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GOVERNING IN THE AGE OF DISRUPTION

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GLOBAL ECONOMIES ARE IN the midst of unprecedented technological change, including an explosion in automation, the takeoff of artificial intelligence, and rapid advances in fields such as nanotechnology and genomics. This disruption will affect just about every aspect of society—from industrial strategies and competitiveness to the labor market to the way government itself functions.

It is difficult to overstate the magnitude of the impact. Traditional jobs in nearly every industry—manufacturing, agriculture, professional services—will be redesigned or completely eliminated, the degree varying by country. At the same time, there will be continuing shortages in the high-skilled workforce that companies will need in order to compete. In addition, previously winning industrial and economic development policies will become outdated. And governments will need to manage these issues at the same time that they embrace digitization in their own operations, creating new citizen-centric approaches to the design and delivery of services. (See “Digi-

tal Government Services by the Numbers,” BCG article, April 2017.)

Government leaders must confront this disruption head-on. They must determine the respective roles played by the public and private sectors in forecasting and managing major shifts in the workforce. They must support new approaches in education that will provide students with the skills required in the 21st century. And they must develop industrial policies that support their countries’ competitiveness, particularly in the developing world, where the path to economic development is being upended.

Despite the scope of the challenges, there is reason to be optimistic. Countries around the world have tested and embraced new policies and approaches, including some designed to make the workforce more adaptive and to ensure that systems of basic education are adequate to training workers able to learn amid rapid technological change. The experiences of these nations can provide lessons about which policies work best and how they can be

successfully implemented by other countries. As governments experiment and explore new strategies, they must be willing embrace fresh—even radical—thinking.

The Forces of Disruption

In what has been called the fourth industrial revolution, advances in robotics, machine learning, artificial intelligence, and other fields are transforming how companies manufacture products and deliver services. According to the World Bank, about two-thirds of all jobs in the developing world are susceptible to automation, although the extent of job loss will ultimately depend on wage levels and the pace of technology adoption; in OECD countries, automation could replace nearly 60% of jobs.¹ Separately, a report by *Harvard Business Review* found that currently available technology has the potential to automate activities that account for 1.2 billion full-time equivalent positions and \$14.6 trillion in wages.²

On the flip side, the private sector will find it increasingly difficult to recruit enough highly skilled workers to fill new jobs created by this disruption. Between 2020 and 2030, BCG projects significant worldwide labor force imbalances—shortfalls, in particular. One significant implication is the potential aggregate value of GDP squandered, either because nations will not be able to fill the jobs available within their borders or because they will not be able to create enough jobs for the workers they have. The amount at risk is a stunning \$10 trillion—around 60% of US GDP and more than 10% of total world GDP. (These projections are based on 2013 data. See *The Global Workforce Crisis: \$10 Trillion at Risk*, BCG report, June 2014.)

TECHNOLOGICAL CHANGE AND INDUSTRIAL POLICY

Rapid advances in technology have major implications not only for the workforce, but also for the competitiveness of nations as a whole. In developed countries, the failure of industry to effectively harness new technology could undermine economic health and growth.

In developing economies, the challenge is even more significant. Historically, such countries have followed a path leading from agriculture to low-value-added manufacturing to the manufacture of higher-value-added products. In making the transition from agriculture to manufacturing, they have typically relied on low-cost labor to attract large manufacturers to their shores. For manufacturers, these low costs have more than offset the expenses incurred by shipping and complex supply chain logistics.

But that equation is starting to change. As automation promises to replace an increasing share of the labor required in production, manufacturing in more expensive labor markets becomes more viable. According to BCG research, average manufacturing labor costs in 2025 are expected to be 33% lower in South Korea than they would otherwise have been—and 18% to 25% lower in China, Germany, the US, and Japan.³ (See *The Robotics Revolution: The Next Great Leap in Manufacturing*, BCG report, September 2015.) Evidence of the beginning of this shift abounds. Adidas, for example, is piloting automated footwear manufacturing in the US and Germany.

THE RIPPLE EFFECTS OF DISRUPTION

The changing dynamics in the labor market will complicate the task of dealing with aging populations in both developed and developing countries. According to the United Nations, the population of people 60 years and older will double between 2015 and 2050 to nearly 2.1 billion, accounting for 20% of the world's population. The population of those over 80 will grow even more quickly, ballooning from 125 million in 2015 to a projected 434 million in 2050. These longer lifespans will create significant disruption for governments. In many countries, for example, increased life expectancy is occurring alongside declining birth rates. This raises the specter of a “demographic time bomb,” a scenario in which future generations struggle to adequately care for large numbers of retirees and to honor mounting pension commitments.

In fact, governments face a potential funding issue of major proportions. In the US, for example, 47% of government revenue comes from personal income tax and 34% comes from the payroll tax. Large numbers of displaced workers, combined with an aging population and declining birth rates, will eat into such revenues and hamstring the ability to cover rising health care and pension costs. This is a major concern for Western governments, particularly those with existing debt issues and unfunded pension schemes.

In addition, these changes in the labor market could exacerbate income inequality in many countries. A report from the White House in late 2016 acknowledged the problem, pointing out that while artificial intelligence-driven automation will “continue to create wealth and expand the American economy,” it could also “push towards reduced competition and increased wealth inequality.”⁴

Strategies for Addressing Technological Disruption

Responding to the disruption wrought by advances in technology is a tall order. But some existing workforce training, education, and industrial and economic development policies are beginning to point the way forward.

HELPING WORKERS ADAPT

It is impossible to predict with any reliability the types and numbers of workers who will be in demand five or ten years out. An agile system is therefore needed that can spot signals in the labor market and quickly respond. Such a system requires rethinking worker training so that it is geared around lifelong learning. And all stakeholders—government, employers, and employees—will have to bear some of the cost and responsibility for developing and sustaining the necessary programs.

A number of established approaches could help relieve the looming gaps in the labor market. In Denmark, the system known as “flexicurity”—whose goal is flexibility for employers and security for workers—pro-

vides extensive job search and training assistance. Government job centers work with employers to understand the types of training programs needed to meet local labor market demand, and counselors connect unemployed individuals with the programs they need. Unions also play an important role, working with employers to identify the skills required and accommodating flexibility in hiring and firing in return for programs such as paid leave during training.

In Singapore, meanwhile, a three-pronged government effort to adapt the nation to the new industrial revolution supports investments in critical new technologies, promotes companies’ adoption of those technologies, and ensures that the workforce has the skills needed to use them. An initiative called SkillsFuture aims to help Singaporeans receive the training or certification required to remain marketable—whether they are just starting in their careers, are in the middle of their work life, or are looking to remain employable in their later years. And, with the help of partners from the private sector, the Professional Conversion Programme provides professionals, managers, executives, and technicians with the training needed to transition into new occupations or industries.

RETHINKING EDUCATION

For retraining to succeed, the workforce must comprise highly adaptive individuals. Adaptability is critical to the ability to move into different roles and even professions as labor demands shift. Of the jobs that today’s students will hold in 2030, it is estimated that 85% do not exist today.⁵ At the same time, research from the World Economic Forum indicates that core skills such as active learning, creativity, and critical thinking are becoming increasingly important in many industries.⁶

In most developed countries, people rely on the education received through their late teens or early twenties for most of their working life. But as the nature of work evolves, and as people change jobs more frequently and live and work much longer than they did in the past, this path

is becoming increasingly obsolete. The emphasis on memorization and rote learning typical of traditional education systems needs to be replaced by methods that foster the development of 21st century skills.

There is already some evidence of change. For example, Finland is exploring ways to remake its education system to better match the skills that the jobs of the future will demand. Instead of teaching subjects in isolation, educators are taking a more cross-disciplinary approach, often with students working together in groups. The goal is to develop the ability to problem solve in a collaborative environment.

But in general, systems of education are not changing fast enough. Employers are increasingly dissatisfied with the workforce readiness of new employees, with 40% reporting difficulty finding people with the communication, critical thinking, and collaborative skills needed in the modern workplace.⁷

Education in many parts of the world must therefore be reoriented. Formal education will continue to provide an important foundation for young people, but it will need to start earlier and be supplemented with continuing flexible and modular learning opportunities throughout people's working life. Education leaders will also need to leverage new technology and learning methods to ensure that students are equipped with the skills and capabilities needed to succeed.

PROMOTING COMPETITIVENESS AND DEVELOPMENT

Government strategies to ensure industrial competitiveness and development must also evolve. In developed countries, this means supporting and actively incentivizing the adoption of technology by industry. While technology adoption may exacerbate labor market challenges in the near term, it is critical for the health of industry over the long term.

Germany has been a leader in this area, with the Federal Ministry for Economic Affairs and Energy and the Federal Ministry

of Education and Research creating a coordinating body that brings together stakeholders to discuss the long-term strategy for Industry 4.0. The government is also funding Mittelstand 4.0 centers of excellence, which provide small and medium-size enterprises with information and training related to new manufacturing technologies. For its part, the Italian government launched an initiative in 2016 to stimulate industry investments in new technology, including tax incentives such as rapid depreciation schedules, increased tax credits, and deductions for investments in startups. And in Singapore, the government has adopted a comprehensive strategy to advance new manufacturing technology, including a program to support robotics R&D and adoption.

In concert with strategies such as these, governments must rethink their regulatory role. That should include determining how regulations might need to change in order to allow new digital business models to flourish. In addition, as new technologies and business models remake industry, smart regulation will be needed to create the necessary safeguards for workers and citizens without discouraging innovation. In developing countries specifically, government leaders must craft economic development strategies that do not rely on low labor costs to attract manufacturers.

Policy approaches should also be tailored to a country's specific advantages and opportunities. This requires assessing the dynamics of demand—for example, whether domestic consumption or foreign markets are the primary driver of demand for products and services—and supply issues, including the nature of the country's labor force. With an understanding of those factors, governments can determine where investment and support will help drive economic development.

Poland, for example, has prime advantages in its proximity to Western Europe and its relatively low costs, advantages it has leveraged to attract manufacturing. And Indonesia has a young and growing population, an emerging middle class, and a relatively im-

mature technology landscape—factors that could spark a boom in technology startups if the government addresses obstacles such as the country’s less than friendly regulatory environment. The rise of digital entrepreneurship in Indonesia could allow the country to make huge strides in development, moving well beyond its current base in low-value-added manufacturing.

Two of the world’s largest economies are recognizing the need to rethink their economic development strategies. China has outlined a plan that aims to modernize the country’s manufacturing with advanced technologies such as robotics, 3-D printing, cloud computing, and big data. All told, the government has committed \$150 billion to its Made in China 2025 effort. The goal is not only to support high-value-added manufacturing—medical devices and information technology, for example—but also to use technology to improve the competitiveness of low-value-added manufacturing.

The government of India, meanwhile, has taken a hard look at issues related to job creation. This is critical in a nation with the largest number of young people in the world. If these workers do not find satisfactory employment, India could be headed for a demographic disaster. So far, the country has generated only two-thirds as many jobs per unit of economic growth as the global average.

To understand why—and to figure out how to change India’s overall economic ecosystem and improve its ability to generate good jobs—the government sponsored an in-depth assessment of such factors as government policy, access to finance, and mechanisms for supporting lifelong learning. It then looked at how various initiatives that adjusted these factors would improve India’s ability to create jobs. This kind of scenario analysis can provide a foundation for prioritizing programs intended to improve job creation.

The Need for Bold Thinking

There are undoubtedly some encouraging signs of public-sector innovation when it

comes to confronting the challenges posed by technological disruption. But a greater willingness to go further is needed—to consider completely novel and even radical approaches.

Consider the concept of a universal basic income (UBI). In Finland, an unconditional payment to citizens regardless of their work status is being tested in a two-year pilot. Originally conceived as a way to avoid penalizing unemployed people who accept part-time work, it is now being examined as a possible way to manage job losses stemming from automation. Similar pilots are underway in Canada, Brazil, the Netherlands, and sub-Saharan Africa.

There is significant resistance to this concept, however. Voters in Switzerland rejected a UBI proposal in June of 2016, reflecting quite reasonable concerns that it would seriously erode productivity. But what if the UBI were directed toward funding education and training for every citizen? Using a nation’s wealth to support and enhance worker training in a way that helps people earn a decent living could be an effective strategy.

Novel approaches to a government’s vast and often underutilized assets should also be considered. This does not necessarily mean privatization (although in some cases that may make sense). Rather, governments should make a full accounting of the assets that they own and control—from infrastructure to utilities to valuable data—and determine whether better management of those assets could yield increased revenues. Such funds could be used for critical investments in education and workforce retraining.

Finally, governments need to draw on ideas from outside the public sector, where some of the most forward-looking thinking is taking place. For example, the World Economic Forum has launched an effort to study the shifting dynamics in work and education. And Teach For All—along with a network of education-focused organizations that includes the Asia Society, the Brookings Institute, the Qatar Foundation, and

Results for Development—is leading roundtable discussions with more than 100 global education stakeholders on how the world’s education ecosystem needs to evolve. Drawing on such thinking can help shape new, more effective government strategies.

CERTAINLY THERE ARE no simple solutions to the significant challenges governments face in adapting to disruptive changes in the labor market. But what clearly will not work are old approaches or incremental change. Experimentation and fresh thinking are required. This must include a fundamental rethinking of how government is structured to encourage collaboration across departments, eliminate silos, and create an agile organization. Ultimately, the strategies that prove successful will be those that are focused on the individual. Training will need to be worker centered,

education will need to be learner centered, and government services will need to be citizen centric. Only then will people be able to chart their own course in life and work.

NOTES

1. The World Bank, *World Development Report 2016: Digital Dividends*, May 2016.
2. “The Countries Most (and Least) Likely to be Affected by Automation,” *Harvard Business Review*, April 12, 2017.
3. Figures adjusted for inflation and other costs and for productivity-enhancing measures.
4. Executive Office of the President, “Artificial Intelligence, Automation, and the Economy,” December 2016.
5. Institute for the Future and Dell Technologies, “The Next Era of Human-Machine Partnerships,” 2017.
6. World Economic Forum, “The Future of Jobs Report 2016.”
7. Manpower Group, “2015 Talent Shortage Survey.”

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