

ADAPTING JOBS POLICIES AND PROGRAMS IN THE FACE OF ACCELERATED TECHNOLOGICAL CHANGE

KEY MESSAGES

- Rapidly changing technologies are disrupting labor markets, posing significant risks to those with insufficient and inadequate skills.
- Improving access to digital infrastructure and affordable broadband will enable people to find jobs, innovate, and compete.
- Developing countries with high informal employment need policies to increase worker productivity and skills. Increasing dialogue and collaboration to match labor skills with those demanded by employers will help workers adapt.
- Ineffective labor regulations raise labor costs, while current social protection models leave too many of the most vulnerable behind.
- The World Bank Group (WBG) is investing widely in human capital to increase labor skills, while promoting reforms to increase digital access and social assistance, including for informal workers.
- Expanding this agenda requires more research and data on labor market functioning, human capital, and the specific policies and regulations needed to help countries and workers adapt to technological changes.

This Jobs Solutions Note identifies approaches for practitioners and policymakers to proactively adapt policies and development programs to accelerated technological change. Based on curated knowledge and emerging evidence for a specific topic and relevant to jobs, the Jobs Solutions Notes are not intended to be exhaustive; they provide key lessons, solutions and approaches synthesized from the experiences of the World Bank Group and partners. This Note draws from [World Development Report 2019: The Changing Nature of Work](#) and [Protecting All: Risk-Sharing for a Diverse and Diversifying World of Work](#).

MOTIVATION: WHAT IS THE PROBLEM?

People fear the advent of a jobless economy.

“They’re always polite, they always upsell, they never take a vacation, they never show up late, there’s never a slip-and-fall, or an age, sex or race discrimination case,” Andrew Puzder, chief executive of Hardee’s restaurant chain with headquarters in Tennessee, says of swapping employees for [machines](#).¹ Such statements give workers good reason to fear the advent of a jobless economy: tasks traditionally performed by humans are increasingly performed using robots and artificial intelligence. Indeed, the number of robots operating worldwide

is rising rapidly: by 2020, there will be [3 million new industrial robots](#) in operation, more than doubling the operational stock over the seven years spanning 2014–2020.²

The fast pace of change exacerbates job insecurity.

The declining cost of machines threatens low-skill jobs in routine tasks—occupations most susceptible to [automation](#) and [offshoring](#).³ Automation also threatens some relatively complex jobs, such as assessing legal documents. Decline in industrial employment in many high-income economies over the past two decades is well known. The United States, Singapore, and Spain are among



Photo credit: John Hogg / World Bank

countries where the share of industrial employment dropped 10 percent or more since 1991. Foxconn Technology Group, the world's largest electronics assembler based in Taiwan, cut its workforce by 30 percent when it adopted robots for production; [workers decreased](#) from 1.3 million in 2012 to 873,467 by the end of 2016.⁴

Meanwhile, technological progress also provides opportunities. Digital technology improves aggregate efficiency by reducing or eliminating “frictions” and intermediation costs between economic actors. It decreases transaction costs, including in remote markets lacking transport infrastructure. Firms that embrace technology grow and can compete better in global markets. More importantly, digital platforms reshape labor demand, directly or indirectly, and create jobs.

How governments prepare, shape policies, and intervene will largely determine how technological change affects jobs. In approaching this challenge, some features of the current wave of technological progress are especially salient: (a) disruption of the production process, (b) changing demand for skills, and (c) terms of work.

- **Technology is disrupting production processes.** Technology decreases the costs of doing business, complementing investments in infrastructure, free trade agreements, and other liberalization efforts

to reduce trade barriers, which expands [global value chains](#)⁵ and changes the [geography of jobs](#).⁶ New business models—[digital platform firms](#)—can evolve rapidly from local start-ups to global behemoths, often with few employees and tangible assets.⁷ Digital platforms can enable clusters of businesses to form in underdeveloped rural areas. Online work platforms eliminate many geographical barriers previously associated with certain types of work and tasks. Bangladesh contributes 15 percent to the global labor pool online through 650,000 freelance workers. [IndieZ](#), founded in 2016 in India, brings a remote, distributed community of talent—mainly from India, Southeast Asia, and Eastern Europe—to work in teams remotely on tech projects for clients anywhere.

- **Technology is reshaping work skills, implying adjustment costs for workers.** While returns to routine, job-specific skills are declining, the premium for skills that cannot be replaced by robots is increasing; these include cognitive skills such as critical thinking, as well as socio-behavioral skills such as managing and recognizing emotions that enhance teamwork. Earnings are higher for those having a combination of skills as opposed to just one skill. The evolving world of work demands adaptable skills that enable workers to transfer them more easily from one task to another. Since 2001, the share of employment in occupations intensive in non-routine cognitive and socio-behavioral skills has increased from 19 to 23 percent in emerging economies, and from 33 to 41 percent in advanced economies.
- **Digital technology is changing the terms of work.** Rather than “standard” long-term contracts, digital technologies are giving rise to more short-term work, often via online work platforms. These “gigs” make certain kinds of work more accessible and flexible. That said, despite the hype, the gig economy is slow to take over traditional occupations. The largest three global gig platforms—[Freelancer](#) of Australia, [Upwork](#) in the United States and [Zhubajie](#) in China—have 60 million total users; only 0.3–0.5 percent of the active labor force participate in the gig economy globally.⁸ The majority of workers regard gig work as a supplement to more stable income. Data show that about 10 percent of registered users on global freelancing platforms are active and that this figure is growing fast. Most of these workers concentrate

in a few countries: India, Bangladesh, Pakistan, United States, Philippines, and the United Kingdom.

Persistent informality continues to pose the greatest challenge for emerging economies.

Informality has remained remarkably high across regions over the past two decades in spite of improvements in business regulatory environments and the changing nature of work. About two-thirds of the labor force in emerging economies is informal with no social protection and little access to technology. Women make up a disproportionate percentage of workers in the informal sector. In South Asia, [over 80 per cent of women in non-agricultural jobs are in informal employment](#); in sub-Saharan Africa, 74 per cent; and in Latin America and the Caribbean, 54 per cent.⁹ While platforms make certain kinds of work more accessible and flexible, they also raise concerns about income instability and lack of social insurance. This means that many digital economy jobs facilitated and created may increase the large share of informal workers in developing countries without social protection.

Technology access is necessary for people and businesses in the digital era, but developing countries lag.

Evidence on automation suggests that these [technologies have contributed to higher productivity](#) and larger scale production.¹⁰ Yet, although cities and towns may have online access, rural or remote communities—where four-fifths of the poor live¹¹—are [drastically underserved](#). Mobile phone access alone is also not enough; broadband technologies push down transaction costs even further in remote markets that lack transport infrastructure. Regulatory and market failures often hinder provision of affordable and reliable internet and broadband access to these areas.

Innovation will continue to accelerate, but developing countries will need to take rapid action to compete in the economy of the future.

Technological progress—even that involving labor-saving technologies—provides opportunities to create new jobs, increase productivity, and deliver public services. To harness the benefits of technology and make the most of these opportunities, governments need to invest in people, while adopting policies that alleviate disruptions. The most significant investments people, firms, and governments can make are those that enhance human capital. Digital technology

also reinforces the need for developing countries to rethink social protection and labor regulations. Here too technology can help by expanding options for government service delivery, while improving citizens' ability of to hold governments accountable.

WHAT ARE WE DOING?

World Bank Portfolio

Human Capital

The World Bank (WB) is committed to improving human capital outcomes at all stages of the human development cycle.

For children, the WB helps provide nutrition, early childhood education, and social insurance. For adults, it helps workers participate in labor markets through skills development, expanding social insurance, and investing in digital infrastructure and services. This is achieved through lending, analytical work, and partnerships with donors and the private sector.

World Bank human capital projects are often multi-sectoral.

For example, [The Marshall Islands—Multisectoral Early Childhood Development Project](#) includes three components to address a range of challenges: (a) the early childhood education component aims to improve children's cognitive and socio-emotional development to prepare them for on-time transition to primary school, (b) the nutrition component aims to decrease infant mortality through facility-based care for pregnant women and newborns, and (c) the social insurance component provides cash transfers to families with young children (age 0–59 months) in selected areas to modify care practices and promote uptake of best practices in early childhood development.

Governments have a vital role to play in building human capital.

Governments should provide health, education, and financing, and regulate accreditation and quality control of private providers. Yet governments often fail to deliver. Good measurement of education and health outcomes raises human capital locally, nationally, and globally, and is essential for research and analysis to inform policies to improve human capital. With this goal in mind, in 2018 the World Bank launched the [Human Capital Project](#) (HCP) to raise awareness and increase interventions to build

human capital. A program of advocacy, measurement, and analytical work, the HCP has three components: (a) a cross-country metric—the Human Capital Index (HCI), (b) a measurement and research program to inform policies, and (c) a program to support country strategies to accelerate investment in human capital.

The [Human Capital Index](#) quantifies the contribution of health and education to the productivity of the next generation of workers.

Countries can use the HCI to assess how much income they forego because of human capital gaps, and how much faster they can turn reverse these losses. Globally, the HCI finds that nearly 60 percent of children born today will, at best, be half as productive as they could be with complete education and full health. The medium-term program of data and analytical work aims to improve measurement of a wide range of human capital outcomes, better understand human capital formation, and link it to country policies. The World Bank Group (WBG) supports governments, together with development partners, to identify national human capital priorities and implement policies to address barriers. As of June 2019, 63 countries had joined the HCP—nearly a third of WBG members.

World Bank investments reflect the changing nature of skills employers need with the rapid onset of automation and access to digital infrastructure. The World Bank portfolio addressing skills and technical and vocational education and training (TVET) comprises 114 projects valued at US\$13 billion, in the following sectors: Tertiary Education sector, Workforce Development and Vocational Education, and Adult and Continuing

Education. The new generation of skills projects address market demand for skills, with curriculum designed in consultation with employers to facilitate smooth transition of trainees to employment. The [Niger Skills Development for Growth Project](#), for instance, provided employer approved training in agribusiness and entrepreneurship, as well as start-up funds to young graduates.

Technology Access

The World Bank’s recently established Digital Development Global Practice (GP) underscores the importance of digital infrastructure and networks. The GP provides knowledge and finance to help countries participate in the digital revolution. World Bank lending operations in the ICT Infrastructure and Services sector totals 179 projects valued at US\$20 billion.¹² These include projects to increase geographic reach of broadband, reduce communication service costs, and develop e-government solutions. For example, [The West Africa Regional Communications Infrastructure Project](#) in the Islamic Republic of Mauritania and the Republic of Togo increased access to telephone services from 72 to 87.4 phones per 100 people in two years. Digital development projects also address sector specific problems. For example, the [e-Gabon Project](#) supports the National Health Information Service (NHIS) in Gabon to transmit health information electronically, thus reducing administrative burdens and medical errors.

The WBG supports developing countries through financing and technical assistance to expand digital access and incorporate digital technology into government services. For example, in Niger’s

BOX 1. CODING BOOTCAMPS FOR WOMEN’S DIGITAL EMPLOYMENT

Rapidly expanding global connectivity and cloud-based technologies have opened new digital employment opportunities. This has enormous potential to allow women to work from home on flexible schedules, thereby overcoming employment constraints related to child and family care, mobility, and legal, regulatory, and social restrictions.

This activity focuses on delivering coding “bootcamps” training for women in Nairobi [Kenya] Medellín [Colombia], and Peshawar [Pakistan]. Program design took into account specific women’s needs and constraints, including “wrap-around” services such as fostering business networks to increase and sustain women’s participation in the technology sector. The program’s methodology will be revised as needed, including adjusting content. In addition, randomized control trials [RCTs] in Medellín and Nairobi will test youth employment and wage outcomes compared to women-centered coding bootcamps.

[Smart Villages program](#) the WB supports digitizing payments for people living in rural areas, including farmers and civil servants. The [Uganda Digital Acceleration Program](#) aims to improve access to high-speed internet, increase efficiency of digital government services, and strengthen the enabling environment for digital technology adoption. [The E-Society and Innovation for Competitiveness Project](#) in Armenia addressed constraints to competitive e-Society and enterprise innovation. The program enhanced penetration of digitization in businesses, grew the technology-enabled services sector, and created 12,685 jobs.

At the current incremental pace of economic and social advancement, too many of Africa's expanding youth population will fall short of their potential. Digital technologies can disrupt this trajectory by unlocking new paths for rapid economic growth, innovation, job creation, and access to services that would have been unimaginable a decade ago. Several WB initiatives deepen the benefits of digital technologies and overcome the risks of digital exclusion. [The Digital Economy for Africa \(DE4A\) Moonshot](#), for example, aims to digitally connect every individual, business, and government in Africa by 2030. Goals include improving digital infrastructure, equipping the workforce with digital skills, expanding the use of digital platforms, increasing access to digital financial services, and encouraging digital entrepreneurship.

The Jobs Multi-Donor Trust Fund (MDTF) also finances projects related to leveraging new technologies. For example, the [Digital Jobs for Khyber Pakhtunkhwa](#) (Box 2) project aims to create digital

economy jobs, especially for Pakistani youth. The [Malawi Resilient Productive Landscapes](#) project aims to increase resilience-enhancing landscape management in watersheds and strengthen water management capacity. [The Agricultural Productivity Program for Southern Africa in Angola and Lesotho](#) aims to increase availability of improved agricultural technologies in the South African Development Community. [The Climate Resilient Agriculture and Productivity Enhancement](#) project in Chad supports institutions to improve sustainable agriculture and climate resilience by strengthening institutional capacities for research and development and climate adaptation.

World Bank Analytical Work

Recent key World Bank studies focus on how technology advances are changing work in developing countries. It is critical that workers prepare to embrace technology, digital literacy, and connectedness. This challenge is most acute in developing countries. [The World Development Report \(WDR\) 2019: The Changing Nature of Work](#) emphasizes the need for a new social contract to protect workers, address high informality, harness technology, and prepare countries for the future. The recently published WB [Protecting All: Risk Sharing for a Diverse and Diversifying World of Work](#) analyzes these issues in more detail.

The IDA 19 paper on Jobs and Economic Transformation identified digital economy as one of the emerging priority areas for creation of more and better jobs. Core investment in digital infrastructure and platforms is a powerful jobs stimulus and facilitates labor market inclusion,

BOX 2. DIGITAL JOBS FOR KHYBER PAKHTUNKHWA (KP)

Khyber Pakhtunkhwa province in Pakistan has a population of 20 million. A significant youth “bulge” persists with roughly half the population being under age 30. The province is emerging as a nascent digital economy with rapidly expanding mobile and internet connections presenting a unique opportunity to accelerate development through faster growth, more jobs, and better services.

Building on the Jobs MDTF Digital Jobs Pilot, the project aims to promote inclusion of women and youth in the digital economy. The project will leverage Pakistan's growing role in the global Business Process Outsourcing (BPO) industry to create jobs through BPO-ready spaces. It will also promote digital entrepreneurship and freelancing through an online platform to match jobs with trained youth. The project will also expand a network of publicly available, gender-inclusive co-working spaces to promote women's inclusion in the digital economy.

especially for youth. It is also an enabling sector that supports wider economic growth and indirect job creation. Two of the nine policy commitments in IDA 19 relate to digital jobs: (a) 30 percent broadband penetration in at least 20 IDA countries by 2023, and (b) 50 percent of entrepreneurship projects with digital financial services and/or digital entrepreneurship element. Client countries also understand the importance of digital economy as reflected by its inclusion in upcoming Country Partnership Frameworks (CPFs). The [Benin CPF](#) for FY 2019–23 states that digital economy could be transformative given its strategic location within West Africa and access to existing submarine cable networks. Improved digital access can increase crop yields and sales volumes, and reduce post-harvest losses. Similarly, the [Armenia CPF](#) for FY 19–23 states that the government aims to improve farm productivity and strengthen resilience to climate and market risks through use of digital platforms.

Several Jobs MDTF-financed activities have also focused on advancing knowledge on the impacts of technologies on labor markets and potential policy interventions. [Robots, Tasks and Trade](#) explores the effects of robotization on trade patterns and wages. The study finds that robotization makes firms more competitive in rich economies, which in turn increases demand for products from developing economies. [Does Automation in Rich Countries Hurt Developing Ones? Evidence from the U.S. and Mexico](#) finds that although increased use of robots in the United States decreased Mexican exports to the U.S., it does not find effects on labor markets. [From Ghana to America: The Skill Content of Jobs and Economic Development](#) measures the skill content of jobs in developing economies. It finds that developing countries have more jobs intensive in skills facing automation risks—such as routine manual work—while developed countries have jobs more intensive on skills that benefit from greater technology, such as non-routine cognitive skills.

The Jobs Group has also undertaken analytical work in the digital economy. The [Solutions for Youth Employment Partnership \(S4YE\)](#) recent report [Digital Jobs for Youth](#) identifies main challenges for employment programs through 19 case studies, and proposes strategies to mitigate them such as scoping the job market relevance of skills, partnering



Photo credit: Peter Kapuscinski / World Bank

with government agencies to improve credibility, and better targeting the programs for women (providing childcare and meal stipends, among other things).

WHAT WORKS?

The future of work is hard to predict: The [WDR 2019](#) documents the wild variations in predictions for automation. Illustrations below of what works are based on the best evidence we have, understanding that new ideas and better solutions may emerge. Thus, the forward-looking nature of this topic merits viewing the examples below with some caveats given the forces of change in motion.

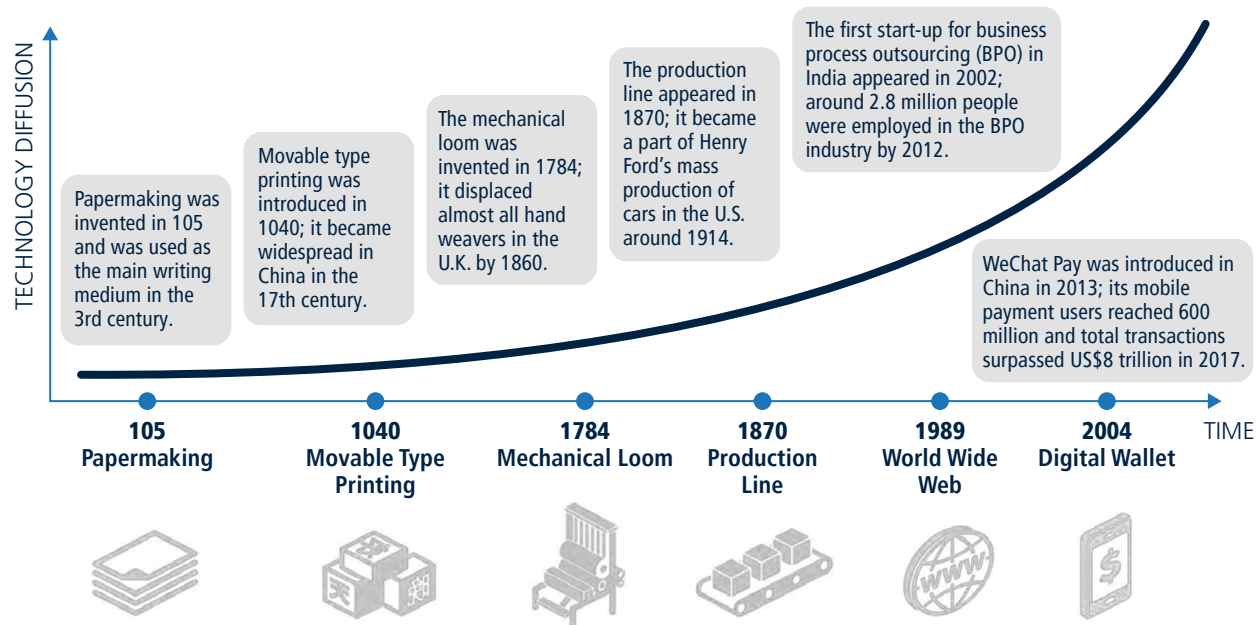
Adapting to the changing nature of work requires investments and reforms in critical areas:

- Lifelong learning to build and maintain human capital as conditions change.
- Social protection to protect people no matter how they work or on what terms.
- Labor markets flexibility to encourage worker skills acquisition and reduce ineffective and burdensome labor costs to firms.
- Bridge gender gaps by providing women with the same opportunities to acquire skills and access technology and finance, while removing gender-specific legal barriers.

1. Invest in lifelong learning alongside formal schooling

In the digital era, technology advances demand rapid uptake of new skills. In the past, shifts in skill

Figure 1
The increasing rate of technology diffusion



Source: 2019 WDR

requirements took centuries to manifest (Figure 1). Today, labor markets value the ability to quickly adapt to changes. Demand for advanced [cognitive](#)¹³ and [socio-emotional skills](#)¹⁴ are increasing across low to high-income countries, while [demand for narrow job-specific skills is waning](#). Yet, technological change makes it hard to anticipate which job-specific skills will thrive and which will become obsolete. Strong skill-foundations are important for developing in-demand skills and adaptability. However, schools in many low and middle-income countries are failing to teach [foundational skills](#). Important skills re-adjustments happen increasingly outside compulsory education and formal jobs through early childhood, tertiary education, on-the-job learning, and adult learning outside the workplace.

1.1. Invest in learning in early childhood. The most effective way to acquire skills demanded by the [changing nature of work](#) is to start early. Early investments in nutrition, health, social protection, and education lay strong foundations for acquisition of cognitive and socio-behavioral skills. They also make future skills acquisition more resilient to uncertainty. Returns to early investments are the highest of those made over the lifespan: a dollar invested in quality early childhood programs yielded a return of US\$6–\$17

in [Sierra Leone](#).¹⁵ In [Jamaica](#), early childhood stimulation for infants and toddlers increased their future earnings by 25 percent—equivalent to that of adults raised in wealthier households.¹⁶ In [Guatemala](#), an early childhood development nutrition program for poor families significantly increased wages for these children in adulthood.¹⁷ By contrast, poor early childhood development programs are associated with disappointing results in children's language development, cognitive skills, and sociability. A study of preschools in a [Nairobi](#) slum shows that, despite high participation rates, the curriculum and pedagogical approach were not age-appropriate; three to six-year-olds were forced to follow inappropriate academic oriented instruction and even sit for exams.¹⁸

Despite their efficiency in producing important skills, early childhood investments are underprovided. Some 250 million children under age 5 are at risk of not reaching their developmental potential in low and middle-income countries despite availability of effective early childhood development solutions. Cash transfers to support early childhood development for poor children have succeeded in various contexts. Such programs reduced stunting in [Mexico](#), fostered language development in [Ecuador](#), and improved



Photo credit: Khasar Sandag / World Bank

children's socioemotional skills in [Niger](#).¹⁹ Integrated approaches that combine health, nutrition, and learning stimulation investments can be highly effective. Chile's **Crece Contigo** program integrates health, education, welfare and protection services—a child's first contact with the system occurs while still in the womb.²⁰ Community-based playgroups have also generated sustained outcomes at low cost. In [Tonga](#), playgroups significantly improved children's early grade reading skills.²¹

1.2 Establish lifelong tertiary education.

Integrated, technology-driven economies increasingly value tertiary education, defined as any education beyond high school, including trade schools and college. As technology increases demand for lifelong learning, tertiary education with a wide array of course offerings and flexible delivery models, from general to vocational, can meet this growing demand. One path to flexibility is through "bridging" arrangements, such as those the Democratic Republic of Congo (DRC) and Tanzania have piloted, allowing vocational students to continue studies at universities. Tertiary education systems should deliver a minimum of transferable, high-order cognitive skills, the best inoculation against job uncertainty. Incorporating more general education in tertiary programs and innovating on pedagogy are effective. For example, an additional year of general education added in 2012 to undergraduate programs in Hong Kong focused on problem-solving and critical thinking. The Faculty of Architecture and Environmental Design at the College of Science and Technology, University of [Rwanda](#) promoted strategies that include open-ended assessment, feedback opportunities, and

a progressive curriculum balancing academics with student support. The approaches improved students' critical thinking skills.²²

1.3 Increase support for on-the-job learning for informal workers.

Most people work in the informal sector in developing countries, often starting at a very young age with limited formal education; learning on-the-job in the informal sector is crucial. The WBG is increasing support to informal apprenticeship systems and other training opportunities. In [Senegal](#), for example, a new WBG US\$53 million project aims to strengthen the apprenticeship system and improve youth employability in selected trades through providing capital grants to upgrade technology for informal workshops; strengthening the pedagogical and technical skills of master craftspersons or companions; strengthening the literacy, socio-emotional, and business skills of apprentices; and providing financial assistance to enable youth entrepreneurship. The WBG is expanding similar initiatives in Africa, Latin America, and South Asia. In South Africa, the WBG is partnering with the Youth Employment Service (**YES**), a local public-private partnership, to support small and medium enterprises, which have many informal workers, to provide on-the-job training to vulnerable youth through one-year internships.

1.4 Make adult learning programs more effective.

Workers are caught in the crosshairs of ongoing disruptions in demand for skills. As economies adjust, adult learning can supply people not in schools or jobs with new or updated skills. However, many programs are not effective due to designs that do not reflect biological, emotional, or socioeconomic conditions of adult learners. Adult learning can be improved in three ways: (a) better evaluate the specific constraints adults face, (b) customize pedagogies for the adult brain, and (c) create flexible delivery models compatible with adult lifestyles.

- a. **Better evaluation.** Data collection before program design can identify constraints for the target population. For example, administrative data under India's massive [National Rural Employment Guarantee Act program](#) offers powerful insights about local labor markets.
- b. **Customize pedagogies for adults.** There is tremendous scope to tailor programs for adults using insights from neuroscience and behavioral

economics. Motivational tools such as financial rewards, work experience, or frequent feedback can boost adult learning. Incorporating socio-emotional skills in training design has also shown promise. In [Togo](#), teaching informal business owners “personal initiative”—a mindset of self-starting behavior, innovation, and goal-setting—boosted firms’ profits by 30 percent two years after the program, which was much more effective than traditional business training.²³

- c. **Flexible delivery models.** Adult learning programs need to be flexible so adults can learn at their convenience. In a voucher program for vocational training in [Kenya](#), nearly 50 percent of women cited proximity to a training center as a determining factor.²⁴ Given competing demands on adults’ time, training programs with short-modules and delivered through mobile applications are promising. Delivering training programs via mobile phones can also shield adult learners from stigmatization. Moreover, studies show that adult learning programs are more successful when linked to employment opportunities, such as apprenticeships or internships. In [Colombia’s Jóvenes en Acción](#) (Youth in Action) program, which combines classroom instruction with on-the-job training at private companies, formal employment and earnings rose in the short term and has been sustained in the long run.²⁵

2. Expand social protection beyond the formal sector

The changing nature of work and uncertain labor markets call for strengthened social protection. Most social protection systems in rich countries are based on mandatory contributions and payroll (labor) taxes on formal wages. The changing nature of work, including diverse and fluid forms of employment—that is, the “gig” economy and part-time work—challenges this model. While these arrangements have served many countries well, the model remains mostly aspirational in developing countries due to persistently high informality, and it has seldomly been adopted at scale. As a result, in the poorest quintile of countries, only 18 percent of people are covered by social assistance and 2 percent by social insurance.²⁶ Given the endemic nature of informality, which accounts for around 80 percent of work in



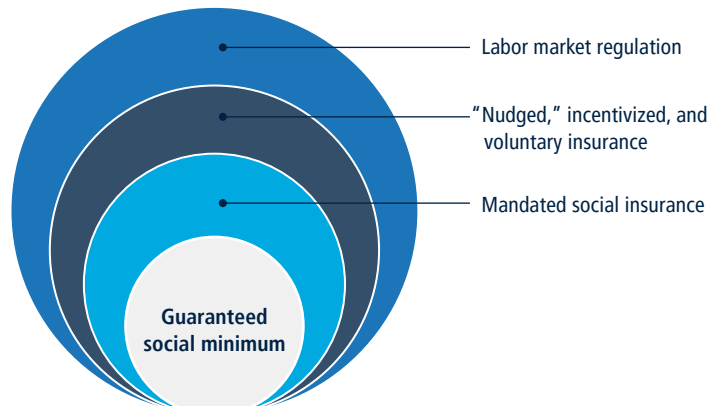
Photo credit: Simone D. McCourtie / World Bank

developing countries, most people would be better-off with a social protection system that does not depend on formal employment. Three main components of social protection systems can help manage labor market challenges: (a) a guaranteed social minimum (with social assistance at its core), (b) social insurance, and (c) improved labor market regulation (Figure 2).

2.1 Establish a social minimum. Expanding social assistance will help manage labor market risks and increase support, irrespective of how a person works. Social assistance works on many levels. Cash transfer recipients spend on items such as food, health care, education, and other goods associated with improvements in human capital. A [systematic review of 56 cash transfer programs](#) found significant advances in school enrollment, test scores, cognitive development, food security, and use of health facilities.²⁷ In Mexico, the **Prospera** conditional cash transfer program improved motor skills, cognitive development, and receptive language of children from age 24 to 68 months. In [Kenya](#), secondary school enrollment increased by seven percent for children in the Orphans and Vulnerable Children program. Gains are usually largest for the poorest, rural dwellers, girls, and ethnic minorities. Cash transfers reduce stress and depression, increase mental bandwidth, and foster more involved parenting. Social assistance programs increasingly reinforce livelihood effects by raising awareness on nutritional risks, fostering financial inclusion, training entrepreneurs, and providing asset transfers (See Box 3).

Figure 2

Social protection and regulation can help manage labor market challenges and changing nature of work



Source: 2019 WDR

BOX 3. SUPPORTING EXPANSION OF SAFETY NETS TO HELP INFORMAL WORKERS MANAGE RISKS

The [Egypt Strengthening Social Safety Project \(ESSSP\)](#) Takaful and Karama cash transfer program has reached 2.26 million households and 9.46 million individuals, and is now being expanded to cover 3 million households, or about 12.6 million people, with proposed [additional financing \(AF\)](#). The program has reduced poverty among beneficiaries by 12 percentage points. Karama supports poor families with elderly and disabled people, while Takaful supports poor families with children and is conditional on households' health and education investments. Takaful covers poor families with adult members who are able to work but are either not working or working informally. In response to concerns about dependency on cash transfers and lack of economic inclusion, the World Bank will also support pilot interventions under the proposed AF to improve access to and quality of employment among Takaful beneficiaries, focusing on youth and women.

2.2 Enhance social insurance. Social assistance could include more informal sector workers (Box 4). In Bangladesh, India, Indonesia, Nigeria, and Pakistan—together making up about one-third of the world's population—coverage of social insurance languishes in the single digits, with virtually no increase over recent decades. A reformed system must help low-income workers access risk management tools. A comprehensive [package of protection](#) would contain:

- Guaranteed minimum insurance with subsidized coverage against impoverishing losses, to complement social assistance by covering losses too large to address through transfers.
- A mandated savings and insurance plan to “smooth” consumption. Initially, the mandate can apply only to formal workers to attract greater compliance. Market-based “nudges” or purely

voluntary savings would allow people to contribute more, if desired.²⁸

2.3 Strengthening labor market programs to raise productivity and earnings, especially in the informal sector. The WBG is helping address constraints inhibiting informal workers from accessing better jobs or enhancing productivity. Many labor market programs have shown mixed results. To improve future programs, studies and evaluations have tried to understand why some programs are successful and others are not. Evidence shows that “productive inclusion” programs for poor and vulnerable youth have mixed effects. Certain interventions, such as wage subsidies, have been more effective in peri-urban contexts with large industrial parks, while safety net programs, including transfer of assets such as livestock, are more

BOX 4. SOME COUNTRIES ARE ALREADY IMPROVING SOCIAL PROTECTION

China is significantly extended its rural pension scheme. Currently, about 360 million rural and urban informal workers contribute to the scheme, and about 150 million older people are receiving payments.

Similarly, the Government of Costa Rica covers part of pension contribution for the self-employed.

Thailand does the same for informal workers who choose to join a special pension scheme. Subsidies could be offered to everyone or just to the poor, or they could be gradually reduced as income grows. In addition to providing an almost universal old-age pension, Thailand pays part of the social insurance premium for working-age people in the informal sector.

Building on recent extension of pension coverage to the informal sector in Benin, the [Disruptive Technologies for Development \[DT4D\]](#) Secretariat of the WBG has provided additional funding to develop a regional, flexible, digital-pension benefits platform to enhance social protection for precarious, informal workers. As opposed to savings tied to standard employment contracts, participants in the scheme can contribute to their pension through individual accounts using mobile money.

successful in rural areas. Interventions facilitating transition out of very low-productivity activities are among the most difficult, and often require traditional labor measures, such as training and subsidies, combined with demand-side interventions. The World Bank [Kenya Youth Employment and Opportunities Project](#) (KYEOP) addresses multiple constraints to employment, including interventions to improve skills, foster productivity of informal workers, and support self-employment using methods such as competitions to identify promising job-creation initiatives.

Increasingly, safety nets are combined with programs and policies to increase informal worker productivity. The WBG engagement in Ethiopia is a case in point. Building on the success of the [Ethiopia Urban Productive Safety Net Project](#), the WBG is discussing an Urban Safety Nets and Jobs Project to expand and solidify gains to urban safety nets, but also to increase support to improve youth economic opportunities. The program increases access to wage internships, mentoring, and coaching to support transition out of informal employment or into more productive informal employment. In addition, the new project will harness digital technologies to improve job search, including in the informal sector.

2.4 Make labor regulation more flexible to facilitate job changes. The [International Labor Organization](#) (ILO) core labor standards represent vital bulwarks to safeguard hard-won advances in human well-being. However, burdensome regulations

should also be reconsidered especially when they raise labor costs. Reducing labor costs by reforming expensive and ineffective labor regulations also [reduce incentives to substitute workers](#) with robots.²⁹ Lower labor costs help firms adapt to the changing nature of work, while encouraging greater formal employment, especially for new entrants into the labor market and low-skill workers. A proper balance between labor market flexibility and adequate protections is needed. Complementary support for learning new skills, as well as new arrangements for strengthening the voice of workers, remain important.

2.5 Enhanced social assistance and insurance can reduce the need for labor regulations. Some regulations in place to manage job market risks burden firms, for example, severance pay obligations. As people have better protection through enhanced social assistance and insurance systems, labor regulation could, where appropriate, be more flexible. For example, unemployment benefits could supplant severance pay. The WBG is working with several governments on labor market reforms. In Indonesia, the government is considering improving worker protection to reduce the formal-informal divide, while lowering labor costs to incentivize formal job creation. Recommendations focus on revising rigid [labor regulations](#) with policies that balance between worker protections and business flexibility. For example, the proposal includes overhauling the expensive severance pay system in favor of an unemployment benefit program open to informal workers. Proposed reforms

also include shifting burden for paid maternity leave from employers to the social security system.

3. Bridge Gender Gaps

3.1 Level the playing field by enabling women to benefit from technological change through better access to technology, skill acquisition, and financing. Women's access to digital technologies remain low. The internet access gender gap in developing countries is about 25 percent. Women in low and middle-income countries are, on average, 10 percent less likely to own a mobile phone than men. Labor market success and technological adaptability depends on whether women have the right education and skill development before entering the labor market. Education is not just important for labor market outcomes but for [agency](#) as well, which includes control over resources, condoning wife beating, and child marriage.³⁰ Prioritizing capacity building through investments in lifelong learning is important, especially for women in places where education levels are low. Improving access to technology and skill acquisition for women is also necessary for them to attain less automatable jobs.

3.2 Legal frameworks and informal institutions shape whether women transition to high-skilled jobs that complement automated systems. Discriminatory laws and provision of care services will determine whether women face additional barriers to enter the labor market or transition into better jobs, and also whether they are able to balance family and work. Social norms shape beliefs of the role of women and can sometimes impede women from accessing formal, well-paying jobs. More recent evidence has shown that removing legal barriers faced by women can help them access high paying jobs and managerial positions. These wide-ranging barriers include travel and mobility restrictions, restrictive inheritance laws, less access to finance, and unequal pay.³¹

3.3 Technology can be leveraged to close gender gaps too. Virtual learning provides opportunities for women to acquire skills. Online jobs can help women to overcome mobility restrictions, especially in countries where such constraints are pronounced. IFC's report on [Driving Toward Equality: Women, Ride-Hailing, and the Sharing Economy](#) sheds light on how ride-hailing can improve women's mobility and labor force participation.



Photo credit: Stephan Gladieu / World Bank

WHAT'S NEXT?

Better data and research on developing countries. There is still a large knowledge gap regarding specific barriers to technology adoption and policies to maximize technology potential. Research has progressed about bottlenecks and their negative effects on technology adoption, but there is a wide gap between the amount of knowledge on these issues in developed and developing countries. Furthermore, evidence about labor market disruptions linked to technology and automation in developing economies remains limited. This knowledge gap must be addressed to design better, evidence-based, and forward-looking policies.

Human capital. The World Bank [Human Capital Project](#) (HCP) will continue efforts to boost human capital outcomes globally. HCP countries are focusing on national plans that prioritize human capital, acting on national and international agreements. The WBG launched its [Africa Human Capital Plan](#) in April 2019 to respond to the tremendous challenges and opportunities for human capital development in Sub-Saharan Africa (SSA). The Plan sets ambitious targets for the region by 2023, including innovative human capital interventions to foster policy change, women's empowerment, demographic change, and mobilization of a network of Africa Human Capital Champions. The WBG is developing similar visions for the Middle East and North Africa (MENA) and South Asia regions. Efforts are underway to gather more

disaggregated subnational and gender data to better inform policies, but continuous investment in these data efforts is needed. For example, subnational geographic disaggregation of HCI data has been completed for Angola, Chad, Indonesia, Mali, Niger, Pakistan, Peru, the Philippines, Romania, Sierra Leone, Sri Lanka, and Turkey. Disaggregation by socioeconomic status is ongoing for a large group of countries.

Skills. Promising work on skill content of jobs in developing economies is underway, such as in [Ghana](#),³² where a study maps out the nature of skills—cognitive, manual, routine, among others—to determine how susceptible these jobs are to automation. Studies limited to a handful of developing economies have to be scaled-up to understand global automation risks. Furthermore, the importance of socio-emotional skills in work necessitates understanding the prevalence of such skills globally. The [Programme for the International Assessment of Adult Competencies \(PIAAC\)](#) assesses adult skills for [OECD](#) economies. The World Bank’s [Skills towards Employment and Productivity \(STEP\)](#) survey has made progress in a handful of developing economies to capture soft skills, but with mixed success. New data initiatives are needed, along with cheaper innovative alternatives to current expensive and time-consuming surveys.

The digital agenda. Closing the digital infrastructure gap and increasing affordable broadband access is an immediate regulatory priority. The [WB Digital Moonshot](#) initiative is based on five principles:

- a. Taking a **comprehensive** ecosystem approach.
- b. Increasing the scale of ambitions to be **transformative**, beyond incremental “islands” of success.
- c. Creating an **inclusive** digital economy for everyone.
- d. Aiming for local, **homegrown** content and solutions.
- e. Encouraging **collaboration** across different actors.

Five foundations that need to be in place are: digital infrastructure, digital platforms, digital financial services, digital entrepreneurship, and digital skills. Digital infrastructure entails greater connectivity; however, good regulatory frameworks and business environments are also needed for digital financial services and digital entrepreneurship to thrive. A digitally-savvy workforce is needed to build robust

digital economies and competitive markets. Further research is needed on how to improve regulatory frameworks given new digital challenges.

Labor supply and demand. Encouraging dialogue and collaboration between labor supply and labor demand (firms) may allow workers to adapt faster to technology. With 90 percent of employment in the private sector, skills need to be relevant and demanded by firms. Educators rarely, however, take part in private sector activities and vice versa. Tertiary education and the private sector can come together through “knowledge hubs” to drive new capabilities, innovation, and high-tech entrepreneurship.

A healthy [innovation ecosystem](#) connecting supply and demand also requires an enabling environment. Governments can create environments where innovation clusters flourish by providing local infrastructure, allocating more budget to research and development, connecting high quality researchers with innovative private sector firms, and relaxing rigid labor market regulations. These methods have been successful in developed economies: in the United States at Stanford University, University of California, Berkeley (Silicon Valley), Harvard, and the Massachusetts Institute of Technology (Boston’s Route 128); and in the United Kingdom at the University of Cambridge, University of Oxford, and University College London (“golden triangle”). Similar endeavors are emerging in middle-income economies. Peking University is building a research cluster for precision medicine, health big data, and intelligence medicine (Clinical Medicine Plus X). The University of Malaya has eight interdisciplinary research clusters covering sustainability science and biotechnology. In Mexico, the Research and Technology Innovation Park has seven university-led research centers on research and development in biotechnology, nanotechnology, and robotics.³³

Labor regulations. Governments must avoid extremes when crafting labor regulations. [The World Development Report 2013: Jobs](#) advocated for a broad “plateau” between extreme “cliffs” of too little and too much regulatory intervention. This Note fully espouses the powerful “plateau” metaphor to guide policies and labor market regulations. However, it is currently not possible to provide actionable policy guidance. More empirical analysis is needed to identify features and inflection points—that is, precisely what regulations and policies represent “too little” and what is “too much.”

Gender. Technology and more flexible work arrangements can help integrate excluded groups. For example, internet access may help women overcome safety and security barriers and facilitate women's labor force participation. Furthermore, some evidence shows that [automation is less likely to occur in woman-dominated sectors](#).³⁴ Research on the effects of technological advancement on women can point to tangible policies. Furthermore, obtaining gender-disaggregated data should be a priority for data collection initiatives to support research on gender-specific barriers preventing women from thriving in an era of technological change.

Social protection. Technology can improve social protection delivery, even in fragile contexts. In Lebanon, for instance, electronic smartcards provide 125,000 Syrian refugee households with food vouchers. Some programs are already using technology-based data, although evidence on their effectiveness comes only from a handful of ongoing programs. In Mexico, geospatial mapping identifies the most vulnerable in cities. In Côte d'Ivoire, mobile phone data is used to construct poverty maps. In Benin, GPS-based data locates households lacking addresses in urban settlements.

"Government to Person" (G2P) payments, ranging from salaries to cash transfers, are increasingly digital, reducing payment costs, delays, and waste, while increasing program efficiency. Technology is also improving personal identification (ID) systems, the first step in delivering social protection and payments. In SSA, the share of the Rwandan population with national IDs is 90 percent, but less than 10 percent in Nigeria. Oman's worker protection scheme monitoring wage payments has reduced worker payment delays. In Ghana's Labor-Intensive Public Works (LIPW) scheme, digitization of paper-based transactions and use of biometric machines reduced wage payment time from four months to one week. In the Indian state of Chhattisgarh, the Public Distribution System used electronic devices for food assistance, helping reduce "leakage" from 52 percent in 2005 to 9 percent in 2012.

These examples are largely anecdotal, so more rigorous evaluations are needed related to the use of technology to implement social protection programs.

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