

SKILLSNEXT

Return on Investment

Industry Leadership on Upskilling and Reskilling their Workforce

JANUARY 2020

Dr. Wendy Cukier





Good Policy. Better Canada. The Public Policy Forum builds bridges among diverse participants in the policymaking process and gives them a platform to examine issues, offer new perspectives and feed fresh ideas into critical policy discussions. We believe good policy is critical to making a better Canada—a country that’s cohesive, prosperous and secure. We contribute by:

- Conducting research on critical issues;
- Convening candid dialogues on research subjects; and
- Recognizing exceptional leaders.

Our approach—called **Inclusion to Conclusion**—brings emerging and established voices to policy conversations, which informs conclusions that identify obstacles to success and pathways forward. PPF is an independent, non-partisan charity whose members are a diverse group of private, public and non-profit organizations.

ppforum.ca [@ppforumca](https://twitter.com/ppforumca)



The Future Skills Centre is a forward-thinking centre for research and collaboration dedicated to preparing Canadians for employment success. We believe Canadians should feel confident about the skills they have to succeed in a changing workforce. As a pan-Canadian community, we are collaborating to rigorously identify, test, measure and share innovative approaches to assessing and developing the skills Canadians need to thrive in the days and years ahead.

The Future Skills Centre is a partnership between:



For more information, visit www.fsc-ccf.ca or contact info@fsc-ccf.ca





The Diversity Institute conducts and coordinates multi-disciplinary, multi-stakeholder research to address the needs of diverse Canadians, the changing nature of skills and competencies, and the policies, processes and tools that advance economic inclusion and success. Our action-oriented, evidence-based approach is advancing knowledge of the complex barriers faced by underrepresented groups, leading practices to effect change, and producing concrete results. The Diversity Institute is a research lead for the Future Skills Centre.

This report is available online: [English](#) | [French](#)

ISBN: 978-1-988886-89-3

Skills Next is funded by the Government of Canada's [Future Skills Centre](#).

The opinions and interpretations in this publication are those of the authors and do not necessarily reflect those of the Government of Canada. This report may be reproduced for non-profit and educational purposes, with the exception of scholarly or professional journals. For more information on reproduction rights, please email communications@fsc-ccf.ca.

The word 'Canada' in a serif font, with a small Canadian flag icon above the 'a'.

TABLE OF CONTENTS

About the Projectiv

About the Authors.....vi

Executive Summary1

Introduction.....3

Canada in the International Context.....5

Case Studies8

 ICT Sector13

 Financial Services17

 Consulting.....20

 Other sectors23

Impacts: What Works and What Does Not Work.....25

Preparing for the Future of Work: The Need to Develop an Upskilling and Reskilling Strategy28

Further Research.....33

References34

ABOUT THE PROJECT

Canadians' needs for skills training are changing rapidly. Through Skills Next, the Public Policy Forum and the Diversity Institute—in its role as a research lead for the Future Skills Centre—are publishing a series of reports that explore a number of the most important issues currently impacting the skills ecosystem in Canada. Each report focuses on one issue, reviews the existing state of knowledge on this topic, and identifies areas in need of additional research. This strong foundation is intended to help support further research and strengthen policymaking. A diverse set of authors who are engaged in the skills ecosystem through various roles, including through research, activism and policymaking, have been carefully selected to provide a broad range of perspectives while also foregrounding the Canadian context. Their varied backgrounds, experiences and expertise have shaped their individual perspectives, their analyses of the current skills ecosystem, and the reports they have authored.

Skills Next includes reports focused on:

- **Global comparison of trends to understand the future of skills;**
- **Knowns and unknowns about skills in labour market information;**
- **Rethinking the relationship between technology and the future of work;**
- **Defining digital skills and the pathways to acquiring them;**
- **Barriers to employment for immigrants and racialized people in Canada;**
- **Barriers to employment for persons with disabilities;**
- **The return on investment of industry leadership in skills and training;**
- **Approaches to improving the transitions of university graduates from education to the workforce.**



ABOUT THE AUTHORS



DR. WENDY CUKIER

Ryerson University

Wendy Cukier is one of Canada's leading experts in disruptive technologies, innovation processes and diversity. She has written more than 200 papers on technology, innovation and management and is coauthor of the bestseller "Innovation Nation: Canadian Leadership from Java to Jurassic Park." She is the Founder of Ryerson University's Diversity Institute aimed at promoting the participation and advancement of underrepresented groups. Previously, as Vice President of Research and Innovation at Ryerson University, she led a number of large multi-stakeholder projects including the proposal for the Ontario Centre for Workforce Innovation. Currently she leads the Women Entrepreneurship Knowledge Hub as well as research projects for the Future Skills Centre. Wendy began her career in information technology and has worked for decades with leading firms on foresight, strategy and market research including the Institute for the Future (Menlo Park, CA) and the International Data Corporation. She is active in a range of industry associations including the Information Technology Association of Canada (ITAC), Canadian Advanced Technology Association and Information (CATA) and Information Communications Technology Council (ICTC) and has won a number of awards for her work advancing diversity and inclusion in the sector.



EXECUTIVE SUMMARY

In Canada and beyond, employers face challenges in recruiting and retaining staff that have the skills they need. These challenges will only increase as digitization, automation and artificial intelligence change the types of skills employers require. McKinsey estimates that 14 per cent of the global labour force may need to change jobs as technology transforms the nature of work.

To change jobs, workers will need to upskill their current skills or reskill in new fields. Yet compared to peers in the Organisation for Economic Co-operation and Development, Canadian employers invest relatively little in training. On average, Canadian employers spent \$889 CAD per employee on learning and development from 2016-2017.

Yet some employers have begun to recognize the severity of the issue and are taking dramatic action. In a survey of executives at 1,500 large companies, two-thirds said that addressing the skills gap caused by automation and digitization was among the top 10 priorities at their company. Many companies are developing ambitious strategies to reskill and upskill their employees; for instance, Scotiabank has committed to investing \$250 million over 10 years to create a highly skilled workforce, while AT&T has invested \$1 billion to retrain nearly half its workforce.

This report reviews the literature on employers' efforts to upskill and reskill their employees, and examines the effectiveness and return on investment of various approaches. In addition to corporate programs, it considers three types of investment in reskilling and upskilling: government investment; public-private partnerships, such as Siemens' partnership with academia and government; and skills training as part of corporate social responsibility and philanthropy, such as the Royal Bank of Canada's commitment to invest \$500 million to help Canadian youth prepare for the jobs of tomorrow.

While there is no clear consensus on whether government or corporations should be responsible for upskilling and reskilling, many corporations are taking the lead. Case studies from companies including Amazon, TD Bank, Accenture and Walmart demonstrate how some organizations have taken small steps by experimenting with pilot programs and new tools, while others have developed comprehensive programs to retrain large segments of their workforce. In some instances, as at Microsoft, these initiatives support both the company and its customers.

While companies forge ahead with reskilling and upskilling programs, a lack of empirical data makes it difficult to rigorously determine the success and impact of these programs. Better labour market data, common definitions around skills, and more research to systematically understand the rationale behind corporate investments to reskill, including the return on investment, are needed to better understand and improve reskilling and upskilling initiatives. Further, reskilling and upskilling strategies need to build in performance measurement systems to assess what works and what does not.

As digitization continues to shift the type of skills employers need, it will only become more urgent for Canadian companies to understand the impact of reskilling and upskilling programs, and to create a culture of continuous learning to ensure employees have the skills they need.



Many companies are developing ambitious strategies to reskill and upskill their employees; for instance, Scotiabank has committed to investing \$250 million over 10 years to create a highly skilled workforce.



INTRODUCTION

Talent is a critically competitive issue in virtually every sector and employers are grappling with challenges in recruiting and retaining staff with the skills they need to succeed. These occupational transitions will be underscored by the evolving needs of business in light of digitization, automation and artificial intelligence (AI), which will change the types of skills required. A recent McKinsey Global Institute Report estimated that 375 million workers, about 14 percent of the global labour force, may need to change jobs as technological disruption transforms the future of work.¹ Further, new jobs will need to be filled; the Information and Communications Technology Council (ICTC) predicts that 216,000 new ICT positions will need to be filled by 2021.² To change jobs, workers will need to upskill their current skills or reskill in new field.

PricewaterhouseCoopers (PwC) defines employee upskilling as developing skills required to perform the same role in the future, while reskilling is developing skills needed to perform a new or different role.³ Many surveys have shown that companies of all sizes consider the lack of skilled workers an impediment to their success and growth.⁴ A Toronto Finance Services Alliance (TFSA) and PwC Canada study found that 80 percent of CEOs around the world are worried about whether the key skills they need will be available.⁵ Further, 91 percent “agree that they need to strengthen their organization’s soft skills in addition to their digital skills.”⁶ While there are differences in perceptions of whose responsibility upskilling and reskilling is—and many feel the burden should be on the individual versus the employer⁷—executives see investments into upskilling and reskilling as an urgent priority that should be led by business rather than government.⁸

Conceptualizations of “urgent,” however, may differ. PwC and TFSA found that 66 percent of executives consider addressing the skills gap one of their top 10 priorities, while only 30 percent considered it within the top five.⁹ The United States created the National Council for the American Worker,¹⁰ comprised of 25 corporate leaders committed to investing in employee reskilling. Some have pledged massive

¹ Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](#). McKinsey & Company.

² Information and Communications Technology Council (ICTC). (2017). [The Next Talent Wave: Navigating the Digital Shift – Outlook 2021](#). ICTC.

³ PricewaterhouseCoopers (PwC). (2018a). [Your workforce needs reskilling](#). PwC.

⁴ Bughin, J. et al. (2018). [Skill shift: Automation and the future of the workforce](#). McKinsey & Company.

⁵ PricewaterhouseCoopers (PwC) and Toronto Financial Services Alliance (TFSA). (2018). [Unlocking the human opportunity: Harnessing the power of a mid-career workforce](#). PwC and TFSA.

⁶ Ibid.

⁷ Medros, A. (2019). [edX announces results of new survey on reskilling trends](#). edX.

⁸ Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](#). McKinsey & Company.

⁹ PricewaterhouseCoopers (PwC) and Toronto Financial Services Alliance (TFSA). (2018). [Unlocking the human opportunity: Harnessing the power of a mid-career workforce](#). PwC and TFSA.

¹⁰ Trump D., J. (2018). [Executive order establishing the president’s national council for the American worker](#). Whitehouse.

A recent McKinsey Global Institute Report estimated that 375 million workers, about 14 percent of the global labour force, may need to change jobs as technological disruption transforms the future of work.

RETRAINING AND RESKILLING WORKERS
IN THE AGE OF AUTOMATION



investments.^{11, 12} But smaller companies continue to face challenges in sponsoring reskilling.¹³ And overall, large US companies (>\$100m annual revenue) are less committed to retraining as a way to address skills gaps than comparable European companies; 45 percent of European companies say retraining is the best way to resolve potential skills gaps, while only 27 percent of US companies say the same.¹⁴

In Canada, only 56 percent of CEOs identify digital skills as important skills, compared to 79 percent in other countries.¹⁵ Almost half of Canadian executives (46 percent) say that the leading hurdle to achieving positive outcomes from digital technology is a lack of skilled teams.¹⁶ Further, 72 percent of Canadian CEOs are concerned about the availability of digital skills in their industries and 67 percent believe their senior leadership teams lack those same digital skills.¹⁷ The PwC report centres around the need to focus upskilling strategies on mid-career employees and to fast-track the development of skills needed to maintain and grow their talent pipeline for the future.¹⁸ In order to do this, Canadian companies need to create a culture of continuous learning and make lifelong learning a priority. Report findings also support the use of evidence-based approaches to identify critical future skills, as well as multi-faceted adaptable

¹¹ Trump D., J. (2018). [Executive order establishing the president's national council for the American worker](#). Whitehouse.

¹² National Retail Federation (NRF). (2018). [NRF signs white house 'Pledge to America's workers'](#). NRF.

¹³ O'Leary, J., Widener, C. and Agarwal, S. (2018). [Closing the talent gap: Five ways government and business can team up to reskill workers](#). Deloitte.

¹⁴ Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](#). McKinsey & Company.

¹⁵ PricewaterhouseCoopers (PwC). (2017). [Digital IQ 2017 - Canadian insights: Unlocking value from digital investments](#). PwC.

¹⁶ Ibid.

¹⁷ PricewaterhouseCoopers (PwC). (2018). [21st global CEO survey: What's on the minds of Canadian CEOs in 2018?](#) PwC.

¹⁸ PricewaterhouseCoopers (PwC). (2017). [Digital IQ 2017 - Canadian insights: Unlocking value from digital investments](#). PwC.

approaches to develop these skills. Empowering employees to embrace upskilling and strengthening new approaches to learning are also key components to effective strategy.¹⁹

Many employees are enthusiastic about embracing opportunities to learn. In the 2017 Accenture Future Workforce Worker and C-Suite Survey, more than two-thirds of employees surveyed said “it will be important/very important to learn new skills to work with intelligent technologies in the next 3 to 5 years.”²⁰ Yet only 3 percent of executives intend to significantly increase investment in training and reskilling programs in the next three years.²¹ At the same time, employees have different levels of confidence in their ability to upskill, and programs need to address differences between, for example, Gen Z employees who are very confident (42 percent) in their abilities and baby boomers who have less confidence (22 percent).²² Willingness to upskill is also affected by employees’ skill levels.²³

Despite varying perceptions around the urgency of upskilling and reskilling, the challenge for all organizations will be twofold: understanding what skills will be most relevant in the future; and developing a pathway to get there. Numerous case studies, mostly from the information and communications technologies (ICT) sector, provide insight into these efforts and underscore the importance of assessing current skills capacities and developing a future skills taxonomy to be used to map transition pathways. This paper undertakes a detailed scan to identify, document and assess upskilling and reskilling practices and identifies areas for further examination.

This paper will:

- 1. review the literature on upskilling by employers globally;**
- 2. provide an overview of approaches and review examples of large-scale upskilling and reskilling; and**
- 3. offer evidence of impacts and the return on investment and components of effective strategies.**

Canada in the International Context

Compared to other Organisation for Economic Co-operation and Development (OECD) members, Canadian employers invest relatively little in training. From 2016-2017, they spent only “an average of 81

¹⁹ PricewaterhouseCoopers (PwC). (2018). [21st global CEO survey: What's on the minds of Canadian CEOs in 2018?](#) PwC.

²⁰ Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](#). Accenture.

²¹ Ibid.

²² Ibid.

²³ Ibid.

cents for every dollar spent by US organizations.”²⁴ However, a recent Conference Board of Canada report indicates that Canadian employers’ investments in employee learning and development has been steadily increasing since the end of 2010.²⁵ On average, Canadian employers spent \$889 CAD per employee on learning and development from 2016-2017, a 10 percent increase since 2014-2015.²⁶ This increase reduces the learning and development spending gap between Canadian and US organizations. Still, in 2017, an average of \$1,296 USD (\$1,629 CAD) per employee was spent on workplace training worldwide,²⁷ 45 percent higher than spending per Canadian employee.

Recently, the World Economic Forum (WEF) concluded that despite the front-loaded public investment in education, there is a net economic positive benefit to government investment into reskilling and upskilling, in addition to the broader social benefits.²⁸ With a principal investment of \$19.9 billion, the US government could reskill more than two-thirds of the country’s workforce expected to be displaced by technology.²⁹ Conversely, if the US private sector took the lead on upskilling and reskilling, a \$4.7-billion principal investment would still result in a net positive benefit and would retrain 25 percent of would-be displaced workers.

Some public-private partnerships are addressing some of the gaps, such as Siemens’ program, Shopify’s relationship with Carleton University, and the multifaceted funding partnership backing Ryerson’s new cybersecurity centre. Notably, the Siemens program is based in a partnership between industry, academia and government, and has focused on adopting the German-style apprenticeship model with on-the-job training and community college partners.³⁰ Shopify has partnered with Carleton University to build their talent pipeline at the source. Launching in 2016, the ambitious program set out to “validate a work-integrated model that works” and assist in the development of the tech talent needed in Canada to remain competitive on the global stage.³¹ Ryerson University’s not-for-profit cybersecurity centre is funded by one of Canada’s biggest telecommunication firms (Rogers), one of the country’s largest banks (Royal Bank of Canada) and the federal government.³² The centre has a mandate of training, research and education to build talent to bridge the skills shortage in IT security. Programs to promote and encourage greater diversity will also be offered within the centre; women only represent about 20

²⁴ Conference Board of Canada. (2018). [Learning Cultures Lead the Way: Learning and Development Outlook - 14th Edition](#). Conference Board of Canada

²⁵ Ibid.

²⁶ Ibid.

²⁷ Mazareanu, E. (2019). [Average spend on learning and development per employee worldwide 2008-2017](#). Statista.

²⁸ World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). WEF.

²⁹ Ibid.

³⁰ Business Roundtable. (2017). [Work in Progress: How CEOs are Helping Close America’s Skills Gap](#). Business Roundtable.

³¹ Rubinstein, D. (n.d.). [Shopify Springboard for Students](#). Carleton Newsroom, Carleton University.

³² Solomon, H. (2019). [Ryerson, Rogers, RBC back new Brampton cyber security innovation centre](#). IT World Canada.

percent of professionals in this field.³³ While these successful public-private partnerships are bridging the gap and developing the talent pipeline, they are exceptions rather than the rule.

The problem is even more pronounced in small and medium enterprises (SMEs).³⁴ In 2017, 98 percent of businesses in Canada were SMEs with fewer than 100 employees.^{35, 36} Small businesses rarely have a dedicated human resources function, much less the resources for in-house training; only one-quarter provide in-house training.³⁷ According to a Canadian Chamber of Commerce report, there are significant and unique barriers to closing the skills gap for SMEs. Topping the list are the risk of training being wasted if employees leave the company, and the challenge of finding information and programs that are suitable for smaller companies and do not require significant customization.³⁸ Without central functions (i.e., HR), it is difficult for SMEs to identify skills gaps and map out retraining initiatives.³⁹ These barriers are especially concerning when considering the impact on the economy; in 2014, SMEs contributed 53 percent of the gross domestic product (GDP) generated by the private sector.⁴⁰ If SMEs are not able to pivot for the future of work, this will affect not only workers and organizations, but also the Canadian economy.

Another way to build an agile workforce is to embed commitments to building the skills training ecosystem into corporate social responsibility and philanthropy strategies. RBC is investing \$500 million over 10 years and TD \$1 billion by 2030 in ambitious strategies to drive change and support the workforce to thrive in a time of unprecedented technological disruption.^{41, 42} In Canada, the Business Higher Education Round Table has framed talent as one of the key competitive drivers for the economy and pushed for a commitment for all university graduates to have access to work-integrated learning.⁴³ Nearly 200 CEOs of the US Business Roundtable recently committed to considerations beyond shareholder value, reflecting a growing recognition of the need to invest in people.⁴⁴ This includes

³³ Solomon, H. (2019). [Ryerson, Rogers, RBC back new Brampton cyber security innovation centre](#). IT World Canada.

³⁴ Innovation, Science, and Economic Development Canada. (2019). [Key small business statistics January \(2019\)](#). Government of Canada.

³⁵ Ibid.

³⁶ Canadian Chamber of Commerce. (2013). [Upskilling the workforce: Employer-sponsored training and resolving the skills gap](#). Canadian Chamber of Commerce

³⁷ De Vos, A. and Willemse, I. (2019). [Leveraging training skills development in SMEs](#). Organisation for Economic Co-operation and Development (OECD).

³⁸ Roy, S. (2013). [Closing the skills gap: Mapping a path for small business](#). Canadian Chamber of Commerce.

³⁹ Ibid.

⁴⁰ Innovation, Science, and Economic Development Canada (ISED). (2019). [Key small business statistics January \(2019\)](#). Government of Canada.

⁴¹ TRIUMF. (2019). [TRIUMF partners with RBC future launch to create opportunities for undergraduate students](#). TRIUMF.

⁴² TD Bank. (2018). [TD funds 10 organizations to prepare people for the future of work](#). National Post.

⁴³ Business Roundtable. (2019). [Business roundtable redefines the purpose of a corporation to promote 'An economy that serves all Americans.'](#) Business Roundtable.

⁴⁴ Ibid.

providing learning and development support to facilitate the development “of new skills for a rapidly changing world.”⁴⁵ These types of investments in workers reflect a broader commitment to drive an economy that serves everyone. Many of the organizations represented on the Board of Directors for the US Business Roundtable have begun rolling out these employee-focused investments, which demonstrate that broader considerations beyond shareholder value is essential “for the future success of our companies, communities, and our country.”⁴⁶

One of the biggest barriers to national strategies is the lack of common definitions around skills. Multiple frameworks exist, often with different definitions of skills, competencies and tools. The extent to which businesses apply national frameworks, such as Economic and Social Development Canada’s (ESDC), Essential Skills or the USA’s O*Net Framework, varies, and many companies are developing their own frameworks. For example, Accenture used data analytics to understand skill trends, skill frameworks and 1,000 workforce development programs, creating categories for universal skill families and the underlying cognitive capabilities needed for inclusion in the digital economy.⁴⁷ Their analysis informed their in-house program, which has already upskilled nearly 300,000 members of their workforce and is being extended as a client service.⁴⁸

Case Studies

To date, limited empirical research on the upskilling and reskilling initiatives has been undertaken, but there is extensive news coverage and some reporting in the grey literature. A cursory review reveals that ICT, consulting and financial services seem to dominate the field, but there are also emerging examples from the manufacturing and retail industries. Further research is required, but program highlights, primarily based on publicly available sources, are described here.

Table 1 summarizes some of the investment in upskilling and reskilling and the preliminary returns on these investments.

⁴⁵ Business Roundtable. (2019). [Business roundtable redefines the purpose of a corporation to promote ‘An economy that serves all Americans.’](#) Business Roundtable.

⁴⁶ Ibid.

⁴⁷ Accenture. (2017). [New skills now: Inclusion in the digital economy.](#) Accenture.

⁴⁸ Ibid.

Table 1: Industry Investment Experience

Company	Program Inception Date	Targeted workforce	Type of investment	Available Results
Accenture ⁴⁹	2010	<ul style="list-style-type: none"> Entire workforce. 	<ul style="list-style-type: none"> \$1B annually. 	<ul style="list-style-type: none"> Approx. 300,000 employees reskilled (nearly 65% of their total workforce).
Amazon ⁵⁰	2019	<ul style="list-style-type: none"> Approx. 100,000 people. 	<ul style="list-style-type: none"> \$700M earmarked. 	<ul style="list-style-type: none"> By 2025, one-third of the workforce will be retrained.
AT&T ⁵¹	2013	<ul style="list-style-type: none"> Entire workforce, 250,000 people. 	<ul style="list-style-type: none"> \$1B on retraining including online course collaboration with Coursera, Udacity and leading universities. 	<ul style="list-style-type: none"> Approx. 50% of employees have completed 2.7M online courses; 177,000 virtual badges awarded to 57,000 employees; Avoided significant costs associated with turnover; and By 2020, will have re-trained 100,000 employees.
Best Western Hotel & Resorts ^{52, 53}	2016 ⁵⁴	<ul style="list-style-type: none"> Frontline hotel employees. 	<ul style="list-style-type: none"> \$3.35 per minute for simulation delivery. 	<ul style="list-style-type: none"> More than 35,000 employees upskilled in soft skills related to customer interactions.
Cognizant ^{55,56}	2017	<ul style="list-style-type: none"> Approx. 260,000 people. 	<ul style="list-style-type: none"> Unknown investment 	<ul style="list-style-type: none"> Approx. 100,000 of 260,000 people (current workforce at the time) trained in new digital skills in 2017.

⁴⁹ Feloni, R. and Turner, M. (2019). [Accenture's AI program 'Job buddy' helps retrain workers who've lost jobs to automation, and it could be a game-changing model for other companies to follow](#). Business Insider.

⁵⁰ Siegel, R. (2019). [Amazon will retrain one-third of its U.S. employees to get ahead of tech changes](#). The Washington Post.

⁵¹ Caminiti, S. (2018). [AT&T's \\$1 billion gambit: Retraining nearly half its workforce for jobs of the future](#). CNBC.

⁵² Dishman, L. (2019). [The high-tech solution to becoming more empathetic in less than an hour](#). Fast Company.

⁵³ Mest, E. (2016). [Best Western invests in virtual reality training](#). Hotel Management.

⁵⁴ Sickel, J. (2017). [Best Western Brands Sweep Midscale](#). Business Travel News.

⁵⁵ Cognizant. (2018). [Cognizant and general assembly to launch no-cost digital engineering education program](#). Cognizant News.

⁵⁶ Schwartz, S., A. (2018). [Cognizant retaining workforce through internal retraining efforts](#). CIO Dive.

Company	Program Inception Date	Targeted workforce	Type of investment	Available Results
Development Bank of Singapore ⁵⁷	2015	<ul style="list-style-type: none"> Entire workforce. 	<ul style="list-style-type: none"> \$15M commitment over five years beginning in 2017. 	<ul style="list-style-type: none"> 10,000 training sessions held annually at DBS Academy; Additional specific results have not been announced.
Discover Financial ⁵⁸	2010	<ul style="list-style-type: none"> Approx. 15,000 people. 	<ul style="list-style-type: none"> \$7.4M invested from 2010-2013 	<ul style="list-style-type: none"> Achieved 144% return on upskilling investment.
JP Morgan Chase & Co.	2013	<ul style="list-style-type: none"> Approx. 147,000 people. 	<ul style="list-style-type: none"> \$250M investment in 2013. \$350M investment over five years in 2018. 	<ul style="list-style-type: none"> Skills development for nearly 150,000 people; and Partnered with more than 700 organizations through New Skills at Work initiative.
IBM ⁵⁹	2015	<ul style="list-style-type: none"> Unknown. 	<ul style="list-style-type: none"> Unknown. 	<ul style="list-style-type: none"> 750,000 badges have been earned (100,000 of which achieved for IBM's Development for AI Program); and 70% of IBM employees have been upskilled.
RBC ⁶⁰	2017	<ul style="list-style-type: none"> Youth in Canada. Approx. 85,000 employees. 	<ul style="list-style-type: none"> \$500M investment over a 10-year period. \$84M in 2018 on formal employee training and career development. 	<ul style="list-style-type: none"> Development of RBC Future Launch: a commitment to help Canadian youth prepare for the jobs of tomorrow;⁶¹ RBC Learn, a new digital platform, provides access to customized content to build future-ready skills; and Digital literacy program for upskilling employees.

⁵⁷ Kien, S., S., Weill, P. and Xu, M. (2019). [DBS: From the "World's Best Bank" to building the future-ready enterprise](#). CISR Working Paper: 436. MIT Sloan Center for Information Systems Research.

⁵⁸ LuminaFoundation. (2016). [Talent investments pay off](#). Executive Briefing: Discover Financial Services Realizes Returns for Investments in Tuition Reimbursement. LuminaFoundation.

⁵⁹ PricewaterhouseCoopers (PwC) and Toronto Financial Service Alliance (TFSA). (2018). [Unlocking the human opportunity: Future-proof skills to move financial services forward](#). PwC and TFSA.

⁶⁰ Royal Bank of Canada (RBC). (2017). [Introducing RBC Future Launch: RBC's largest-ever commitment to help young Canadians prepare for the future of work](#). RBC.

⁶¹ Ibid.

Company	Program Inception Date	Targeted workforce	Type of investment	Available Results
SAP ⁶²	2017	<ul style="list-style-type: none"> Digital Business Services Division. 	<ul style="list-style-type: none"> 2.6 times the previous training budget Implementation of comprehensive workforce skills upgrade. 	<ul style="list-style-type: none"> After one year, 4,700 employees globally have been engaged in the transformational learning framework.
Scotiabank	2019	<ul style="list-style-type: none"> Internal workers who have or will experience occupational impact resulting from technological change. 	<ul style="list-style-type: none"> \$70M investment in 2017. \$250M over 10-year period, beginning in 2019. 	<ul style="list-style-type: none"> Specific results have not been announced; Development of interactive learning and development portal, Scotiabank Virtual University; Development of talent for the newly built Digital Factory; and Creation of the workforce that can successfully steward Scotiabank through their digital revolution.

⁶² Gumbel, P and Reich, A. (2018). [Building the workforce of tomorrow today](#). McKinsey & Company.

TD Bank	2018	<ul style="list-style-type: none"> Internal workforce. Organizations with innovative solutions to drive change in light of technological disruption and social change. 	<ul style="list-style-type: none"> \$1B by 2030 (up to 10 \$1M grants available annually). 	<ul style="list-style-type: none"> Results are not yet publicly available for internal workforce measurement. As grants are delivered to individual organizations, results will vary. A list of recipients, their respective solutions and their initiatives are available on the TD website.⁶³
Tech Mahindra⁶⁴	2019	<ul style="list-style-type: none"> IT workforce. 	<ul style="list-style-type: none"> Unknown. 	<ul style="list-style-type: none"> More than 70% of the company's technical employees have been certified in digital skills; and More than 20,000 associates have been trained in advanced technologies.⁶⁵
Walmart⁶⁶	2018	<ul style="list-style-type: none"> Entry-level staff. 	<ul style="list-style-type: none"> 2015-2016 \$2.7B invested in wages and training. 	<ul style="list-style-type: none"> Provision of online degree programs for \$1 a day in the areas of business, technology and supply chain management at three different universities.⁶⁷ Program was expanded in June 2019 to include six universities and 14 areas of study, including new focus areas of cybersecurity and computer science. Following the first year of Walmart's expanded learning and development initiative, 7,500 employees were enrolled.⁶⁸

⁶³ TD Ready Commitment. (n.d.). [The TD Ready Challenge](#). TD.

⁶⁴ Cook, S. (2019). [Tech Mahindra starts investing in reskilling its employees in blockchain and digital technologies](#). CryptoNewsZ.

⁶⁵ Bhattacharyya, R. and Verma, P. (2019). [Reskill to survive: Tech firms retrain staff on war footing](#). ETtech.

⁶⁶ Hanna, J. (2019). [Walmart's workforce of the future](#). Harvard Business School.

⁶⁷ Ibid.

⁶⁸ Ibid.

ICT Sector

AT&T

AT&T has one of the best-documented and publicized cases of corporate upskilling—investing \$1 billion in retraining nearly 50 percent of its workforce.⁶⁹ The company initiated the program, dubbed Workforce 2020 (WF2020),⁷⁰ when it determined that nearly half of its 250,000 employees lacked the essential skills to maintain AT&T's competitive edge.⁷¹ Companies like AT&T have approached reskilling from both merit and bottom-line perspectives. In understanding the costs and benefits, the costs of turnover factor heavily; AT&T estimated them to be 21 percent of the employee's salary.⁷² In addition to the financial losses associated with turnover, it results in the forfeiture of valuable institutional knowledge.⁷³ To avoid these losses, AT&T developed a substantial retraining initiative with a focus on science, technology, engineering and math (STEM) skills. The program intends to reskill employees for newly emerging roles by developing interchangeable skills and enhancing job mobility.⁷⁴

This comprehensive initiative includes online course collaboration with Coursera and Udacity, as well as partnerships with leading universities and the establishment of a career centre to support employee learning and development, and to plan for future jobs.⁷⁵ An online portal provides staff with a wealth of information; they can discover jobs, see the associated competencies, and take advantage of learning opportunities. The portal will also provide job analytics to inform employees about specific positions rising or declining in demand.⁷⁶ Importantly, with WF2020, AT&T connected learning with performance for its nearly 300,000 strong workforce.⁷⁷ While the onus is on the employee to engage in retraining activities, the company allocates 10 hours per week for training.⁷⁸

Since the program launched in 2013, AT&T has invested \$250 million on learning and professional development, including \$30 million for tuition assistance annually.⁷⁹ Further, the company now offers up to \$8,000 in annual tuition support for degrees and nanodegrees, with a lifetime maximum of \$25,000

⁶⁹ Caminiti, S. (2018). [AT&T's \\$1 billion gambit: Retraining nearly half its workforce for jobs of the future](#). CNBC.

⁷⁰ World Economic Forum (WEF). (2017). [Accelerating workforce Reskilling for the fourth industrial revolution: An agenda for leaders to shape the future of education, gender and work](#). WEF.

⁷¹ Caminiti, S. (2018). [AT&T's \\$1 billion gambit: Retraining nearly half its workforce for jobs of the future](#). CNBC.

⁷² Ibid.

⁷³ Ibid.

⁷⁴ World Economic Forum (WEF). (2017). [Accelerating workforce Reskilling for the fourth industrial revolution: An agenda for leaders to shape the future of education, gender and work](#). WEF

⁷⁵ Caminiti, S. (2018). [AT&T's \\$1 billion gambit: Retraining nearly half its workforce for jobs of the future](#). CNBC.

⁷⁶ Ibid.

⁷⁷ World Economic Forum (WEF). (2017). [Accelerating Workforce Reskilling for the Fourth Industrial Revolution: An agenda for leaders to shape the future of education, gender and work](#). WEF.

⁷⁸ Ibid.

⁷⁹ Ibid.

for undergraduate and \$30,000 for graduate degrees.⁸⁰ To date, 140,000 AT&T staff have been engaged in the acquisition of new skills for new roles.⁸¹ Collectively, nearly half of AT&T employees have completed 2.7 million online courses in data and computer science, cybersecurity and Agile project management.⁸² Fifty-seven thousand employees have earned approximately 177,000 virtual “badges,” indicating that coursework has been completed. These badges appear on their internal career profiles.⁸³

While it is still early days, AT&T claims to have “reduced its product-development life cycle by 40 percent, accelerated time to revenue by 32 percent, and cut developing and rollout time by half.”⁸⁴

Cognizant

Another global giant that provides professional services, Cognizant, trained approximately 100,000 of its existing workforce of 260,000 employees in 2017 on new digital skills.⁸⁵

The Cognizant case study is an interesting one given the range of programs that they have provided both for existing employees and to expand the talent pipeline into the company. For example, one Cognizant partner is General Assembly,⁸⁶ which provides entry-level pathways; the same tools are also available for employees. Among its signature programs, the General Assembly program can create a full stack Java developer over 10-14 weeks regardless of their base-level technology skills.⁸⁷

This public-private model of businesses partnered with technology talent-development organizations is becoming more prevalent as more companies are looking to reduce the hiring time (for new graduates), cut the costs and timelines associated with upskilling/reskilling, and increase retention of current staff by improving the relevancy of their skillsets in the age of the fourth industrial revolution. Also noteworthy about the Cognizant example is the extent to which its reskilling strategy is embedded in the business strategy. Each business unit is expected to undertake a skills assessment and gap analysis, and to create opportunities and develop pathways—an approach that has proven successful.

⁸⁰ World Economic Forum (WEF). (2017). [Accelerating Workforce Reskilling for the Fourth Industrial Revolution: An agenda for leaders to shape the future of education, gender and work](#). WEF.

⁸¹ Ibid.

⁸² Ibid.

⁸³ Ibid.

⁸⁴ Newman, D. (2018). [The digitally transformed workforce: How to upskill and retrain to retain talent](#). Forbes.

⁸⁵ Schwartz, S., A. (2018). [Cognizant retaining workforce through internal retraining efforts](#). CIO Dive.

⁸⁶ Cognizant News. (2018). [Cognizant and general assembly to launch no-cost digital engineering education program](#). Cognizant.

⁸⁷ General Assembly (GA). (2019). [Learn online](#). GA.

SAP

One of SAP's main divisions, Digital Business Services (DBS), which has 20,000 employees, began implementing an upskilling initiative in 2017 to support a shift to a new digital product strategy.⁸⁸ Their programs include learning journeys, boot camps, shadowing senior colleagues, peer coaching and digital learning.⁸⁹ The process began with a mapping of skills and comparison to future requirements and business plans. Notably, this company communicated the rationale behind the skills transformation journey, allowing the workforce to understand the drivers of the change.

One year into the program, DBS reports engaging nearly one-quarter of employees in its learning framework.⁹⁰

Amazon

In July 2019, Amazon announced that it would invest US \$700 million to retrain 100,000 employees—a third of its US workforce—in new technologies by 2025.⁹¹ Based on an analysis of labour market information and its own internal data, the company identified the fastest-growing jobs in the previous five years.⁹² Increasingly, virtually *all* jobs at the company, from product design to warehouse fulfilment, require some technological skills.⁹³ For example, a fast-growing area for Amazon's business is human-robot interaction.⁹⁴

To fulfill this ambitious upskilling initiative, Amazon plans to use its own programs to retrain employees, such as Amazon Technical Academy and Machine Learning University.^{95, 96} The pledged funding will go towards numerous programs, including programs for those without technical backgrounds. Amazon's programs seemingly offer something for everyone.⁹⁷ Amazon's significant investment and creation of in-house programming suggests that the company recognizes the importance of talent development for talent acquisition.

⁸⁸ Gumbel, P and Reich, A. (2018). [Building the workforce of tomorrow, today](#). McKinsey & Company.

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ Siegel, R. (2019). [Amazon will retrain one-third of its U.S. employees to get ahead of tech changes](#). The Washington Post.

⁹² Ibid.

⁹³ Ibid.

⁹⁴ France-Press, A. (2019). [Amazon's 'collaborative' robots offer peek into the future](#). Voice of America (VOA).

⁹⁵ Perez, S. (2019). [Amazon invests \\$700 million to retrain a third of its US workforce by 2025](#). TechCrunch.

⁹⁶ Prokopeak, M. (2019). [Amazon goes big with \\$700 million reskilling pledge](#). Chief Learning Officer.

⁹⁷ Cutter, C. (2019). [Amazon to retrain a third of its U.S. workforce](#). Wall Street Journal.

IBM

IBM introduced the digital credential program on Credly's Acclaim platform in 2015.⁹⁸ To support continuous learning and development, IBM provides 40 hours per year of dedicated learning in various mediums, at the discretion of the employee and manager.⁹⁹ To enhance employee education, IBM provides employees with access to "Your Learning," an AI-driven digital learning marketplace.¹⁰⁰ Through the portal, employees can get a better understanding of skills for which demand is declining, available job opportunities, and the skills and badges needed to prepare for roles and new opportunities within the company.

To date, IBM employees have earned 750,000 badges (100,000 of which were achieved for IBM's Development for AI Program) and 70 percent of IBM employees now have the skills they need to be successful in the future.¹⁰¹

Microsoft: New Partnerships for Custom Training

As part of its expansion of cloud services, Microsoft has built data centres in Dublin, Ireland, Boydton, Virginia and Des Moines, Iowa, among others.¹⁰² With these new centres, the company has invested in training to create new sources of talent working with local partners. In Iowa and Virginia, for example, the company has worked with local colleges to create new Microsoft Data Center Academies, which provides tailored training to prepare the next generation of employees for Microsoft or alternative IT business with similar needs.¹⁰³ To date, over 200 students have graduated, with some joining Microsoft, and others joining other companies.¹⁰⁴

In October 2019, Microsoft, RBC Future Launch, the Information Technology Association of Canada (ITAC), Agorize and Isobar Canada announced a new collaboration funded partially by the Government of Canada.¹⁰⁵ This talent development program, called the AI Pathways Initiative, supports students and underrepresented communities to become work-ready for an AI career.

⁹⁸ Upskill America, Fall, J.S. (n.d.) [Models of Upskilling: Certifications](#). The Aspen Institute.

⁹⁹ PricewaterhouseCoopers (PwC) and Toronto Financial Services Alliance (TFSA). (2018). [Unlocking the human opportunity: Harnessing the power of a mid-career workforce](#). PwC and TFSA.

¹⁰⁰ Ibid.

¹⁰¹ Ibid.

¹⁰² Gratton, L. (2019). [New frontiers in re-skilling and upskilling](#). MIT Sloan Management Review, 61, 1.

¹⁰³ Ibid.

¹⁰⁴ Ibid.

¹⁰⁵ Globe Newswire. (2019). [ITAC collaborates with Agorize, Microsoft and RBC Future Launch to unveil new upskilling initiative to help prepare students with future-ready skills to thrive in age of disruption and artificial intelligence](#). Globe Newswire.

Financial Services

Discover Financial

Discover Financial Services supports employee retraining for their 15,000 frontline call centre agents and corporate staff through their Tuition Reimbursement Program (TRP). From 2010 to 2013, Discover Financial's \$7.4 million investment in the TRP had a 144 percent ROI. In addition to the company's healthy return on the initial investment of \$1 million, these investments benefitted employees, who received promotions, wage increases and more career opportunities.¹⁰⁶

Scotiabank

Over the next 10 years, Scotiabank will invest \$250 million to help its employees upskill and reskill for the digital economy, including workers who have or will experience an occupational impact resulting from technological change.¹⁰⁷ Scotiabank's new retraining initiative, launched in January 2019, will include various learning methods, including an interactive learning and development portal, career advice and a boost in tuition allowances for employees.^{108, 109} This new funding commitment follows a 2017 investment of \$70 million into employee education, including continuing education and in-house digital skills training.¹¹⁰

These investments intend to not only to develop the talent for the newly built Digital Factory, but also to create the workforce that can successfully steward Scotiabank through their digital revolution.

Royal Bank of Canada

RBC is committing substantial resources towards skill building and work-integrated learning in the communities where it operates. Announced in March 2017, RBC Future Launch is a 10-year \$500 million commitment to support young people in gaining "access to work experience, skills development opportunities, networking solutions and/or mental well-being supports and services" to overcome the "no experience, no job" cycle. The program brings the private and public sectors together to create solutions so young people are better prepared for the future of work with a number of innovative programs to build pathways to employment.¹¹¹

¹⁰⁶ LuminaFoundation. (2016). [Talent investments pay off](#). Executive Briefing: Discover Financial Services Realizes Returns for Investments in Tuition Reimbursement. LuminaFoundation.

¹⁰⁷ McIntosh, J. (2016). [Scotiabank invests \\$250M to help re-skill employees for the digital economy](#). The Canadian Press.

¹⁰⁸ Ibid.

¹⁰⁹ Ranosa, R. (2018). [Major bank balances job cuts with innovation incubator](#). HRTechNews.

¹¹⁰ Ibid.

¹¹¹ See the full list of programs and resources under RBC Future Launch at [the RBC website](#).

RBC also focused on upskilling existing employees, developing tools and technologies to enable them to build new skills and discover unexpected career paths. Beyond investing \$84 million on formal training and career development in 2018, RBC enables collaboration and skill-sharing through sites like Spark!, an internal “gig” portal where employees can explore work beyond their traditional mandate. In 2019, RBC introduced a new self-serve digital platform to deliver customized learning experiences that meet employee needs and interests, along with a professional development library to build future-ready skills. As business needs evolve and talent requirements shift, RBC provides their workforce with resources to grow in their roles, or opportunities to reskill through role and skills-based pathways so they can take on different work across RBC.

RBC projects that 50 percent of occupations in Canada will experience a shift in skills required, 25 percent of Canadian jobs will experience disruption by technology, and 2.4 million jobs will require a new and different mix of skills in the next 10 years.¹¹² In light of these macro shifts, the company has launched RBC Upskill, a personalized and interactive tool that allows anyone, not just employees, to evaluate career-relevant skills.¹¹³ The tool is powered using Canadian labour market data, projected growth and shrinkage, the impacts of automation, and related earning potential.¹¹⁴

TD Bank

TD Thrive, the upskilling initiative launched by TD Bank in 2018, leverages digital technologies while also teaching digital skills. The initiative uses the Degreed platform and offers employees access to specific learning and development content, including internally and partner-developed software and freeware.¹¹⁵ The platform supports the needs of both the bank and employees by providing learning pathways for upskilling when wanted and prescriptive reskilling when needed.¹¹⁶ This platform also serves as an online community, where employees can connect with others, namely peers, leaders and subject matter experts.¹¹⁷

In 2018, TD announced the TD Ready Challenge, a multi-year program to help people thrive in a time of technological disruption.¹¹⁸ Each year, up to 10 \$1 million grants will be available “to catalyze innovative solutions for a changing world;”¹¹⁹ by 2030 TD will contribute up to \$1 billion.¹²⁰ The inaugural challenge

¹¹² Royal Bank of Canada (RBC). (2019). [RBC Upskill: A Future Launch Initiative](#). RBC.

¹¹³ Ibid.

¹¹⁴ Ibid.

¹¹⁵ PricewaterhouseCoopers (PwC) and Toronto Financial Service Alliance (TFSA). (2018). [Unlocking the human opportunity: Future-proof skills to move financial services forward](#). PwC and TFSA.

¹¹⁶ Ibid.

¹¹⁷ Ibid.

¹¹⁸ TD Bank. (2018). [TD funds 10 organizations to prepare people for the future of work](#). National Post.

¹¹⁹ Ibid.

¹²⁰ Ibid.

focused on skills training and development and career transitions for the North American workforce. The TD Ready Challenge is part of a broader strategy, the Ready Commitment, which is a multi-year initiative targeting areas including: financial security, community connectivity, better individual health and a vibrant planet.¹²¹

JP Morgan Chase & Co.

Building on an initial \$250 million investment made in 2013, JP Morgan Chase & Co. made a \$350 million five-year global investment in a program called New Skills at Work in 2018. This initiative supports community college and alternative pathways for underserved populations and supports the firm's employee needs.¹²² The program will also focus on providing training and career supports for people who face barriers to reaping the rewards of the growing and evolving economy.¹²³

The funding commitment includes \$200 million to develop and pilot innovative new training programs for digital and technical skills; \$125 million to improve collaboration between employers and educators; and \$25 million to develop and distribute “actionable labour market data and research” to inform government and business investments in education and training.¹²⁴ The company has increased wages for frontline customer service employees and adopted new training approaches, including technology apprenticeships, such as the Bournemouth Technology Degree Apprenticeship.¹²⁵ Additional supports consist of technology-focused learning and development through initiatives, including JPMC Coding Academy, to arm current and future employees with skills in software, infrastructure, cybersecurity and data analytics. JPMorgan Chase & Co. has also created an interactive learning and assessment tool that assesses employees' skills and provides personalized learning suggestions.¹²⁶

Since the inception of the New Skills at Work initiative, the company has partnered with more than 700 organizations in their training ecosystem and have supported the skills development of 150,000 people.¹²⁷

In November 2019, the JPMorgan Chase & Co. announced \$2.3 million to provide in-demand digital skills training and job placement services for more than 700 veterans across the US.¹²⁸ This investment will

¹²¹ TD Bank. (2018). [TD funds 10 organizations to prepare people for the future of work](#). National Post.

¹²² JPMorgan Chase & Co. (2019). [JPMorgan Chase makes \\$350 million global investment in the future of work](#). JPMorgan Chase & Co.

¹²³ Ibid.

¹²⁴ Ibid.

¹²⁵ Ibid.

¹²⁶ Ibid.

¹²⁷ JPMorgan Chase & Co. (2019). [This program helped 147,000 people climb the economic ladder. And it's about to get better](#). JPMorgan Chase & Co.

¹²⁸ Business Wire. (2019). [JPMorgan chase commits \\$2.3 million to NPower to prepare more than 700 veterans for high-quality technology jobs](#). Business Wire.

provide veterans with three training pathways: tech fundamentals, including a focus on hard and soft skills, in addition to a paid technology-based internship; cybersecurity, including dedicated training, professional development and paid internships; and coding, including a mix of instructor-led training, professional development and online learning labs.¹²⁹

Development Bank of Singapore

In 2017, the Development Bank of Singapore (DBS) announced \$20 million SGD (approximately \$15 million USD) over five years to support employee learning, including for employees who had been with the company for decades, to develop digital competencies.¹³⁰ DBS intended for all employees to participate, regardless of their role, and facilitated learning in ways including: AI-powered e-learning, experiential learning and innovative learning spaces. DBS also provided grants and scholarships, and upwards of 10,000 training sessions were completed at the DBS Academy to support upskilling and reskilling.¹³¹ Supporting the workforce's continuous learning will allow DBS to be adaptable and resilient in the face of the emerging digital economy.

Consulting

Accenture

In the past four years, the global consulting firm has invested \$1 billion in retraining almost 65 percent of their workforce—300,000 employees—using a system that makes the new skills immediately applicable.¹³² Their approach focuses on integrated learning based on the observation that if an employee receives training and cannot implement new skills for six months, neither the worker nor the company benefits.¹³³ Following the completion of the pilot program, 85 percent of employees who had access to Accenture's "Job Buddy" software used it to assess their job's susceptibility to automation and enroll in new learning and development opportunities.¹³⁴

Accenture developed a "New Skilling" framework to guide the development and acquisition of IT skills internally using a number of innovative learning methods, including apprenticeships, hackathons and

¹²⁹ Business Wire. (2019). [JPMorgan chase commits \\$2.3 million to NPower to prepare more than 700 veterans for high-quality technology jobs](#). Business Wire.

¹³⁰ Kien, S., S., Weill, P. and Xu, M. (2019). [DBS: From the "World's Best Bank" to building the future-ready enterprise](#). CISR Working Paper: 436. MIT Sloan Center for Information Systems Research.

¹³¹ Business Wire. [JPMorgan Chase Commits \\$2.3 Million to NPower to Prepare More than 700 Veterans for High-Quality Technology Jobs](#). Business Wire.

¹³² Feloni, R. and Turner, M. (2019). [Accenture's AI program 'Job buddy' helps retrain workers who've lost jobs to automation, and it could be a game-changing model for other companies to follow](#). Business Insider.

¹³³ Ibid.

¹³⁴ Ibid.

augmented reality.¹³⁵ By implementing their own framework, the company has reduced costs associated with training by 25 percent while increasing the number of training hours by 40 percent.¹³⁶ Accenture’s approach for continuous learning includes four phases, as illustrated in Figure 1.

Figure 1: Learning Framework: “New Skilling” at Accenture



Source: Shook, E. and Knickrehm, M. 2018. [Reworking the revolution](#). Accenture.

¹³⁵ Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](#). Accenture.

¹³⁶ Ibid.

- **Awareness:** recognizing the new skills required to make the change is the first step to making a confident pivot. This necessitates strategic planning about the types of skills specifically required, beyond digital literacy.¹³⁷
- **Conversant:** individual skills and tasks need to be assessed and a training pathway mapped.¹³⁸ A number of tools are available to test and measure skills and competencies to understand skill types and associated skill levels. This is critical; a sufficient learning plan cannot be created without a clear understanding of current skills versus what skills are needed. Further, one-size training does not fit all.
- **Job reading:** tailored upskilling or reskilling approaches are essential to building the necessary talent to complete in the digital economy. Once familiar with the new skills, a number of approaches can be implemented to get the individual job ready. Accenture’s methods for job readiness include: job shadowing and on-the-job learning, simulations (including virtual reality) and experimentation.¹³⁹
- **Expert:** continued mentoring and monitoring occurs as the individual builds greater expertise and moves toward the fourth expert phase.¹⁴⁰ Once they have mastered the new skill, they can help upskill or reskill others.

Tech Mahindra

Tech Mahindra, a leading provider of IT consulting services, have significantly invested into upskilling their workforce for the digital economy.¹⁴¹ Its TechMNxt initiative has focused on advanced technologies, including blockchain, AI, cybersecurity, machine learning, automation, 5G and robotics.¹⁴²

For the training initiative, Tech Mahindra has partnered with online educators including Pluralsight and edX.org.¹⁴³ Additionally, the company is developing internal programs, such as RIDE, a self-directed learning platform intended to “accelerate skilling on next generation roles.”¹⁴⁴ To date, Tech Mahindra has reskilled a large portion of their IT workforce; more than 70 percent of the company’s technical

¹³⁷ Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](#). Accenture.

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ DataQuest India Online (DQ). (2019). [Tech Mahindra reskilled nearly 70% of IT workforce in digital and future skills](#). DQ.

¹⁴² Cook, S. (2019). [Tech Mahindra starts investing in reskilling its employees in blockchain and digital technologies](#). CryptoNewsZ.

¹⁴³ DataQuest (DQ) India Online. (2019). [Tech Mahindra Reskilled nearly 70% of IT Workforce in Digital and Future Skills](#). DQ.

¹⁴⁴ Ibid.

employees have been certified in digital skills, and more than 20,000 associates have been trained in advanced technologies.¹⁴⁵

In November 2019, the company took a new step toward upskilling the future workforce and developing the talent pipeline by signing a memorandum of understanding with the College of Engineering and Technology, Bhubaneswar.¹⁴⁶ This collaboration will result in the development of a new centre of excellence on the campus to train graduates in AI by providing technologically advanced capacity, subject matter expertise and thought leadership, as well as “packaged programs to augment capabilities across academia, enterprises, government industries, and start-ups.”¹⁴⁷ This partnership underscores the commitment of both industry and the public sector to upskill new graduates and foster “a growth system that will positively impact the economy and the lives of people.”¹⁴⁸

Other sectors

General Motors Canada and Unifor

General Motors (GM) Canada’s approach to upskilling has varied across markets. In Ontario, the company has made a \$170 million investment to transition the assembly operations at GM Oshawa to parts manufacturing and autonomous and advanced technology vehicle testing.¹⁴⁹ However, this investment is limited to supporting 300 job transitions to the new business. GM helped to launch a Jobs Action Centre that opened in June 2019, to assist employees whose jobs will not be retained at the plant to plan for opportunities outside of GM. This centre will help by matching employee skills with new employer requirements; for qualified hourly employees seeking new employment, GM will offer financial aid to support their reskilling efforts.¹⁵⁰

Walmart

Walmart has actively invested in moving through a digital transformation by investing in e-commerce infrastructure, employee reskilling and advanced technologies, including robot workers and the use of new technologies, such as virtual reality, to create immersive learning experiences.¹⁵¹

¹⁴⁵ Bhattacharyya, R. and Verma, P. (2019). [Reskill to survive: Tech firms retrain staff on war footing](#). ETtech.

¹⁴⁶ The Economic Times (ET) Bureau. (2019). [Tech Mahindra signs MoU with CET for AI Center](#). ET.

¹⁴⁷ Ibid.

¹⁴⁸ Ibid.

¹⁴⁹ GM Canada. (2019). [GM Canada and Unifor reach agreement to save hundreds of jobs with a C\\$170 million investment in Oshawa](#). GM Canadian Corporate News Room.

¹⁵⁰ Ibid.

¹⁵¹ Hanna, J. (2019). [Walmart's workforce of the future](#). Harvard Business School.

The company recognizes that the digital shift will create new jobs, but more importantly will change their nature, creating the demand for reskilling and better compensation.¹⁵² Between 2015 and 2016, Walmart invested \$2.7 billion in wages and training.¹⁵³ This training focused on building long-term and transferable skills through efforts including Pathways, a development program geared toward entry-level associates to learn about the retail business model, which can be completed in 60 days.¹⁵⁴

The company introduced a broader education initiative in 2018 that allowed employees to enroll in online degree programs at three different universities for \$1 a day in the areas of business, technology and supply chain management.¹⁵⁵ This program expanded in June 2019 to include six universities and 14 areas of study, including cybersecurity and computer science.¹⁵⁶ In the first year of this expanded program, 7,500 employees enrolled.¹⁵⁷

In September 2019, Walmart and Penn Foster announced an upskilling collaboration for people interested in working in the healthcare industry.¹⁵⁸ For \$1 per day, Walmart's 1.5 million associates across the US interested in studying to become opticians or pharmacy technicians can access a learning platform created in partnership with Guild Education.¹⁵⁹

Best Western Hotels & Resorts

In 2016, Best Western Hotels & Resorts partnered with Mursion to provide a simulative training platform using virtual reality to prepare employees for guest interactions by developing soft skills¹⁶⁰ This software has allowed Best Western to focus on developing and refining skills such as problem resolution, for which it may be otherwise difficult to train.

As a result of the training, the company experienced a 5 percent gain on problem resolution, the primary focus of the training, and 2-5 percent increases in other areas linked with customer satisfaction.¹⁶¹ To date, the company has upskilled more than 35,000 employees in soft skills around related to customer interactions, including expressions of empathy and being resourceful in addressing client problems.¹⁶²

¹⁵² Ibid.

¹⁵³ Ibid.

¹⁵⁴ Freifeld, L. (2019). [Training Top 125 Best Practice: Walmart's Pathways](#). TrainingMagazine.

¹⁵⁵ Hanna, J. (2019). [Walmart's workforce of the future](#). Harvard Business School.

¹⁵⁶ Ibid.

¹⁵⁷ Ibid.

¹⁵⁸ PR Newswire. (2019). [Walmart Taps Digital Upskilling Platform to Prepare Workers for In-Demand Healthcare Jobs](#). PR Newswire.

¹⁵⁹ Ibid.

¹⁶⁰ Mest, E. (2016). [Best Western invests in virtual reality training](#). Hotel Management.

¹⁶¹ Mursion. (n.d.). [VR for HR: Startup raises \\$8M from impact investors to tackle workplace bias through simulation](#). PR Newswire Association.

¹⁶² Gratton, L. (2019). [New frontiers in re-skilling and upskilling](#). MIT Sloan Management Review, 61, 1.

IMPACTS: WHAT WORKS AND WHAT DOES NOT WORK



While this paper has documented numerous reskilling and upskilling success stories across multiple sectors, there is little discussion of failures.¹⁶³ Apart from AT&T, which has publicized the impacts of its reskilling efforts, relatively little information about the impact of reskilling programs is available—at least in the public domain. Numerous trailblazing organizations use different assessments, training and tools for skills development, but none provide a proven method on a large scale.

Unknowns still exist. What approaches work best for specific sectors? Given the importance for both government and industry, how can public-private partnerships enhance and increase the reach of upskilling efforts, while reducing individual organizational investments? Perhaps most importantly, how can the return on investment of retraining efforts be better estimated and understood, in terms of financial, economic and social benefits versus opportunity costs, costs of turnover and productivity losses? Reliably quantifying this return will arguably be the most significant step toward achieving full buy-in from all parties and scaling efforts to retrain the Canadian workforce beyond specific organizational or governmental initiatives.

¹⁶³ Weber, L. (2019). [Why companies are failing at reskilling](#). Wall Street Journal.



The World Economic Forum has proposed an innovative cost-benefit analysis which aims to better understand the merit of upskilling and reskilling from both government and corporate perspectives. This calculation uses the principal of net present value (NPV) and net present value difference (NPVD). The NPV calculates the difference between cash inflows and outflows over a period of time, or the difference between the present value of future money. In other words, a dollar today is worth more than a dollar tomorrow, a critical factor for ensuring an apples-to-apples comparison when considering the impact over a period of time. This calculation is compared with the NPVD to determine whether the initiative produces a net positive or negative result.

This NPVD comparison provides greater insight into the costs and relative benefits of upskilling and reskilling efforts, compared to associated opportunity costs (i.e., the loss of potential gain from other opportunities.)¹⁶⁴ The analysis accounts for severance and hiring costs, the reduced initial productivity of new hires, the costs associated with reduced productivity and the time away from work during reskilling, as well as the actual costs associated with reskilling, to name a few.¹⁶⁵ One key assumption in the WEF's calculation is the upskilling and reskilling cost expenditure, which is based on average reskilling costs using the average cost between a two-year college program and the costs of instructors and training rooms, or \$90 per day/per person for 170 days.¹⁶⁶ While this input may reflect the costs to train people, it does not measure the impact of public-private partnerships, which pool resources for economies of scale

¹⁶⁴ World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). WEF.

¹⁶⁵ Ibid.

¹⁶⁶ Ibid.

and “significantly impact the number of workers who could be reskilled with a positive cost-benefit balance.”¹⁶⁷ However, it should be noted that changes to any of the assumptions or factors used in the calculation could produce different outcomes.

Companies are still grappling with the challenge of understanding the current skills within the existing workforce, mapping out the types of skills they will need, and determining which upskilling and reskilling approach makes the most sense for their industry.¹⁶⁸ While there are a number of models and tools to measure the existing stock of skills, multiple frameworks and the lack of common definition around skills complicate this. And though there are national frameworks (i.e., ESDC’s Essential Skills and the US O*Net Framework) the extent to which these are applied at the organizational level varies. This is further complicated when companies develop their own frameworks.

Additionally, there is no clear consensus on who is responsible for upskilling and reskilling. Historically in Canada, the government has taken considerable responsibility through the public school system and heavily subsidized post-secondary education, though this support has decreased significantly in recent years. With the current rate of change and disruption, however, retraining and continuous learning will be essential for participation in the new digital economy. This presumably means both government and industry will have roles in upskilling and reskilling the future workforce. And indeed, the government is already investing in skills in new ways, as demonstrated in the multi-stakeholder collaboration to create the AI Pathways program and in the creation of the Future Skills Centre (FSC). The FSC, led by a consortium of partners, will help Canadians recognize in-demand skills, acquire skills needed for success in the new future of work, and disseminate lessons learned and best practices.^{169, 170}

In different industries, the choice to develop the existing workforce instead of fully relying on new recruitment is notable; all of the organizations discussed in this report made significant internal investments to build their existing workforce instead of solely investing in new talent. Yet in spite of organizational examples and general claims about the benefits of upskilling and reskilling the workforce, there is limited public information that quantifies the return on investment and demonstrates the business case.¹⁷¹ Moreover it is not clear, particularly in Canada, that upskilling and reskilling efforts are sufficient to offset significant layoffs, particularly in the financial services industry, which is in the midst of disruption.

¹⁶⁷ World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). WEF.

¹⁶⁸ Ibid.

¹⁶⁹ Employment and Social Development Canada (ESDC). (2019). [Future Skills Centre](#). Government of Canada.

¹⁷⁰ McDougall, A. (2019). [All together now: Intergovernmental relations in Canada’s labour market sector](#). Institute for Research on Public Policy.

¹⁷¹ World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). Centre for New Economy and Society Insight Report. WEF.

In most cases, collaborative models are used to scale retraining efforts so the maximum number of workers receive training, which makes the cost-benefit analysis difficult. Further, this cost-benefit analysis does not measure related benefits, including dividends paid to employees through promotions and wage gains (i.e., Discover Financial) or the social return on investment. Even more importantly, the cost-benefit analysis does not consider externalities (i.e., benefits) associated with massive layoffs, which inevitably produce abrupt changes in socioeconomic conditions. Shocks from job loss impact psychological well-being, often resulting in stress, depression and anxiety; physical well-being, as job loss is linked to short- and long-term health decline; children and family well-being, with impacts on educational attainment; and economic impacts because of greater dependence on medical services and social programs, such as unemployment insurance and welfare and disability benefits.¹⁷²

Preparing for the Future of Work: The Need to Develop an Upskilling and Reskilling Strategy

Addressing the skills gap is critical for the success of the future economy and is increasingly important to industry. In a recent survey of executives at 1,500 firms with greater than \$100 million in annual revenue, two-thirds said that addressing the skills gap caused by automation/digitization was among the top 10 priorities at their company.¹⁷³ Among these executives, 58 percent believed corporations should lead reskilling and upskilling initiatives, and 40 percent believed that retraining the current workforce can solve the skill gaps.¹⁷⁴

While the shape of change is uncertain, the demand for reskilling or upskilling is accelerating.¹⁷⁵ Some organizations are taking small steps by experimenting with pilots and new tools, while others have developed comprehensive programs to retrain large segments of their workforce. In some instances, these initiatives support both their customers and their supply chain, as at Microsoft. Some consultants and researchers have suggested that companies need to dramatically retool their training and development functions to provide comprehensive systems to support continuous learning, an approach that concurrently benefits the workforce and the organization.

Organizations should view the challenges associated with the digital transformation holistically and make decisions about investments, technology and talent in the context of the broader strategy for the entire organization.¹⁷⁶ This requires bold leadership and strong links to corporate strategy and functional areas. Organizations with successful upskilling programs have made these programs part of a cross-

¹⁷² Brand J. E. (2015). [The Far-Reaching Impact of Job Loss and Unemployment](#). Annual Review of Sociology. 41, 359–375.

¹⁷³ Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](#). McKinsey & Company.

¹⁷⁴ Ibid.

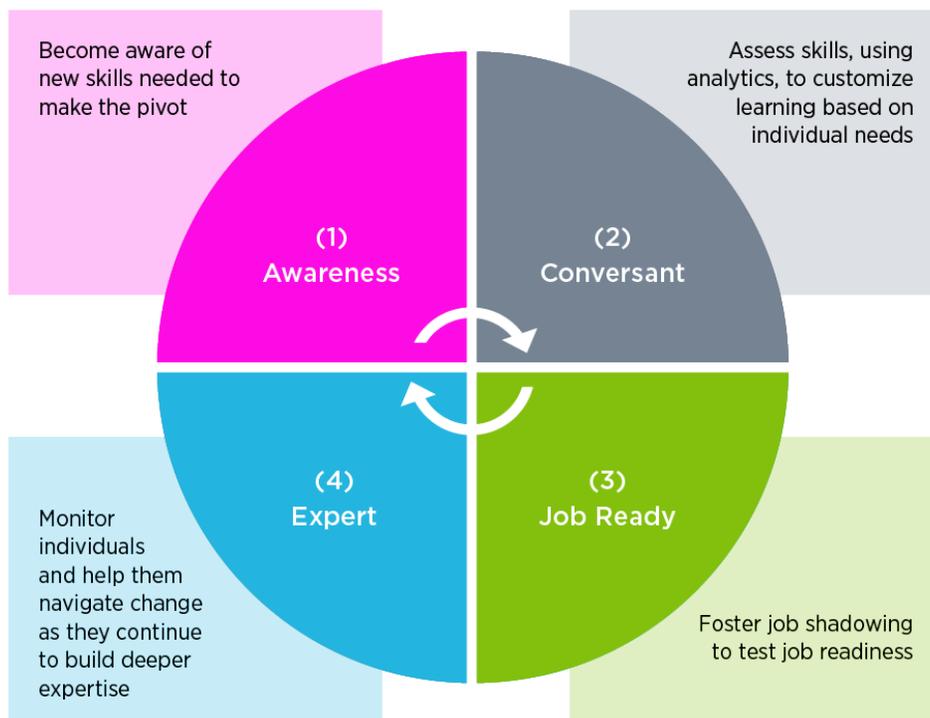
¹⁷⁵ Gratton, L. (2019). [New frontiers in re-skilling and upskilling](#). MIT Sloan Management Review, 61, 1.

¹⁷⁶ Lund, S. et al. (2019). [The future of work in America: People and places, today and tomorrow](#). McKinsey & Company.

organizational strategy, rather than a responsibility of HR, and have embedded upskilling into every aspect of the organization. Holistic and iterative considerations are critical to ensuring that organizations, and their talent, stay competitive as the future of work transforms.

Companies large and small all face one similar challenge: understanding what skills will be most relevant to their organization in the future. It is challenging to plan for upskilling when the future cannot be predicted. Some organizations, like McKinsey, have proposed data-driven approaches which carefully analyze current skills sets, future skillsets, gaps and transition paths focusing on skills rather than jobs. Similarly, the Accenture model described in Figure 2 underscores a systematic approach to leveraging the existing workforce; designing the future talent pipeline through strategic upskilling and reskilling programs; and optimizing the talent ecosystem by developing a culture of continuous learning.

Figure 2: Learning Framework: “New Skilling” at Accenture Reimagined



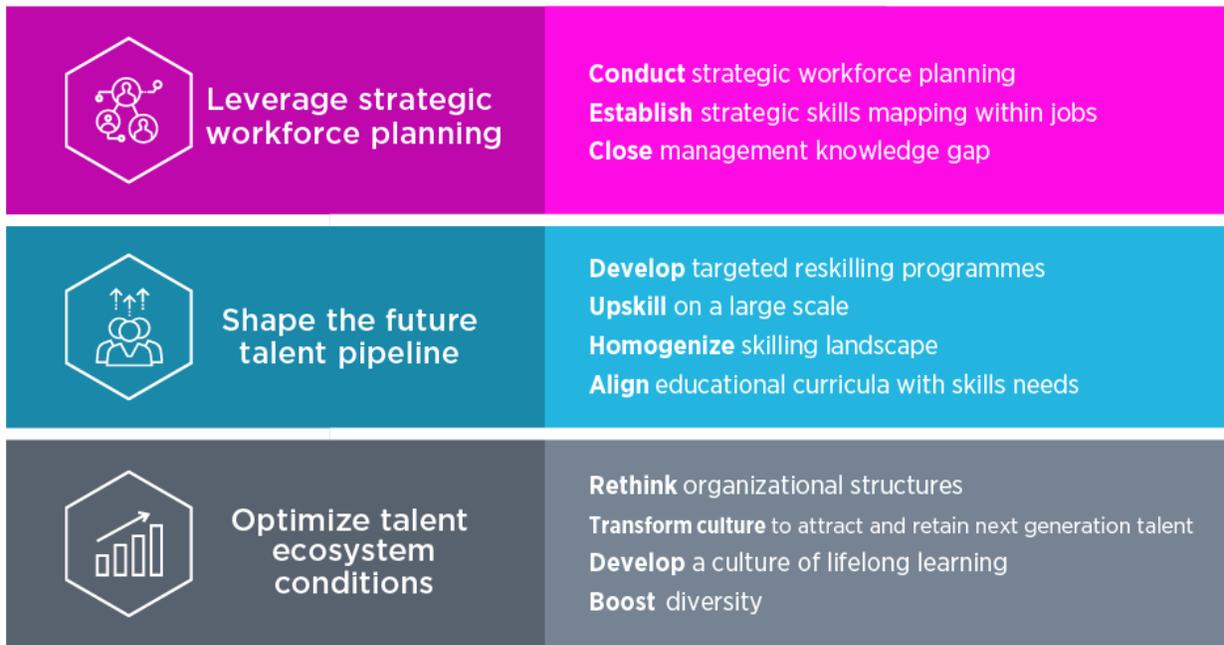
Source: Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](#). Accenture.

The universal first step toward filling gaps and developing transition pathways should be the development of an organizational jobs functions and skills taxonomy.¹⁷⁷ Individual organizations, however, do not have to create their own new taxonomies; rather, they can build on existing

¹⁷⁷ World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). WEF.

classifications, such as ESDC’s nine essential skills.¹⁷⁸ As described in Figure 3, the WEF recommends building on top of the basic taxonomies through the addition of information related to changes in the workforce due to attrition, retirement and demographic supply factors (i.e., aging population and changing workforce demographics).¹⁷⁹ A detailed skills inventory can identify roles with overlapping skill requirements, revealing logical transitions.¹⁸⁰ New technology-based tools can assess the skills that each employee has today and how those overlap with skills needed in the future.¹⁸¹ Using these comprehensive needs assessments, organizations can design their skilling approach, using the range of available approaches, tools and techniques, from traditional classroom learning to simulation software.

Figure 3: Getting Employees Future Work Ready



Source: World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). WEF.

Internal skill assessments and job taxonomies should take into account external drivers that impact talent demands, such as technology, as well as economic, social and political trends.¹⁸² The WEF encourages scenario-based analysis to consider a range of possible situations when supply and demand levers are

¹⁷⁸ For more information, see Employment and Social Development Canada (ESDC). (2015). [Understanding Essential Skills](#). Government of Canada.

¹⁷⁹ World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](#). WEF.

¹⁸⁰ Lund, S. et al. (2019). [The future of work in America: People and places, today and tomorrow](#). McKinsey & Company.

¹⁸¹ Ibid.

¹⁸² Ibid.

tweaked. This approach identifies strategies and actions that are defensible across a range of scenarios and increases the security of the long-term workforce investment.¹⁸³

As previously discussed, numerous companies have taken steps toward internal strategic workforce planning, while others have developed tools and approaches to assist other companies. McKinsey Global Institute and Accenture, for example, have developed approaches that allow deep analytical tools to support these transitions on a large scale.^{184, 185} Following the completion of strategic workforce planning (i.e., skills taxonomy and strategic skills mapping), and designing the future talent pipeline (i.e., development of targeted upskilling and reskilling initiatives and scaling up across the business), companies are in the best position to elevate their talent ecosystems to better prepare individuals and organizations for the future of work.

Reskilling and upskilling strategies need to build in concrete outcomes and performance measurement systems to assess what works, what does not work and which approaches are best suited for developing specific skills. Modern skilling models are made more accessible through digitally enabled platforms that support anytime/anywhere learning. Organizations can create their own learning experience, as with SAP's end-to-end learning experience, which includes boot camps, shadowing and digital learning.¹⁸⁶ For less tailored solutions, edX, Coursera, Udacity, LinkedIn Learning and others provide off-the-shelf tools. For blended methods, organizations can partner with educational providers to prepare a more curated curriculum, as illustrated with Cognizant and General Assembly¹⁸⁷ and Tech Mahindra's partnership with Pluralsight and edX.¹⁸⁸ Reskilling and upskilling is moving away from traditional classroom learning to online self-study, as seen throughout the case studies and a recent Deloitte study, which found a 27 percent increase in the proportion of online self-study and workplace learning programs between 2009 and 2015.¹⁸⁹

Identifying and implementing appropriate incentives and reward systems are also important to support workforce engagement. To drive the right investment requires making a strong case and building a sense of urgency.¹⁹⁰ The costs associated with enterprise-wide upskilling are considerable. For example:

¹⁸³ Lund, S. et al. (2019). [The future of work in America: People and places, today and tomorrow](#). McKinsey & Company.

¹⁸⁴ Ibid.

¹⁸⁵ Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](#). Accenture.

¹⁸⁶ Gumbel, P and Reich, A. (2018). [Building the workforce of tomorrow, today](#). McKinsey & Company.

¹⁸⁷ Cognizant News. (2018). [Cognizant and general assembly to launch no-cost digital engineering education program](#). Cognizant.

¹⁸⁸ DataQuest India Online (DQ). (2019). [Tech Mahindra reskilled nearly 70% of IT workforce in digital and future skills](#). DQ

¹⁸⁹ O'Leary, J., Widener, C. and Agarwal, S. (2018). [Closing the talent gap: Five ways government and business can team up to reskill workers](#). Deloitte.

¹⁹⁰ Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](#). McKinsey & Company.

- **SAP increased its training budget to be 2.6 times greater than previous training budgets;**¹⁹¹
- **Accenture invests about \$1 billion annually into training, using 60 percent of savings derived from AI investment;**¹⁹² and
- **Amazon has committed to spending \$700 million to retrain its employees.**¹⁹³

Investments are used to fund the actual training and, in many cases, are also used to develop online platforms and portals to map development pathways and identify learning progress to date. For instance, AT&T's online portal identifies opportunities and associated competencies, and maps the learning journey required to enable the transition.¹⁹⁴

Factors affecting success are consistent with other enterprise-wide change management initiatives, and hinge on making people understand that changes are required.¹⁹⁵ Further, upskilling and reskilling initiatives should be framed as a transformational framework for growth that will lead to greater opportunities, in order to build employee engagement and buy-in.¹⁹⁶

¹⁹¹ Ibid.

¹⁹² Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](#). Accenture.

¹⁹³ Siegel, R. (2019). [Amazon will retrain one-third of its U.S. employees to get ahead of tech changes](#). The Washington Post.

¹⁹⁴ Caminiti, S. (2018). [AT&T's \\$1 billion gambit: Retraining nearly half its workforce for jobs of the future](#). CNBC.

¹⁹⁵ Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](#). McKinsey & Company.

¹⁹⁶ Ibid.



FURTHER RESEARCH

While ambitious strategies and promising practices have been identified, empirical data on successful examples is limited and data on non-successful initiatives is almost non-existent. To better understand reskilling and upskilling, the following is needed:



Better data on labour market trends, specifically data on employment trends and in-demand skills and related occupations and how these are translated at the employer level into individual company needs.



Understand the extent of corporate strategies for refreshing their workforces and reskilling compared to, for example, layoffs. This requires more empirical work to understand the scale of reskilling and examine specific processes in specific companies.



Assess the impact and ROI of reskilling approaches. ROI and intended and unintended consequences of various approaches need to be better measured in order to understand the extent to which reskilling reduces the needs for layoffs.



Recognize if and how government policies can encourage and support employer investments in retraining and upskilling.



More exploration of public-private skills training partnerships. Key questions include: what conditions are necessary for success? How transferable are the skills? And critically, how is responsibility divided up between partners, how is the funding structured, and who funds what?



Analyze upskilling strategies, processes and delivery mechanisms with a view to understanding what works and what does not work.



Build knowledge platforms to share experiences and aggregate tools that can be used across industries and platforms.

REFERENCES

Abbosh, O., Nunes, P., & Downes, L. (2019). Pivot to the future: Discovering value and creating growth in a disrupted world. PublicAffairs.

Accenture. (2017). [New skills now: Inclusion in the digital economy](https://www.accenture.com/_acnmedia/pdf-63/accenture-new-skills-now-inclusion-in-the-digital.pdf). Accenture.
https://www.accenture.com/_acnmedia/pdf-63/accenture-new-skills-now-inclusion-in-the-digital.pdf

Amazon.com. (n.d.). [Amazon Pledges to Upskill 100,000 U.S. Employees for In-Demand Jobs by 2025](https://press.aboutamazon.com/news-releases/news-release-details/amazon-pledges-upskill-100000-us-employees-demand-jobs-2025). Amazon.
https://press.aboutamazon.com/news-releases/news-release-details/amazon-pledges-upskill-100000-us-employees-demand-jobs-2025

Ashoka Germany and McKinsey & Company. (2018). [The skilling challenge](https://www.ashoka.org/sites/default/files/atoms/files/2018_the_skilling_challenge_ashoka_mckinsey.pdf). Ashoka Germany and McKinsey & Company.
https://www.ashoka.org/sites/default/files/atoms/files/2018_the_skilling_challenge_ashoka_mckinsey.pdf

Association for Talent Development (ATD). (2018). [Bridging the skills gap: Workforce development and the future of work](https://d22bbllmj4tvv8.cloudfront.net/83/74/450e8cb644188b984d6528d43d58/2018-skills-gap-whitepaper-final-web.pdf). ATD Public Policy Advisory Group White Paper.
https://d22bbllmj4tvv8.cloudfront.net/83/74/450e8cb644188b984d6528d43d58/2018-skills-gap-whitepaper-final-web.pdf

Bagchi, M. et al. (2019). Cognizant-Diversity Institute Conference Call: re Upskilling Employees.

Bhattacharyya, R. and Verma, P. (2019). [Reskill to survive: Tech firms retrain staff on war footing](https://tech.economictimes.indiatimes.com/news/technology/reskill-to-survive-tech-firms-retrain-staff-on-war-footing/70338528). ETtech.
https://tech.economictimes.indiatimes.com/news/technology/reskill-to-survive-tech-firms-retrain-staff-on-war-footing/70338528

Birnbaum, E. (2019). [Apple, IBM, Walmart join white house advisory board](https://thehill.com/policy/technology/429805-apple-walmart-ibm-join-white-house-advisory-board). The Hill.
https://thehill.com/policy/technology/429805-apple-walmart-ibm-join-white-house-advisory-board

Brand J. E. (2015). [The Far-Reaching Impact of Job Loss and Unemployment](https://www.annualreviews.org/doi/abs/10.1146/annurev-soc-071913-043237). Annual Review of Sociology. 41, p. 359-375. https://www.annualreviews.org/doi/abs/10.1146/annurev-soc-071913-043237

Brende, B. (2019). [We need a reskilling revolution. Here's how to make it happen](https://www.weforum.org/agenda/2019/04/skills-jobs-investing-in-people-inclusive-growth/). World Economic Forum.
https://www.weforum.org/agenda/2019/04/skills-jobs-investing-in-people-inclusive-growth/

Bughin, J. et al. (2018). [Skill shift: Automation and the future of the workforce](https://www.mckinsey.com/-/media/mckinsey/featured%20insights/future%20of%20organizations/skill%20shift%20automation%20and%20the%20future%20of%20the%20workforce/mgi-skill-shift-automation-and-future-of-the-workforce-may-2018.ashx). McKinsey & Company.
https://www.mckinsey.com/-/media/mckinsey/featured%20insights/future%20of%20organizations/skill%20shift%20automation%20and%20the%20future%20of%20the%20workforce/mgi-skill-shift-automation-and-future-of-the-workforce-may-2018.ashx

Business Roundtable (BR). (2019). [Business roundtable redefines the purpose of a corporation to promote 'An economy that serves all Americans'](https://www.businessroundtable.org/business-roundtable-redefines-the-purpose-of-a-corporation-to-promote-an-economy-that-serves-all-americans). BR. https://www.businessroundtable.org/business-roundtable-redefines-the-purpose-of-a-corporation-to-promote-an-economy-that-serves-all-americans

Business Wire. (2019) [JPMorgan chase commits \\$2.3 million to NPower to prepare more than 700 veterans for high-quality technology jobs](https://www.businesswire.com/news/home/20191111005084/en/JPMorgan-Chase-Commits-2.3-Million-NPower-Prepare). Business Wire. https://www.businesswire.com/news/home/20191111005084/en/JPMorgan-Chase-Commits-2.3-Million-NPower-Prepare

Caminiti, S. (2018). [AT&T's \\$1 billion gambit: Retraining nearly half its workforce for jobs of the future](https://www.cnn.com/2018/03/13/atts-1-billion-gambit-retraining-nearly-half-its-workforce.html). CNBC.
https://www.cnn.com/2018/03/13/atts-1-billion-gambit-retraining-nearly-half-its-workforce.html

Canadian Chamber of Commerce. (2013). [Upskilling the workforce: Employer-sponsored training and resolving the skills gap](http://www.chamber.ca/media/blog/131009_Upskilling-the-Workforce/131009_Upskilling_the_Workforce.pdf). Canadian Chamber of Commerce. http://www.chamber.ca/media/blog/131009_Upskilling-the-Workforce/131009_Upskilling_the_Workforce.pdf

- Christensen, U., J. (2019). [Why employers grapple with reskilling and what they can do about it](https://www.forbes.com/sites/ulrikjuulchristensen/2019/04/25/why-employers-grapple-with-reskilling-and-what-they-can-do-about-it/#53b3552569fb). Forbes. <https://www.forbes.com/sites/ulrikjuulchristensen/2019/04/25/why-employers-grapple-with-reskilling-and-what-they-can-do-about-it/#53b3552569fb>
- Cognizant News. (2018). [Cognizant and general assembly to launch no-cost digital engineering education program](https://news.cognizant.com/2018-03-22-Cognizant-And-General-Assembly-To-Launch-No-Cost-Digital-Engineering-Education-Program). Cognizant. <https://news.cognizant.com/2018-03-22-Cognizant-And-General-Assembly-To-Launch-No-Cost-Digital-Engineering-Education-Program>
- Conference Board of Canada. (2018). Learning Cultures Lead the Way: Learning and Development Outlook – 14th Edition. Conference Board of Canada.
- Cook, S. (2019). [Tech mahindra starts investing in reskilling its employees in blockchain and digital technologies](https://www.cryptonews.com/tech-mahindra-starts-investing-in-reskilling-its-employees-in-blockchain-and-digital-technologies/12396/). CryptoNewsZ. <https://www.cryptonews.com/tech-mahindra-starts-investing-in-reskilling-its-employees-in-blockchain-and-digital-technologies/12396/>
- Council of Economic Advisors. (2018). [Addressing America's reskilling challenge](https://www.whitehouse.gov/wp-content/uploads/2018/07/Addressing-Americas-Reskilling-Challenge.pdf). Whitehouse. <https://www.whitehouse.gov/wp-content/uploads/2018/07/Addressing-Americas-Reskilling-Challenge.pdf>
- Cutter, C. (2019). [Amazon to retrain a third of its U.S. workforce](https://www.wsj.com/articles/amazon-to-retrain-a-third-of-its-u-s-workforce-11562841120). Wall Street Journal. <https://www.wsj.com/articles/amazon-to-retrain-a-third-of-its-u-s-workforce-11562841120>
- DataQuest India Online. (2019). [Tech Mahindra reskilled nearly 70% of IT workforce in digital and future skills](https://www.dqindia.com/tech-mahindra-reskilled-nearly-70-workforce-digital-future-skills/). DataQuest (DQ). <https://www.dqindia.com/tech-mahindra-reskilled-nearly-70-workforce-digital-future-skills/>
- De Vos, A. and Willemse, I. (2019). [Leveraging training skills development in SMEs](http://www.oecd.org/regional/leed/49180408.pdf). Organisation for Economic Co-operation and Development (OECD). <http://www.oecd.org/regional/leed/49180408.pdf>
- Donovan, J. and Benko, C. (2016). [AT&T's talent overhaul](https://hbr.org/2016/10/atts-talent-overhaul). Harvard Business Review. <https://hbr.org/2016/10/atts-talent-overhaul>
- Dua, A., Segel, L., H. and Lund, S. (2019). [It's time for a c-level role dedicated to reskilling workers](https://hbr.org/2019/09/its-time-for-a-c-level-role-dedicated-to-reskilling-workers). Harvard Business Review. <https://hbr.org/2019/09/its-time-for-a-c-level-role-dedicated-to-reskilling-workers>
- Feloni, R. and Turner, M. (2019). [Accenture's AI program 'Job buddy' helps retrain workers who've lost jobs to automation, and it could be a game-changing model for other companies to follow](https://www.businessinsider.com/training-employees-on-new-skills-and-technology-what-accenture-learned-2019-1). Business Insider. <https://www.businessinsider.com/training-employees-on-new-skills-and-technology-what-accenture-learned-2019-1>
- France-Presse, A. (2019). [Amazon's 'collaborative' robots offer peek into the future](https://www.voanews.com/silicon-valley-technology/amazons-collaborative-robots-offer-peek-future). Voice of America (VOA). <https://www.voanews.com/silicon-valley-technology/amazons-collaborative-robots-offer-peek-future>
- Freifeld, L. (2019). [Training top 125 best practice: Walmart's pathways](https://trainingmag.com/training-top-125-best-practice-walmart-s-pathways/). TrainingMagazine. [https://trainingmag.com/training-top-125-best-practice-walmart's-pathways/](https://trainingmag.com/training-top-125-best-practice-walmart-s-pathways/)
- Globe Newswire. (2019). [ITAC collaborates with Agorize, Microsoft and RBC Future Launch to unveil new upskilling initiative to help prepare students with future-ready skills to thrive in age of disruption and artificial intelligence](https://www.globenewswire.com/news-release/2019/10/09/1927417/0/en/ITAC-collaborates-with-Agorize-Microsoft-and-RBC-Future-Launch-to-unveil-new-upskilling-initiative-to-help-prepare-students-with-future-ready-skills-to-thrive-in-age-of-disruption.html). <https://www.globenewswire.com/news-release/2019/10/09/1927417/0/en/ITAC-collaborates-with-Agorize-Microsoft-and-RBC-Future-Launch-to-unveil-new-upskilling-initiative-to-help-prepare-students-with-future-ready-skills-to-thrive-in-age-of-disruption.html>
- GM Canadian Corporate News Room. (2019). [GM Canada and unifor reach agreement to save hundreds of jobs with a C\\$170 million investment in Oshawa](https://media.gm.ca/media/ca/en/gm/oshowa_transformation_agreement.html#backgrounders). GM Canada. https://media.gm.ca/media/ca/en/gm/oshowa_transformation_agreement.html#backgrounders
- General Assembly (GA). 2019. [Learn Online](https://generalassemb.ly/education?where=online). GA. <https://generalassemb.ly/education?where=online>
- Employment and Social Development Canada (ESDC). (2015). [Understanding Essential Skills](https://www.canada.ca/en/employment-social-development/programs/essential-skills/definitions.html). Government of Canada. <https://www.canada.ca/en/employment-social-development/programs/essential-skills/definitions.html>

- Gratton, L. (2019). [New frontiers in re-skilling and upskilling](https://sloanreview.mit.edu/article/new-frontiers-in-re-skilling-and-upskilling/). MIT Sloan Management Review, 61, 1. <https://sloanreview.mit.edu/article/new-frontiers-in-re-skilling-and-upskilling/>
- Gumbel, P and Reich, A. (2018). [Building the workforce of tomorrow, today](https://www.mckinsey.com/business-functions/organization/our-insights/building-the-workforce-of-tomorrow-today). McKinsey & Company. <https://www.mckinsey.com/business-functions/organization/our-insights/building-the-workforce-of-tomorrow-today>
- Haims, J. et al. (2015). [Learning and development: Into the spotlight](https://www2.deloitte.com/us/en/insights/focus/human-capital-trends/2015/learning-and-development-human-capital-trends-2015.html). Deloitte Insights. <https://www2.deloitte.com/us/en/insights/focus/human-capital-trends/2015/learning-and-development-human-capital-trends-2015.html>
- Hanna, J. (2019). [Walmart's workforce of the future](https://hbswk.hbs.edu/item/walmart-s-workforce-of-the-future?cid=wk-rss). Harvard Business School. <https://hbswk.hbs.edu/item/walmart-s-workforce-of-the-future?cid=wk-rss>
- Illanes, P. et al. (2018). [Retraining and reskilling workers in the age of automation](https://www.mckinsey.com/-/media/McKinsey/Featured%20Insights/Future%20of%20Organizations/Retraining%20and%20reskilling%20workers%20in%20the%20age%20of%20automation/Retraining-and-reskilling-workers-in-the-age-of-automation.ashx). McKinsey & Company. <https://www.mckinsey.com/-/media/McKinsey/Featured%20Insights/Future%20of%20Organizations/Retraining%20and%20reskilling%20workers%20in%20the%20age%20of%20automation/Retraining-and-reskilling-workers-in-the-age-of-automation.ashx>
- Innovation, Science, and Economic Development Canada (ISED). (2019). [Key small business statistics January \(2019\)](https://www.ic.gc.ca/eic/site/061.nsf/vwapj/KSBS-PSRPE_Jan_2019_eng.pdf/$file/KSBS-PSRPE_Jan_2019_eng.pdf). Government of Canada. [https://www.ic.gc.ca/eic/site/061.nsf/vwapj/KSBS-PSRPE_Jan_2019_eng.pdf/\\$file/KSBS-PSRPE_Jan_2019_eng.pdf](https://www.ic.gc.ca/eic/site/061.nsf/vwapj/KSBS-PSRPE_Jan_2019_eng.pdf/$file/KSBS-PSRPE_Jan_2019_eng.pdf)
- JPMorgan Chase & Co. (2019). [JPMorgan Chase makes \\$350 million global investment in the future of work](https://www.jpmorganchase.com/corporate/news/pr/jpmorgan-chase-global-investment-in-the-future-of-work.htm). JPMorgan Chase & Co. <https://www.jpmorganchase.com/corporate/news/pr/jpmorgan-chase-global-investment-in-the-future-of-work.htm>
- JPMorgan Chase & Co. (2019). [This program helped 147,000 people climb the economic ladder. And It's About to Get Better](https://www.jpmorganchase.com/corporate/news/stories/this-program-helped-people-climb-economic-ladder.htm). JPMorgan Chase & Co. <https://www.jpmorganchase.com/corporate/news/stories/this-program-helped-people-climb-economic-ladder.htm>
- Khan, N. and Forshaw, T. (2017). [New skills now: Inclusion in the digital economy](https://www.accenture.com/t20171012t025413z__w__in-en/_acnmedia/pdf-62/accenture-new-skills-now-report.pdf). Accenture. https://www.accenture.com/t20171012t025413z__w__in-en/_acnmedia/pdf-62/accenture-new-skills-now-report.pdf
- Kien, S., S., Weill, P. and Xu, M. (2019). [DBS: From the "World's Best Bank" to building the future-ready enterprise](https://www.pegacom/system/files/resources/2019-05/mit-cisr-digital-transformation-dbs.pdf). CISR Working Paper: 436. MIT Sloan Center for Information Systems Research. <https://www.pegacom/system/files/resources/2019-05/mit-cisr-digital-transformation-dbs.pdf>
- LuminaFoundation. (2016). [Talent investments pay off](https://www.luminafoundation.org/files/resources/discover-roi-executive-briefing.pdf). Executive Briefing: Discover Financial Services Realizes Returns for Investments in Tuition Reimbursement. LuminaFoundation. <https://www.luminafoundation.org/files/resources/discover-roi-executive-briefing.pdf>
- Lund, S. et al. (2019). [The future of work in America: People and places, today and tomorrow](https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-america-people-and-places-today-and-tomorrow). McKinsey & Company. <https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-america-people-and-places-today-and-tomorrow>
- ManpowerGroup. (2019). [ManpowerGroup employment outlook survey Canada: Q3 2019](https://manpowerab.com/wp-content/uploads/2019/06/CANADA-BROCHURE-EN.pdf). ManpowerGroup. <https://manpowerab.com/wp-content/uploads/2019/06/CANADA-BROCHURE-EN.pdf>
- Mazareanu, E. (2019). [Average spend on learning and development per employee worldwide 2008-2017](https://www.statista.com/statistics/738519/workplace-training-spending-per-employee/). Statista. <https://www.statista.com/statistics/738519/workplace-training-spending-per-employee/>
- McDougall, A. 2019. [All Together Now. Intergovernmental Relations in Canada's Labour Market Sector](https://www.irpp.ca/wp-content/uploads/2019/06/All-Together-Now-Intergovernmental-Relations-in-Canada-s-Labour-Market-Sector.pdf). Institute for Research on Public Policy.

- McIntosh, J. (2016). [Scotiabank invests \\$250M to help re-skill employees for the digital economy](https://www.bnnbloomberg.ca/scotiabank-invests-250m-to-help-re-skill-employees-for-the-digital-economy-1.1052470). The Canadian Press. <https://www.bnnbloomberg.ca/scotiabank-invests-250m-to-help-re-skill-employees-for-the-digital-economy-1.1052470>
- Medros, A. (2019). [edX announces results of new survey on reskilling trends](https://blog.edx.org/edx-announces-results-new-survey-reskilling-trends/). edX. <https://blog.edx.org/edx-announces-results-new-survey-reskilling-trends/>
- Mest, E. (2016). [Best Western invests in virtual reality training](https://www.hotelmanagement.net/operate/best-western-invests-virtual-reality-training). Hotel Management. <https://www.hotelmanagement.net/operate/best-western-invests-virtual-reality-training>
- Modgil, S. (2019). [Upskilling the next gen workforce: The IBM way](https://www.peplematters.in/site/interstitial?return_to=%2Farticle%2Fskillup%2Fupskilling-the-next-gen-workforce-the-ibm-way-21932). People Matters Media. https://www.peplematters.in/site/interstitial?return_to=%2Farticle%2Fskillup%2Fupskilling-the-next-gen-workforce-the-ibm-way-21932
- Mursion. (n.d.). [VR for HR: Startup raises \\$8M from impact investors to tackle workplace bias through simulation](https://www.prnewswire.com/news-releases/vr-for-hr-startup-raises-8m-from-impact-investors-to-tackle-workplace-bias-through-simulations-300817329.html). PR Newswire Association. <https://www.prnewswire.com/news-releases/vr-for-hr-startup-raises-8m-from-impact-investors-to-tackle-workplace-bias-through-simulations-300817329.html>
- National Institute of Standards and Technology (NIST). (2019). [National Council for the American Worker](https://www.nist.gov/itl/applied-cybersecurity/nice/resources/executive-order-13800/latest-activities/national-council). NIST. <https://www.nist.gov/itl/applied-cybersecurity/nice/resources/executive-order-13800/latest-activities/national-council>
- Newman, D. (2018). [The digitally transformed workforce: How to upskill and retrain to retain talent](https://www.forbes.com/sites/danielnewman/2018/03/11/the-digitally-transformed-workforce-how-to-upskill-and-retrain-to-retain-talent/#571d1c31d6fb). Forbes. <https://www.forbes.com/sites/danielnewman/2018/03/11/the-digitally-transformed-workforce-how-to-upskill-and-retrain-to-retain-talent/#571d1c31d6fb>
- O'Leary, J., Widener, C. and Agarwal, S. (2018). [Closing the talent gap: Five ways government and business can team up to reskill workers](https://www2.deloitte.com/content/dam/insights/us/articles/4697_Workforce-reinvention/DI_Workforce-reinvention.pdf). Deloitte. https://www2.deloitte.com/content/dam/insights/us/articles/4697_Workforce-reinvention/DI_Workforce-reinvention.pdf
- OTEC. (2019). [Canada-Ontario Job Grant \(COJG\)](https://www.otec.org/Training-Solutions-Overview/Canada-Ontario-Job-Grant.aspx). OTEC. <https://www.otec.org/Training-Solutions-Overview/Canada-Ontario-Job-Grant.aspx>
- Pant, D. (2019). [Cognizant to offer voluntary separation to 300 top executives](https://www.peplematters.in/news/employee-relations/cognizant-to-layoff-about-300-top-executives-21816). PeopleMatters. <https://www.peplematters.in/news/employee-relations/cognizant-to-layoff-about-300-top-executives-21816>
- Pegasystems Inc. (2019). [Pega University Academic Program](https://community.pega.com/training/university-academic-program). Pegasystems Inc. <https://community.pega.com/training/university-academic-program>
- Perez, S. (2019). [Amazon invests \\$700 million to retrain a third of its US workforce by 2025](https://techcrunch.com/2019/07/11/amazon-invests-700-million-to-retrain-a-third-of-its-u-s-workforce-by-2025/). TechCrunch. <https://techcrunch.com/2019/07/11/amazon-invests-700-million-to-retrain-a-third-of-its-u-s-workforce-by-2025/>
- PricewaterhouseCoopers (PwC). (2017). [Digital IQ \(2017\) - Canadian insights: Unlocking value from digital investments](https://www.pwc.com/ca/en/services/consulting/publications/digital-iq-survey-2017.html). PwC. <https://www.pwc.com/ca/en/services/consulting/publications/digital-iq-survey-2017.html>
- PricewaterhouseCoopers (PwC). (2018). [Your workforce needs reskilling](https://www.pwc.com/us/en/services/hr-management/library/workforce-reskilling.html). PwC. <https://www.pwc.com/us/en/services/hr-management/library/workforce-reskilling.html>
- PricewaterhouseCoopers (PwC). (2018). [21st global CEO survey: What's on the minds of Canadian CEOs in \(2018\)?](https://www.pwc.com/us/en/services/hr-management/library/workforce-reskilling.html) PwC. <https://www.pwc.com/us/en/services/hr-management/library/workforce-reskilling.html>
- PricewaterhouseCoopers (PwC) and Toronto Financial Service Alliance (TFSA). (2018). [Unlocking the human opportunity: Future-proof skills to move financial services forward](http://tfsa.ca/pwc/TFSA_PwC_Unlocking_the_human_opportunity_2018.pdf). PwC and TFSA. http://tfsa.ca/pwc/TFSA_PwC_Unlocking_the_human_opportunity_2018.pdf
- PricewaterhouseCoopers (PwC) and Toronto Financial Services Alliance (TFSA). (2019). [Unlocking the human opportunity: Harnessing the power of a mid-career workforce](https://tfsa.ca/files/common/TFI-Uncovering-Opportunity_Upskilling-Feb-2019-vD.pdf). PwC and TFSA. https://tfsa.ca/files/common/TFI-Uncovering-Opportunity_Upskilling-Feb-2019-vD.pdf

PR Newswire. 2019. [Walmart Taps Digital Upskilling Platform to Prepare Workers for In-Demand Healthcare Jobs](https://www.prnewswire.com/news-releases/walmart-taps-digital-upskilling-platform-to-prepare-workers-for-in-demand-healthcare-jobs-300925434.html). PR Newswire. <https://www.prnewswire.com/news-releases/walmart-taps-digital-upskilling-platform-to-prepare-workers-for-in-demand-healthcare-jobs-300925434.html>

Prigent, A. (2019). [OECD forum \(2018\): Reskilling: How difficult is it?](https://www.oecd-forum.org/users/67300-anne-lise-prigent/posts/39838-oecd-forum-2018-reskilling-how-difficult-is-it) Organisation for Economic Co-operation and Development (OECD). <https://www.oecd-forum.org/users/67300-anne-lise-prigent/posts/39838-oecd-forum-2018-reskilling-how-difficult-is-it>

Prokopeak, M. (2019). [Amazon Goes Big With \\$700 Million Reskilling Pledge](https://www.chieflearningofficer.com/2019/07/11/amazon-goes-big-with-700-million-reskilling-pledge/). Chief Learning Officer. <https://www.chieflearningofficer.com/2019/07/11/amazon-goes-big-with-700-million-reskilling-pledge/>

Rainie, L. and Anderson, L. (2017). [The future of jobs and jobs training](https://www.pewresearch.org/internet/2017/05/03/the-future-of-jobs-and-jobs-training/). Pew Research Center. <https://www.pewresearch.org/internet/2017/05/03/the-future-of-jobs-and-jobs-training/>

Randstad. (n.d.). [Skilling, reskilling and upskilling](https://www.randstad.com/workforce-insights/talent-management/skilling-reskilling-and-upskilling/). Randstad. <https://www.randstad.com/workforce-insights/talent-management/skilling-reskilling-and-upskilling/>

Ranosa, R. (2018). [Major bank balances job cuts with innovation incubator](https://www.hrtechnologynews.com/news/learning-and-development/major-bank-balances-job-cuts-with-innovation-incubator/98230). HRTechNews. <https://www.hrtechnologynews.com/news/learning-and-development/major-bank-balances-job-cuts-with-innovation-incubator/98230>

Royal Bank of Canada (RBC). (2019). [About value for employees](https://www.rbc.com/assets/rbcits/docs/citizenship/about-value-employees.pdf). RBC. <https://www.rbc.com/assets/rbcits/docs/citizenship/about-value-employees.pdf>

Royal Bank of Canada (RBC). (2019). [About RBC Future Launch](https://www.rbc.com/dms/enterprise/futurelaunch/about.html). RBC. <https://www.rbc.com/dms/enterprise/futurelaunch/about.html>

Rubinstein, D. (n.d.). [Shopify Springboard for Students](https://newsroom.carleton.ca/story/shopify-springboard-for-students/). Carleton Newsroom. <https://newsroom.carleton.ca/story/shopify-springboard-for-students/>

Schwartz, S., A. (2018). [Cognizant retaining workforce through internal retraining efforts](https://www.ciodive.com/news/cognizant-retaining-workforce-through-internal-retraining-efforts/516627/). CIO Dive. <https://www.ciodive.com/news/cognizant-retaining-workforce-through-internal-retraining-efforts/516627/>

Sharma, M (Ed.). (2018). [Cognizant fires 200 senior level employees: offers them up to 4 months of severance payout](https://www.businesstoday.in/current/corporate/cognizant-fires-200-senior-level-employees-offers-4-months-severance-payout/story/284541.html). Business Today. <https://www.businesstoday.in/current/corporate/cognizant-fires-200-senior-level-employees-offers-4-months-severance-payout/story/284541.html>

Shook, E. and Knickrehm, M. (2018). [Reworking the revolution](https://www.accenture.com/_acnmedia/pdf-69/accenture-reworking-the-revolution-jan-2018-pov.pdf). Accenture. https://www.accenture.com/_acnmedia/pdf-69/accenture-reworking-the-revolution-jan-2018-pov.pdf

Siegel, R. (2019). [Amazon will retrain one-third of its U.S. employees to get ahead of tech changes](https://www.washingtonpost.com/business/2019/07/11/amazon-will-retrain-one-third-its-us-employees-get-ahead-tech-changes/?noredirect=on). The Washington Post. <https://www.washingtonpost.com/business/2019/07/11/amazon-will-retrain-one-third-its-us-employees-get-ahead-tech-changes/?noredirect=on>

Simpson, M. (2018). [FutureFit AI could help GM workers learn new skills, find new job opportunities](https://www.itbusiness.ca/news/futurefit-ai-could-help-gm-workers-learn-new-skills-find-new-job-opportunities/107257). ITBusiness.ca. <https://www.itbusiness.ca/news/futurefit-ai-could-help-gm-workers-learn-new-skills-find-new-job-opportunities/107257>

TD Bank Group. (2018). [TD propels 10 innovative solutions designed to prepare workers for an inclusive future](https://www.newswire.ca/news-releases/td-propels-10-innovative-solutions-designed-to-prepare-workers-for-an-inclusive-future-698394561.html). CNW Group. <https://www.newswire.ca/news-releases/td-propels-10-innovative-solutions-designed-to-prepare-workers-for-an-inclusive-future-698394561.html>

TD Bank. (2018). [TD funds 10 organizations to prepare people for the future of work](https://nationalpost.com/sponsored/business-sponsored/td-funds-10-organizations-to-prepare-people-for-the-future-of-work). TD Bank. <https://nationalpost.com/sponsored/business-sponsored/td-funds-10-organizations-to-prepare-people-for-the-future-of-work>

- The Economic Times (ET) Bureau. (2019). [Tech Mahindra signs MoU with CET for AI center](https://economictimes.indiatimes.com/tech/ites/tech-mahindra-signs-mou-with-cet-for-ai-center/articleshow/71899243.cms). ET. <https://economictimes.indiatimes.com/tech/ites/tech-mahindra-signs-mou-with-cet-for-ai-center/articleshow/71899243.cms>
- Tibando, A. and Do, A. (2018). [Employer needs for re-skilling in an era of technological change](https://brookfieldinstitute.ca/report/future-proof-preparing-young-canadians-for-the-future-of-work/). Brookfield Institute for Innovation + Entrepreneurship. <https://brookfieldinstitute.ca/report/future-proof-preparing-young-canadians-for-the-future-of-work/>
- TRIUMF. (2019). [TRIUMF partners with RBC future launch to create opportunities for undergraduate students](https://www.triumf.ca/funding-announcements/triumf-partners-rbc-future-launch-create-new-opportunities-for-undergraduate). TRIUMF. <https://www.triumf.ca/funding-announcements/triumf-partners-rbc-future-launch-create-new-opportunities-for-undergraduate>
- Trump D., J. (2018). [Executive order establishing the president's national council for the American worker](https://www.whitehouse.gov/presidential-actions/executive-order-establishing-presidents-national-council-american-worker/). Whitehouse. <https://www.whitehouse.gov/presidential-actions/executive-order-establishing-presidents-national-council-american-worker/>
- United States Office of Personnel Management (OPM). (2019). [Reskilling toolkit: Accelerating the gears of transformation](https://www.opm.gov/policy-data-oversight/workforce-restructuring/reshaping/accelerating-the-gears-of-transformation/reskilling-toolkit.pdf). OPM. <https://www.opm.gov/policy-data-oversight/workforce-restructuring/reshaping/accelerating-the-gears-of-transformation/reskilling-toolkit.pdf>
- Upskill America, Fall, J.S. [Models of upskilling: Certifications](https://www.aspeninstitute.org/publications/upskill-playbook-models-upskilling-certifications/). The Aspen Institute. <https://www.aspeninstitute.org/publications/upskill-playbook-models-upskilling-certifications/>
- Vander Wier, M. (2019). [Workers displaced by automation to receive fresh start via pilot program](https://www.hrreporter.com/focus-areas/automation-ai/workers-displaced-by-automation-to-receive-fresh-start-via-pilot-program/304614). Canadian HR Reporter. <https://www.hrreporter.com/focus-areas/automation-ai/workers-displaced-by-automation-to-receive-fresh-start-via-pilot-program/304614>
- Weber, L. (2019). [Why companies are failing at reskilling](https://www.wsj.com/articles/the-answer-to-your-companys-hiring-problem-might-be-right-under-your-nose-11555689542). Wall Street Journal. <https://www.wsj.com/articles/the-answer-to-your-companys-hiring-problem-might-be-right-under-your-nose-11555689542>
- World Economic Forum (WEF). (2019). [Towards a reskilling revolution: Industry-led action for the future of work](http://www3.weforum.org/docs/WEF_Towards_a_Reskilling_Revolution.pdf). WEF. http://www3.weforum.org/docs/WEF_Towards_a_Reskilling_Revolution.pdf

