Mat Daly

A **streetcar** named productivity

Bus and train systems habitually run at a loss. But public-transit agencies could lower costs and raise the quality of service by emulating best practices from around the world.

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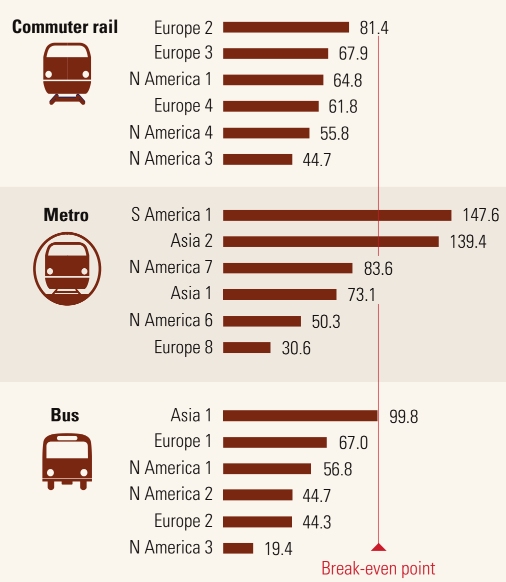
From Delhi's famously overcrowded buses and the legendary Paris Métro to the waves of commuter trains rolling into Manhattan each morning, transit systems are as different as the cities they serve. Most, though, share one unfortunate characteristic: chronic operating deficits. According to a recent McKinsey benchmarking study of 48 public-transit operators around the world, the average transit agency covers less than 70 percent of its operating expenses with passenger revenues (Exhibit 1).

EXHIBIT 1

Deficit disorder

Operating ratio of various public-transit agencies in different regions,[1] %



[1]Total revenues ÷ total costs; revenues exclude government subsidies; costs include nonoperating purchased transportation, depreciation, and other noncash charges. Figures are rounded and adjusted for purchasing-power parity.

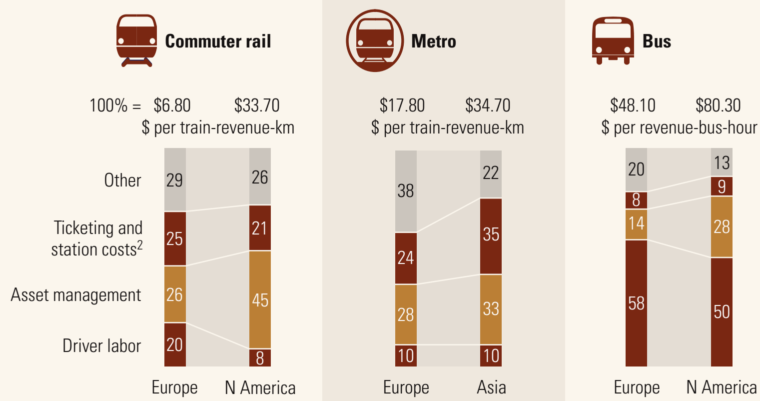
Source: 2003 McKinsey urban-transit benchmarking initiative

Operating deficits in transit systems stem from two essential sources. The first, intrinsic to the task of safely transporting millions of passengers every day, is the need to make trade-offs between the system's public-service mission and its operational efficiency. These trade-offs involve complex and at times contentious policy issues—such as fare structures, service levels, and route design—that are often beyond the short-term control of typical transit agencies. The second, however, involves factors

EXHIBIT 2

The big operating costs

Operating costs by type,[1] %



[1]For commuter rail: 4 operators in Europe, 4 in North America; for metro: 3 operators in Europe, 3 in Asia; for bus: 6 operators in Europe, 8 in North America.
[2]Includes onboard, nondriver labor as well as all station and ticketing costs (such as customer service, maintenance of station/ticket-vending machines, security, ticket sales).

Source: 2003 McKinsey urban-transit benchmarking initiative

that they can address without sacrificing safety or service: fleet maintenance, labor management, and fare collection.

As agencies scramble for their share of increasingly scarce public resources, not to mention additional funding for security, some of them might need to consider politically controversial changes such as increasing fares, altering routes, and reducing the frequency of service, particularly during off-peak hours. Others will have to get creative with alternative revenue streams, including advertising and retail kiosks in stations. But while transit agencies wrestle with these longer-term questions, the benchmarking study finds plenty of room for short-term improvements in the three largest cost categories of transit systems (Exhibit 2). If some of the less efficient agencies learned from global best practice in these areas, operating costs could fall by as much as 15 to 20 percent, and service levels would likely improve.

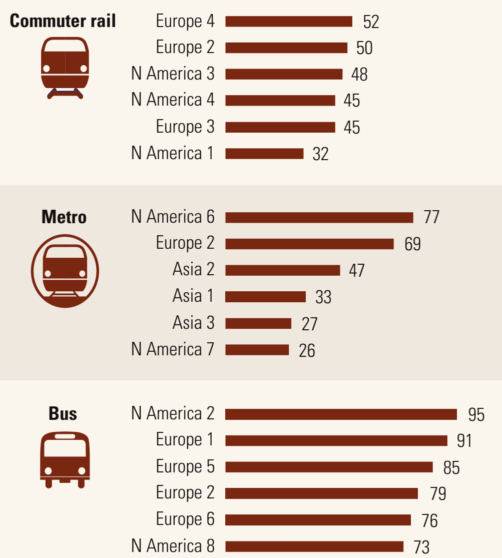
The productivity of drivers

Operating benchmarks that make it possible to compare transit agencies across geographies and modes (commuter rail, metro, and bus) should differentiate between factors that agencies can control directly and those beyond their reach. Take driver labor: it is no surprise that, even at purchasing-power parity, wage rates in places such as Rio de Janeiro and New York vary by as much as 240 percent. But the wide range in the efficiency with which drivers are utilized was unexpected (Exhibit 3). The most productive bus systems have drivers at the steering wheel for up to

EXHIBIT 3

Time at the wheel

Driver utilization (vehicle hours per driver hour) of various public-transit agencies in different regions, %



Source: 2003 McKinsey urban-transit benchmarking initiative

95 percent of their working hours; meanwhile, many subway and commuter rail operators struggle to deploy drivers for more than half of the time they are at work. Driver utilization rates can fall dramatically if routes and round trips keep drivers idle during significant parts of the workday or don't take account of the time required for mandatory breaks or of the fact that drivers must check their vehicles at the start of each shift. In many cases, it is utilization, rather than wages, that represents the greater improvement opportunity.

Moreover, although local market conditions and union contracts often make it hard to address the issue of wages, public-transit agencies have many ways of improving the utilization of their drivers. Doing so isn't easy, since under the traditional eight-hour staffing model the supply of drivers doesn't comport very well with public transit's notorious fluctuations in demand—the result of causes ranging from predictable rush-hour peaks to unpredictable weather. But best-practice operators have increased utilization levels through measures such as better overtime management and dynamic staffing (deploying drivers in full- and part-time shifts according to real-time analysis of passenger demand). Other transit agencies have improved utilization levels by taking simpler steps, such as splitting shifts into two four-hour periods to cover the rush hours, with an unpaid break during the day, and cross-training maintenance and clerical workers so that they can drive trains and buses during unexpected spikes in demand (Exhibit 4, on the next page).

Fleet management and maintenance

There are also better ways to manage what is usually an operator's biggest asset: its fleet of vehicles.[1] High levels of utilization must be balanced against the need to serve the traveling public effectively. While less frequent service theoretically might increase the number of passengers on each bus

[1] While most agencies are responsible for maintaining both the fixed infrastructure (such as tracks and signals) and the rolling stock (buses and trains), McKinsey's benchmarking effort focused only on the management of rolling stock.

EXHIBIT 4

Keeping them in the driver's seat

Factors in improving driver utilization (all modes)

Relative performance	Shift flexibility	Responsiveness to demand	Staffing flexibility	Resource control	Overtime management
High	No standard shift times (flexible hours)	Electronic real-time analysis of demand; dynamic staffing	Cross-training for multiple roles	Balanced distribution of scheduled vacations	Overtime based on statistical approach to volatility of demand and supply
	Short advance notice for start of shift				
	Split shifts	Schedules driven by demand (time of day, week, season)	Broad job descriptions	Controls in place for unexcused absences/ sick days only	
Low	Fixed and continuous shifts	Fixed schedules	Narrow job descriptions	Limited control procedures	Standard overtime levels

Source: 2003 McKinsey urban-transit benchmarking initiative

or train, in practice it can lead to a vicious cycle: lower ridership increases the agency's cost per passenger, thus necessitating fare hikes that often drive away still more passengers. By contrast, more frequent service often attracts riders to a system, thereby raising the number of riders per vehicle and cutting costs per passenger. These decisions about passenger service and fleet operations are obvious drivers of total maintenance costs. So too are fleet-purchasing choices, which should take into account a vehicle's total cost of ownership, not just its purchase price.

In maintenance, the challenge is threefold: to improve labor productivity, to define the right maintenance schedule, and to prevent every transit operator's nightmare—breakdowns. To avoid the disruptions they cause, many operators keep extra vehicles and staff standing by, an extremely expensive insurance policy. One North American bus operator with a poor maintenance strategy is so plagued by frequent breakdowns that it keeps nearly 500 extra buses, worth a total of $125 million, either in the shop being serviced or sitting in depots waiting to replace the next breakdown. In Europe, one rail operator keeps 20 percent more maintenance workers on duty than do its peers to provide rapid service when breakdowns occur.

Best-practice agencies reduce breakdown rates and maintenance costs and improve service by taking an integrated approach to operations and maintenance (Exhibit 5). These agencies understand that decisions about a vehicle's operations—which routes it runs, how often, and when—must be coordinated with, and should help to define, the maintenance schedule.

EXHIBIT 5

Integrating operations and maintenance

Factors in improving vehicle utilization (all modes)

Relative performance	Passenger utilization: match demand with supply	Operational utilization: maximize equipment effectiveness	Maintenance: improve strategy and labor productivity	Purchasing
High	• Real-time management of service intervals and vehicle/car sizes	• Few or no vehicles kept on standby • Little or no idle time • Average speed managed as driver of cost, service[1]	• Component-based decisions for preventive vs corrective maintenance • Comprehensive lean-production approach	• Focus on designed-to-cost, low-maintenance assets • Consideration of life-cycle cost, line interoperability • Use of sourcing techniques (such as bundling, tendering)
	• Different service intervals and vehicle/car sizes depending on time of day/week	• Targets set for optimum number of vehicles in active fleet and on standby		
Low	• 1 standard set of service intervals and vehicle/car sizes	• Number of vehicles in active fleet and on standby not actively managed • No management of idle times and speed	• Predominantly corrective maintenance • Low standardization of labor processes • No attention given to waste arising from deadheads[2] or vehicle downtime in moving to/awaiting repairs	• No consideration of life-cycle cost • Acceptance of supplier's price without negotiation

[1]For example, through use of dedicated bus lanes, faster boarding procedures.
[2]Vehicles traveling without paying passengers.

Source: 2003 McKinsey urban-transit benchmarking initiative

They also mine operational and maintenance data to predict replacement cycles for specific components (such as brakes and doors) and schedule maintenance during off-peak times at night or on weekends to minimize conflicts with passenger service. One European rail operator has mined these data so successfully that it has reduced its spare ratio (the number of vehicles kept on standby) virtually to zero during peak hours by improving the reliability of its vehicles. If the most poorly maintained fleets reached average levels, the operators should be able to increase their fleet utilization levels and cut their maintenance costs by more than half (Exhibit 6, on the next page).

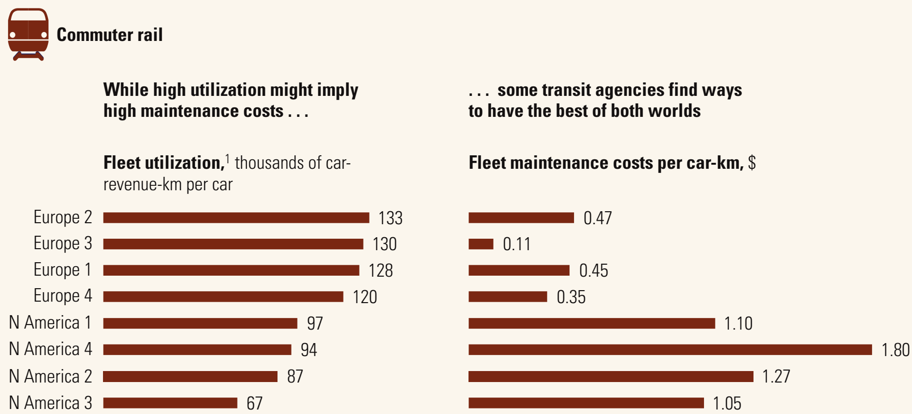
Collecting fares

Finally, while there is no easy or inexpensive way to collect fares, operators should understand the service and economic trade-offs involved in the various collection technologies. Paper tickets and monthly passes are relatively inexpensive to issue but require significant station and onboard labor, which for some operators can represent more than $1 a ride. Systems that control access to platforms (by using turnstiles or other barriers to collect fares through tokens, cash, or magnetic cards) must have capital for

EXHIBIT 6

Striking a proper balance

Fleet utilization and maintenance costs at various public-transit agencies in different regions



[1]High fleet utilization, when coupled with high passenger use per vehicle-km, generally means that system is being used very cost-effectively despite potentially higher maintenance costs; low fleet utilization coupled with high maintenance costs is often signal of poor fleet maintenance.

Source: 2003 McKinsey urban-transit benchmarking initiative

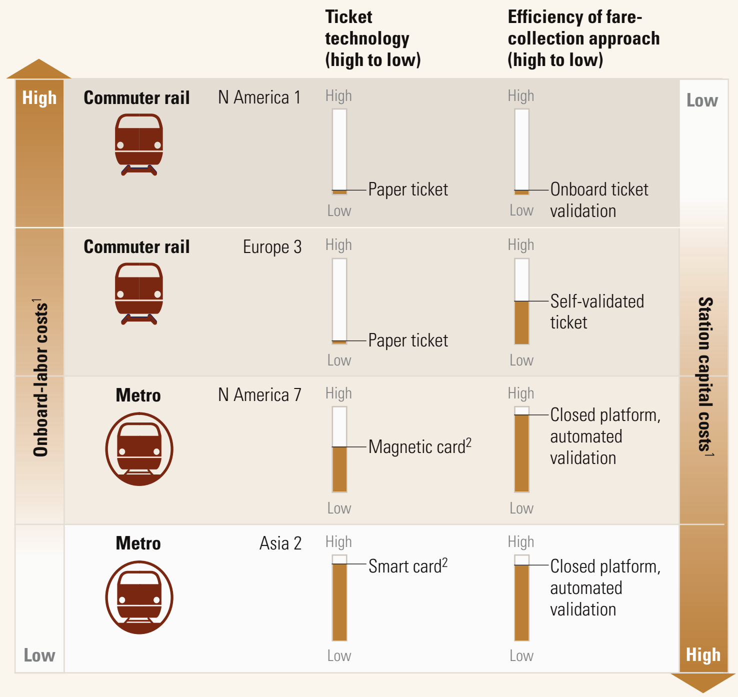
ticket-vending machines and barriers but require little or no onboard labor. Those using self-validation (or "honor") systems, in which passengers carry proof of payment throughout the journey, can use fewer conductors onboard but need the legal authority to impose stiff fines during spot checks (Exhibit 7).

Some agencies have deployed new smart-card technologies that can improve service significantly. Hong Kong's Octopus card allows passengers to change modes seamlessly (from bus to rail to subway to ferry), makes it possible to collect passenger data that can be used to improve customer service and to plan routes as well as to develop customer-relationship-management opportunities such as targeted discounts and automatic debit services to replenish fares. Where smart cards are not feasible in the short term, self-validation systems offer a reasonable alternative: they reduce onboard labor costs by 30 to 40 percent and, in Europe at least, have surprisingly resulted in less revenue leakage than many operators initially feared. Practice has shown that there are more honest people who don't get checked by conductors than dishonest people who escape spot checks.

In cities around the world, high-performing transit systems seem to offer the only route away from traffic congestion and toward a more civilized environment. But public resources are scarce, and if transit managers are

EXHIBIT 7

Ticketing trade-offs



¹Adjusted for purchasing-power parity.
²Magnetic cards are digitally encoded cards from which fare is debited when inserted into card reader; smart cards are similar but also allow 2-way information flow that facilitates data collection.

Source: 2003 McKinsey urban-transit benchmarking initiative

to maximize the value of what public money they do receive, they must look closely at the underlying drivers of performance and cost-effectiveness. They will then be able to make informed choices among the many trade-offs involved in providing quality service at low cost to the millions of people, in hundreds of cities, who depend on public-transit systems every day. Q

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