NORTH AMERICA 2.0
Forging a Continental Future

Successful Workforce Development Is Vital for a Competitive and Prosperous North America

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Introduction

The North American workforce suffers from alarming skills gaps and mismatches. Employers often have a hard time identifying employees who have the specific skills needed for particular positions, and employees may find it difficult to acquire the education and training necessary to prepare for the jobs that are available to them. These issues harm North America's economic performance and impede companies in Canada, Mexico, and the United States from realizing the potential inherent in the powerful production and commerce networks that their countries have been building since the early 1990s. They also risk leaving many workers behind, and that risk has increased with the pandemic.

At the same time, accelerating technological changes of "Industry 4.0" or the "Fourth Industrial Revolution" are sweeping through workplaces across the continent, eliminating, redefining, and creating new classes of jobs. This shift has forced all three countries to reconsider the "future of work" in their economies, as they face the serious challenges as well as new opportunities for collaboration. These transformations could contribute to more and better jobs in the future; however, individuals, economies, and governments all need to prepare for the shocks that will accompany the so-called creative destruction ahead, and to join forces to make more and better jobs a reality.[1] Poor preparation can easily lead to economic, social, and political disruptions.

Since late 2019, the fallout from the new coronavirus and the COVID-19 pandemic has been accelerating, exacerbating, and reshaping changes in the ways in which both production and business are conducted. In particular, the pandemic has forced businesses to suddenly reevaluate the ways in which they apply and use technology in their workplaces, manage workers remotely, and use the internet commerce.[2] Many of these changes were occurring prior to the pandemic, but the global health crisis has created what the World Economic Forum (WEF) called a "double disruption" for workers globally.[3] McKinsey finds that more workers may now have to shift occupations and that lower wage jobs and lower skilled employees may suffer relatively more in the years ahead. (https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19) Alongside these issues, the crisis opened serious discussions about the resilience, robustness, and reliability of supply chains across North America and worldwide.[4] Overall, these changes and potential future trends underscore the importance of paying attention to North America's workforce—specifically, to their skills gaps and training opportunities—as automation, technology, and algorithms continue to evolve.

To more effectively address the challenges being wrought by these transformations, the United States, Canada, and Mexico need to significantly increase quality investment in the development, adjustment, and training of their workforces, and to collaborate on these investments in order to enable them to reinforce and improve North America's economic strengths. Much as the Biden administration has framed its economic response to the COVID-19 pandemic as a "Build Back Better" approach, a "Build North America Back Better" perspective on workforce development would provide a foundation for future cooperation among all three countries.

A post-pandemic North American workforce agenda, therefore, should focus on four areas: (1) work-based learning; (2) credentials transparency; (3) labor market data collection and transparency; and (4) creating collaborative mechanisms to help prepare for changes ahead.[5]
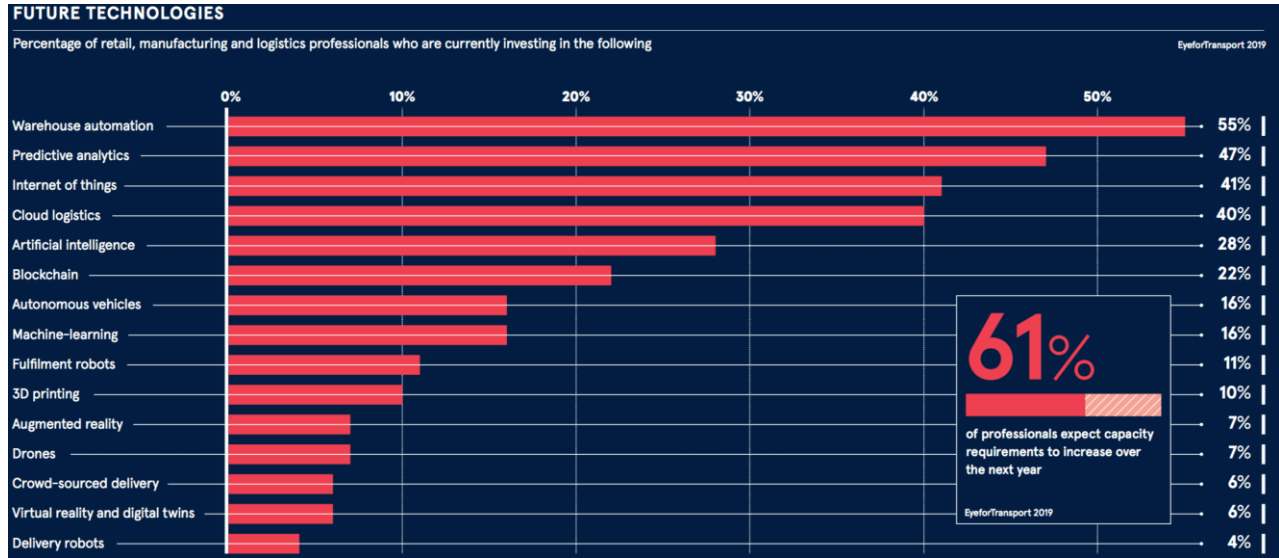
The successful implementation of a North American Workforce Development Agenda depends on joint collaboration and multistakeholder involvement among national and subnational governments, businesses, academia, and other relevant groups, including unions and nongovernmental organizations (NGOs). The three governments should identify and work to scale up successful partnerships and programs already underway across the continent. This collaboration might best start by building on the needs of sectors of particular importance in existing production networks that link the economies, such as the vehicle sector, and those of emerging importance such as "greener" energy production. By sharing workforce solutions, North America will be able to strengthen its critical coproduction and value chains and bolster its ability to compete in a global marketplace, including against powerhouses like China, while helping the continent's workers.

An Assessment of Workforce Development in North America

Together, North American countries have one of the strongest trading and production networks in the world. The United States, Canada, and Mexico share a population of more than 493 million people and a gross domestic product (GDP) of almost $24 trillion, representing the world's largest, tenth-largest, and fifteenth-largest economies, respectively.[6] The United States is the largest trading partner of Mexico and Canada, and those two countries are the United States' largest export markets. More than 50 percent of the trade within North America is in intermediate goods, reflecting the fact that the three countries build so much together.[7] Trade within North America has grown by a factor of four since the early 1990s, and mutual investment is massive. Yet these three economies face serious challenges regarding the quality development of their workforces, and thus their competitiveness relative to global rivals, particularly China.

Even before the COVID-19 pandemic, the forces of technological change and global competition were well underway in North America. Figure 1 illustrates the investments in innovations, from warehouse automation to delivery robots, being explored by businesses as of 2019.

Figure 1. Advanced Technologies Investment by Retail, Manufacturing, and Logistics Firms
Source: Raconteur, "Supply Chain Automation," 2020.

FUTURE TECHNOLOGIES

Percentage of retail, manufacturing and logistics professionals who are currently investing in the following — EyeforTransport 2019

Technology	Percentage
Warehouse automation	55%
Predictive analytics	47%
Internet of things	41%
Cloud logistics	40%
Artificial intelligence	28%
Blockchain	22%
Autonomous vehicles	16%
Machine-learning	16%
Fulfilment robots	11%
3D printing	10%
Augmented reality	7%
Drones	7%
Crowd-sourced delivery	6%
Virtual reality and digital twins	6%
Delivery robots	4%

61% of professionals expect capacity requirements to increase over the next year
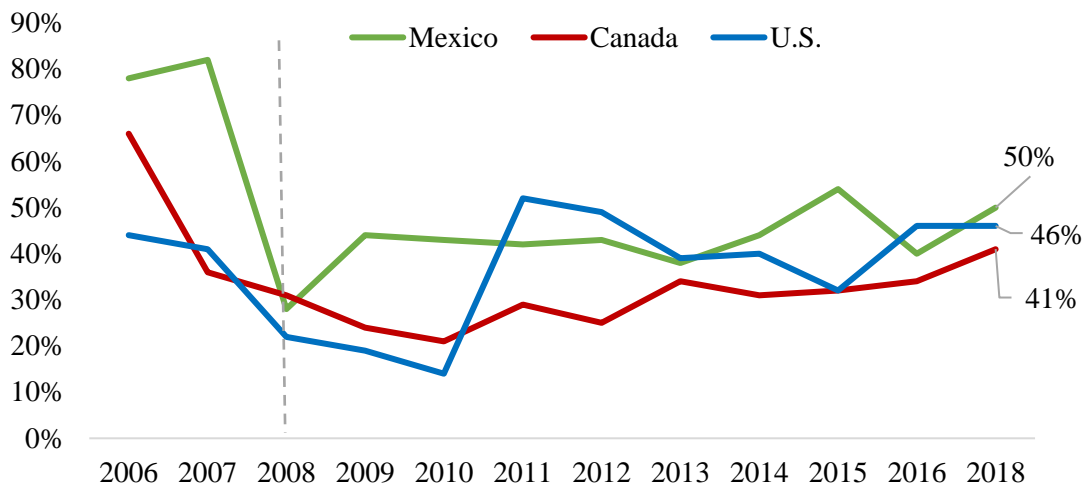EyeforTransport 2019

This figure offers insights into areas of business and production where workforce development, including reskilling and upskilling, will be vital for the future of the North American economy. Specific areas of interest will be discussed in greater detail in the sections that follow.

Skills Gaps and Technological Changes

The three North American economies face alarming skills gaps and mismatches. According to the Manpower Group's 2018 talent shortage survey, 50 percent of Mexican employers have difficulty filling jobs, and 46 percent and 41 percent of U.S. and Canadian employers, respectively, face the same problem.[8] Employers from the North American economies reported the lack of applicants, lack of adequate or sufficient technical ("hard") and human/social ("soft") skills, and lack of experience as the main reasons for this difficulty filling positions. Figure 2 present the relative talent shortage in all three countries over the past 12 years.

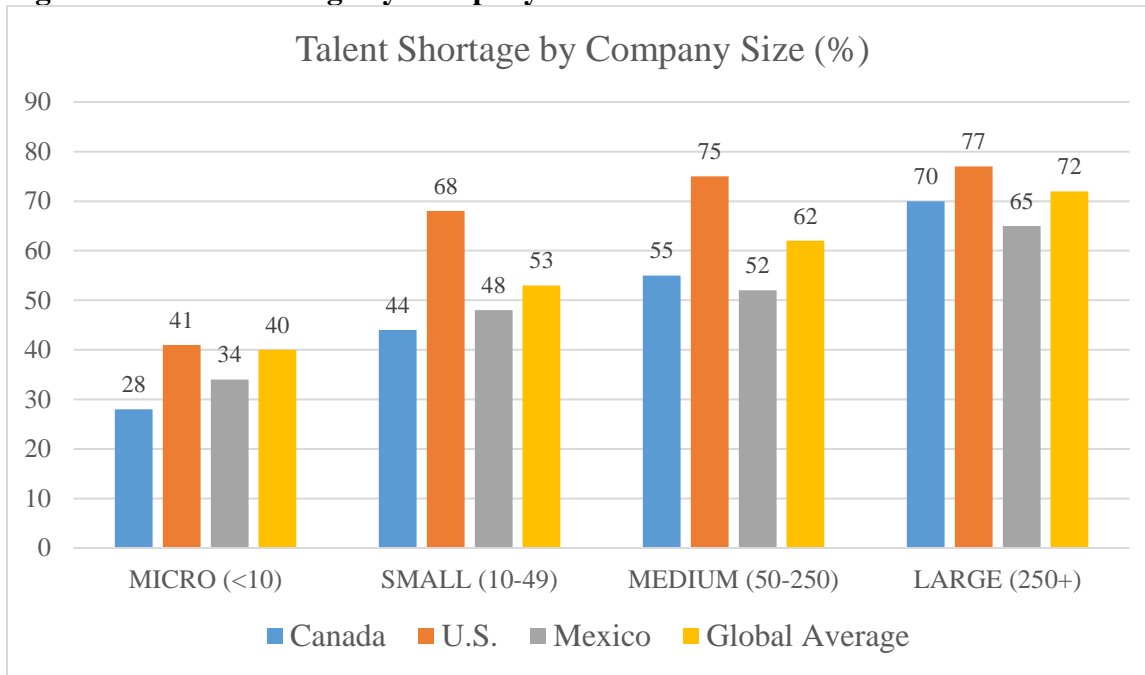**Figure 2. Employers in North America Having Difficulty Filling Jobs**

These skills gaps and mismatches negatively affect their competitiveness and industrial performance.

Drawing on data from the 2019 Manpower Group study, Figure 3 displays talent shortages in Canada, the United States, and Mexico by company size, as well as the global average for each category. The figures suggest that in all three countries—much like the global average—larger companies face more difficulty filling jobs. Canada and Mexico appear to face less difficulty than the global average filling jobs, whereas the United States experiences more difficulty than the global mean in all size categories. This discrepancy is most pronounced for small enterprises, where the global average of difficulty filling jobs is 53 percent compared to 68 percent in the United States—a 15 percent difference.

Figure 3. Talent Shortage by Company Size

Talent Shortage by Company Size (%)

Legend: Canada, U.S., Mexico, Global Average

- MICRO (<10): Canada 28, U.S. 41, Mexico 34, Global Average 40
- SMALL (10-49): Canada 44, U.S. 68, Mexico 48, Global Average 53
- MEDIUM (50-250): Canada 55, U.S. 75, Mexico 52, Global Average 62
- LARGE (250+): Canada 70, U.S. 77, Mexico 65, Global Average 72

Source: Manpower Group, 2019 Talent Shortage Survey.

The 2018 WEF jobs report estimated that 54 percent of workers will require "reskilling" (training intended largely for those displaced from jobs) or "upskilling" (training intended largely for those who are still employed but whose jobs are evolving) over the next five years.[9] The 2020 WEF report estimates that technology-driven shifts may displace 85 million jobs by 2025, while 97 million new jobs may emerge which will require new skills.[10] Deloitte argues that 47 percent of today's jobs might be gone in the next decade, and that the skills shortages could cost the U.S. economy some $2.5 trillion in lost output.[11] A study by the Markle Foundation found that digital literacy and foundational digital skills will be increasingly important, since by 2030 an estimated 77 percent of jobs in the United States will require the use of technology.[12]

The OECD (Organisation for Economic Co-operation and Development) estimates that 14 percent of jobs across its member countries could disappear as a result of automation in the next 15 to 20 years, and another 32 percent are likely to change radically.[13] Furthermore, a recent analysis in *Foreign Affairs* argues that the growing complexity of manufacturing and production will diminish the importance of cheap, unskilled labor.[14] The WEF's 2020 job report estimates that on average 40 percent of core skills will change in the next five years in the countries covered by its study and that 50 percent of the of all employees will need reskilling and upskilling.[15] A skilled workforce is needed more than ever.[16]

Figure 4 presents a 2017 McKinsey Global Institute analysis of the percentage of U.S. and Mexican workers who may need to change occupations by 2030. It suggests that more than 60 million people will be forced to change jobs. This number amounts, for comparison purposes, to about half of Mexico's population.

Figure 4. Percentage of Workers Who May Need to Change Occupations by 2030
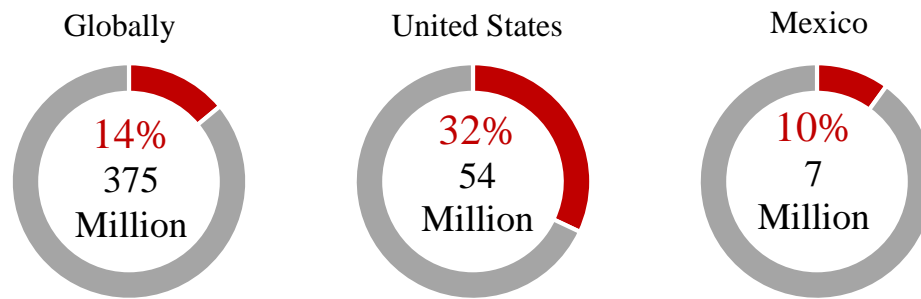
Globally	United States	Mexico
14% 375 Million	32% 54 Million	10% 7 Million

Source: McKinsey Global Institute, *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation*, 2017.

A 2021 McKinsey follow up report, The Future of Work After COVID 19, examined eight countries, including the U.S, McKinsey researchers found that the pandemic will increase the number of workers that likely need to switch occupations by 2030.[17] Those hardest hit, the study argues, will be low-wage occupations and workers without a college degree, women, ethnic minorities, and younger workers.

The likely short- and long-term impacts of the pandemic, McKinsey writes, will be concentrated in four areas of the economy where people work in close proximity to each other: a) leisure and travel; b) retail and hospitality; c) computer-based work; and d) indoor production and warehousing. More workers in those sectors are now expected to have to change occupations by 2030 (compared to what was expected before the pandemic). On the other hand, other sectors are now expected to have additional labor demand following the pandemic: medical care, home support, personal care, transportation of goods, and outdoor production and maintenance. This are generally higher paying and higher skilled jobs. In addition, McKinsey notes that post-pandemic many higher-skilled jobs will continue to rely on the virtual work that became the norm during the crisis.

Faced with these changed work expectations, McKinsey makes a strong case that businesses should reimagine where and how work is done and increase reskilling efforts, with more focus on sort-term training and credentials to reflect skills learned.

For public authorities, the McKinsey researchers suggest additional investment in: a) digital infrastructure for larger percentages of the population; b) improving programs that support workers who need to retrain and shift occupations; c) developing portable benefits for workers; d) revising licensing and certification requirements to allow easier access for new entrants; and finally, e) rethinking how localities attract and retain workers members who will continue to work remotely.

The OECD estimates that 10.2 percent of U.S. workers are in occupations with high risk of automation and are therefore in need of "moderate training." An additional 2.3 percent are in need of "important training" to avoid the risk of losing their jobs because of automation.[18] Likewise, about 8.5 percent of Canadian workers are in need of "moderate training" and 3.2 percent need "important training."[19] The OECD does not provide similar data for Mexico, but finds that it ranks at the bottom 20 percent on most indicators of skills development.[20]

Figure 5 lists the U.S. occupations most at risk of automation. Notably, occupations where repeatability of actions is the main feature are the ones at the highest risk.
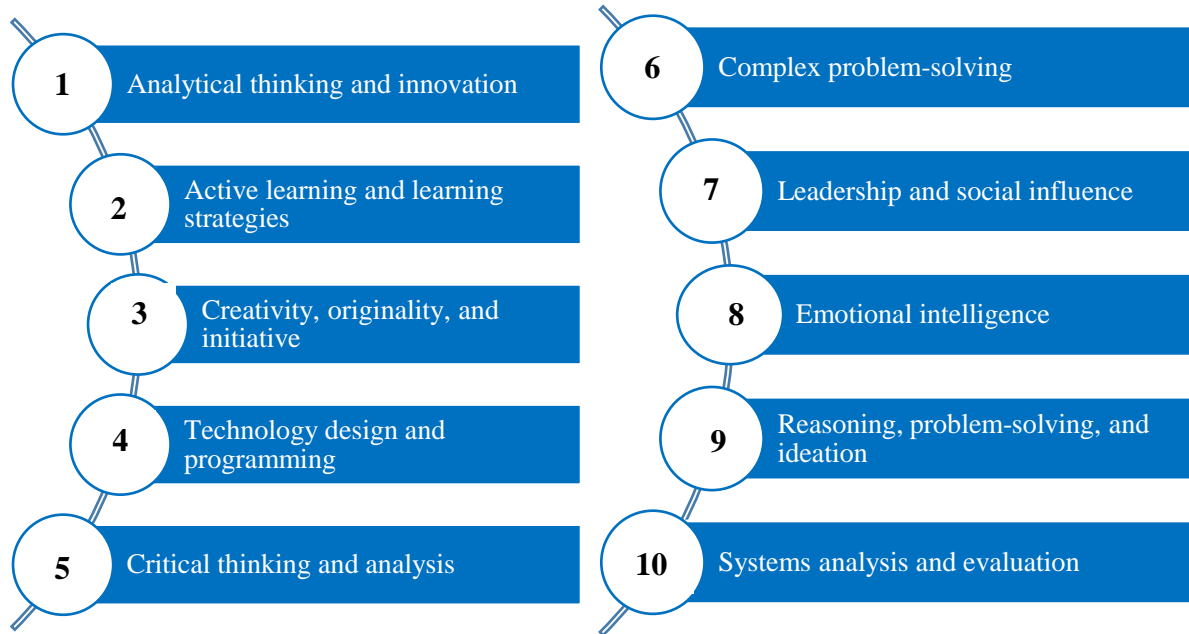
Figure 5. Occupations at High Risk of Automation

Industrial family	Annual labor productivity growth, 2000-16	Automation potential
Accommodation and Food Services	-0.8%	73%
Manufacturing	2.9%	59%
Transportation and Warehousing	0.2%	58%
Agriculture, Forestry, Fishing and Hunting	3.3%	57%
Retail Trade	0.9%	53%
Mining, Quarrying, and Oil and Gas Extraction	3.2%	51%
Other Services (except Public Administration)	-1.6%	49%
Construction	-1.0%	47%
Wholesale Trade	1.7%	44%
Utilities	-0.2%	43%
Finance and Insurance	1.1%	42%
Arts, Entertainment, and Recreation	0.4%	41%
Administrative and Support and Waste Management and Remediation Services	2.1%	41%
Real Estate and Rental and Leasing	2.1%	40%
Government	-0.1%	37%
Health Care and Social Assistance	0.2%	36%
Information	6.2%	35%
Management of Companies and Enterprises	0.1%	34%
Professional, Scientific, and Technical Services	0.9%	34%
Educational Services	-0.7%	27%
U.S. total	**0.8%**	**46%**

Source: Brookings Institution analysis of Bureau of Labor Statistics, U.S. Census, EMSI, Moody's, and McKinsey data, March 2020.

Hard or technical skills and soft or human/social/employability skills are crucial to navigate Industry 4.0 and to prepare for the future of work.[21] According to the WEF, understanding of technology is an essential part of the 2022 workforce skill requirements (see Figure 6).[22] Some commentators have argued that a culture of learning and innovation is also essential for success.[23] As new technological advances are expected to modify classes of jobs for which workers are being trained today, it will be essential to develop this culture of learning and innovation throughout a worker's life.

Figure 6. Top 10 Trending Skills by 2022

1 Analytical thinking and innovation	**6** Complex problem-solving
2 Active learning and learning strategies	**7** Leadership and social influence
3 Creativity, originality, and initiative	**8** Emotional intelligence
4 Technology design and programming	**9** Reasoning, problem-solving, and ideation
5 Critical thinking and analysis	**10** Systems analysis and evaluation

Source: WEF, *The Future of Jobs Report 2018*, 2018.

The United States, Canada, and Mexico will need agile and resilient workforces with public and private educational and training systems that better support current workers and prepare students for future careers. Workforce resiliency should be a measure of its ability to adapt under varying and uncertain economic conditions. If no steps are taken in this direction, North America undoubtedly will face the social and political repercussions of displacement and unemployment.

Skills mismatches in North America, combined with the unyielding pace of technological change in the economy, calls for concerted action by governments, the private sector, and educational institutions. Businesses are recognizing some of the needs and building them into their planning: 74 percent of companies surveyed by the WEF, for example, say that the primary factor in determining the locations for new investments will be talent availability.[24] Figure 7 shows that leading companies in the United States, Canada, and Mexico are adopting new technologies at comparable rates. However, public-private-academic collaborative efforts still fall short in all three.

Figure 7. Technology Adoption Rates Reflected by Countries Surveyed by the World Economic Forum
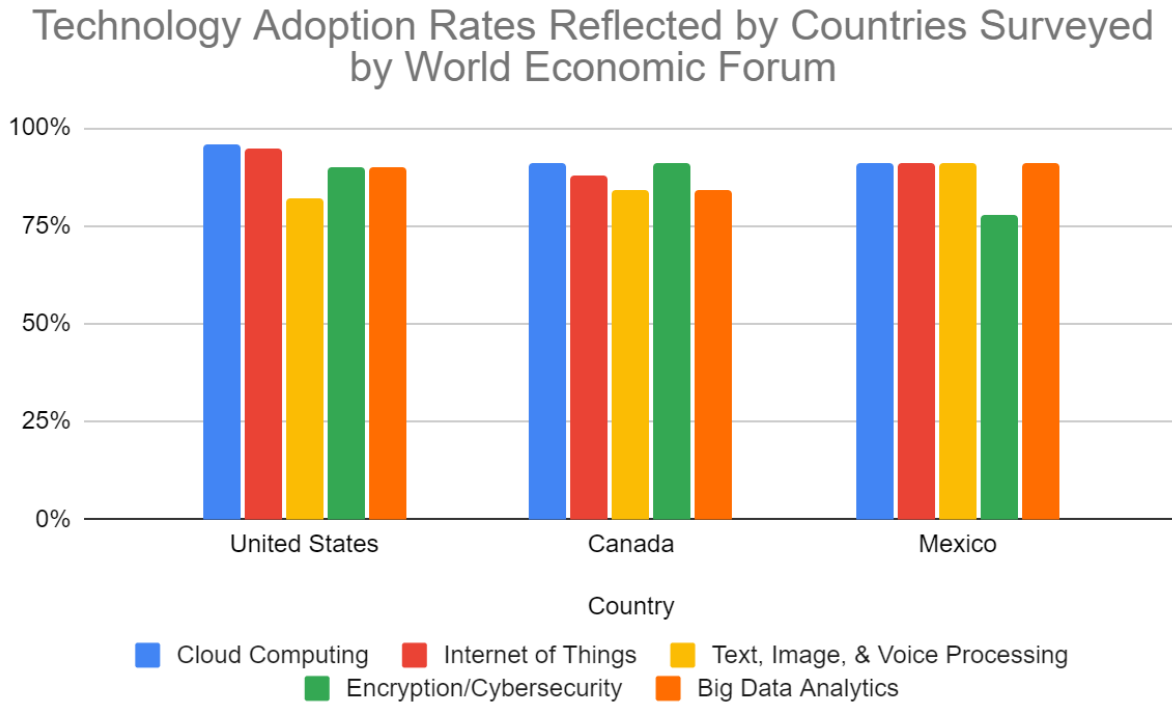
Source: WEF, *The Future of Jobs Report 2020*, 2020.

Job Displacement: Trade and Technology

In recent years, U.S. domestic political discourse has included a great deal of criticism about trade agreements—in particular, trade within North America—causing job losses. Trade has caused jobs to move between countries and within the United States, for example. However, serious studies point to productivity improvements and new technology, as well as trade from China, as the major drivers of U.S. manufacturing job losses in the 21st century.[25] A study by Ball State University found that more than 87 percent of manufacturing job losses from 2000 to 2010 could be attributed to productivity improvements rather than international trade or globalization trends.[26] The 2019 OECD Employment Outlook reveals that across that OECD's membership, employment in the manufacturing sector declined by 20 percent over the past two decades while employment in services grew by 27 percent.[27]

Whatever the causes, too many workers and communities have been left behind in recent years. Programs instituted to help, such as the U.S. Trade Adjustment Assistance, have not produced the desired results.[28] More disruptive job displacement could be ahead. The Brookings Institution predicts that the spread of artificial intelligence will negatively affect the same areas of the United States that suffered job losses in the first decade of this century (see Figure 9), unless employees and employers in "at-risk" regions take steps to mitigate the likely job displacement.[29]

A 2020 McKinsey study about the future of work in Europe found a large overlap (about 24 million jobs) between those who face job loss risk from automation and those who face possible job loss because of the COVID-19 economic recession. The study found that the top job sectors which face losses from both automation and COVID-19 in Europe are wholesale and retail, manufacturing, accommodation and food services, construction, transportation and storage, and human health and social work.[30] Similar trends are likely to hold in North America, as the three economies struggle to emerge from the downturn sparked by the global pandemic.

In a Brookings Institution article, Mark Muro, Robert Maxim, and Jacob Whiton report that for the United States, some 36 million jobs have a "high" susceptibility to automation. They argue that any economic downturn is likely to bring "a new bout of structural change in the labor market and its demand for skills."[31] Figure 8, for instance, presents a recent WEF assessment of skills that are increasingly desired by employers and those that are becoming more redundant.

**Figure 8. Top Emerging Skills and Redundant Jobs in North America**

Country	Top 5 Emerging Jobs				
United States	AI & Machine Learning	Data Analysts & Scientists	Big Data Specialists	Internet of Things Specialists	Digital Transformation Specialists
Canada	AI & Machine Learning	Data Analysts & Scientists	Process Automation Specialists	Information Security Analysts	Software & Application Developers
Mexico	AI & Machine Learning	Data Analysts & Scientists	Big Data Specialists	Information Security Analysts	Project Managers
Country	Top 5 Redundant Jobs				
United States	Data Entry Clerks	Accounting, Bookkeeping, & Payroll Clerks	Admin & Executive Secretaries	Assembly & Factory Workers	Accountants & Auditors
Canada	Data Entry Clerks	Accounting, Bookkeeping, & Payroll Clerks	Business Services& Admin Managers	Accountants & Auditors	Admin & Executive Secretaries
Mexico	Accounting, Bookkeeping, & Payroll Clerks	Data Entry Clerks	Admin & Executive Secretaries	General & Operations Managers	Architects & Surveyors

Source: WEF, *The Future of Jobs Report 2020*, 2020.
Note: AI = artificial intelligence

Figure 9 presents earlier Brookings estimations for the geographic impact of automation across the United States. The figure suggests that the U.S. industrial heartland, which suffered manufacturing job losses during the first decade of the 21st century (highlighted by the blue rectangle in the map), may again suffer the costs of increased automation replacing and reinventing jobs.
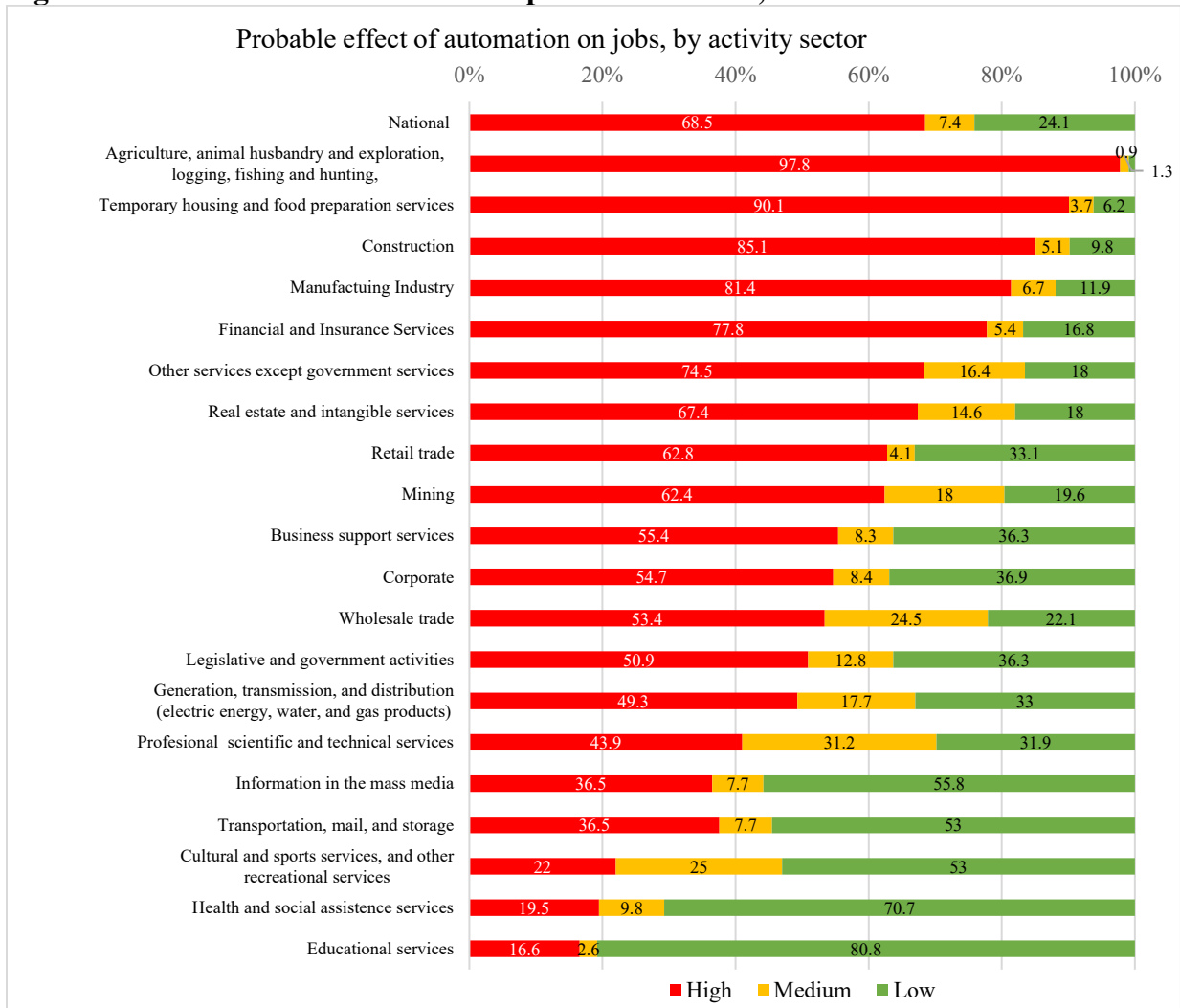
Figure 9. Average Automation Potential by County, 2016

Automation potential 2016

|				
31.6% - 44%	44% - 46%	46% - 48%	48% - 50%	50% - 64.4%
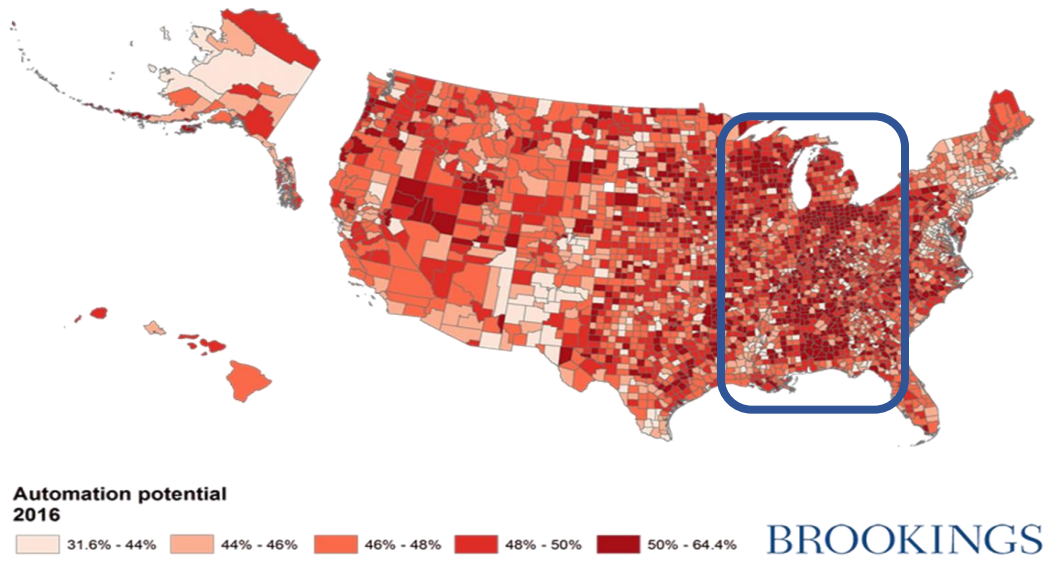
BROOKINGS

Source: Brookings Institution, 2018.

For the case of Mexico, in 2018 the Banco de México, Mexico's central bank, published a report on automatization using data collected between 2005 and 2017.[32] Using the probabilities of automation for different types of occupations calculated for the United States, the Banco de México classified the risk of automation for different occupations in Mexico and developed three risk categories: (1) high risk, with a probability greater than 66 percent; (2) medium risk, with probability between 33 percent and 66 percent; and (3) low risk, with probability less than 33 percent (Figure 10). According to this study, approximately two-thirds of Mexico's employed population work in occupations with the highest probability (i.e., high risk) of automation, including the agricultural sector, hospitality and food services, construction, manufacturing, and financial services. Moreover, occupations with highest risk of automation correspond to where employees often have lower levels of schooling (Figure 11). Less-qualified workers are less able to avoid the risks of automation. The highest risk of automation is concentrated in Mexican states with the highest rates of economic and social inequality, including Chiapas, Guerrero, Oaxaca, Puebla, and Yucatán.

Figure 10. Risk of Automation for Occupations in Mexico, 2018

Probable effect of automation on jobs, by activity sector

Sector	High	Medium	Low
National	68.5	7.4	24.1
Agriculture, animal husbandry and exploration, logging, fishing and hunting,	97.8	0.9	1.3
Temporary housing and food preparation services	90.1	3.7	6.2
Construction	85.1	5.1	9.8
Manufactuing Industry	81.4	6.7	11.9
Financial and Insurance Services	77.8	5.4	16.8
Other services except government services	74.5	16.4	18
Real estate and intangible services	67.4	14.6	18
Retail trade	62.8	4.1	33.1
Mining	62.4	18	19.6
Business support services	55.4	8.3	36.3
Corporate	54.7	8.4	36.9
Wholesale trade	53.4	24.5	22.1
Legislative and government activities	50.9	12.8	36.3
Generation, transmission, and distribution (electric energy, water, and gas products)	49.3	17.7	33
Profesional scientific and technical services	43.9	31.2	31.9
Information in the mass media	36.5	7.7	55.8
Transportation, mail, and storage	36.5	7.7	53
Cultural and sports services, and other recreational services	22	25	53
Health and social assistence services	19.5	9.8	70.7
Educational services	16.6	2.6	80.8

■ High ■ Medium ■ Low

Source: Banco de México, 2018.

Figure 11. Risk of Automation for Occupations by Education Level in Mexico

Probable impact of automation on jobs in Mexcio by educational level
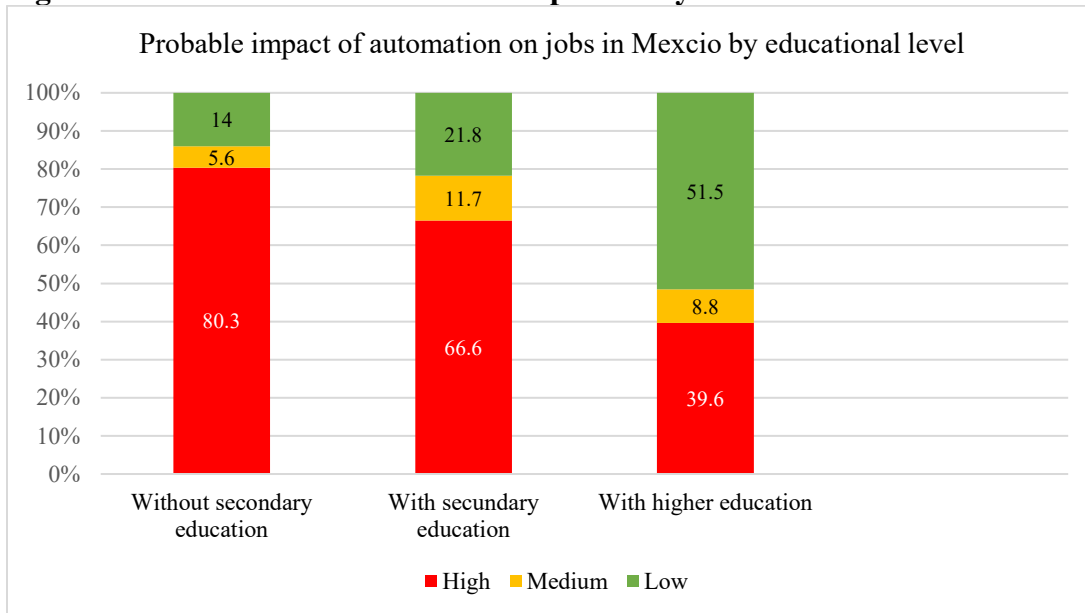
Source: Banco de México, 2018, based on data from the Instituto Nacional de Estadística y Geografía (National Institute of Statistics and Geography; INEGI) National Survey of Occupation and Employment (Encuesta Nacional de Ocupación y Empleo; ENOE) and Frey & Osborne (2017).
Note: The figures presented correspond to the average of all ENOE quarterly surveys published between 2005 and 2017.

Another study conducted in Mexico recommended that the country should adopt or adapt the best practices implemented for workforce development and training in other countries, particularly with regard to middle and higher education.[33] To counteract the loss of 2.7 million manufacturing sector jobs expected by 2030, the study proposed to modify the curricula and include courses related to future industrial practices, to invest in laboratories and applied research infrastructure, and to promote work-based learning activities. Regrettably, these priorities are not evident in current Mexican government spending.[34]

Insufficient Workforce Development Budgets

The North American economies should also be investing more in the development of their current and future workers. A January 2019 poll from the National Skills Coalition found that 93 percent of likely voters in the 2020 U.S. election support increasing investment in skills training.[35] However, according to the OECD's comparative studies, North American countries trail other developed countries in such investment (Figure 12). Even though U.S. investment in skills already lags behind most developed economies, the U.S. Congress has cut funds for job training grants by 40 percent since 2001.[36]

Figure 12. Total Public Expenditure on Labor Market Programs as a Percentage of Gross Domestic Product (GDP), 2016

Source: OECD Stats, 2019, http://stats.oecd.org//Index.aspx?QueryId=8540.
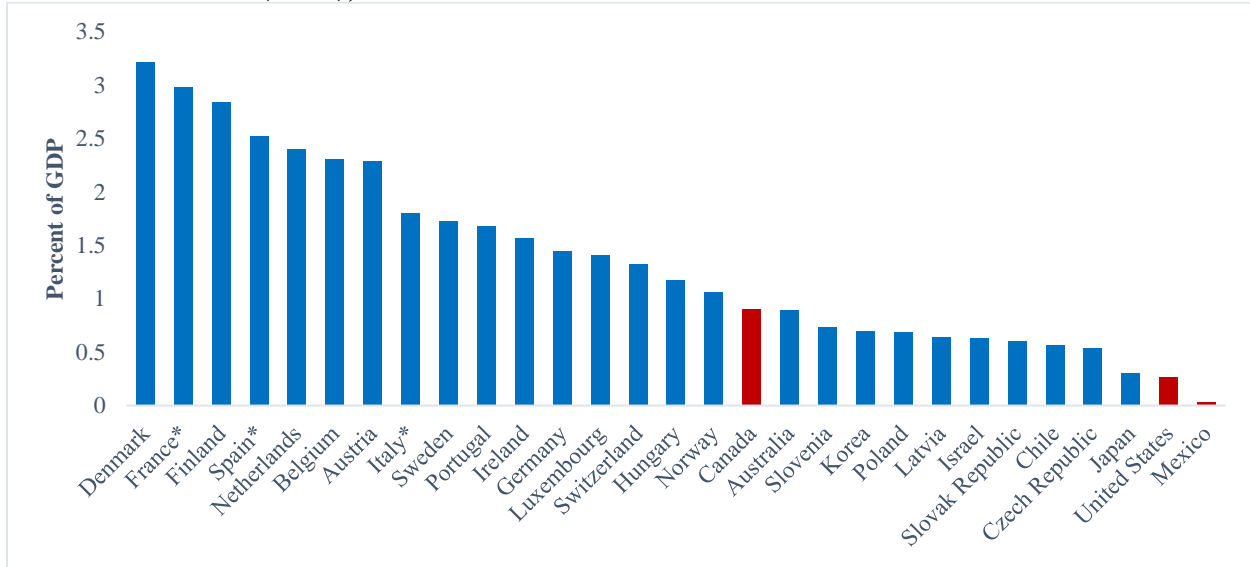
Note: * Only 2015 data available. The information in this graph is based on OECD measures of total public spending on labor market programs include training, employment incentives, sheltered and supported employment and rehabilitation, direct job creation, start-up incentives, out-of-work income, maintenance and support, and early retirement.

In the Automation Readiness Index, a recent Economist Intelligence Unit ranking of which countries appear to be prepared for the coming wave of automation, Canada came in 5th, the United States in 9th, and Mexico in 23rd out of 25 countries.[37] This index is based on an assessment of existing policies and strategies in the areas of innovation, education, and the labor market. Highly ranked countries provide significant support for technology innovation and strategies to address the workforce effects of automation. The Economist Intelligence Unit found that few policies are in place today to addresses the challenges of artificial intelligence and robotics-based automation. One of the main findings from the research is that challenges and opportunities of intelligent automation require a robust policy response informed by multistakeholder engagement. Such policies include educational aspects, which explicitly should address the impact of automation and the need for vocational training and lifelong learning.

Although the rankings indicate the need for improvement in all three North American economies, they make clear that much deeper change is warranted in Mexico than in the United States or Canada. Specifically, Mexico's challenges mostly involve the development and support of a culture of innovation and improvements to its labor market. Regarding the culture of innovation, Mexico's research and innovation environment, the infrastructure, and the ethics and safety policies urgently need to be improved. In the labor market space, vocational training and linkages between educational institutions and economic sectors should be expanded. In contrast, according to this study, Canada needs to fine-tune policies to finance and support innovation, to facilitate workplace transitions, and to increase options for developing technical skills. The United States faces its largest challenges in the realm of education (early childhood, STEM [science, technology, engineering, mathematics], teacher training and curricular innovation), vocational training, and university transition to workplace in labor market.

Among U.S. workers, education gaps underscore the need to invest in education and skills training, particularly digital skills training (Figure 13).[38] Although some argue that recent shifts in U.S. trade policy and the pandemic's effects on supply chains will lead to more reshoring, as of yet there is no clear evidence of what such a trend might look like.[39]

Figure 13. Education and Skills in Percent of Population

Percent of Population with Education and Skills in the U.S., Canada, and Mexico
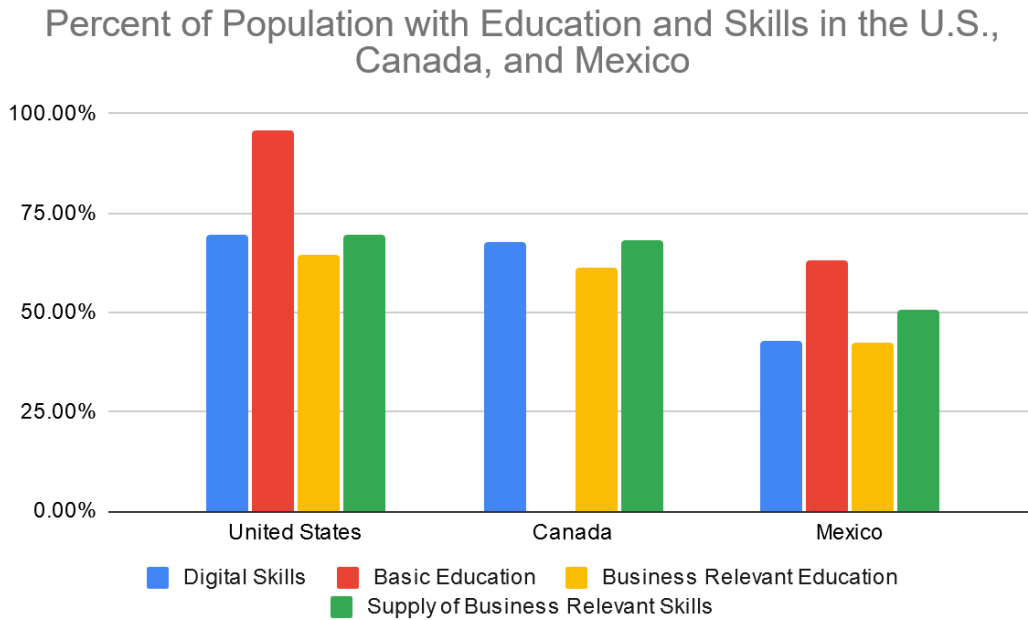
Source: WEF, *The Future of Jobs Report 2020*, 2020.
Note: Basic education level for Canada was not available in the WEF 2020 report

A Proposal for Workforce Development in North America

North America's economies share workforce challenges, though these challenges have different characters in each country. Their commercial and economic integration underscores the need for regional cooperation to tackle these challenges. As 50 percent of the trade in North America is in "intermediate goods" (those used in the production of finished goods), the three countries literally build things together.[40] The massive cross-border production chains and trade networks have positioned the region as one of the most competitive in the world.[41] However, skills gaps and mismatches are likely to harm economic and industrial performance and will affect the region's competitiveness. The three countries have implemented different strategies for developing their workforce (see Boxes 1 to 3). Nevertheless, strategies for vocational training and transition to workplace, identified as critical for the United States and Mexico, do not appear to be prominent in the current workforce development efforts.

Box 1. National Workforce Development Agenda in Canada

Canada's direct investments in workforce development include scholarships and fellowships, research grants, wage subsidies, entrepreneurial support programs, and training benefits for

midcareer workers. Examples of programs to incentivize private sector investments in people, skills development, and new jobs include the Innovation "Superclusters" Initiatives, a Strategic Investment Fund, and the Industrial Technology Benefits Policy.

Canada explicitly recognizes in its policies the need for collaboration and communication among stakeholders from all sectors to address workforce challenges. In 2018, the Canadian government created six Economic Strategy Tables, composed of industry CEOs, to investigate growth challenges within their sectors.[42] The Future Skills Centre, Council and Office, launched in 2019, is a multistakeholder undertaking to identify emerging skill demands; develop, test, and evaluate new approaches to skills development; and share results and best practices. The 2019 Canadian federal budget announced the creation of the Canada Training Benefit, which will help midcareer workers access upskilling opportunities, secure income support during training, and offer job protection while on training leave. [43] Canadian workforce development specialists highlight the need to measure and examine results.[44]

Canada's federal budget for fiscal year 2020/2021 provides CA$922 million to help employers train workers and address local labor market needs through Workforce Development Agreements. Additionally, it offers nearly CA$2.5 billion through Labor Market Development Agreements to support employers with employment insurance-funded skills training and other supports to help workers prepare for and find quality jobs. Lastly, it strives to support access to skilled trades by providing grants to nearly 73,100 Canadians through the Apprenticeship Grants Program.[45] The authors have not seen evaluations for the programs' effectiveness but note the impressive amount of funds being invested.

Box 2: National Workforce Development Agenda in Mexico

In 2019, the president of Mexico and the secretary of labor and social welfare launched one of the largest apprenticeship/mentoring programs in the world, called "Youth Building the Future" (Jóvenes Construyendo Futuro).[46] The program's objective is to increase productivity levels and economic growth by increasing job and training opportunities for 2.3 million young Mexicans aged 18 to 29 who are neither studying nor employed.[47] This mentorship program aims to train young people for up to one year with relevant work skills and link them to the private, not-for-profit, and public sectors. This initiative gives priority to applicants who live in marginalized areas, with high rates of violence and with a predominantly indigenous population.[48] Young people who join this program receive a monthly stipend of 3,600 Mexican pesos (around US$190) and health insurance during their participation in the program. At the end of the training/mentorship year, young people will receive a certificate that describes the training received and the skills developed during the mentorship program, and then will be incorporated into the labor market. National Employment Service will monitor the program.[49]

Experts stress the need to see results, including the measured skills and competencies obtained, the development of recognized certificates, and the onward employment record. They also are concerned about the budget cuts being proposed for the program. Moreover, two limitations of this program must be noted. First, Mexicans Against Corruption (Mexicanos Contra la Corrupción), an independent nongovernmental organization, identified potential "irregularities" in the enrollment patterns of the program.[50] Second, the program is not aimed at preparing young workers

for jobs of the future, but rather for the standard jobs of today. The authors have not yet seen an evaluation of the program's effectiveness.

Box 3: National Workforce Development Agenda in the United States During the Trump and Biden Administrations

Workforce development was an announced priority for President Donald Trump's administration, with the active involvement of his daughter, Mrs. Ivanka Trump, and the Departments of Labor and Commerce. In July 2018, Trump established the President's National Council for the American Worker.[51] The scope of the Council's mandate encompasses key issues regarding skills, competencies and training.[52] The Council met for the first time in March 2019 and created four working groups, which provided their recommendations in September 2019. The recommendations on areas such as developing a campaign to inform workers and students of training initiatives and increasing data transparency are in line with the recommendations of this report. The group also released useful recommendations on modernizing candidate recruitment and measuring private investments in training initiatives.[53]

As part of the National Council for the American Worker, the Trump Administration asked companies throughout the country to sign a "Pledge to America's Workers." Over 450 companies and associations committed to create some 16 million new education and training opportunities over the next five years.[54] The U.S. Administration said it aimed to facilitate the creation of at least 6.5 million training opportunities for American workers from high-school age to near-retirement. The authors have not yet seen evaluations of this program's impact, including the jobs and training opportunities created.

In March 2021, President Biden proposed significant workforce investments as part of his American Jobs Plan. This includes investing a combined $48 billion in American workforce development infrastructure and worker protection. The proposals include $40 billion investment in a new Dislocated Workers program and sector-based training, with $12 billion targeting workers facing some of the greatest challenges. His proposals include scaling up work-based learning programs with a focus on building a diverse workforce, through opportunities like registered apprenticeships, pre-apprenticeship programs and other labor-management training programs. The proposals discuss helping to develop pathways for diverse workers to access training and career opportunities. While the specifics of Biden's proposals still need to be revealed, the description talks about ensuring comprehensive services for workers who have lost their jobs through no fault of their own to gain new skills and to have training programs focused on growing high demand sectors. President Biden's proposals also call for new investments in middle and high schools to connect underrepresented students to STEM and in-demand sectors. They also include significant investment in community college partnerships to deliver jobs training programs based on in-demand skills. Congressional approval will be required to put these proposals into action.[55]

Across the region, subnational governments (states, provinces, and cities) illustrate the importance of public-private-academic partnerships to achieve economic growth and workforce development.[56] Being closest to the challenges, the subnational governments often engage the most rigorously on workforce development. Moreover, subnational governments have played an growing role in building and expanding production and trade networks within North America.

These local and regional successes are what need to be identified as "best practices" to develop continent-wide collaboration. They should be built upon, learned from and scaled up.

The Need for a Public-Private North American Workforce Development Agenda

In the United States, each state, as well as many municipalities, has a Workforce Development Board composed of business leaders, elected officials, educational institutions, and other stakeholders. These boards have created strategic plans relating to workforce development and determine funding priorities.[57] The boards also facilitate the disbursement of federal funds from the Workforce Innovation and Opportunity Act and are at the forefront of implementing the country's workforce development agenda.[58] A particularly successful example was when Siemens announced the opening of manufacturing facilities in Charlotte, North Carolina. Charlotte's workforce development board learned which skills Siemens employees would require and worked with community colleges to train and administer the proper certifications. They also created an exclusive application website for candidates interested in working at Siemens.[59] When the Siemens facilities opened, a highly qualified workforce was prepared to begin manufacturing.

In Mexico, the Canadian aerospace and transportation company Bombardier Inc., whose production network encompasses all three countries, collaborated with and invested in the Universidad Aeronaútica en Querétaro to develop a qualified workforce training program to fulfill the company's labor market needs. The program trains students in structural assemblies and composite materials manufacturing, enabling the students to work for Bombardier upon completion of the program.[60] This partnership expanded, transforming the state of Querétaro into an aerospace hub and allowing it to become the state in Mexico with the highest GDP growth rate.[61] Querétaro is now home to 80 aerospace companies and 7 specialized education centers, with more than 8,000 people employed in the aerospace sector.[62] Another example is the creation of the Complejo Interinstitucional de Formación e Innovación para la Industria Automotriz (CIFIIA), under the sponsorship of the government of the State of Puebla, the University of Puebla, and the German car manufacturer Audi.[63] CIFIIA is aimed at developing a regional network of public education institutions for vocational training on the automotive sector. The program model is supported with the help of academic coaches (teachers), industry mentors, and the "maker" community that interact and create diverse learning opportunities for students. The flexible, competence-based curricular model allows students to select their choice of online or on-site courses and learning experiences. To date, CIFIIA's model is in its initial stages of implementation.

In British Columbia, Canada, the City of Surrey, in partnership with Simon Fraser University and Kwantlen Polytechnic University, implemented a strategy to build innovative talent after the region identified significant skilled-worker shortages in 2015. Studying feedback from over 250 manufacturers, the City of Surrey and its partners saw that manufacturers were struggling to hire production-line workers, tradespeople, technicians, and engineers for advanced manufacturing systems. They developed a "phased action plan" to help address the skills gaps. Phase one of the plan consists of strategies to increase the knowledge and availability of advanced skills in Surrey manufacturing. Strategies currently pursued in this phase include improving information sharing between manufacturers, conducting learning missions to other countries, increasing co-op students and interns, and exploring the possibility of creating a Centre of Excellence for Advanced

Manufacturing in Surrey. The next two phases of the action plan are currently under development. The second phase will aim to attract manufacturing businesses to Surrey, while the third one will review university programs to ensure they are in line with Industry 4.0 needs and raise awareness among high school students about careers in the manufacturing industry. Along with this strategy, both universities collaborated with Siemens to create the Siemens Mechatronic Systems Certification Program, a graduate certificate course that facilitates pursuing a career in automation and manufacturing.[64]

Simply implementing these kinds of programs is not enough, however. The three North American countries must also work to ensure that the public and stakeholders are aware of the programs' existence and the benefits that participation creates for students, workers, and industry. They also need to build in careful examination of results.[65] The United States, Mexico, and Canada should establish formal mechanisms to implement trilateral innovation strategies aimed at improving workforce development through a regional focus, and at exchanging lessons learned. These mechanisms could very well be part of the USMCA's Committee on Competitiveness discussed below.

USMCA Opens a Window for Cooperation

The renegotiation of the North American Free Trade Agreement (NAFTA) resulted in the United States-Mexico-Canada Agreement (USMCA), which took effect on July 1, 2020. USMCA opens a new window for cooperation on workforce development and related issues. Trade between the three countries under NAFTA increased from just over US$300 billion in 1993 to more than US$1.2 trillion in 2019; a jump of some 300 percent.[66] Under NAFTA, the private sector built regional production networks, covering automotive, petrochemical, aerospace and other manufactured goods. These trade networks support up to 12 million jobs in the United States and millions more in Mexico and Canada (Figure 14).

Of special importance for the three economies is the development of their border regions. The benefits of regional trade to employment and local GDP are discussed in Box 4.

Figure 14. Top 10 States: Number of U.S. Jobs Supported by Trade with Mexico and Canada, 2017

Trade with Mexico: 4.9 million			Trade with Canada: 7.2 million		
No.	State	Net Number of U.S. Jobs (Thousands)	No.	State	Net Number of U.S. Jobs (Thousands)
1	California	+ 572.2	1	California	+ 898.5
2	Texas	+ 399.5	2	Texas	+ 549.4
3	New York	+ 325.5	3	New York	+ 475.9
4	Illinois	+ 198.0	4	Florida	+ 446.3
5	Pennsylvania	+ 195.7	5	Illinois	+ 293.7
6	Ohio	+ 170.9	6	Pennsylvania	+ 282.3
7	Georgia	+ 158.2	7	Ohio	+ 257.5
8	North Carolina	+ 150.6	8	Georgia	+ 229.2
9	New Jersey	+ 141.2	9	North Carolina	+ 225.8
10	Virginia	+ 135.3	10	Michigan	+ 209.7

Box 4: Workforce Development and the Border Regions

The United States and its neighbors also have much to gain from strengthening North American economic partnerships. For example, a 2018 "Bordernomics" study by the Perryman Group estimates that enhancing economic integration across the U.S.-Mexico border would bring substantial benefits. For the U.S. border states, the increase in employment and GDP could range from 700,000 to 1.4 million jobs, and from $69 billion to $140 billion in added GDP, with the largest impact in the state of California. For the Mexican border states, the "Bordernomics" study finds the increase in employment would range from 96,000 to 193,000 jobs and a GDP increase of $4.8 billion to $9.7 billion, with the largest impact in the state of Nuevo León, which has well-equipped universities and the tradition of academic-business collaboration.[67]

The immediate cross-border economies themselves are substantial. In 2017, the U.S.-Canada and U.S.-Mexico border states' GDP reached $6.25 trillion and $5.07 trillion, respectively. The GDPs of the border states would constitute the third-largest economy in the world, after the United States and China with $19.49 trillion and $12.01 trillion, respectively, surpassing Japan with $4.87 trillion.[68] The three countries can benefit from focusing on strengthening the competitiveness of border states' coproduction networks, which can also help improve the quality of life and the environment on both sides of the border.

Although the USMCA negotiations did not address workforce development directly, the chapter on labor (chapter 23) specifically calls for sharing of best practices and developing cooperative activities, including on apprenticeships.[69] The competitiveness chapter (chapter 26) outlines the parties' shared interest in strengthening regional economic growth and calls for the establishment of a Committee on Competitiveness, which could encompass the multisector, multistakeholder dialogue on workforce development.[70] Through these avenues, all three USMCA countries can address the issues surrounding the future of work and of North America's competitiveness. North America would benefit greatly from a public-private-academic process where governments (at all levels), the private sector, unions, educational institutions, and others could explore best practices on workforce development.

Priorities for Action

The authors strongly recommend that the United States, Mexico, and Canada create a trilateral task force and four working groups to develop and coordinate regional cooperation on key elements of workforce development in the context of maintaining and increasing the region's competitiveness as well as meeting the needs of the continent's workforces and businesses.[71] The trilateral task force and the four working groups should meet collectively at least once a year to oversee the evolution of strategies and to identify and eliminate barriers.

The three governments might also find it useful to launch public-private task forces or working groups focused on specific linked sectors where further technological change is expected. Given the importance of the vehicle sector in North American production chains, the expansion of electric

vehicle production and use could be one such area for coordinated approaches. An enhanced focus on renewable energy and the creation of new "green" jobs promoted by the Biden administration is another example of a cross-cutting topic that could have an important workforce development element.

Issue 1. Expand Apprenticeships and Other Types of Work-Based Learning and Technical Education, Including Internships, Mentorships, and Mid-Career Learning

Work-based learning (WBL) or work-integrated learning programs encompass a wide range of models. Apprenticeships are a well-known, but differentiated example. The mix of academic instruction and on-the-job learning equips individuals with relevant capabilities to meet the demands of the labor market and provides businesses with the trained employees they need. These types of learning programs have positive impacts on the economy, facilitating the transition from school to the labor market, fostering productivity and higher wages, and encouraging workers to seek further education.[72] WBL also helps to fulfill the mission of educational institutions by being close to and relevant for improved quality of life and enhanced opportunities in their communities.

WBL approaches such as apprenticeship programs can address skills gaps by immediately placing workers in unfilled jobs, and the companies offering the apprenticeships can adjust the training to fit evolving needs.[73] WBL also provides a career path by offering workers paying jobs, certifications, and marketable skills.[74] However, apprenticeships and other WBL initiatives will need to evolve with the pace of technological change and workplace needs. The OECD recommends that its member countries move away from front-loaded education systems to a model where skills are continuously updated to match changing demand.[75]

Despite the benefits of WBL programs, they remain a second choice for many young people in North America. The National Association of Manufacturers found that negative stereotypes persist regarding vocational education.[76] Yet the OECD reports that each year of postsecondary education that a worker receives leads to an increase in per capita income of 4 to 7 percent.[77] Serious questions remain to be addressed about how best to incentivize young people and businesses to pursue WBL models.[78] Improving public appreciation of the importance of technical and technological education appears to be an important agenda item for the new Committee on Competitiveness.

Current Federal Apprenticeship Programs

In recent years, the three economies of North America have increased their interest and investment in career and technical education. However, more can be done on both the national and local levels to promote WBL and further education for employees.

In the United States, labor unions historically have been a major provider of apprenticeship and on-the-job training programs. The AFL-CIO (American Federation of Labor and Congress of Industrial Organizations) lists registered apprenticeship programs, which the organization says provide on-the-job training under the guidance of professionals in the relevant industry.[79] The previous U.S. federal administration called for the expansion of apprenticeships and vocational education as a national policy priority.[80] The U.S. Department of Labor proposed an Industry-

Recognized Apprenticeship Program on June 24, 2019.[81] The rule would allow the Department of Labor to certify private organizations as Standards Recognition Entities (SREs), which would in turn be responsible for regulating the Industry-Recognized Apprenticeship Programs.[82] The Final Rule became effective May 11, 2020, with the U.S. Department of Labor accepting SRE applications through an online portal.[83] This portal (Apprenticeship.gov) also connects job seekers, employers, training providers, parents, teachers, and local workforce agencies with resources about apprenticeship programs and instructions on how to access these opportunities.[84]

In 2013, Mexico's Secretaría de Educación Pública (SEP), in partnership with the Cámara México - Alemana de Comercio e Industria (CAMEXA) and the Confederación Patronal de la República Mexicana (COPARMEX), created the Modelo Mexicano de Formación Dual (MMFD, Mexican Dual System of Vocational Education), which has expanded across the country. Governments, educational institutions, and industry cooperate in this effort.[85] Another effort, the Colegio Nacional de Educación Profesional Técnica (CONALEP, National College of Technical Professional Education) is a federal institution that provides technical education across all states in Mexico and working to meet skills needed of nearby industries.[86] The Tecnológico Nacional de México (TecNM, National Technological Institute of Mexico) is another federal entity that provides technological education to over 608,000 students at 254 campuses across Mexico.[87] With an annual budget of 25,800 Mexican pesos (about US$1,300) per student, TecNM is the largest single institution for engineering education in the country.[88]

In a similar fashion to the United States, Mexico's Secretaría de Trabajo y Prevención Social (STPS) grants special certifications to private organizations which provide training for workers and employers as Agentes Capacitadores Externos (External Training Agents). Moreover, in 2019, Mexico's STPS created the first government website aimed at training the Mexican workforce by providing tools and information such as available apprenticeship programs, advisory services, and overall educational materials, with the intent of raising Mexico's labor force's productivity.[89]

In Canada, the Red Seal Program is a long-standing federal-provincial-territorial partnership that develops common national standards and examinations for designated trades.[90] The Canadian federal, provincial, and territorial governments have been working closely with industry to further harmonize apprenticeship training and align apprenticeship systems across the country.[91] In addition, the Federal Student Work Experience Program is a similar undertaking which provides full-time students hands-on experience related to their field of study.[92] Another example of technical education in Canada is the emergence of a third pillar of postsecondary education, alongside universities and community colleges—polytechnics, which offer industry-aligned technical and technological training to earn credentials. Canadian polytechnics combine academic education with experiential learning opportunities focused on the development of skills and application of technology, working with industry associations and employers of all sizes.[93]

Private Sector Initiatives

A number of companies and associations are leading workforce training efforts in North America. Walmart, for example, launched Walmart Academies in 2016, now operating over 200 training academies across the United States where more than 500,000 workers have been trained in advanced retail, technical and digital skills.[94] Similarly, Amazon's Career Choice Program pays
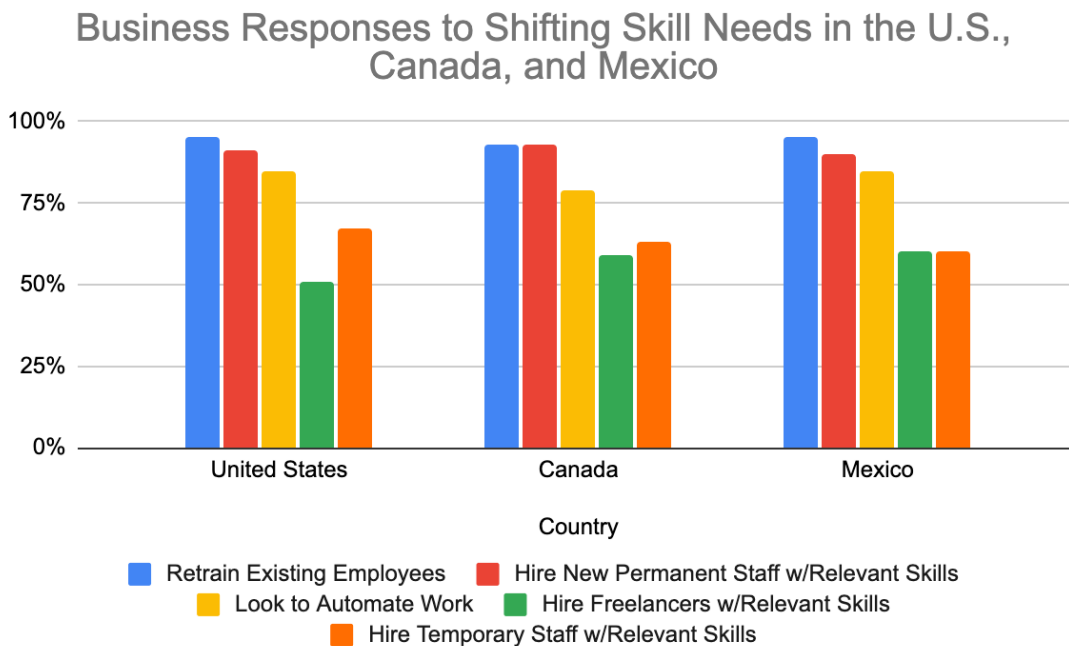
95 percent of the fees for their workers to get a certificate or diploma in qualified/in-demand careers.[95]

The Markle Foundation has sparked three private sector initiatives. First, the Rework America Alliance, is a nationwide collaboration to enable unemployed and low-wage workers to emerge from the pandemic-sparked crisis stronger by accelerating the development of an effective system of worker training aligned to jobs that employers will need to fill. Second, the Rework America Business Network, explores how companies can better utilize a skills-based approach when it comes to hiring, learning, and development. Third, the Rework America Learning Network, brings together innovative training providers, practitioners, organizations, and leaders to build the skills of adults who do not have a bachelor's degree.[96] In addition, the National Skills Coalition connects a wide range of stakeholders, including businesses and foundations, to demonstrate broad-based support for a new national skills policy.[97]

As of the 2018 Accenture study, most companies had not yet accepted the value proposition of midcareer on-the-job training.[98] That may be changing. The 2020 WEF jobs report found that on average the employers they surveyed said they expected to offer reskilling and upskilling to just over 70 percent of their employees by 2025 and that they hoped to internally deploy nearly 50 percent of workers displaced by technological automation and augmentation (Figure 15).[99]

Figure 15. Business Responses to Shifting Skill Needs

Business Responses to Shifting Skill Needs in the U.S., Canada, and Mexico

Legend:
- Retrain Existing Employees
- Hire New Permanent Staff w/Relevant Skills
- Look to Automate Work
- Hire Freelancers w/Relevant Skills
- Hire Temporary Staff w/Relevant Skills

Source: WEF, *The Future of Jobs Report 2020*.

Small and mid-sized businesses often find the cost of upskilling and reskilling programs to be prohibitive. Industry or sector partnerships with existing workforce stakeholders, especially government, can help smaller organizations to reap more benefits from training programs.[100] Yet the WEF 2020 report finds that only 21 percent of businesses reported being able to use public

funds to support their reskilling and upskilling efforts.[101] The WEF also found that a significant number of employees in Canada, Mexico and the United States would need a year or more of additional skills training (Figure 16).

Figure 16. Average Reskilling Needs in the United States, Canada, and Mexico

Source: WEF, *The Future of Jobs Report 2020*.

Given these needs in North America, the authors suggest that the federal governments of Canada, Mexico, and the United States should agree to create trilateral standards for the following elements:

1. **Define apprenticeships and other major types of work-based learning (WBL), as well as minimum criteria and quality standards.[102]** Any agreement should leave flexibility to adapt to national, regional, and local demands, while incorporating economic and technological changes and providing common professional skills attributes.

2. **Agree on broad guidelines assigning roles and responsibilities to governments, industry, and intermediaries regarding the development, implementation, and funding of apprenticeships and other WBL.**

3. **Create a trinational career and technical education and apprenticeship task force to identify best practices in strategies to promote apprenticeships and other WBL programs.**

4. **Agree on elements of a marketing strategy to increase public awareness of the advantages of WBL in order to change negative public misperceptions of such programs.**

5. **Build trinational spaces to foster ongoing dialogue between regional stakeholders in order to share best practices on WBL and training, and to strengthen public-private**

partnerships. These spaces should include creating industry-academia dialogue platforms within and across countries that become part of the workforce ecosystem. Such platforms should also be implemented at the local and subnational level.

6. **Agree among the three countries on ways to incentivize and support companies, including small and mid-sized enterprises, to develop training and learning programs for reskilling and upskilling their workforces.** Such programs should emphasize training and learning about exponential technologies, such as Internet of Things, artificial intelligence, blockchain, intelligent transportation systems technologies, self-learning systems, and sensors. Best practices in government programs and practices should be identified.

Issue 2. Address Key Issues Surrounding Credentials, Including Recognition and Portability, to Enhance Transparency

Professional credentials provide a clear sense of what skills a worker has and facilitate mobility in the labor market. They generally reduce selection costs for firms and lead to higher wages and quality of workers. Enhanced mobility can help alleviate the impact of job displacement. Yet the current fragmented system for credentials among many U.S. states and Canadian provinces, for example, forms a barrier to mobility and portability for workers of many skills levels.[103] Higher education and employment services are disjointed across the continent and too often are disconnected from employer and industry needs. This is a major challenge across national borders, where various nontransferable credentials leave skilled and well-educated individuals underemployed.[104] Some employers are moving away from credential-based hiring to focus on competencies, but differing understandings of "competencies" can lead to perceived skills mismatches.

Given the range of governmental jurisdictions and different regional and sectorial demands, this is a complex area. The Mexican National Competencies Framework and the Canadian Red Seal Program are examples of national efforts to better coordinate and bring transparency to the credentials/competencies market.[105] Although several efforts have been made to develop such a system in the United States, as of yet none has been widely accepted. In addition to challenges with each country, differences in education and training systems across the region make it difficult to compare qualifications and assess skills of workers holding credentials from another North American country. It is vital, however, to work toward making credentials comparable, transferable, stackable, and more transparent to support North American competitiveness and to help meet skills gaps and mismatches. Part of this task is getting employers to validate and recognize education and experience from neighboring countries. The Pan-Canadian Framework for the Assessment and Recognition of Foreign Qualifications, for example, seeks to improve assessment and recognition of foreign qualifications so people are able to effectively use their skills in the Canadian labor market.[106] These types of changes are needed as education is transformed from a largely front-loaded system to one in which skills are continuously updated during the working life, as the OECD promotes.[107]

North America can learn from the best practices of other countries and regions regarding credentialing systems. The EU has developed a common language of competencies and skills by

developing the European Skills/Competencies, Qualifications and Occupations Framework, which encourages the private sector and educational institutions to develop and validate credentials, and also ensures quality programs.[108] Such a system likely will face challenges given the strong role of provinces and states in the United States and Canada, the EU also had to spend years forging agreement among its member states, and it still relies on member states to implement the skills framework.

Although this chapter has not addressed gender or ethnic factors, any policy design and implementation in each of the three countries, as well as into any continental dialogues, will need to consider and incorporate them. The authors recommend the three North American countries work to build agreement upon the following elements:

1. **Develop a common language about credentials and competencies to facilitate understanding, quality, transferability, recognition, and the ability to stack or accumulate them..** High-quality credentials should be industry-defined and competency-based to ensure they meet the needs of the labor market, are accepted and used widely, and are comparable regionally.

2. **Develop or strengthen national competency frameworks and aligning them to the trinational common language of credentials and competencies.** This process could involve revising and updating frameworks periodically in order to meet evolving labor market needs, as well as promoting the use of competency frameworks in hiring processes. These frameworks could encompass innovations such as micro-credentials and digital badges.

3. **Develop guidelines to assess and validate informal learning and professional experience, and to identify skills associated to such experience. Share and emulate best practices across the continent.**

Issue 3. Improve Labor Market Data Collection and Transparency, Including Moving Toward Accepted Norms for Employment, Education, and Skills-Related Data Collected and Making Such Data Widely Available

One of the biggest challenges is that neither public authorities nor the private sector and academia collect and share data on credentials, skills, and workforce trends. Improved data collection can allow people to make better-informed career decisions and, if shared widely, can bring valuable transparency to the labor market.[109] The speed of change in the economy increasingly requires the development of real-time labor market information platforms and databases of in-demand skills that are regularly updated.

One proposed concept is the creation of a North American Workforce Observatory (NAWO) as a tool for continued review and evaluation of the needs (quantitative and qualitative) of the North American workforce based on recent changes and trends. NAWO would aid public policy makers, industry, and education institutions for making timely and pertinent decisions about labor development, reskilling, and training. It also would provide relevant information for students and workers in the region.

In 2018, President Trump tasked his Council for the American Worker to "propose ways to increase access to important information such as available job data and skills required to fill open jobs, so that American students and workers can make the most informed decisions possible regarding their education, job selection, and career paths."[110] The U.S. Department of Labor already provides O*Net as a primary source of occupational information with a substantial database of occupations available for those seeking jobs, training, and skilled employees.[111]

In 2018, the Government of Canada announced the creation of the Education and Labour Market Longitudinal Platform and the Labour Market Information Council. The Education and Labour Market Longitudinal Platform is a tool to help find information and trends related to individuals' transitions from education to the labor market. However, the government is planning to make the digital platform available to the entire population and allow its use to monitor progress of government programs.[112] The Labour Market Information Council is a not-for-profit group established to provide timely, reliable, and accessible labor market information.[113] The official Government of Canada's webpage also has a "Find a Job" tab which matches workers with job postings across the country.[114]

In 2013, the Government of Mexico issued the National Digital Strategy, "México Digital."[115] By 2017, Mexico's sustained efforts in digital government and open government data were reflected in the country's fifth ranking position in the OECD's Open, Useful, Re-usable Data Index.[116] According to the OECD, Mexico's digital transformation of government has enabled the country to position itself as a global and regional leader.[117] Since 1973, the specialized organism in Mexico connecting workers to jobs has been the STPS National Employment Service (Servicio Nacional de Empleo). Recently, this service launched the "Portal del Empleo"—a website that provides information, training, and counseling related to the labor market. This STPS platform offers a searching tool for job postings throughout the country, online counseling, and online training programs.[118]

In 2014, the North American countries' federal governments launched the North American Cooperation on Energy Information website, which compiles energy-related data, maps, and analyses from the three countries in English, French and Spanish.[119] Applying this model to skills, jobs, education, and training across the continent and to strategic sectors could bring substantial benefits.

The following elements should be agreed upon trilaterally through a collaborative process:

1. **Develop norms to collect real-time labor market data and information in a consistent and homogeneous way so it is comparable across countries and across the region as well as easily accessible.** The data collected could include a list of in-demand skills and competencies, longitudinal data to measure performance, and the return on investment of education and training programs and credentials, perhaps including information that addresses the development of hard (technical) and soft (employability) skills.

2. **Establish a North American Workforce Observatory (NAWO) aimed at developing a trinational online platform (linked to national platforms) to serve as a hub for real-**

time labor market data in the three countries, and for best practices from the public and private sectors.

3. **Develop guidelines to make the trinational NAWO platform and data tools openly available to stakeholders, while allowing space for the development of private sector initiatives.**
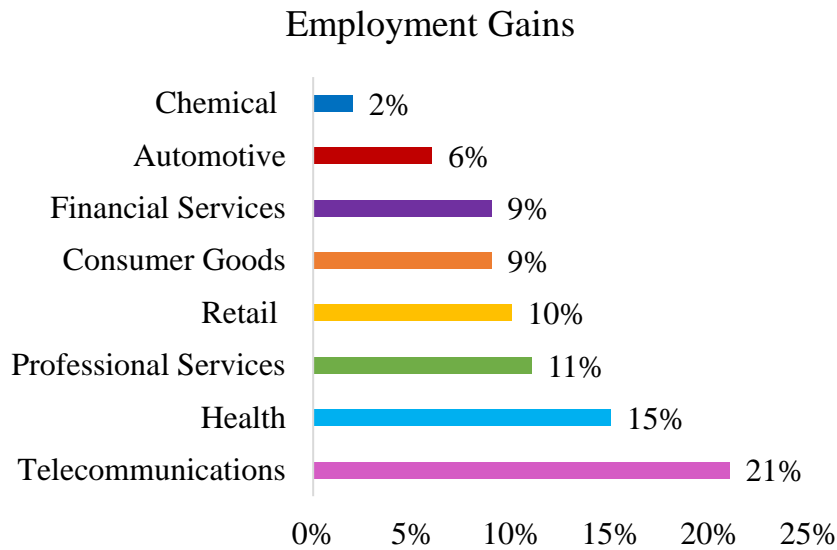
Issue 4. Identify Best Practices to Approach/Prepare for "The Fourth Industrial Revolution," the Transformative Arrival of New Technologies and the Future of Work

Experts argue that the already rapid pace of change will increase and that the changes will produce massive job creation, destruction, and transformation of workplaces and work/life styles.[120] As noted at the outset, many now argue that the pandemic has increased the speed with which new technology and processes are being put into practice.[121]

From the perspective of North American commerce, as the economies emerge from the pandemic, significant changes may become more apparent. These changes include more use of technology in production and in supply chains, more use of the internet for commerce, more cross-border data flows to help manage business, more management of different processes from afar, more provision of services via internet, and more need for new and higher-level skills among workers. Broadly speaking, new technology can allow businesses and individuals to achieve higher levels of productivity, creativity, and economic growth, but it can also displace many workers and spark serious economic and social disruption, as the United States experienced over the past decade. According to two studies of recent recessions, employers shed less-skilled workers and replaced them with technology and higher-skilled workers.[122] This trend posed societywide public policy problems for governments faced with higher unemployment and for businesses seeking workers with the skills needed.

As a part of the solution, the World Economic Forum argues for the adoption of business models that fully integrate investment in human capital as an integral element in budget and planning.[123] According to Accenture, those companies that successfully integrate technology and human capital could increase profits by 38 percent and employment by 10 percent, on the average, by 2022 (see Figures 17 and 18). However, a low percentage of CEOs interviewed by Accenture plan to invest in training programs to retool workers. To assure potential gains, employers should start investing more in agile job training programs.[124] Several of the specialists consulted stress that quality training fosters higher productivity and loyalty, reducing turnover.[125] These needs also underscore the vital importance of partnerships with educational institutions.

Figures 17. Projected Employment by Adopting New Technologies

Employment Gains

Industry	Employment Gain
Chemical	2%
Automotive	6%
Financial Services	9%
Consumer Goods	9%
Retail	10%
Professional Services	11%
Health	15%
Telecommunications	21%

Source: Ellyn Shook and Mark Knickrehm, "Reworking the Revolution," Accenture Strategy, 2018.

Figure 18. Projected Revenue Gains for Adopting New Technologies

Revenue Gains

Industry	Revenue Gain
Automotive	28%
Chemical	32%
Financial Services	32%
Professional Services	34%
Retail	41%
Telecommunications	46%
Health	49%
Consumer Goods	51%
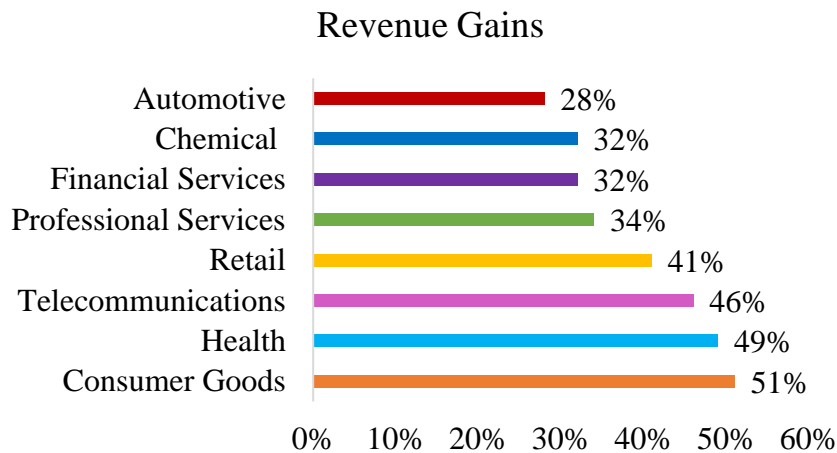
Source: Shook and Knickrehm, "Reworking the Revolution."

Private, public, and academic sector leadership is needed to get the mix right and to develop new public-private-academic models to adapt successfully to the pace of change, or all three countries will face serious problems.[126] Such models need to include developing a 21st-century educational system to keep up with the demands of the labor market. The OECD has underscored the need for educational improvements in all three countries, especially in Mexico.[127] For Mexico, one of the main setbacks for education improvements is the architecture of the educational system. A paradigm shift and redesign will be needed to establish an education-research-innovation-creativity system.[128] For such a system to properly work, policies and strategies in the Mexican Ministry of Public Education and the Mexican National Council for Science and Technology

should be aligned.[129] The McKinsey Global Institute argues that demand for higher cognitive skills, social skills, and technological skills will increase by 2030 (Figure 19).[130]

Consequently, much more emphasis is needed on educators' relevant training, tools, and skills to adapt their teaching and learning methods. A well-prepared and skilled educator could make the difference in establishing a proper and conducive learning environment. Curricula also need to be updated to match current and future job market needs. The effects of the COVID-19 pandemic will doubtless put a premium on a number of these skills, as economies and commerce adapt and try to emerge from the economic downturn.

North American needs to learn from the experiences during the pandemic. Equity, recovery and resilience will be priorities for governments, especially with predictions that lower skilled workers and traditionally disadvantaged workers may well face more barriers coming out of this crisis. Workforce development needs to be better incorporated into economic and industrial policies going forward with better public-private-academic collaboration. Training needs to be agile and flexible to reflect evolving in-demand sectors and technology and both workers and employers are going to need help navigating the changes. Simultaneously, positive lessons from the pandemic should be built upon, e.g., distance work could be expanded across the continent for those positions where that type of work is suitable and distance education/training that is working should be continued and expanded. Above all successful models should be identified as "best practices" and scaled up.

Figure 19. Required Skills for Moving into Industry 4.0.

Cognitive Skills	Social Skills	Technological Skills
Advanced literacy and writing	Advanced communication and negotiation	IT (information technology) literacy
Quantitative skills	Empathy	Data analyis
Critical thinking	Ability to learn continuously	Research
Complex information processing	Adaptability	Programming
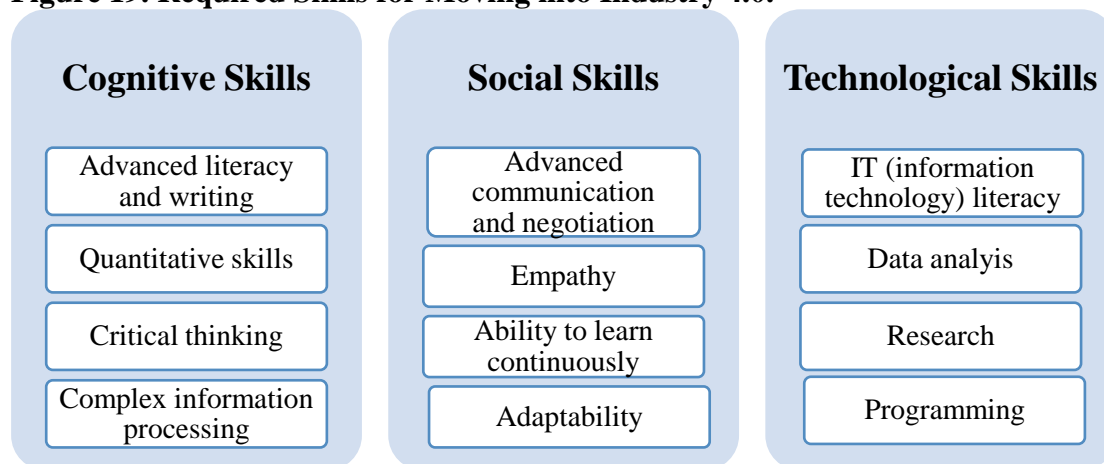
Source: McKinsey Global Institute, "Skill Shift Automation and the Future of the Workforce," 2018.

The authors suggest trilateral work to reach agreement in the following areas:

1. **Identify successful examples of private and public collaboration, with emphasis on highlighting promising steps and tools to incentivize companies to invest in worker reskilling and upskilling, to provide midcareer training and learning opportunities, and to develop agile training and learning programs to ease the transition and improve the quality of work transformations.**

2. **Agree on approaches and strategies to encourage companies to collaborate with educational institutions, trade unions, and other interested parties to better align curricula with the evolving labor market needs, better connect graduates to the labor market, and foster the modernization of educational spaces.** The North American Workforce Observatory could provide relevant information and trend analysis to support education modernization.

   a. *Work to strengthen STEM education* as a strategic tool for creating a strong basis of skills for the development of strategic technical workforce skills.
   b. *Emphasize training and learning about exponential technologies*, deemed critical for improving North American competitiveness.
   c. *Recognize the social value of businesses that generate entry-level jobs* at scale and at multiple points along the skill curve, as well as of educational institutions that develop flexible, well-targeted curriculums.
   d. *Foster curricula flexibility by allowing students to design their own studies based on their own expectations*. Modernized curricula should also enable students to attain intermediate skill/competence certificates during college and university studies. Such intermediate certificates could be aligned with apprenticeship programs.

3. **Build trinational spaces to share best practices on the implementation of Industry 4.0 and the lessons from pandemic era workspaces, and to strengthen partnerships to better link the priorities of the business, academic, and government actors. Look for ways to maintain and expand models of remote or distance work that can work well across the continent and its value chains.**

4. **Identify best practices for small and mid-sized enterprises to keep up with technological changes and talent creation.**

5. **Establish trilateral research and innovation projects in strategic economic areas through grants and scholarships. Invest in evaluation to assess future trends and prepare for future skills needs.[131]**

   a. *Align competing frameworks* to help foster regional development, including across borders, through cluster-based innovation initiatives and connect them with the education sector to strengthen the chain of value.
   b. Establish trilateral mechanisms to support the development and implementation of new technologies to increase trading opportunities and improve workforce competitiveness. Similarly, create trilateral collaboration that can identify, highlight and share emerging skills needs.

Implementing the North American Agenda

The North American Workforce Development Agenda should be a collaborative effort that includes North American governments, private sector, educational institutions, unions, and nongovernmental organizations. The agenda should provide mechanisms to convene both federal

and subnational governments to collaborate and innovate on best practices. Many of the successes and innovative approaches are being forged at local levels, and this culture of creativity needs to be encouraged across North America.

The economic and social impacts of the pandemic only underscore the importance of energetically pursuing this agenda now. The arrival of the Biden administration in the United States should open a host of new possibilities for collaboration across the continent. Even as President Joe Biden prioritizes "building back better" at home, working collaboratively with the United States's immediate neighbors and largest economic partners makes great sense for assuring prosperity and global competitiveness.

To guide future progress on these issues, the three national governments should establish an overarching senior level trilateral taskforce with substantial private sector and academic participation. The taskforce would name public/private/academic and federal.subfederal working groups to develop specific proposals in the four areas described above and ensure that programs are effectively communicated to the public to fully reach intended participants. As the process develops, specialized working groups might be formed, for example, on digital skills training or use of community and technical colleges. The three governments should also identify promising programs and models that should be scaled up early as priority best practices. The trinational task force and working groups should be linked formally to the ongoing work of USMCA's competitiveness committee, but they also should operate in parallel with USMCA as part of a broader competitiveness agenda for North America.[132] The bottom line is that North America's workers and businesses will benefit greatly from pursuing an active dialogue and enhanced cooperation on workforce development to improve the economic, social and political well-being of the United States, Mexico, and Canada.

North American Workforce Development Agenda 2.0
Elements that should be agreed among the three countries in a public-private multistakeholder process
Issue 1. Investing in Apprenticeships and Other Work-based Learning and Education
1. Define apprenticeships and other major types of work-based learning (WBL), as well as minimum criteria and quality standards.
2. Agree on broad guidelines assigning roles and responsibilities to governments, industry, and intermediaries regarding the development, implementation, and funding of apprenticeships and other WBL.
3. Create a trinational Career and Technical Education (CTE) and apprenticeship taskforce to identify best practices in strategies to promote apprenticeships and other WBL programs.
4. Agree on elements of a marketing strategy to increase public awareness of the advantages of WBL in order to change negative public misperceptions of such programs.
5. Build spaces to foster ongoing dialogue between regional stakeholders in order to share best practices on WBL and training, and to strengthen public-private partnerships.
6. Agree among the three countries on ways to incentivize and support companies, including small and mid-sized enterprises, to develop training and learning programs for reskilling and upskilling their workforces.
Issue 2. Addressing Credentials and Related Issues
1. Develop a common language about credentials and competencies to facilitate understanding, quality, transferability, and recognition.
2. Develop or strengthen national competency frameworks and align them to a shared trinational common language regarding credentials and competencies.
3. Develop guidelines to assess and validate informal learning and professional experience, and to identify skills associated to such experience. Share and emulate best practices across the continent.
Issue 3. Improving Labor Market Data Collection and Transparency

1. Develop norms to collect real-time labor market data and information in a consistent and homogeneous way so it is comparable across countries and across the region as well as easily accessible.
2. Establish a North American Workforce Observatory (NAWO) aimed at developing a trinational online platform (linked to national platforms) to serve as a hub for real-time labor market data in the three countries, and for best practices from the public and private sectors.
3. Develop guidelines to make the trinational NAWO platform and data tools openly available to stakeholders, while allowing space for the development of private sector initiatives.
Issue 4. Learning Best Practices for "The Fourth Industrial Revolution" and the Future of Work
1. Identify successful examples of private and public collaboration, with emphasis on highlighting promising steps and tools to incentivize companies to invest in worker reskilling and upskilling, to provide midcareer training and learning opportunities, and to develop agile training and learning programs to ease the transition and improve the quality of work transformations.
2. Agree on approaches and strategies to encourage companies to collaborate with educational institutions, trade unions, and other interested parties to better align curricula with the evolving labor market needs, better connect graduates to the labor market, and foster the modernization of educational spaces.
3. Build trinational spaces to share best practices from pandemic work experiences, the implementation of Industry 4.0 and existing partnerships to better link the priorities of the business, academic, and government actors.
4. Identify best practices for small and mid-sized enterprises to keep up with technological changes and talent creation.
5. Establish trilateral research and innovation projects in strategic economic areas through grants and scholarships. Invest in evaluation to assess future trends and prepare for future skills needs.

Acknowledgments

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