

Annotated Bibliography

This annotated bibliography includes summaries of key publications on “Future Skills” which were selected based on their influence, their timeliness, and their geographic coverage from our more extensive list of references. Search our [Future Skills Reference Database](#).

The current list is not exhaustive and will be regularly updated. [Comments and suggestions are welcome](#).

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Learning nation: Equipping Canada's workforce with skills for the future

Advisory Council on Economic Growth

2017

 Download Report

 Download Report

Citation

Advisory Council on Economic Growth. (2017). Learning nation: Equipping Canada's workforce with skills for the future. Ottawa, ON. Government of Canada.

Summary

This report reviews the findings of a number of other key reports on the future of work and applies their approaches to the Canadian context in order to describe the future of work in Canada. The report identifies a number of technological drivers of these changes, including artificial intelligence. Based on this analysis, the authors suggest that as many as 2 million Canadians could lose their jobs by 2030. Critically, they also argue that these new developments can produce new opportunities as well as losses and highlight the key changes that must be made in order for Canadians to take advantage of these opportunities. Specifically, the report recommends that a third pillar be added to Canada's existing skills development infrastructure. This third pillar, which would complement Canada's traditional education and its system for supporting workers who leave the workforce, would support working adults by focusing on adult skills training. This third pillar could include a number of new initiatives, such as the development of a Skills Plan for Working Canadians to guide governmental action. The authors argue that any such skills plan should focus on [1] convening a broad conversation and national commitment to adult skills training; [2] ensuring a joint effort by all orders of government; [3] testing and scaling innovative and agile programs; [4] prioritize areas of greatest need, such as among low-income Canadians; [5] specifically tailor its programs for adult learners; [6] providing seamless access that is easy and simple for workers. The report also recommends the establishment of a Lifelong Learning Fund to incentivize individuals and employers to increase their investments in skills development, and action by the federal and provincial governments to transform existing employment centres to provide improved practical guidance to Canadians seeking to navigate the coming labour market disruptions. The report also emphasizes the importance of improved labour market data. Finally, it also includes a review of some promising initiatives currently underway in Canada and abroad that the authors suggest are worthy of attention.

The risk of automation for jobs in OECD countries: A comparative analysis

OECD

Melanie Arntz
Terry Gregory
Ulrich Zierahn

2016

[Download Report](#)**Citation**

Arntz, M., Gregory, T., and Zierahn, U. (2016). The risk of automation for jobs in OECD countries: A comparative analysis. Working Paper No. 189. Paris, France: OECD Publishing.

Summary

The authors modify Frey and Osborne's (2013/2017) approach by shifting to task-based method for estimating the percentage of jobs susceptible to automation in 21 OECD countries. To accomplish this, the authors apply Frey and Osborne's assessments of occupational automatability to the tasks which comprise these occupations on a country-specific basis using responses from the PIAAC survey which describe the tasks involved in these occupations. Using national labour force data, the authors use the assessment of the automatability of tasks to estimate the percentage of jobs susceptible to automation in the 21 countries. An average of 9 per cent of jobs in the OECD are found to be highly susceptible to automation. There is variation between countries with only 6 per cent of jobs in South Korea identified as susceptible which contrasts with a high of 12 per cent in Austria.

**The future of skills:
Employment in 2030**

UK - National Endowment
for Science, Technology and
the Arts (NESTA)

Hasan Bakhshi
Jonathan M. Downing
Michael A. Osborne
Philippe Schneider

2017



Download Report

Citation

Bakhshi, H., Downing, J., Osborne, M., and Schneider, P. (2017). The future of skills: Employment in 2030. London, UK: NESTA. Retrieved from https://media.nesta.org.uk/documents/the_future_of_skills_employment_in_2030_0.pdf

Summary

The authors updated Frey and Osborne's (2013/2017) approach in order to estimate the percentage of jobs in the USA and the UK that were part of an occupation likely to experience increased, the same, or reduced demand by 2030. The authors convened two experts workshops (one each in the USA and the UK) which they primed by briefing them on a set of 7 key trends that they asserted would impact the future of work. They then asked these experts to assess whether specific occupations would be in greater, the same, or lesser demand by 2030 and also asked them their confidence in this assessment. These assessments were mapped onto the full O*NET list of 120 "job features". This created a training set used to train an algorithm that then classified the more than 1,000 remaining occupations. Statistical analysis was then used to identify whether an occupation was likely to be in greater or lesser demand in 2030. Ultimately, 9.6 per cent of occupations were identified as likely to see employment growth, employment prospects for 43.2 per cent of occupations were found to be uncertain, and 18.7 per cent of occupations were identified as likely to experience contraction. Six bundles of job features (4 in the US and 2 in the UK) were identified as providing an approximation of new occupations likely to emerge by 2030.

Skills for jobs: Today and tomorrow

UK Commission for
Employment and
Skills

Vicki Belt
Mike Campbell
Lesley Giles

2010



Download Report

Citation

Belt, V., Campbell, M., and Giles, L. (2010). Skills for jobs: Today and tomorrow. The National Strategic Skills Audit for England 2010: Volume 2: The Evidence Report. London, UK: UKCES.

Summary

The UK Commission for Employment and Skills (UKCES) was tasked to provide expert, evidence-based advice on skills and employment issues to the UK Government. This report, “The National Strategic Skills Audit”, is the Commission’s first report. It pulls from existing evidence and specially commissioned reports to provide insight and foresight on skill needs and imbalances and identifies priority sectors, occupations, and skills needed for the changing economy and labour market. The report identifies ten key messages based on the evidence assembled for the audit. [1] Intelligent markets need to anticipate needs (Labour Market Information). [2] Skills for jobs matter. [3] Demand matters as well as supply. [4] The workplace matters. [5] Migration matters. [6] Sectors and geography matter. [7] High level skills and jobs matter. [8] Intermediate skills and jobs matter. [9] Generic, employability, and basic (fundamental or essential) skills matter. [10] Low skilled jobs will persist. The report briefly outlines the next steps to be taken by the UKCES.

Structural transformation in the OECD: Digitalisation, deindustrialisation and the future of work

OECD

Thor Berger
Carl Benedikt Frey

2016

[Download Report](#)**Citation**

Berger, T., and Frey, C. (2016). Structural transformation in the OECD: Digitalisation, deindustrialisation and the future of work. OECD Social, Employment and Migration Working Papers 193. Paris, France: OECD Publishing.

Summary

This paper examines the effect of the diffusion of computer technology since the 1980's on labour market outcomes in the OECD and the potential impact of recent advances in digital technology on the future of work. While the authors find that the composition of the workforce has changed significantly in recent decades, partially due to technological change, they also see the impacts of digitalization on the future of work as uncertain. Indeed, there is some evidence that suggests that the diffusion of digital technologies is not creating many new jobs to substitute for the old ones that it is automating. At the same time, technologically stagnant sectors that have been historically resistant to automation, such as health care, government, and personal services, continue to create jobs. But this may not always be the case. To capture the opportunities and address the challenges created by technological advancement, the authors suggests investing in training and reskilling for the workforce to help boost fluctuating productivity growth and to reduce undesirable rises in inequality. They also suggest that lagging regions could be revived through policies that aim to increase unskilled workers' mobility and skill development programs to drive the creation of new jobs and strengthen the innovative capacity in these regions.

What is the future of work?

World Economic Forum
(WEF)

Keith Breene

2016



Download Report

Citation

Breene, K. (2016). What is the future of work? Geneva, Switzerland: World Economic Forum (WEF).

Summary

The post highlights the significant job gap that exists between the number of young people, especially young women, who will come of age and be looking to enter the workforce by 2020, and the number of existing jobs. It estimates this gap to be about 500 million jobs. The post identifies technological change and outdated skills training as key challenges facing countries as they grapple with closing this gap. It identifies three critical changes that need to be made. [1] Education needs to become more connected to employers and focus more on lifelong learning. [2] Better forecasting of where the jobs market is headed is needed. [3] The quality of education systems needs to improve, and labour market regulation needs to become more nimble and responsive to changes in the labour market. The post closes by highlighting ongoing WEF work in this area.

The future of work in the developing world: Brookings Blum Roundtable 2016 post-conference report

Global Economy and Development at Brookings

Laurence Chandy

2017



Download Report

Citation

Chandy, L. (2017). The future of work in the developing world: Brookings Blum Roundtable 2016 post-conference report. Washington, DC: Global Economy and Development at Brookings.

Summary

Technological change and globalization are reshaping the global economy and changing the nature of work in various ways. But most existing analysis of how these forces will impact the future of work has been confined to developed economies with little analysis of their impact on emerging economies being undertaken. In this collection of essays, the various authors seek to help fill this gap. Carl Benedikt Frey and Ebrahim Rahbari argue that new technologies like additive manufacturing may make it impossible for many developing economies to use previously successful export-led economic development strategies that leverage low cost labour. Harry Anthony Patrinos highlights how education is critical to adapting to the future of work, and that efforts should be focused on fostering [1] basic, early, childhood development; [2] enabling workers to invest in skills that will protect them from automation; and [3] using labour market returns to education to finance innovation. Cecilia Chen and Marcus Haymon highlight the importance of digital labour platforms and how they enable [1] big data analytics that can help workers identify in-demand skills, [2] employers to better evaluate “soft skills”; and [3] job-seekers to showcase their technical skills in new ways. Louise Fox points out that the development trajectory of developing countries casts doubt on the inevitability of the expansion of worker protections and benefit schemes. She suggests that there is a significant need for innovation in this space. Eric Simonson suggests that outsourcing may still prove to be a good way of providing quality jobs in developing economies and reports the results of research on the features of organizations offering this talent successfully. Finally, Michael Grimm reports findings on how to produce good jobs in developing economies in the current context, including: [1] access to well-designed financing programs; [2] the provision of entrepreneurship training; [3] the use of wage subsidy programs; [4] business development programs that help business move from the informal to the formal economy.

**Building connections:
Platforms for the future
of education and skills in
Canada**

The Conference Board of
Canada

2019



Download Report

Citation

The Conference Board of Canada. (2019). Building connections: Platforms for the future of education and skills in Canada. Ottawa, ON: The Conference Board of Canada.

Summary

In this report, the Conference Board of Canada examines the current state of advanced skills and education in Canada. It is the product of a five-year process which engaged public and private sector stakeholders in a broad collaboration focused on studying themes and issues in education – and especially post-secondary education – and is based on a re-examination of the results of more than 40 outputs and events held as a part of that process. The report is organized around six key platforms, with aspirations identified for each. [1] The aspiration for accessibility is to make post-secondary education accessible and reflective of Canada’s diversity. [2] The aspiration for skills is to provide all Canadians with the skills they need to thrive in the global economy. [3] The aspiration for learner pathways is fluid movement of learners through all stages of education. [4] The aspiration for institutional sustainability is the creation of sufficient and flexible funding regimes that enable institutions to fulfill all their responsibilities. [5] The aspiration for data is that all stakeholders have access to high quality and uniform data on the performance of Canada’s post-secondary education system. [6] The aspiration for knowledge mobilization is that Canada becomes a leader spanning boundaries and connecting their work to new innovations that produce value of all sorts for Canadian society. For each of these platforms a series of challenges and disruptors, as well as lists of specific goals are also identified. The paper closes by identifying some system-wide goals and proposing some high level next steps.

Building the workforce of tomorrow: A shared responsibility

Government of Ontario

Sean Conway
Dr. Carol Campbell
Robert Hardt
Aison Loat
Pradeep Sood

2016

[Download Report](#)[Download Report](#)

Citation

Conway, S., Campbell, C., Hardt, R., Loat, A., and Sood, P. (2016). Building the workforce of tomorrow: A shared responsibility. Toronto, ON. Government of Ontario.

Summary

In this report an expert panel appointed by the Premier of Ontario provides an integrated strategy aimed at assisting Ontario's workforce in adapting to the demands of a technology-driven knowledge economy. The panel's work drew upon the expertise and experience of its membership as well as significant stakeholder consultation across the education, skills development, and training sectors. Its work included a focus on groups currently underrepresented in the workforce including older workers, new Canadians, Indigenous peoples, and persons with disabilities. The report includes 28 recommendations grouped into six themes: [1] Partnerships and Local Leadership; [2] Labour Market Information; [3] Experiential Learning and Mentorship; [4] Promotion of Multiple Career Paths; [5] Strategic Investment in Human Capital; and [6] Skills and Competencies. Two other areas of focus included the role of government (especially the role of the federal government) and the importance of measuring success. The report highlights four recommendations on which the authors argue that the Government of Ontario should take a leading role: [1] establish a Planning and Partnership Table (PPT) as a formalized stakeholder institution responsible for driving progress in skills development and the creation of experiential learning opportunities designed to increased linkages to employment and entrepreneurship; [2] establish a Workforce Planning and Development Office to support the PPT and to drive delivery of the recommendations of this report; [3] leverage the Forum of Labour Market Ministers to develop and widely disseminate high quality labour market information; and [4] strengthen and expand experiential learning opportunities across secondary, post-secondary, and adult learning environments with the goal of having every secondary and post-secondary student in Ontario participate in at least one experiential learning opportunity by the time they graduate.

**The intelligence revolution:
Future-proofing Canada's
workforce**

Deloitte

2017

[Download Report](#)**Citation**

Deloitte and Human Resources Professional Association (HRPA). (2017). The intelligence revolution: Future-proofing Canada's workforce. Toronto, ON: Deloitte

Summary

This report is designed to provide insight into the future of work and to promote the meaningful multi-stakeholder discussion needed for humans to thrive during what the authors term “the Intelligence Revolution”. Based on their own research, as well as a review of the existing literature, the authors identify eight new work archetypes: Protector, Innovator, Influencer, Integrator, Scorekeeper, Performer, Builder, and Curator. They provide a summary of existing research and suggest that much of the change that is being anticipated has actually already occurred or is in the process of occurring. Recommendations are provided for three groups: government, businesses, and individuals. The authors recommend that government: modernize labour laws, rethink universal basic income, strategize ways of capitalizing on Canada's strengths, strengthen commitment to immigration, and reimagine the education system. For businesses they recommend: lead future-proofed capability development, take an active role in education changes, and empower workers to manage their careers. For individuals they recommend taking career responsibility.

The future of work: Final report

Government of Canada

Vihara Dharmaratne
Roxanne Hamel
Darroch Harrop
Reyn Lauer
Chelsea Moore
Angel Qi
Annie Xie
Wrenna Robertson

2018

Download Report



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Citation

Dharmaratne, V., Hamel, R., Harrop, D., Lauer, R. Moore, C., Qi, A., Xie, A., and Robertson, W. (2018). The future of work: Final report. Canada Beyond 150. Ottawa, ON. Government of Canada.

Summary

In this report an interdepartmental team of new Canadian public servants examine the changing nature of work and ask how these changes can lead to greater prosperity and social inclusion. This examination was facilitated by the use of foresight methodology and workshops with subject area experts. The authors' analysis identified two major challenges: [1] the growing skills gap driven by increased automation and [2] the weakening social contract between workers, employers, and governments, which they identify as being driven by digital technologies and financialization of business decisions. The authors discuss a number of different factors driving changes in work, such as increased use of telepresence, the replacement of management functions by artificial intelligence, and greater participation by seniors in the workforce. They also examined the potential impacts of these changes which they identified as rising inequality, less financial security, a growing gap between education systems and the labour market, and the rise in importance of reputation systems. In response, the authors propose a two part Human Capital Strategy for Canada. The first part of this strategy is the creation of an interactive career platform designed to identify, measure and validate competencies; enable work and training exploration; and provide matching services for individuals. The second part of the proposed strategy is a workplace stewardship suite meant to encourage businesses to boost private investment in human capital by encouraging them to consider both financial and social returns in their decision-making. The authors propose a number of tools for this suite, including government funding designed to help businesses become better employers, the use of government procurement practices to encourage certain practices among businesses, and assistance from government entities like Statistics Canada and ESDC to businesses to help them collect more and better data.

The future of work: A literature review

International Labour Office

Thereza Balliester
Adam Elsheikhi

2018

[Download Report](#)**Citation**

Elsheikhi, A., and Balliester, T. (2018). The future of work: A literature review. Research Department Working Paper No. 30. Geneva, Switzerland: International Labour Office.

Summary

This paper reviews 225 studies focused on the future of work. It categorizes the findings into five key dimensions: [1] the number of jobs, [2] the quality of jobs, [3] social protection, [4] the evolution of income and wage inequality, and [5] social dialogue and industrial relations. Highlights from this review include the following. First, the future number of jobs depends on demography and the impact of automation. Many studies suggest that job gains will occur in engineering, computer and mathematics-related fields while technological progress in genetics, artificial intelligence, and robotics will likely impact the labour market. Second, on-demand and other forms of flexible and non-standard employment will likely become more widespread. This may create more opportunities for marginalized individuals to participate in the labour force, but may also degrade working conditions and benefits. Third, social protection and welfare will be impacted. Fourth, while many of the reviewed studies discussed widening income inequalities, yet very few studies address wage growth with respect to the Future of Work. Fifth, the factors driving the changing nature of work are also driving a need for the creation of new models of representation. The report suggests that the existing literature features significant gaps with regards to the likely impacts of demographic shifts and environmental changes. Consequently, additional research is needed in areas such as the impact of migration, the potential employment impacts of the mechanization of agriculture in developing countries, and on wage growth.

**The upside of disruption:
Megatrends shaping 2016
and beyond**

Ernst & Young (EY)

2017

 Download Report

Citation

EY. (2017). The upside of disruption: Megatrends shaping 2016 and beyond. New York, NY: EY.

Summary

This is a broader report from EY that includes a focus on the future of work as one of eight megatrends impacting global society. In all eight cases the disruption that each megatrend is likely to occasion is framed as generating opportunities. The main drivers of these megatrends are identified as globalization, technology, and demographics. The interrelationships among the eight megatrends are also discussed. The future of work is directly linked to the spread of “smart” (connectivity, big data, and increasingly powerful analytics) and increased application of behavioural economics. The authors make four main predictions: [1] that the reinvention of work will be unprecedented; [2] that white-collar and creative work will be impacted; [3] that the pathway of change leads through the gig economy to a machine economy characterized by artificial intelligence and robotics; [4] that change will disrupt business, government, and society. The report also highlights a number of potential upsides to these changes.

**The future of employment:
How susceptible are jobs to
computerisation?**

Oxford Martin Programme,
Oxford University

Carl Benedict Frey
Michael A. Osborne

2017

 Download Report

Citation

Frey, C., and Osborne, M. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, 114, 254-280.

Summary

This journal article re-published the analysis and findings originally published by the authors as a whitepaper in 2013. In it, the authors and machine learning experts manually analyzed 70 occupations and labelled them as either automatable or not. An algorithm trained on this training set was then used to label the remaining 632 occupations contained in the O*NET database. This list of occupations, classified by automatability, was then applied to US labour market data to determine the susceptibility of the US workforce to automation. Using this approach, the authors found that 47 per cent of total US employment was concentrated in occupations that are highly susceptible to automation in the next 10 to 20 years. On average, occupations with high educational attainment requirements and higher wage-levels were found to be less at risk of automation.

Navigating the future of work: Can we point business, workers, and social institutions in the same direction

Deloitte

John Hagel
Jeff Schwartz
Josh Bersin

2017



Download Report

Citation

Hagel, J., Schwartz, J., and Bersin, J. (2017). Navigating the future of work: Can we point business, workers, and social institutions in the same direction. *Deloitte Review*, Issue 21. New York, NY: Deloitte

Summary

In this article, the authors advance a high level argument based on the contention that, in many ways, the future of work is already here, it's just not evenly distributed. The authors argue that the critical challenge posed by the future of work lies in aligning its three key constituencies (individuals, businesses, and social and governmental institutions) in their understandings and responses to it. To that end, they develop a framework for understanding the future of work. This framework considers the three key forces of change (technologies, demographics and consumer empowerment), the impact these forces will have on work and workforce definitions, and the implications of these factors for each of the three stakeholder groups. The authors' central argument is that the three key forces of change will alter both the definition of work and transform the workforce. This in turn will result in implications for all three stakeholder groups. Some examples of these implications include: a need for individuals to engage in lifelong learning; the need for organizations to redesign themselves to better accommodate technology and learning; and the need for governments to redesign their income support programs and healthcare systems.

Will robots really steal our jobs?

PwC

John Hawksworth
Jonathan Gillham
Richard Berriman

2018

[Download Report](#)**Citation**

Hawksworth, J., Berriman, R., and Goel, S. (2018), Will robots really steal our jobs? UK: PwC.

Summary

In this report, pwc considers the impact of automation on work by dividing its likely impact into three waves. Wave 1 is algorithmic (projected to end in the early 2020s) and involves the automation of simple computational tasks using structured data. It will primarily effect data-driven sectors like financial services. Wave 2 is augmentation (ending in the late 2020s) and involves dynamic interaction between humans and robots for clerical support and decision-making as well as robots completing tasks in semi-controlled environments like warehouses. Wave 3 is autonomous (to the mid 2030s) and involves automation of physical labor and manual tasks in dynamic real-world situations like transportation and construction. While women will be more impacted in the first two waves, more men are in jobs at risk of automation by Wave 3. Those with lower educational attainment are at highest risk, but the risk increases for those with medium and high levels of education in the latter waves. The authors point out that just because a task or job can be automated does not mean that doing so will be economically or politically viable. They also argue that, over the long term, any job losses from automation are likely to be offset by job creation. Nonetheless, the short and medium terms will be characterized by job disruption. The authors make several public policy recommendations including increased investment in education and skills, taking steps to increase demand through infrastructure investment, refraining from letting potential job losses prevent the realization of benefits from technology adoption, taking steps to share the benefits of new technologies as broadly as possible, and enhancing social safety nets. They anticipate job gains in health, education, and personal service and that the greatest job losses will be among jobs defined by simple, low-skill tasks.

Global commission on the future of work: Work for a brighter future

International Labour Organization (ILO)

2019



Download Report



Download Report

Citation

International Labour Organization (ILO). (2019). Global commission on the future of work: Work for a brighter future. Geneva, Switzerland: International Labour Organization (ILO).

Summary

This report proposes a human-centred agenda for adaptation to the future of work. This agenda comprises three suggestions: [1] increasing investment in people's capabilities, [2] increasing investment in the institutions of work, and [3] increasing investment in decent and sustainable work. To increase investment in people's capabilities, the authors suggest giving individual workers an entitlement to engage in lifelong learning; investing in the institutions, policies, and strategies that will support individuals making work transitions; implementing a transformative agenda to support gender equality; and providing greater social protection over individual's full life cycle. To increase investment in the institutions of work, the authors suggest establishing a Universal Labour Guarantee; expanding workers' sovereignty over their time; for governments to ensure collective representation of workers and employers and support this through public policy; and the harnessing of technology for technology for decent work. To increase investment in decent and sustainable work, the authors argue for incentives to promote investments in key areas for decent and sustainable work; and for reshaping business incentive structures to increase longer-term investment and encourage exploration of supplementary indicators of human development and well-being.

**The talented Mr. Robot:
The impact of automation
on Canada's workforce**

Brookfield Institute for
Innovation + Entrepreneurship

Creig Lamb

2016



Download Report

Citation

Lamb, C. (2016). The talented Mr. Robot: The impact of automation on Canada's workforce. Toronto, ON: Brookfield Institute for Innovation + Entrepreneurship.

Summary

In this report, the author applied Frey and Osborne's (2013/2017) approaches to estimating the percentage of jobs susceptible to automation to Canadian labour market data to identify the percentage of jobs susceptible to automation in Canada in the next 10 to 20 years. The author also applied McKinsey's (2015) similar approach to identify the percentage of jobs that are automatable given existing technologies. The results of this analysis were that 42 per cent of Canadian jobs were identified as being highly susceptible to automation while 36 per cent were identified as being at low risk of automation according to Frey and Osborne's approach. Using McKinsey's approach, only 1 per cent of occupations in Canada were deemed totally automatable, while 18 per cent of occupations were found to comprise activities where at least 70 per cent of which could already be automated.

**Identification of "hot
technologies" within the
O*NET® System**

US Department of Labor -
O*Net

Phil Lewis
Jennifer Norton

2016



Download Report

Citation

Lewis, P., and Norton, J. (2016). Identification of "hot technologies" within the O*NET® System. Raleigh, NC: National Center for O*NET Development.

Summary

The US O*NET system identifies "hot technologies" (those where a technology requirement is frequently included in job postings). The authors identify these technologies by mining existing data sources to find top technologies. They then convert these findings to O*NET terms by using the O*NET Tools and Technology Taxonomy. This enables them to link these technologies to occupations. The current list stands at 182 technologies ranging from Adobe Systems Adobe Acrobat to YouTube.

**A future that works:
Automation, employment,
and productivity**

McKinsey (McKinsey &
Company;
McKinsey Global Institute)

James Manyika
Michael Chui
Mehdi Miremadi
Jacques Bughin
Katy George
Paul Willmott
Martin Dewhurst

2017



Download Report

Citation

Manyika, J., Chui, M., Miremadi, M., Bughin, J., George, K., Willmott, P., and Dewhurst, M. (2017). A future that works: Automation, employment, and productivity. New York, NY: McKinsey&Company

Summary

In this report, the authors applied a method developed in an earlier McKinsey (2015) report to estimate the percentage of jobs that are susceptible to automation by already existing technology. This method involved disaggregated O*NET occupations into 2,000 discrete activities. Requirement profiles in terms of 18 capabilities were completed for each activity. The amount of time spent per activity was estimated for each occupation. Using this information, the authors estimated the automatability of activities given current technical feasibility. This estimation was then applied to the O*NET list of occupations. This list, classified by automatability, was then applied to national labour force data in various countries. Globally, 49 per cent of activities that workers are paid to do currently were found to be automatable using existing technology. Less than 5 per cent of occupations are susceptible to total automation. For about 60 per cent of occupations, at least 30 per cent of the activities involved are technically automatable already.

**Jobs lost, jobs gained:
Workforce transitions in a
time of automation**

McKinsey (McKinsey &
Company;
McKinsey Global Institute)

James Manyika
Susan Lund
Michael Chui
Jacques Bughin
Jonathan Woetzel
Parul Batra
Ryan Ko
Saurab Sanghvi

2017



Download Report

Citation

Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., Ko, R., and Sanghvi, S. (2017). Jobs lost, jobs gained: Workforce transitions in a time of automation. New York, NY: McKinsey&Company

Summary

This report examines the number and types of jobs that could be created and lost through automation from a global perspective. It considers a variety of different scenarios in order to project changes for 46 major economies through 2030. They find that the extent of displacement of workers by automation and related technologies will be dependent on technology adoption, economic growth, and growth in demand for work. The authors applied an approach developed in an earlier McKinsey report (2015) to estimate the automatability of existing jobs given existing technology. The authors then developed scenarios to project the extent to which this potential automatability would combine with the key intervening factors and result in the displacement of actual jobs by 2030. These projections ranged from essentially no displacement to displacement of 30 per cent of existing jobs. The mid-point of their various scenarios, which was held up as the most likely outcome, projected the displacement of about 15 per cent of current jobs. Additionally, the authors suggest that increased demand and economic growth generated by new technologies will also create new jobs. The authors argue that the coming transition could be of a similar scale to that of the Industrial Revolution, and that governments, businesses, and individuals will all have critical roles to play in managing it and ensuring that the transition is a positive one overall. They recommend that [1] governments make supporting workforce transitions and job creation a more urgent priority; [2] businesses should embrace automation while carefully managing workforce transitions; and [3] individuals prepare for a future of work where lifelong learning and iterative, evolving careers are the norm. They close the report by providing additional more specific recommendations under these headings for each of these three groups.

How useful is the concept of skills mismatch?

International Labour Organization (ILO)

Seamus McGuinness
Konstantinos Pouliakas
Paul Redmond

2017



Download Report

Citation

McGuinness, S., Pouliakas, K., and Redmond, P. (2017). How useful is the concept of skills mismatch? Geneva, Switzerland: International Labour Organization (ILO).

Summary

This paper examines different definitions of skills and education mismatches, such as vertical mismatches (usually measured in terms of over-education, under-education, over-skilling and under-skilling), skill gaps, skill shortages (usually measured in terms of unfilled and hard-to-fill vacancies), field of study (horizontal) mismatches and skill obsolescence. They note that there is no consensus on how to define skills mismatches in the literature, with the result that using the concept in policy discussions can be problematic. The authors use the 2014 European Skills and Jobs Surveys (ESJS) to examine the prevalence of different combinations of skill mismatches. The paper also examines the utilization of the skill mismatch concept in the European policy framework to evaluate how well policy debates on this subject align with the evidence base. Oddly, despite the prevalence of evidence connecting surpluses in human capital (e.g., over-education, and over-skilling) policy attention at both the national and European levels typically focuses on areas, such as skills gaps and skill shortages, for which there is little evidence. The authors conclude that while tackling the issue of skill shortages and gaps may be important there needs to be greater emphasis placed on resolving problems for which there is evidence, namely the prevalence of surpluses of human capital.

Automation and a changing economy - Part 1: The case for action. Washington, DC: The Aspen Institute's Future of Work Initiative

Aspen Institute

Ethan Pollack
Alastair Fitzpayne
Conor McKay

2019



Download Report

Citation

McKay, C., Pollack, E., and Fitzpayne, A. (2019). Automation and a changing economy - Part 1: The case for action. Washington, DC: The Aspen Institute's Future of Work Initiative.

Summary

This report is the first part of a two part series. In this first part, the authors examine the history of automation in the US economy and explore its potential future impact. The report makes four main arguments. [1] Historically, automation enhances economic growth, creates new jobs, and raises living standards. At the same time, however, it creates challenges for workers and communities such as job displacement and greater inequality. [2] In the past, investments in social safety nets, education, and training have helped to mitigate the negative impacts of automation. This mitigation was further supported by workplace benefits and protections. [3] Many of these mitigating supports have been eroded in recent years, for example, through disinvestment in worker training and a weakening of the social safety net. This has left society less well equipped to overcome the challenges it now faces. [4] The advent of artificial intelligence may result in automation that is deeper, faster, broader, and more disruptive than previous instances. But even if it does not, the automation that has already started will warrant new policy interventions. The form and scope of these interventions form the subject of the second part of this series.

Automation and a changing economy - Part 2: Policies for shared prosperity. Washington, DC: The Aspen Institute's Future of Work Initiative

Aspen Institute

Ethan Pollack
Alastair Fitzpayne
Conor McKay

2019



Download Report

Citation

McKay, C., Pollack, E., and Fitzpayne, A. (2019). Automation and a changing economy - Part 2: Policies for shared prosperity. Washington, DC: The Aspen Institute's Future of Work Initiative.

Summary

This report is the second part of a two part series. In the first part, the authors examined the history of automation in the US economy and explored its potential future impact. In this second part, the authors outline a policy agenda for addressing the challenges and opportunities identified in the first part. The paper's analysis is divided into four sections. [1] In the first section, employers are encouraged to take a human-centric approach to automation. This includes calls for increased employer investment in workforce development and for employers to adopt a multi-stakeholder approach to identifying and mitigating the impacts of automation on workers and their communities. [2] In the second section, enabling workers to access skills training, good jobs, and new economic opportunities is identified as a priority. The authors suggest that improved access to skills training and the development of a culture of lifelong learning will be critical to providing workers with the education and training they will need to transition and adapt effectively to new realities. [3] An exploration of the need to help workers and communities impacted by displacement recover forms the focus of the third section. The solutions that are suggested focus primarily on strengthening supports for workers and services related to the labour market such as employment insurance and retraining programs, while also supporting the economies of the affected communities. [4] The final section of the paper focuses on the importance of understanding the impacts of automation on the workforce. The lack of relevant data on subjects such as technological advancements, adoption rates, and workforce impacts, is highlighted as a problem, and steps to collect and share this data with key stakeholders was identified as a priority.

Skills, training and lifelong learning. Brave New Work: Key Issues Series:1

Canada's Public Policy Forum

Daniel Munro

2019

[Download Report](#)[Download Report](#)**Citation**

Munro, D. (2019). Skills, training and lifelong learning. Brave New Work: Key Issues Series:1. Ottawa, ON: Public Policy Forum.

Summary

In this paper, the author argues that, due to the changing nature of work, Canada needs to improve its skill development, training, and lifelong learning systems. In this vein, four specific objectives are identified as key, including [1] focusing on foundational skills; [2] improving equity and inclusion in training and skill development; encouraging cost sharing between workers, government and industry; [3] sharing information between educational institutions, industry, unions, and other stakeholders (and using this information for sound analysis); and [4] tracking program effectiveness. The report includes an overview of Canada's education, skills and training systems and focuses specific attention on Canada's critical, but neglected, mid-career skills training and development systems. It also includes an assessment of the training and development inputs, levels of participation, and barriers to participation, that characterize Canada's systems and an evaluation of these systems in light of Canada's evolving needs. This is followed by an examination of promising models from other jurisdictions and an identification of the key principles and priorities (already listed above) that could contribute to improving Canada's systems. The report closes with a review of gaps in the system that persist and unresolved questions that remain and need to be addressed.

Technological change and the future of work: Issues paper

New Zealand Productivity Commission

2019

[Download Report](#)**Citation**

New Zealand Productivity Commission (2019). Technological change and the future of work: Issues paper. Wellington, New Zealand: The New Zealand Productivity Commission

Summary

This discussion paper is designed to provide individuals with background information and highlight questions to which the New Zealand Productivity Commission is seeking responses from members of the public as it considers how New Zealand can capture the benefits generated by, and overcome the challenges posed by, disruptive technologies. The paper begins by outlining the approach being taken by the commission and outlines two critical questions: [1] what are the likely impacts of technological disruption on the future of work, the workforce, labour markets, productivity and wellbeing; and [2] how can government best position New Zealand to benefit from these changes. The paper begins by reviewing existing thinking on the ways that disruptive technology can impact developed societies like New Zealand as well as some of the predictions which have been made in the future of work literature, while also cautioning that there is significant uncertainty about what will actually happen. This includes a description of four potential scenarios that could come to pass. The analysis then moves to a discussion of current labour market policies and institutions in New Zealand and the extent to which these elements will be fit for purpose as disruption progresses. The paper then turns to an examination of New Zealand's education system and its system for supplying the skills the economy needs. This involves a discussion of the results currently being delivered, including the role of immigration, and of the likely prospects of these systems given the coming disruption. The final section of the paper examines the role of firms and economic policies, specifically whether New Zealand is currently leveraging new technologies effectively and the obstacles to innovation that exist. The paper closes by summarizing the questions designed to elicit feedback from readers that were distributed throughout the paper.

Future shock? The impact of automation on Canada's labour market

C.D. Howe Institute

Oschinski, Matthias
Wyonch, Rosalie

2017

[Download Report](#)**Citation**

Oschinski, M., and Wyonch, R. (2017). Future shock? The impact of automation on Canada's labour market. Commentary 472. Toronto, ON: C.D. Howe Institute.

Summary

In this report, the authors update and adapt Frey and Osborne's (2013/2017) approach and apply it to Canada in order to estimate the percentage of Canadian jobs that are susceptible to automation. To update the approach, the authors consulted a new group of experts and created an updated list of skills that are difficult to automate. Using this list, they further updated Frey and Osborne's approach to estimating the susceptibility of jobs to automation by adding a weighting of non-automatable skills according to their importance to an occupation and applied it to Canadian labour market data. The authors then extrapolated this assessment to report results at the industry level. Canadian industries where less than 25 per cent of jobs were found to be susceptible to automation account for 27.5 per cent of current total employment (4.9 million jobs). Industries where more than 75 per cent of jobs were found to be at high risk of automation account for only 1.7 per cent of employment (310,000 jobs).

Workplace policy reform in New Zealand: What are the lessons for Australia?

Australia Centre for Future Work

Alison Pennington

2019



Download Report

Citation

Pennington, A. (2019). Workplace policy reform in New Zealand: What are the lessons for Australia?. Canberra, ACT: The Centre for Future Work at the Australia Institute.

Summary

This report discusses seven specific labour reforms or campaigns either already enacted or in development in New Zealand as a way of identifying potential lessons that could be applied to Australia as it reforms its labour relations. These discussion includes reforms focused on [1] pay equity; [2] bargaining agreements and employee rights; [3] unions; [4] government commitments; [5] minimum wage increases; [6] civil society alliances; and [7] employee rights pertaining to leaves of absence. These reforms are discussed against the backdrop of an initial discussion of the employer friendly reforms that were undertaken from the mid-1980s onward which resulted in the radical dismantlement of New Zealand's previously highly-developed welfare state, a development which the author argues has contributed to a number of problems including rising inequality and the country finding itself trapped in a low-wage, low productivity cycle.

The future of work: Five game changers

Policy Horizons Canada

2019

[Download Report](#)[Download Report](#)

Citation

Policy Horizons Canada. (2019). The future of work: Five game changers. Ottawa, ON: Government of Canada.

Summary

In this report, the authors examine five “game changers” – significant shifts in the way people think about or do something – that they foresee impacting the future of work in Canada. [1] Further transformation of work from long-term and time-based employment to temporary and task-based. This change would enable the further unbundling of jobs into tasks and the management of these tasks by digital platforms and algorithms operating globally. While the impact on wages is not yet clear, increased wage polarization is likely as is the use of more intrusive monitoring systems to enable automated worker management. [2] Artificial intelligence (AI) and other technological advances will likely start causing unemployment well before they begin replacing entire jobs. Automation may reduce the overall demand for labour as workers are made more productive. As this occurs, tipping points may arrive which dramatically reduce the demand for humans, such as when it makes more sense to design workplaces primarily for robots. [3] AI may eliminate the scarcity of knowledge workers, potentially enabling jobless growth in knowledge industries. This could result in significant gains (greater productivity, new opportunities etc.) But since developing such systems is expensive and difficult, it may accentuate first mover advantages and result in greater corporate consolidation by global “superstar” firms. [4] Through a combination of technologies, the need for human intermediaries who provide trust and security services may be reduced or eliminated. Occupations in these areas may be particularly hard hit by job losses. But the loss of “economic friction” currently entailed by these transactions may increase economic efficiency. [5] Advances in information and communication technology, especially virtual/augmented/mixed reality and telepresence could delink the locations of workers from the locations of their workplaces. If this occurs, existing taxation and government revenue systems could be eroded in the face of intense global competition between jurisdictions for highly skilled individuals.

Humans wanted: How Canadian youth can thrive in the age of disruption

Royal Bank of Canada

2018

[Download Report](#)**Citation**

Royal Bank of Canada (2018). *Humans wanted: How Canadian youth can thrive in the age of disruption*. Toronto, ON: Royal Bank of Canada.

Summary

In this paper, RBC reports the results of its study of the Canadian workforce. This study involved talking to students, workers, educators, and employers across sectors and analyzing data on jobs, employment, and job openings. Ten key findings are highlighted: [1] In the next ten years, 25 per cent of Canadian jobs will be disrupted and more than 50 per cent face a significant overhaul. [2] Demand for “foundational” skills like critical thinking, co-ordination, social perceptiveness, active listening, and complex problem-solving will increase. [3] Over 2.4 million new jobs will be created and these new jobs will disproportionately require these new skills. [4] Canada’s education and training systems are not up to the task of helping youth navigate the emerging skills economy. [5] Employers are not well-prepared to recruit, hire, develop, or retrain for the skills that will be needed in the future. [6] Jobs can be clustered occupationally according to key skills. These clusters include: Solvers, Providers, Facilitators, Technicians, Crafters, Doers. [7] High mobility between jobs can be enabled by focusing on foundational skills common to these clusters. [8] Digital fluency will be essential to all jobs, even if coding is not. [9] Global competencies will be in high demand. [10] Jobs will increasingly value judgment and decision making, and most will value the ability to manage people and resources. Based on these findings, the report poses seven questions, such as “What if employers agree to hire for core skills over credentials”, which it positions as a call to action.

The future of skills: Trends impacting on US and UK employment in 2030

UK - NESTA

Philippe Schneider
Hasan Bakhshi
Harry Armstrong

2017

[Download Report](#)**Citation**

Schneider, P., Bakhshi, H., and Armstrong, H. (2017). The future of skills: Trends impacting on US and UK employment in 2030. London, UK: NESTA.

Summary

This report publishes the briefing delivered to the expert workshops convened by NESTA and Pearson in 2016 as a part of the research that produced the paper entitled The future of skills: Employment in 2030. It consists of explorations of seven trends global trends driving change in the global economy. [1] The first of these trends is technological change. The discussion of this trend includes automation and its impact on the future of work. It also includes discussion of other technological trends such as the sharing economy, the Internet of Things, advances in hardware and materials, and biotechnology. [2] The second trend explored is globalization. Trade and related opportunities are discussed as are globalization's implications for the middle class. [3] Demographic change is the third trend identified by the authors. The implications of the aging of the population, as well as the arrival of millennials, and the likely impacts of these developments on economy form the focus of this discussion. [4] Environmental sustainability, which refers to climate change and the need to transition to a low carbon economy, is identified as the fourth trend. [5] The fifth trend that the authors discuss is urbanization, especially its impact on the growing demand for infrastructure. [6] Inequality, and specifically the factors which are driving its rise and its micro- and macro-level impacts, is the sixth trend identified. [7] Finally, political uncertainty, including the uncertainty it creates and the drivers of this uncertainty like greater international connections, is the seventh trend discussed.

**Putting trust to work:
Decoding organizational
DNA - Trust, data, and
unlocking value in the
digital workplace**

Accenture

Ellyn Shook
Mark Knickrehm
Eva Sage-Gavin

2018



Download Report

Citation

Shook, E., Knickrehm, M., and Sage-Gavin, E. (2018). Putting trust to work: Decoding organizational DNA - Trust, data, and unlocking value in the digital workplace. n.p., USA: Accenture.

Summary

This report focuses on how firms can use the large quantities of data about their business that they increasingly have access to in order to drive growth while avoiding potential pitfalls like data breaches and disgruntled employees. They argue that the key to successfully using data lies in building trust with their employees, a process they see as having three critical components. [1] The authors describe the first component as giving control to gain trust, which refers to the idea that the best way to gain employees trust about how their employer uses their data is to give them more control over that data. This could include, for example, giving employees co-ownership of their work-related data so that they can take it with them when they leave. [2] The second component of the authors' strategy is described as sharing responsibility and sharing benefits. The authors argue that in order to lead effectively executives and boards need to be better educated about data and artificial intelligence (AI) so they can contribute to effective decision-making. Moreover, they suggest that employees should be part of designing the systems for using data and in the workplace. [3] The final component involves elevating people and using technology responsibly. The authors argue that technology should be used to open opportunities to individuals, not constrain them. Avoiding algorithmic bias is a key part of this component as is using technology to help employees reach their full potential. The report closes by offering some specific tools that firms can use to help them build trust and get the best out of their data and people.

Making Room: Reflections on diversity & inclusion in the future of work

Caroline Styr
Desmond Dickerson

Cognizant, Center for the
Future of Work

2018



Download Report

Citation

Styr, C. and Dickerson, D. (2018). Making Room: Reflections on diversity & inclusion in the future of work. Teaneck, NJ: Cognizant.

Summary

This report consists of a collection of editorial pieces under four major themes: [1] The Future Hangs on Inclusivity, [2] What Makes Us Human, [3] Addressing Bias, and [4] Community Spirit. Discussion of the first theme (The Future Hangs on Inclusivity) focuses on how workplace diversity and inclusion (D&I) initiatives need to be treated as a learning priority as opposed to mandatory training. The author argues that it is critical for leaders to lead the way through the integration of D&I into the everyday practices and culture of the workplace, which will contribute to the overall success of the workplace. The second theme (What Makes Us Human) emphasizes the importance of communication for fostering authenticity in the workplace. This enables innovation and effective collaboration, as well as effective feedback through the building of community in the workplace. The third theme (Addressing Bias), focuses on the importance of humans in contributing to the success of machines in the workplace. This theme also highlights the contributions that older workers can bring to the workplace. The fourth theme (Community Spirit) emphasizes the importance of empowering women in the world of work. It highlights the importance of cultivating women's leadership skills and offer techniques for how to do so.

Lifelong learning through the SkillsFuture movement in Singapore: Challenges and prospects

Singapore Skills Future

Charlene Tan

2017

[Download Report](#)**Citation**

Tan, C. (2017). Lifelong learning through the SkillsFuture movement in Singapore: Challenges and prospects. *International journal of lifelong education*, 36(3), 278-291.

Summary

This article discusses Singapore's new SkillsFuture initiative, which focuses on fostering a culture of lifelong learning. Specifically, the author discusses three important cultural challenges that confront the SkillsFuture initiative. [1] The first challenge identified is the existing sociocultural preference for academic education over vocational education and a national overemphasis on grades and credentials. The government is seeking to shift Singaporean attitudes by urging them to move away from a "paper chase" and towards an emphasis on the mastery of skills. [2] The second major challenge is the lack of strong local culture that emphasize the "habits of mind" needed for lifelong learning. The author suggests that this challenge is connected to the first in that the Singaporean culture has emphasized the importance of credentials at the expense of deep learning of content. As a consequence, Singaporean's ability to master a subject is often underdeveloped. [3] Finally, the author suggests that Singapore's culture is characterized by a pragmatism and a preference for concrete and quantifiable forms of evidence. The SkillsFuture initiative, on the other hand, emphasizes the development of human capital and creating opportunities, something that is less tangible and more difficult to quantify. Overall, the author argues that for the SkillsFuture initiative to be successful, there will need to be a shift in the culture of Singapore to make it more amenable to a skills growth model of learning and its people more interested in the non-economic and personal development opportunities that it presents. The pressures of globalization should help incentivize this, but government and community leaders need to continue to advocate and organize in ways that advance this agenda.

The probability of automation in England: 2011 and 2017

UK - Office for National Statistics

Sean White
Andrea Lacey
Anna Ardanaz-Badia

2019



Download Report

Citation

White, S., Lacey, A., Ardanaz-Badia, A. (2019). The probability of automation in England: 2011 and 2017. Newport, UK: Office for National Statistics.

Summary

This technical report from the UK's Office of National Statistics estimates the susceptibility of jobs to automation in England. Specifically, the paper replicates the task-based approach developed by Melanie Arntz and collaborators (2016), noting that the alternative approach developed Frey and Osborne tends to generate more extreme probabilities of automation. The authors follow the common convention of defining jobs with less than 30 per cent likelihood of automation as having a low susceptibility while jobs that have a 30 per cent to 70 per cent and jobs with a greater than 70 per cent likelihood as having medium and high susceptibilities respectively. For England the authors find that approximately 5 per cent of jobs are at high risk, 70 per cent are at medium risk and 25 per cent are at low risk of automation. They also estimate the risk of job loss from automation based on sex, part-time/full-time, age and education. They also find a strong negative relationship between high levels of training or educational attainment in an occupation and the probability of jobs in that occupation being automated. Finally, they also report on the risk of a particular task being automatable based on the words used in the task description. They find that words such as machine and clean are associated with a high risk of automation while words such as plan and research are associated with a lower risk of automation.

Eight futures of work: Scenarios and their implications

World Economic Forum (WEF) and Boston Consulting Group

2018



Download Report

Citation

World Economic Forum (WEF) and Boston Consulting Group (2018). Eight futures of work: Scenarios and their implications. White Paper. Geneva, Switzerland: World Economic Forum (WEF).

Summary

This white paper seeks to spark discussion of potential futures or work by generating eight possible scenarios. These scenarios are designed by combining the following three key variables in different ways; [1] the rate of technological change and its impact on business models; [2] the evolution of learning among the current and future workforce; and [3] the magnitude of talent mobility across geographies. Two possible outcomes are considered for each variables, which all follow the same pattern: either the current situation continues or an acceleration of increase occurs. The eight scenarios explored are as follows: [1] Workforce autarkies; [2] Mass movement; [3] Robot replacement; [4] Polarized world; [5] Empowered entrepreneurs; [6] Skilled flows; [7] Productive locals; and [8] Agile adapters.

The future of jobs: Employment, skills and workforce strategy for the fourth industrial revolution

World Economic Forum (WEF) and Boston Consulting Group

2016



Download Report

Citation

World Economic Forum (WEF) (2016). The future of jobs: Employment, skills and workforce strategy for the fourth industrial revolution. Global Challenge Insight Report. Geneva, Switzerland: World Economic Forum (WEF).

Summary

This paper reports on the results of a large survey of human resources executives from leading firms that was conducted by the World Economic Forum. Highlights from the results of this survey include the expectations of these individuals regarding employment changes from 2015-2020. The report describes the executives' perspectives on key trends and drivers of change. Based on their assessments, it projects net job losses will total 5.1 million globally by 2020, with most losses concentrated in the "office and administrative" job family. The report also builds on early WEF research focused on gender gaps in the workplace and reports on executives' views on a variety of related questions such as drivers of change, barriers to progress, strategies for increasing female participation in the formal workforce, and the better leveraging of female talent in the workplace. The report also provides breakdowns of many of its findings on a gender, regional, and industry basis.

Towards a reskilling revolution: Industry-led action for the future of work

World Economic Forum (WEF)

2019

[Download Report](#)**Citation**

World Economic Forum (WEF) (2019). Towards a reskilling revolution: Industry-led action for the future of work. Centre for New Economy .

Summary

This report describes a new tool for mapping job transition opportunities developed by the WEF, the Boston Consulting Group and Burning Glass Technologies. The tool integrates conventional labour market information systems as well as online job postings and uses a big data-driven approach to identify opportunities for training, reskilling, and transitions between jobs. The tool has been designed for use by individual workers, policymakers, firms, corporate strategic workforce planners and others. The bulk of the report is divided into four sections. [1] In the first section, the authors describe their methodology and provide an overview of their approach and the components out of which the method is built. [2] The next section explains how to use the tool and provides examples of the tool being used that draw on data for the US labour market. [3] The third section highlights the usefulness of the tool for individuals. [4] The final section provides analysis of additional policies and initiatives needed to support more effective job transitions at scale.

**The future of jobs report
2018**

World Economic Forum (WEF)

2018

[Download Report](#)**Citation**

World Economic Forum (WEF) (2018). The future of jobs report 2018. Geneva, Switzerland: World Economic Forum (WEF).

Summary

This paper reports the results of the second iteration of the WEF's Future of Jobs Survey, a large and extensive survey of human resources executives representing the large firms that make up the WEF's global membership community. The purpose of the report is to help inform responses to the major challenges facing businesses, governments, and workers and to reassess the findings from the WEF's first report conducted in 2016. In total, 313 questions, which can be divided up into question focused in the following three areas, were asked: [1] mapping the transformations currently underway; [2] documenting job transformations to 2022; and [3] understanding firms training, reskilling, and upskilling priorities and objectives. Overall, the report identifies 12 key findings. Highlights from these findings include: the identification of four technological drivers of change (ubiquitous high-speed mobile internet, artificial intelligence, widespread adoption of big data analytics, and cloud technology) as critically important for the 2018-2022 period; the expectation that there will be a net gain in jobs as the employment share of emerging professions is predicted to grow faster than the decline in the share of employment in declining roles; a growing skills instability as technological changes result in major shifts in the skills required to perform most jobs; and insufficient plans on the part of employers to reskill or upskill the employees most at risk of automation. In addition to this analysis, much of the paper is devoted to simply reporting the results of the survey, broken down in a number of different ways, including by industry and by region.

Risk and readiness: The impact of automation on provincial labour markets

C.D. Howe Institute

Rosalie Wyonch

2018

[Download Report](#)**Citation**

Wyonch, R. (2018). Risk and readiness: The impact of automation on provincial labour markets. Commentary 499. Toronto, ON: C.D. Howe Institute.

Summary

In this report, the author assesses the different levels of susceptibility to automation faced by the workers Canada's various provinces as well as their readiness to adapt to this disruption. The results reported in this paper are derived from research conducted for an earlier paper (Oschinski and Wyonch 2017) which explored the susceptibility to automation of the occupations that make up Canada's workforce. The findings of this research were then applied to labour market data from each of Canada's provinces. The author found that workers in New Brunswick, Newfoundland and Labrador and Saskatchewan are the most susceptible to technological disruption while workers in Ontario, British Columbia and Alberta are, on average, less at risk. The author also constructs a measure of workers' readiness to adapt which incorporates measures of core skills like literacy and numeracy as well as the percentage of a province's population capable of solving problems in a technology-rich environment, the province's employment rate, and the percentage of a province's population that possess a postgraduate degree. Using this measure, the author identifies workers in Ontario and Alberta as the most ready to adapt to technological disruption and workers in New Brunswick and Newfoundland and Labrador as the least ready. The author's main public policy recommendations are that governments should leverage existing programs to provide workers with opportunities to reskill, though she also notes that technological disruption may require a broader approach.