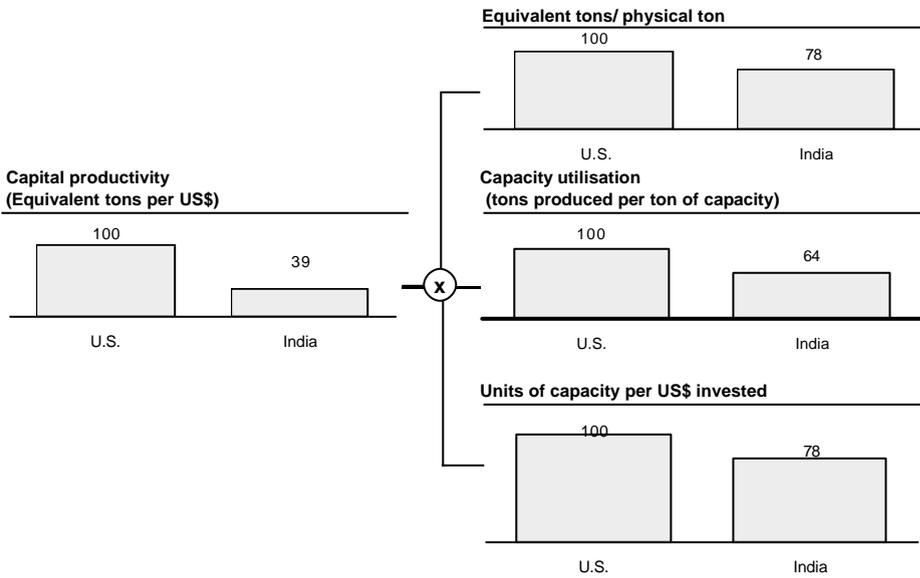
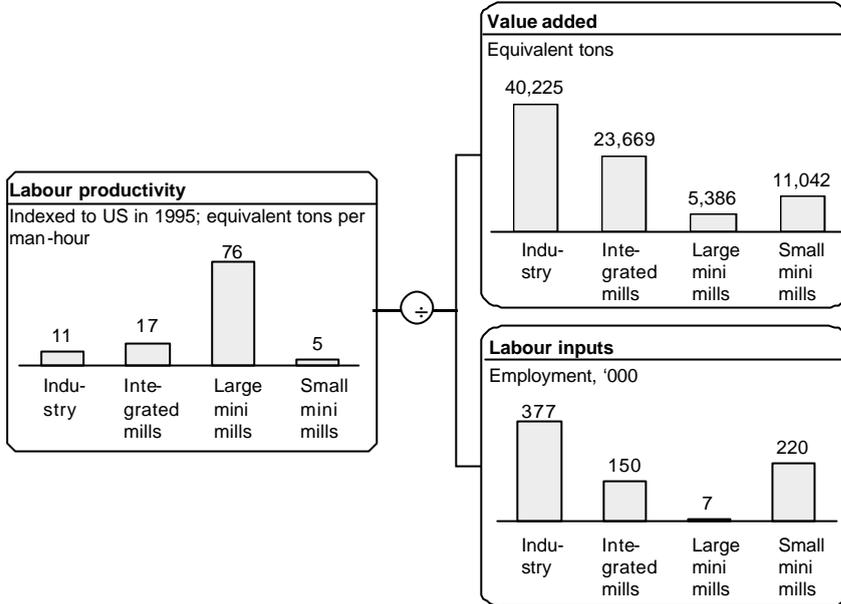


Exhibit 6.8

### LABOUR PRODUCTIVITY BY INDUSTRY SEGMENT

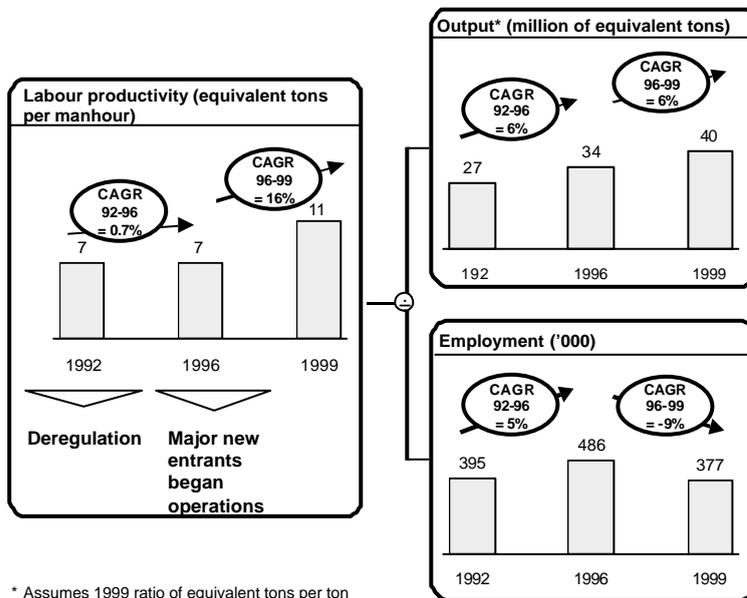


Source: McKinsey analysis; Interviews; CSO; CMIE

Exhibit 6.9

### EVOLUTION OF INDIAN LABOUR PRODUCTIVITY AFTER DEREGULATION

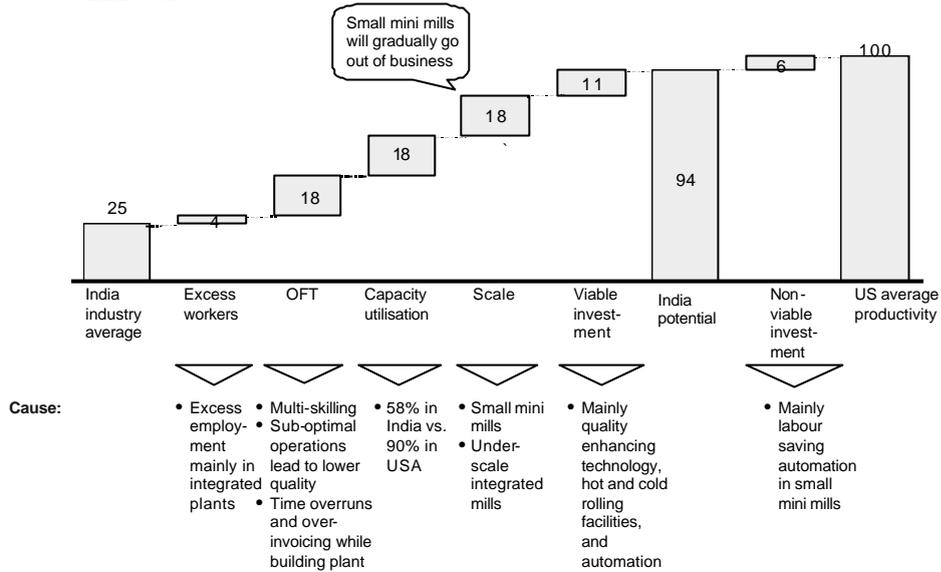
Indexed to US=100 in 1995



\* Assumes 1999 ratio of equivalent tons per ton  
Source: CSO; Worldsteel; INFAC, McKinsey analysis

Exhibit 6.10

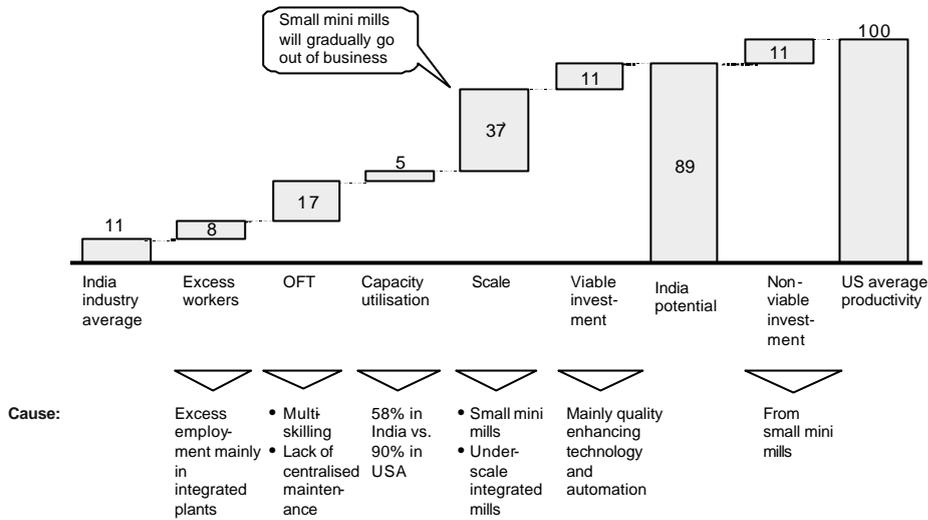
## CAUSAL FACTORS FOR TOTAL FACTOR PRODUCTIVITY DIFFERENCES IN STEEL INDUSTRY



Source: McKinsey analysis; Interviews; CSO, Joint Plant Committee, CMIE; India Infoline.com; Worldsteel.org; Paine Webber

Exhibit 6.11

### CAUSAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES IN STEEL



Source: McKinsey analysis; Interviews; CSO, Joint Plant Committee, CMIE; India Infoline.com; Worldsteel.org, Paine Webber

Exhibit 6.12

### CAUSAL FACTORS FOR CAPITAL PRODUCTIVITY DIFFERENCES IN STEEL

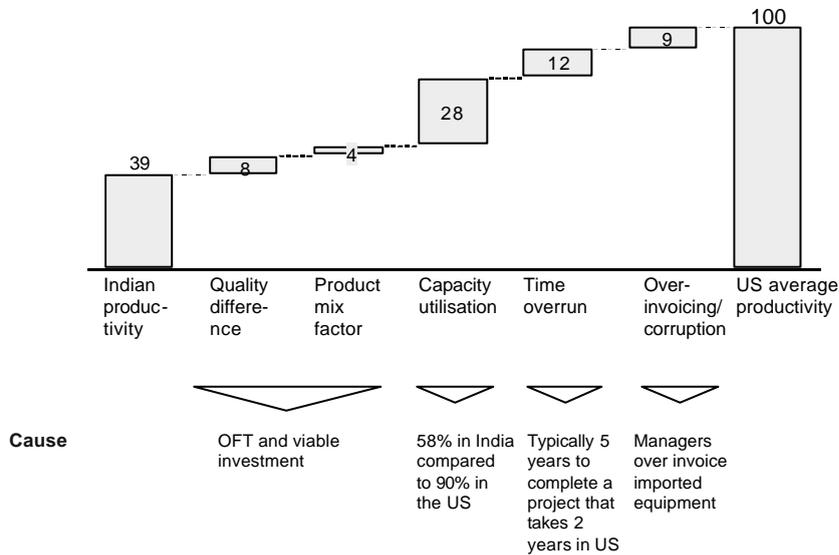
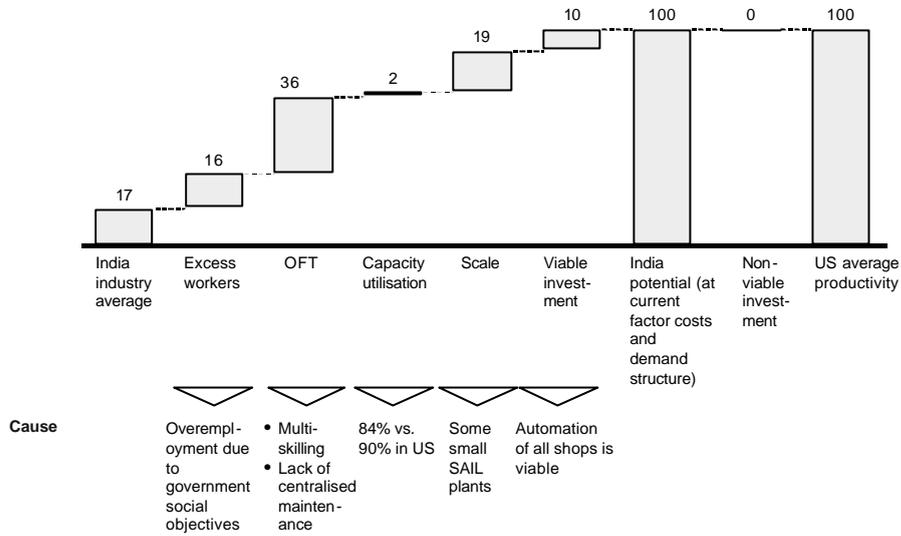


Exhibit 6.13

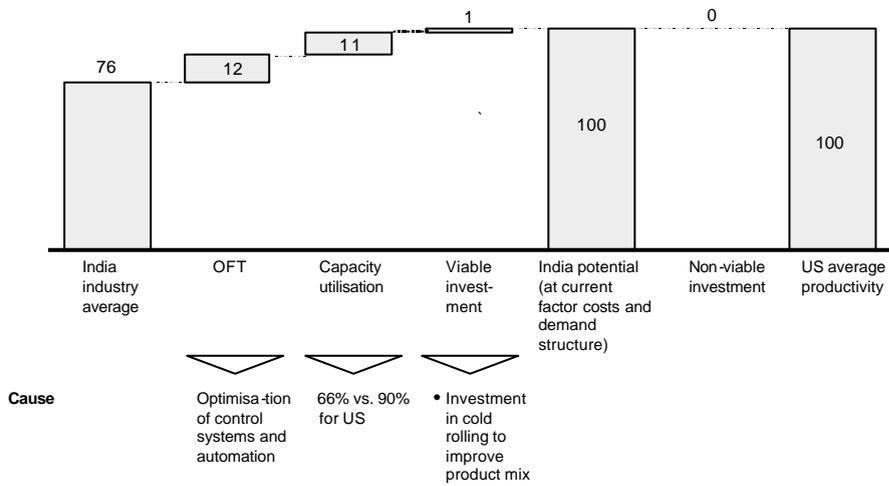
### CAUSAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES IN INTEGRATED STEEL MILLS



Source: McKinsey analysis; Interviews; CSO, Joint Plant Committee, CMIE; India Infoline.com; Worldsteel.org, Paine Webber

Exhibit 6.14

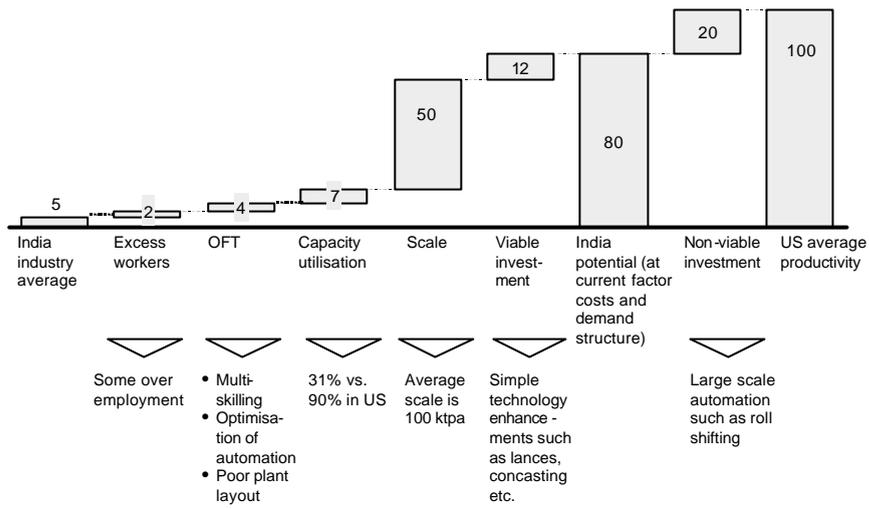
### CAUSAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES IN LARGE MINI MILLS



Source: McKinsey analysis; Interviews; CSO, Joint Plant Committee, CMIE; India Infoline.com; Worldsteel.org, Paine Webber

Exhibit 6.15

## CAUSAL FACTORS FOR LABOUR PRODUCTIVITY DIFFERENCES IN SMALL MINI MILLS AND ROLLING MILLS

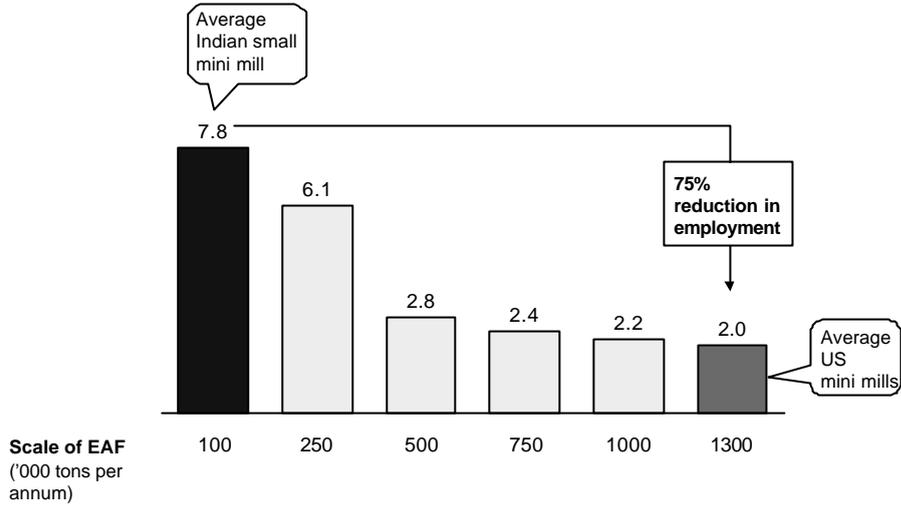


Source: McKinsey analysis; Interviews; CSO, Joint Plant Committee, CMIE; India Infoline.com; Worldsteel.org; Paine Webber

Exhibit 6.16

### IMPACT OF SCALE ON LABOUR PRODUCTIVITY IN SMALL MINI MILLS

Man-hours per ton



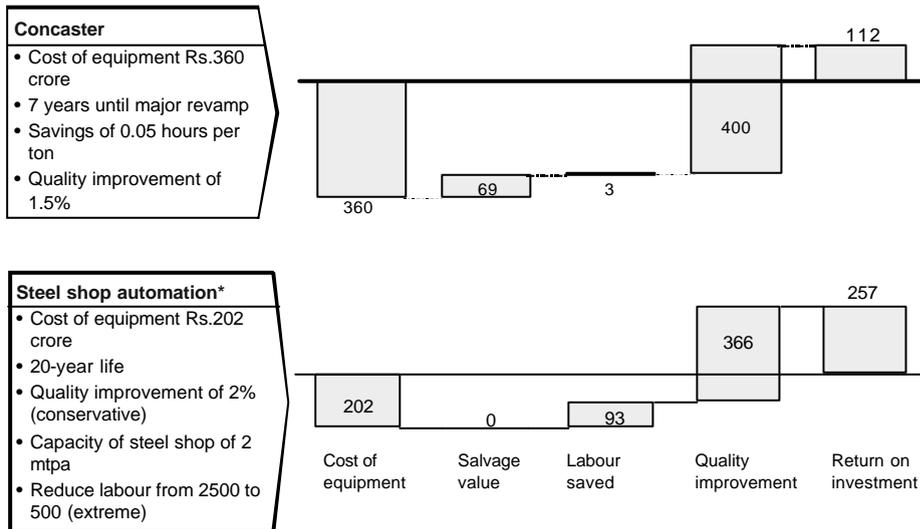
Source: McKinsey Steel Practice; Team analysis

Exhibit 6.17

### NPV OF INVESTMENTS UNDER INDIAN CONDITIONS

ILLUSTRATIVE

Rupees crore



\* Includes control system for LD converters, subblance in LD converted, combined blowing  
 Note: Assumes WACC of 16%; cost of labour Rs.42 /hour

Exhibit 6.18

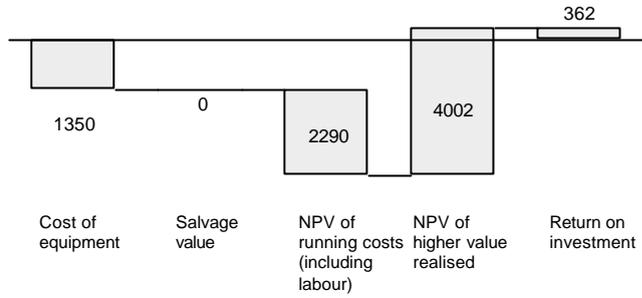
**NPV OF INVESTMENTS UNDER INDIAN CONDITIONS**

ILLUSTRATIVE

Rupees crore

**Cold rolling plant (1.7 m tpa)**

- Cost of plant Rs.1350 crore
- 20-year plant life
- 400 people required to run it
- Running cost Rs.3,000 per ton at 90% capacity (200 kwh)
- Price of CR Coils/ GP-GC Rs.22,000 /ton
- Price of HR coils Rs.16700 /ton



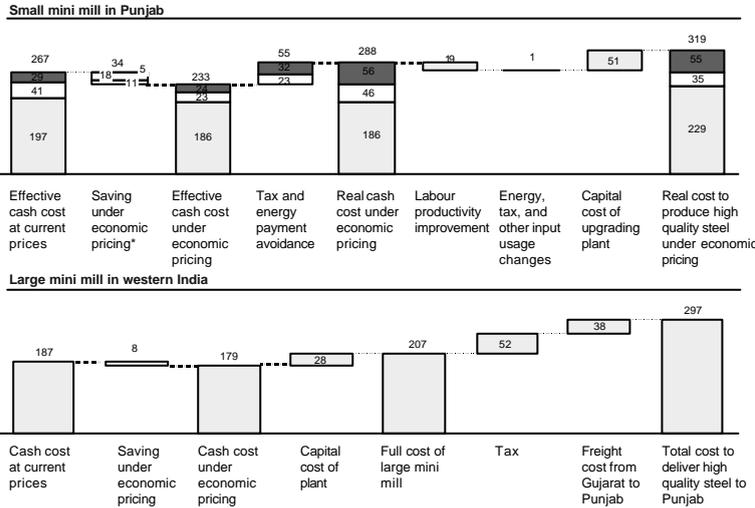
Note: Assumes WACC of 16%; cost of labour Rs.42/hour

Exhibit 6.19

**PRODUCTION COST UNDER ECONOMIC PRICING: REINVESTMENT COST OF LARGE MINI MILL vs CASH PLUS UPGRADING COST OF SMALL MINI MILL**

US\$ per ton of liquid steel

■ Tax  
□ Power  
□ Other



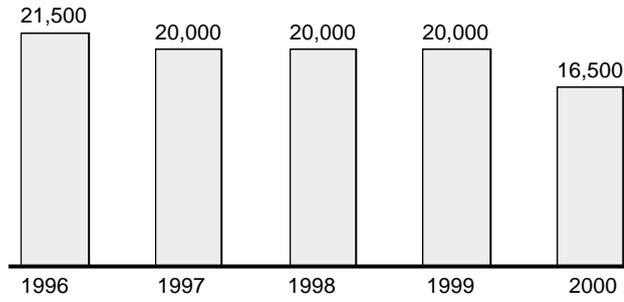
\* Mainly power

Source: McKinsey Metals and Mining Practice; Interviews; Indian Railways; McKinsey analysis

Exhibit 6.20

### PRICE TREND – HOT ROLLED COILS

Rupees per ton

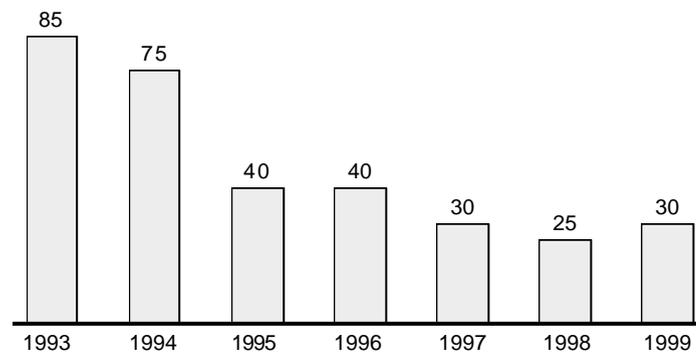


Note: Price for 20G HRC  
Source: India Infoline.com

Exhibit 6.21

### IMPORT DUTY ON COLD ROLLED COILS

Per cent of purchase value



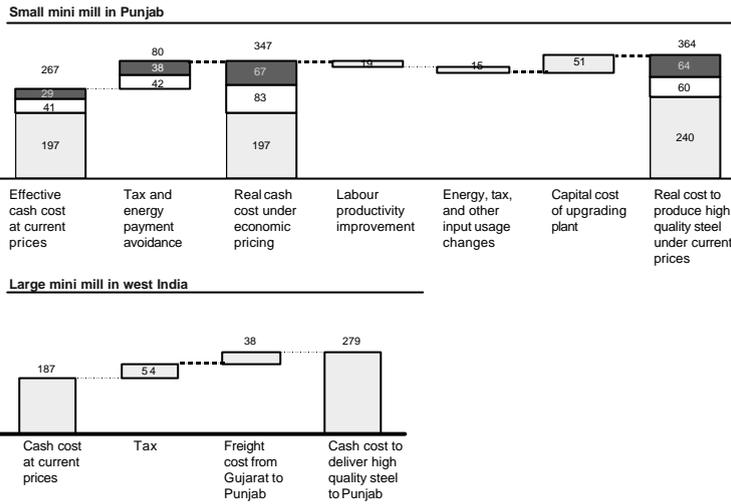
Source: India Infoline.com

Exhibit 6.22

**PRODUCTION COST UNDER CURRENT PRICES: CASH COST OF LARGE MINI MILL vs. CASH + UPGRADING COST OF SMALL MINI MILL**

US\$ per ton of liquid steel

■ Tax  
□ Power  
□ Other



• The non-level playing field allows small mini mills to compete with large plants by

- Avoiding taxes
- Avoiding energy payments
- Selling sub-standard steel

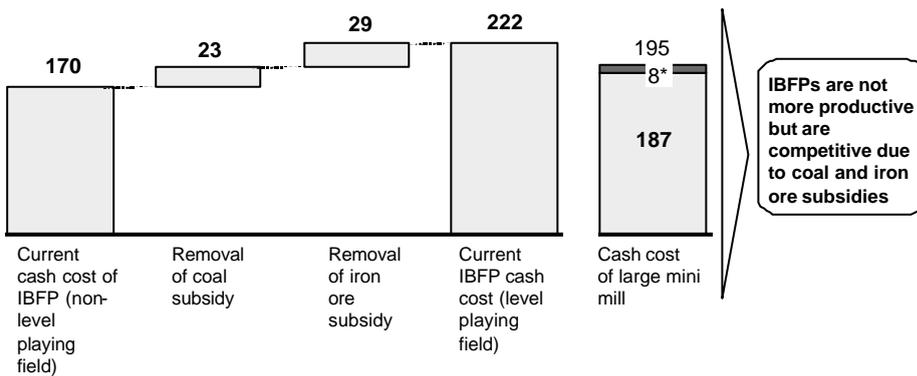
Source: McKinsey Metals and Mining Practice; Interviews; Indian Railways; McKinsey analysis

Exhibit 6.23

**COMPARISON OF SLAB PRODUCTION COST OF IBFP AND LARGE MINI MILL ON LEVEL PLAYING FIELD**

US\$ per ton of slab

AT CURRENT PRICES



IBFPs are not more productive but are competitive due to coal and iron ore subsidies

\* Cash cost of slab casting

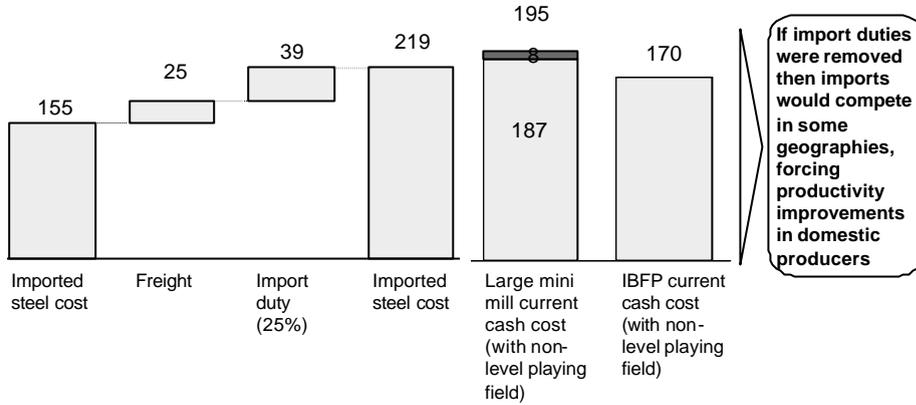
Source: McKinsey analysis; Interviews

Exhibit 6.24

## COMPARISON OF IMPORTED STEEL COST WITH DOMESTIC PRODUCTION COST

US\$ per ton of slab

USING CURRENT PRICES



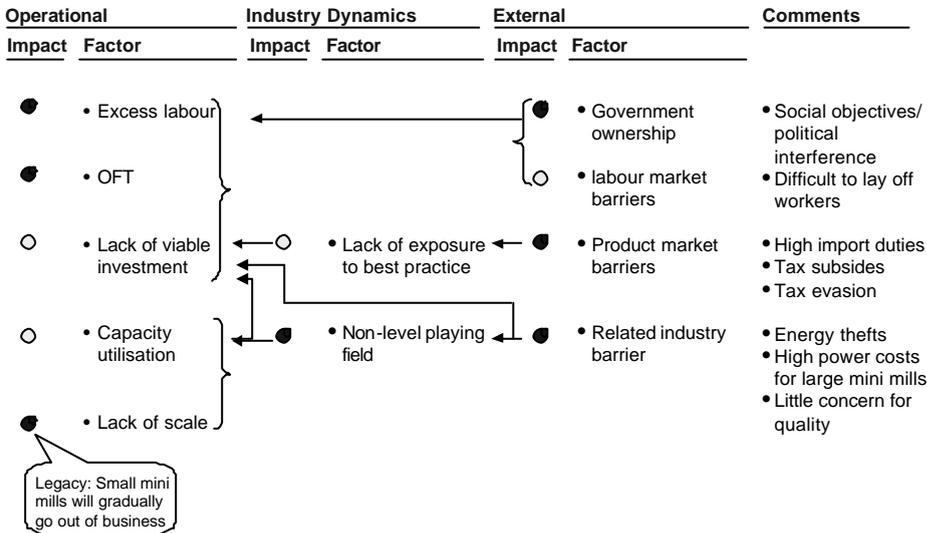
\* Cash cost of slab casting

Source: McKinsey analysis; Interviews; Indiainfoline.com

Exhibit 6.25

## LABOUR PRODUCTIVITY CAUSALITY IN STEEL INDUSTRY

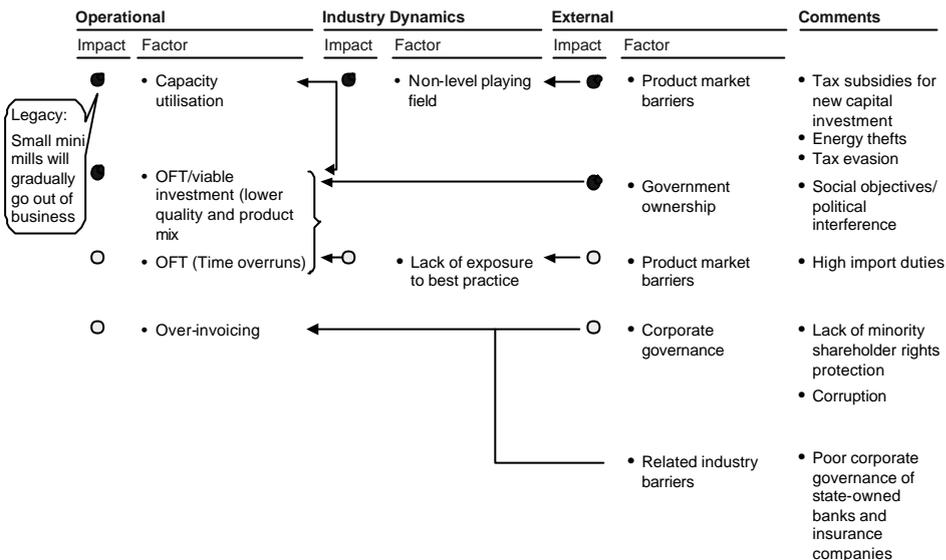
● Important  
○ Less important



Source: Interviews; McKinsey analysis

### CAPITAL PRODUCTIVITY CAUSALITY IN STEEL INDUSTRY

● Important  
○ Less important

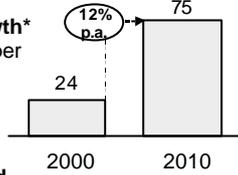


Source: Interviews; McKinsey analysis

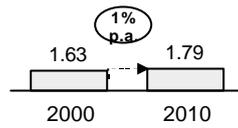
Exhibit 6.27

## STEEL INDUSTRY POTENTIAL GROWTH

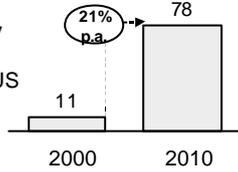
**Projected output growth\***  
Million tons per year



**Value added per ton**  
Equivalent tons per ton



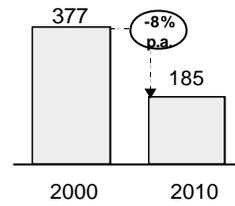
**Projected productivity growth**  
Per cent of US in 1995



### Comments

- Assumes 12% GDP growth
- Benchmarked with other similar countries consumption, including Brazil, Thailand & Indonesia

**Projected fall in employment**  
'000 of employees



- Assumes that most small mini mills close
- Small integrated plants expand
- Assumes that all new capacity is created at 100% of US productivity

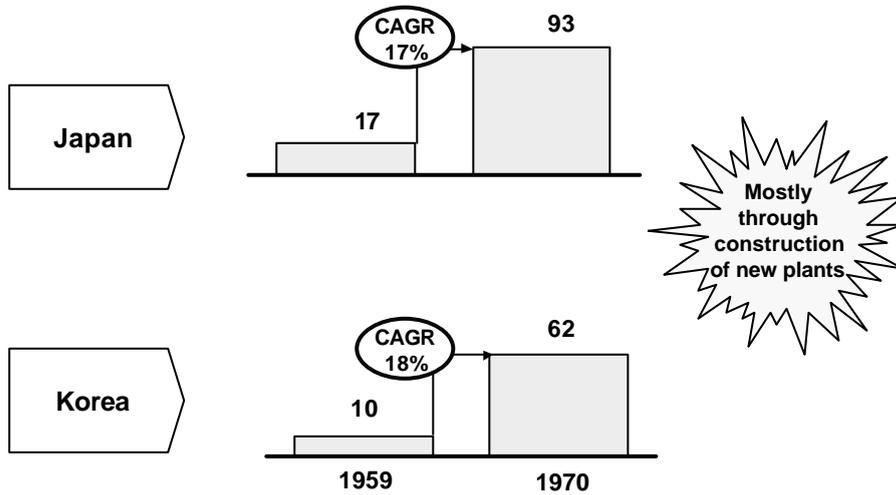
\* Assumes no net imports or exports of steel in 2010

Source: JFK; McKinsey Steel Practice; Team analysis

Exhibit 6.28

## PRODUCTION GROWTH IN OTHER COUNTRIES

Millions of tons of crude steel per year

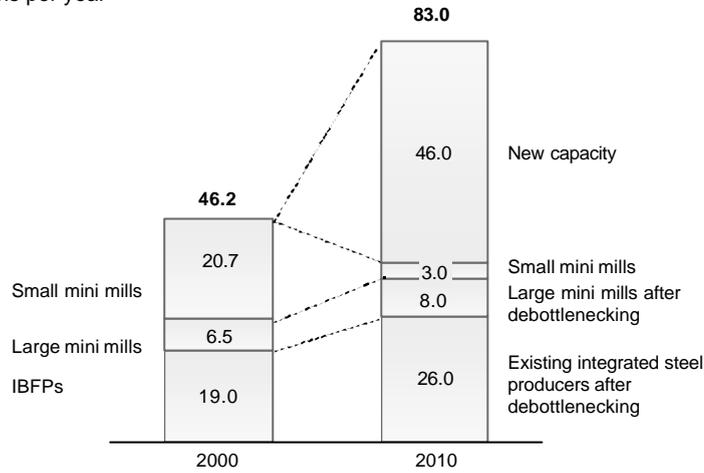


Source: McKinsey analysis; National Statistics

Exhibit 6.29

### SOURCES OF STEEL PRODUCTION CAPACITY TO SATISFY INCREASED STEEL DEMAND

Millions of tons per year



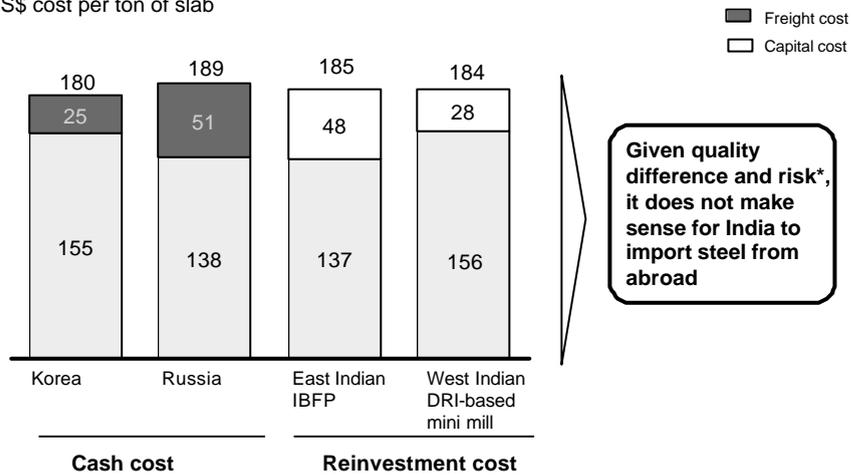
\* Assumes 50% increase in existing capacity through debottlenecking

Source: Interviews; McKinsey analysis

Exhibit 6.30

### COMPARISON OF IMPORT COST AND INDIAN MANUFACTURING COST

US\$ cost per ton of slab



\* Currency and country risk

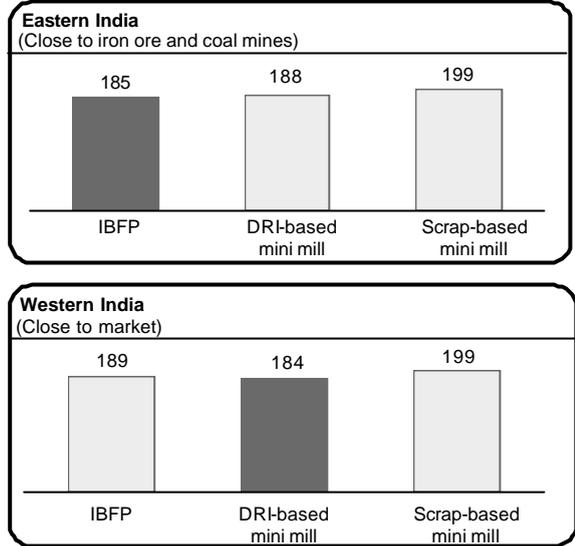
Source: McKinsey analysis; WSD; JFK; Maersk Shipping; SCI

Exhibit 6.31

**COST COMPARISON OF DIFFERENT TECHNOLOGIES  
UNDER ECONOMIC INDIAN PRICES**

US\$ per ton of liquid steel

BARGAINING POWER SHARED

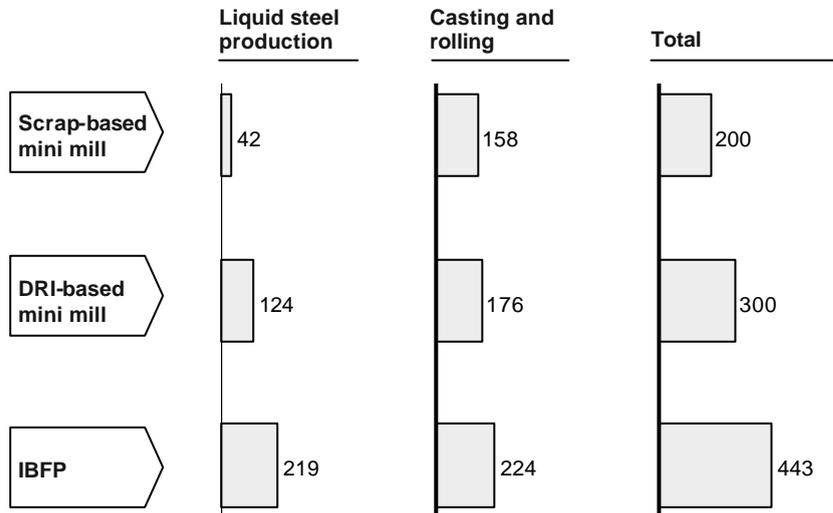


Source: McKinsey analysis; Interviews; Paine Webber

Exhibit 6.32

**CAPITAL COST OF DIFFERENT TECHNOLOGY OPTIONS**

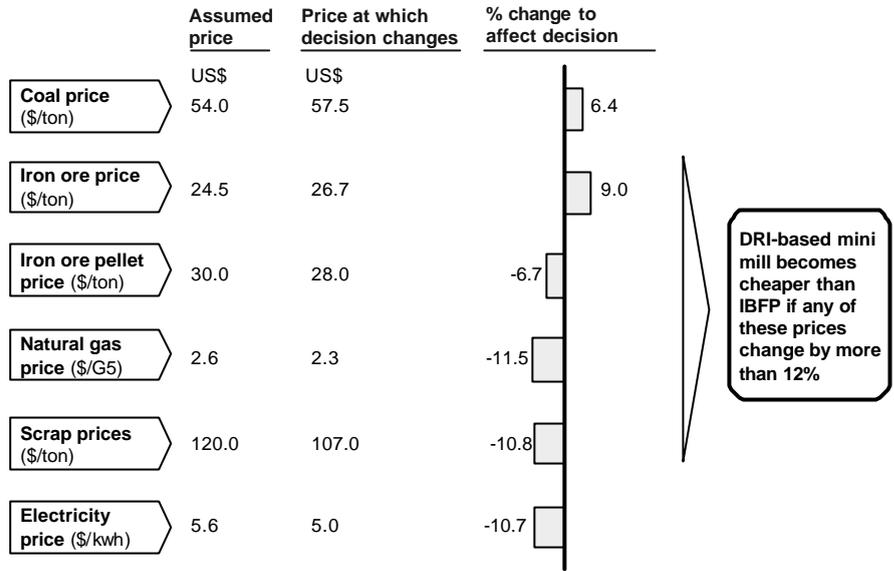
US\$ per ton of annual capacity



Source: Interviews; McKinsey analysis

Exhibit 6.33

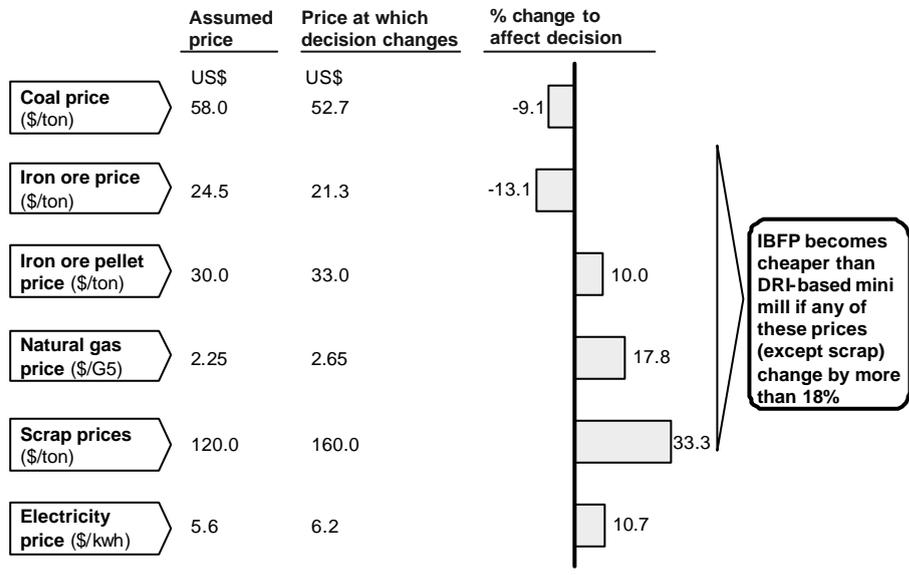
**SENSITIVITY OF EASTERN INDIA RESULT TO CHANGES IN PRICE**



Note: Base case assumes economic prices; ignores freight to market  
 Source: Interviews; INFAC Government of India; McKinsey analysis

Exhibit 6.34

**SENSITIVITY OF WESTERN INDIA RESULT TO CHANGES IN PRICE**



Note: Base case assumes economic prices; ignores freight to market  
 Source: Interviews; INFAC Government of India; McKinsey analysis

Exhibit 6.35

**ECONOMIC PRICING IN EAST INDIA\***

	Current price	Economic price		
		Cost of importing***	Net back from exporting****	Shared power
Iron Ore pellet price (\$/ton)	–	35.0	25.0	30.0
Natural gas (\$/GJ)	–	3.0	2.2	2.6
Iron ore lump** (\$/ton)	2.5*****	36.0	13.0	24.5
Coking coal (\$/ton)	6.0*****	68.0	40.0	54.0

- \* Vizag for mini mills, Eastern states for IBFPs
- \*\* Iron ore fines assumed to be 80% of cost of lump iron ore
- \*\*\* Maximum steel plant would pay (cost of import)
- \*\*\*\* Minimum at which input producer would sell (revenue on exporting)
- \*\*\*\*\* Excludes capital cost of mines of \$4.6 per ton of iron ore and \$7.5 per ton of coal

Exhibit 6.36

**ECONOMIC PRICING IN WEST INDIA\***

US\$

	Current price	Economic price		
		Cost of importing***	Net back from exporting****	Shared power
Iron Ore pellet price (\$/ton)	35.0	35.0	25.0	30.0
Natural gas (\$/GJ)	1.5	3.0	1.5	2.5
Iron ore lump** (\$/ton)	–	26.0	23.0	24.5
Coking coal (\$/ton)	–	58.0	58.0	58.0

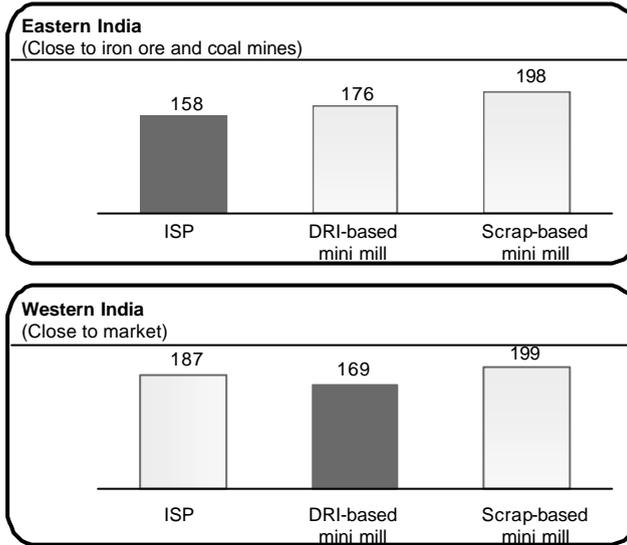
- \* Gujarat for mini mills, Goa for IBFPs
- \*\* Iron ore fines assumed to be 80% of cost of lump iron ore
- \*\*\* Maximum steel plant would pay (cost of import)
- \*\*\*\* Minimum at which input producer would sell (revenue on exporting)

Exhibit 6.37

## COST COMPARISON OF DIFFERENT TECHNOLOGIES UNDER ECONOMIC INDIAN PRICES

BARGAINING POWER WITH STEEL PRODUCER

US\$ per ton of liquid steel



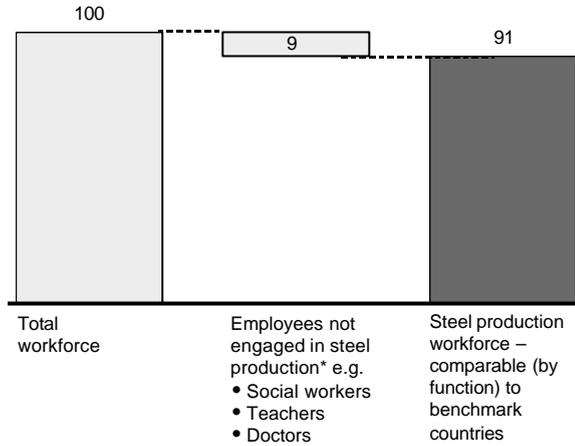
Source: McKinsey Analysis; Interviews; Paine Webber

Exhibit 6.38

### TYPICAL INDIAN INTEGRATED PLANT OR LARGE MINI-MILL STAFFING

Per cent of total plant staffing

■ Used in productivity calculation



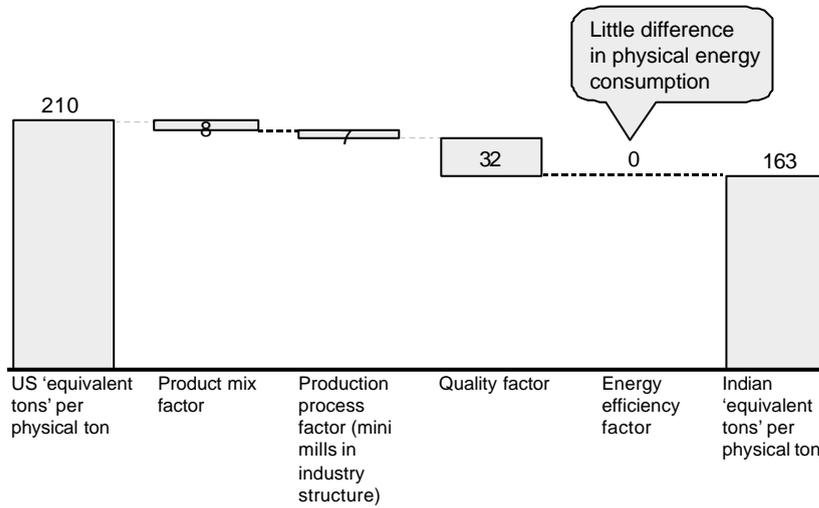
\*Steel plant managers are considered to be engaged in steel production

Source: Interviews; McKinsey analysis

Exhibit 6.39

### ADJUSTMENTS TO PHYSICAL STEEL OUTPUT

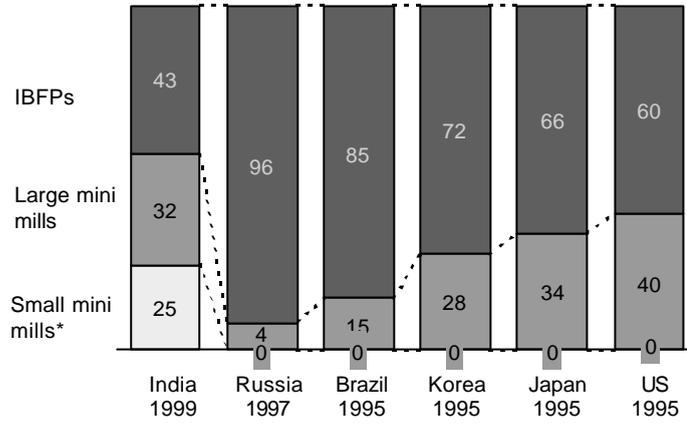
Per cent



Source: McKinsey analysis; INFAC; Indian Infoline.com; Ministry of Steel; Interviews

Exhibit 6.40

**PRODUCTION PROCESS MIX – MINI-MILL SHARE BY COUNTRY**  
Per cent of tons of finished steel



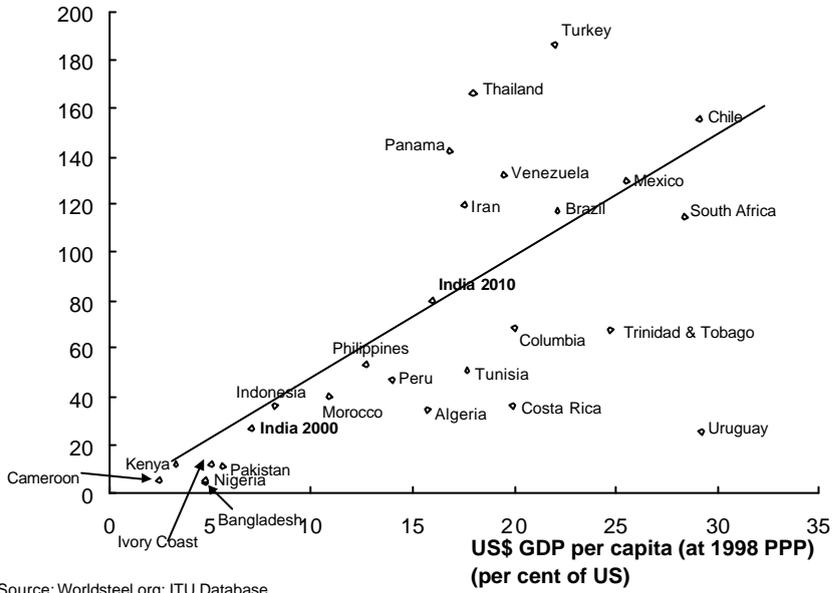
\* Old technology and sub-scale mini mills

Source: INFAC; Indianinfo; Ministry of Steel; McKinsey analysis

Exhibit 6.41

### STEEL CONSUMPTION DEVELOPMENT: DEVELOPING COUNTRIES

Steel consumption  
(kg per capita)



Source: Worldsteel.org; ITU Database

# Telecommunications

## **SUMMARY**

Despite the partial opening up of the sector in 1994 and further liberalisation in 2000, the Indian telecommunications sector has remained relatively under-penetrated, unproductive and dominated by government-owned incumbents. Telephone density is only about one-third of China's levels; total factor productivity in the sector is only half of what its potential could reach and government-owned incumbents still account for over 90 per cent of revenues in the sector.

We believe that substantial reforms are needed if the sector is to attain its productivity and growth potential. If these reforms are carried out in the telecom sector and if the economy grows at 10 per cent a year (which it should if the reform programme we recommend is undertaken), the telecom sector will experience dramatic growth in productivity and output. Line penetration will increase from 3 per 100 capita to 15 per 100 capita by 2010 and the capital productivity growth alone will save India US\$ 13 billion.

## **Productivity performance**

Productivity in the telecom sector in India is well below its potential. Total factor productivity (TFP) in India is around 48 per cent of US levels, while its potential is as high as 89 per cent. This gap between current and potential TFP reflects the fact that the Indian industry is under-performing both in terms of labour and capital productivity. While Indian labour productivity could match US levels, it is currently only at 25 per cent. Similarly, capital productivity that is currently only 59 per cent of US levels, could potentially reach as much as 83 per cent.

In fact, productivity in the Indian telecom sector lags behind not only developed countries such as France, Germany and the US but also other developing countries such as Brazil and Korea.

## **Operational reasons for low productivity**

At the operational level, five reasons account for the gap between current and potential productivity in the telecom sector:

- ¶ **Excess labour:** Approximately 28 per cent of the labour in the sector is excess. A large part of this is due to the fact that players did not retrench any of their surplus labour when they moved from labour-intensive electromechanical switches to digital switches.
- ¶ **Lack of viable investments:** Although investments have focused on laying additional lines, economically viable investments, that would have improved the performance of the existing network or reduced the operating costs of the network, have been neglected. These include automation of network and fault management and conversion of aerial wires to underground.
- ¶ **Poor organisation of functions and tasks:** Productivity could be significantly improved by improving business processes, improving capital budgeting procedures and improving project management.
- ¶ **Poor marketing of value added features:** Several value added products such as voice mail, call forwarding and three-way calling have very low penetration in India. This is because these products have not been launched and marketed adequately.
- ¶ **Lack of competition among suppliers:** Historically, one equipment supplier has dominated the Indian market. This lack of competition has resulted in higher equipment prices and, as a result, lower capital productivity.

### **Industry dynamics**

If we analyse industry dynamics to understand the reasons for the low productivity in the sector, it is very apparent that it is a result of low competitive intensity, which in turn has been created by the fact that government-owned players dominate all the segments with the exception of the mobile.

### **External factors responsible for low productivity**

Productivity in the telecom sector remains low because of three reasons.

- ¶ Government ownership of the key players limits their incentive to increase productivity.
- ¶ The sector has been plagued by policy and regulatory issues that have deterred competition. The initial policy framework failed to attract competitors into the sector and the instability and uncertainty that has surrounded the regulatory framework ever since has also deterred entry. In fact, the regulatory and policy framework, even now, after several

revisions, still has some pro-incumbent features that would limit the ability of new players to capture share from the incumbents.

- ¶ Finally, although less importantly, labour market rigidities directly limit the players' ability to reorganise their workforce.

## **Industry outlook**

If these reforms are carried out in the telecom sector and the economy grows at the 10 per cent a year we expect, the telecom sector will experience dramatic growth in productivity and output. Productivity will grow at 23 per cent while output will grow at 20 per cent a year. Telephone line penetration will increase from less than 3 lines currently to 15 by 2010. However, productivity growth will outstrip output growth and will lead to an approximate decline of 3 per cent a year in employment.

## **Policy recommendations**

Though a number of effective reforms in the telecom sector have been carried out during the last 2-3 years, the reform agenda is still not complete. In order to reach its potential productivity and output growth, India needs to do three things: Privatisise the sector, develop a "light touch" regulatory framework and grant greater independence to the regulator. If these reforms are carried out, progress in this sector could act as a catalyst for economic expansion across the country, even in the backward regions. The key elements of the changes required in the sector are described below.

- ¶ **Privatise the sector:** The government should privatise the entire telecom sector, i.e., not just VSNL and MTNL as currently planned but BSNL as well. We would like to point out here that the privatisation of the sector will not compromise the government's objective of raising teledensity, especially in rural areas. This objective can still be pursued through a universal service fund.
- ¶ **Develop a "light touch" regulatory framework:** There are regulatory issues with six broad categories – industry structure, pricing, interconnect, equal access, cross subsidy and performance targets. Recommendations for some of these issues are described here:
  - **Industry structure:** A single licence for all telecom services should replace today's technology and service based licensing scheme.
  - **Pricing:** Price caps on basic services, such as caps on monthly rentals and local call rates, should be raised to provide greater incentive for

players to lay lines. Further, all price caps should be removed in areas where there is sufficient competition.

- **Interconnect rules:** As in the case of service licences, interconnection rules should be made technology independent.
  - **Equal access:** To reduce the incumbents' inherent advantages, all carriers should be guaranteed equal access. This will involve guaranteeing number portability; ensuring that the incumbent is not the default long distance carrier and that consumers can choose all long distance carriers with equal ease, and allowing, but not mandating, unbundling of the local loop.
- ¶ **Grant greater independence to the regulator:** Certain actions are critical for ensuring the independence of the regulator.
- The regulator's funding should not be dependent on the executive decisions of the government. It should either be fixed by the legislature or should be generated from a fee levied on industry participants.
  - The recommendations of the regulator should be binding.
  - In reaching its recommendations, the regulator should be free to hire the best industry experts and compensate them by industry standards, not government standards. This will not be possible if there is government control of the regulator's budget.
  - The requirement for Supreme Court intervention in the removal of members of the regulatory body should be restored.

# Telecommunications

The telecommunications case is important from this study's perspective because of three reasons. First, a nationwide, high capacity, reliable communications network is a prerequisite for reaping the benefits of the information age. Improvements in the productivity, quality and output of telecom services could have a ripple effect and positively impact many parts of the economy. Second, India will be likely to make large investments of as much as Rs. 20,000 crore and more in telecom infrastructure since the environment today is one of dramatic technological change. As a result, the technological options exercised and the regulatory regime adopted in India will have a dramatic impact on the evolution of this industry as well as the entire economy. And finally, this sector illustrates how government ownership and the resulting regulatory distortions affect productivity on a large scale.

We have found that telecom penetration is low today and the sector's productivity lags behind its potential primarily due to government ownership and regulations (product market barriers) that reduce the pressure on incumbents to improve productivity. If reforms were carried out, the sector would experience strong productivity and output growth over the next 10 years. Line penetration could increase from approximately 3 per 100 to approximately 18 per 100, with only a marginal decline in employment.

For the purposes of this study, we have included all the voice services including local, long distance, international and mobile in our definition of the sector. We have not included the Internet, private and public data networks, cable networks and equipment manufacture. These markets are still nascent in India and there is not enough data for measuring and evaluating India's productivity performance.

This chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## **INDUSTRY OVERVIEW**

Despite the partial opening up of the sector in 1994 and further liberalisation in 2000, telecom penetration remains low and the sector remains relatively unproductive and dominated by government-owned incumbents. Telephone density is 2.6 per 100, a mere one-third of China's levels while the total revenues of the sector are 1.2 per cent of GDP compared to the more than 2 per cent in most developed and developing countries. Total factor productivity in the sector is only 48 per cent of US levels, while its potential is 89 per cent. Government-controlled entities account for 93 per cent of Indian telecom revenues.

### **Industry size and growth**

The Indian telecom sector remains relatively small in terms of both output and employment (**Exhibit 6.1**). Revenues from the Indian telecom sector are 1.2 per cent of Indian GDP, lower than countries like the US, UK, Malaysia, Korea and China, all of which have shares above 2 per cent. As of 1998, the telecom industry employed about half a million workers, which accounts for about 0.06 per cent of the Indian work force. This percentage remains low compared to other benchmark countries. The fact that the share of employment in the sector is low is driven by the fact that output is low and does not represent high productivity.

In terms of consumption of telephone services, India remains in line with similar GDP per capita countries at about 224 call minutes per capita per year. In terms of the distribution of consumption across services, India's call minute consumption is markedly skewed towards local calls (**Exhibit 6.2**). Local calls account for almost 85 per cent of the total call minutes in India, compared to about 69 per cent in the US. India's line penetration in 1998 was 2 lines per 100 inhabitants (and is today at around 3 lines per 100) compared to developing countries such as China and Brazil with 7 and 15 respectively (**Exhibit 6.3**). The penetration of mobile services was also low, at around 0.2 per 100 inhabitants compared with over 4 in Thailand and 6 in China (**Exhibit 6.4**).

Though consumption was low between 1990 and 1999, call minute consumption in India increased sharply at around 24 per cent a year (**Exhibit 6.5**). This growth was the result of an average annual increase of 19 per cent in the number of lines and 4 per cent in the average capacity utilisation of each line.

### **Evolution of regulation in Indian telecom**

The regulatory environment in the Indian telecom sector has gone through three distinct eras (**Exhibit 6.6**).

¶ **Government monopoly (1947-1994):** During this period, the government had exclusive monopoly over all telecom services in the country.

¶ **Partial deregulation (1994-1999):** The 1994 National Telecom Policy kicked off the partial deregulation era by opening up the sector to competition in fixed wireline. In contrast to the approach of other countries, the Indian government chose to open up the local access sector before long distance in order to boost line density. In order to facilitate this process, India was divided up into 21 regions called circles, and bids were invited from private players for licences to provide services in these circles. Despite the opening up of the sector, only six circles received bids from private operators, of which only four actually started operations. The high fixed (i.e., independent of revenue) licence fee was a major deterrent for private entrants. The fee, together with the continued requirement of cross-subsidisation of local access by long distance revenues, discouraged bids and delayed financial closure for the bidding companies.

The partial deregulation era also saw the opening up of the wireless market to the private sector. The government chose to stay out of this market and limited the number of operators to two per circle. As a result, 19 operators had already purchased licences and started operations by 1999.

¶ **Complete deregulation (1999 onwards):** The 1999 National Telecom Policy kicked off the completion of deregulation. First, the fixed fee model for basic and wireless licences was dropped in favour of a revenue-sharing model. And then, the government-owned telephone company was corporatised with a view to eventual privatisation. And finally, on the wireless front, the government announced that two government-controlled entities, MTNL and BSNL, would start wireless services as the third operator in each circle. The government also announced its plans to auction a fourth licence for each circle.

Finally, the government has also announced its policy of opening up the long distance sector to competition. A number of private sector players have expressed an interest in this sector, but only two so far have stepped forward to purchase the National Long Distance Operator (NLDO) licence.

Recently, the government announced that it intends to reform the current service-specific licence regime and move to a single licence covering all services. The Convergence Bill addressing this issue has been drafted but has not yet been introduced in Parliament.

## Participants in India's telecom sector

In India, government-controlled entities still account for 93 per cent of Indian telecom revenues. Private operators dominate the mobile and ISP space and are starting to compete in the fixed line space. Foreign entities are limited to a maximum stake of 74 per cent in all telecom ventures. Another set of private operators in telecom is the 613,000 or so Public Call Office (PCO) operators. PCOs are community-based phones in booths operated by individual entrepreneurs. Typically they retail local, domestic long distance and international calling services to consumers on a cash-only basis.

This level of government ownership is consistent with the situation in other liberalising markets such as Korea and Brazil but is in stark contrast to the more mature US market where the telecom sector is entirely owned by the private sector (**Exhibit 6.7**). The government-controlled players in Indian telecom are (**Exhibit 6.8**):

- ¶ **BSNL:** This is the basic (wireline) services provider for all of India, other than Mumbai and Delhi. It also provides long distance services nationwide. It accounts for around 53 per cent of total telecom revenues and is intending to introduce wireless services in those areas to which it is already providing basic services.
- ¶ **MTNL:** This is the incumbent basic (wireline) service provider in Mumbai and Delhi. MTNL accounts for around 17 per cent of total telecom revenues. It has also introduced wireless services in Delhi and Mumbai recently.
- ¶ **VSNL:** This is the international telephony and ISP services provider for the whole nation and accounts for around 23 per cent of total telecom revenues.

On the policy-making front, there are three main bodies. The Telecom Commission is responsible for making all policy decisions relating to the telecom sector. The Telecom Regulatory Authority of India (TRAI) sets tariffs and ensures compliance with price regulation and licence conditions. The government consults TRAI while deciding tariffs and licensing conditions but the recommendations are not binding on the government. Finally, the Telecom Dispute Settlement and Appellate Tribunal (TDSAT) is the regulatory body responsible for dispute resolution and adjudication in the telecom sector. The proposed Convergence Bill will assign the functions of the Telecom Commission and TRAI to a single body, thereby making the regulator's recommendations binding.

## PRODUCTIVITY PERFORMANCE

The Total Factor Productivity (TFP) in Indian telecom is estimated to be at about 48 per cent of the US level and lagging behind countries such as Brazil and Korea (**Exhibit 6.9**). TFP is the weighted average of capital productivity (68 per cent weight) and labour productivity (32 per cent weight).

- ¶ Indian capital productivity is estimated to be at around 59 per cent of the US, close to Korea but trailing behind Brazil and the US (**Exhibit 6.10**). Capital productivity, measured as call minutes per dollar of capital, may be viewed as a ratio of capacity utilisation (call minutes per line) and capital inputs per access line. Capital stock in Indian telecom is utilised at around 81 per cent of US levels and requires around 37 per cent more capital per access line than the US.
- ¶ Labour productivity in the Indian telecom sector is estimated to be at around 25 per cent of the US (**Exhibit 6.11**). This estimate is the product of two components: Access line productivity and capacity utilisation of the line. The access line labour productivity in India is 31 per cent of the US while the capacity utilisation of lines is 81 per cent of the US.

Our estimates exclude the Public Call Offices (PCOs) or manned pay phone booths. PCOs are an excellent and efficient way to provide telephone access to the masses in India. However, we have excluded them from our analysis to ensure comparability of service levels between India and the US. In particular, PCOs provide a much lower level of service because users need to go to the booth to make calls, typically have to wait in line and, by and large, cannot receive incoming calls. Moreover, PCOs are not open 24 hours, thereby limiting access to daytime.

If PCOs were included in the calculation, the TFP would increase to around 54 per cent of the US. This increase results from an increase in capital productivity to around 75 per cent and a reduction of labour productivity to 10 per cent of US levels (**Exhibit 6.12**). The increase in capital productivity results from the higher utilisation of PCO lines, which increases total capacity utilisation to 102 per cent of US levels (**Exhibit 6.13**). Higher utilisation of PCO lines in India (over eight times that of the US average) stems from the low penetration of phones in India. Similarly, the reduction in labour productivity results from the additional employment in PCOs, estimated at around 613,000 workers.

The methodology for measuring productivity, including the adjustments made to ensure comparability across countries, is described in detail in **Appendix 6A**.

## OPERATIONAL REASONS FOR LOW PRODUCTIVITY

The TFP of the Indian telecom industry could reach 89 per cent of the US level from its current 48 per cent. Labour productivity in Indian telecom could reach 100 per cent of US levels, while capital productivity could potentially reach 83 per cent. The key operational factors responsible for low TFP in Indian telecom are a lack of viable investments and poor marketing. Other less important operational factors include excess workers, poor supplier relations and poor organisation of functions and tasks (OFT) (**Exhibit 6.14**).

We now describe in more detail how these operational factors affect TFP, in order of ease of implementation (*see Appendix 6A* for impact of each factor on labour and capital productivity).

### Excess labour

This accounts for around 3 percentage points of the TFP gap. Excess workers account for around 28 per cent of the workforce in Indian telecom and represent a productivity penalty of around 38 per cent. These excess workers could quite easily be laid off immediately with no effect on output, technology or operating practices. In our interviews, most managers in government-owned companies readily acknowledged the presence of excess labour, with estimates ranging from 25 to 50 per cent of the total workforce. A large part of the excess workforce was created when companies upgraded from labour-intensive electromechanical to digital switches but did not retrench the workers rendered surplus by this change. This burden of excess labour is gradually being reduced because the hiring of blue-collar workers by BSNL and MTNL has been frozen (since 1984), despite the rapid (19 per cent a year) growth in the number of lines.

### Lack of viable investments

This accounts for around 16 points of the TFP gap. Economically viable investments could more than double labour productivity in Indian telecom. These investments, mostly in maintenance and repair operations, are, however, not undertaken despite being clearly viable (**Exhibit 6.15**). They include:

- ¶ **Network and fault management automation:** Labour productivity can increase by around 39 per cent if economically viable investments in network and fault management are undertaken. Maintenance personnel, who account for as much as three quarters of the workforce, can be greatly reduced if greater automation of network fault management is invested in. Moreover, these investments would also enhance the quality of service provided, further increasing value added and productivity.

These investments, which are already being implemented by best practice operators (both government and private), include:

- A 24-hour problem reporting hotline for subscribers. The hotline uses an interactive voice response to record the problem.
- An automated initial test procedure to localise the fault.
- Automated scheduling systems to dispatch a maintenance person to fix the fault.
- An automated escalation procedure to notify senior management if a problem is not fixed in a reasonable amount of time.
- An automated final test procedure to verify that the fault has indeed been fixed.

¶ **Conversion of aerial wires to underground:** Labour productivity could increase by around 16 per cent if economically viable investment in underground cables is undertaken. Up to half the maintenance effort of Indian carriers is expended on fixing aerial cable-related problems. Aerial cables are exposed to weather and bird/human interference and are thus prone to more faults than underground cables. In India, underground wiring is economically feasible for around 60 per cent of the subscribers. Private, as well as some government, operators have recognised its advantages and are already switching to underground cables, wherever feasible.

¶ **Better transport and tool kits:** Improving transport and tool kits can increase labour productivity by around 15 per cent. Typically, maintenance personnel do not have adequate test equipment, tools and spares. Often the ladders used for maintenance work above ground need two people for safe operation. Moreover, workers lack communications devices such as pagers and mobiles and often use public transport to reach maintenance sites. These deficiencies typically result in delays, longer visits and multiple visits to fix a single problem.

### **Poor organisation of functions and tasks (OFT)**

This accounts for around 2 percentage points of the TFP gap. Better OFT will lead to an improvement in both labour and capital productivity.

¶ Better OFT could increase the labour productivity of Indian telecom by around 7 per cent. Examples of such improvements include:

- **Mail-in bill payment:** Increased centralisation and changes in the payment period would reduce labour requirements and improve services in Indian telecom. In India, bill collection is typically done through manned booths where subscribers line up, make their payments and receive a receipt. The use of drop-in boxes could save resources and reduce inconvenience to customers. These boxes, used only by a few players in India, should be well marked and advertised to ensure customers' trust in the new system.
  - **Centrally dispatched maintenance personnel:** Centralisation of maintenance personnel could boost productivity by eliminating idle time. Instead, government-owned carriers usually assign maintenance personnel on a geographic basis thereby increasing downtime and adding complexity.
- ¶ Better OFT could increase capital productivity by around 7 per cent. Calendar-based budgeting procedures, cost overruns and corruption are some of the organisational factors affecting capital productivity in Indian telecom.
- **Calendar-based budgeting procedures:** Calendar-based budgeting procedures in government-owned carriers limit the planning horizon of the manager and increase cable and labour costs by around 15 per cent and 25 per cent respectively (**Exhibit 6.16**). Laying cables in the local loop accounts for about 40 per cent of the capital cost of adding a wireline connection. Under the current calendar-based budgeting, managers typically lay lower than optimal pair copper cables in order to meet their line growth targets for a particular year. In the face of growing demand, this practice results in higher costs per subscriber as it does not take advantage of economies of scale in purchasing cable (lower cost per line of higher capacity cable) and digging trenches (digging the trench only once for a higher capacity cable).
  - **Cost overruns and corruption:** Project delays as well as over-invoicing result in higher capital disbursements and reduce capital productivity. These factors, present only to a limited degree in the telecom sector, are mainly confined to government-owned providers.

### **Poor marketing of value added features**

This accounts for around 17 points of the TFP gap. Improvements in marketing practices could boost the use of value-added features and services and increase productivity by around 23 per cent. In India, penetration of call services such as voice mail, call forwarding and three-way calling is very low compared to other countries (**Exhibit 6.17**). Moreover, carriers do not advertise the use of the phone

as an efficient customer service medium and as an alternative to face-to-face meetings. Introducing these services would not require significant new investments. Lowering long distance charges to international levels would also boost capacity utilisation of lines. These improved marketing practices could also increase capital productivity by around 24 per cent.

### **Lack of competition among suppliers**

This accounts for around 3 points of the TFP gap. Lack of competition among equipment suppliers, in the past, has resulted in higher equipment prices. Historically, one equipment supplier dominated the entire Indian market and this situation has changed only in the recent past. As a result, switch prices have fallen dramatically by around 50 per cent in the last two years (from around Rs.4,000 to 2,000) compared to only 60 per cent during the 1985-1993 period (from around Rs.10,000 to 4,000).

## **INDUSTRY DYNAMICS**

Low competitive intensity is the main reason why managers do not feel the pressure to improve productivity. Competitive pressure for most players remains low, as consumers do not typically have an alternative provider to turn to. Government-owned incumbents still account for over 93 per cent of the market. Private entrants in the local market have limited their operations to the more profitable business segments. Moreover, the prices of long-distance and international calls remain high, even when compared to richer countries such as the US. As a result, Indian government-owned incumbents enjoy higher profits than their counterparts in the US who face greater competitive pressure (**Exhibit 6.18**).

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

In this section we discuss how external factors (i.e., policies that could be changed by the government) have interacted to result in low and stagnant productivity in the Indian telecom industry. We also summarise the relative importance of these external factors in explaining the gaps in labour and capital productivity (**Exhibits 6.19 & 6.20**).

Government ownership of the key players limits their incentive to increase productivity. The regulatory and policy guidelines framed in the early years of telecom liberalisation (mid-90s) were pro-incumbent and therefore did not attract enough new players in basic services capable of competing effectively with the Government-owned incumbents. In fact, the regulatory and policy framework

even now, after several revisions, still has some pro-incumbent features that limit the ability of new entrants to capture share from incumbents. For example, the new entrants have to pay a high license fee while the incumbents do not. Further, it was only recently that the national long distance market was opened up and has therefore yet to see any competition. Finally, although less importantly, rigidities in the labour market directly limit the players' ability to reorganise their workforce.

## **Government ownership**

Government ownership distorts managers' objectives, thereby reducing their incentive to improve efficiency, and introduces bureaucratic procedures that make this improvement difficult. In the case of telecom, government ownership affects capital and labour productivity in four different ways:

- ¶ **Profit incentives:** There are not enough incentives for making profits in the sector. This has three direct effects. First, managers have no interest in improving marketing and encourage the introduction of call completion services. In fact a number of regional operators actually indicated that they had no marketing capabilities to speak of, but private operators, with a fraction of the number of lines, had larger sales forces. Second, managers are not particularly concerned or careful about cost overruns since they are not accountable for the opportunity costs of the funding used. Finally, managers exert little pressure on equipment providers to force down prices and improve quality.
- ¶ **Employment objectives:** Employment objectives imposed on government managers result in reluctance on their parts to reduce their workforce. This reluctance is responsible for a large share of the excess workers and the managers' sluggishness in improving the organisation of functions and tasks (e.g., bill-in-mail payment). One manager is known to have said: "I cannot lay off anybody here. It would just not be accepted by the head office". A similar argument holds true for the lack of investment in viable capital such as tool kits and fault management systems. There is no incentive to invest in labour saving automation if you are forced to retain workers anyway.
- ¶ **Annual targets for line penetration:** The government's capital allocation philosophy is flawed and limits economically viable investment. Currently, managers are evaluated primarily on the basis of the line growth targets that have been set. Planned line additions often determine the company's budget for the year following. Although boosting density is certainly a worthy goal, its pursuit at all costs severely limits labour and capital productivity. For one thing, managers often sacrifice network and customer service quality by devoting all

capital investments to new lines rather than economically viable investment. For another, network planning is also prepared short-sightedly as the capacity created only reflects current demand rather than anticipated future demand.

- ¶ **Bureaucratic delays and corruption:** Bureaucratic delays and corrupt practices also hamper labour and capital productivity. Viable investments are limited by the multiple layers of approvals required to obtain funds for items outside the annual budget. Further, corrupt practices sometimes lead to over-invoicing of capital equipment, thereby hampering capital productivity.

## **Policy and regulatory issues**

The two key reasons for the low competitive intensity in the sector are: the legacy that the restrictive 1994 telecom policy left behind and the instability and inconsistencies that have plagued the policy and regulatory regime. What is more, the current regulatory regime, even after it has undergone several revisions, contains some features that deter competitive entry. These features also create a non-level playing field that makes it more difficult for those who do enter to capture share from the incumbents.

- ¶ **The legacy of the 1994 policy:** Few players entered the telecom sector following its opening up in 1994. This was because of the following reasons:
  - The national long distance market was not opened up to competition and remained the exclusive preserve of BSNL.
  - Very high reserve prices were set for entry into basic and mobile services. In fact, of the 21 basic services circles that were put out to bid only 6 were taken up by private players after three rounds of bidding. In case of mobile services, of the 42 licenses offered (2 in each circle) 40 licenses were taken up.
- ¶ **Instability, inconsistencies and lack of clarity in the regulatory environment:** The regulatory environment is still plagued by instability, inconsistency and a lack of clarity. For example, the rules of the game in the mobile business were changed and “basic” services providers were allowed to offer limited mobility services. Similarly, lack of clarity on the issue of Internet Telephony persists. This regulatory instability has been a key reason why players have been reluctant to commit to the sector.

Further, even though the regulatory framework has been revised, it still retains some pro-incumbent biases. These are likely to pose problems for the entry and growth of productive private players in the future:

- **High licensing fee for entrants:** At 12-17 per cent of revenue, licensing fees for private players in India are the highest in the world. This will make it difficult for private players to compete with the incumbents.
- **Delays in interconnection:** A new operator cannot start operations until there is proper connectivity with the incumbent's network. Private operators complain that the incumbent often moves very slowly when providing interconnection to private operators, thereby increasing time-to-market for private operators. There has not been adequate pressure on the incumbents from the regulators to ensure that new entrants do not face delays in interconnection.
- **Lack of equal access requirements in long distance:** It is not clear from the current regulations whether all new long distance carriers will be provided equal access. An equal access requirement in long distance would force local access providers to provide subscribers with identical access codes for all long distance providers. If, however, the incumbent long distance access provider has an easier access code or is made the default carrier, it places the new entrant at a significant disadvantage. This would be especially true in India where BSNL, the monopolist long distance service provider, is also the dominant local access provider and is, therefore, well positioned to exploit its position in the access markets to the benefit of its long distance business.
- **Low price caps on local wireline service:** Very low price caps have been set for local wireline services. This limits the incentive of players to add local access lines.
- **Restrictions to entering the national long distance market:** New entrants in the national long distance business have to pay a high license fee (Rs. 100 crore) and have to meet to onerous nationwide rollout obligations (nationwide network in 7 years, including uneconomic area coverage) on entering. As a result only 2 private players have applied for a national long distance license.

### **Labour market barriers**

Labour market rigidities also limit the labour productivity of government-owned companies, although not to a very great extent. In principle, government-owned companies find it difficult to fire workers except on disciplinary grounds.

However, according to our interviews, the presence of excess labour in government-owned operations seems to be driven mainly by the government's social objectives rather than by any legal obstacles. Many government-owned companies in a competitive environment (banks, steel) have successfully used voluntary retirement schemes (VRS) to reduce excess labour even though the profits of these companies have been so high that there has been little pressure to reduce the excess labour force.

## **INDUSTRY OUTLOOK**

The evolution of the industry will depend on the nature of the reforms carried out within the sector and across the Indian economy. We have developed a perspective on the evolution of the sector under three scenarios: status quo, reforms in telecom alone and reforms in all sectors.

In this section, we explain our perspective on wireless technology (which we expect will have a key role to play in all three scenarios), describe our methodology for estimating demand and elaborate on each of the three scenarios.

### **Technology outlook**

Wireless technologies can be used effectively to increase penetration. Our analysis shows wireless service can be cheaper than wireline service both on a capital as well as operating cost basis (**Exhibits 6.21 - 6.23**). Further, the capital cost of wireless services depends on what the peak hour usage of its subscribers is (**Exhibit 6.24**). Thus, the cost per subscriber in wireless can actually be lowered if operators are given the freedom to discriminate on the basis of usage (**Exhibit 6.25**).

### **Demand analysis**

The traditional penetration curve analysis commonly used to predict the penetration of phones as a function of GDP per capita is not adequate to estimate penetration in current Indian conditions due to the older, higher costs of service embedded in the curves, the differences in local access subsidies across countries and the differences in income distribution across countries. As a result, we performed a bottom-up supply and demand analysis to estimate the future outlook in the face of changing technology costs (**Exhibit 6.26**). We found that demand for telephone services rises dramatically as the cost of these services falls (**Exhibit 6.27**). This analysis was based on income data collected by the National Council for Applied Economic Research (**Exhibit 6.28**).

## Outlook for output, productivity and employment

In order to evaluate the outlook for output, productivity and employment, we considered three possible future scenarios: status quo, reforms in telecom alone and reforms in all sectors:

¶ **Status quo:** In this scenario, we assumed that India's GDP per capita would continue to grow at the current rate of around 4 per cent a year and that government subsidies would continue to hold telecom prices at current levels (i.e., no increase in telecom prices in real terms). Under such conditions, we estimated that the number of lines would grow at 20 per cent while labour productivity would grow at 16 per cent (even though labour productivity has increased a lot more dramatically in the past), resulting in a 5 per cent annual growth in employment.

Telephone density would increase from around 2.6 to 15 per 100 in 2010, resulting in 167 million phones being deployed in the country, an output increase of around 20 per cent per year. This would be consistent with the 19 per cent growth seen in the past. This high growth would primarily be due to the low price caps put in place by the government, which may not be sustainable in the long run. The uniformly low price caps would prevent mobile operators from implementing innovative pricing plans and result in a high average peak hour usage (0.08Erlangs/user) and therefore a high economic cost of service of mobile phones. This model was based on the conservative assumption that there would be an equal number of wireline and wireless phones in the country by 2010. The growth in the number of lines was estimated by matching the estimated cost of service with the likely demand at that cost.

The low price caps would result in sluggish private sector investment in the sector and would require the government to provide large operating subsidies (of the order of Rs.1,500/ phone/ year). By 2010, the government would thus need to provide a subsidy of over Rs. 25,000 crore for local access service.

Labour productivity would be likely to continue to grow at 16 per cent, reaching about half that of US productivity in wireline and equalling European productivity in wireless. Government-owned managers would keep their current "freeze" on blue collar hiring, gradually decreasing excess employment and implementing improvements in OFT. The required viable productivity-enhancing investments would probably not be made. We expect that wireless services, being privately owned and requiring inherently lower labour inputs, would reach European productivity levels and cause overall employment in the sector to rise at the rate of about 5 per cent each year.

¶ **Reforms in telecom alone:** In this scenario, we again assumed that India's GDP per capita would continue to grow at 4 per cent a year. As a result, we estimated that output would grow at 18 per cent, labour productivity at around 23 per cent and employment would decline at 5 per cent a year.

Telephone density would increase from around 2.6 to 12 per 100, resulting in an output increase of around 18 per cent. The price of local access service in this scenario would be expected to rise to economic levels. Price caps (at economic levels) would probably still be required in a large number of areas that would not have much competition but the government would not have to provide the large subsidy that would be required in the status quo scenario.

Annual productivity growth would likely be around 23 per cent. Newly privatised carriers would reduce their excess labour, optimise OFT and invest in economically viable automation (e.g., automated fault repair and management). As a result, employment would be likely to decrease at around 4 per cent a year.

¶ **Reforms in all sectors:** In this scenario, we assumed that India's GDP per capita would grow at around 8.6 per cent a year. As a result, we estimated that output would grow at 20 per cent, productivity at 23 per cent and employment would decrease at around 3 per cent a year (**Exhibit 6.29**).

Under an 8.6 per cent GDP per capita growth, India's GDP per capita would grow from today's 6 per cent to 14 per cent of US levels by 2010. Telephone density would consequently increase to 15 phones per hundred, resulting in 161 million phones in the country, a 20 per cent annual growth. (This calculation takes into account the fact that GDP per capita growth in the rural areas will be much lower than the urban growth rate.) The price of local access service in this scenario would be expected to rise to economic levels. Price caps (at economic levels) would still be required in the areas that were relatively less competitive. However, the government would not have to provide the large subsidy required in the status quo scenario.

As in the previous scenario, annual productivity growth would likely be around 23 per cent. Under the pressure of increased competition, newly privatised incumbent players would reduce excess workers, improve OFT and make viable investments. New players would also be likely to enter with levels of potential productivity at US/European levels. As a result, employment would fall by around 3 per cent a year.

## POLICY RECOMMENDATIONS

The telecom policy and regulatory framework that was developed under the 1999 National Telecom Policy has removed many of the deficiencies that were hampering competition and growth in the sector. The reform process is, however, not complete. To achieve the large productivity and output gains discussed earlier, India needs to privatise the sector, further liberalise regulations and strengthen the regulatory body in the sector. Although not crucial, relaxing the labour laws would also facilitate the rationalisation of the bloated telecom workforce. Specifically, the government should:

¶ **Privatise the incumbents:** The government should privatise the entire telecom sector, i.e., not just VSNL and MTNL, as currently planned, but also BSNL. Privatising the telecom sector is likely to result in a significant windfall for government revenues: It could be as much as US\$ 15-20 billion. This surplus could either be reinvested in the sector to boost penetration in lower income areas or could be used to reduce the rapidly growing budget deficit. The main perceived losers from privatisation are the current employees of these carriers. These groups, through their labour unions, will claim that a great number of jobs would be lost as a result. However, privatisation and liberalisation are likely to boost output dramatically, resulting in the overall employment staying about level.

¶ **Develop a fair “light touch” regulatory framework:** The right regulatory framework is critical for India to boost its teledensity and develop a state-of-the-art telecom network that reaches every corner of the country. The regulatory issues can be grouped into six main categories: industry structure; pricing; interconnect; equal access; cross subsidy; performance targets (**Exhibits 6.30 & 6.31**).

- **Move to single telecom licence:** Today’s technology-based licensing scheme should be simplified into a single licence for all telecom services. Operators should be free to use the most appropriate and cost efficient technology available in local access. Moreover, artificial barriers to long distance voice service should be removed allowing access providers to freely bundle long distance voice with their local access offering.

A single telecom licence would allow licence holders to: (1) Use any technology for providing access to customers; (2) Build as much (or as little) network as they choose, both for access and for backbone; (3) Interconnect with other networks freely; and (4) Provide all telecom services (voice, video, data, local access, long distance, etc.). In this context, the government should move towards a market-based spectrum policy allowing buying, selling and leasing of spectrum

subject to certain guidelines on usage. Moreover, wherever possible, under-utilised spectrum blocks, especially in the sub-1GHz range, should be cleared up for telecom use.

Technological changes are rapidly changing the cost of various alternatives for providing telephone services. In particular, wireless access is often cheaper than wireline access. Other technologies such as corDECT hold a lot of promise in providing cheaper access alternatives and allowing the unorganised sector to participate in providing telecom service in rural areas. With further technological advances, cable operators and Internet service providers will be able to offer voice services on their networks at a tiered quality of service. Rather than allowing these technological advances to further complicate the licensing rules, the government should remove barriers to efficient service and create a level playing field by allowing a single licence for all telecom services. A single licence would allow the market players to choose the optimal technology. The Convergence Bill being discussed by the government seems to endorse this view as well.

Eventually, long distance voice will cease to be an independent market. In today's network, voice and data flow on the same fibre backbone where the voice is just a subset of the overall data market. Given that end-user charges for data are independent of the source and destination distance, a similar trend is likely to follow with voice traffic. Furthermore, consumer surveys in the US already show that consumers view local and long distance as complementary services. As a result, consumers would typically prefer to buy local and long distance services from the same provider. This trend is already evident in the US where most national wireless providers bundle long distance service with their wireless service. Thus, maintaining a separate long distance voice service licence is an artificial regulatory construct that should be discarded in favour of a single unified licence for all telecom services.

- **Raise price caps on local access services and remove price caps in areas where there is sufficient competition:** Currently, very low price caps have been imposed on local access services. These limit the incentives of players to add lines and should therefore be raised. Further, all price caps for local access should be removed in areas with sufficient competition, which should be determined on the basis of the dominant player's market share, not just the number of players. In the mobile market, it is important for the government to remove price caps in the medium term following the expected entry of multiple players in these segments. This will allow operators to

discriminate appropriately over prices and drive down the cost of service.

- **Local access:** Currently the price caps on local access are very low and should be raised to encourage players to add lines. Further, price caps should be completely removed in areas with sufficient competition. According to our estimates, competition in the Indian local access market is likely to exist in towns with over 50,000 inhabitants (**Exhibit 6.32**). In the past, price regulation in local access was based on the notion that local wireline networks were a natural monopoly. In the future, the introduction of new wireless technologies as well as rapid line growth is likely to increase competition in the Indian local access market, especially in the higher density areas. Demand for new capacity in local access will come from the increased base of users as well as increased volume for data users. This rapid growth will deepen the adoption of recent technologies allowing India to leap frog over more developed countries in creating competition in the local access.

It should be noted that we are not recommending the removal of price regulation in all areas indiscriminately. Price regulation will still be required in small towns and rural areas that have low competitive intensity due to low population and telephone density. Moreover, in the short term, the government should eliminate the usage penalty embedded in the current price cap regime (the greater the usage, the more expensive the call). Given the negligible variable cost of service, this inhibits revenues and profits.

- **Long distance:** As shown by the experience of countries such as the US, entry into the long distance market boosts competition and naturally reduces prices in this segment. In long distance, new players enter the segment on the basis of lower fixed costs and there is a rapid increase in demand for faster high-speed networks.
- **Mobile:** The government should remove price caps in this segment once sufficient entry occurs (e.g., more than four players). Even in areas with price caps, operators should, at the very least, have the flexibility to make price differentiations between busy hour usage and non-busy hour usage and provide differing rates for heavy and light users. Regulatory constraints and separate price caps on “limited mobility” or Wireless Local Loop service should be removed and both cellular and WLL players should be treated equally in all respects. Finally, the government should introduce a Calling Party Pays (CPP) regime to persuade more people to adopt wireless technology. Under a CPP regime, the calling party will

pay for the entire call, including terminating airtime. A combination of CPP and pre-paid cell phones has become very popular in Venezuela and Argentina, making mobile very competitive with wireline.

- **Frame explicit interconnect regulations:** As in the case of service licences, interconnection rules in India should also be made technology independent. This will mean that the regulator will have to provide explicit guidelines for interconnection and efficient mechanisms for resolving eventual disputes.

A single technology-independent interconnection charge will remove distortions and create a level playing field. Interconnect rules differ by type of service provider in India. Since wireline providers are forced to sell service below cost, they are allowed to retain 60 per cent of the inter-circle, long distance revenues. On the other hand, wireless operators get a 5 per cent share of the long distance revenue, creating a non-level playing field between the two.

The regulator should provide strong guidelines for interconnect agreements, within which interconnect negotiations between operators may occur. These guidelines, coupled with a rapid mechanism for resolving disputes, are essential in ensuring that these negotiations converge rapidly. The negative effect of lax guidelines has already been observed in Chile and Australia where the first interconnect agreements took over 2 years to be finalised.

- **Guarantee equal access for all carriers:** In order to nurture competition and neutralise the incumbents' inherent advantages, the government should guarantee equal access for all carriers. To achieve this in the Indian context, the following steps are required:
  - **Implement equal access for long distance providers:** This will help subscribers reach every competing long distance provider with equal ease. For example, subscribers should be able to reach their default long distance carrier by dialling the same prefix regardless of who their access provider is.
  - **Permit unbundling of the local loop:** Unbundling the local loop is the process of leasing out parts of the local access network to competitors at regulated wholesale prices. Making unbundling mandatory at regulated wholesale prices can discourage infrastructure investments and is therefore not an advisable option for a country like India that wants to grow its infrastructure. Unbundling should, however, be allowed if it makes economic sense for the particular leasing carrier.

- **Allow the use of the pre-subscription model in parallel with call-by-call prefix:** This should be instituted for long distance services. The pre-subscription model is used in the US, where each subscriber has a default long distance carrier whose network gets used when the subscriber makes a long distance call. The subscriber has the option to change providers at any time. Also, if the subscriber so wishes, he/she can use a call-by-call prefix to access alternative carriers (the 10-10-xxx model). A call-by-call prefix without pre-subscription, as envisaged in India, would be the most competitive. But this would result in a lot of customer churn, which in turn would direct investment away from infrastructure into marketing and customer acquisition. This is not appropriate for an infrastructure-starved country like India. When there are sufficient players willing to offer long distance service, subscribers should be balloted for their choice of carrier and non-voters should be proportionally allotted to long distance providers. In addition, of course, the subscribers can also be allowed to make a call-by-call selection.
- **Retain universal service fund and build backbone in rural areas:** In order to achieve the government’s social objective of boosting penetration in low income areas, we recommend the following measures:
  - **Universal Service Fund (USF):** India should continue to use its USF to subsidise service in non-economic areas. As in the case of other countries, USF should continue to be financed through a fixed percentage of revenues from all operators.
  - **Market-based subsidies:** Subsidies should be market-based to avoid distortions, minimise the financial burden to the budget and promote production efficiency and customer choice. On the provider side, India should encourage the farming out of telecommunications infrastructure in non-economic areas that are prioritised according to the government’s social objectives. On the customer side, India should consider the approach of distributing need-based “telephone stamps” to low income consumers who can use them for the payment of their telephone bills.

A market-based mechanism for allocating subsidies would remove the current bias in favour of urban lines. According to our analysis, demand for rural lines remains supply-constrained as opposed to demand-constrained as frequently argued. Given the current income distribution, we would expect 20-22 million lines to be economical, with 38 per cent of them located in rural areas (**Exhibit 6.33**). In contrast, the current distribution of lines is

heavily skewed towards urban areas, with only 15 per cent of the 26 million installed lines in rural areas (**Exhibit 6.34**). As a result, rural coverage remains below demand projections despite the heavily cross-subsidised price caps for local service.

Finally, market-based mechanisms would reduce the financial burden on the Indian budget. Given current technologies, bidding operators are likely to choose wireless service rather than wireline service for low income and low-density areas. Adoption of wireless technologies would reduce the per-user subsidy requirements by around 50 per cent (**Exhibit 6.35**). Changing the direction of subsidies, coupled with actively encouraging privately owned, community-based Public Call Offices, will ensure that telephony and information access is made available to a larger proportion of the population.

- **Radio coverage and backbone build-out in rural areas.** To provide access in rural areas, the government should aggressively pursue the policy of blanketing the country with wireless coverage and providing backbone connectivity. A blanket of radio coverage provides access in remote areas (though not necessarily sufficient capacity). The only additional cost to be incurred for service would be the cost of a handset. Similarly, the availability of a backbone would reduce minimum efficient scale, facilitate competition and provide data connectivity in rural areas. The government should therefore subsidise radio coverage and backbone build-out through competitive bidding to ensure service in uneconomic areas. The total investment requirement for ensuring countrywide radio coverage and connectivity would be approximately Rs. 26,500 crore (**Exhibits 6.36 - 6.38**).

¶ **Grant greater independence to the regulator:** To be effective, an independent regulator should implement the new regulatory framework. The proposed Convergence Bill is a step in the right direction but it needs to be backed up by appropriate regulatory detailing and proper implementation. We recommend the following:

- The regulator's funding should not be dependent on the executive decisions of the government. It should either be fixed by the legislature or should be generated from a fee levied on industry participants.
- The recommendations of the regulator should be binding.
- In reaching its recommendations, the regulator should be free to hire the best industry experts and compensate them by industry standards,

not government standards. This will not be possible if there is government control of the regulator's budget.

- The requirement for Supreme Court intervention in the removal of members of the regulatory body should be restored.

## Appendix 6A: Measuring productivity

We use Total Factor Productivity (TFP) as a measure of productivity in the telecom sector. TFP is the weighted average of labour and capital productivity in the sector.

Labour productivity is defined as the ratio of total call minutes divided by the total employment in the sector. The total employment in the sector is estimated from official statistics from the Central Statistical Office (CSO), excluding the employees that are performing telegraphic functions within telecom operators. Furthermore, Indian employment figures were adjusted for country specific factors not present in the US benchmark. The adjustments include:

- ¶ **Rural adjustment:** Indian productivity estimates were adjusted upwards to reflect the higher labour requirement required to serve very low-density areas. We used the labour productivity of US rural telephone companies scaled by the rural penetration in India to make this adjustment.
- ¶ **New lines adjustment:** Indian productivity estimates were adjusted upwards to account for the higher labour involvement required in installing new lines. In India, access lines are currently growing at around 20 per cent per year compared to a 5 per cent growth registered in the US. The size of the Indian telecom labour force was thus adjusted downwards to account for the higher installation workforce.
- ¶ **Subscriber unit adjustment:** Employment was also adjusted to exclude the time spent in maintaining, repairing and servicing the subscriber units (telephone sets). These services, not performed by US telephone providers, are estimated to absorb around 30 per cent of the maintenance personnel effort in Indian telecom.

Capital productivity is defined as the ratio of total call minutes divided by capital inputs. The capital inputs per line in India were calculated using estimates of capital invested at PPP adjusted to account for network differences between India and the US. First, the Gross Fixed Capital Formation (GFCF) was estimated from company annual reports. This step was necessary because government sources (e.g., CSO) only quote figures for communications as a whole, which also includes investment in the postal and telegraph service. Second, these investment figures were then deflated using price information for telecom equipment from TRAI. Third, in order to compare these figures with our international benchmarks, the real figures in Indian rupees were then converted to US dollars using the estimated

telecom investment PPP of Rs.19 per USD. The PPP was estimated from extensive interviews in which we compared the cost of setting up an exactly equivalent network in the US and in India. This was necessary because there are significant differences in network construction costs. For example, laying a 24 fibre optical fibre cable over 1000 km would cost Rs.20,000 in India while it would cost US\$ 1050 in the US

Finally, the estimates of capital inputs at PPP for both India and the US were adjusted to account for network differences between these countries (**Exhibits 6.39 & 6.40**). These adjustments include:

- ¶ **Lower backbone capacity in India:** Indian capital figures were increased to account for the additional investment necessary to provide similar levels of backbone capacity as the US. According to our estimates, India would require a minimum additional investment of around US\$ 90 per line to eliminate blocking and have sufficient route diversity in the voice network.
- ¶ **Lower cable quality in India:** Around 30 per cent of the cable installed in India is paper coated. Compared to the jelly-filled cable used in the US, paper coated cable provides lower service quality due to a higher incidence of moisture. The replacement cost of the existing installed base of paper-coated cable is estimated to be around US\$ 153 per line.
- ¶ **Greater incidence of overhead cable in India:** In India, a significant portion of the last mile wiring is still laid overhead as opposed to underground. Overhead cables require less initial investment but much higher maintenance than underground cables. The cost of converting overhead cables to underground cables is estimated at around US\$ 53 per line.
- ¶ **Greater incidence of private (data) lines in the US:** In the US, a significant amount of capital is invested in private (data) lines that are leased by corporations. This investment, estimated at around US\$ 154, is excluded from the US capital inputs figures.
- ¶ **Higher spending on operations supports systems (IT):** The US spends significant amounts of money on IT for operations and business support systems. These systems primarily provide better customer care and marketing capabilities and automate network maintenance. This expenditure, estimated at around US\$ 254 per line, is deducted from the US capital figures.
- ¶ **Multiple investments made in upgrading networks in the US:** Over time, US carriers have invested in upgrading switches from electromechanical to analogue and subsequently from analogue to digital. In India, this upgrading cost was not incurred to the same extent as most

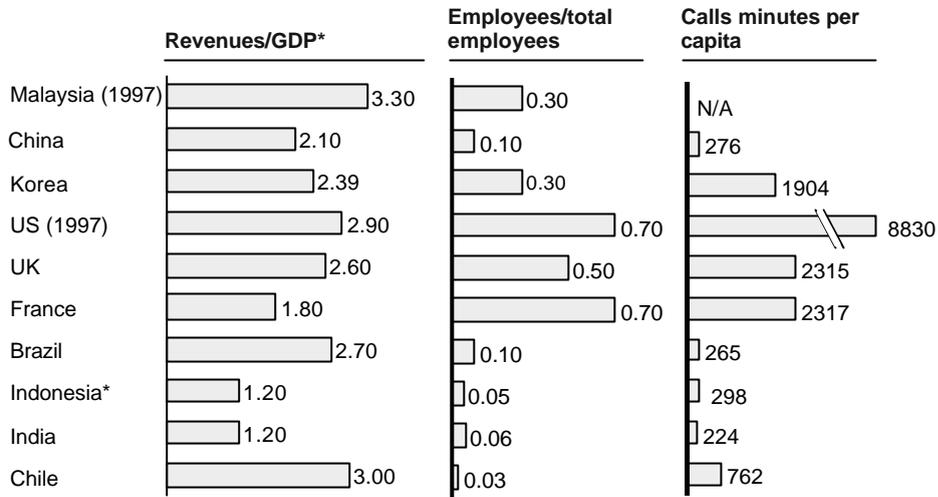
of the lines have been installed over the past decade using digital technology. The upgrading investment is estimated to be around US\$ 28 per line.

Exhibit 6.1

### TELECOM'S SHARE OF THE NATIONAL ECONOMY – 1998

Per cent

ESTIMATES



\* Nominal GDP

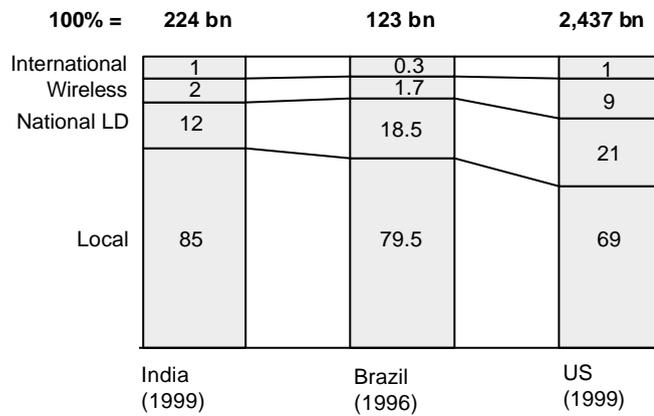
Source: ITU; World Bank; DoT

Exhibit 6.2

### TELECOM TRAFFIC DISTRIBUTION

Minutes of traffic

ESTIMATES



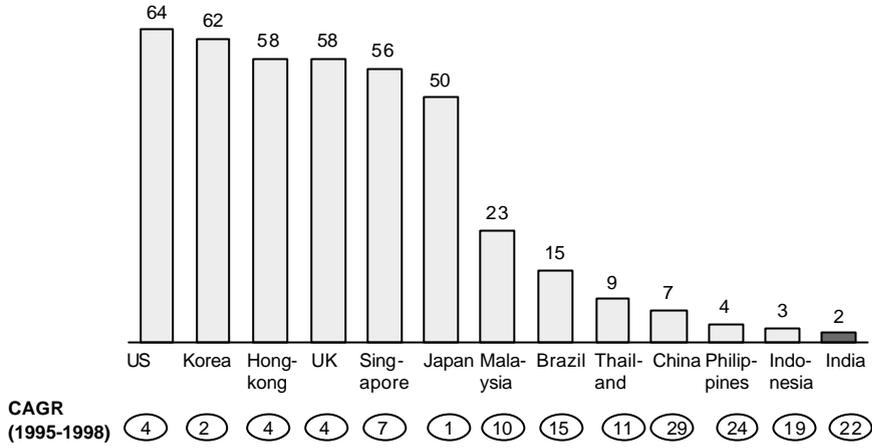
Source: DoT (India); MSDW; TRAI; ITU; McKinsey estimates

Exhibit 6.3

**INTERNATIONAL COMPARISON OF LINE PENETRATION**

Lines per 100 inhabitants, 1998

ESTIMATES



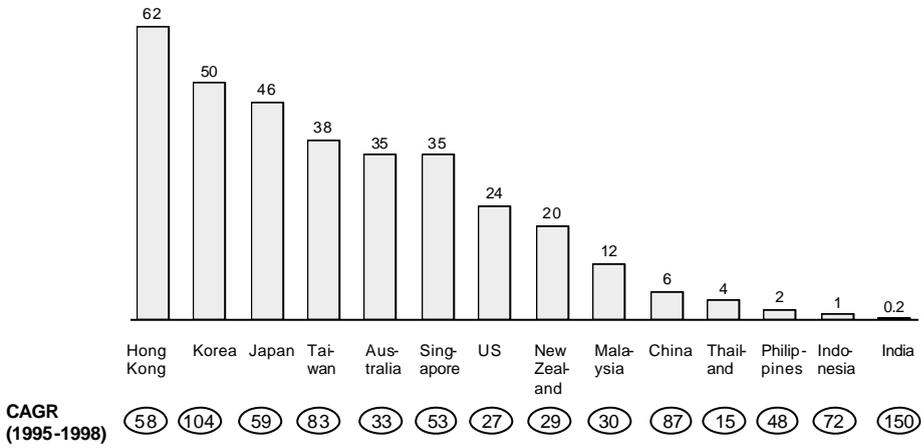
Source: MSDW; INFAC; ITU

Exhibit 6.4

**INTERNATIONAL COMPARISON OF WIRELESS PENETRATION**

Wireless phones per 100 inhabitants

ESTIMATES

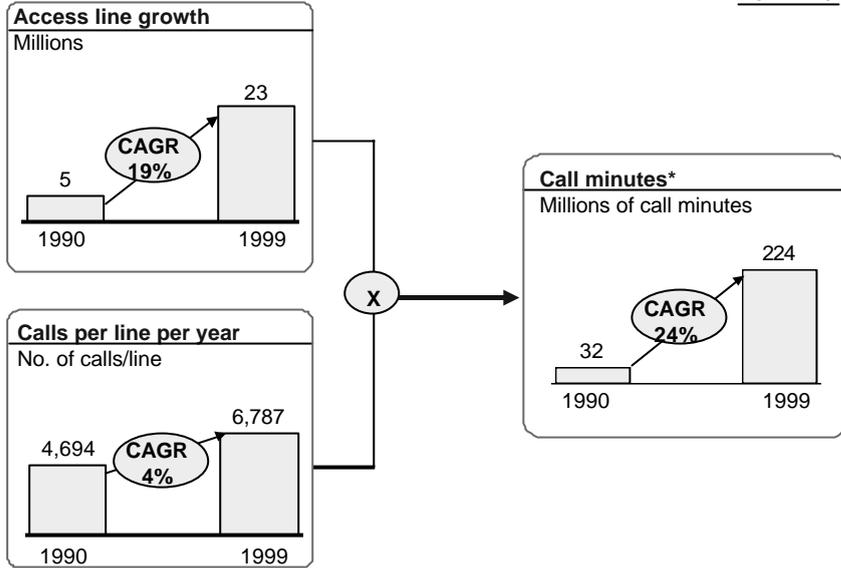


Source: MSDW; COAI; DLJ; ITU

Exhibit 6.5

### OUTPUT GROWTH IN INDIAN TELECOM SECTOR

ESTIMATES



\* Assumes 1.5 minutes per call

Source: DoT

Exhibit 6.6

### REGULATORY ENVIRONMENT FOR VOICE TELEPHONY IN INDIA

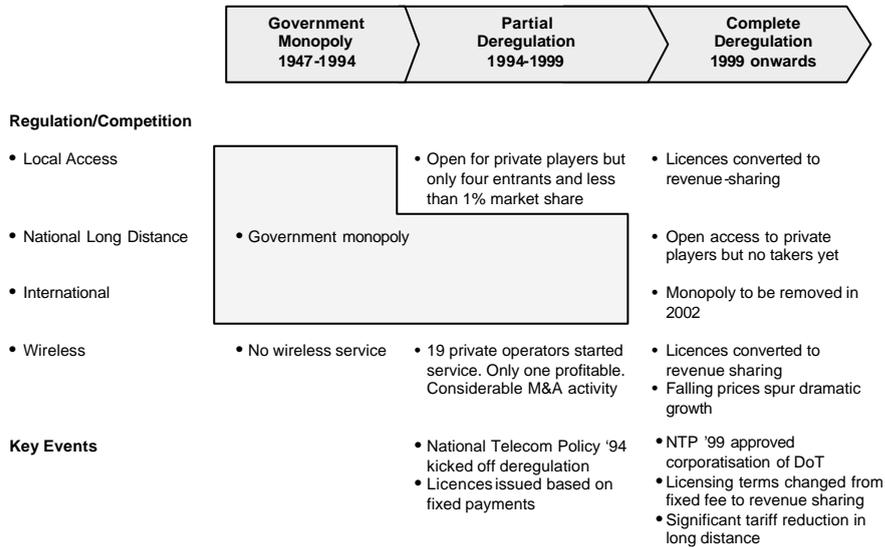


Exhibit 6.7

**INTERNATIONAL BENCHMARKS OF GOVERNMENT CONTROL** ESTIMATES  
**IN TELECOM**

Per cent

Private  
 Government control

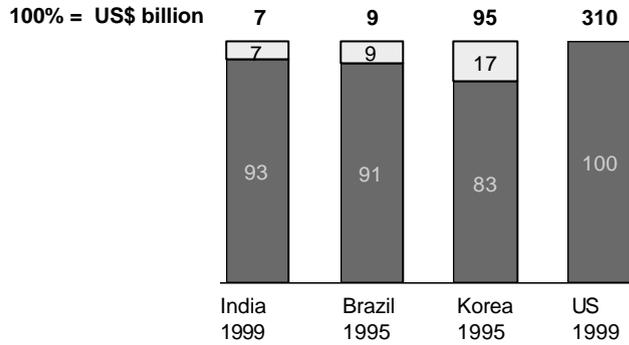


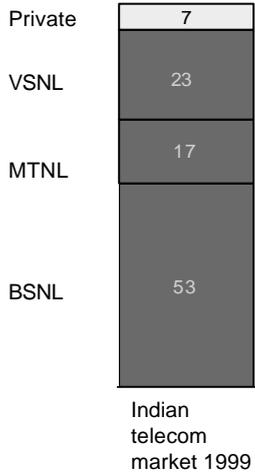
Exhibit 6.8

**KEY PLAYERS IN THE INDIAN TELECOM SECTOR** ESTIMATES

Per cent

Government owned

100% = US\$7 billion



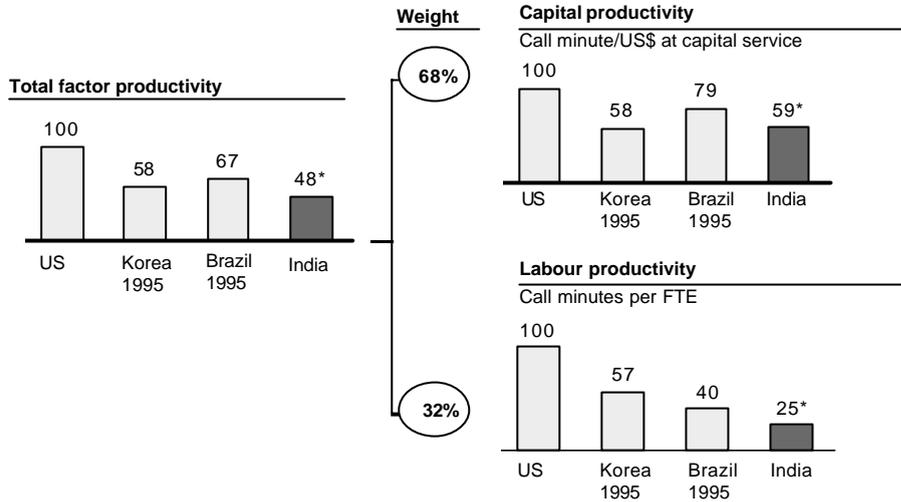
Entity	Services
• Private	<ul style="list-style-type: none"> <li>• Wireless</li> <li>• ISP</li> <li>• Some local access</li> </ul>
• VSNL	<ul style="list-style-type: none"> <li>• International voice</li> <li>• International data</li> <li>• ISP</li> </ul>
• MTNL	<ul style="list-style-type: none"> <li>• Local access in Mumbai &amp; Delhi</li> <li>• ISP</li> </ul>
• BSNL	<ul style="list-style-type: none"> <li>• Local access everywhere except Mumbai &amp; Delhi</li> <li>• All national long distance</li> </ul>

Source: Annual Report on DoT (India); MSDW

Exhibit 6.9

### TOTAL FACTOR PRODUCTIVITY IN INDIAN TELECOM

Indexed to US = 100 in 1999

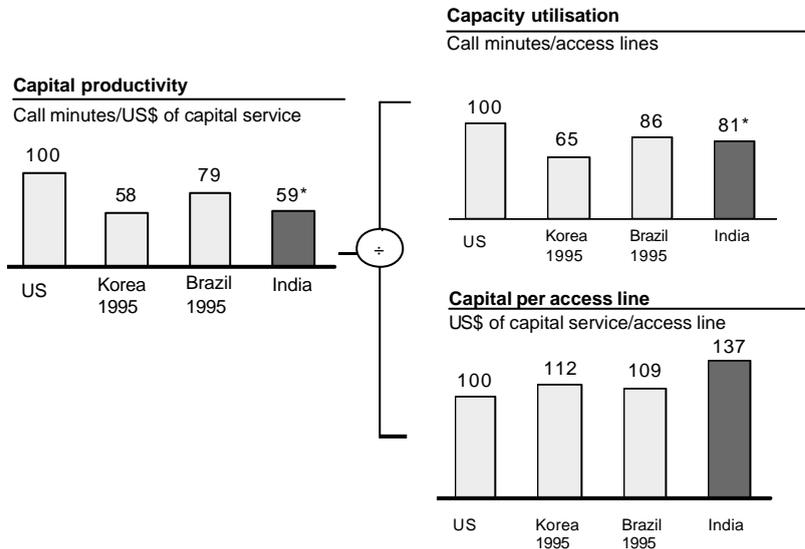


\* For non-PCO lines. If PCOs are included, labour, capital and total factor productivity are 10%, 75%, and 54% respectively  
Source:FCC; DoT; Telebrás; CSO; MTNL; VSNL; TRAI; MSDW; CMIE; Interviews; McKinsey estimates

Exhibit 6.10

### CAPITAL PRODUCTIVITY IN INDIAN TELECOM

Indexed to US = 100 in 1999

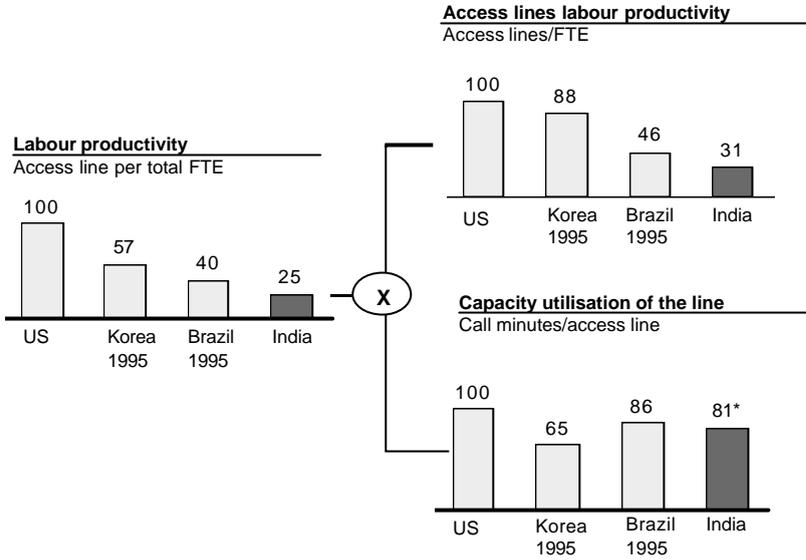


\* For non-PCO lines. If PCOs are included, capital productivity is 75% and network utilisation is 102%.  
Source: CSO; DoT; MTNL; VSNL; TRAI; MSDW; CMIE; Interviews; McKinsey estimates

Exhibit 6.11

### LABOUR PRODUCTIVITY IN INDIAN TELECOM

Indexed to US = 100

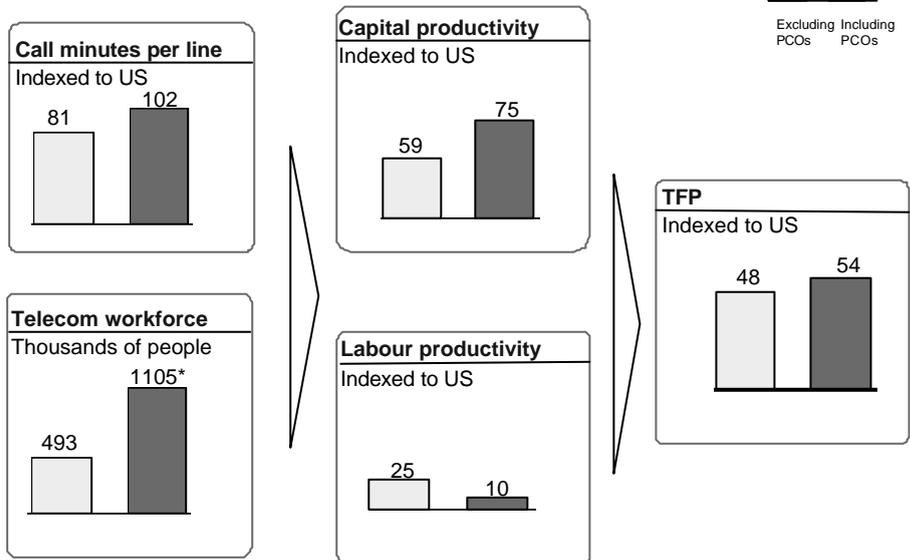


\* If PCO operators were included in the labour pool, labour productivity would drop to 10%

Source: FCC; DoT; Telebras; McKinsey analysis; Interviews

Exhibit 6.12

### EFFECT OF INCLUSION OF PCO BOOTHS ON PRODUCTIVITY



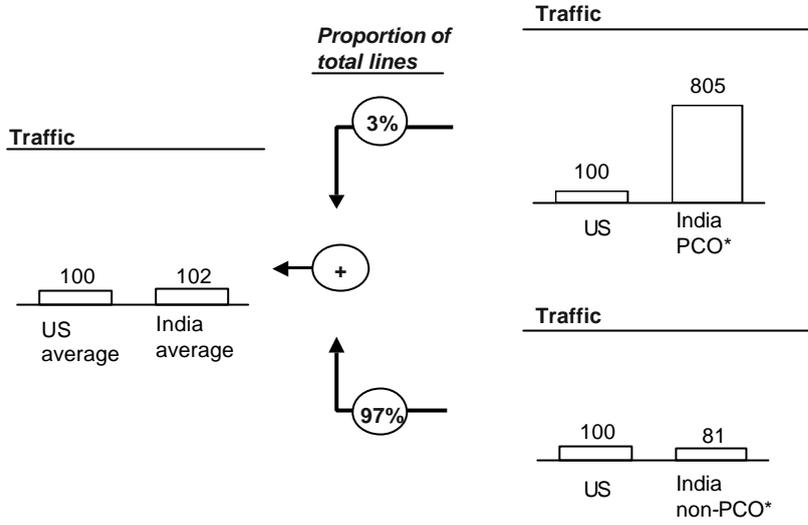
\* Assumes one operator per booth

Source: DoT; TRAI; McKinsey estimates

Exhibit 6.13

### COMPARISON OF CAPACITY UTILISATION OF DIFFERENT TYPES OF LINES

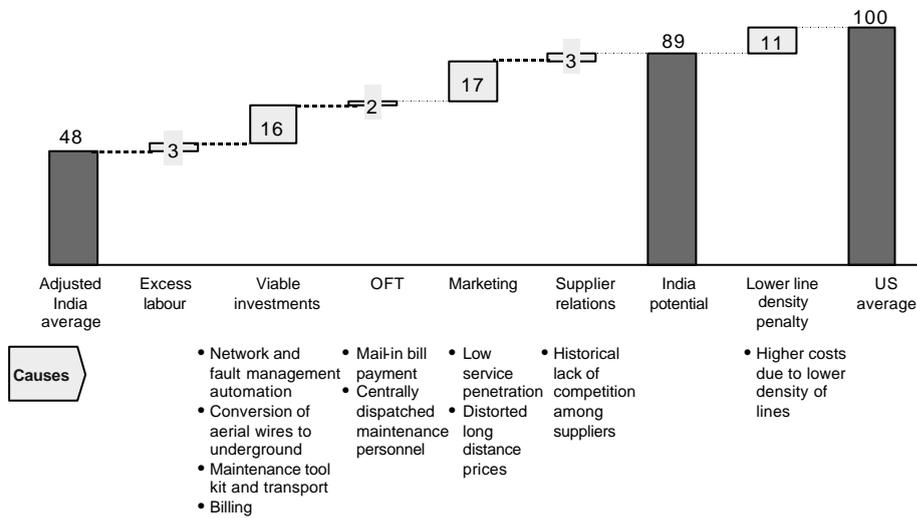
Indexed minutes of use per line, US = 100



\* Public call office (a manned pay phone booth)

Exhibit 6.14

### INDIAN TELECOM TOTAL FACTOR PRODUCTIVITY GAP: CAUSAL FACTORS



Source: FCC; NTCA; DoT; Interviews; McKinsey estimates

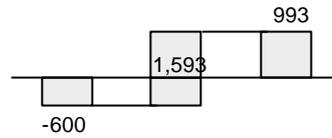
**VIALE INVESTMENTS TO BOOST LABOUR PRODUCTIVITY**

ILLUSTRATIVE

- Assumptions**
- Cost of capital: 15%
  - Investment benefits reaped to perpetuity
  - Salaries are constant to perpetuity

**Network and fault management automation**

Rupees per line

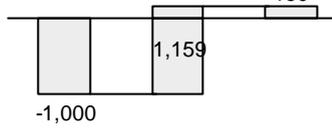


**Impact on labour productivity**

+39%

**Aerial to underground wires**

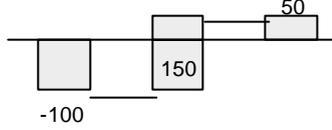
Rupees per line



+16%

**Better transport + tool kits**

Thousand rupees per employee



+15%

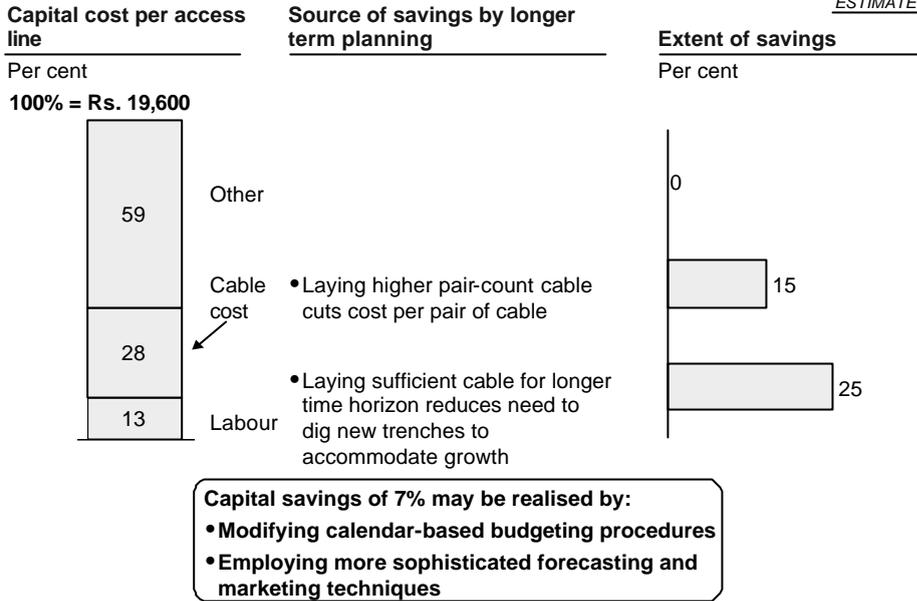
Source: Interviews; McKinsey estimates

**Cost      Benefit      NPV**

Exhibit 6.16

### EFFECT OF SHORT-SIGHTEDNESS IN NETWORK PLANNING

ESTIMATES

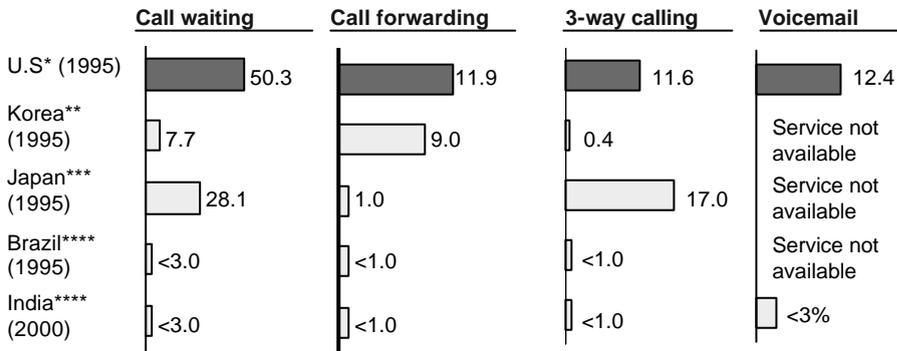


Source: Interviews; McKinsey estimates

Exhibit 6.17

### PENETRATION OF CALL COMPLETION SERVICES

Per cent of telephone subscribers subscribing to the service



\* Based on sample survey data

\*\* Per cent of total Korea Telecom subscribers that subscribe to the service

\*\*\* Percentage of total NTT subscribers that subscribe to the service

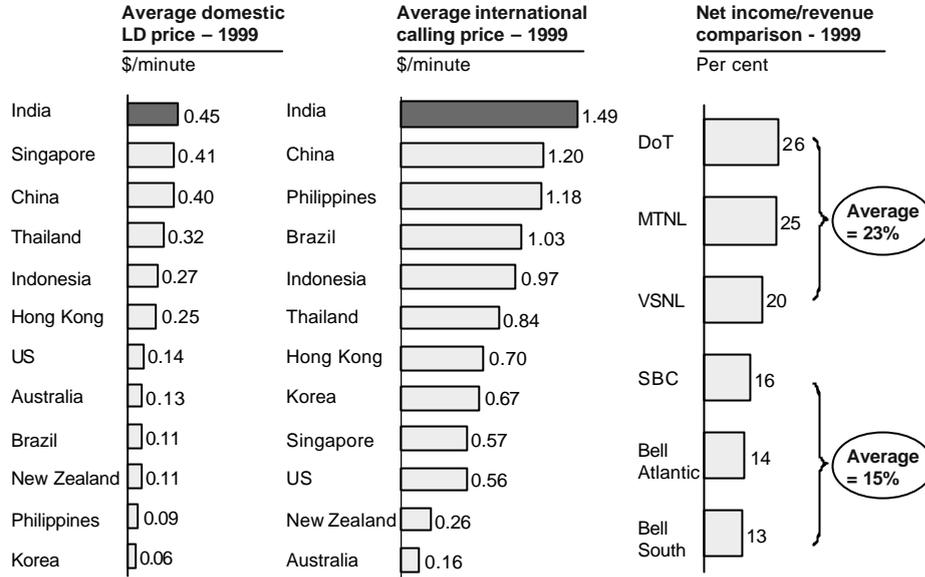
\*\*\*\* Estimate based on interviews

Source: Korea Telecom; IDC/Link; McKinsey estimates

Exhibit 6.18

**PRICES AND PROFITS IN TELECOM SERVICES**

ESTIMATES



Source: MSDW; ITU; Pyramid Research; FCC

Exhibit 6.19

**CAUSAL FACTORS EXPLAINING INDIAN TELECOM LABOUR PRODUCTIVITY GAPS**

● Important  
○ Moderately important

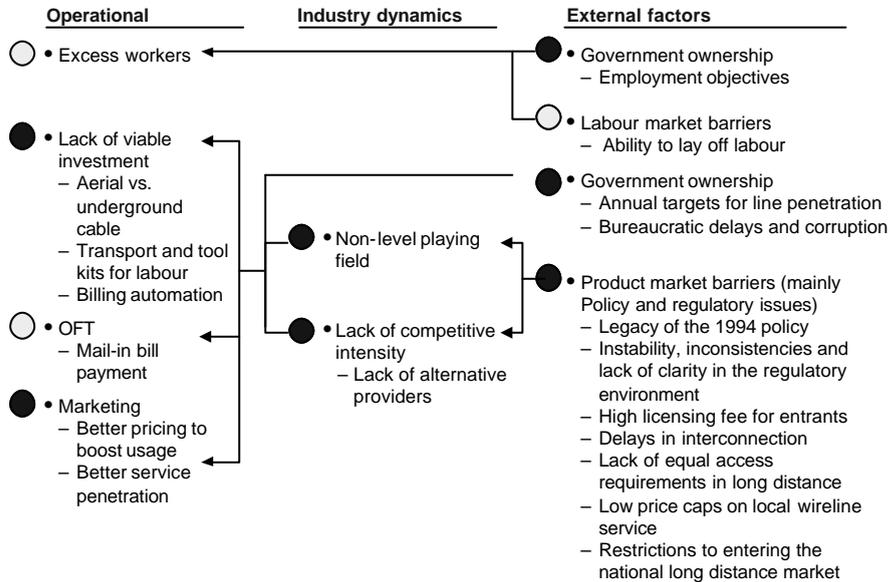


Exhibit 6.20

## CAUSAL FACTORS EXPLAINING INDIAN TELECOM CAPITAL PRODUCTIVITY GAPS

● Important  
○ Moderately important

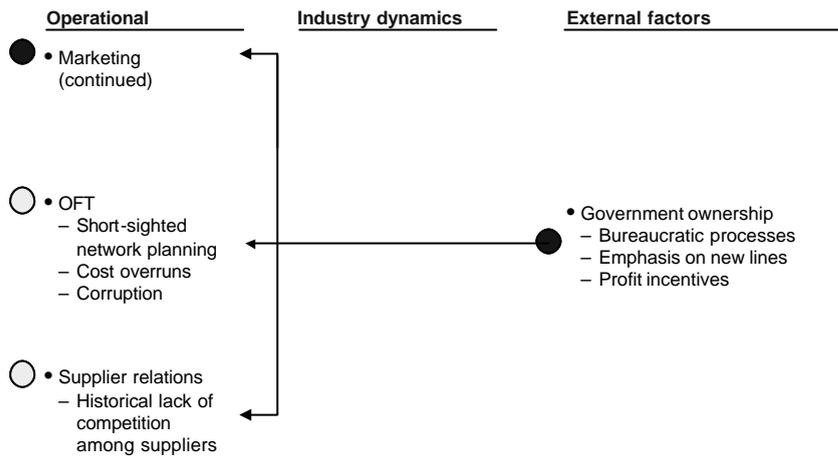
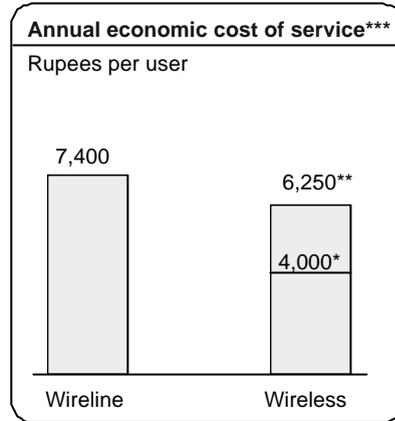
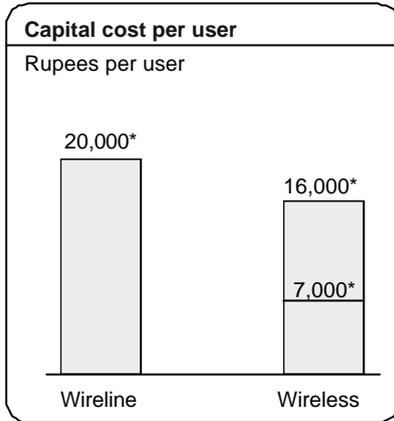


Exhibit 6.21

**COST COMPARISON OF WIRELESS AND WIRELINE SERVICES**

ESTIMATES



\* Assumes busy hour traffic of 0.02 Erlangs per subscriber (little above current wireless traffic level)

\*\* Assumes busy hour traffic of 0.08 Erlangs per subscriber (approximate wireline traffic level)

\*\*\* Indian private operator example. Capital cost excludes cost of wireless handset, but cost of service includes economic cost of handset rental.

Source: Interviews; McKinsey analysis

Exhibit 6.22

**ANNUAL ECONOMIC COST OF WIRELINE SERVICE**

ESTIMATES

Assumptions
• 47 lines per employee
• Rs.83k annual salary per employee
• 10%/year, straight line depreciation
• Return on investment
– Capital investment Rs. 20,000/line
– Required return 15 per cent per year
• Rental cost based on 5 year depreciation of Rs.300 wireline handset
• Ignores customer acquisition (marketing) costs

**Annual economic cost of service**

Per cent

100% = Rs. 7,400 per user per year

Other (materials)	7
Handset rental	2
Salary expense	24
Depreciation	27
Return on investment	40

Wireline Service

Source: DoT; MTNL; TRAI; Interviews; McKinsey Analysis

**ANNUAL ECONOMIC COST OF WIRELESS SERVICE**

ESTIMATES

Percent

Assumptions
<ul style="list-style-type: none"> <li>Capital costs per subscriber of Rs.7,000 and Rs.16,000 for busy hour traffic of 0.02 &amp; 0.08 Erlangs per subscriber</li> <li>1.25 employees per thousand users</li> <li>Rs.200,000 per year annual salary</li> <li>Rental cost of handset estimated on basis of 5-yr depreciation of handset costing Rs.3000</li> <li>Customer acquisition cost of Rs. 1200 and churn rate of 25%/year</li> </ul>

**Annual economic cost of service**

Per cent, per user per year

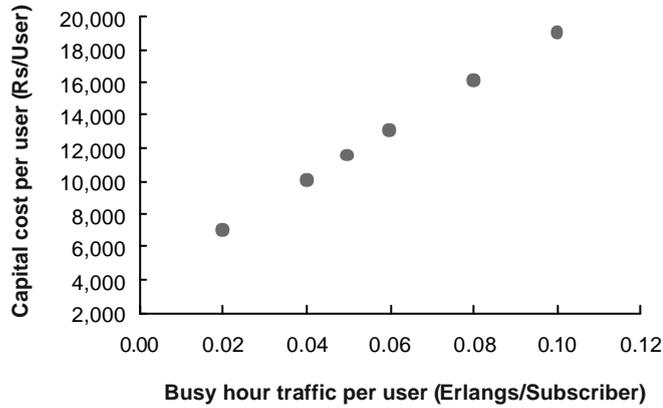
	100% = Rs. 4,000	6,250
Other (materials)	13	8
Marketing	8	5
Handset rental	30	19
Salary expense	6	4
Depreciation	18	26
Return on investment	26	38
	Wireless at 0.02 Erl/user*	Wireless at 0.08 Erl/user*

\* Current wireless consumption is a little over 0.01Erl/user. Wireline consumption is about 0.08Erl/user. As wireless is treated as a substitute for wireline, one would expect the wireless consumption to rise.

Source: Interviews; McKinsey Analysis

**CAPITAL COST PER USER AS A FUNCTION OF TRAFFIC**

ESTIMATES



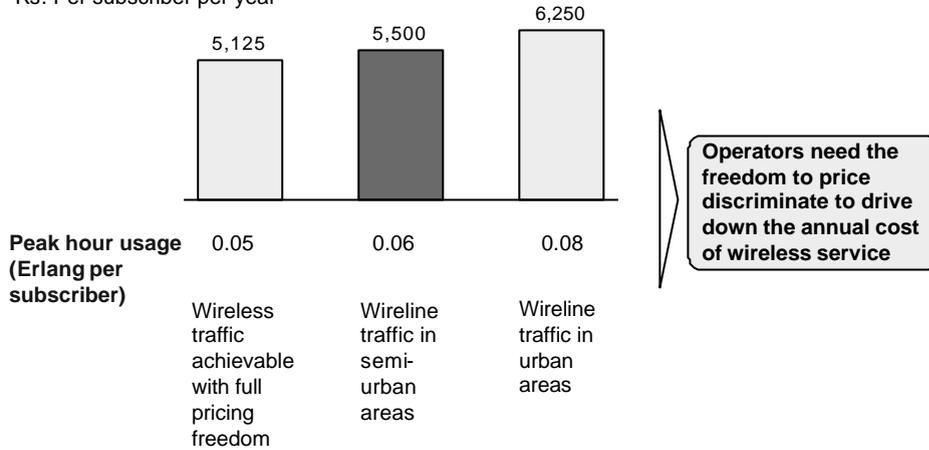
Capital cost and thus the cost of service for wireless depends on peak hour usage

Exhibit 6.25

## VARIATION OF ANNUAL COST OF SERVICE PER SUBSCRIBER WITH PEAK HOUR USAGE

ESTIMATES

Rs. Per subscriber per year



Note: Current economic cost of service is only Rs. 4,000 per subscriber per year. This is because peak hour usage is currently very low 0.02 erlangs per subscriber. The peak hour usage is expected to rise over time as cellular usage increases

Source: Interviews; McKinsey analysis

Exhibit 6.26

## METHODOLOGY FOR DEMAND-SUPPLY ANALYSIS

### Assumption

#### Income distribution

- Income bands for 2000 estimated by adjusting 1996 income bands (NCAER study) for inflation (using CPI)
- The income bands for 2010 were arrived at by assuming real GDP per capita annual growth of 13% in towns and 4% in rural areas.
- Distribution of households among the income bands in 2000 and 2010 was assumed to be the same as in 1996.

#### Demand

- All households in 2010, for whom 7% of income was greater than the cost of service, were assumed to have one phone each (i.e. families with income above Rs.64,000 per year).
- 50% mark-up in number of phones was added for business lines and multiple lines (upper end of TRAI range)

#### Cost of service

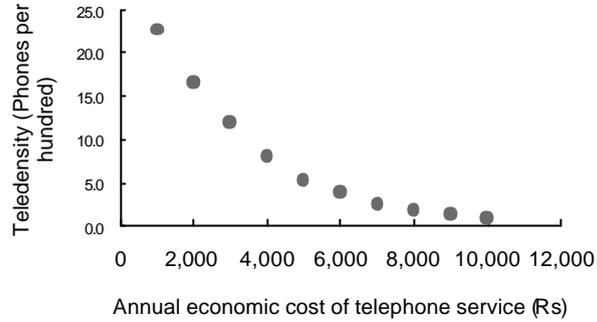
- Labour productivity in 2010 reaches potential in 2010.
- Capital costs for wireless services were assumed to fall 10% each year till 2003, and then savings were assumed to taper off to 0% per year by 2008.
- Material costs were assumed to stay constant (in real terms).

Source: DLJ; NCAER; McKinsey analysis

**TELEDENSITY AS A FUNCTION OF COST OF SERVICE**

ESTIMATES

- Assumptions**
- NCAER 1996 income bands grown at CPI rate to 2000
  - Uniform distribution of population within NCAER income band
  - Only those households for whom 7% of income exceeds cost of phone service will own phones
  - Population growth of 2% per year
  - Persons per households of 5.2
  - 50% extra lines for business and multiple lines



**INCOME DISTRIBUTION BY SIZE OF TOWN - 1996**

Per cent

1996 annual household income

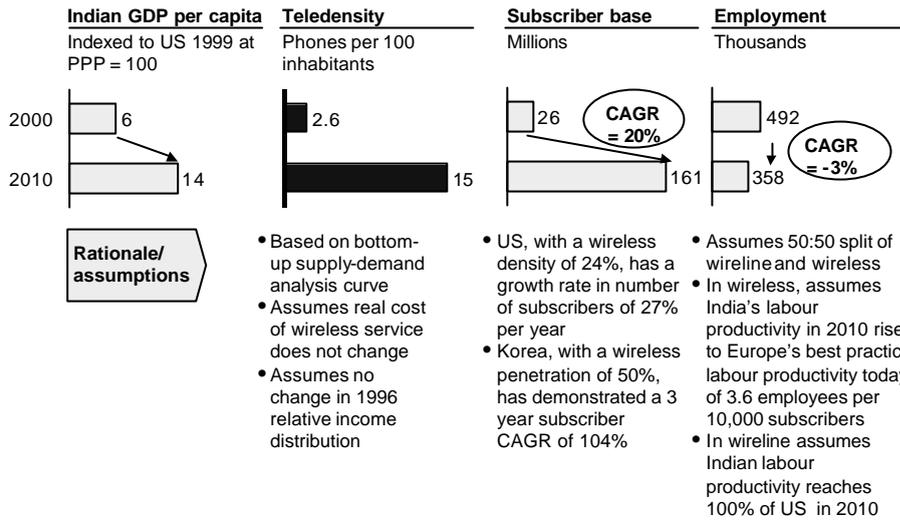
100%=	21	6	5	5	6	5	118 million
>106k	12	5	4	5	4	3	2
77k-106k	14	8	7	6	5	4	9
50k-77k	25	19	19	18	14	11	29
25k-50k	32	36	39	36	35	37	57
0-25k	17	32	31	35	42	45	
Town size (Thousands)	>500	200-500	100-200	50-100	20-50	5-20	Rural

Source: NCAER

Exhibit 6.29

## FUTURE OUTLOOK – TELEDENSITY INCREASES MORE THAN SIX FOLD

ESTIMATES



Source: McKinsey analysis

Exhibit 6.30

## HIGH PRIORITY REGULATORY RECOMMENDATIONS FOR INDIAN TELECOM SECTOR

- Create a fair, independent and competent regulatory body by ensuring that all its members enjoy the respect and confidence of the local and international telecom industry
- Remove the arbitrary distinction between Limited Mobility and Full Mobility with respect to licensing terms, pricing and interconnect
- Replace current revenue sharing between local and long distance service with a flat, per-minute access charge consistent with international norms
- Allow NLDOs to carry inter-circle as well as intra-circle traffic
- Discontinue forced, indiscriminate wireline access subsidies in favour of targeted subsidies to build nationwide wireless network and backbone

Exhibit 6.31

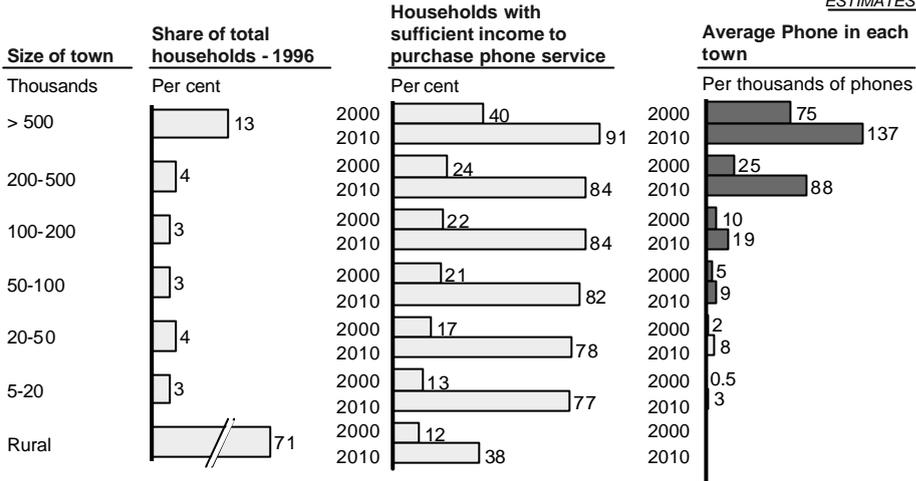
## CURRENT AND PROPOSED REGULATION FOR INDIA

	Current regulation in India	Proposed regulation in India
<b>Industry structure</b>	<ul style="list-style-type: none"> <li>• Separate technology based licences for access</li> <li>• Separate local access and backbone licenses</li> <li>• Circle-based licences</li> <li>• Significant rollout requirements</li> </ul>	<ul style="list-style-type: none"> <li>• No technology barriers</li> <li>• Single licence for all services</li> <li>• No rollout requirements</li> </ul>
<b>Pricing</b>	<ul style="list-style-type: none"> <li>• Price caps on local</li> <li>• Local players are given exclusive rights to offer intra-circle LD in order to cross-subsidize local service</li> </ul>	<ul style="list-style-type: none"> <li>• Price caps removed in areas where there is adequate competition</li> <li>• Allow pricing freedom for mobile operators to segregate users based on usage/geography, subject to some price caps</li> </ul>
<b>Interconnect</b>	<ul style="list-style-type: none"> <li>• Limited interconnect mandated</li> <li>• 60% of LD revenue retained by fixed access providers</li> </ul>	<ul style="list-style-type: none"> <li>• Level playing field between mobile and fixed operators with respect to interconnect for long distance</li> <li>• Provide pricing framework for interconnect and rapid dispute resolution mechanism</li> <li>• Remove revenue-sharing between local &amp; long distance in favour of access charges or COBAK</li> <li>• Allow access providers to connect across circles</li> </ul>
<b>Equal Access</b>	<ul style="list-style-type: none"> <li>• Being debated</li> </ul>	<ul style="list-style-type: none"> <li>• Carrier pre-selection with balloting for LD</li> <li>• Number portability mandated</li> <li>• Unbundling permitted but not mandatory</li> <li>• Equal access for all LD operators mandated</li> </ul>
<b>Cross-Subsidy Support</b>	<ul style="list-style-type: none"> <li>• Heavy local access charges levied on LD</li> <li>• 5% of revenue goes to USF except for ISPs</li> <li>• Restrictions on number of licensees in access</li> </ul>	<ul style="list-style-type: none"> <li>• No forced cross-subsidisation. All subsidies directly provided by government</li> <li>• Revenue tax channelled into USF</li> <li>• Additional funding of USF directly by government</li> </ul>
<b>Performance level</b>	<ul style="list-style-type: none"> <li>• Significant rollout requirement in local access as well as LD (i.e. rural area coverage)</li> </ul>	<ul style="list-style-type: none"> <li>• None, except enforcement of any compensatory damage clauses</li> </ul>

### EXTENT OF LOCAL ACCESS COMPETITION

■ Able to support competition in access

*ESTIMATES*



- Towns with populations above 50k can support competition in access
- Remaining areas (75% of population) will require price regulation

Source: McKinsey analysis; TRAI



Exhibit 6.33

**ESTIMATE OF NUMBER OF LINES IF LOCAL SERVICE IS PRICED AT ECONOMIC COST**

ESTIMATES

<b>Town size - population ('000)</b>	<b>&gt;500</b>	<b>200-500</b>	<b>100-200</b>	<b>50-100</b>	<b>20-50</b>	<b>&lt;20</b>	<b>Rural</b>
Number of households* (millions)	21	6	5	5	6	5	118
Proportion of households that can afford service ** (per cent)	26	13	11	11	9	7	5
Total lines with allowance for business lines*** (million)	8.2	1.2	0.8	0.8	0.8	0.5	7.7

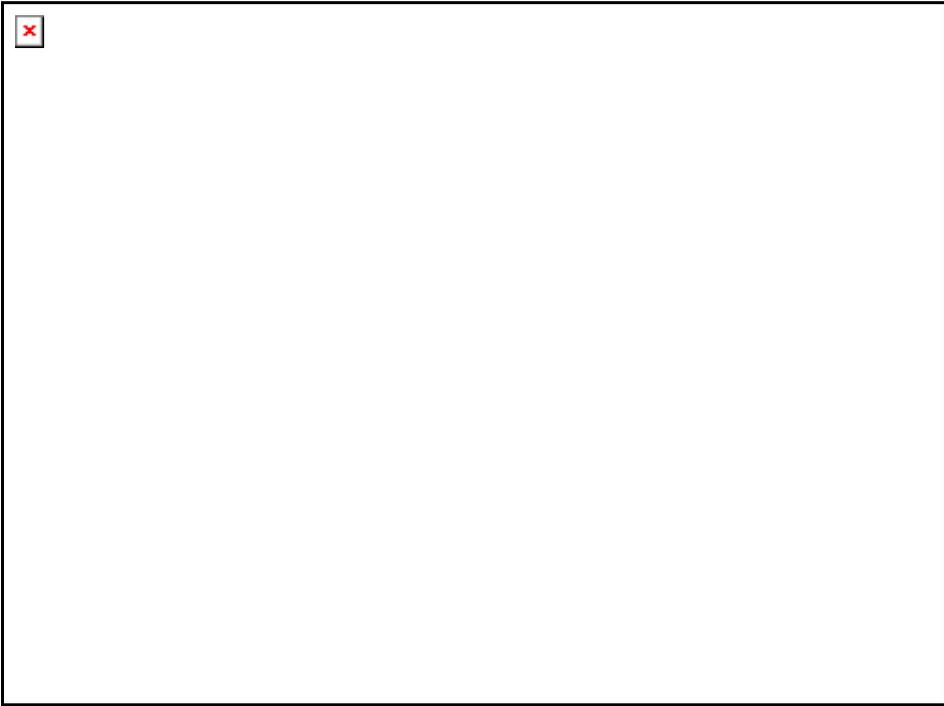
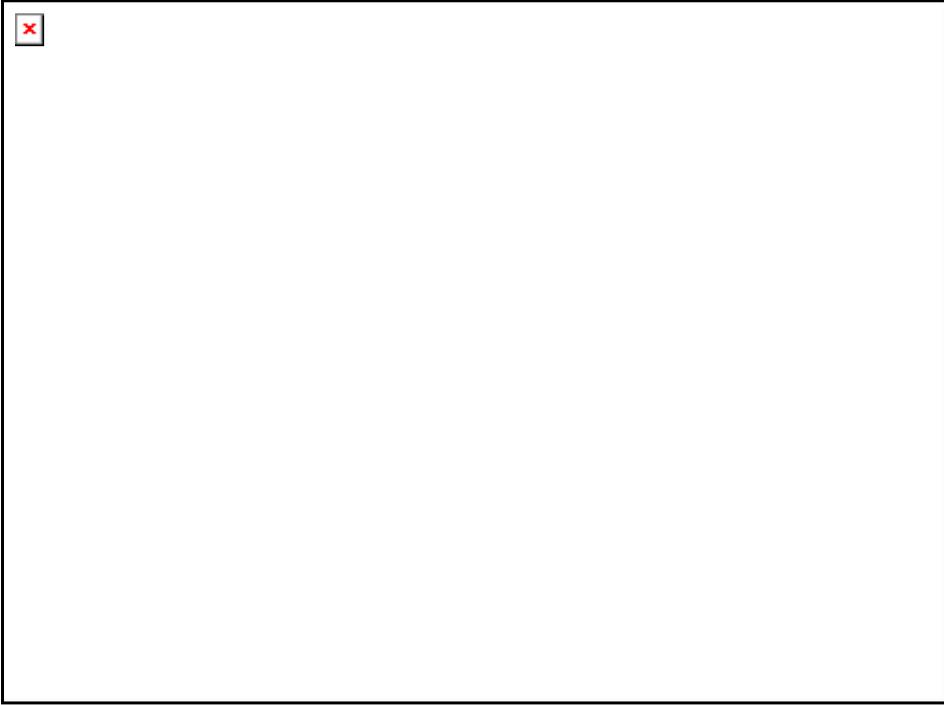
**If local service were priced at economic cost, India would have about 20-22 mm lines, about 38% of which would be rural**

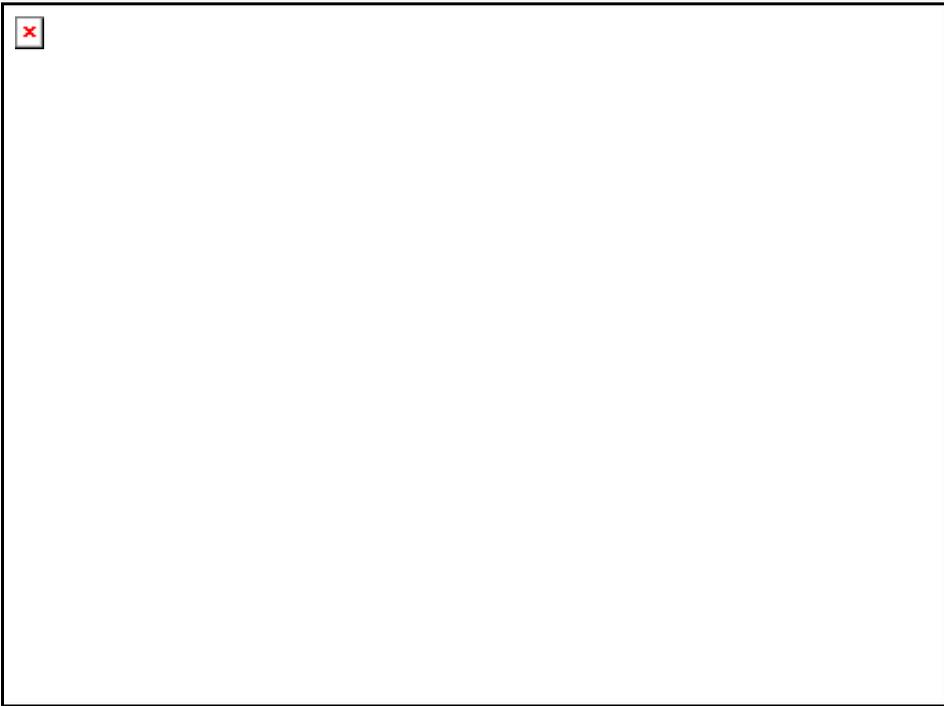
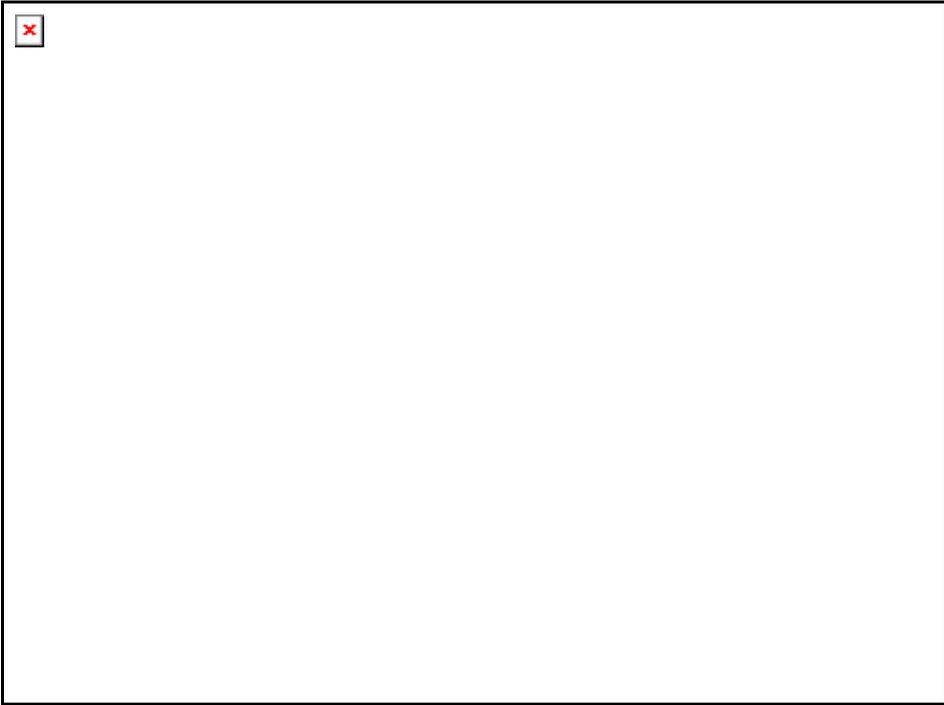
\* NCAER data from 1996

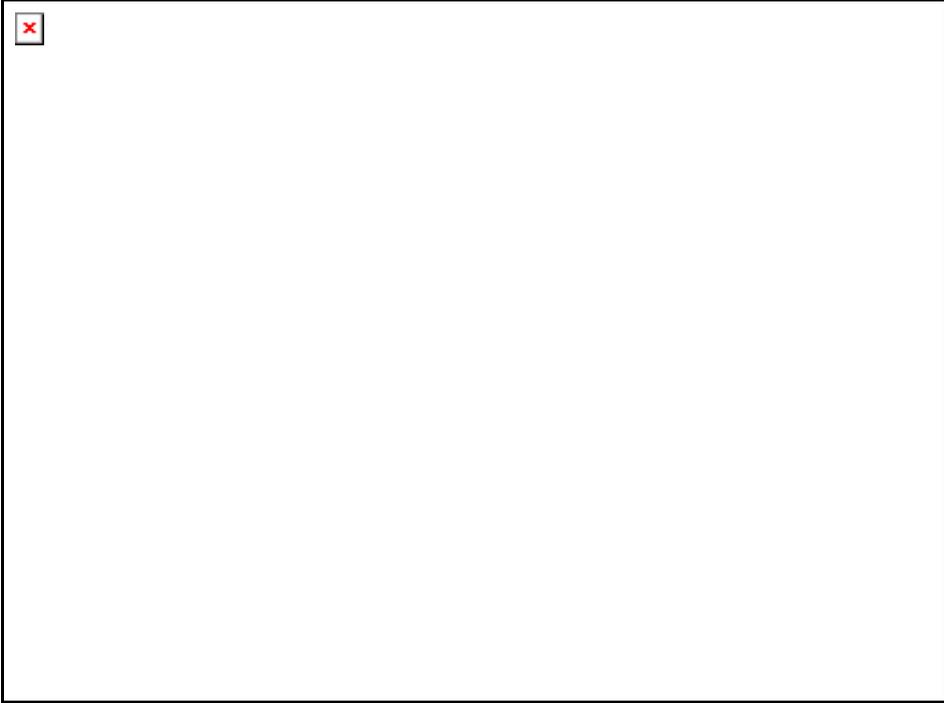
\*\* Households with income greater than Rs.100,000 per year. Economically priced service is Rs.7000 per year

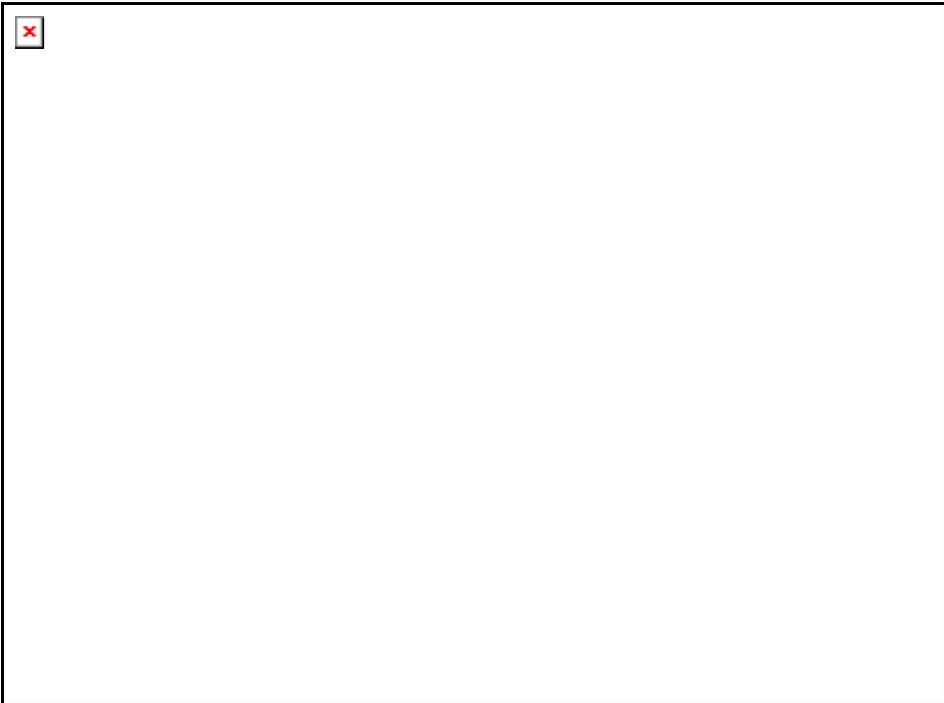
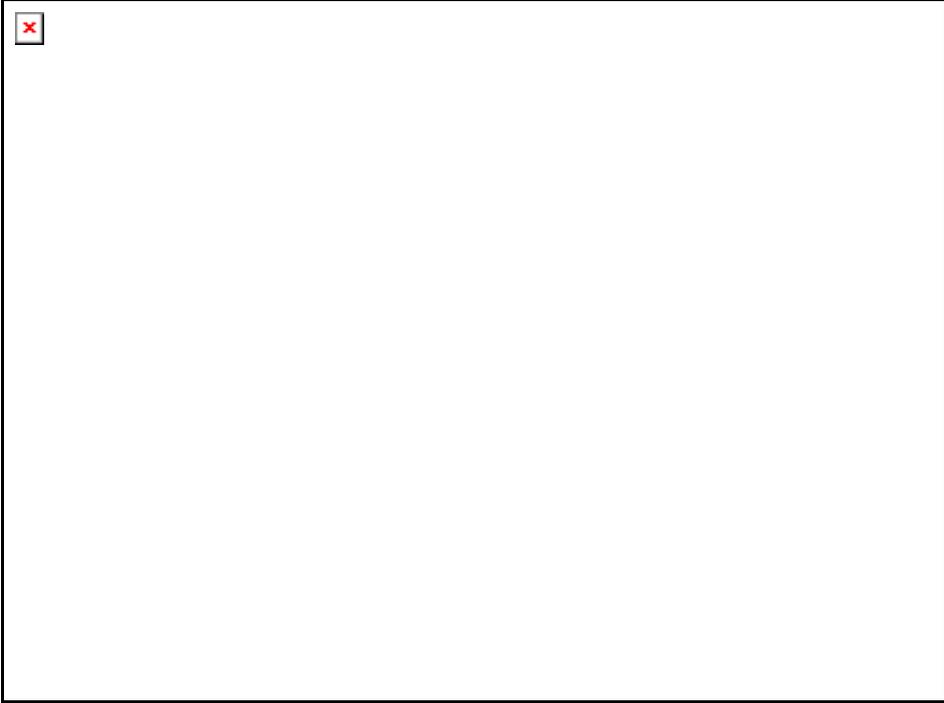
\*\*\* 50% business & other lines in towns and 25% in rural areas added to one phone per household

Source: NCAER; TRAI; McKinsey analysis











# Wheat Farming

## **SUMMARY**

Wheat is one of the most important agricultural crops in India – accounting for approximately 3 per cent of GDP and involving 15 million farming households. However, India's productivity in wheat farming is only 1.3 per cent of US levels. Further, the potential productivity is also low at about 2 per cent of US levels. This is because farming in India is likely to remain a labour-intensive activity, as most mechanisation, such as the use of combine harvesters, large tractors and sprinkler systems, is not viable owing to the low cost of labour. In fact, combine harvesters are just being introduced in Thailand, a country four times richer than India.

Almost 80 per cent of the gap between current and potential productivity is due to the fact that yield (wheat output per unit of land) is below potential. Our study reveals that the main barrier to raising productivity in agriculture is the lack of effective extension services and irrigation facilities. Contrary to popular belief, fragmented landholdings and the presence of minimum support price do not impact productivity significantly.

Extension services are poor because the state extension services are moribund while upstream players like fertiliser and seed companies have limited incentives to provide extension services and downstream processors (wheat millers) face barriers in dealing with farmers. While wheat is generally a well-irrigated crop in India, with almost 85 per cent of the land area under cultivation being irrigated either through ground water or canals, areas in Madhya Pradesh and Bihar still lack proper irrigation infrastructure. This significantly reduces the yield in such areas, despite relatively good soil quality. If extension services and irrigation facilities are improved, yield could increase by over 40 per cent.

### **Productivity performance**

Overall labour productivity in wheat farming in India is 1.3 per cent of US levels. The productivity performance varies from 0.87 per cent for non-mechanised farmers to 1.6 per cent for semi-mechanised farmers and 2.9 per cent for mechanised farmers. Productivity has been growing at an average of 4.7 per cent a year because of both an average annual yield increase of 2.7 per cent a year and an average annual decline in labour intensity, due to increasing tractor usage, of 2 per cent.

## **Operational reasons for low productivity**

Given its current factor costs, productivity in wheat farming in India can reach only 2 per cent of the US level. This will require a 40 per cent increase in yield and a 10 per cent decrease in labour intensity. The gap between current productivity and potential productivity is explained by poor organisation functions and tasks (e.g., lack of precision farming), insufficient tractor use and poor irrigation infrastructure in some regions. Interestingly, the small size of landholdings is not a constraint to achieving potential productivity. The gap between the Indian productivity potential and the US average is explained by the low level of mechanisation that is economically viable in India – equipment such as air spraying, combine harvesters and large-scale sprinkler systems is not viable given India's low labour costs.

## **Industry dynamics**

Poor OFT is the result of limited exposure to best practice. This, in turn, is due to poor extension services delivered by state agencies and agricultural universities, and negligible market-driven extension from upstream input providers and downstream buyers of grain. Although there is little price-based competition and market conditions for farmers vary across states, these have little negative impact on productivity.

## **External factors responsible for low productivity**

The key external barriers to productivity growth in this sector are the poor governance of state extension agencies and irrigation departments and product market regulations.

- ¶ **Poor governance of state extension agencies:** State extension departments and agricultural universities are marked by low employee morale and paucity of funds, limiting their will and ability to provide extension services. Moreover, a disproportionate share of their annual budget is spent in meeting salary bills, leaving few funds for investment in new facilities.
- ¶ **Poor governance of state irrigation departments:** Irrigation departments also suffer from low motivation and paucity of funds.
- ¶ **Product market regulations:** Product market regulations such as input price controls on fertilisers, subsidies for government companies (e.g., state seed companies), and restrictions on downstream buyers of grain buying directly from farmers are key barriers to market driven extension.

Some of the commonly perceived barriers such as land ceilings, minimum support prices and the monopoly buyer status of the Food Corporation of India have not been found to be detrimental to productivity growth in wheat farming.

## **Industry outlook**

Productivity growth in wheat farming can increase from the current growth rate of 4.7 per cent to at least 6 per cent if the irrigation infrastructure is improved and barriers to the growth of farm extension services are removed.

## **Policy recommendations**

Based on our assessment of the impact on productivity growth, we suggest the following measures:

- ¶ Improve state extension services by introducing performance ethic measures and a performance based rewards system.
- ¶ Use private players to deliver state extension services. For instance, government agencies can certify a set of players competent to deliver extension services and entrust farmer associations (such as village panchayats) with the task of selecting the vendors and contracting their services. Denmark extensively uses such a system where private players selected by village committees deliver extension services.
- ¶ Encourage competition in upstream and downstream sectors (e.g., fertiliser, seeds) by reforming the agricultural inputs industry (e.g., fertiliser, seeds) and allowing food processors to procure directly from farmers. This will ensure that the players in this sector reach out and provide extension services to farmers.
- ¶ Improve the irrigation system by introducing usage-based water charges and transferring the operations and maintenance responsibility of the downstream irrigation system to elected bodies of water users.

# Wheat Farming

India is the largest producer of wheat in the world after China, accounting for more than 11 per cent of the world's area under wheat cultivation and 12 per cent of total global production (**Exhibit 2.1**). Wheat is also the largest crop in India after paddy, with 12 per cent of India's total cultivable land area and 15 million farming households engaged in wheat farming. Overall, wheat farming contributes to about 3 per cent of India's GDP and 2 per cent of employment on a full time equivalent (FTE) basis.

Three factors contribute to wheat farming's importance in this study. First, it represents the agricultural sector, which is the single largest sector in terms of employment. Agriculture contributes to 27 per cent of GDP and around 60 per cent of employment. Second, wheat farming highlights issues related to downstream linkages in food processing and retail, since almost all wheat is processed before consumption. Third, since wheat constitutes almost 12 per cent of an average household's food consumption, improvement in productivity and the decline in wheat prices once the issue price is decontrolled will impact household consumption and the standard of living significantly.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## INDUSTRY OVERVIEW

In India, wheat is a winter crop, sowed in early winter and harvested in spring. More than 85 per cent of the wheat grown in India is of the aestival variety. Based on variations in temperature, rainfall, soil type, terrain and irrigation, there are five broad agro-climactic zones in India (**Exhibit 2.2**): the Northwestern zone, the Eastern zone, the Central zone, the Hill zone and the Peninsular zone. The wheat

yield varies from 3.8 tons per hectare in the Northwestern zone to less than 1.5 tons per hectare in the Peninsular zone. The Northwestern, Eastern and Central zones account for over 90 per cent of the total area under wheat cultivation.

Wheat production in India has increased seven fold over the last four decades – from 10.3 million tons in 1960 to over 70 million tons in 1999 (**Exhibit 2.3**). Over this period, the area under wheat increased by 1.8 per cent a year while the yield grew by 3.2 per cent per year. Overall, wheat availability per capita improved from 42 grams per day in 1970 to 168 grams per day in 2000, rendering India self-sufficient in wheat. Most of this improvement came during the Green Revolution of the 1960s and 1970s, and was driven by the dissemination of modern farming practices and the development of high-yielding varieties of seeds suited to the Indian climate.

Wheat farmers can be classified into three segments based on their operational behaviour (**Exhibit 2.4**):

- ¶ **Non-mechanised farmers:** These farmers use bullocks for tilling, sowing and transportation, and manual labour – by family members or hired labour – for harvesting. Typically, they weed their fields manually and operate on a small scale with landholdings of less than 2 hectares. Almost 30 per cent of the land area under wheat is tilled using bullocks.
- ¶ **Semi-mechanised farmers:** These farmers use tractors (typically 35-50 hp) for tilling, sowing and transportation. In a majority of cases, the tractor is rented. This segment too harvests the crop manually, using hired labour. Semi-mechanised farmers farm almost 67 per cent of the land area under wheat. They typically own farms larger than 2 hectares but smaller than 10 hectares.
- ¶ **Mechanised farmers:** These farmers use tractors for tilling and sowing and combine harvesters for harvesting and threshing. They account for less than 3 per cent of the land area under wheat. Most of them own farms larger than 10 hectares and are located mostly in the Northwestern zone, particularly in Punjab.

## **PRODUCTIVITY PERFORMANCE**

India's labour productivity in wheat farming is very low – only 1.3 per cent of US levels (**Exhibit 2.5**). While Indian wheat yield per hectare is 96 per cent of US levels, Indian farmers use 74 times the hours used by US farmers to farm each hectare. France, which has one of the highest wheat farming productivities in the world, has a labour productivity of 222 per cent of the US. The yield in France is 2.62 times the average US yield owing to the former having a 10-month wheat crop as opposed to the US' 120-day crop. The labour intensity in France, however, is only marginally higher at 1.2 times that of the US.

Productivity levels for different segments in India vary from 0.9 per cent of US levels for the non-mechanised farmer to 2.9 per cent for the mechanised farmer. Semi-mechanised farmers are at a productivity level of 1.6 per cent of US levels (**Exhibit 2.6**). The differences in productivity across segments are entirely due to varying levels of mechanisation and labour intensity. Yield is found to have little correlation with mechanisation or with the size of the farm.

Labour productivity as a percentage of US levels varies sharply across regions – from 2.4 per cent in Punjab to 0.9 per cent in Bihar (**Exhibit 2.7**). This variation is due to differences in yield and levels of mechanisation across regions. In Punjab, the average yield is 4.2 tons per hectare and less than 5 per cent of land area is tilled using bullocks. In Bihar, however, the average yield is 2.2 tons per hectare and almost 50 per cent of the land area is tilled using bullocks.

Labour productivity grew at an average of 4.7 per cent a year during the 1990s (**Exhibit 2.8**) largely because of an average yield increase of 2.7 per cent and a decrease in labour intensity by 2 per cent a year. The increasing base of installed tractors, which is currently growing at the rate of 10 per cent each year, is responsible for the decrease in labour intensity. (**Appendix 2A** explains the methodology we have used to measure productivity.)

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

This section studies the gap between current productivity levels and the potential productivity India can achieve at current factor costs, as well as the reasons for the gap between the Indian potential and average US levels.

### **Reasons for gap between current and potential productivity**

At current factor costs, India can raise its productivity from 1.3 per cent to 2 per cent of US levels (**Exhibit 2.9**). The main reasons for the gap between current and potential productivity are poor OFT, insufficient use of tractors and poor irrigation infrastructure. Interestingly, the small size of the landholdings is not a constraint to achieving potential productivity.

- ¶ **Poor OFT:** Productivity in wheat farming can increase by 40 per cent by improving yield and using labour more efficiently.
- **Improvement in yield:** Wheat farming yields can improve by at least another 30 per cent (**Exhibit 2.10**). This requires better farming practices including quality and timeliness of operations, use of better quality contemporary seeds and optimisation of inputs such as fertilisers and water (**Exhibit 2.11**).

- **Poor quality and timeliness of operations:** Most wheat farmers do not do precision farming. They employ poor quality field preparation and sowing methods, and follow sub-optimal schedules for different operations. Since wheat is extremely sensitive to the time of sowing, any delay in sowing after the onset of appropriate weather conditions reduces the time available for the grain to develop and, thus, severely affects the yield. The yield is also sensitive to the depth of sowing. Many farmers do not follow the correct methods, such as using seed drills, for this purpose.
- **Poor quality of seeds:** Almost all wheat farmers in India keep a part of their produce as seeds for the next cycle. This leads to gradual genetic deterioration and lowers yield over successive seed generations. In the US, most farmers change seeds every year.
- **Sub-optimal inputs:** Most farmers do not factor in soil quality, weather conditions and the crop while using inputs such as water, fertiliser and weedicide. This has a detrimental impact on plant growth and, hence, the yield. For example, though frequency of irrigation and its timing is important to overall plant growth, many farmers in western UP economise on the frequency of irrigation.
- **Optimisation of labour:** Most farmers use labour inefficiently. For example, most farmers use labour to spray weedicide on the entire farm while best practice farmers carefully identify the specific fields that need to be sprayed. Similarly, excess labour is used for ploughing operations. For instance, most farmers use two persons – a driver and a helper – to till the field though the driver alone can do the job if he does some of the helper’s jobs such as setting up the tilling equipment.
- ¶ **Insufficient use of tractors:** At current factor costs, using tractors is cheaper than using bullocks by at least Rs. 925 per hectare (**Exhibit 2.12**). This is because bullocks need to be fed for the entire season but can be used productively only during the short ploughing period. Tractors, on the other hand, have little maintenance cost during idle periods and reduce the number of labour hours required for tilling.

Ideally, tractors should be employed in 90 per cent of India’s harvested land area, up from the existing 70 per cent. Bullocks need to be used on the remaining 10 per cent of India’s agricultural land usually because of economic or land contour reasons. For a small minority of farmers, the feed costs are negligible due to the availability of fallow grazing land in their vicinity. Further, the bullocks bring in additional revenue by being used for transport.

Using combine harvesters is still not viable in India though it reduces the labour hours required for harvesting and threshing by 80 per cent. This is because the extra fodder recovered during the manual process, can be used as cattle feed and thereby compensates for the higher cost of harvesting and threshing (**Exhibit 2.13**). Using combine harvesters results in the loss of almost half this fodder.

In Punjab, manual harvesting is cheaper than combine harvesting by Rs.750 per hectare. This difference is even larger for low labour cost areas such as Bihar, at Rs.1, 650 per hectare, and Madhya Pradesh, at Rs.950 per hectare (**Exhibit 2.14**). Real labour costs need to increase by over 60 per cent to make combines viable.

For a few large farmers in Punjab, however, the use of combine harvesters is viable as the opportunity cost of fodder is relatively low for them. This is because these large farmers can only use a limited amount of fodder for their own cattle and it is not remunerative to sell the leftover fodder owing to the high transportation and storage costs and relatively low prices of fodder in the state. Using harvesters also protects the farmers from crop loss due to labour shortage and the onset of early rains during the harvesting season. This problem is acute in labour-scarce Punjab, since most labour is migrant labour and arranging workers at short notice in emergencies such as sudden showers is extremely difficult. These farmers, therefore, manually harvest a small portion of their farms to collect fodder for their own cattle, and use a combine harvester for the rest.

In summary, at current factor costs it is viable for wheat farmers in India to use tractors for ploughing and threshers for threshing, but it is still not viable for them to use combine harvesters for harvesting.

¶ **Poor irrigation infrastructure:** Poor irrigation has an extremely negative impact on yields. Wheat is a well-irrigated crop in India, with almost 85 per cent of the land area under cultivation being irrigated either through ground water or canals. However, in a few areas such as Madhya Pradesh, about 40 per cent of the area under wheat is still rain-fed (**Exhibit 2.15**). This significantly reduces the yield in such areas, despite relatively good soil quality. Better irrigation infrastructure, in the form of canals or water harvesting facilities, could improve the irrigation potential in this region and, consequently, the overall yield.

Similarly, the lack of drainage facilities in Bihar leads to large areas in north Bihar remaining waterlogged till late December, delaying sowing and reducing overall yield. Investment in new drainage facilities and better maintenance of existing facilities will reduce this problem.

## **Reasons for gap between Indian productivity potential and the US average**

The productivity potential for wheat farming in India at current factor costs is only 2 per cent of average US levels. The higher level of mechanisation in the US is the main reason for the gap between the Indian productivity potential and the US average. A number of people believe that India's productivity can be boosted by increasing mechanisation, which is currently hampered by fragmented landholdings. However, we have found that mechanisation is not viable even on large pieces of land at current factor costs.

### **¶ Mechanisation that does not require land consolidation:**

Mechanisation by way of combines, larger tractors, weedicide sprayers and larger irrigation pumps can help reduce labour requirements to almost one-fourth of current levels (**Exhibit 2.16**). Most of these machines are mobile and can be accessed through an efficient rental market; also, they do not require land consolidation. However, this level of mechanisation will be viable only when agricultural wages rise almost four fold. Our finding gains credence by studying the case of Thailand, which is about four times as rich as India on GDP per capita but is only now moving towards mechanisation.

**MECHANISATION THAT WILL REQUIRE LAND CONSOLIDATION:  
MECHANISATION BY WAY OF LARGE-SCALE SPRINKLER  
SYSTEMS, LARGE COMBINES AND AIR SPRAYING OF  
AGRICULTURAL INPUTS REQUIRES LARGER LAND PLOTS. FOR  
THIS, LAND NEEDS TO BE CONSOLIDATED ON AN  
OPERATIONAL, IF NOT ON AN OWNERSHIP, BASIS. INDUSTRY  
DYNAMICS**

**The lack of exposure to best practice has a significant impact on wheat farming productivity in India. In addition, the industry lacks price-based competition and varying market conditions across states, but this has little impact on productivity.**

### **Limited exposure to best practice**

Poor OFT is primarily a result of limited exposure to best practices, which in turn is caused by limited extension services. Innovation in farming requires the development and diffusion of new knowledge and best practices by government institutions or related industry players. On their own, individual farmers are

incapable of undertaking any research and development. Knowledge is typically provided either by state agencies such as agricultural universities and government extension services or by upstream players (e.g., input providers) and downstream players (e.g., buyers of grain). In India, state agencies provide relatively poor extension services while market-driven extension from upstream and downstream players is negligible.

- ¶ **Poor state-sponsored extension:** State-sponsored extension services have steadily deteriorated over the years and are now more or less moribund. The state-sponsored agencies merely perform the task of collecting statistics and make little effort to disseminate new knowledge or reach out to a larger group of farmers. Even the development of new seed varieties, which was funded by the government during the Green Revolution, has slowed down considerably.
- ¶ **Little market-driven extension:** Upstream players, such as fertiliser companies, work under price and quantity controls and have no incentive to reach out to farmers. Private seed companies do not deal with crops like wheat, partly because subsidised seeds from state seed agencies such as the National Seed Corporation render the market unattractive. On their part, downstream buyers also provide few extension services as the law prevents them from buying directly from farmers.

### **Absence of price-based competition**

The government regulates the market price for wheat by fixing minimum support prices every year. Government agencies buy almost 60 per cent of the total traded wheat (25 million tons) at these prices, effectively allowing the farmer to sell unlimited quantities of wheat without facing price pressure from other producers. However, the absence of price-based competition has little impact on productivity because of the highly fragmented nature of wheat farming in India.

With more than 15 million farmers involved in wheat farming, most farming households have small landholdings and, therefore, relatively low incomes. More than 78 per cent of farmers have landholdings of under 2 hectares and household earnings of about US\$ 2,000 (PPP adjusted) per year. They are thus under pressure to optimise inputs and maximise output. Though output price is guaranteed by the minimum support price (MSP), the farmer has every incentive to maximise productivity and earn more by producing more. Moreover, farming in India is a relatively simple business with the owner often acting as both manager and worker. There is, therefore, no conflict of interest, and maximising profitability, and thereby productivity, is the key objective.

Even in the developed countries, the presence of MSP has not affected growth in productivity. Most countries with high levels of productivity, including the US,

impose price controls on agricultural commodities. Thus, price control does not explain relative differences in productivity.

### **Varying market conditions across states**

Unlike most other sectors, wheat farming is conducted on a fairly level playing field. The only factors that do vary across states, due to government regulations, are the costs of irrigation in the form of electricity, diesel and water. These, however, account for only 10 per cent of the total farming cost (**Exhibit 2.17**). The remaining costs are incurred on labour (which depends on market forces) or inputs like fertilisers (which are constant across all farmers in the state). The small distortion that does exist does not impact productivity, as it does not lead to inequities against the more productive farmers.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

The key external barriers to productivity growth are poor governance of state-administered agencies and product market regulations that prevent better extension services to the farmers. In addition, there are legacy effects that explain the low use of tractors. Interestingly, we did not find some of the other widely perceived restrictions, such as the presence of a monopoly buyer and minimum prices, to be significant barriers to productivity growth in wheat farming, though they may affect productivity significantly in other crops.

### **Poor governance of state-administered agencies**

Poor corporate governance of state-administered agencies such as research organisations, state extension services and irrigation departments has a detrimental impact on labour productivity in wheat farming. As we saw earlier, poor governance of state extension departments leads to poor quality services and poor OFT. In addition, the poor management of irrigation departments leads to inadequate irrigation infrastructure and adversely affects yield and productivity.

- ¶ **State extension services:** Employees, with no accountability or incentive to excel, and a paucity of funds inhibit the progress of state-administered extension departments and agricultural universities. This has led to a steady deterioration in the quality of research and development as well as in the organisations' zeal to disseminate knowledge. This may partly be due to the belief that India is self sufficient in food grains and there is low potential in yield improvement.

The quality of these services also differs markedly from state to state. For instance, while the Punjab Agricultural University is active, its counterpart in Bihar is defunct.

- ¶ **Irrigation departments:** Irrigation departments face the same issues as do extension services – low motivation levels and little incentive to excel. In addition, they are overstaffed, resulting in most of their annual budget being earmarked for salaries, leaving little to invest in new irrigation assets. For example, according to the Auditor-General’s report for the minor irrigation department in Bihar, over 98 per cent of the budget in 1994-96 was spent on employee salaries and other establishment charges.

### **Product market regulations**

Market-driven extension from upstream and downstream players is almost non-existent in wheat farming. This is due to two factors:

- ¶ **Input price controls and subsidies:** As discussed in the section on industry dynamics, upstream players have no incentive to reach out to the farmer because of either price controls on inputs (e.g., fertilisers) or the presence of subsidised state players, such as state seed companies. These companies sell subsidised seeds rendering the market unattractive for unsubsidised private players.
- ¶ **Constraints on direct purchase from farmers:** Downstream buyers are required to buy grain in auctions at government-regulated markets (*mandis*). This rules out any direct dealing between the farmers and the buyers. Thus, the buyers have no incentive to provide the farmers with extension services in return for a more competitive price, quality and assured supply.

An interesting corollary of price controls on input and outputs is the absence of farmer cooperatives in grains. In dairy farming, these cooperatives provide a marketing channel for the produce and give the farmers more bargaining power for the purchase of inputs and sale of outputs. This is not possible in food grain. While the Food Corporation of India (FCI) markets the produce, bargaining power cannot be leveraged since both input and output prices are controlled.

### **Legacy effects**

Tractor usage in India is only 70 per cent at present but is poised to touch 90 per cent in the next 4 to 6 years, as there are no barriers, including bank credit, to this growth. Over 90 per cent of tractors are bought with financial assistance from

banks or other institutions, and conditions for loans are relatively easy. Tractor sales have been strong in the last few years and are still growing.

### **Perceived barriers which are not significant**

We have found that some of the commonly perceived restrictions on agriculture are not significant barriers to productivity growth. These include: 1) presence of a monopoly buyer, namely the Food Corporation of India; 2) minimum support prices; and 3) land ceilings.

- ¶ **Presence of monopoly buyer:** The FCI is the monopoly buyer of food grains in India, buying almost 60 per cent of traded wheat. This does not adversely affect labour productivity as the farmers are free to sell their produce to other buyers in *mandis*, and the FCI helps remove price volatility and acts as an assured buyer reducing market risk to the farmer. While the corporation's presence does not affect productivity, its inefficiency (high storage losses, overstaffing, etc.) is reflected in the high cost of operations and, hence, in the fiscal deficit of the central and state governments.
- ¶ **Minimum support prices:** The central government administers the minimum price of many agricultural commodities to assure returns to farmers. While this creates market distortions in terms of eventual subsidies, it has little bearing on labour productivity. This is because all farmers face similar prices and thus the playing field is level.
- ¶ **Land ceilings:** At current labour costs, land ceilings do not stand in the way of further mechanisation. This is because natural economies of scale in agriculture are minimal and rental markets ensure economies of scale in the use of mobile equipment such as tractors. Also, the current level of land ceilings at 6 to 8 hectares is much larger than the average landholding size of 1.6 hectares. International experience confirms this. In most Southeast Asian countries, mechanisation and, thus, productivity growth has not been hampered by small landholdings. In South Korea, Japan and Thailand, the average landholdings are smaller than those in India. Despite that, Japan uses combines on a large scale and farmers in Thailand have started using combines recently.

### **INDUSTRY OUTLOOK**

Productivity in wheat farming will continue to grow at 4-5 per cent a year for the next few years under current conditions. This can be accelerated to around 6 per cent by removing all the barriers to productivity growth and accelerating yield growth from 2.7 per cent today to about 4 per cent as achieved in the 1980s.

Currently, the per capita consumption of wheat in India is only 168 grams per day compared to 244 grams per day in the US. Hence, output growth is unlikely to be constrained by a lack of demand. Increasing mechanisation will depend on the increase in agricultural labour wages and will be influenced by the rate at which agricultural labour migrates to non-farming jobs.

## **POLICY RECOMMENDATIONS**

Based on our assessment of the impact on productivity growth, we suggest that the following measures be considered:

- ¶ **Improve state extension services:** Introducing performance ethic measures will help improve the quality of state agriculture extension services. These measures are:
  - Set clear output (e.g., total cost of production, total production, yields, etc.) and input targets (e.g., pest management, nutrient management, extension activity, etc.) for every member of the extension team
  - Ensure appropriate staffing of and training for extension team
  - Institutionalise a strict review mechanism
  - Institute a performance-based reward system.
- ¶ **Use private players to deliver state extension services:** The public extension service is designed to provide an average farmer with services that are general in nature. Private players can be used to deliver specialised services to the farmers. While the government agencies can certify a set of players competent to deliver extension services, farmer associations (such as village panchayats) should be entrusted with the task of selecting the private vendors and contracting their services. The panchayats can monitor the services provided by the private players and collect the payment from the members. Denmark extensively uses such a system where private players selected by village committees deliver extension services.
- ¶ **Encourage competition in upstream and downstream sectors:** This will ensure that the players in this sector reach out and provide extension services to farmers. This can be done by reforming the agricultural inputs industry.
  - **Remove price and quantity controls on the fertiliser industry:** The fertiliser industry is still bound by the administered pricing regime. This leaves little incentive for a fertiliser company to conduct any

marketing activity. Removing price controls will provide an incentive to fertiliser companies to actively market their products and, in the process, educate farmers on better farming practices.

- **Remove price subsidies for state seed companies:** Subsidies to state seed companies should be removed to create a level playing field for private seed companies. This will provide incentives for the private seed companies to reach out to the farmers to educate them about better farming practices, in an attempt to market their products.
  - **Allow downstream buyers to buy directly from farmers:** If restrictions on direct purchase are removed, some of the larger downstream buyers will reach out directly to farmers. This will be mutually beneficial. Farmers will still have the option of selling to government agencies if the price is not attractive enough. This interaction will help drive extension of knowledge from downstream players, who are usually much larger and have better access to new developments.
- ¶ **Strengthen the irrigation system:** Nearly two-thirds of all agricultural output comes from irrigated land, while the remaining comes from rain-fed areas. Hence, improving the condition of the irrigation system is extremely critical for India. Two critical steps are required for this:
- **Introduce usage-based water charges:** Currently farmers pay a flat fee for irrigation water, irrespective of actual usage. This provides farmers with little incentive to conserve water or use it judiciously. Introducing usage-based charges for irrigation services and corporatising state irrigation departments will make these departments both more financially accountable and financially viable. It will also make farmers more careful in water usage and promote water conservation.
  - **Transfer operations and maintenance (O&M) responsibility to Water User Associations (WUAs):** The world over, the O&M responsibilities for downstream irrigation systems are farmed out to farmer cooperatives on long-term leases to bring in market discipline. Mexico and Turkey have successfully transferred the O&M responsibility to WUA comprising elected representatives of farmers. In India, Andhra Pradesh has already migrated to this system of irrigation system management. Over 10,000 WUAs have been formed, covering nearly 5 million hectares of land across all major and minor schemes in the state.



## Appendix 2A: Measuring labour productivity

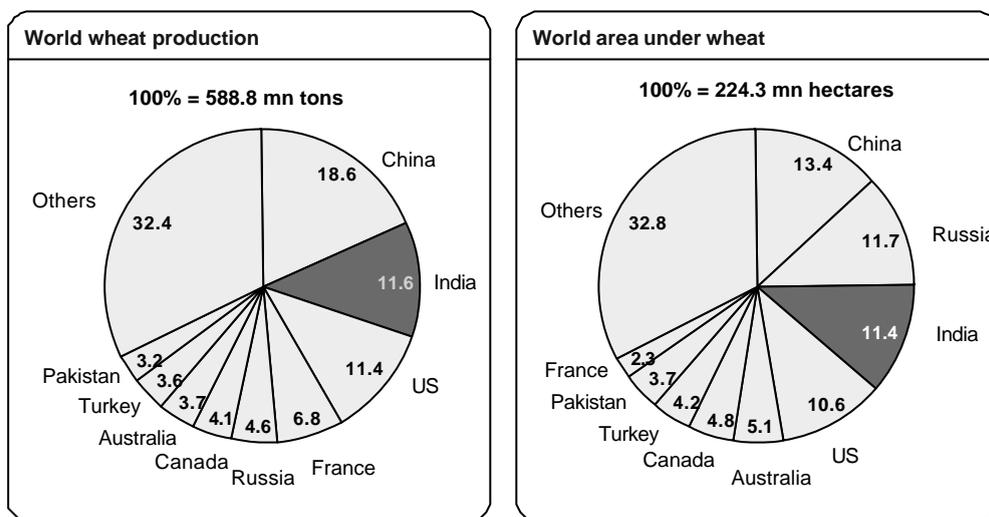
We used kilograms of output per labour hour as a physical measure of labour productivity; this is computed by dividing yield measured in kilograms per hectare by labour intensity measured in labour hours per hectare. This allowed us to compare labour productivity with other countries without the need for price adjustment.

To determine the productivity of Indian wheat farming, we used the data available from the Commission for Agricultural Costs and Prices (CACCP) between 1996-97 for the six main wheat-producing states. We adjusted the data for the growth in mechanisation between 1996-2000 using industry data available for tractor and combine harvester sales. This was supplemented by more than 100 interviews with farmers in the three main wheat-growing regions, namely Northwest, East and Central India. To determine the productivity of US wheat farming, we used the data available from the US Department of Agriculture.

While there are minor differences in wheat quality from one grade to another, we have not adjusted for it in our productivity calculations, as these do not significantly affect either the analysis or the conclusions.

Exhibit 2.1

## INDIA'S POSITION IN WORLD WHEAT PRODUCTION, 1998



Source: FAO, Production Book

1

Exhibit 2.2

## SEGMENTATION BY AGRO CLIMATIC REGIONS

Zone	Characteristics	Yield Tons/ha	Proportion of land Per cent	Proportion of output Per cent
<b>Northwestern</b> • Punjab • Haryana • West UP • N Rajasthan	<ul style="list-style-type: none"> <li>• Long winter (130 days)</li> <li>• &gt;95% irrigated</li> <li>• Even land with good soil quality</li> </ul>	3.76	38.7	53.5
<b>Eastern</b> • East UP • Bihar • W-Bengal • Orissa • Assam	<ul style="list-style-type: none"> <li>• Medium duration winter (115 days)</li> <li>• Large parts water-logged</li> <li>• Good soil</li> </ul>	2.27	32.6	27.2
<b>Central</b> • MP • S Rajasthan • Some parts of Maharashtra	<ul style="list-style-type: none"> <li>• Medium duration winter (110 days)</li> <li>• ~50% irrigated</li> <li>• Fertile soil</li> </ul>	2.00	22.4	16.5
<b>Hill</b> • J&K • HP • Hill UP	<ul style="list-style-type: none"> <li>• Uneven land</li> <li>• Poor irrigation</li> </ul>	1.50	2.05	1.1
<b>Peninsular</b> • Maharashtra • AP • Karnataka	<ul style="list-style-type: none"> <li>• Short winter (105-110days)</li> <li>• Poor irrigation/rain-fed</li> <li>• Hard soil</li> </ul>	1.10	4.10	1.6

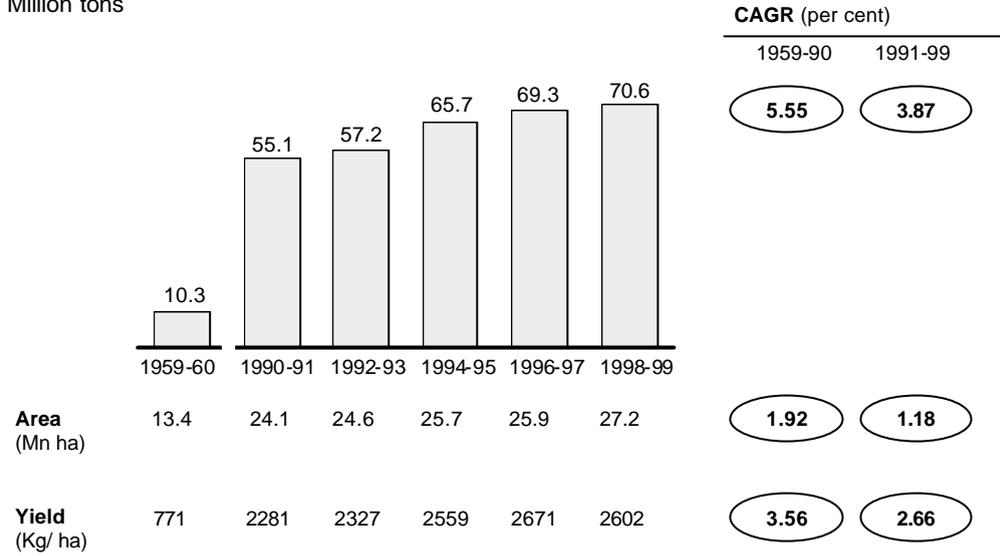
Source: Expert interviews; CACP

2

Exhibit 2.3

### GROWTH IN WHEAT PRODUCTION

Million tons



Source: CACP

3

Exhibit 2.4

### SEGMENTATION OF FARMERS BY OPERATIONAL BEHAVIOUR

	<u>Non-mechanised</u>	<u>Semi-mechanised</u>	<u>Mechanised</u>
<b>Tilling and sowing</b>	• Bullocks	• Tractors	• Tractors
<b>Fertilising</b>	• Manual	• Manual	• Manual
<b>Irrigating</b>	• Flood irrigation	• Flood irrigation	• Flood irrigation
<b>Weeding</b>	• Manual	• Manual spray	• Manual spray
<b>Harvesting</b>	• Manual	• Manual	} • Combine
<b>Threshing</b>	• Thresher	• Thresher	
<b>Transporting</b>	• Bullocks	• Tractors	• Tractors
<b>Percentage of area</b>	<b>30</b>	<b>67</b>	<b>3</b>

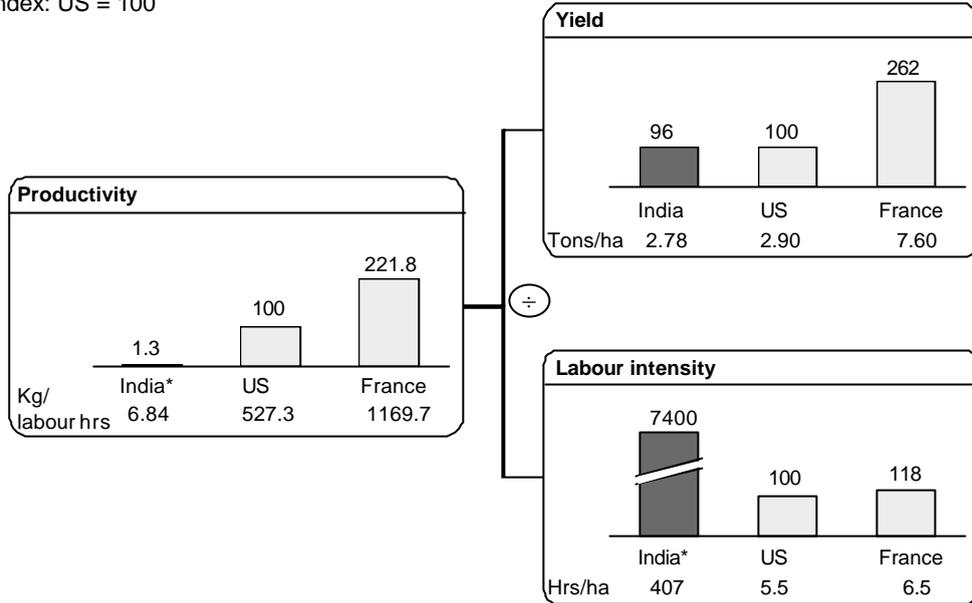
Source: Interviews; McKinsey analysis

4

Exhibit 2.5

### LABOUR PRODUCTIVITY IN WHEAT FARMING

Index: US = 100



\* Aggregate for six states from CACP, 1996-97 adjusted for tractor increase up to 1999-2000

Source: National Statistical Service, US; McKinsey R&I; FAO Handbook, CACP

5

Exhibit 2.6

### PRODUCTIVITY ESTIMATES BY SEGMENTS

Operation	Typical Area Ha	Yield Kg/ha	Labour intensity Hrs/ha	Labour productivity Kg/hr	Proportion of land Per cent	Proportion of labour-hrs Per cent	Labour productivity Per cent of US
<b>Non-mechanised</b> • Bullock users	0-2	2784	606	4.59	30.0	44.8	0.9
<b>Semi-mechanised</b> • Tractor users	2-10	2784	328	8.51	67.0	53.8	1.6
<b>Mechanised</b> • Tractor • Combine harvester	>10	2784	168	15.3	3.0	1.4	2.9
<b>Overall</b>		2784	407	6.84	100.0	100.0	1.3

Source: Based on expert interviews, farmer interviews

6

Exhibit 2.7

### STATE-WISE ESTIMATES OF LABOUR PRODUCTIVITY, 1996-97

State	Yield Kg/ha	Labour-intensity Hrs/ha	Labour productivity		CAGR, 1990-97 (per cent)		
			Kg/hr	% of US	Yield	Labour-intensity	Labour productivity
Punjab	4235	330.5	12.8	2.4	2.2	-0.6	2.8
Haryana	3879	341.2	11.4	2.2	1.82	-3.1	4.9
UP	2659	440.9	6.0	1.1	3.43	-2.4	5.8
MP	1755	345.1	5.1	1.0	2.41	-2.1	4.5
Rajasthan	2740	509.4	5.4	1.0	2.41	-1.4	3.8
Bihar	2168	454.4	4.8	0.9	3.03	-1.5	4.5
<b>India*</b>	<b>2784</b>	<b>407.0</b>	<b>6.8</b>	<b>1.10</b>	<b>2.66</b>	<b>-2.0</b>	<b>4.7</b>

\* For six states

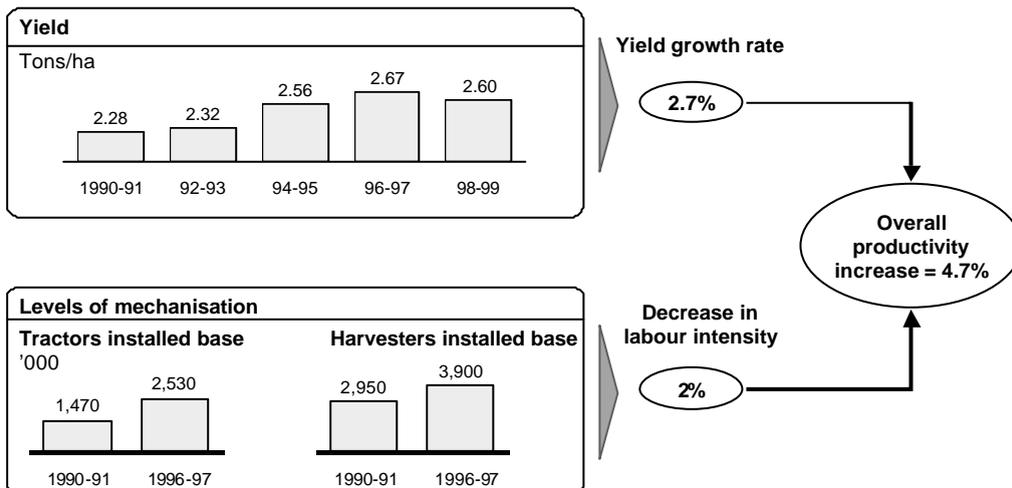
Source: CACP

7

Exhibit 2.8

### LABOUR PRODUCTIVITY GROWTH IN WHEAT FARMING

#### Drivers of growth



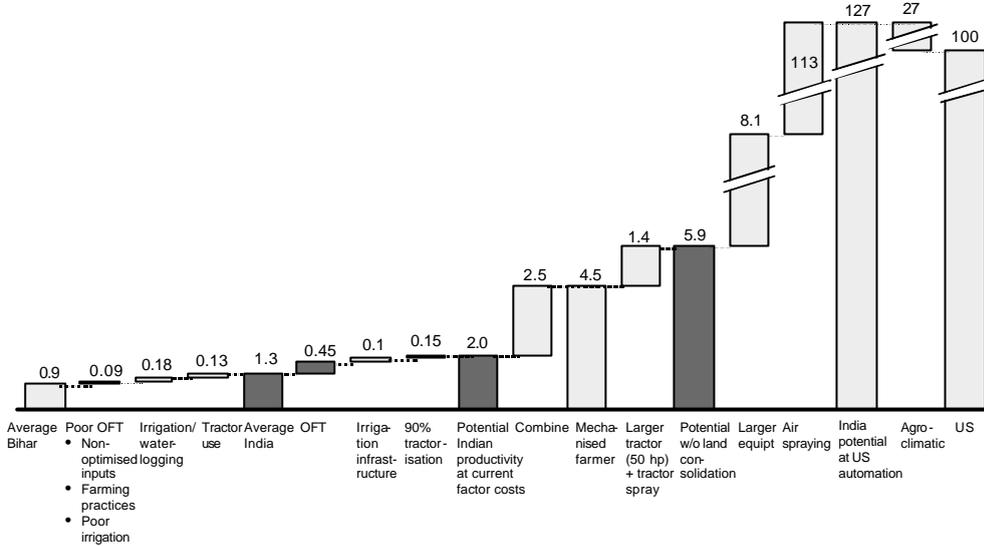
Source: World Development Indicators

8

Exhibit 2.9

### OPERATIONAL REASONS EXPLAINING THE PRODUCTIVITY GAP

Indexed to US 100 = 527.3 kg/labour-hrs

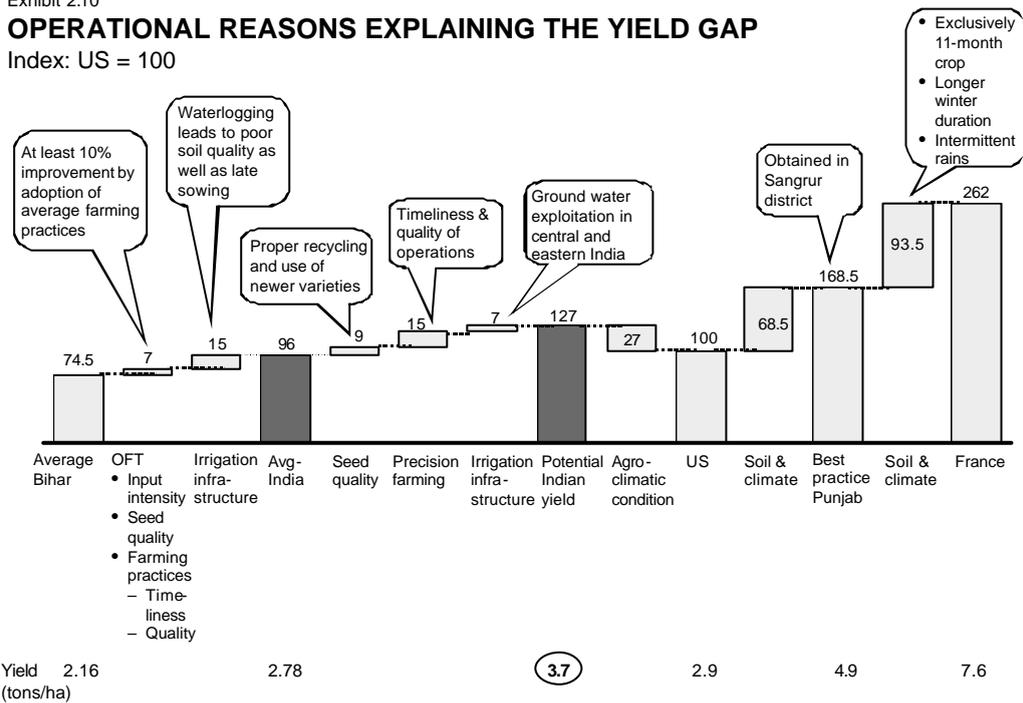


Source: Team analysis; Interviews

Exhibit 2.10

### OPERATIONAL REASONS EXPLAINING THE YIELD GAP

Index: US = 100



Yield 2.16 (tons/ha)

2.78

3.7

2.9

4.9

7.6

Source: Team analysis; Interviews

Exhibit 2.11

### IMPACT OF CONTROLLABLE FACTORS

Factor	Explanation	Expert views
<b>Farming practices</b> <ul style="list-style-type: none"> <li>• Timeliness of sowing</li> <li>• Number of irrigations/ timing</li> <li>• Optimising inputs</li> </ul>	<ul style="list-style-type: none"> <li>• Delay in sowing reduces yield</li> <li>• Irrigation at correct time impacts yield</li> <li>• Inputs such as fertilisers, weedicide should be optimised based on soil conditions, crop</li> </ul>	<i>While there has been improvement, there is potential for another 15-20% through precision techniques</i>
<b>Seed quality</b>	<ul style="list-style-type: none"> <li>• Most farmers tend to recycle farm produce which leads to genetic deterioration</li> <li>• Adoption of newer seed varieties is slow</li> </ul>	<i>10-15% improvement is easily possible with genetic sieving/change every year</i>
<b>Irrigation infrastructure</b>	<ul style="list-style-type: none"> <li>• 40-50% of MP is dependent on rain</li> <li>• 20-30% of eastern India gets flooded</li> </ul>	<i>Soil in MP &amp; Bihar is very good. With proper irrigation, this area can be as good as Punjab</i>

Source: Team analysis

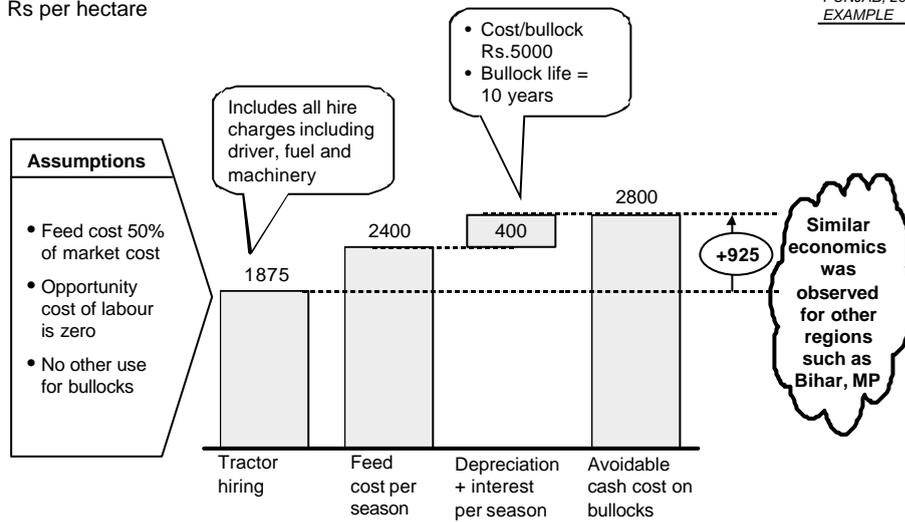
11

Exhibit 2.12

### ECONOMICS OF MECHANISED PLOWING

Rs per hectare

PUNJAB, 2000  
EXAMPLE

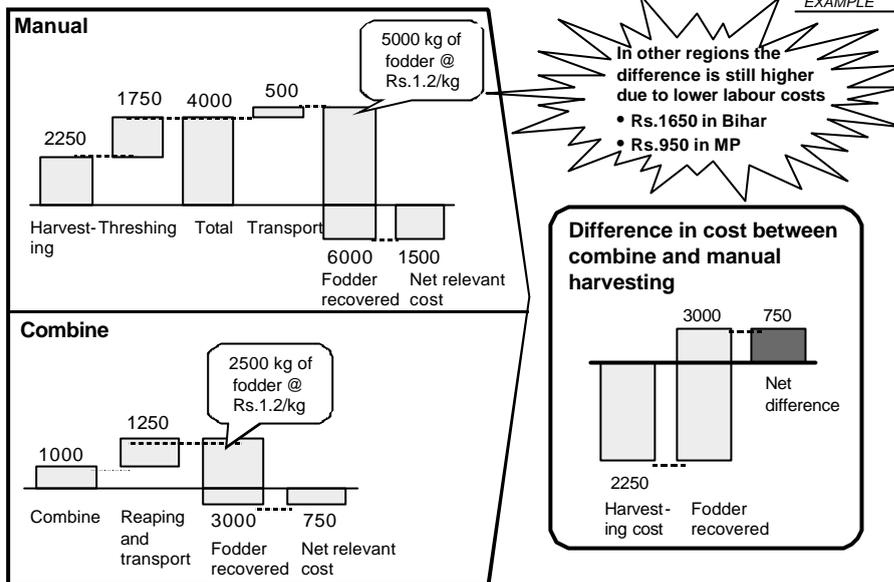


Source: Farmer interviews; Discussion with experts

12

Exhibit 2.13  
**ECONOMICS OF MECHANISED HARVESTING**  
 Rs per hectare

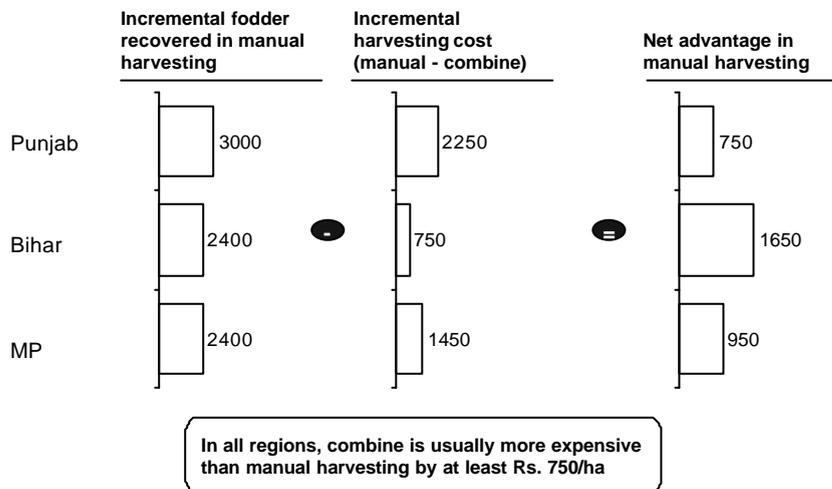
PUNJAB, 2000  
 EXAMPLE



Source: Farmer interviews; Discussion with experts

13

Exhibit 2.14  
**REGIONAL VARIATION IN HARVESTING ECONOMICS**  
 Rs per hectare



Source: Team analysis; Interviews

14

Exhibit 2.15

### WHEAT AREA IRRIGATED, 1992-93

State	Total area '000 hectare	Area irrigated '000 hectare	Percentage irrigated
Punjab	3281	3165	96
Haryana	1956	1922	98
UP	8905	8105	91
Rajasthan	2251	2067	92
MP	3672	2190	60
Bihar	1974	1724	87
<b>Overall</b>			<b>84</b>

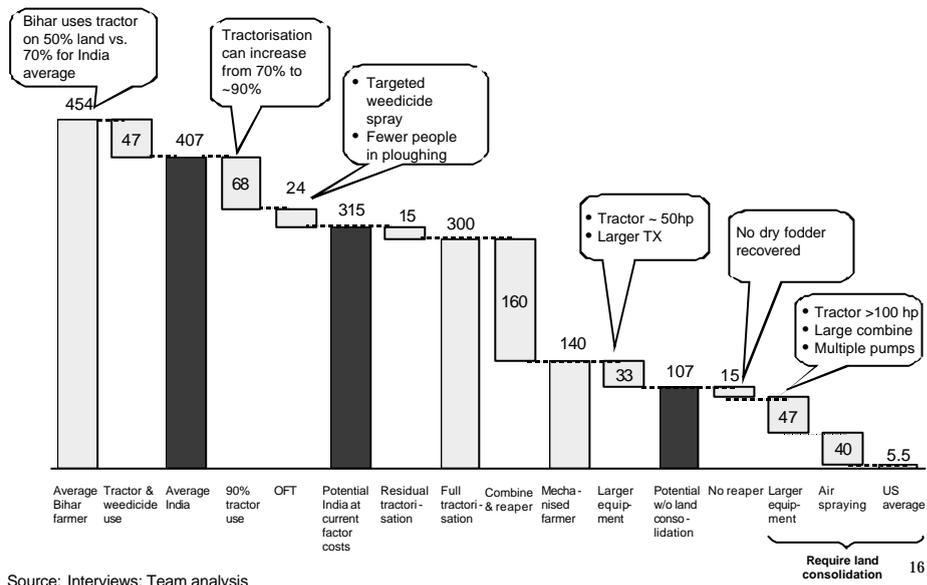
Source: CMIE

15

Exhibit 2.16

### OPERATIONAL REASONS FOR GAP IN LABOUR HOURS

Hours per hectare



Source: Interviews; Team analysis

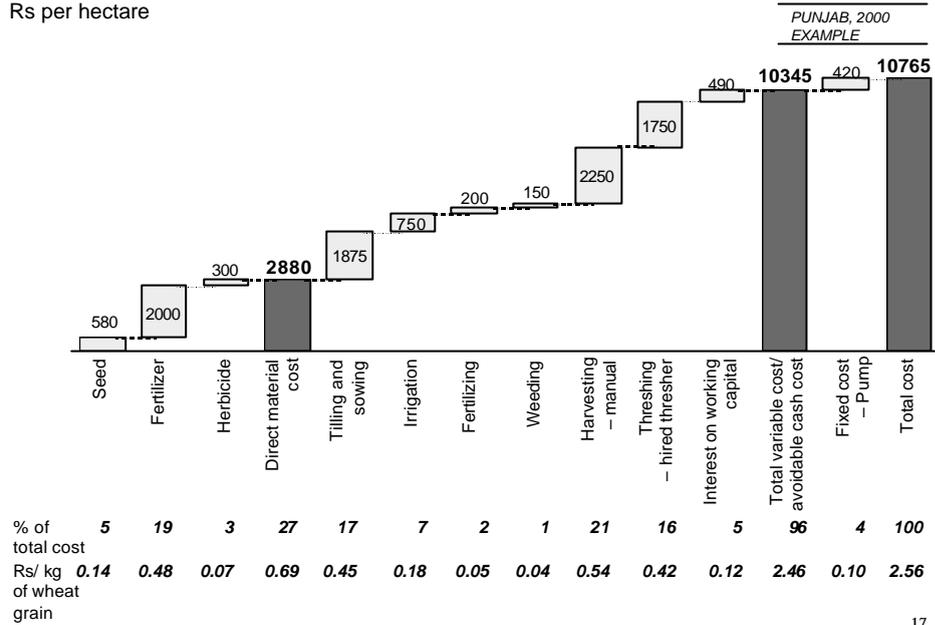
16



Exhibit 2.17

### COST STRUCTURE OF WHEAT FARMING

Rs per hectare



Source: Forum interviews; Discussion with experts

# Wheat Milling

## **SUMMARY**

Wheat milling is a relatively liberalised sector. It has few regulatory constraints and its assets are not government-owned. As a result, the players perform close to their current potential and the productivity improvement potential of the sector is relatively modest. Chakkis, a transition format which accounts for over 98 per cent share of the sector, operate at 2.2 per cent of US levels. They could reach 4.4 per cent of US levels at current factor costs but are constrained by low utilisation of labour and the lack of alternative employment opportunities. Industrial mills, a small but rapidly growing modern format, already have a productivity of 7.3 per cent of US levels. This could reach a maximum of 9.5 per cent of US levels.

The only significant distortion in the sector is the lack of a level playing field. Not only is there a higher tax burden on mill atta relative to chakki atta, food subsidies given through wheat also favour the chakkis. This non-level playing field slows down the rate at which industrial mills, the more productive format, capture share from chakkis.

Over time, the utilisation of chakki labour is expected to rise as output increases and chakkis diversify into other activities. If the non-level playing field issues are addressed and the economy grows by 10 per cent – which is possible if the recommended reform programme is carried out – the average productivity in the sector could grow at 6.5 per cent. Output will grow at 2.7 per cent (the expected rate of growth of wheat output) and employment will decline by 3.7 per cent a year. Industrial mills will capture share from chakkis and, by 2010, will account for more than a third of the output of the sector.

## **Productivity performance**

Overall, wheat milling productivity in India is 2.2 per cent of that in the US. The productivity of chakkis is 2.2 per cent of the US level whereas the productivity level of industrial mills is 7.3 per cent. The overall productivity is growing by 3.5 per cent a year. Overall productivity is increasing as industrial mills, the more productive format, are gaining share: Their output is growing at 30 per cent a year, and productivity in chakkis is improving at 3.2 per cent a year.

## **Operational reasons for low productivity**

At current factor costs, India can raise its wheat milling productivity to 4.6 per cent of US levels. The gap between current productivity and potential productivity is explained by the idle hours at chakkis, low utilisation and small scale of industrial mills, and the lower than potential share of industrial atta. The difference between Indian productivity potential and US average productivity is explained by the output mix favouring chakkis as well as constraints on industrial atta in the form of bagged movement of grain, consumer packaging of flour and low viable automation.

## **Industry dynamics**

One of the reasons for the lower than potential share of industrial atta (1.5 per cent versus a potential of 5.6 per cent) is the differential tax on flour and wheat paid by industrial mills relative to chakkis. Further, poor segments of the population have no option but to rely on chakkis to grind the subsidised wheat that they receive.

## **External factors responsible for low productivity**

The immediate impediments to productivity growth are on two fronts: The barriers to transition from direct chakki atta to mill atta, and the barriers to productivity growth within each of these formats. The barriers to transition from chakkis to industrial atta are the differential taxes paid by mills and the inefficiencies in downstream distribution and retail. Transition is also hampered by the negligible cost attributed to the time spent by housewives at chakkis, the distribution of subsidised wheat to low income households and zero wheat tax for rural consumers.

Limited employment opportunities for chakki owners are the key barrier to the growth of chakki productivity. Industrial atta productivity is restricted primarily because most automation is unviable given the low labour costs.

## **Industry outlook**

If status quo is maintained, the current growth in the industrial format will lead to average annual productivity growth of 3.7 per cent over the next 10 years. The share of employment in the industrial format will reach 1.4 per cent by 2010.

If, however, barriers such as differential taxes and inefficiencies in distribution and retailing are removed and GDP per capita continues to grow at 4 per cent a year, productivity in wheat milling will grow by 4.6 per cent a year over the next 10 years. This can increase further to 6.5 per cent a year if the GDP per capita growth rate over the next decade increases to 8.6 per cent. In this scenario, the

penetration of industrial atta will increase to 34 per cent, from the current low of 1.5 per cent, and the share of employment in the industrial format will touch 8.3 per cent by 2010.

### **Policy recommendations**

To ensure rapid productivity growth in the sector, we recommend that the government:

- ¶ Equalise taxes on flour and input wheat for mills and chakkis: This will make the industrial mills more competitive and expedite their growth.
- ¶ Remove barriers to growth of large retail formats: Growth of large retail formats is constrained by land market barriers, restrictions on FDI and SSI reservations in upstream industries (*see* Volume III, Chapter 3: Retail). Removing these barriers will help large retail formats to develop, thereby allowing the industrial atta mills to grow faster.
- ¶ Ensuring regular power supply by privatising distribution (*see* Volume III, Chapter 2: Electric Power): This will reduce the labour requirements of industrial mills by eliminating the need to maintain back-up power facilities.
- ¶ Replacing wheat subsidy with food stamps: This will allow consumers to choose between industrial and chakki atta. Currently, consumers have to use chakkis, as subsidies are given only on wheat and only chakkis can process the small amounts of wheat that individual consumers need.

# Wheat Milling

Wheat milling is important to the study as it represents the food processing sector as a whole. Food processing is an important sector in most countries as it is one of the biggest manufacturing sectors and has close linkages to, and impact on, agriculture. In India, food processing constitutes 1.1 per cent of employment and 1.4 per cent of GDP. In particular, wheat milling contributes to 0.3 per cent of employment and 0.5 per cent of GDP. Further, an average Indian household spends 51 per cent of its income on food (opposed to 8 per cent in the US), of which 12 per cent is on wheat products.

Wheat milling is a relatively liberalised sector. It has few regulatory constraints and its assets are not government-owned. Hence, a comparison of this sector with other more regulated sectors provides interesting insights about the impact of market deregulation.

The rest of this chapter is divided into seven sections:

- ¶ Industry overview
- ¶ Productivity performance
- ¶ Operational reasons for low productivity
- ¶ Industry dynamics
- ¶ External factors responsible for low productivity
- ¶ Industry outlook
- ¶ Policy recommendations.

## INDUSTRY OVERVIEW

Of the 70 million tons of wheat produced per year in India, about 60 million tons is milled into two broad product categories: 53 million tons into whole-wheat flour (atta) and 7 million tons into non-atta products, such as refined white flour (maida), semolina (suji) and bran (**Exhibit 7.1**). In this study, we have focused on atta milling since it constitutes more than 85 per cent of total consumption. Most atta is consumed directly by households to prepare unleavened Indian bread (chapatis).

Atta is milled in two formats: About 98 per cent is milled in a traditional format called chakkis and the remainder is milled in modern industrial mills (**Exhibit 7.2**). A third format, manual grinding at home, is now almost obsolete.

- ¶ **Chakkis:** A chakki is a relatively primitive, two-person operation with a simple, electrically operated grinder. Chakkis are widespread in residential and commercial areas, both in rural and urban India. There are approximately 300,000 chakkis in India mostly in the north and east – the main wheat producing and consuming regions. A typical chakki has a milling capacity of up to 2 tons of wheat per day and is run by workers who have migrated from agriculture.
- ¶ **Flour mills:** Industrial mills are the modern format for milling wheat. The base technology is similar to that of wheat milling plants in the US. India has approximately 70 industrial mills for atta, most of which are located near large urban centres. A typical mill has a milling capacity of 50-100 tons of wheat per day and employs over 50 workers.

Atta consumers can be broadly classified into those who use chakki atta and those who buy industrial atta. The industrial atta consumers belong primarily to upper income, urban households that value convenience and branding. They buy packaged, branded atta in 5-10 kg bags from grocery stores. The atta bought by chakki consumers, on the other hand, is unbranded and loose. Chakki atta consumers can be classified into four major segments based on their wheat and flour buying pattern (**Exhibit 7.3**):

- ¶ **Self-consumption:** For this segment of consumers, wheat is not intermediated through markets and no tax is paid. This segment includes the large majority of rural consumers such as farmers, their relatives and friends and agricultural labourers who are paid their wages in the form of wheat: 67 per cent of atta consumption is in this segment.
- ¶ **Public Distribution System (PDS):** This segment consists of low- and middle-income households that purchase subsidised wheat through the PDS: 10 per cent of atta consumption is in this segment.
- ¶ **Open market wheat:** This segment comprises primarily urban consumers who purchase wheat in the open market, clean it at home and then get it milled at a chakki: 14 per cent of atta is consumed by this segment.
- ¶ **Direct chakki flour:** This segment of consumers does not procure wheat but buys loose atta directly from the chakkis. These are mainly urban consumers who value convenience and yet are cost conscious: 7.5 per cent of atta is consumed by this segment.

## **PRODUCTIVITY PERFORMANCE**

The overall productivity of atta milling is only at 2.2 per cent of US levels (**Exhibit 7.4**). This is because chakkis, which have an employment share of over 99 per cent and output share of 98.5 per cent, are at 2.2 per cent of the US. The modern industrial mills are at 7.3 per cent of the US with a 1.5 per cent share of the output and a negligible share of the employment. In the US, there is no counterpart of the chakki format. All US wheat is milled in large-scale industrial plants, which have an average output of 440 tons per day.

The productivity in atta milling is estimated to be growing at 3.4 per cent a year (**Exhibit 7.5**). Productivity is increasing as industrial mills, the more productive format, gain share and productivity in chakkis improves. Industrial atta output has been growing at 25-30 per cent a year for the last 3 years with several large foreign and Indian players such as Unilever, Conagra and Pillsbury entering the branded atta market. Chakki productivity is increasing at about 3.2 per cent every year due to increased capacity utilisation of chakkis in rural areas and better labour utilisation in urban areas. Many chakkis in urban areas are now diversifying into semi-retail stores, thereby improving their labour utilisation.

We have calculated labour productivity in wheat milling in physical terms as kilograms of flour per hour worked. For calculating productivity for different segments, we conducted over 50 interviews with players in both chakki and industrial milling segments. The overall sector productivity was then obtained by averaging individual format productivity weighted by the format's share of employment.

## **OPERATIONAL REASONS FOR LOW PRODUCTIVITY**

This section is divided into two parts. First, we discuss the reasons for the gap between the current productivity of 2.2 per cent of US levels and the potential productivity of 4.6 per cent of US levels India can achieve at current factor costs. Then, we discuss the reasons for the difference between the Indian productivity potential and the US average.

### **Reasons for difference between current and potential productivity**

At current factor costs, India can achieve a productivity level of 4.6 per cent of the US, whereas its current productivity is only 2.2 per cent of the US (**Exhibit 7.6**). The main reasons for the difference between current and potential productivity are low chakki utilisation, low utilisation and scale of industrial mills and low output share of industrial atta.

- ¶ **Low capacity utilisation in chakkis:** At present, chakkis are idle 50 per cent of the time. A combination of higher capacity utilisation and diversification of chakkis into non-milling activities such as retailing can double the productivity of chakkis to 4.4 per cent of the US level from the current level of 2.2 per cent.
- ¶ **Low scale and utilisation in industrial mills:** The productivity in atta mills can only increase from the current 7.3 per cent of the US level to 9.5 per cent at current factor costs. Most mills are close to their potential with high uniformity between different plants. This increase in productivity can be achieved by increasing capacity utilisation and expanding the scale of operations. In addition, a regular supply of power will help reduce the labour employed in operating captive power generation facilities.

Most Indian mills run at an average capacity utilisation of about 70 per cent. This can increase to at least 84 per cent, the average in the US. In terms of scale, the average Indian mill has an output of 50 tons per day. The minimum efficient scale today is about 100 tons per day and most new mills are being designed accordingly. This is still much less than the average US scale of 440 tons per day.

- ¶ **Low share of industrial atta:** Today, the output share of industrial mills is less than 1.5 per cent, which translates into a share of less than 5 per cent of urban consumption. This share could be as high as 20 per cent at current factor costs (**Exhibit 7.7**). Differential taxes on flour and high downstream distribution and retail costs increase the consumer price of packaged industrial atta and thus limit its share of consumption. In Delhi, where there is no flour tax, this share is already about 13 per cent. With the growth of larger retail formats and the consequent reduction in downstream distribution and retail costs, the share of packaged industrial atta in urban areas can easily be about 20 per cent, which translates into an overall share of about 5.6 per cent.

### **Reasons for difference between potential Indian and average US productivity**

The main reason for the difference between the Indian productivity potential and the US average productivity is investment in technology that is economically unviable in India at current factor costs. Since labour costs will need to increase substantially for such investment to become viable, we do not expect to see these technologies in India for several years. Besides the low share of the more productive industrial format, the other reasons for low industrial mill productivity are the bagged movement of grain, consumer packaging of output flour into small-sized packs and low automation and scale.

- ¶ **Bagged movement of grain:** Bagged movement of grain in India leads to a productivity penalty of 1.2 per cent on mill productivity. In the US, all grain is stored and transported in a loose form while in India it is bagged in 90-100 kg bags, stacked in warehouses and transported in this bagged form in trucks or railway wagons. Bagged movement of grain increases labour intensity in the mill since extra labour is required to unload and stack the bags as well as to open them.

At current factor costs, loose movement of grain is not viable because the higher capital cost of storing loose grain in silos far outweighs the benefits of lower handling and bagging costs and lower storage losses (**Exhibit 7.8**). Real labour costs in handling will have to increase four-fold before the loose movement of grain becomes economically viable.

- ¶ **Consumer packaging of flour:** In India, almost all atta is packed in small (1-10 kg) bags directly for household consumption, leading to a productivity penalty of 6.1 per cent (**Exhibit 7.9**). In the US, where downstream players such as bakeries further process flour, only 50 per cent of flour is packed, and even this, in large bags (greater than 100 kg). Due to this product mix penalty, Indian mills require more labour both for packaging and loading.
- ¶ **Low automation and scale:** An average US mill is far more automated and has a higher scale of operation than an economically viable mill in India. While an average US mill has a capacity of 440 tons per day, the minimum efficient scale in India is only 100 tons per day. US mills are also far more automated in milling, packaging, loading, supervision and control and in sundry operations such as providing refreshments. At current factor costs, automation is not viable in India for any of these operations. For example, packaging is done manually in India. Labour costs would need to double for automated packaging to be viable (**Exhibit 7.10**).

## INDUSTRY DYNAMICS

Wheat milling is a fairly competitive industry with a large number of domestic and foreign players. It is, however, characterised by a significant non-level playing field in terms of unequal taxes on flour and effectively differential prices of wheat, which ensures that the more productive industrial mills do not gain higher market share.

Both in the chakkis and industrial mills, there is significant domestic competition with a large number of players having low capacity utilisation. In the industrial mills segment, foreign players are also active either directly, as in the case of

Cargill, or indirectly through contract milling, as in the cases of Unilever, Pillsbury and Conagra. The technology used by different companies is fairly uniform, leading to a similar productivity performance across players.

In comparison with chakkis, industrial mills are discriminated against in two ways: unequal flour taxes and higher wheat prices. Almost 75 per cent of chakki consumers, particularly the self-consumption and PDS segments, receive wheat at an effective price that is much lower than the price for mills.

## **EXTERNAL FACTORS RESPONSIBLE FOR LOW PRODUCTIVITY**

The external deterrents to achieving potential productivity can be classified into two categories: Factors that hinder productivity improvements in individual formats – both chakkis and industrial mills – and those that affect the migration of consumption from the less productive format of chakkis to the more productive format of industrial mills.

### **Factors hindering improvement in chakki and mill productivity**

The key external factor impeding improvement in chakki productivity is the limited alternative employment opportunities for chakki owners. This is a macro-economic barrier and should gradually correct itself with overall growth in the economy.

Similarly, the lower scale of operation and low capacity utilisation in industrial mills is a legacy effect and should correct itself given the current growth in industrial atta output of over 30 per cent a year. However, the productivity penalty due to the lack of regular power supply is the result of government ownership of state-owned electricity utilities.

### **Factors preventing migration from chakki atta to industrial atta**

Migration from chakki atta to industrial atta is limited primarily by the higher consumer price for industrial atta. The price for industrial atta in north India is Rs.11.2 per kg compared to Rs.9.50 per kg for loose atta bought directly from the chakki. This price difference is due to three factors: 1) Unequal taxes on flour favouring chakkis; 2) distortions in input wheat price due to higher taxes on wheat for the industrial format and subsidised wheat for the PDS segment; and 3) high downstream costs in distribution and retail.

- ¶ **Non-level taxes on industrial atta:** In most states, industrial mills incur a flour tax of 4 per cent that is not applicable to chakkis. This increases the cost of industrial atta by about Rs.0.4 per kg.

- ¶ **Distortions in input wheat price:** The majority of chakki consumers, particularly the self-consumption and PDS segments, receive less expensive wheat than do the industrial mills. The self-consumption segment does not pay any tax on input wheat and the PDS segment obtains subsidised wheat from the government at prices much below the market level (**Exhibit 7.11**). The tax on input wheat varies from 2 to 10 per cent in various states. This introduces a penalty of up to Rs. 0.60 per kg.
- ¶ **High downstream costs in distribution and retailing:** An analysis of the overall cost difference between direct chakki and industrial atta shows that while the latter is more economical in terms of milling and input wheat costs, the downstream costs are higher by Rs.2.8 per kg. This is because of higher packaging, sales and marketing expenses and downstream distribution costs (**Exhibit 7.12**).

While the packaging and other sales expenses are unavoidable, downstream distribution costs can be reduced by over Rs.0.3 per kg, which amounts to 10 per cent of downstream costs (**Exhibit 7.13**). This can be achieved through the growth of large-scale retail formats, which usually disintermediate the chain and increase scale to reduce the working capital cycle, handling costs, intermediary margins and losses. In addition, they reap economies of scale in retailing and transportation.

However, even if taxes were equalised and distribution costs came down, we expect the transition format to continue for a long time. Atta from chakkis will continue to be cheaper in rural areas where modern retail formats are unlikely to appear soon. However, in urban areas, industrial atta is likely to gain share as its price competitiveness with chakki atta improves.

## INDUSTRY OUTLOOK

Productivity growth in wheat milling can increase from the current 3.5 per cent to an average of 6.5 per cent over the next 10 years if all the barriers to productivity growth are removed. This will result in a steady, qualitative improvement in the nature of employment from low productivity chakkis to the more organised, high productivity mills.

To evaluate the outlook on output, productivity and employment, we consider three possible future scenarios for the competitive environment: status quo, reforms in wheat milling alone and reforms in all sectors (*see* Volume 1, Chapter 4: Synthesis of Sector Findings).

- ¶ **Status quo:** In this scenario, India's per capita output and productivity will continue to grow by 2.7 per cent and 3.7 per cent a year respectively. As a result, employment will decrease by 1 per cent a year. There will be 20 per cent growth in milled atta output and labour wages will go up by 4 per cent, in line with GDP per capita<sup>1</sup> growth. By 2010, the output share of milled atta will be 7.1 per cent and the share of industrial employment 1.4 per cent (**Exhibit 7.14**).
- ¶ **Reforms in wheat milling alone:** This scenario envisages all external barriers in this sector being removed while GDP per capita continues to grow at the current rate of 4 per cent a year equivalent to GDP growth of 5.5 per cent a year. In this scenario, we expect milled atta output to grow at 30 per cent a year and capture share from chakki atta. We expect the share of milled atta to increase from the current 1.5 per cent to over 15 per cent. Productivity in the sector will increase at 4.5 per cent a year. Labour wages will grow at 4 per cent a year and the output and employment share of milled atta will increase to 15.9 per cent and 3.3 per cent respectively (**Exhibit 7.15**).
- ¶ **Reforms in all sectors:** In this scenario, the mill atta segment will experience very rapid output growth of around 40 per cent a year in milled atta as GDP grows at about 10 per cent. Labour wages too will go up by 10 per cent a year. Overall productivity in the sector will increase at 6.5 per cent a year reaching 4.1 per cent of US levels by 2010. The share of the traditional format will go down substantially in urban areas where industrial atta prices will compete with the price of chakki atta. In rural areas, however, chakkis will continue to dominate. Overall, industrial atta mills will account for over one-third of the output and over 8 per cent of the employment in the sector (**Exhibit 7.16**).

## POLICY RECOMMENDATIONS

To remove the external barriers to productivity growth, we suggest the following measures: Equalise taxes on flour and wheat, replace subsidies on input wheat with food stamps, remove barriers to the emergence of large-scale retail formats and ensure a continuous power supply.

- ¶ **Equalise taxes on flour and wheat:** Differential taxes can be equalised either by removing the tax on industrial flour and wheat purchased or by imposing a fixed tax on chakkis. While the first option is easier to

---

<sup>1</sup> Throughout this section we refer to growth in GDP per capita in PPP terms. This differs from the growth in GDP per capita according to National Accounts statistics because each measure uses different relative prices to aggregate sectors to obtain the overall output. See the chapter 5, Volume 1: India's Growth Potential.

implement, it leads to a revenue loss for the government. This revenue loss is estimated to be Rs. 412 crore – Rs. 400 crore in wheat tax collections and Rs.12 crore in flour tax collections.

- ¶ **Replace the subsidy on wheat with food stamps:** Food stamps will allow the subsidised consumers to exercise their choice on atta rather than wheat and thus leave them free to choose milled atta, if they find it more cost effective.
- ¶ **Remove barriers to the emergence of large-scale retail formats:** Land market regulations, foreign direct investment controls, antiquated labour laws and other barriers to the growth of large scale retail formats should be removed. This will help reduce downstream costs and make industrially milled atta more competitive (*see* Volume III, Chapter 3: Retail).
- ¶ **Ensure a consistent power supply by enforcing payment:** A regular power supply is dependent on the overall viability of the electricity sector for which disciplined tariff collection is crucial. One solution for this is the privatisation of the power sector, which we discuss in the power case study (*see* Volume III, Chapter 2: Electric Power).



Exhibit 7.2

## MILLING SEGMENTATION – ATTA

	Segment	Atta/wheat milled annually Million tons	Number of units Nos.	Average installed capacity Tons/day	Comments
	Manual	Negligible	–	–	<ul style="list-style-type: none"> <li>• More or less extinct</li> </ul>
	Chakki	51.0	300,000	2	<ul style="list-style-type: none"> <li>• 2 person operation</li> <li>• High idle capacity (25% utilisation)</li> </ul>
	Industrial atta plants	0.8	70+	50 - 100	<ul style="list-style-type: none"> <li>• Growing at 30-35% per year</li> <li>• 60-70% utilisation</li> <li>• Large players such as Pillsbury, Conagra and Unilever entering the market</li> </ul>

Source: Interviews

2

Exhibit 7.3

## CONSUMER SEGMENTATION

Segments	Sub segments	Description	Share Per cent	Price Rs per kg
	Self consumption	<ul style="list-style-type: none"> <li>• Consumers: Mainly in rural areas                             <ul style="list-style-type: none"> <li>– Farmers and farmers' families</li> <li>– Labourers paid in kind</li> </ul> </li> <li>• Channel: Non-intermediated wheat</li> </ul>	67	6.8
	PDS*	<ul style="list-style-type: none"> <li>• Consumers: Low and middle income households</li> <li>• Channel: PDS* outlets selling subsidised wheat</li> </ul>	10	5.2
	Open market wheat	<ul style="list-style-type: none"> <li>• Consumers: Mainly urban households who value quality and are cost conscious</li> <li>• Channel: Wheat purchased in retail stores and taken to chakkis for milling</li> </ul>	14	8.5
	Chakki flour	<ul style="list-style-type: none"> <li>• Consumers: Mainly urban households who are cost conscious and value convenience</li> <li>• Channel: Loose atta sold by chakkis</li> </ul>	7.5	9.5
		<ul style="list-style-type: none"> <li>• Consumers: Urban, higher income consumers who value convenience and branding</li> <li>• Channel: Packaged, branded atta sold at retail stores</li> </ul>	1.5	11.2

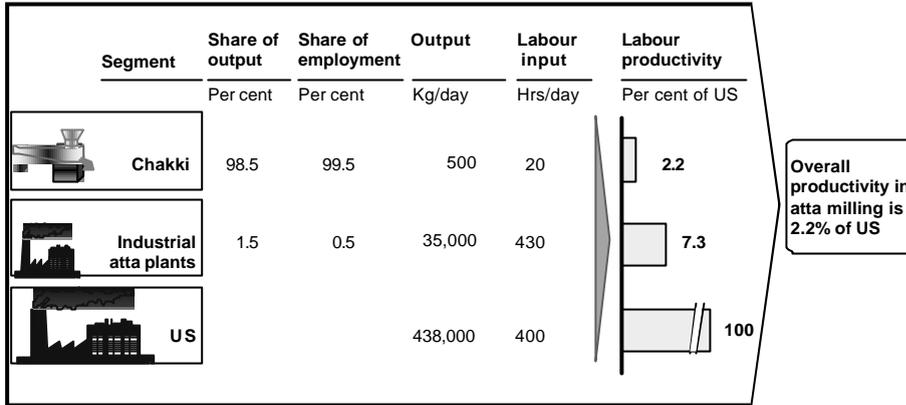
\* Public Distribution System

Source: Team analysis

3

Exhibit 7.4

### SEGMENT-WISE PRODUCTIVITY ESTIMATES



\* Average output of players in the segment  
Source: Interviews; Team analysis

Exhibit 7.5

### PRODUCTIVITY GROWTH RATE ESTIMATES

#### Productivity growth drivers

##### Increase in output share of industrial format

- Growth in packaged atta at 25-30% per year

##### Increase in chakki productivity

- Urban areas: Decrease in labour intensity (5% per year\*) due to diversification into other activities such as retailing and non-atta milling
- Rural areas: Utilisation of existing chakkis is improving as no new chakkis are being set up and larger wheat output is being processed through existing chakkis

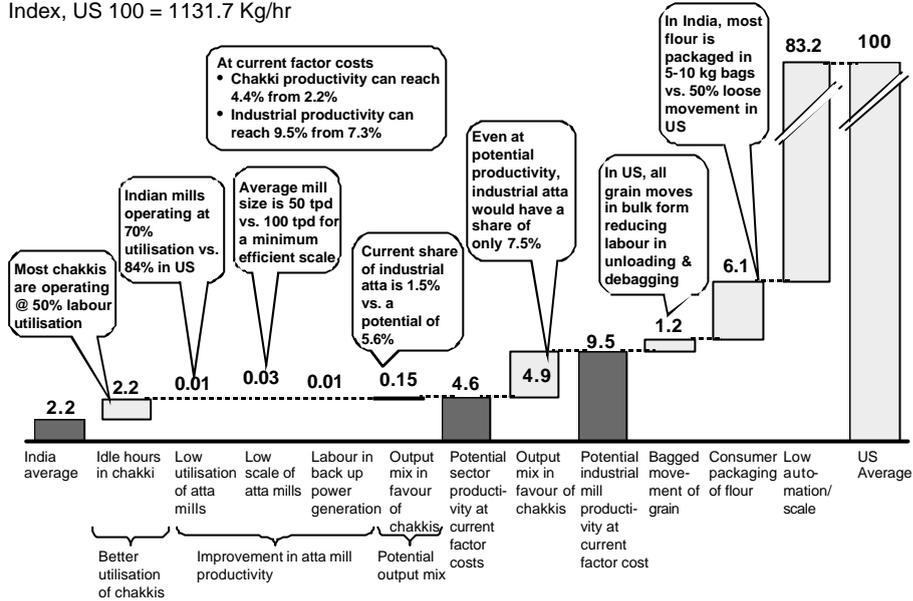
Productivity in  
the sector  
growing at  
3.4% a year

\* Estimated as a lower bound  
Source: Interviews; Team analysis

Exhibit 7.6

### OPERATIONAL REASONS EXPLAINING THE PRODUCTIVITY GAP

Index, US 100 = 1131.7 Kg/hr



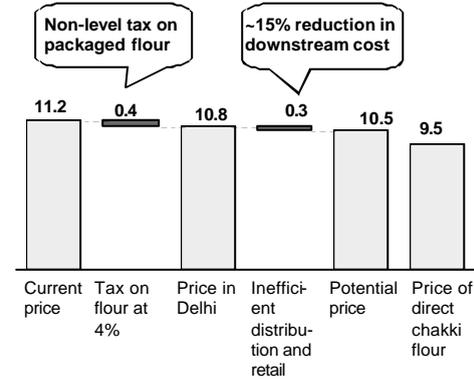
Source: Interviews; Team analysis

Exhibit 7.7

### POTENTIAL PENETRATION OF INDUSTRIAL ATTA

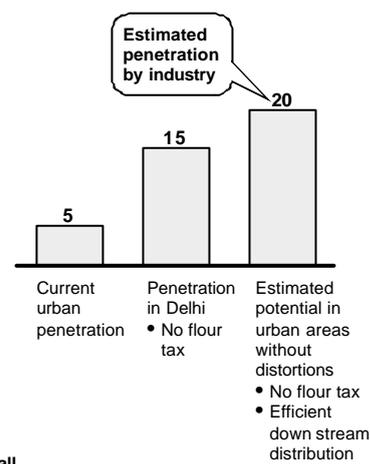
#### Price of industrial atta

Rs per kg



#### Share of urban consumption

Per cent



Overall share of industrial atta (%)

1.5

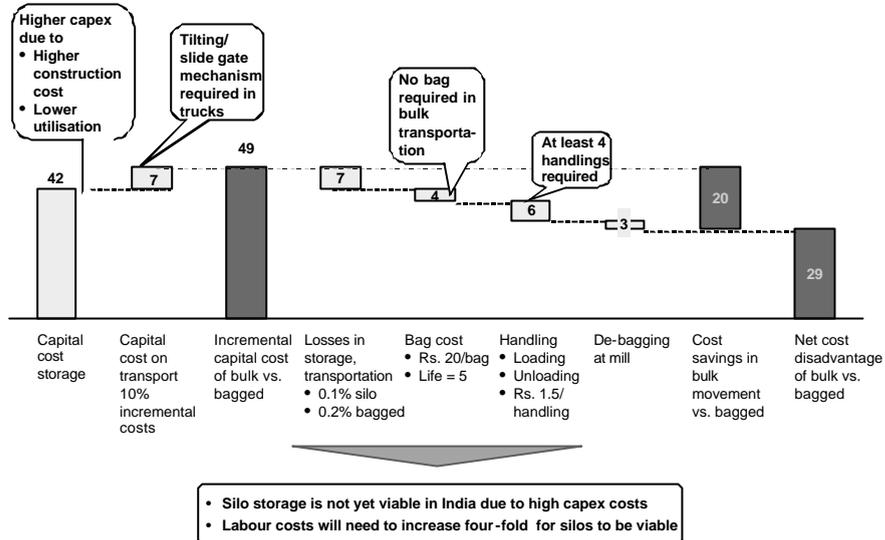
5.6

Source: Interviews; Team analysis

Exhibit 7.8

### COST DIFFERENCE BETWEEN BULK AND BAGGED MOVEMENT OF GRAIN

Rs. per bag of 100 kg



Source: Interviews; McKinsey analysis

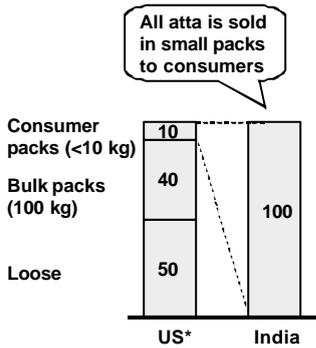
Exhibit 7.9

### CONSUMER PACKAGING OF FLOUR

100 tpd ATTA MILL

**Product mix**

Per cent



**Impact of large pack and loose sales on labour requirement**

- Packaging labour falls by 75%
  - No packaging for loose flour
  - 50% time required for bulk packaging
- Loading time falls by 50% since loose flour is aspirated directly

**Overall industrial mill productivity would increase from 10.7% to 16.8% of US levels if atta was sold largely to bulk consumers**

\* Estimates from interviews

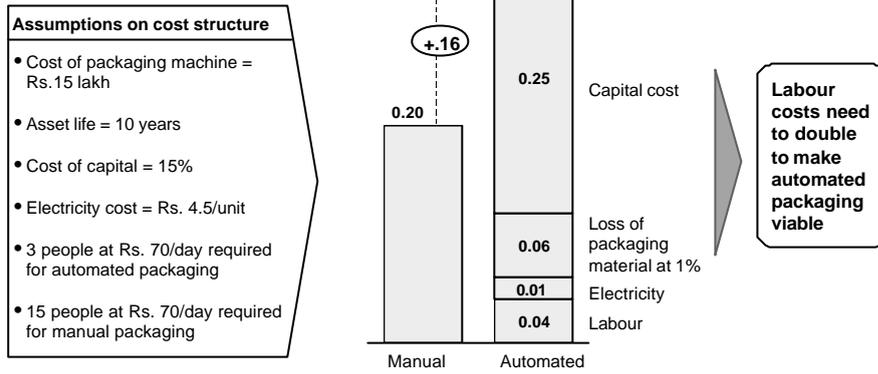
Source: Team analysis

Exhibit 7.10

## AUTOMATION IN PACKAGING

Rs. per 10 kg bag

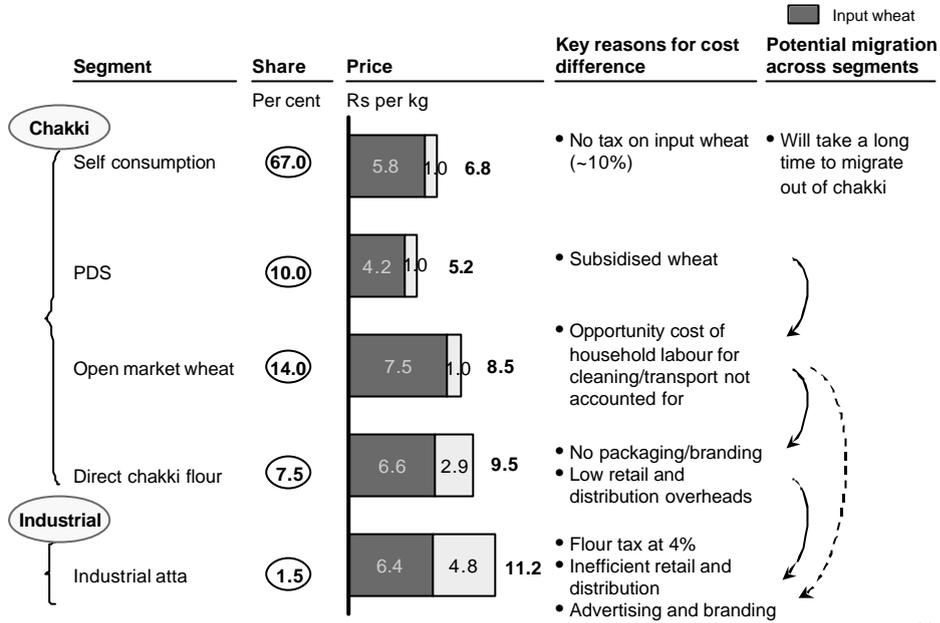
50 TPD EXAMPLE



Source: Interviews

Exhibit 7.11

### VARIATION IN ATTA COST ACROSS CONSUMER SEGMENTS

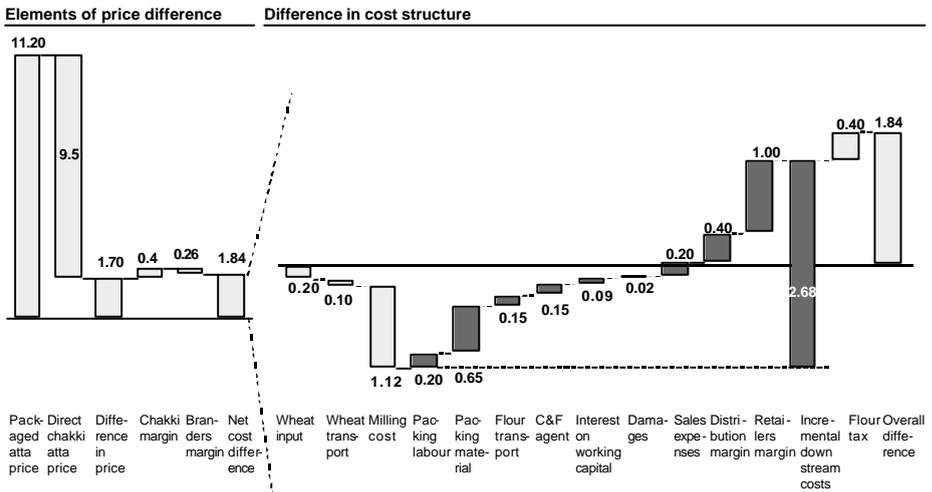


Source: Interviews; Team analysis

Exhibit 7.12

### COMPARISON OF COST STRUCTURE – CHAKKI VERSUS INDUSTRIAL MILL

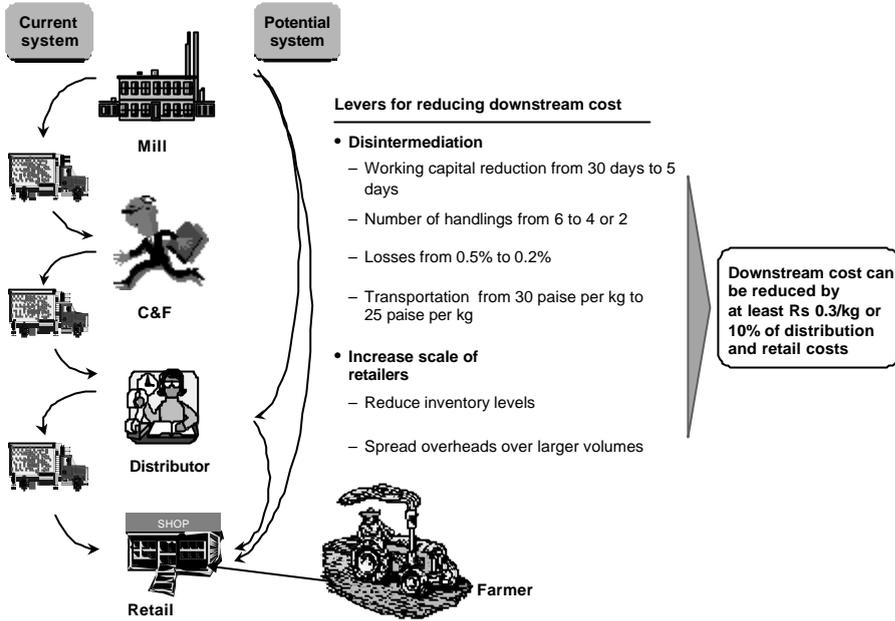
Rs. per kg of flour



Source: Interviews; McKinsey analysis

Exhibit 7.13

### DOWNSTREAM DISTRIBUTION AND RETAIL

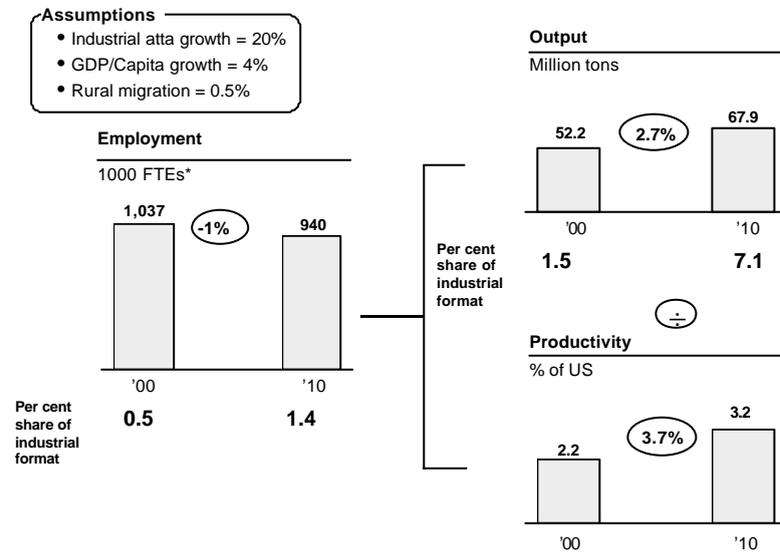


Source: Interviews; Team analysis

Exhibit 7.14

### FUTURE OUTLOOK – STATUS QUO

(X%) - CAGR



\* FTE = 2,000 hrs/annum

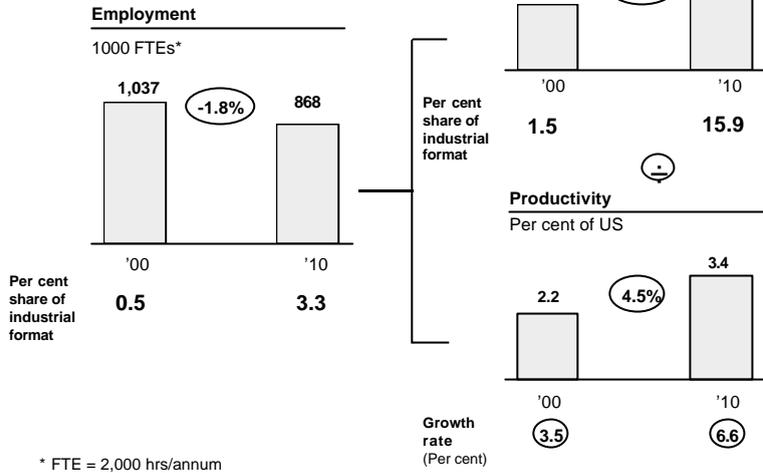
Source: Team analysis

Exhibit 7.15

### FUTURE OUTLOOK – REFORMS IN WHEAT MILLING ALONE

(X%) - CAGR

- Assumptions**
- Industrial atta growth = 30%
  - GDP/Capita growth = 4%
  - Rural migration = 0.5%



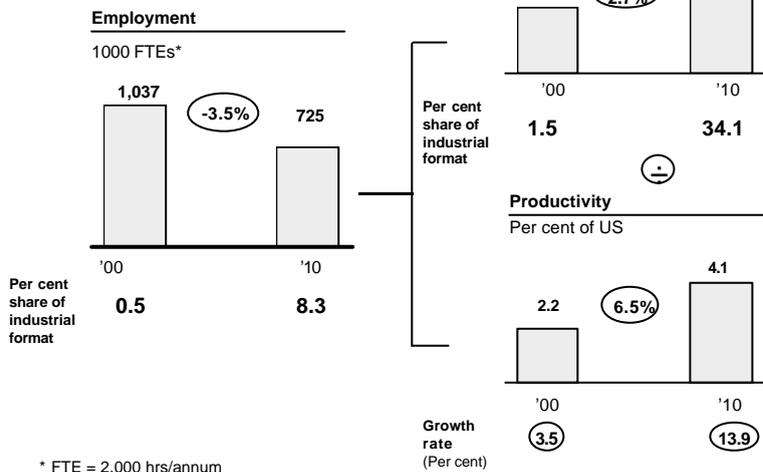
\* FTE = 2,000 hrs/annum  
Source: Team analysis

Exhibit 7.16

### FUTURE OUTLOOK – REFORMS IN ALL SECTORS

(X%) - CAGR

- Assumptions**
- Industrial atta growth = 40%
  - GDP growth = 10%
  - Rural migration = 1%



\* FTE = 2,000 hrs/annum  
Source: Team analysis