By Diaan-Yi Lin | February 2017

What executives need to know about automation

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Last month, my colleagues at the McKinsey Global Institute (MGI) published a fascinating report about how artificial intelligence, robotics, and other automation technologies might influence the world's economies, industries, and jobs. I encourage people in Singapore and elsewhere to read the report, which also looks at how business leaders and policy makers can respond to the challenges and opportunities that automation creates.

For Singapore, MGI estimates that 44 percent of all work could be automated with current technologies. This estimate and the surrounding analysis by MGI are well worth considering in light of the report from Singapore's Committee on the Future Economy, which discusses strategies that would help the city build strong digital capabilities and equip its people with skills for today's jobs and those of the future.

As an introduction to MGI's research, I'd like to focus on some highlights that ought to interest executives.

Artificial intelligence is a key feature of today's automation, if not the defining feature

For decades, companies have used computers, machines, and robots to streamline, enhance, and even take over work activities that humans used to perform. Now, people are designing machines that can do more cognitive work, such as finding patterns in data, solving problems, and making decisions.

These capabilities have emerged because of recent advances in computing technology, programming techniques, and data collection.

And innovation seems likely to get faster, since tech giants and venture capitalists are pouring investment into new artificial intelligence (AI) applications. When my McKinsey colleagues in China conducted a survey on artificial intelligence, the respondents identified more than 100 ways it might affect their industries.

Automation will affect all jobs, but not to the same degree

The public discourse about automation often centers on the idea that it will destroy jobs. That's a scary idea, but it's also a misconception that the MGI report should help to dispel. This is because the report takes a more detailed view of how work can be automated.

Most jobs consist of many activities. Some can be automated with relative ease, like collecting data or doing predictable physical labor. Activities that involve social, emotional, and cognitive skills, such as dealing with customers and managing workers, are harder to automate.

When MGI looked at the potential for automating activities, it found that just 5 percent of occupations could be fully automated with currently demonstrated technologies. Many more could be partly automated: some 60 percent could have 30 percent of their activities automated. These jobs span the ranks and pay scales of typical organizations. Even CEOs could hand over some of their work to machines. MGI estimates that "activities consuming more than 20 percent of a CEO's working time could be automated using current technologies."

The impact of automation will also vary among geographies and sectors

MGI estimates that currently demonstrated technologies could automate about half of the work people do today. Although automation will influence jobs in every sector and country, it will make more of a difference in some places than in others.
MGI estimates that the potential for automation is concentrated in four countries with large populations, high wages, or both: China, India, Japan, and the United States. These countries account for just over half of the wages, and almost two-thirds of the working hours, associated with automatable activities.

Of the 11 Asian countries that MGI studied, Singapore has the lowest proportion of work that can be automated with current technologies (44 percent). Much of this work is in the city's biggest industries: manufacturing (equivalent to 213,800 jobs), administrative and support services (134,200 jobs), retail (124,900 jobs), and construction (120,000 jobs). Two sectors have especially high percentages of automatable work: accommodation and food services (60 percent) and transportation and warehousing (59 percent).

The adoption of automation will take decades

MGI argues that the pace and extent of automation's effect on work activities depends on **five broad factors**:

- technical feasibility, which governs how quickly a currently demonstrated technology can be turned into a commercial product or service
- the costs of development and deployment, which have to be covered in advance and eventually recouped
- labor-market dynamics, which include supply and demand, as well as demographics, wage levels, and worker training
- economic benefits of various kinds, such as increased productivity, improved safety, lower labor costs, and higher product quality
- regulatory and social acceptance, related to issues such as safety and liability, data privacy and security, and possible increases in unemployment levels

When all these factors are assumed to favor the rapid development and adoption of automation technologies, MGI projects that 50 percent of work activities will be automated by around 2035 and estimates that this won't happen until 2075 if automation develops and is adopted slowly.

Automation could have major economic benefits

MGI estimates that the productivity boost from automation in the world's 20 largest economies (G19 plus Nigeria) could be equivalent to adding 1.1 billion to 2.3 billion full-time workers by 2065. This could increase productivity growth by 0.8 to 1.4 percent of global GDP annually. Such gains would offset some of the slowdown in workforce growth that is happening in many advanced and some emerging economies—a demographic trend that could cut economic growth nearly in half.

Automation will surely change the nature of work. This dynamic naturally raises questions about the effects on employment. MGI's estimates recognize that economic growth will benefit most from automation if the hundreds of millions of people it affects continue working at the same levels of productivity.

Large-scale labor shifts are not unprecedented. In the United States, the share of the workforce in agriculture fell from 40 percent in 1900 t0 2 percent in 2000, and manufacturing employment fell from 25 percent in 1950 to less than 10 percent in 2010. In both cases, new jobs replaced the ones that disappeared.

Easing the labor shifts caused by automation will require concerted action. Business leaders could find ways to redeploy the displaced, either within their own organizations or elsewhere. Policy makers might develop measures to help workers develop new skills and to promote the creation of new jobs.

I am optimistic that companies in Singapore and around the world will capitalize on the opportunities created by automation while limiting the downside. Previous periods of structural economic change created winners and losers, but not in a zero-sum way. Society as a whole was better off when the transitions were complete. Singapore's companies have the human and technological capital, as well as the international outlook, to make the most of automation and even to gain standing in the global economy.

Diaan-Yi Lin is a Senior Partner and Managing Partner, Singapore at McKinsey & Company

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