

Turn and Face the Strange:

Changes impacting the future of employment in Canada

April 2019



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ISBN: 978-1-926769-97-4

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SPECIAL THANKS + ACKNOWLEDGEMENTS

The Brookfield Institute's research is supported by external advisors who provide subject matter expertise and linkages to both policymaker and practitioner perspectives.

For their contributions and insight into this report, we would like to thank:

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With special thanks to graphic designer Lindsay Smail and illustrator Jesseca Buizon.

This report was supported by the Government of Canada's Sectoral Initiative Program and the Max Bell Foundation.

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INTRODUCTION

Most contemporary conversations about the future of employment tend to focus on technological trends. However, in order to support forward-facing planning and avoid blind spots, it is critical to understand a range of trends, with various levels of maturity, and how they might interact over time. This is the purpose of *Turn and Face the Strange* which outlines 31 broad trends that could impact the future of Canada's labour market over the next 10–15 years.

What does the future hold for Canada's labour market? Since the beginning, labour markets have experienced shifts based on a range of drivers, from urbanization to industrialization. As concern about the impact and pace of the most recent wave of changes increases, interest has also increased in education and training approaches focused on skills that are transferable across a range of occupations and industries rather than credentials. The rationale for this approach is that workers with in-demand and transferable skills may more easily find new work, upskill, or otherwise navigate changes in the labour market over the course of

their careers. Given this focus on skills, policy makers, employers, and education institutions are investing considerable resources in skills development initiatives to prepare Canadians for what the future may hold.

However, Canada currently lacks a holistic, detailed, and actionable forecast of in-demand skills. A complex array of changes could impact employment over the next 10–15 years. Some, such as population aging, are well understood, while others, such as technological change, present a high degree of uncertainty. When these changes interact, uncertainty expands, making it challenging to predict the future of Canada's labour market, and more specifically, what skills will be most in-demand. Will coding be the next blue collar job?¹ Are 85% of the jobs in 2030 not even invented yet?² These predictions are useful in sparking debate and challenging existing assumptions, but can miss the complexity of how dominant and more nascent trends might interact. This can lead to blind spots or an over-emphasis on certain trends, such as automation, over others.

The following 31 broad trends were identified using a horizon scanning process. This work was conducted as part of *Employment in 2030*, a new initiative of the Brookfield Institute, in partnership with [Nesta](#), a leading innovation research foundation in the UK. Supported by the Government of Canada's Sectoral Initiative Program and the Max Bell Foundation, *Employment in 2030* takes a unique, mixed methods approach to generate a skills and occupation forecast for Canada, shedding light on how the labour market may shift between now and 2030. Using a combination of foresight research, six cross-country expert workshops, and machine learning to drive insights, this project aims to explore the future demand of occupations and skills in Canada, and their distribution across different geographies and demographic groups. The final report will be published in early 2020.

Turn and Face the Strange is the first product of this initiative, meant to inform a conversation about the range of changes at play, and to provide a starting point for the expert workshops, which will forecast how these changes might impact future skill demands. This work builds on Nesta's 2017 report, *The Future of Skills: Trends impacting on US and UK employment in 2030*,³ which outlined seven mega trends including: technological change, globalisation, demographic change, environmental sustainability, urbanisation, increasing inequality, and political uncertainty. It extends this framework of mega trends further to explore deeper dynamics, presenting 31 meso trends, some of which are mature while others are emerging or speculative.

This report sets out to illuminate the diverse and intersecting drivers of change in Canada's labour market, which could influence future skills demands in positive and negative ways. It is not a prediction of the future, a comprehensive overview of all forces that might impact Canada's labour market, or a deep analysis of any one trend. Rather, it paints a complex picture that aims to spark exploratory and imaginative thinking. To arm people with the skills that Canada's labour market will demand in a range of possible futures, leaders from all sectors—including policymakers, educators and employers—will need to cast their thinking wide to encompass multiple trends, including weak signals of change as well as those that are in the limelight, and to consider the potential for different trends to interact in ways that are not always obvious.

-
1. Pontin, J. (2018). The New New Deal. Retrieved October 10, 2018, from <https://www.wired.com/story/how-the-feds-can-future-proof-the-economy/>
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 3. Schneider, P., Bakhshi, H., & Armstrong, H. (2017). The Future of Skills: Trends impacting on US and UK employment in 2030. Retrieved December 19, 2018, from <https://www.nesta.org.uk/report/the-future-of-skills-trends-impacting-on-us-and-uk-employment-in-2030/>

Figure 1:
Horizon Scanning Process



No one can predict the future as it is not an observable entity that exists, therefore it cannot be described. This is a foundational rule of strategic foresight and future studies, a growing discipline that offers a useful lens for exploring future-focused topics. Strategic foresight uses tools and processes that enable the exploration of possible, plausible, probable, and preferable futures so that organizations, and especially governments, can plan for what the future may hold.

One such tool is called a horizon scan, which is a technique for gathering broad emerging information that can be used to identify possible changes impacting any given subject.¹ As Schultz explains, horizon scanning helps identify weak signals of change, identifying emerging opportunities for forward-looking policy and helping to assess prospective policy risks, security threats, and public vulnerabilities.² The 31 meso trends outlined in this report were identified using this method, studying secondary data points from

academic journals, popular media, and fringe news sources to identify possible signals of change.

These signals of change were organized using the STEEPV conceptual framework, which categorizes data based on whether their origin of potential change will be societal, technological, economic, environmental, political, or values based.³ Conducted over the course of three months, this process unearthed 600+ signals of change, which were synthesized into 31 trends and described in detail below. For the purposes of this report, trends are defined as “a historic change over time...for which we have some sort of quantitative data.”⁴

1. Choo, C. W. (1999). The Art of Scanning the Environment. *Bulletin of the American Society for Information Science*, 25(3), 13–19. Retrieved from <http://choo.fis.utoronto.ca/fis/respub/asisbulletin/ASISbulletinES.pdf>
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3. Institute for Alternative Futures. (2013). *Wiser Futures Workshop Compendium Appendices Using Futures Tools to Better Understand and Create the Future*. Alexandria. Retrieved from http://vision2021.org/anticipating_the_future.pdf.
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CANADA'S LABOUR MARKET IN 2018

In order to explore the future of Canada's labour market, it is important to start from an understanding of its current state. By no means an exhaustive analysis, the following section provides an overview of Canada's labour market in 2018.

Canada's diverse labour force consists of 19.6 million people who are either employed or actively looking for work, constituting 65.8% of the country's population.¹ Of these nearly 20 million workers, 21% are over the age of 55, 14% are young people between 15 and 24 years old, and the remaining 65% are of core working age.² Nearly a quarter of Canada's labour force are immigrants.³

The past few years brought continued recovery for most of the country's labour market following the 2008 financial crisis and the 2014 oil shock. In fact, Canada experienced the highest rate of employment growth in a decade (2.3%) in 2017, driven by the creation of full time positions.^{4,5} In 2018, this growth continued, but at a lower rate of 0.9%,⁶ while December's unemployment rate was 5.6%, the lowest since 1976.⁷ For all demographic groups, employment is growing faster than their population, and these employment gains are present in both goods and services-producing sectors.^{8,9}

However, productivity growth in the Canadian economy, as in many OECD countries, has been considerably slower in the post-2000 period than in the pre-2000 period. For example, in the business sector, output per hour advanced at a 0.9% average annual rate from 2000 to 2016 compared to 1.6% from 1981 to 2000. This can be attributed in part to a slowdown in the commercialization of new technologies,¹⁰ and lack of investment in information communication technology (ICT). In fact, between 2008 and 2014, the gap between Canadian and US investment in ICT increased from 31.6% to 43.7%.¹¹

In Canada, Healthcare and Social Assistance is the highest-employing industry with 2.14 million workers, followed closely by Retail Trade (2.11 million). Manufacturing, Construction, and Educational Services are the next largest sectors and account for 4.3 million workers.¹² In 2017, manufacturing had the strongest employment growth in 15 years, growing at a pace of 1.8%.¹³ Goods producing industries on the other hand have declined from 22% of the Canadian labour force in 2001 to 18% in 2017. Meanwhile service producing industries have increased from 77% to 80% of the Canadian labour force over this period.¹⁴

There are marked differences in the labour forces of Canada's provinces and territories. Ontario and Quebec alone account for most of the country's labour force (7.6 and 4.5 million respectively), followed by British Columbia and Alberta with close to 2.5 million workers each. All other provinces and territories have a labour force of fewer than one million people.

According to Statistics Canada's Annual Review of the Labour Market, employment has risen in most provinces, led by Ontario, Alberta, Manitoba, and Prince Edward Island, but has declined in Newfoundland and Labrador. British Columbia has experienced the fastest employment growth and has the lowest unemployment rate in the country, while Quebec's employment figures continue to be strong. Alberta, while on a path to recovery, has not yet reached its pre-oil shock employment levels.¹⁵

Differences are also evident between urban and rural regions. According to national estimates, about 98% of employment growth between 2017 and 2018 took place in urban areas.¹⁶ In the past decade, rural employment has decreased and offset growth in population centres, particularly in Nova Scotia and New Brunswick.¹⁷

From 1995 to 2015, the share of total employment grew by 4.32% points for high-skilled occupations, based on wage levels, and by 1.83% points in low-skilled occupations, based on wage levels. Employment shrank by 6.32% points for occupations whose wages were in the middle of the income distribution. While still a challenge, this job polarization has been less severe in Canada than in other countries.¹⁸

1. Statistics Canada. (2018). Canada at a Glance 2018 Labour. Retrieved January 8, 2019, from <https://www150.statcan.gc.ca/n1/pub/12-581-x/2018000/l-t-eng.htm>
2. Statistics Canada. (2019). Labour force characteristics by industry, annual (x 1,000). Retrieved January 8, 2019, from <https://www150.statcan.gc.ca/t1/tbl/en/tv.action?pid=1410002301>
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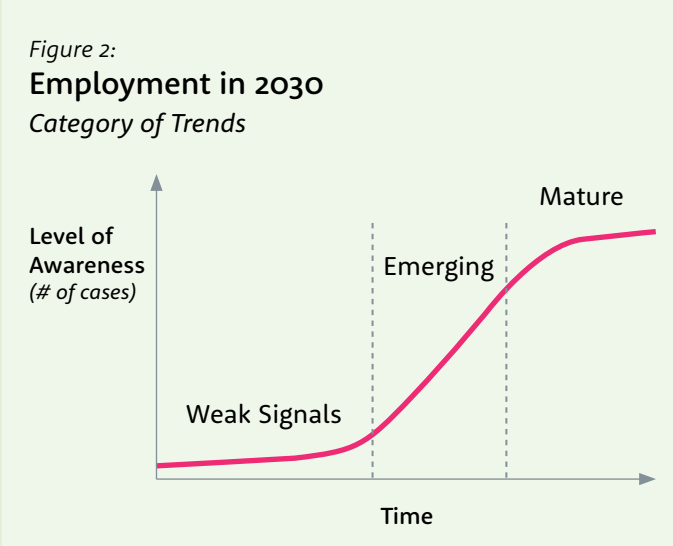
Each trend is presented with corresponding contextual information. The elements presented with each trend include:

TREND ORGANISATION

This report organises meso trends based on the 7 mega trends identified in Nesta’s 2017 report: technological change, globalisation, demographic change, environmental sustainability, urbanisation, increasing inequality, and political uncertainty, along with an additional section called “Other” for those which do not fit within one of these mega trends.¹

Within each mega trend section, three categories have been distinguished—mature, emerging and weak signals. These categories are distinguished by their relative level of awareness (amount of evidence), as well as their maturity (Figure 2).

Mature—Trends that are well known, have been developing for a long period of time, and have often been the subject of in-depth study. They are backed by robust evidence and are likely to impact the future in some way.



Emerging—Trends characterized by a medium level of awareness, with some evidence. They are less developed, but likely to shape the direction the future takes.

Weak Signals—Trends that may or may not manifest. These trends are much less developed, and not much is known about them or how they might evolve. They may have no impact on the future, or they may have a significant impact—which is why they are worthy of attention.

TREND CONTENT

Each trend contains key information, including:

Potential implications for Canada's labour market: to share key insights about how the labour market might shift or change in response to the trend.

Present day studies + predictions: to help contextualize each trend.

Sample evidence of change: presents examples of evidence from diverse sources, intended to paint a picture of the trend and its potential evolution.

Action assessment: indicates whether the trend should receive immediate action, should inform strategy, needs careful monitoring or should be watched.²

In 2030 this could mean: provides examples of how this trend might manifest in the year 2030. *Note: this section is speculative and meant to spark imaginative thinking about the possible future scenarios that could result from the maturity of trends.*

Context of each trend: visualizes how each trend relates to others within the report, communicating countertrends and related trends.

-
1. Schneider, P., Bakhshi, H., & Armstrong, H. (2017). The Future of Skills: Trends impacting on US and UK employment in 2030. Retrieved December 19, 2018, from <https://www.nesta.org.uk/report/the-future-of-skills-trends-impacting-on-us-and-uk-employment-in-2030/>
 2. Future Today Institute. (2018). 2018 Tech Trends Report. Retrieved from <https://futuretodayinstitute.com/2018-tech-trends-annual-report/>

TECHNOLOGICAL CHANGE

1. **AI EVERYTHING:** AI may impact and potentially disrupt every industry.
2. **VR + AR EXPERIENCES:** Virtual and Augmented Reality may transform the way Canadians engage with a range of experiences, from training to gaming.
3. **BLOCKCHAIN:** Blockchain adoption may change the security and authenticity of important transactions including banking, land rights, high value goods, insurance and voting.
4. **DIGITAL DETOX:** Finding the cost of digital connectedness too high, Canadians are making deliberate decisions to unplug from technology to achieve a healthier life balance.
5. **3D PRINTING:** 3D printing is gearing up to change the way we produce and consume goods in the future.
6. **WE ARE FAMGA:** Facebook, Amazon, Microsoft, Google, Apple (FAMGA) are redefining the technology industry and dominating multiple markets, leaving limited space for others.
7. **DIGITAL IDENTITY:** Information about us and our families is being used to create digital identities.
8. **HUMANS, AUGMENTED:** Brain enhancements may elevate human capabilities.
9. **TECHNOLOGICAL FEAR:** The pervasiveness of our digital connections is leading to deep fear and anxiety about technology.
10. **RIGHTS OF AI:** AI may transition from being understood as software to being considered beings, therefore achieving a new status and basic rights.
11. **CREATIVE AI:** Creative AI has the potential to automate creative tasks typically deemed automation-resilient.

GLOBALIZATION

12. **TECH TALENT IMMIGRATION:** Canada is using creative mechanisms to address tech talent shortages.

DEMOGRAPHIC CHANGE

13. **WORKING RETIREMENT:** Seniors may meld work and retirement well into their eighties and nineties.
14. **CONNECTED BUT LONELY:** Mental illness may become even more widespread, alongside increased technological connections.
15. **LIFELONG LEARNING:** Learning never stops.
16. **WORK + LIFE INTEGRATION:** Our personal and professional lives are melding, erasing the distinction between work and leisure hours.
17. **MAINSTREAM INCLUSIVE DESIGN:** Understanding that one size does not fit all, inclusive design may create a new market of opportunities.

ENVIRONMENTAL SUSTAINABILITY

18. **RESOURCE SCARCITY:** Clean air, water, sand may all become scarce and extremely valuable resources.
19. **WILDFIRES, FLOODING + MUDSLIDES:** Climate change may increase the instances of wildfires, floods and mudslides in Canada.
20. **CLIMATE REFUGEES:** Canada may see an influx of refugees due to major climate change disruptions in the rest of the world.
21. **ALTERNATIVE ENERGY:** Experimental and sustainable energy sources could provide abundant, affordable energy for all.



URBANIZATION

- 22. SUBURBAN BOOM:** Canada's suburban areas are growing faster than the overall population.

INCREASING INEQUALITY

- 23. DISAPPEARING MIDDLE CLASS:** The middle class may be disappearing and overstretched by debt, increasing the polarization between rich and poor.
- 24. REBALANCING GENDER EQUALITY:** The rebalancing of gender equality could disrupt private and public institutions.
- 25. PERSONAL DATA OWNERSHIP:** Concerns over personal data may create new ownership and revenue models.
- 26. DECLINE OF CAPITALISM:** Millennials may push for a new economic system to replace capitalism.

POLITICAL UNCERTAINTY

- 27. INTERNATIONAL TENSIONS:** New sources of international tensions may drive investment in security, including security applications of AI.

OTHER

- 28. ENTREPRENEURIAL SPIRIT:** Entrepreneurship-related work and the entrepreneurial spirit may become the dominant career path with many Canadians creating their own opportunities rather than committing to a single employer.
- 29. MANDATORY CREATIVITY:** Creativity could become critical for all Canadians, not just for the arts and design community.
- 30. EDUCATION REIMAGINED:** Work is changing, driving demand for learning how to learn instead of memorizing information, paving the way for new models of education for K-12 learners.
- 31. CANNABIS ECONOMY:** Canada becomes second nation in the world to legalize marijuana, creating immense new market opportunities.

TECHNOLOGICAL CHANGE

New technological advancements are perpetually impacting the way humans live and work. Historic evidence suggest that new technologies have the potential to amplify human performance, changing existing jobs, and resulting in entirely new occupations.¹ The pace of adoption does not always match the pace of technological change, which in turn indicates the degree and breadth of impact technological change may have on labour markets. Adoption can be slowed by a number of factors, including concerns about the pace and implications of technological change, cost, regulatory environments, and firms' access to the skills and expertise needed to successfully adopt new technologies. In Canada, adoption rates are reportedly low.²

The following section outlines a range of technological trends impacting Canada's labour market. Some of these trends are well known (such as AI, VR/AR, 3D printing), whereas others are emerging changes, demonstrating the complexity of technological changes with the potential to impact Canada's labour market.

-
1. Schneider, P., Bakshi, H., & Armstrong, H. (2017). The Future of Skills: Trends impacting on US and UK employment in 2030. Retrieved December 19, 2018, from <https://www.nesta.org.uk/report/the-future-of-skills-trends-impacting-on-us-and-uk-employment-in-2030/>
 2. Lamb, C., Vu, V., Munro, D. (2018) Better, Faster, Stronger: Maximizing the benefits of automation for Ontario's firms and people. The Brookfield Institute for Innovation + Entrepreneurship.



AI EVERYTHING

WEAK SIGNALS EMERGING **MATURE**

Artificial Intelligence (AI) has benefited from a number of recent technological advances, including increases in processing power and the explosion available data. While there are numerous barriers to adoption, this transformative technology is already influencing many sectors, including healthcare, transportation, and education. It is likely to change occupations and skill demand across a broad range of sectors. It is made up of technologies such as machine learning, natural language processing, facial recognition, and robotics to create predictive and hyper personalized services.

AI may impact and potentially disrupt every industry.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + All companies could employ AI-related occupations and it may become highly competitive to attract and retain talent.
- + Routine, predictive, and/or dangerous tasks could be among the first to be automated, but over time as technology develops and advances, a wider range of tasks could be impacted.
- + While some jobs could disappear, other jobs could change and new jobs could be created that leverage and complement AI applications.

PRESENT DAY STUDIES + PREDICTIONS:

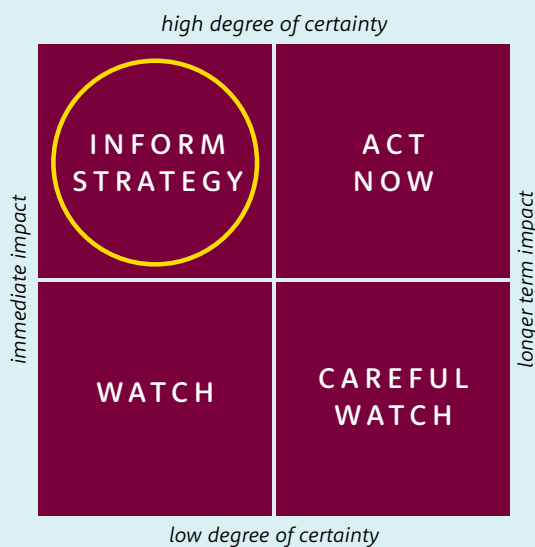
- + A 2018 McKinsey report found that 87% of Canadian executives are planning to increase their investment in AI over the next 3 years.¹
- + Element AI, a Montreal-based company, finds that Canada has the third largest concentration of AI researchers with PhDs in the world.²
- + The Information Communication Technology Council's research suggests that the cumulative Canadian economic impact of AI in 2025 is predicted to be between \$7.1 and \$13.1 trillion.³
- + According to a StartUp Canada report, 42% of startup businesses in Canada plan to adopt AI into their business.⁴
- + A 2016 report produced by the Brookfield Institute finds that automation will likely affect over half of Canadian jobs in the next decade,⁵ while Frey and Osborne estimate 47% of US employment is at risk.⁶ In contrast, researchers using a task-based analysis estimate the share of automatable jobs in OECD countries to be 9%.⁷
- + The Vector Institute suggests that if this change behaves as other major economic shifts in history, the evidence suggests that Canada is uniquely positioned to become a global leader in the world

of artificial intelligence and transform Canada as a country.⁸

- + A McKinsey study found that despite seeing value in AI investment, only 34% of Canadian executives had devised an AI strategy.⁹

SAMPLE EVIDENCE OF CHANGE:

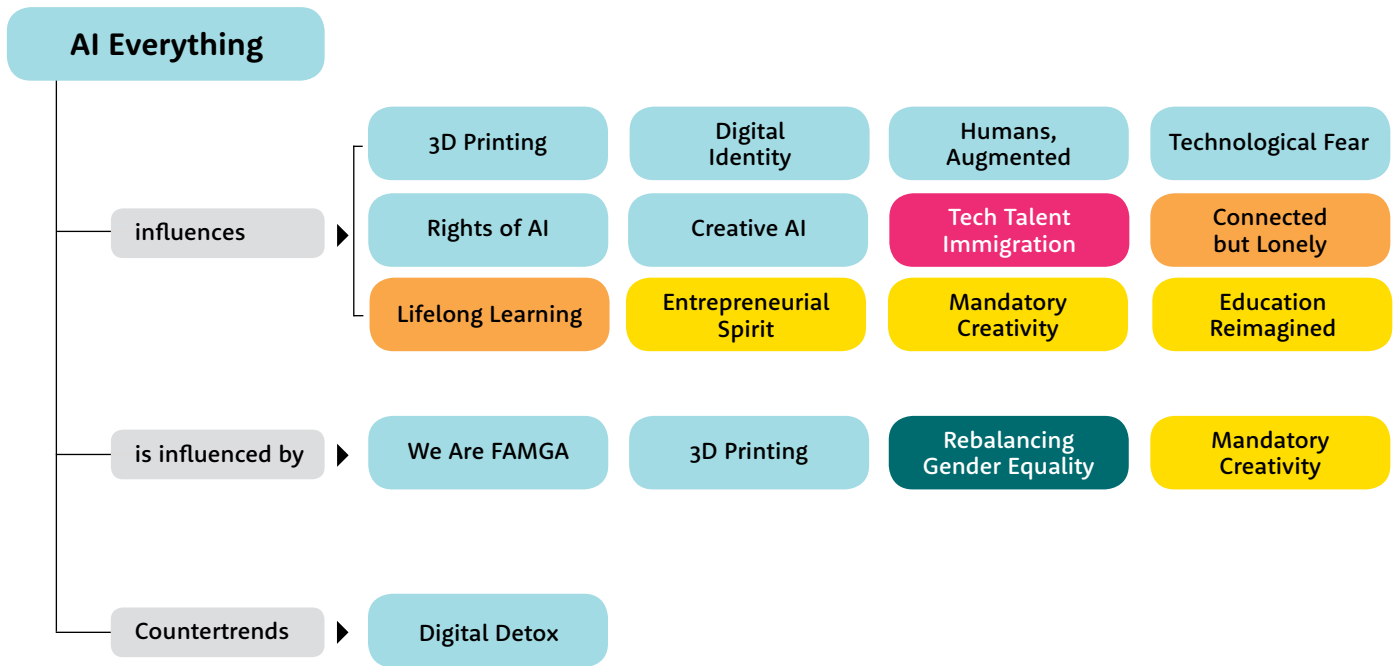
- + University of Toronto researchers suggest that AI could replace people in predictive functions, increasing the demand for human judgement.¹⁰
- + Alberta's oil and gas industry actors are making considerable investments in AI.¹¹
- + Britain's National Health Service pilots chatbot service to review patient symptoms and assess urgency of care.¹²
- + Georgia Tech professor built an AI teaching assistant to support his course work.¹³
- + Companion robot being developed by Abyss Creations to "arouse you on an emotional and intellectual level. Not just a physical level."¹⁴
- + Uber AI 'reliably' completes all stages in Montezuma's Revenge, a notoriously difficult video game.¹⁵



IN 2030 THIS COULD MEAN:

- + Canadians become more accustomed to AI throughout work and daily life, interacting with AI lawyers, A.I doctors, and other AI assisted services.
- + Today's high demand for employees trained in computer science, data science, math, statistics, and economics will continue to increase and may result in a talent gap.
- + Digital skills will be critical for all Canadians as a foundational skill, to be complemented by broader content knowledge.
- + Types of AI will be combined (such as natural language processing and computer vision to learn language).
- + More educational programs will be created to support AI learning and training.

CONTEXT OF THE TREND:



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VIRTUAL + AUGMENTED REALITY EXPERIENCES

WEAK SIGNALS EMERGING MATURE

Virtual reality (VR) enables individuals to see the world from a different point of view, and engage with people and places in ways that would otherwise not be possible. Augmented reality (AR) provides information that is layered over the real world to provide something new. Having not yet reached its full capabilities, these technologies have the potential to change the way Canadians work, learn, interact with each other, and experience the world.

Virtual + Augmented Reality may transform the way Canadians engage with a range of experiences, from training to gaming.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + There could be an increased need for skilled developers to maintain VR and AR evolving technology.
- + A decline of in-person experiences in restaurants, retail, and tourism as Canadians opt to participate in VR and AR experiences in the comfort of their home instead.

- + An increase in demand for health and wellness services in response to potential spike in sedentary behaviour as individuals spend a significant amount of time with their VR/AR headsets and reduce physical activity.
- + Potential labour productivity loss as VR and AR leisure activities divert employee attention, comparable to how video games have been responsible for reducing work young men do by 15—30 hours a year.¹

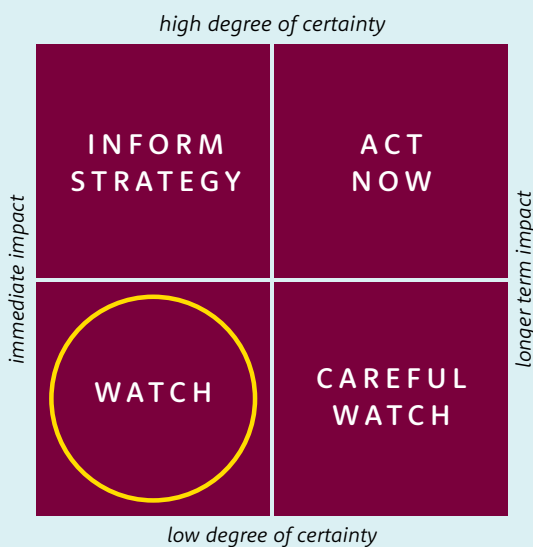
PRESENT DAY STUDIES + PREDICTIONS:

- + According to Statista, in 2018, the virtual reality software market is estimated to value up to \$2.2 billion USD and is expected to reach \$19 billion by 2020.²
- + A 2017 Markets and Markets study suggests that Augmented Reality could have one billion users by 2020, and project revenue from AR to be four times as high as that of VR by 2020.³
- + The Information Systems Audit and Control Association has found that 64% of US consumers believe that AR enhancements would benefit workplace.⁴

- + A study conducted by the Nielsen Company found that 44% of VR users are between the age of 18—34.⁵

SAMPLE EVIDENCE OF CHANGE:

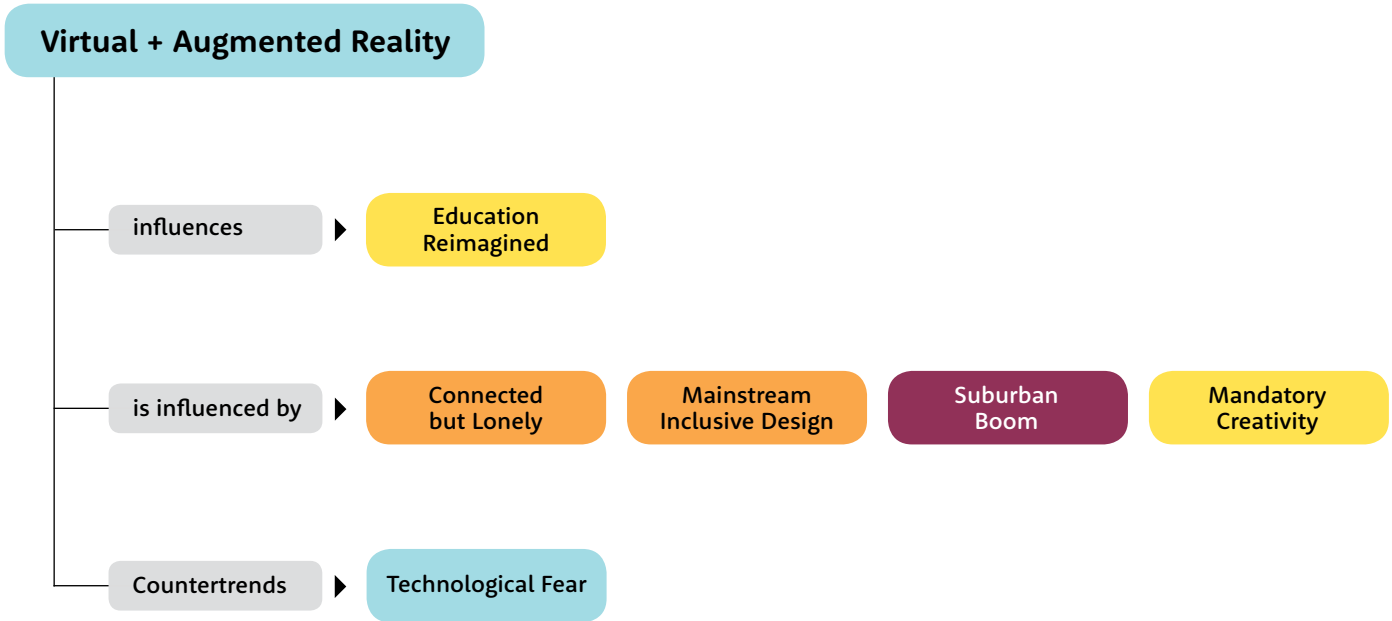
- + DAQRI Worksense is an industrial training platform that uses AR to train employees on the job.⁶
- + An Accenture study finds that healthcare is using VR and AR to train medical residents and help surgeons prepare for surgeries.⁷
- + An article published in Advances in Integrated Medicine journal outlines how VR is being used by the American military to treat soldiers' PTSD.⁸
- + MIT filmmakers demonstrate how VR creates empathy building experiences so that people can better understand other people's experiences.⁹
- + A new research project from Aalborg University shows that seniors can take bike rides using VR, significantly increasing their activity levels.¹⁰
- + Carpediem Capital invests \$3.5 million in interior design startup Flipspaces, a Virtual reality-based interior design and contracting firm.¹¹
- + In Romania, AR is being used in mechanical engineering, building systems, architecture, and education.¹²



IN 2030 THIS COULD MEAN:

- + Increase in competition for jobs as employers gain access to global talent through VR/AR enabled workplace platforms.
- + VR and AR create new opportunities for workforce training and mentoring, with potential to impact existing education and training models.
- + People can work from home without commuting while engaging with supervisors and coworkers face-to-face. Location therefore matters less—employees and employers can live anywhere and still interact face-to-face.
- + Work and leisure travel become a thing of the past, as Canadians opt to purchase VR headsets instead of airfare.
- + People could become lost in VR/AR worlds, withdrawing their participation from daily life activities, personal relationships, and democratic engagement.
- + Healthcare costs could increase given an increase in sedentary lifestyles resulting from more regular VR/AR use.

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B L O C K C H A I N

WEAK SIGNALS EMERGING **MATURE**

Blockchain, a digital ledger in which transactions made in cryptocurrencies are publicly recorded chronologically, is expanding in use. Now, in addition to enabling digital financial transactions, blockchain is being used to support other outcomes, while also circumventing global borders. The potential transformation is great for this technology, but it may be limited by its energy consumption needs, which are significant.

Blockchain adoption may change the security and authenticity of important transactions including banking, land rights, high value goods, insurance and voting.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + Blockchain adoption could directly impact the financial services sector, changing the labour demand for accounting, reporting, and other related financial roles.
- + This change could result in the reduction of financial-related labour needs or the adjustment of tasks associated with these roles.

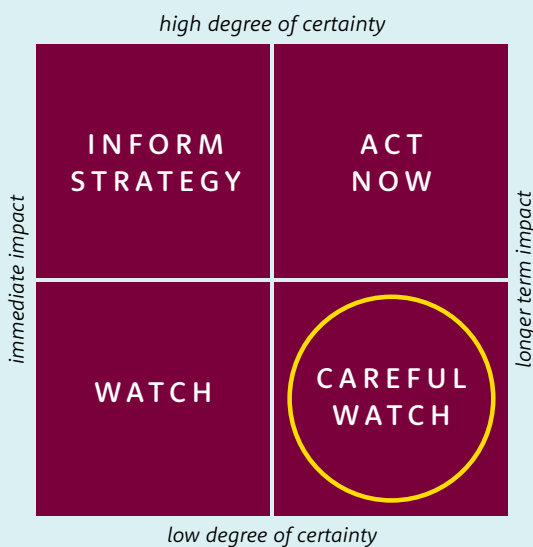
- + Use of blockchain to track additional data points with financial transactions has the potential to impact all sectors, such as transportation and logistics, merging tasks that were previously handled by separate job functions, reducing labour costs.

PRESENT DAY STUDIES + PREDICTIONS:

- + According to a 2018 Deloitte study, 70% of the Canadian firms surveyed had invested more than \$1 million in blockchain, and 74% plan to spend more than \$1 million in the next year.¹
- + A 2017 Accenture study estimated that adoption of blockchain technology could provide a cost savings to banks of \$8-12 billion USD annually.²
- + In 2017, the global market value of blockchain was \$708 million USD according to WinterGreen Research. It is estimated that it will value up to \$60 billion USD by 2024.³
- + Dot Com Infoway states that blockchain related jobs have tripled on LinkedIn over the past year.⁴

SAMPLE EVIDENCE OF CHANGE:

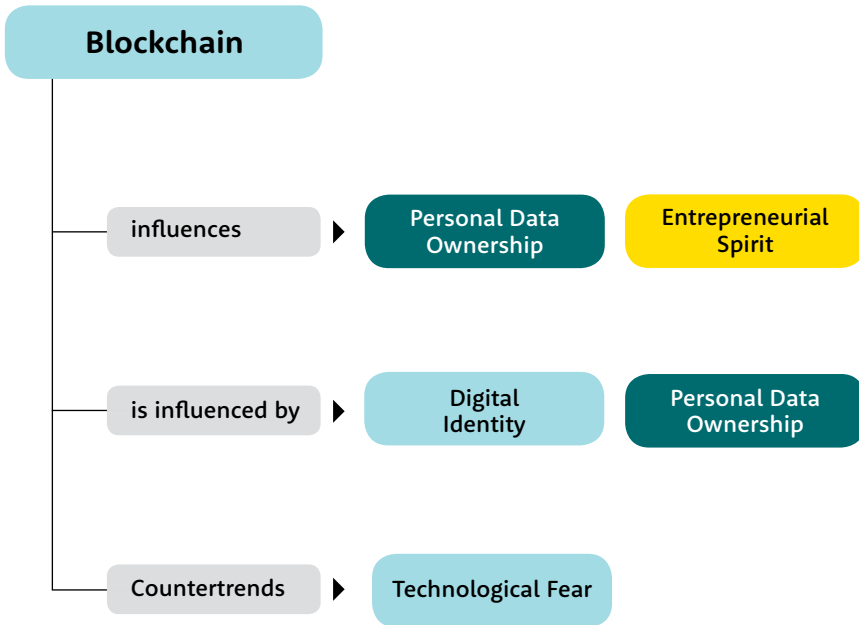
- + IBM becomes one of the world’s biggest blockchain suppliers, becoming the first major firm to acknowledge the potential of blockchain’s distributed ledgers.⁵
- + Walmart tells all their produce suppliers to adopt blockchain by September 2019 to improve tracking in wake of numerous E. coli outbreaks.⁶
- + In China, activists are using blockchain to track and document #metoo stories.⁷
- + Bail Bloc app uses blockchain to help low income Americans post bail.⁸



IN 2030 THIS COULD MEAN:

- + The value of blockchain for tracking data associated with transactions could lead to expansion of use beyond cryptocurrencies.
- + Blockchain becomes every Canadians’ educational transcript, resume, health record, and more.
- + Given the ability of blockchain to tie other data points to currency exchange, society’s concept of currency could evolve.
- + Blockchain could enable more significant cyber attacks, opening millions of Canadians to the risk of financial ruin.

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DIGITAL DETOX

WEAK SIGNALS EMERGING MATURE

As more and more Canadians spend significant portions of time online, some are beginning to reject the concept of always being connected. From opting for flip phones instead of smart phones, or canceling home internet service all together, individuals are choosing to spend more time offline. Understanding the addictive nature of smartphones, many apps have been released in recent years to help users disconnect from technology, while some governments explore legislating downtime.

Finding the cost of digital connectedness too high, Canadians are making deliberate decisions to unplug from technology to achieve a healthier life balance.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

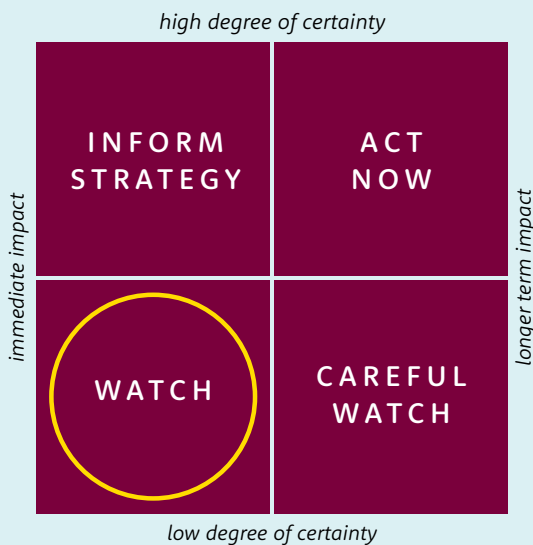
- + Demand for mindfulness products and offline experiences could increase, growing the health and wellness sector, and creating demand for new service offerings within the tourism, retail, and service industries.
- + Demand for personal electronic devices and internet use could decline, impacting Canada's digital economy.

PRESENT DAY STUDIES + PREDICTIONS:

- + A 2016 UK study found that 34% of population have sought time offline, of which 25% spent up to a day internet-free; 20% took up to a week off; and 5% went web-free for up to a whole month.¹
- + According to Statistics Canada, 76% of Canadians own a smartphone, while nearly 100% of Canadians under the age of 45 use the internet on a daily basis.²
- + Canada's telecommunications industry was worth \$48.7 billion in 2016.³
- + Latest survey from Pew Research states that some Americans are cancelling home internet service.⁴

SAMPLE EVIDENCE OF CHANGE:

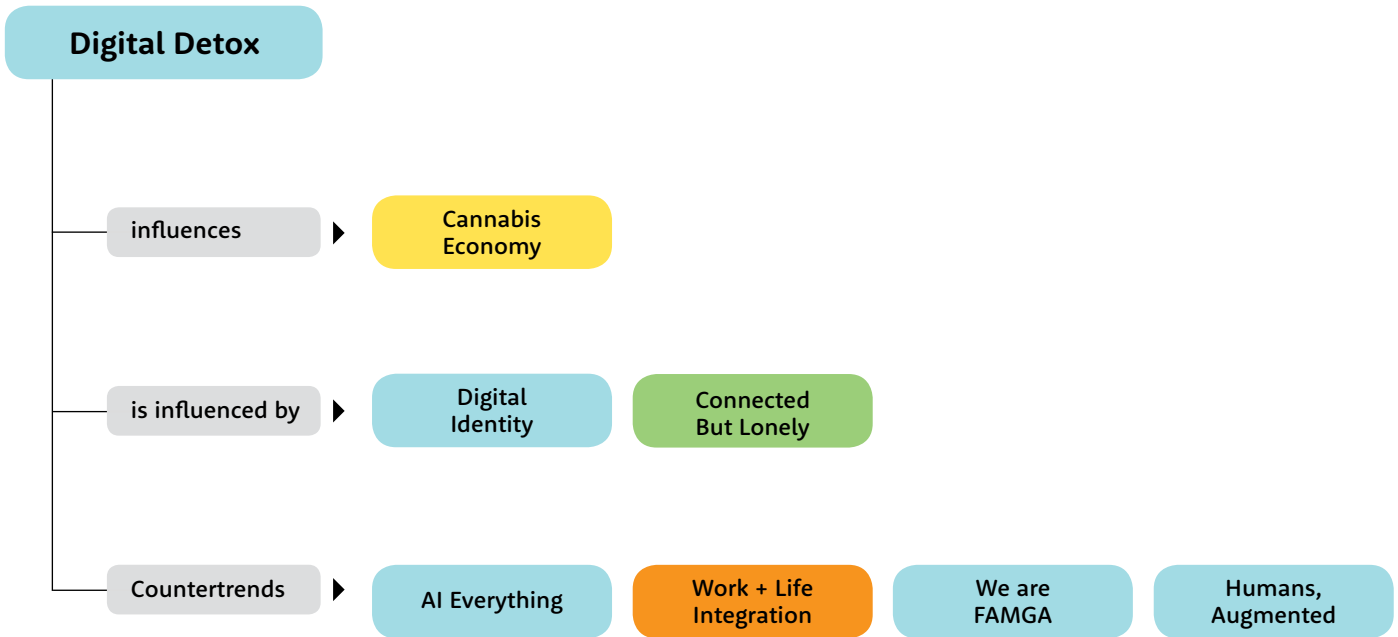
- + CBC reports that celebrities are opting for flip phones (or "dumbphones" as they are sometimes called) instead of smartphones.⁵
- + France gives workers the right to disconnect from work email during non-work hours⁶ while a New York City council member wants to ban after work email.⁷
- + UK launches national unplugging day.⁸
- + Space, RescueTime, Offtime and Clearlock are just a few of the apps released to help smartphone users disconnect from technology.⁹
- + Nottingham Trent University Researcher, Mark Griffiths finds that "social media addiction" is similar to chemical addictions such as smoking or alcoholism. The symptoms include mood changes, social withdrawal, conflict, and relapse.¹⁰



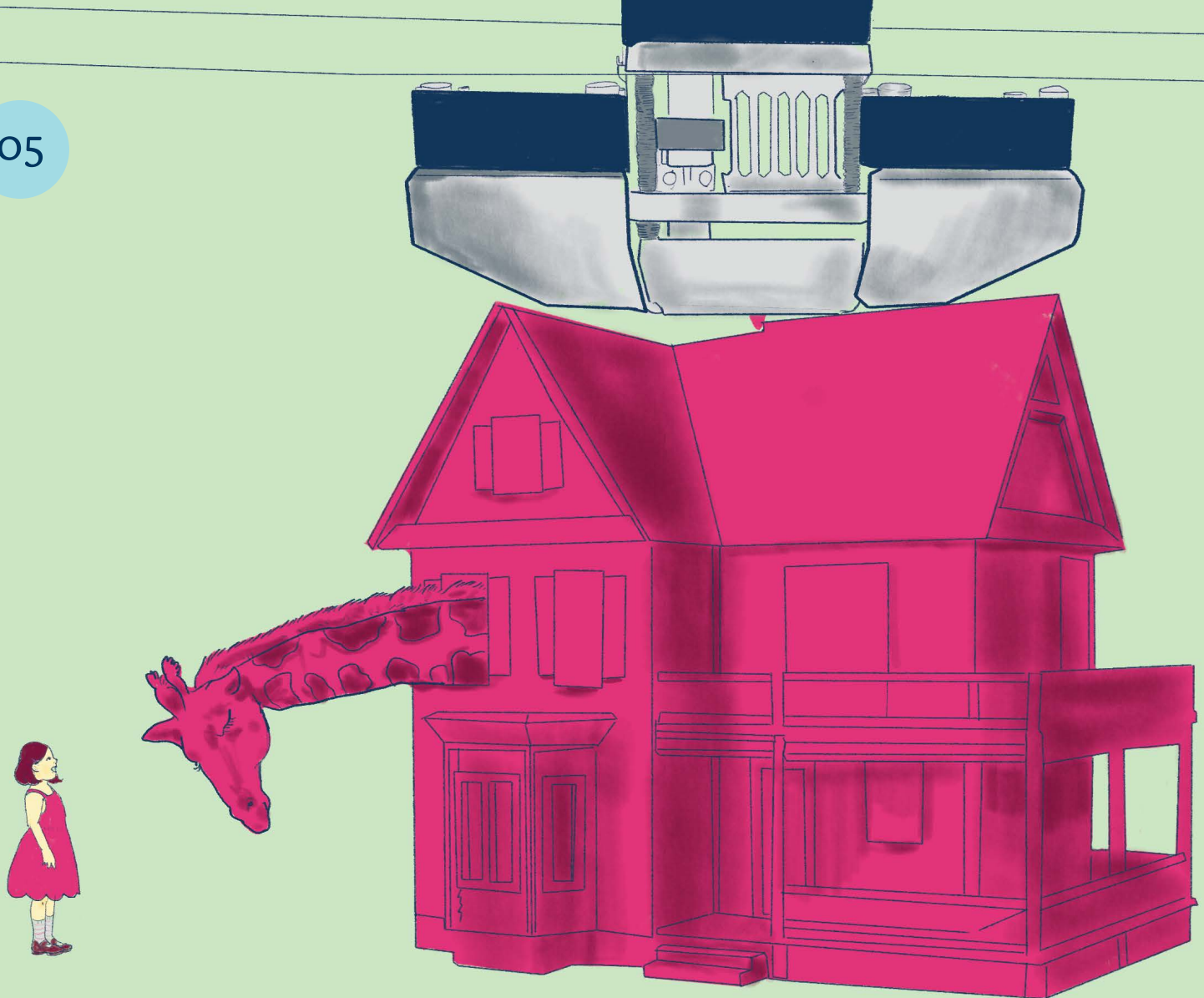
IN 2030 THIS COULD MEAN:

- + Wifi-free zones become more prevalent in restaurants, cafes, and resorts.
- + Occupations and daily tasks that have very little digital requirements may become the most desirable.
- + A reverse digital divide could be created in which those who are required to have more digital involvement suffer greater health consequences, and those who are able to live with minimal digital engagement experience a higher quality of life.
- + "Work from home" declines in popularity among workers as individuals prefer to keep technology out of their living spaces. Similarly, workers could prefer desktop computers and not having a work-provided cell phone and laptop.

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3 D P R I N T I N G

WEAK SIGNALS EMERGING MATURE

3D printing is still at a nascent stage and yet the potential reach of this technology is enormous. The ability to print on-demand custom items may disrupt supply chains, increase speed to market, offer products at lower cost and provide an outlet for infinite creativity. From disaster relief shelters, to clothing, food and human organs, 3D printing could change the way we produce and consume goods in the future.

3D printing is gearing up to change the way we produce and consume goods in the future.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

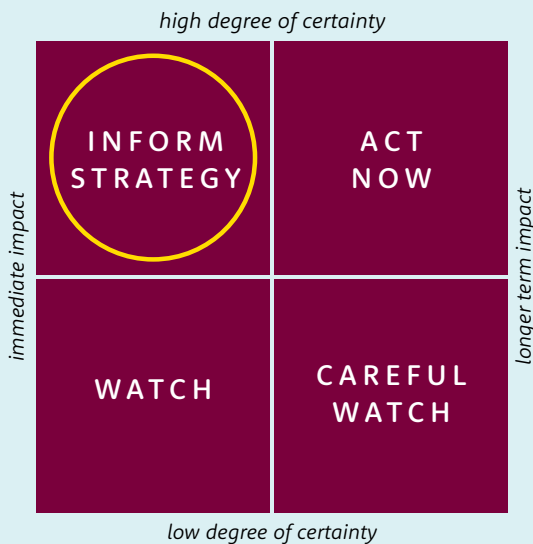
- + Manufacturing could shift to become less reliant on human labour with large manufacturing crews replaced by single machines and time to complete jobs shortened. Factory footprints could be reduced because products are printed in one piece on one machine.
- + Retail sector could decline and be replaced by plans, "filaments" and machines where individuals can print their own products. This could impact many sectors including healthcare, construction, and food.

PRESENT DAY STUDIES + PREDICTIONS:

- + Sculpteo’s *The State of 3D Printing* report found that 3D printing enabled 93% of companies to gain a competitive advantage in 2018.¹
- + Also highlighted in the report, 70% of companies currently using 3D printing have made the decision to increase their investments in this technology.²
- + The global 3D printing market was valued at \$4,164.2 million in 2014 and is projected to reach \$44,393.1 million by 2025.³
- + The inaugural Maker Faire began in Northern California in 2006 attracting 22,000 attendees. By 2013, attendance had increased to 530,000 attendees at 100 Maker Fairs worldwide.⁴

SAMPLE EVIDENCE OF CHANGE:

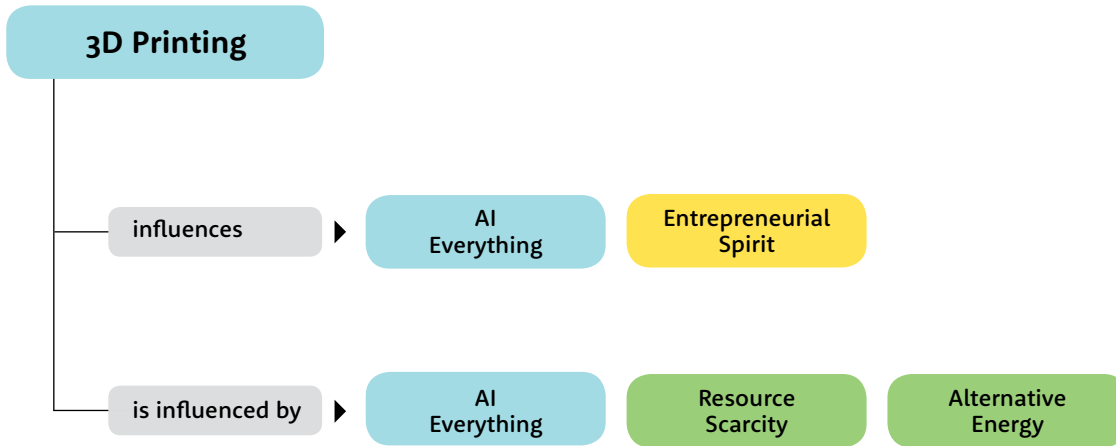
- + Scientists have developed a new method which enables 3D-printing of living tissue.⁵
- + Startup company, S-Squared, thinks they can revolutionize the way that homes are built, using a self-made 3D printing rig that they claim can build a home in a little more than 30 hours.⁶
- + A Professor at the Swinburne University of Technology believes concrete printed buildings will open the door for more creativity in architecture.⁷
- + Fashion designers have unveiled shoes and clothing made via 3D printing. Some experts foresee a day when we could print customized garments right in the store, or maybe even from 3D printers in our own homes.⁸
- + Scientists from Newcastle University have successfully 3D printed human corneas.⁹
- + The startup, ICON, has developed a method for printing a single-story 650-square-foot house out of cement in only 12 to 24 hours, a fraction of the time it takes for new construction, as a solution for people without shelter.¹⁰
- + Established in 2012, Natural Machines is the maker of the first 3D food printer to make both savoury and sweet foods with fresh ingredients. In 2014, Natural Machines launched Foodini, a 3D food printer, which is currently in production and available for select customers.¹¹



IN 2030 THIS COULD MEAN:

- + 3D printed organs could become accessible and affordable for everyone, extending the life of Canadians.
- + A creative renaissance with artists creating things that could only have been imagined previously, pushing creative boundaries, and not being held back by cost or time.
- + Landfills could be reduced as filament for building could come from waste or landfills could multiply as more people create cheap disposable items with an ability to continually upgrade.
- + New communities arise for people to create together and share designs.
- + Custom homes in the future could be accessible to many more people, costing \$50,000 to build instead of \$500,000.
- + As the cost of 3D printed products decreases, value and prestige of handmade products could increase.

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WE ARE FAMGA

WEAK SIGNALS EMERGING MATURE

Five large technology companies—Facebook, Apple, Microsoft, Google, and Amazon (FAMGA)—are redefining industries and controlling most of the data in the world. These companies are deeply embedded in our lives, providing social connections, communications, food, products, and almost everything else we need or want while significantly influencing the trajectory of many sectors. With this pervasiveness, public trust in these monopolies is starting to decline

Facebook, Amazon, Microsoft, Google, Apple (FAMGA) are redefining the technology industry and dominating multiple markets, leaving limited space for others.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + FAMGA could continue to expand their offerings to cover all industries, including industries such as healthcare, financial services, municipal services, and education, creating demand for multidisciplinary talent.

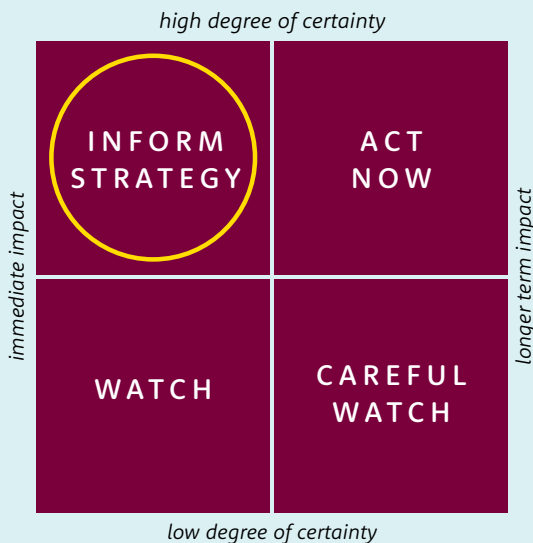
- + Growth of FAMGA could result in an even greater share of the labour force requiring AI, computer science, and tech skills.
- + Given that these firms typically require fewer people per unit of output, however, their growth could negatively impact employment levels.
- + Growth of FAMGA could squeeze other companies out of the markets they enter, could make it difficult for other existing firms to thrive, and could make it difficult for new competitors to emerge.

PRESENT DAY STUDIES + PREDICTIONS:

- + In 2018, FAMGA is estimated to have a combined market-cap of \$3.5 trillion,¹ accounting for 58% of S&P 500 Performance YTD according to the International Monetary Fund.²
- + According to Cryptoracle, just 11 years ago, Microsoft was the only tech company in the top 5 market cap. Today FAMGA, all tech companies, hold all top five positions.³
- + According to an Inc.com article, Facebook’s profits were almost \$5 billion in the first quarter – this translates to \$56 million a day, \$2.3 million an hour, \$39,000 a minute.⁴
- + CNBC reports that some believe the market capitalization of these five technology companies is profound,⁵ while others believe they are overvalued.⁶

SAMPLE EVIDENCE OF CHANGE:

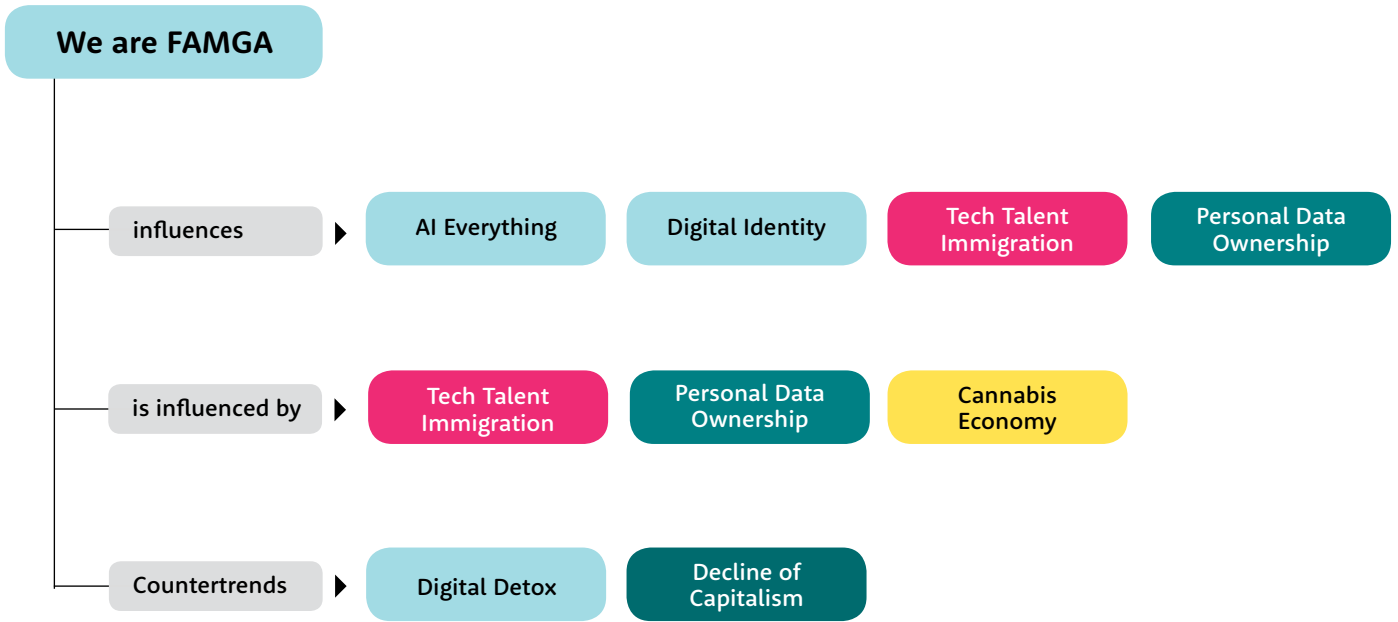
- + BoingBoing reports that Google changed the settings on Android phones without their owners’ permission,⁷ and Google employees are quitting over the company’s plan to launch a censored, surveilling search product in China.⁸
- + The History of Media Evolution created a video depicting what the world might look like if Amazon and Google partnered to form Googlezon. Combined, they become the only source for all news, consisting of customized content and advertising for each user. This content is created by robots, without checks and balances for accuracy.⁹
- + Tech futurist Michael Spencer believes that, “Facebook, Google, Amazon, and Apple may have become too powerful and reached an unprecedented scale of Big Data that not only jeopardizes national security but can be a source of job losses.”¹⁰



IN 2030 THIS COULD MEAN:

- + Canadians become accustomed to having all aspects of their daily lives optimized by FAMGA services and are able to spend more time focused on leisure activities.
- + The public could reject FAMGA and the collection and centralization of their data to protect their privacy. This could push public support for data trusts and personal data ownership, or lead to an increase in unplugging from technology.
- + FAMGA could build on its presence in K-12 education and provide suggestions for future courses and career pathways.

CONTEXT OF THE TREND:



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07

DIGITAL IDENTITY

WEAK SIGNALS EMERGING MATURE

Information is collected about you with every online click and transaction, including your location, gender, age, hobbies, career, interests, relationship status, possible weight, and income. Sharing this information is not only shifting our value of personal privacy, it is also increasingly determining our identities. The data provided online continues to be integrated, sold, and is also being used as a form of currency, particularly for entertainment.

Information about us and our families is being used to create digital identities.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + An increase in demand for new products and services that provide individual data protection, such as data lockers or services to block your digital footprint, driving demand for privacy-minded talent.
- + Employee digital identities could be used to determine job opportunities and reduce employer costs of recruitment.
- + Employers may utilize personal and professional data to optimize employee-job matching and overall productivity.

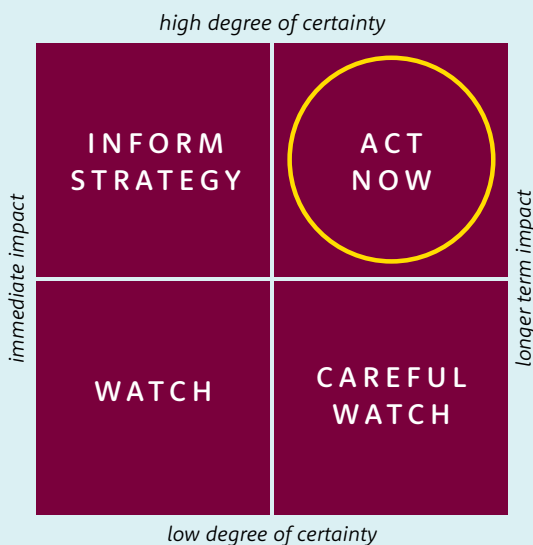
- + Trust in digital products and services, particularly Internet of Things (IoT) devices, could decline, impacting FAMGA and other data dependent firms.

PRESENT DAY STUDIES + PREDICTIONS:

- + In 2015, 87% of Canadian households were connected to the Internet, up from 80% in 2010 according to the Canadian Internet Registration Authority.¹
- + By mid-2018, Canada was the country with the third most cyber incidents in the world.²
- + Of the 48 breaches reported in Canada (2018), a total of 12,551,574 records were exposed, with an average of 261,491 records exposed per breach.³
- + The average person has 92 accounts registered to one email address and must reset a forgotten password for at least 37 of those accounts each year, according to Dashlane.⁴
- + The Digital ID & Authentication Council of Canada estimated that the economic value of a trusted digital identity is \$15 billion.⁵
- + Forbes reports that over the last two years alone 90% of the digital data in the world was generated.⁶
- + At the Paris Peace Forum, a new pact called the Trust and Security in Cyberspace was signed by all countries but five: US, Russia, China, Iran, and North Korea.⁷

SAMPLE EVIDENCE OF CHANGE:

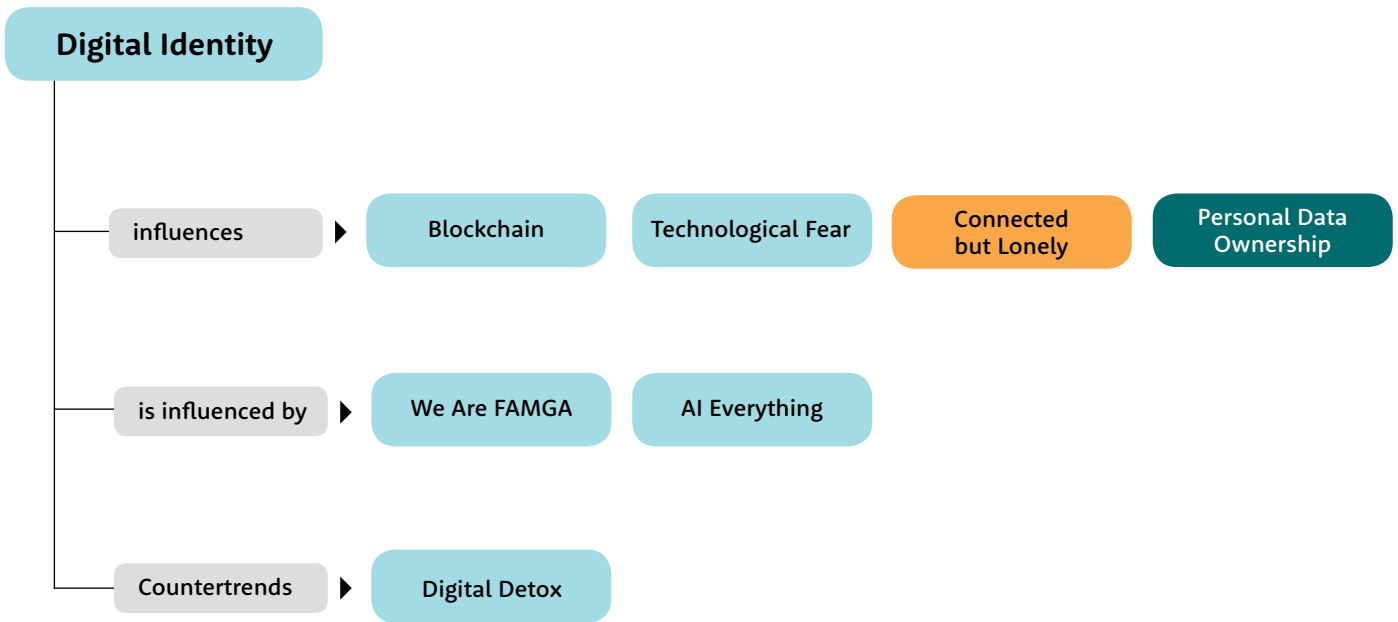
- + John Hancock Financial becomes one of several life insurance companies using fitness data in their interactive policies to provide discounts to customers who opt in.⁸
- + Multiple data breaches: 9.4 million passengers of Cathay Pacific Airlines had personal data stolen after the airline had been under attack for three months prior to the theft, and it took 6 months to disclose;⁹ Dell users were asked to change passwords only to find out weeks after there had been a data breach;¹⁰ and a Marriott Hotel Group breach affected 500 million customers. Information accessed includes payment information, names, mailing addresses, phone numbers, email addresses, and passport numbers.¹¹
- + GlaxoSmithKline announced it was acquiring a \$300 million stake in 23andMe, allowing users’ personal data to be used by the pharmaceutical company to develop new drugs and to inform patient selection for clinical trials.¹²
- + More than 10 billion consumer records have been compromised in 8,000 reported data breaches and 64% of American adults have been victimized by one or more of these breaches. Global economic costs of cybercrime are rising into the trillions of dollars annually.¹³
- + In 2018, the European Union passed a new law through the General Data Protection Regulations giving citizens the right to have their personal information removed from a system upon request.¹⁴



IN 2030 THIS COULD MEAN:

- + Canadians may create private, public, and alternative-self identities, carefully curating their public identities.
- + Individuals could have a digital “wallet” of their personal scores—health, employability, lendability, dateability, diversity, and more, which could impact how they are able to participate in daily activities.
- + Traditional recruitment processes could be disrupted as talent is selected based on their employability score.
- + People may pay to have their identities scrubbed to increase their access to services and employment or purchase fake data trails when lacking access to desired opportunities.
- + People could no longer provide their information for free. Companies could have to pay for and authenticate data or individuals will choose to shift back to an analog life.

CONTEXT OF THE TREND:



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08

HUMANS, AUGMENTED

WEAK SIGNALS EMERGING MATURE

Humans and the digital world could become indistinguishable with brain tech enhancements. This may involve brain implants, new senses, and new devices. As humans explore digital assets to augment their capabilities, this could bring about debates over evolution rights.

Brain enhancements may elevate human capabilities.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

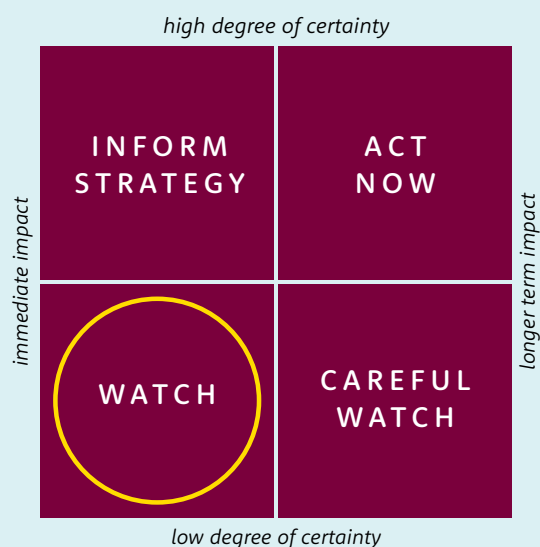
- + A new market for brain enhancements could emerge, driving demand for new products and services.
- + Potential disruption to educational programs should humans be able to receive knowledge updates through brain enhancements.
- + Older workers may choose to enhance their mental capabilities in order to continue to contribute to the workforce.

PRESENT DAY STUDIES + PREDICTIONS:

- + According to Pew Research, 66% of Americans polled say they would “definitely” or “probably” not want to get a brain chip implant to improve their ability to process information.¹
- + Use of “Smart Drugs” is on the rise. In a survey of tens of thousands of people, published in the International Journal of Drug Policy, 14% reported using stimulants at least once in the preceding 12 months in 2017, up from 5% in 2015.²
- + Pew Research finds that 61% of Americans have never heard of a brain enhancement chip. Moreover, 37% believe it to be morally unacceptable to implant such a device, 38% say they are unsure, and 23% find it morally acceptable.³

SAMPLE EVIDENCE OF CHANGE:

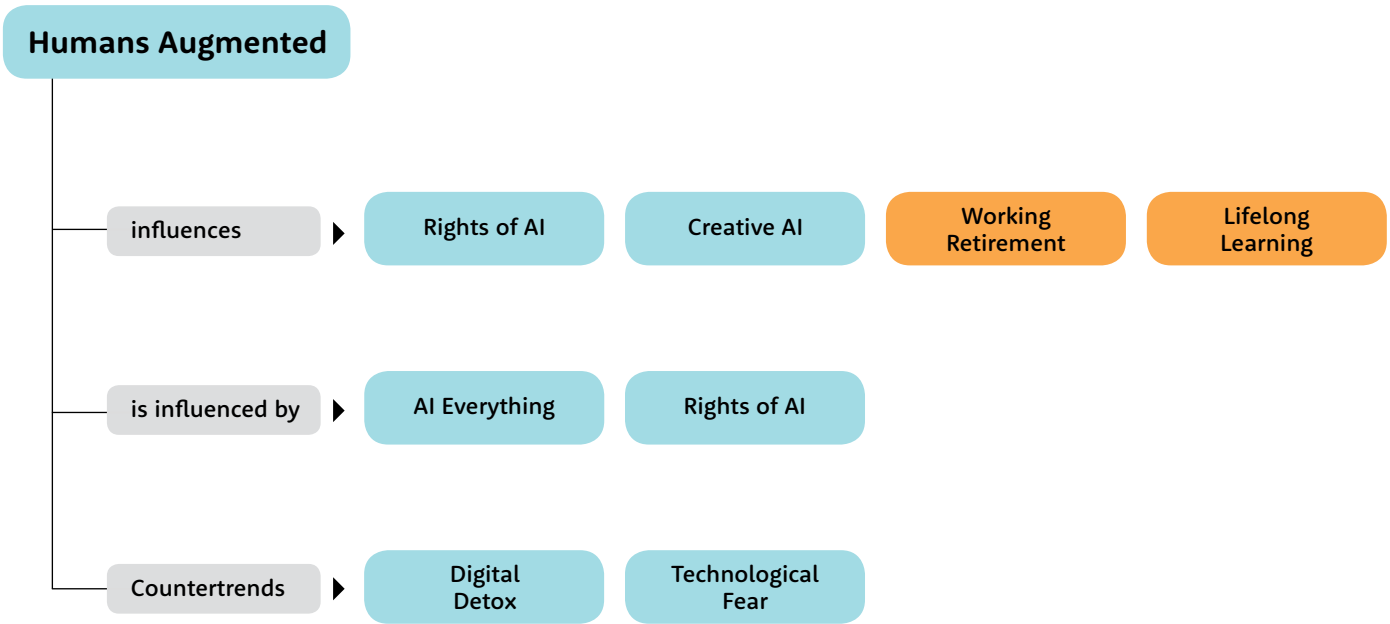
- + Scientists at the University of Washington and Carnegie Mellon University have created BrainNet, a new system that is able to connect the brains of three people, enabling them to share thoughts.⁴
- + Pranav Mistry’s SixthSense is a gesture-based wearable computer system designed to merge physical and digital worlds. Using a device worn around the neck, this technology uses gestures to complete tasks like taking photos, making phone calls, and collecting information about the world around you. The user and the computer behave as one.⁵
- + Researchers in the emerging field of “sensory enhancement” have begun developing tools to give people additional senses such as telepathy and echolocation.⁶
- + Kernel is a startup with the goal of developing technologies to radically improve and expand human cognition. It is working on developing a brain implant or “neural prosthetic”.⁷
- + The Emotiv EEG headset enables users to make commands using their minds.⁸
- + Elon Musk said that people would need to become cyborgs to be relevant in an AI age.⁹



IN 2030 THIS COULD MEAN:

- + Instead of investing in education, some Canadians may choose to invest in brain enhancements (e.g. pay for an upload instead of a university degree).
- + There may be a divide between people who can pay for enhancements and those that cannot.
- + Employers (e.g. FAMGA) may pay for brain enhancements instead of gym memberships.
- + Legal and regulatory frameworks could arise in response to controversies or backlash when Canadians do not wish to adopt enhancements but feel the pressure to do so by employers.

CONTEXT OF THE TREND:



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TECHNOLOGICAL FEAR

WEAK SIGNALS EMERGING MATURE

The rate of technology-driven change is so high, some do not know how to respond. New threats such as cyberwarfare and autonomous killing machines are leaving certain individuals in a permanent state of anxiety. This fear has increased to the point where some fear robots more than their own death.

The pervasiveness of our digital connections is leading to deep fear and anxiety about technology.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

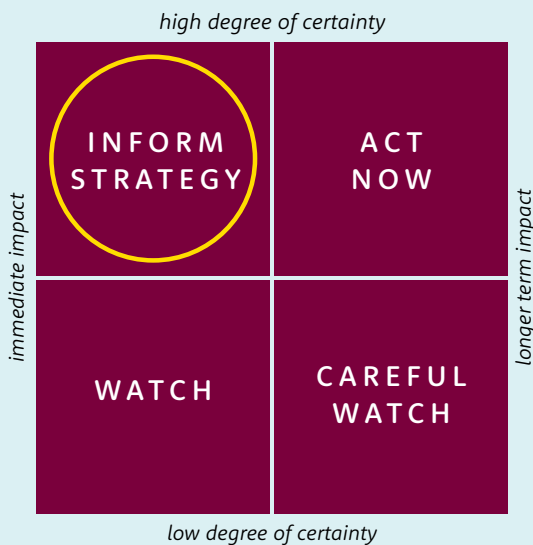
- + Employee productivity and contribution to the labour market could be impacted by chronic anxiety.
- + There could be demand for greater mental health service providers to assist workers.
- + A growing demand for products and services that can protect personal data and potential cyberattacks.
- + The on-demand economy and other businesses that currently collect personal data through online platforms could experience a decline.

PRESENT DAY STUDIES + PREDICTIONS:

- + A survey of American fears by Chapman University lists three tech-related fears in the top five (out of a possible 88): cyberterrorism, corporate tracking of personal information, and government tracking of personal information. Death ranks 43rd.¹
- + According to Pew Research, more than 70% of US citizens fear robots are taking over their lives.²

SAMPLE EVIDENCE OF CHANGE:

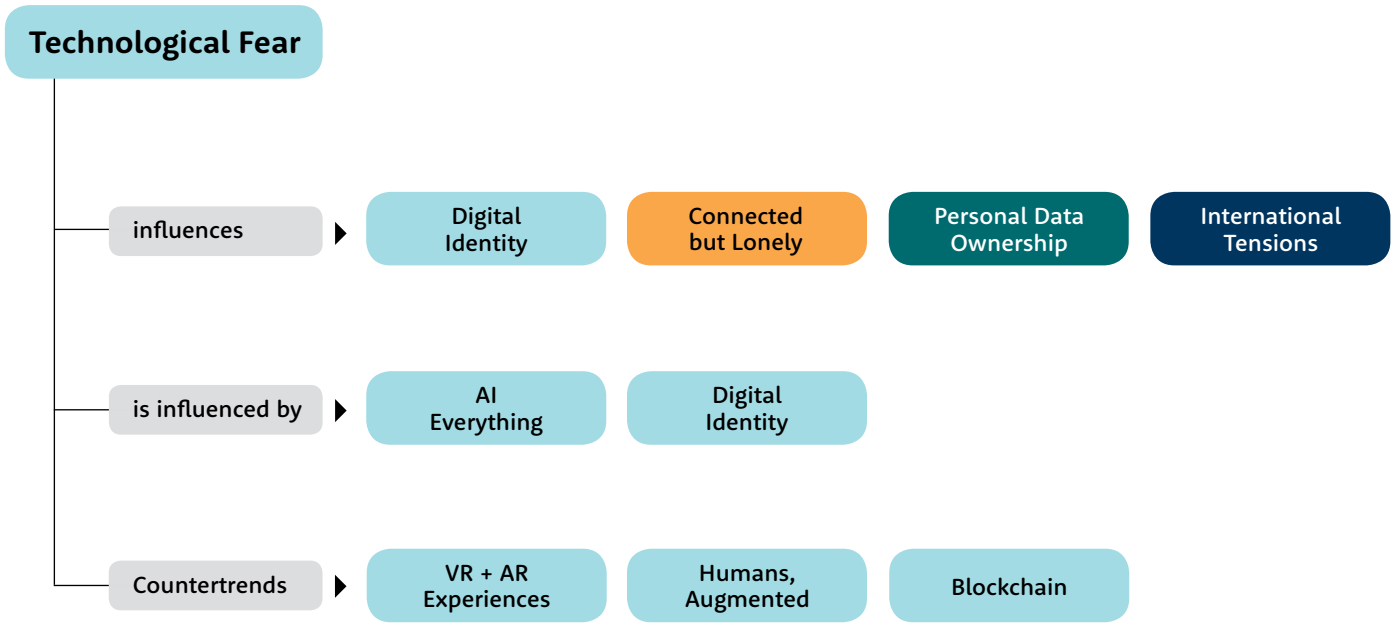
- + Physicist Michio Kaku predicts that drones and facial recognition applications will be used to create automatic killing machines.³
- + President Trump set in motion a plan to remove Presidential Policy Directive 20, an Obama-era policy limiting the use of destructive cyberweapons. Without PPD-20, the US military can now use hacking weapons with far less oversight from the State Department, Commerce Department, and intelligence agencies.⁴
- + Concern over the potential threat of cyber-attacks within the UK energy industry are 'off the scale'. This fear is the result of a trend away from well-protected, centralised large power stations and towards decentralised power, such as many small, flexible gas power plants and solar panels on homes.⁵
- + According to the American Psychological Association, many Americans now reside in a permanent state of anxiety as the result of threat of terrorism, North Korean nuclear weapons and disruptive cyberattacks.⁶



IN 2030 THIS COULD MEAN:

- + Some Canadians withdrawal from technological use and online platforms due to mental health concerns.
- + Individuals go “off the grid” to escape from mainstream society—potential for gated and cyber-walled ‘off-grid’ communities to arise.
- + There could be a return to cash transactions as people avoid providing personal digital data.

CONTEXT OF THE TREND:



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R I G H T S O F A I

WEAK SIGNALS EMERGING MATURE

Today a clear line exists between technology and humanity. As we move closer to the next wave of AI where cognitive processes match those of people, the conversation regarding who and what has rights may come to the forefront.

AI may transition from being understood as software to being considered beings, therefore achieving a new status and basic rights.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + AI regulated rights could require organizational investment and change, and may balance the financial benefit of employing humans.
- + The financial benefit of automation may decrease if a tax is imposed on AI.

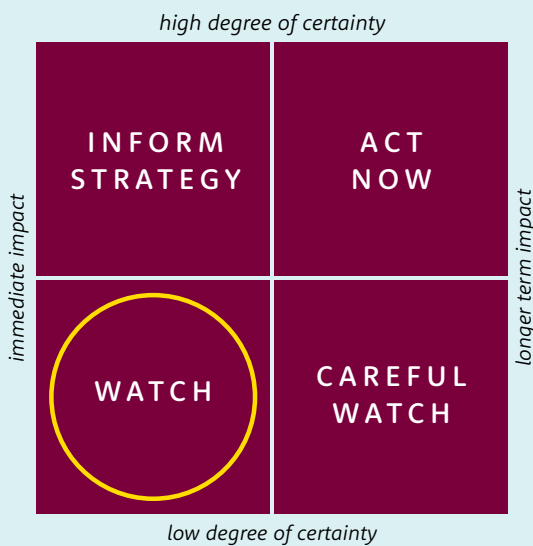
- + There could be an increase in demand for human resources and government policy that understands the regulation of AI.
- + The demand for specialized AI ethics services will continue to increase.

PRESENT DAY STUDIES + PREDICTIONS:

- + World Economic Forum study finds that 45% of experts surveyed believe there will be AI on executive boards by 2025.¹

SAMPLE EVIDENCE OF CHANGE:

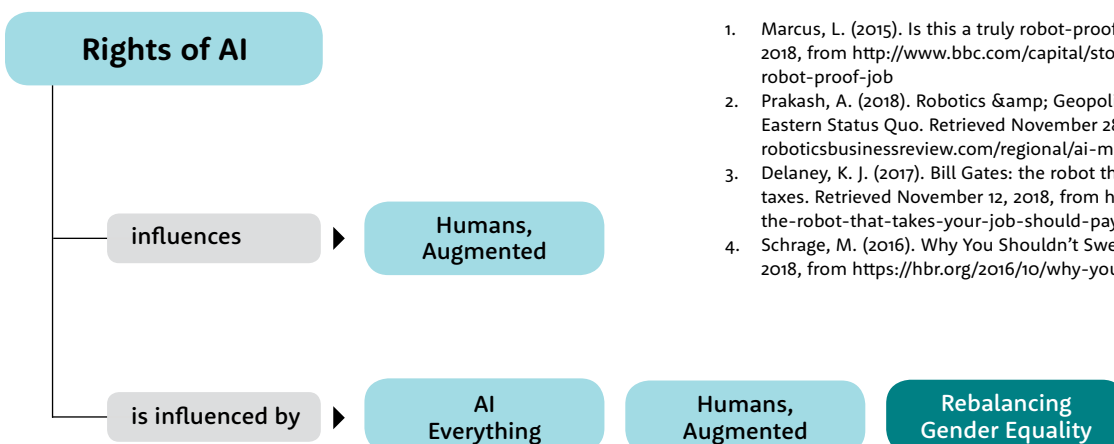
- + Malta is developing a new form of citizenship for robots, that would grant AI certain rights and freedoms. In 2017, the European Union parliament explored a similar proposal.²
- + Bill Gates calls for the taxing of any robot that replace human jobs.³
- + According to an interview with Dr. Sheryl Brahnam, 10-50% of interactions with machines are abusive. Verbal abuse of Apple’s Siri or Amazon’s Alexa undermines how bots learn, compromising their success.⁴



IN 2030 THIS COULD MEAN:

- + New relationships between robots and humans may emerge, normalizing human-AI interactions, especially humans living on the boundary by having cybernetic augmentation.
- + There could be new HR rules governing how humans and AI work together and communicate requirements.
- + People who are left jobless as a result of automation may challenge the rights of robots, creating societal conflict.

CONTEXT OF THE TREND:



1. Marcus, L. (2015). Is this a truly robot-proof job? Retrieved November 12, 2018, from <http://www.bbc.com/capital/story/20150921-is-this-a-truly-robot-proof-job>
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CREATIVE AI

WEAK SIGNALS EMERGING MATURE

Creativity has long been heralded as a uniquely human skill, that cannot be automated by artificial intelligence. However, this is not preventing companies and researchers from challenging this idea, through the development of new AI applications that attempt to replicate human creativity. From art reproduction to developing original ideas, what are the limits of AI creativity?

Creative AI has the potential to automate creative tasks typically deemed automation-resilient.

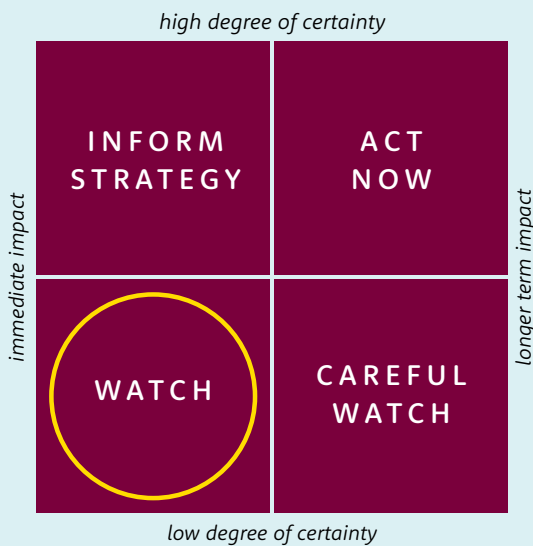
POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + The scope of occupations that may be impacted by automation and technology could significantly broaden to include occupations that were previously thought to be protected.
- + This could result in unemployment in creative industries and other creative fields, or significantly adjust the nature of these jobs.
- + This could build a potential market for AI-delivered creative services (graphic design, interior design, portrait photography, personal shopper).

SAMPLE EVIDENCE OF CHANGE:

- + Three French students use borrowed code to put the first AI-created painting in a Christie's auction.¹
- + A team from Google Brain developed Magenta, a platform for creating AI-generated music.²
- + Lightroom built-in camera uses AI to automatically edit photos, creating clearer, sharper, professional images for its users.³
- + Sunspring is a short sci-fi film which debuted in 2016 and was written entirely by algorithms.⁴
- + In Japan, a robot successfully installed drywall by itself.⁵

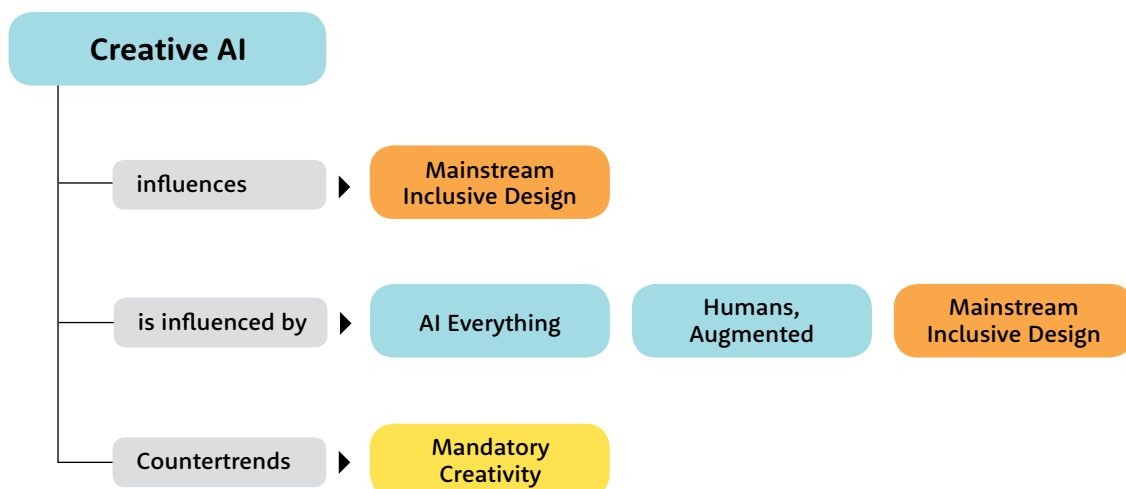
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3. Kelby, S. (2017). 5 Reasons You Should Be Using Lightroom Mobile's Built-in Camera. Retrieved November 12, 2018, from <https://lightroomkillertips.com/5-reasons-using-lightroom-mobiles-built-camera/>
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IN 2030 THIS COULD MEAN:

- + Creative services previously out of reach for many could become affordable. This could include interior design, mural painting, graphic design, and portrait painting.
- + Creativity could no longer be an in-demand employment skill, resulting in lower enrollment in design education programs. Instead, Canadians may seek out creativity-focused leisure activities.
- + Infrastructure and architecture could become more artistic and creative given affordability of automated design.

CONTEXT OF THE TREND:



GLOBALIZATION

Globalization, or the increased interconnectedness of countries, has impacted people and communities across the world. Today, labor markets are increasingly integrated, and world trade is increasing.¹ With this comes benefits and costs. Benefits may be experienced by industries and occupations who gain access to new export opportunities and emerging markets, while others may experience competition from imports and offshoring.² The following section explores one specific trend within this mega trend, with particular relevance for Canada: tech talent immigration.

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TECH TALENT IMMIGRATION

WEAK SIGNALS EMERGING **MATURE**

The global competition for tech talent is fierce. To attract talent, the Canadian government has created new policies to make coming to Canada quicker and easier. While good for Canadian businesses, not all Canadians are in support of opening our borders.

Canada is using creative mechanisms to address tech talent shortages.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

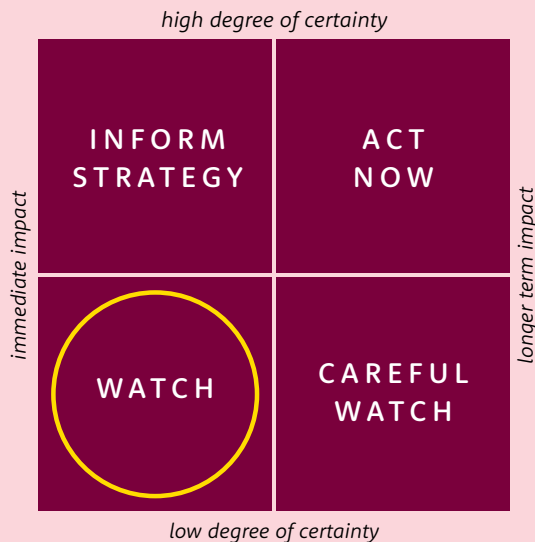
- + An increase in talent immigration could drive new Canadian innovations, creating new products, services, and employment opportunities.
- + The demand for housing and construction, particularly in urban areas, could increase to support growing worker populations.
- + Growing demand for new businesses and services that cater to expanded cultural needs could emerge, including food service and grocery.

PRESENT DAY STUDIES + PREDICTIONS:

- + Canada is increasing immigration levels for the next three years from 310,000 per year today to 350,000 in 2020 to benefit communities and businesses.¹
- + In six weeks, Wave Financial hired and navigated the immigration process to relocate new CTO from Johannesburg with new Canadian tech immigration program.²
- + A July CBRE report ranked Toronto as the fourth top-ranked tech talent market out of 50 cities in the US and Canada, behind just Silicon Valley, Seattle, and Washington, D.C.³
- + According to the same report, there were 241,000 tech jobs in Toronto last year, an increase of more than 50% over five years, with nearly 30,000 jobs added in 2017 alone.⁴
- + A 2008 American study found that a 1% rise in the share of immigrant college graduates in the population increases patents per capita by 6%.⁵

SAMPLE EVIDENCE OF CHANGE:

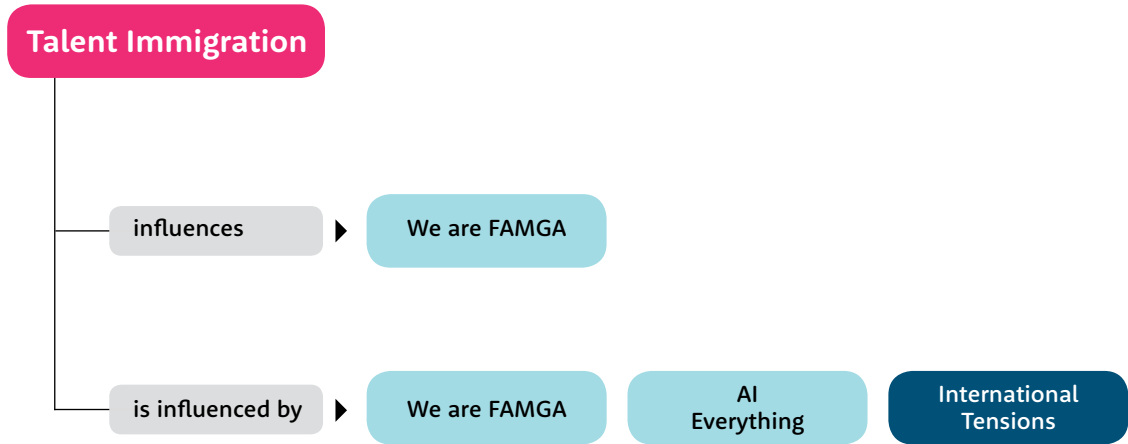
- + In 2017, Canada launched the Global Skills visa pilot program enabling high growth companies to obtain international talent in two weeks vs the traditional one-year timeline.⁶
- + Vancouver based VanHack offers female tech developers flights to Canada for interviews with potential companies.⁷
- + World Bank economist, Ejaz Ghani states that nearly 75% of all high-skilled migrants reside in the United States, the United Kingdom, Canada, and Australia.⁸
- + The federal government is exploring augmented decision-making to speed up immigration applications since 2014.⁹
- + Rohan Mahimker, co-founder of Prodigy Game, states that Canada has a tech talent shortage.¹⁰



IN 2030 THIS COULD MEAN:

- + Increasing potential for booming innovation due to multicultural teams and increased diversity.
- + New planned cities may be created for influx of new workers and talent. Campuses like Google and Facebook could expand, becoming larger tech cities.
- + The cost of living in tech concentrated cities could increase, creating affordability issues for the broader urban population.
- + Rural areas of Canada could become more populated due to housing needs, and technology enabling remote work. This could potentially impact some natural habitat and wildlife, while creating new economic opportunities.
- + Cultural diversity within the workforce may create tensions inside businesses as teams evolve cultural norms and behaviours.

CONTEXT OF THE TREND:



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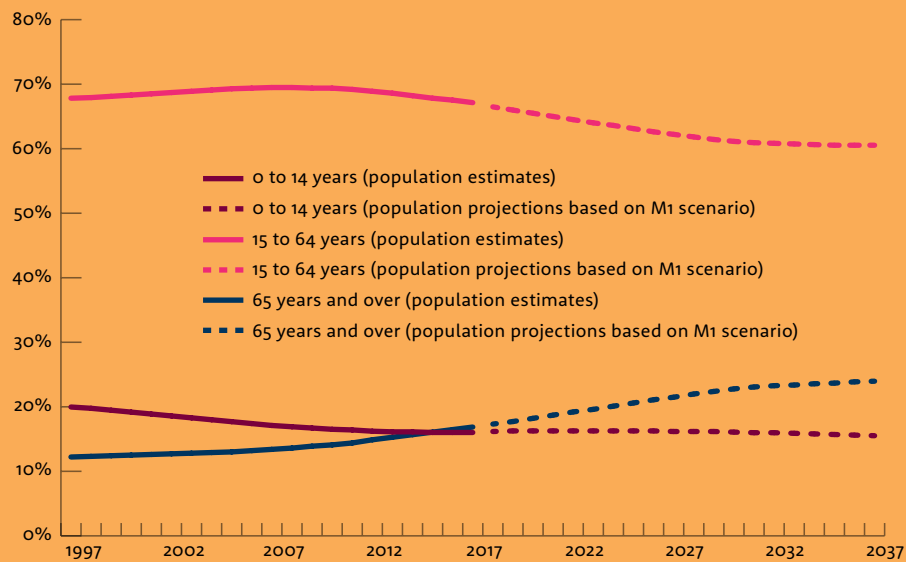
DEMOGRAPHIC CHANGE

While many countries are seeing population growth, several advanced economies, including Canada are currently experiencing low fertility rates. This, paired with advances in health care has shifted the population distribution towards older ages, creating age-specific fiscal pressures but also opportunities for businesses that serve this segment. An aging population has wide ramifications, including for healthcare, housing, leisure activities, while a rising millennial generation is diverging from past behaviours, including with respect to their values, and related economic activity.¹

In addition to population aging, a range of trends could impact the makeup of Canada's population and the behaviours, experiences, expectations and quality of life of the different demographic groups within it. The following section explores several trends relating to demographic change in Canada, which could impact the future of skills and occupations in different ways.

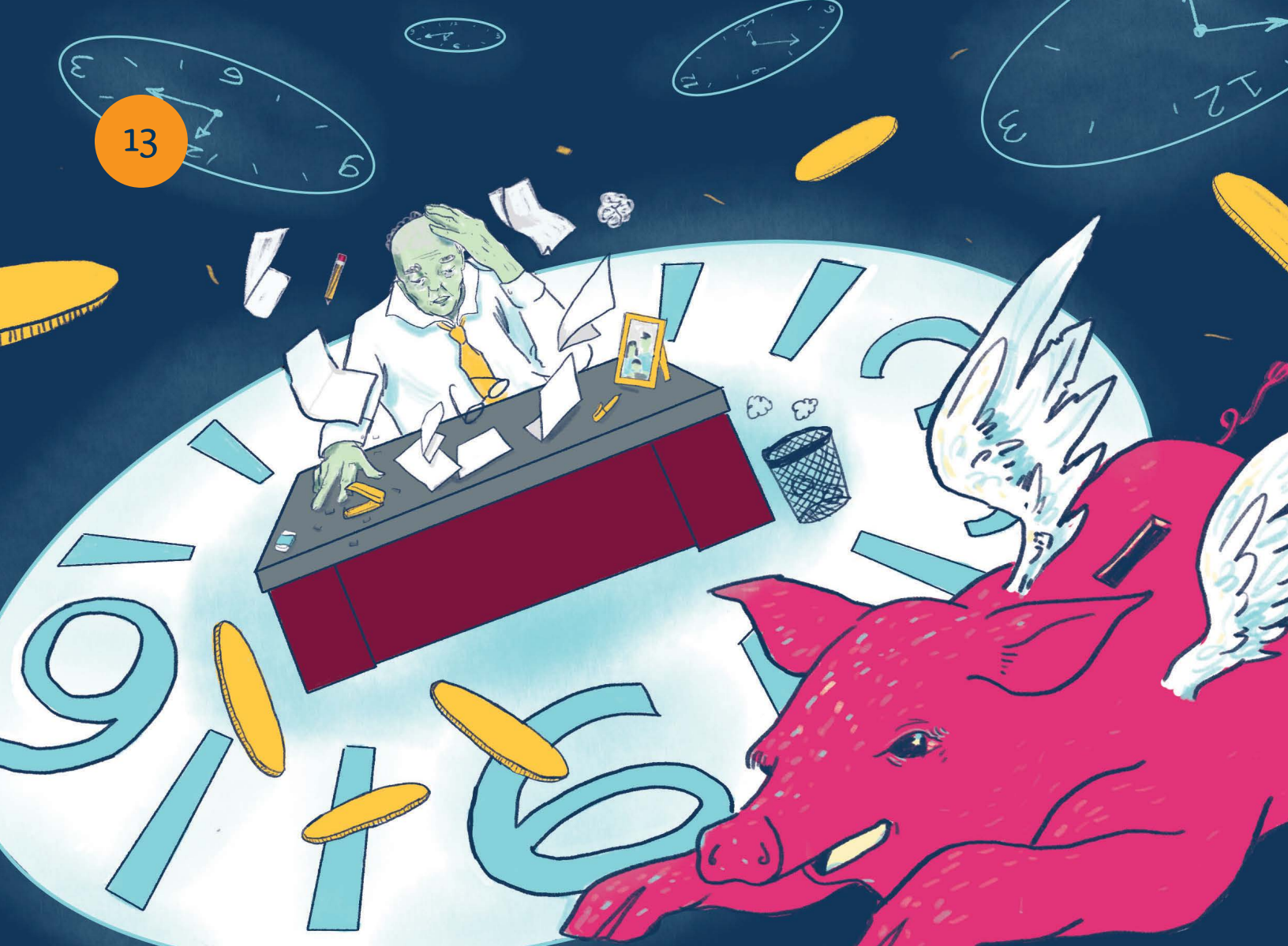
Figure 4:

Proportion of the population aged 0 to 14 years, 15 to 64 years, and 65 years and over, 1997 to 2037, Canada²



Note: From 1997 to 2017, population estimates. From 2018 to 2037, Population Projections for Canada (2013 to 2063), Provinces and Territories (2013 to 2038), Catalogue no. 91-520-X
Source: Statistics Canada, Demography Division.

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WORKING RETIREMENT

WEAK SIGNALS EMERGING **MATURE**

The number of people who celebrate their 100th birthday is on the rise. As lifespans increase dramatically, people will start to work longer to support their financial needs. The millennial generation not saving for retirement will increase the financial necessity of working well into retirement years.

Seniors may meld work and retirement well into their eighties and nineties.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

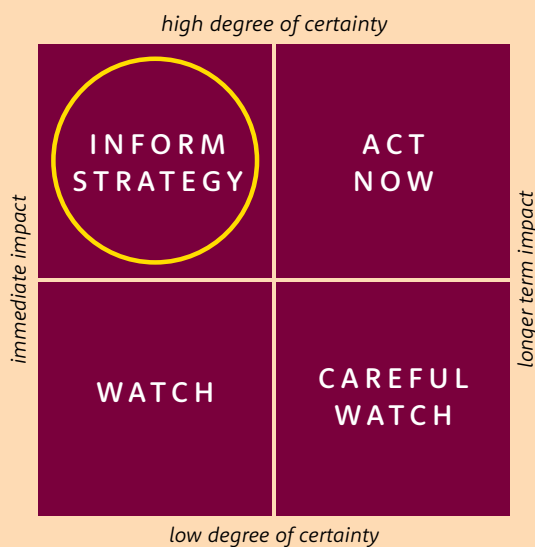
- + Services and experiences for working seniors, to support household responsibilities, physical health maintenance, and transportation, could expand to accommodate this demographic.
- + Employers may need to accommodate workers that span multiple generations and have varying needs throughout life.
- + Offerings and activities targeted as retirees, such as arts and culture, could shrink in the short term as available leisure time declines.

PRESENT DAY STUDIES + PREDICTIONS:

- + The centenarian is the fastest growing demographic in Canadian society, according to an article published in *The Walrus*.¹
- + According to Canada's Census, more than 53% of Canadian men aged 65 were working in some form in 2015, including 22.9% who worked full-time throughout the year. This compares to 37.8 and 15.5 per cent, respectively, in 1995, the census numbers show.²
- + The percentage of working seniors declined in every Census between 1980 and 1995, when it hit 10.1 per cent. By 2015, the percentage of working seniors was close to 20%.³
- + According to Statistics Canada, by 2031, about 23% of Canadians could be seniors over 65 years of age.⁴
- + Based on the 2016 Census, the share of people over 65 was 16.9% of the population, greater than the share of children.⁵

SAMPLE EVIDENCE OF CHANGE:

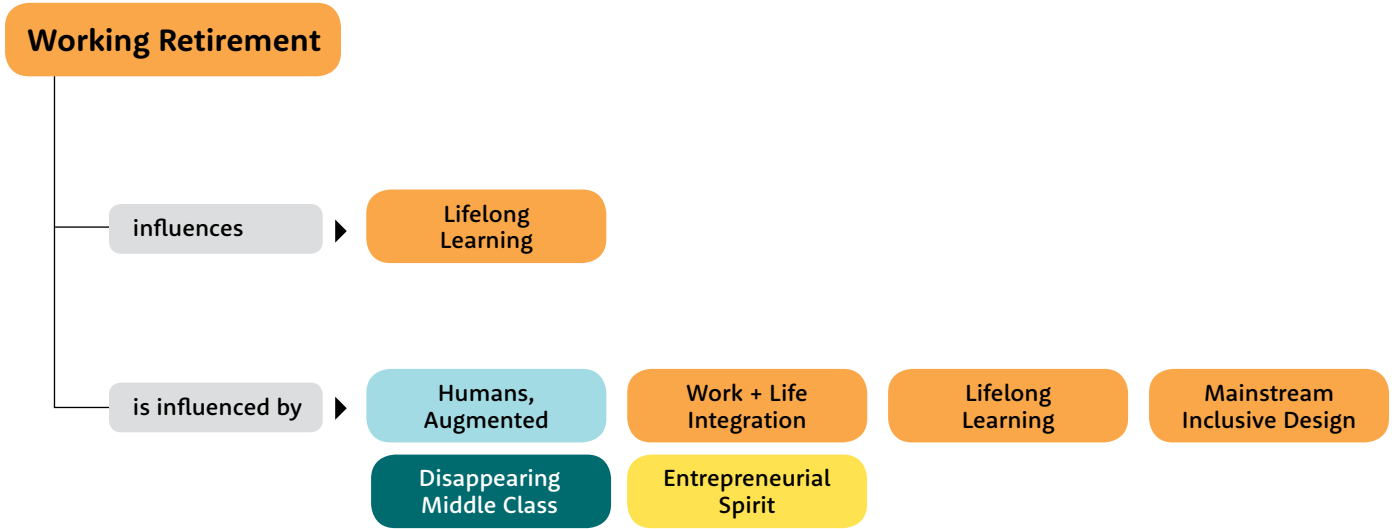
- + Bloomberg reports that in the US, senior citizens are replacing teenagers as fast-food workers.⁶
- + A World Economic Forum white paper has highlighted that individuals will live past 100 but will not be able to afford it.⁷
- + Scientists at Northwestern University have found there are "super agers", people who are 80 years old but have the cognitive health of people who are 30 years old.⁸
- + According to a report from the National Institute on Retirement Security, about 66% of people between the ages of 21 and 32 have absolutely nothing saved for retirement.⁹
- + The life expectancy in the United States has dropped for the second year in a row to 78.7 years according to CDC's National Center for Health Statistics.¹⁰
- + A 2018 study from the European Centre for Disease Prevention and Control finds that antibiotic-resistant bacteria may potentially limit the number of life-extending operations such as hip replacements and heart valve operations.¹¹



IN 2030 THIS COULD MEAN:

- + There may no longer be a "retirement" age, or the concept of retirement may shift away from being perceived as the last and leisurely phase of life.
- + New personalized work arrangements, including part-time employment, may be requested by older workers as they create their desired working retirement.
- + Grandparents will be less available to assist their children and grandchildren creating greater demand for childcare.

CONTEXT OF THE TREND:



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CONNECTED BUT LONELY

WEAK SIGNALS EMERGING **MATURE**

Mental illness and loneliness are becoming more prevalent as we evolve from an in-person culture to digital, asynchronous, connections and communications. This is impacting the quality of interpersonal relationships and productivity at work. The market for mental health supports is expanding exponentially to respond to this growing concern.

Mental illness may become even more widespread alongside increased technological connections.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

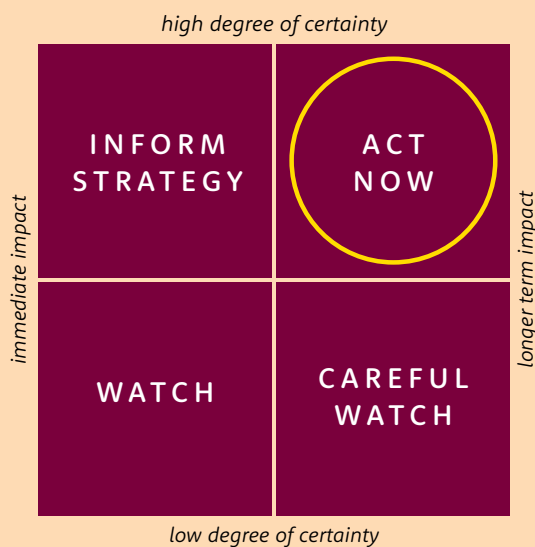
- + There could be an increased demand for professions, products, and services that support improving mental health, including an increase in the mindfulness and wellness sector.
- + If this trend continues on its current trajectory, employers could find it difficult to maintain productivity.

PRESENT DAY STUDIES + PREDICTIONS:

- + The Government of Canada reports that mental illness is experienced by 1 in 3 Canadians during their lifetime.¹
- + By age 40, about 50% of the population have or have had a mental illness, according to the Canadian Mental Health Association.²
- + The Centre for Addiction and Mental Health estimates that \$51 billion per year is the economic burden of mental illness in Canada.³
- + A Berkeley study found that half of teens who indicated that they spend five or more hours a day on a device (like a phone or laptop) said they had contemplated, planned, or attempted suicide at least once—compared with 28% of those who have less than an hour of screen time a day.⁴
- + A 2013 US study found that depression increased annual work loss by 1.4 days, implying an annual aggregate productivity loss ranging from \$700 million to \$1.4 billion USD in 2009.⁵
- + Annual sick days for Canadians continue to rise with 9.6 total days lost per worker in 2017.⁶

SAMPLE EVIDENCE OF CHANGE:

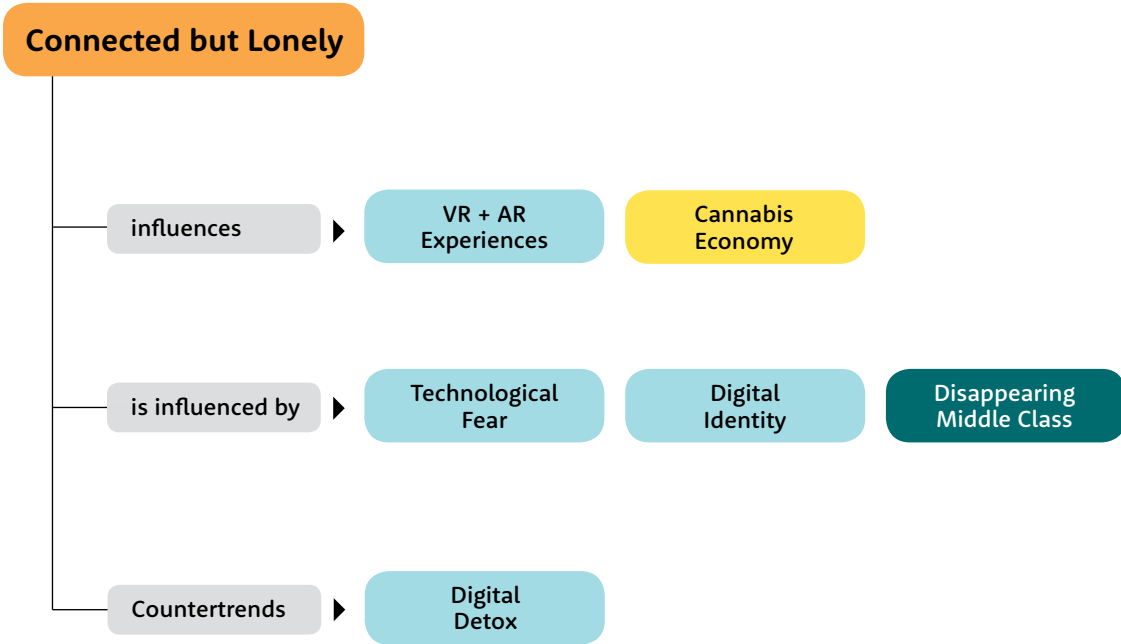
- + In a barbershop in Arkansas, the founder of The Confess Project, a mental health initiative for boys and men of color, trained barbers and their clients on how men hold in their pain—and how to break through.⁷
- + Researchers at MIT have developed a neural network capable of detecting depression through everyday conversation.⁸
- + One of the largest international surveys on loneliness, led by the BBC and The University of Manchester, has found that young people aged 16 to 24 report being more lonely than all other age groups.⁹
- + A new app developed by researchers at Dartmouth College uses motion, audio, and location data harvested from a smartphone to accurately predict stress or depression.¹⁰



IN 2030 THIS COULD MEAN:

- + Technology could be developed to not only provide early detection but also opportunities for treatment through advanced technology, like apps, and virtual doctors and therapists.
- + Workers may have a digital mental health score based on the technology developed that is used to determine suitability for specific occupations.
- + People may learn to mask their mental health status like they protect other valuable data as society grows more fearful.
- + There may be a need to increase government spending on mental health programs.

CONTEXT OF THE TREND:



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LIFELONG LEARNING

WEAK SIGNALS **EMERGING** MATURE



Canadians may adopt a practice of lifelong learning, moving away from one-time post-secondary education to self-directed learning, micro-credentialing, and learning through employer training programs. University education may no longer be a requirement for knowledge-based employment. Learning has no start or end date, especially when paired with the recognition that many of the jobs of the future have not been defined yet.

Learning never stops.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

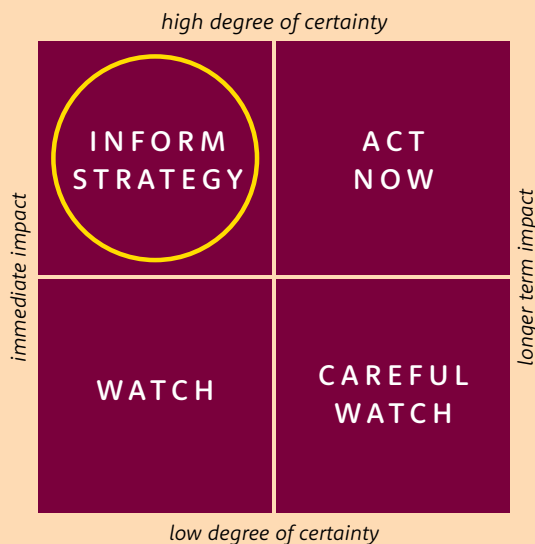
- + The demand for on-demand, time-bound learning products and services could increase, while enrollment in four-year post-secondary degree programs may decline.
- + The cost of running a business may increase if employers are pushed to provide more ongoing training supports for employees.

PRESENT DAY STUDIES + PREDICTIONS:

- + The Association of Universities and Colleges of Canada reports that the number of full-time university students has more than doubled since 1980, and part-time enrolment is up 16 %.¹
- + Class Central reports that 23 million new learners signed up for their first Massive Open Online Course (MOOC) in 2017.²
- + However, recent studies suggest online courses offer very little return on investment for students.³
- + According to a report by the University Professional and Continuing Education Association, one in five institutions now offer digital badges.⁴
- + Currently 400,000 Canadians are enrolled in university continuing education programs, according to a Concordia University study.⁵
- + In 2017, the Canadian federal government allocated \$225 million to a new program to identify skills gaps and address them through continuing education.⁶

SAMPLE EVIDENCE OF CHANGE:

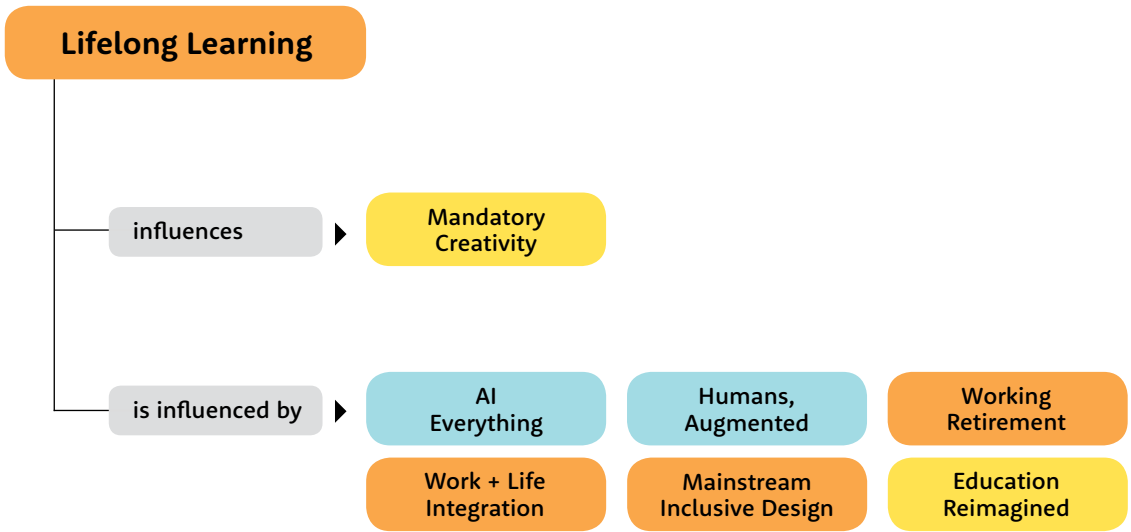
- + A Workopolis report, *Thinkopolis IV: Time to Work*, highlights that Gen Y changed jobs 22% more often over a 12-year period than Gen X did—if the current trend continues Canadians can expect to hold 15 jobs throughout their careers.⁷
- + Upwork’s Chief Executive, Stephanie Kasriel, says skills are changing faster than traditional education is keeping up. Individuals will be in school for their entire lives.⁸
- + Google, Apple, and IBM are no longer requiring applicants to hold a college degree.⁹
- + A 2014 Workopolis study found that nearly three quarters (73%) of Canadians said that they do not expect to remain in the same profession for life.¹⁰



IN 2030 THIS COULD MEAN:

- + College and university campuses could become more diverse in terms of age, changing society’s concept of a “student”.
- + Courses and degrees may be personalized and emphasize skill competencies over job qualifications.
- + Major companies could create their own onsite post-secondary institutions to provide on the job training and potentially offer learning augmentation technologies as employee perks.
- + There could be increased employee loyalty among those who receive additional educational supports.
- + People may not be willing to take on student debt without demonstrated value and may want to be paid to learn.
- + Brain enhancements may make it seamless for individuals to participate in ongoing learning.

CONTEXT OF THE TREND:



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10. Workopolis. (2014). How many jobs do Canadians hold in a lifetime? Retrieved December 7, 2018, from <https://careers.workopolis.com/advice/how-many-jobs-do-canadians-hold-in-a-lifetime/>



WORK + LIFE INTEGRATION

WEAK SIGNALS EMERGING MATURE

The work day may no longer be defined by specific hours and days, and instead is intertwined with all parts of life. Individuals may design their own careers, with a focus on flexibility, and may have an employer for three days a week while also maintaining a side business (or two). With this shift will come a greater reliance on self-management, as workers need to balance competing responsibilities.

Our personal and professional lives are melding, erasing the distinction between work and leisure hours.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

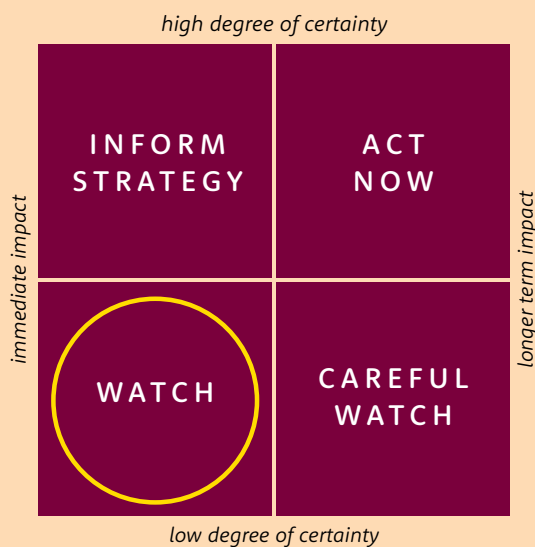
- + Employer productivity in the knowledge-based economy could increase with a labour force that is able to contribute 24/7.
- + Potential for growth in demand of products and services that support managing individual work-life integration, such as productivity apps, flexible child care options, and on-demand home delivery.

PRESENT DAY STUDIES + PREDICTIONS:

- + In 2017, Statistics Canada reported that Canadians are 10% less satisfied with their work-life balance than they were in 2008 (down to 68%).¹
- + The Society for Human Resource Management states that nearly 17% of employers in 2017 offered either a paid or unpaid sabbatical leave, which could range from a few weeks to a few months.²
- + According to Statistics Canada, 79% of Canadian employees with a flexible work schedule reported that they were satisfied or very satisfied with their work-life balance in 2012.³
- + A 2017 Capital Group survey found that millennials want employers to focus on practical needs, such as balancing family with career, education, retirement planning, and alignment with values.⁴

SAMPLE EVIDENCE OF CHANGE:

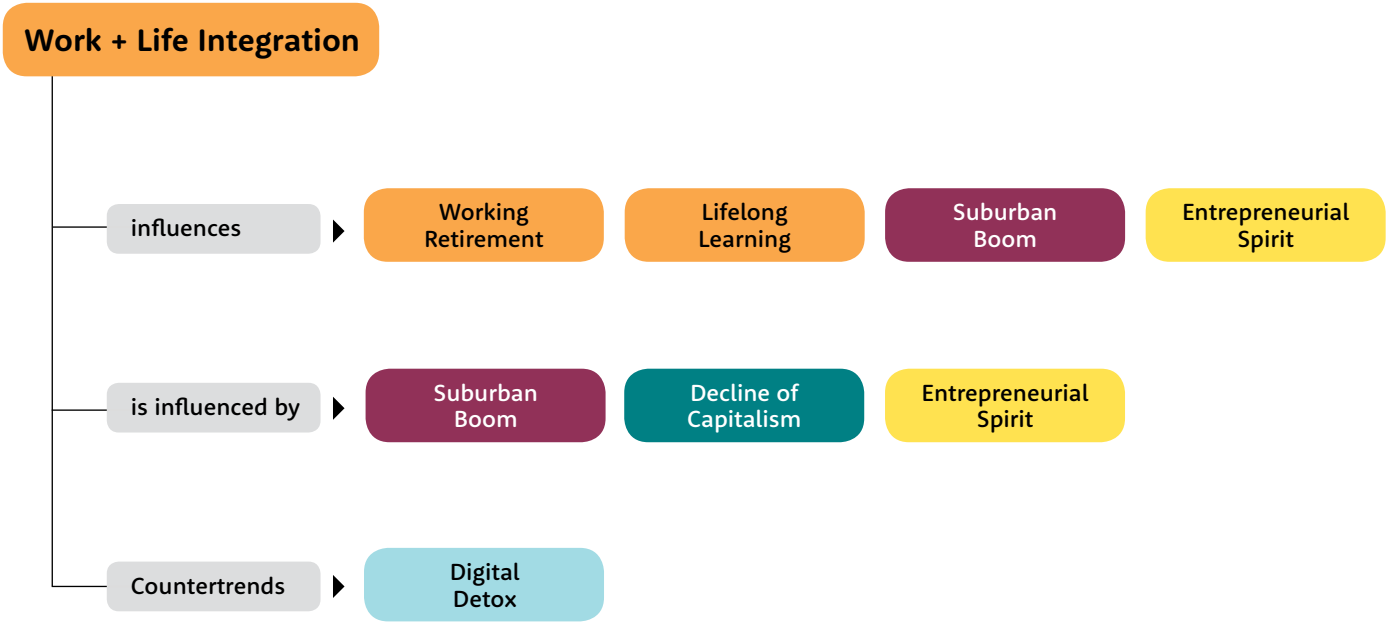
- + Appen, Dell, and Salesforce among 29 companies that support employees who work from remote locations.⁵
- + Northwestern Mutual launches “Spend your life living” campaign to celebrate family time at home.⁶
- + A 2018 Forbes article describes the concept of the “portfolio career” as one that involves building a strong personal brand and requiring self-promotion.⁷
- + As part of a plan to offset employee burnout and increase employee retention, more companies are offering sabbaticals. Adobe Software allows a sabbatical every five years.⁸
- + The Futures School explains the concept of the “People cloud”, an open source talent sharing platform, where work is communal, collaboration is instantaneous, and cloud employees work for multiple enterprises across the globe.⁹
- + However, there is a new law proposed to stop Canadians from working on the weekends¹⁰ and employees are happier and more focused with 4-day work week.¹¹



IN 2030 THIS COULD MEAN:

- + The work week could be unrelenting with personal and professional obligations designed to meet each worker’s needs.
- + Full-time employment with employer benefits could no longer be the default.
- + There could be greater self-directed and individual-based work as Canadians navigate competing responsibilities between work and personal responsibilities.
- + Professional development could be transferred to the employee and will be accomplished through lifelong learning.
- + The locus of management and control may move from the employer to the individual, with each “employee” signing up for work they are interested in completing within a given timeframe.

CONTEXT OF THE TREND:



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MAINSTREAM INCLUSIVE DESIGN

WEAK SIGNALS EMERGING MATURE

Mainstream product and service design is changing to ensure usability by as many people as possible. No longer designing for the median or the “average user” inclusive design looks to the fringes of society. Inclusive design focuses on n=1, where one product is designed for one person rather than the previous thinking of one size fits all.

Understanding that one size does not fit all, inclusive design may create a new market of opportunities.

POTENTIAL IMPLICATIONS FOR CANADA’S LABOUR MARKET:

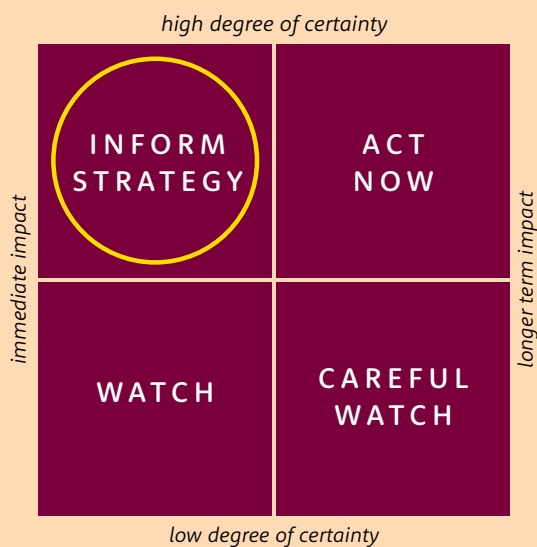
- + A portion of the workforce that has traditionally been challenged to participate, may be given new supports through inclusive design initiatives, expanding Canada’s labour force.
- + Demand for diversity among employees could increase, as companies seek to design services and products that will better reflect the needs and interests of different demographic groups.
- + New demand for inclusive products and services could drive innovation in all sectors.

PRESENT DAY STUDIES + PREDICTIONS:

- + Of the almost 14% of the Canadian population aged 15 years or older, 3.8 million individuals report having a disability that limits their daily activities, according to Statistics Canada.¹
- + A recent survey by the Toyota Mobility Foundation found that only 4% of 575 wheelchair users across five countries felt they had suffered no negative effects while working or job-hunting.²

SAMPLE EVIDENCE OF CHANGE:

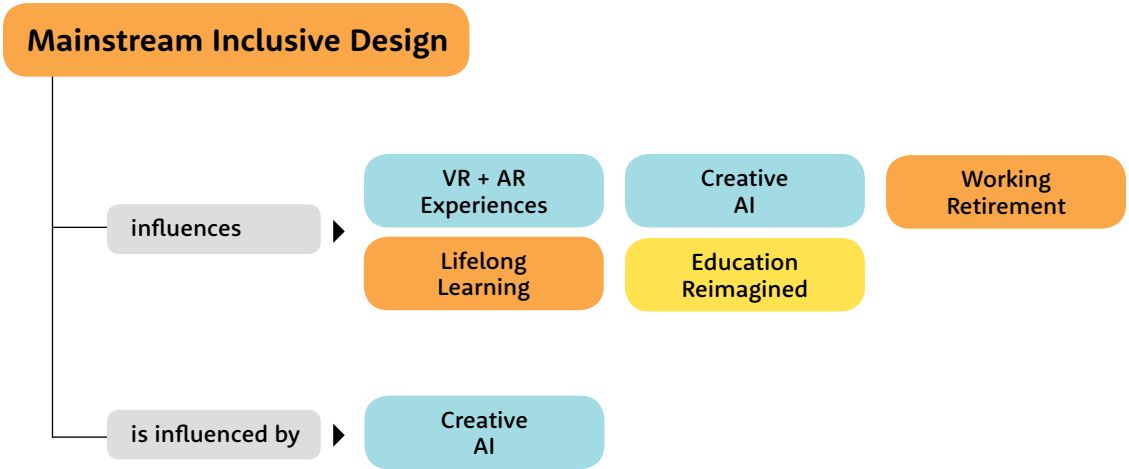
- + Microsoft CEO makes commitment to design their products to be more accessible to all people³ and leads the way in the industry with an Inclusive Design practice that “designs with the disabled in mind, to create products that are better for everyone else”.⁴
- + Retailers like Target and Tommy Hilfiger are expanding on their own previous commitments to accessible design, making clothing and goods that suit people of different abilities.⁵
- + In a Tokyo cafe, the waiters are robots operated remotely by people with disabilities.⁶



IN 2030 THIS COULD MEAN:

- + More Canadians could become accustomed to personalized products and services, evolving society’s expectations of individual accommodations.
- + Canada’s labour market could be more diversified, with individuals not missing out on employment opportunities due to different abilities.
- + Levels of empathy could grow as more Canadians are exposed to different abilities on a daily basis.
- + Embracing inclusive design could allow Canada to ride a new wave of innovation.

CONTEXT OF THE TREND:



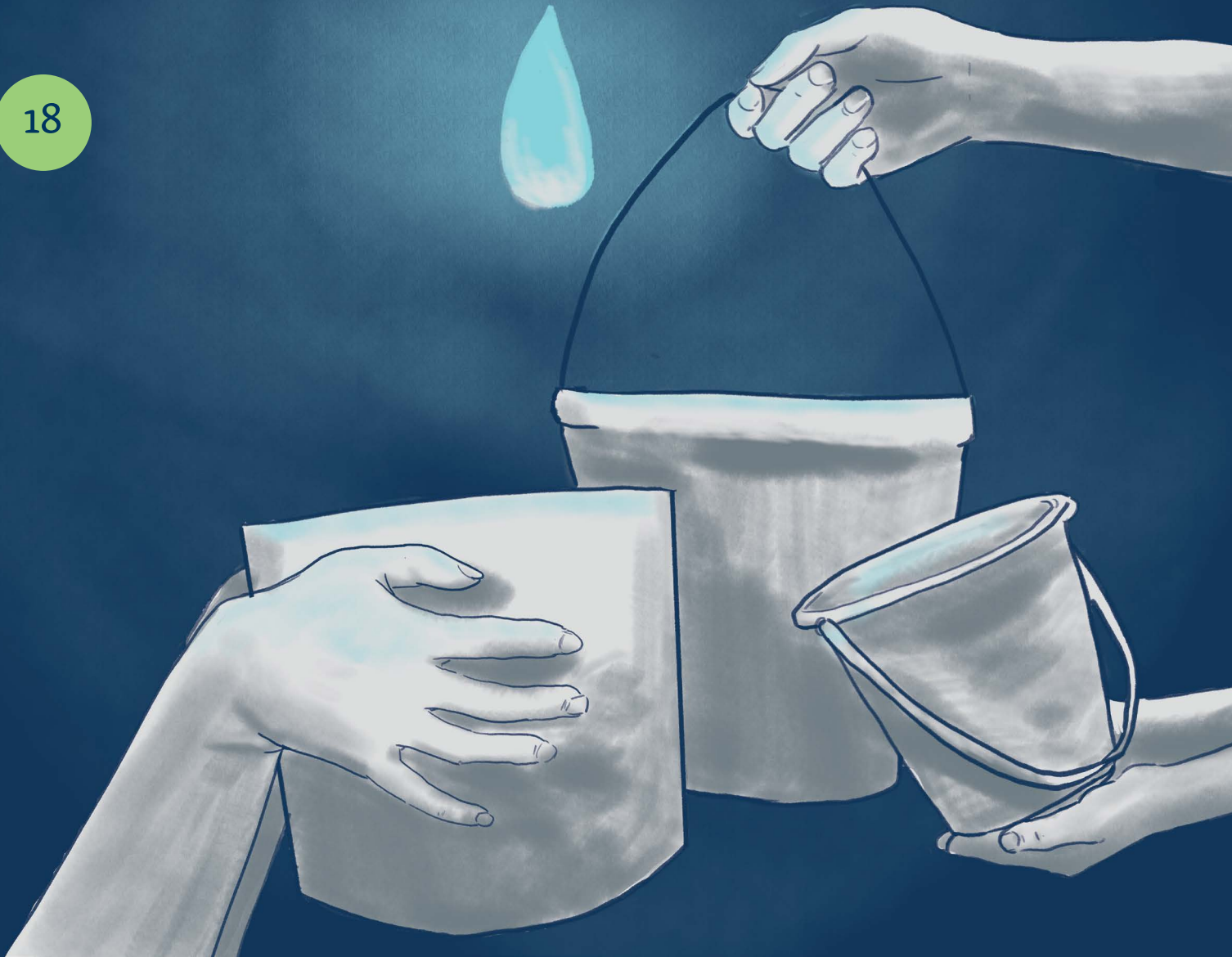
1. Statistics Canada. (2012). A profile of persons with disabilities among Canadians aged 15 years or older, 2012. Retrieved from <https://www150.statcan.gc.ca/n1/pub/89-654-x/89-654-x2015001-eng.htm>
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ENVIRONMENTAL SUSTAINABILITY

Climate change is a global challenge, driving changes ranging from extreme weather to resource scarcity. Understanding the impact, countries across the world are investing in environmental sustainability initiatives. Climate change is creating structural changes within labour markets, with potential consequences for industries that rely on fossil fuels, as well as the emergence of the “green economy sector” and related “green jobs.”¹ The rate and impact of these potential changes are connected to broader government policy responses to climate change.

The following section explores a range of changes related to environmental sustainability, including trends resulting from climate change and those emerging in response to the need to support greater sustainability.

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RESOURCE SCARCITY

WEAK SIGNALS EMERGING **MATURE**

Depleted fossil fuels, extreme weather, rising sea levels, and water shortages have led to resource scarcity challenges globally and across Canada. As the impacts of climate change become more extreme and omnipresent, industries that are directly reliant on natural resources may be impacted most.

Clean air, water, sand may all become scarce and extremely valuable resources.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

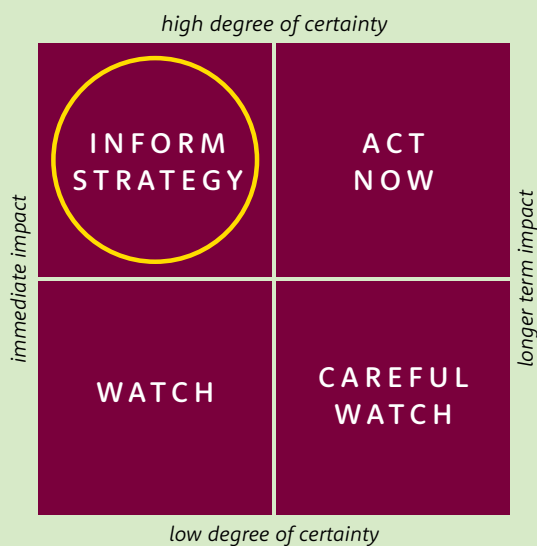
- + Rise of energy prices could impact energy intensive businesses such as technology companies and transportation.
- + Water-reliant sectors such as agriculture, food processing, and manufacturing could struggle to maintain access to this resource.
- + Companies may have to adapt new practices to conserve resources like paper and water.
- + Natural resources sector in Canada could decline.
- + New energy efficient industries may grow or develop in response to this change.

PRESENT DAY STUDIES + PREDICTIONS:

- + According to the World Wildlife Fund, by 2025 two-thirds of the world's population may face water shortages.¹
- + A 2017 study published by *The Lancet* found that 16% of all deaths around the world were linked to pollution in 2015, with the majority of deaths coming from air pollution—6.5 million deaths out of 55 million.²
- + Between 47 and 59 billion tonnes of sand and gravel are mined every year; used in concrete and asphalt. The amount we use every year is enough to construct a wall 27 metres high by 27 metres wide around the equator.³
- + A 2018 study conducted by Public Health England finds that air pollution can damage cognitive development in children.⁴

SAMPLE EVIDENCE OF CHANGE:

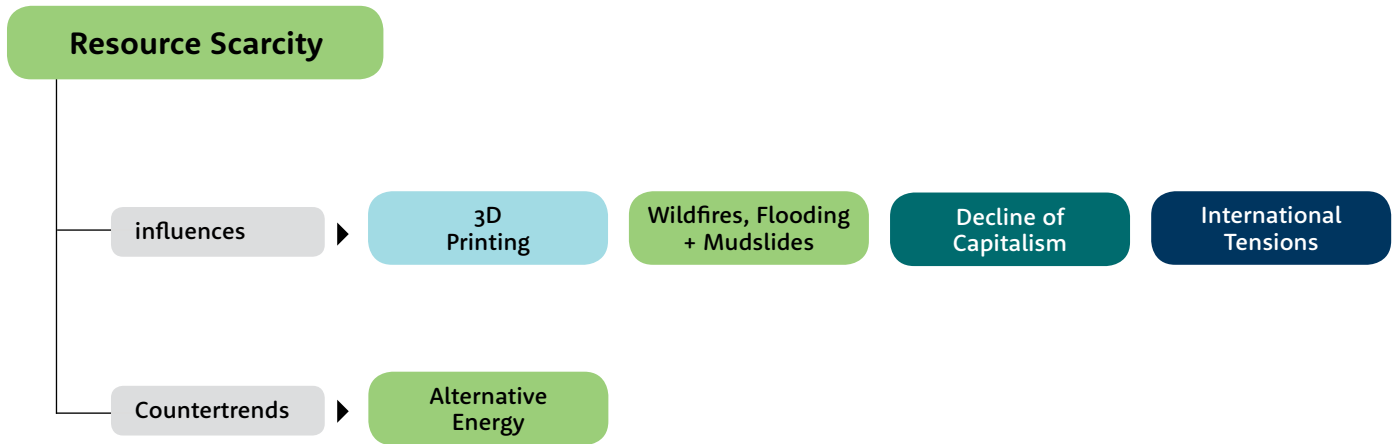
- + Portland, Oregon becomes the first US city to ban fossil fuel expansion, offering a roadmap for others to follow suit.⁵
- + A study published in *Nature Plants* determined that the global yield of barley will decline between three and 17%, posing a risk to Canadian beer production.⁶
- + Zambia's Energy Minister predicts the country may experience an energy crisis if forest depletion is allowed to continue. The country is heavily reliant on wood fuel as primary energy source and the government is keen to diversify to efficient and sustainable methods.⁷
- + The International Water Management Institute estimates that nearly every country south of 35N latitude will experience economic or physical water scarcity by 2025.⁸
- + At current rates of decline, a coalition of American environmental organizations are suggesting that 100% of wild vertebrates could die off by 2026.⁹



IN 2030 THIS COULD MEAN:

- + Canadians may change their eating habits to reduce water consumption—no more meat, plastic, or coal.
- + Building codes and water infrastructure may change to drastically reduce water use.
- + Individual use quotas for various resources may emerge in response to this trend.
- + There could be a reduction in consumer spending as people make a conscious decision to consume less and reuse. Sharing economy could continue to grow as communities find ways to collaborate and do more with less.

CONTEXT OF THE TREND:



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WILDFIRES, FLOODING + MUDSLIDES

WEAK SIGNALS | EMERGING | **MATURE**

Canada, like many countries globally, is experiencing increasing instances of flooding and forest fires, as a result of extreme weather related to climate change. Forest fires followed by flooding can in turn trigger catastrophic mudslides. No longer an infrequent event, flooding and wildfires disrupt everyday life, affecting work, labour, and the economy.

Climate change may increase the instances of wildfires, floods, and mudslides in Canada.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

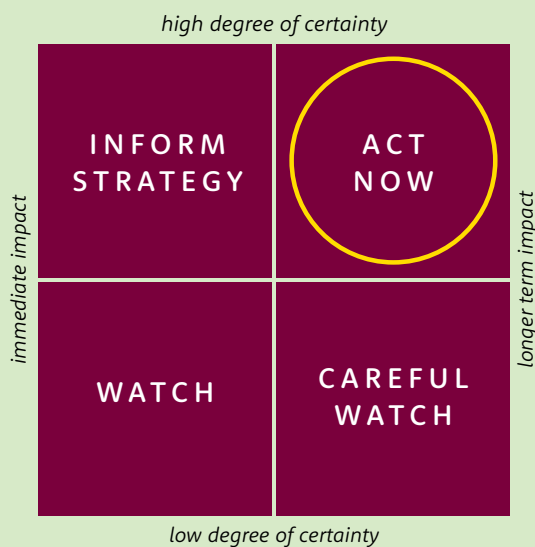
- + Industries tied to natural resources, such as forestry, could be impacted.
- + There could be a growing demand for products and services that support flood and wildfire monitoring and disaster recovery. This may include significant investment to improve municipal infrastructure.
- + Canada's travel and tourism industry could suffer in areas that have regular occurrences of wildfires and flooding.

PRESENT DAY STUDIES + PREDICTIONS:

- + In 2017, \$562.7 million was spent on fire suppression in British Columbia.¹
- + A 2018 University of Hawaii report predicts that by 2100, up to six natural disasters at once could threaten some areas.²
- + The City of Calgary reports that there was \$6 billion in financial losses and property damage sustained across southern Alberta in 2013 due to flooding.³

SAMPLE EVIDENCE OF CHANGE:

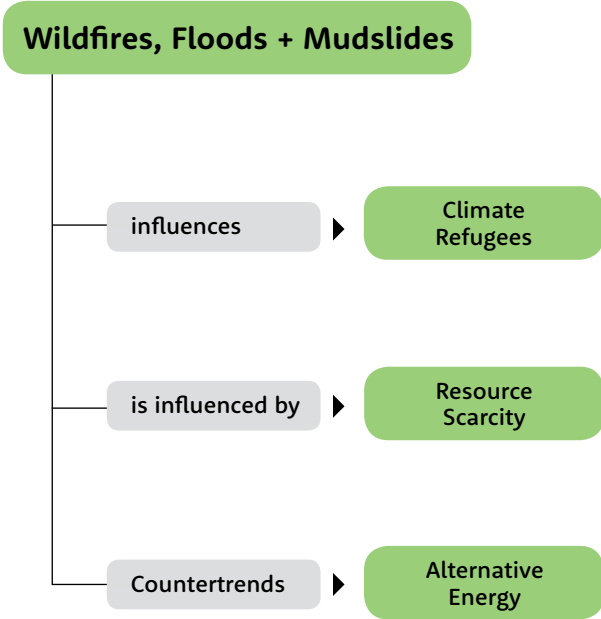
- + In 2018, Province of British Columbia declared a state of emergency as 559 forest fires burned across the province.⁴
- + Unpredictable growing seasons, flooding, and dry spells present challenges to New Brunswick farmers.⁵
- + Federal government employees told to stay home after Gatineau experiences massive flood in 2017.⁶
- + In 2018, Californian forest fires caused by extreme drought killed 29 people.⁷
- + British Columbia communities faced debt after self-financing forest fighting efforts during emergency need.⁸
- + Seventeen people were killed in devastating mudslide in Montecito, California in January of 2018.⁹
- + Thousands of landslides occur each year across Canada accounting for an estimated \$200 to \$400 million in direct and indirect costs annually.¹⁰



IN 2030 THIS COULD MEAN:

- + Canadians may choose to migrate to regions less impacted by flooding and wildfires.
- + There could be increasing instances of unexpected workforce shutdowns.
- + To mitigate impact, there could be a flooding tax added to property taxes, or regulations requiring homeowners to adhere to new fire prevention measures.
- + New Canadian building technology could be created to manage and collect flood water or to prevent fires.

CONTEXT OF THE TREND:



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CLIMATE REFUGEES

WEAK SIGNALS EMERGING MATURE

Disasters, conflict, and climate may increasingly displace millions of people around the world. In Canada, the concept of a climate change refugee currently sits outside of the refugee framework. As more people experience the impacts of climate change, how will Canada respond to this demand?

Canada may see an influx of refugees due to major climate change disruptions in the rest of the world.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

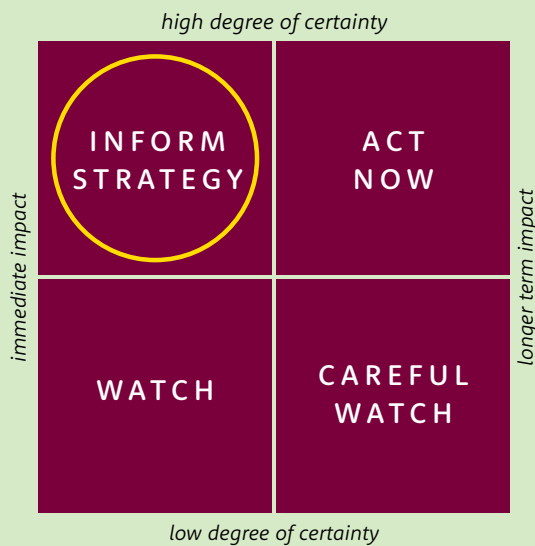
- + The green economy could grow, driven by a talent base with firsthand knowledge and experience of climate change, and growing demand internationally for solutions.
- + An influx of workers in need of employment could reduce cost of labour in some sectors.
- + The demand for settlement-related services such as language training and border security could increase.

PRESENT DAY STUDIES + PREDICTIONS:

- + The United Nations suggests that anywhere from 200 million to one billion people will be displaced due to disaster, conflict, and climate by the year 2050.¹
- + According to the Internal Displacement Monitoring Centre, an average of 22.5 million people are forced to flee floods, storms, and other severe weather events each year.²
- + The UN Refugee Agency estimates that one person every second has been displaced by a disaster since 2009.³
- + The World Resource Institute estimates that global flooding could triple by 2030.⁴

SAMPLE EVIDENCE OF CHANGE:

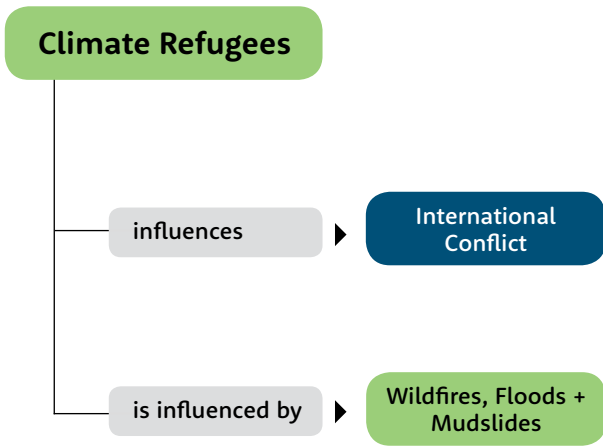
- + University of Waterloo climate scientist predicts that in the coming years people will be migrating to Canada by the millions due to climate change impacts.⁵
- + Climate change is driving thousands of people from Guatemala, El Salvador, and Honduras north to the US.⁶
- + New Zealand moves to create a visa program for climate change refugees,⁷ but Pacific people are not keen to leave their homelands.⁸
- + The International Refugee Rights Conference discussed the issue that climate change refugees currently sit outside of the refugee legal definition.⁹
- + However, while concerns about immigration and border security have not been as prominent as in the US and Europe, Canada is no stranger to these sentiments.¹⁰



IN 2030 THIS COULD MEAN:

- + Federal immigration policies may adapt to create new immigrant categories including climate change refugees.
- + Canadians could become more environmentally conscious given personified impact of climate change.
- + Climate change refugees could increase strain on public services and programs, leading to a backlash of anti-immigration policies and sentiments.

CONTEXT OF THE TREND:



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ALTERNATIVE ENERGY

WEAK SIGNALS EMERGING MATURE

Energy has become one of the most valuable and important resources of our time, particularly because technology cannot exist without energy to power devices, fuel transportation, and cool technology-related infrastructure. Scientists have been searching for new ways to generate energy that is clean, efficient, renewable, and affordable. In response, alternative energy sources and infrastructure are emerging, such as artificial photosynthesis, bacteria-packed solar cells, and micro-grids.

Experimental and sustainable energy sources could provide abundant, affordable energy for all.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

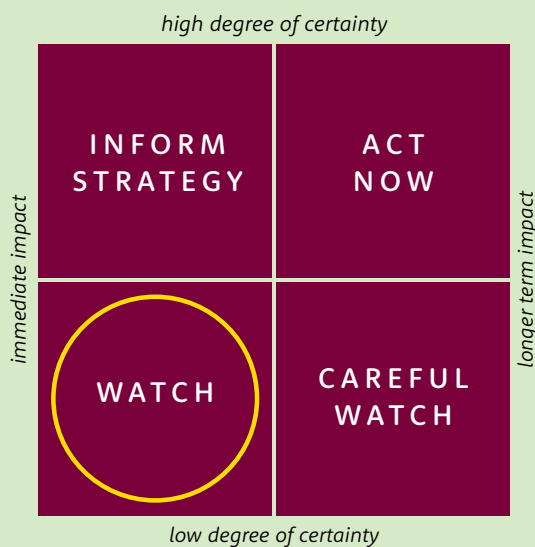
- + If energy costs decrease, more companies could invest in robotics, tech systems and increased computational power.
- + If significant strides towards clean, inexpensive energy are made in the next decade, potentially leading to a faster pace of automation, there may be growth in demand for the skills needed to operate and work alongside new technologies.
- + The traditional resource-based energy sector could decline.

PRESENT DAY STUDIES + PREDICTIONS:

- + According to Statistics Canada, in 2016 Canadian companies spent \$18.1 billion on in-house energy research and development (R&D).¹
- + A 2013 study by the Digital Power Group finds that computers and smartphones use a tenth of the world's electricity, and that share will only increase.²
- + Stanford experts find that fossil fuels, coal, oil, and gas currently supply heat to 80% of our homes globally while also providing humanity's primary source of greenhouse gas.³

SAMPLE EVIDENCE OF CHANGE:

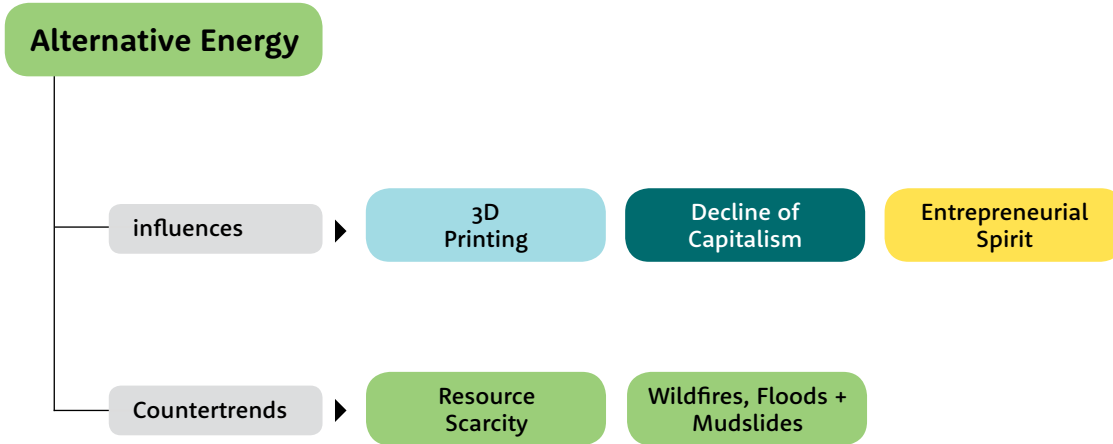
- + Futurist Ray Kurzweil says solar energy is only six doublings, or less than 14 years away from meeting 100% of today's energy needs.⁴
- + One study published in Science Magazine suggests that the installation of massive wind and solar farms in the Sahara desert could power the entire world.⁵
- + Despite the broader context of politically polarized debates on energy and climate change, cities such as St. Louis, Orlando, and Denver are coming together with a common goal of rejecting fossil fuels in favour of renewable energy sources.⁶
- + University of Cambridge scientists have created an artificial photosynthesis device said to absorb more sunlight than natural photosynthesis itself providing a new avenue for renewable energy.⁷
- + Researchers the University of British Columbia have developed a new way to build solar cells containing bacteria, which are more efficient than similar systems and can even work on dim, cloudy days.⁸
- + The Institute for Public Policy in the UK has examined a distributed and decentralized energy system.⁹



IN 2030 THIS COULD MEAN:

- + A radical shift in energy consumption and carbon emissions could lead to a significant reduction of greenhouse gases, changing the current trajectory of climate change.
- + Energy poverty (defined by households spending 10%+ of their monthly budget on energy)¹⁰ could be eradicated in Canada.
- + The sizeable research investments currently directed at discovering green energy alternatives could be redirected to new areas of concern freeing up public funding for other purposes.
- + The marginal cost of energy production could go to zero, allowing industries to decouple growth from the cost of energy inputs.

CONTEXT OF THE TREND:



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2. Walsh, B. (2013). The Surprisingly Large Energy Footprint of the Digital Economy. Retrieved January 10, 2019, from <http://science.time.com/2013/08/14/power-drain-the-digital-cloud-is-using-more-energy-than-you-think/>
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URBANIZATION

Today, more than half of the world population lives in cities. It is estimated that by 2050, this number will increase to 70%.¹ Cities are a hub for employment and consumption, driving a country's economic activity, as well as the need for infrastructure investments and upgrades. In Canada, the federal government has committed \$180 billion in infrastructure spending over 12 years,² which has the potential to drive employment demand for infrastructure related occupations.

While Canadian cities have seen growth in recent years, suburban areas are home to the biggest share of population growth. The following section explores this maturing trend.

Table 1:

Statistics Canada—Population size and growth rate among census metropolitan areas (CMAs) in Canada, 2006 to 2011 and 2011 to 2016, ranked by percentage growth in 2016³

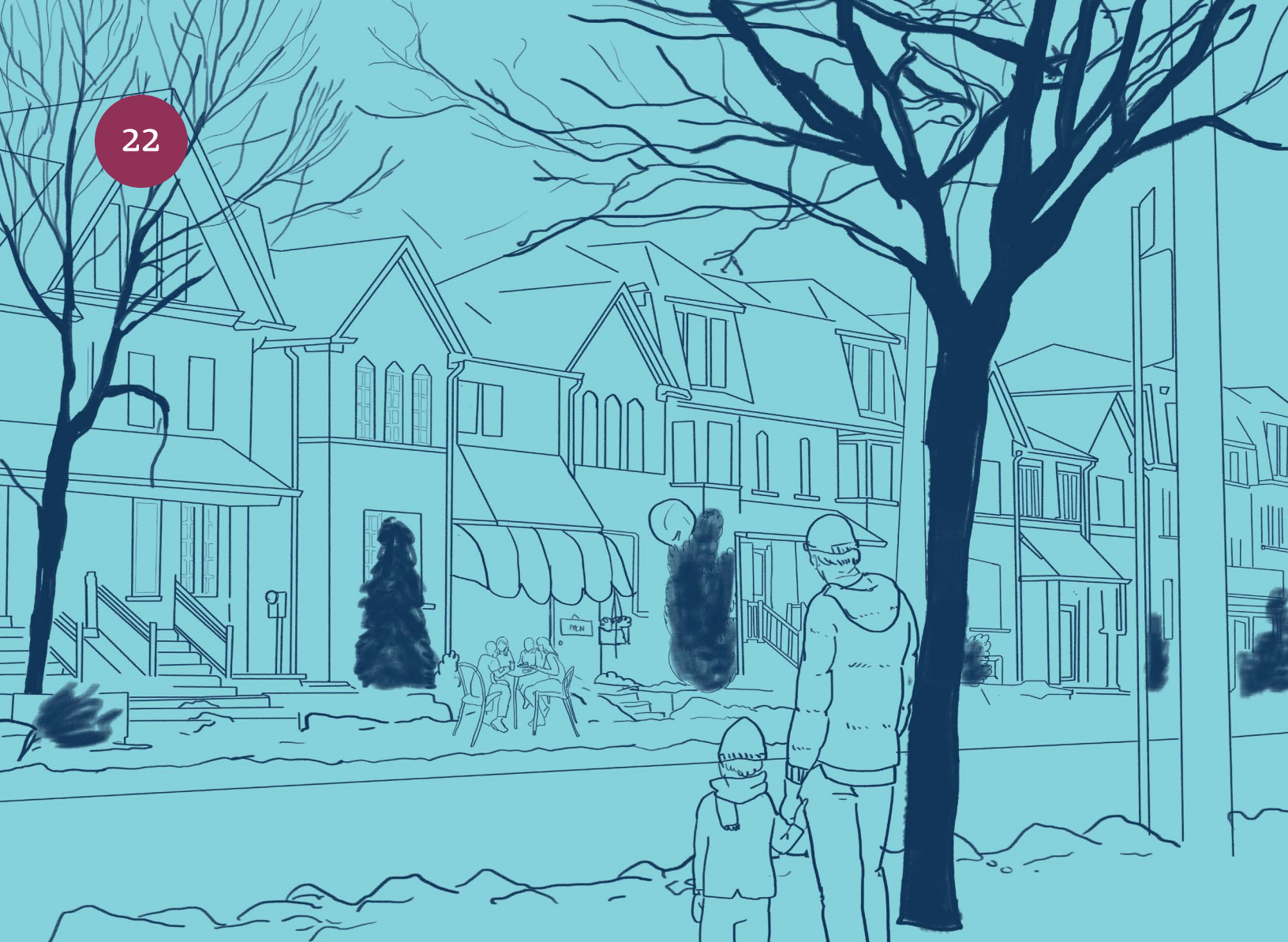
	Population 2016 <i>number</i>	Population growth rate 2006–2011 %	Population growth rate 2011–2016 %
Calgary, Alta.	1,392,609	12.6	14.6
Edmonton, Alta.	1,321,426	12.1	13.9
Saskatoon, Sask.	295,095	11.5	12.5
Regina, Sask.	236,481	7.9	11.8
Lethbridge, Alta.	117,394	11.3	10.8
Kelowna, B.C.	194,882	10.8	8.4
Guelph, Ont.	151,984	5.5	7.7
Victoria, B.C.	367,770	4.4	6.7
Oshawa, Ont.	379,848	7.7	6.6
Winnipeg, Man.	778,489	5.1	6.6
Vancouver, B.C.	2,463,431	9.3	6.5
Toronto, Ont.	5,928,040	9.2	6.2
Abbotsford–Mission, B.C.	180,518	7.0	6.1
Kitchener–Cambridge– Waterloo, Ont.	523,894	6.0	5.5
Ottawa–Gatineau, Que. and Ont.	1,323,783	9.0	5.5
Barrie, Ont.	197,059	5.6	5.4

Table 2:

Canadian Metropolitan Neighbourhood Population Distribution 2006 to 2016

	Population in 2006 ^{6,7}		Population in 2016		Population Growth 2006–2016		Share of Population Growth 2006–2016
Active Core	3,107,305	14%	3,372,730	14%	265,425	9%	8%
Transit Suburb	2,707,917	13%	2,923,161	12%	215,244	8%	7%
Auto Suburb	14,100,386	66%	16,523,569	67%	2,423,183	17%	75%
Exurban	1,572,913	7%	1,887,269	8%	314,356	20%	10%
TOTAL CMA^{8,9}	21,506,282	100%	24,724,257	100%	3,217,975	15%	100%

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7. Data for 2006 is sourced from the 2016 Census 'T9' classification exercise and are estimations due to census tract splits
8. Lethbridge and Belleville are new CMAs for the 2016 Census but have been omitted from this chart for comparison to previous work
9. While all total population figures represent true totals, they are not always a true sum of the Active Core, Transit Suburb, Auto Suburb and Exurban figures due to 'unclassified' census tracts in several CMAs



SUBURBAN BOOM

WEAK SIGNALS

EMERGING

MATURE ▲

After a period of urbanization across Canada, suburban areas are now experiencing significant population growth. This is happening at a time when major employers have made the decision to relocate from the suburbs to urban locations. There is a hyper concentration of knowledge economy jobs in urban areas, including Toronto's downtown, and Canadians have expressed their desire to live close to work. Housing affordability is likely driving this population migration.

Canada's suburban areas are growing faster than the overall population.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

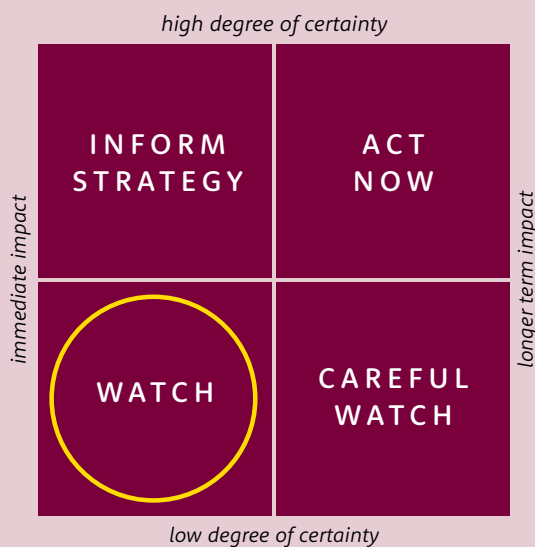
- + As employers continue to relocate offices downtown, and workers move to suburbs, productivity loss related to commuting time could result.
- + There could be a growing demand for new infrastructure projects to support commuting corridors, driving activity in development and construction industries.
- + Lack of affordable housing in urban areas may restrict supply of minimum wage workers in urban areas, forcing demand for wage increases within service sector jobs.

PRESENT DAY STUDIES + PREDICTIONS:

- + According to Queens University researchers, more than two-thirds of Canadians live in suburbs.¹
- + Statistics Canada finds that between 2006 and 2016, suburban areas grew by 17% and 20%, faster than Canada's population growth.²
- + According to the American census, suburban growth outstrips urbanization for the first time in years.³
- + Environics Research survey reveals many Canadians consider the time it takes to get to work as important as the job itself.⁴

SAMPLE EVIDENCE OF CHANGE:

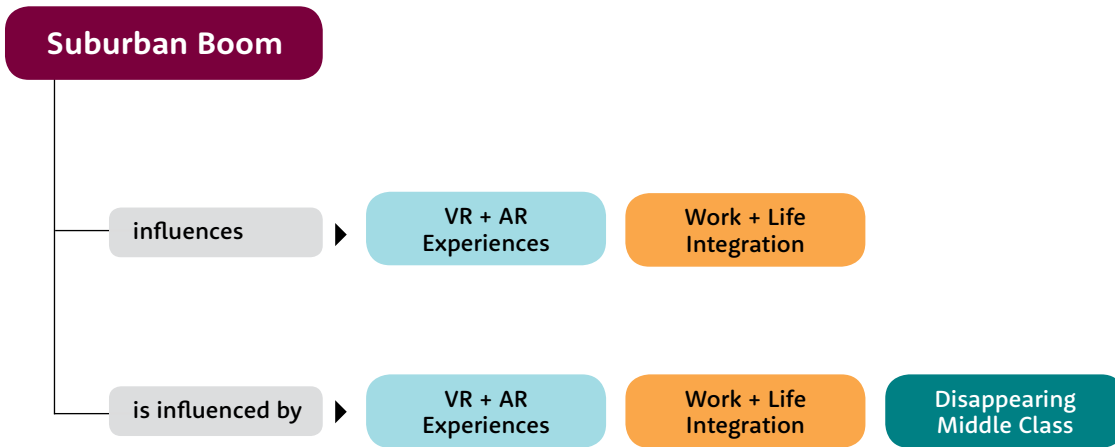
- + Queen's University researchers find that suburban homeowners and car drivers have propelled the fast growth seen in the population of Canada's cities.⁵
- + McGill University researcher cites lack of urban housing affordability is driving people to settle in the suburbs of Canada's metropolitan areas.⁶
- + Microsoft, Google, Yahoo, and McDonalds have relocated to downtown locations to attract younger workers.⁷
- + Neptis Foundation report highlights that there is a hyper concentration of knowledge economy jobs in Toronto's downtown.⁸
- + Housing affordability is reaching a critical point in Vancouver according to a 2018 RBC study.⁹



IN 2030 THIS COULD MEAN:

- + There may be an increase in flexible work arrangements as employees prefer working from home to avoid commuting time.
- + Potential growth of suburban consumer-facing businesses offering extended hours to appeal to long workday of commuting workers.
- + Suburban areas could become the new "hot spots" for trendy restaurants and boutiques.

CONTEXT OF THE TREND:

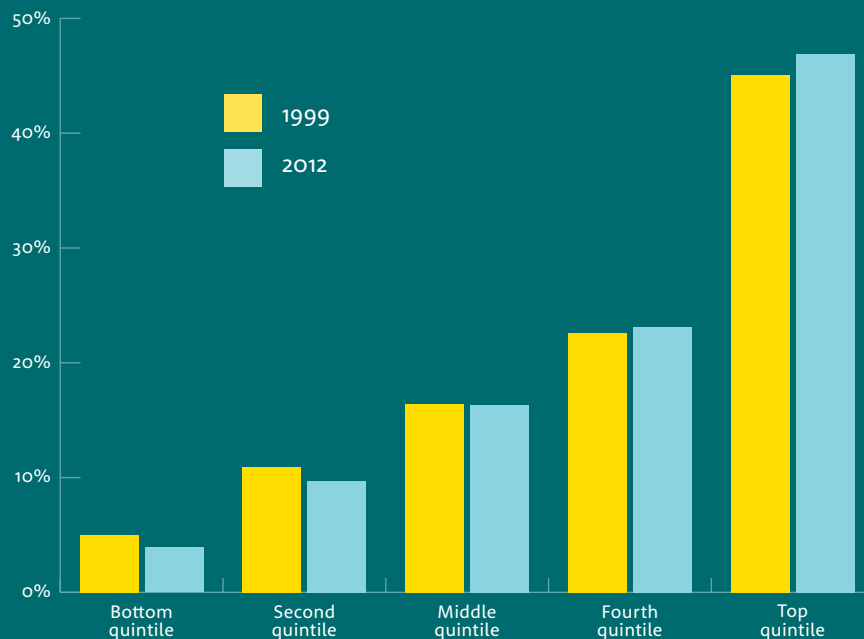


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INCREASING INEQUALITY

According to the International Monetary Fund, the gap between rich and poor people in advanced economies is currently the highest it has been in decade.¹ In Canada, families in the top income quintile held 47% of the total wealth in 2012, which increased from 45% in 1999. Meanwhile, families in the bottom income quintile held only 4% of the overall net worth in 2012, which decreased from 5% in 1999.²

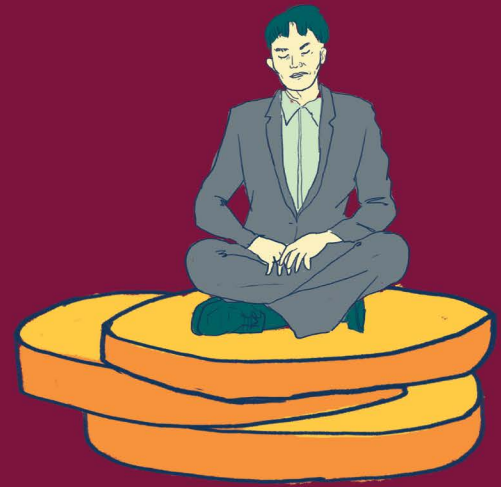
Figure 3:
Share of net worth (wealth) held by each income quintile, 1999 and 2012



Statistics Canada, Survey of Financial Security, 1999 and 2012.

This trend, and its impact in Canada, is explored in the following section, as are a range of other emerging trends relating to social inequality.

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DISAPPEARING MIDDLE CLASS

WEAK SIGNALS EMERGING **MATURE**

Income inequality has increased in Canada. Many people fail to make ends meet in today's economy and are overstretched by credit, loans, and housing costs. This has resulted in growing class resentment and precarious work situations where families are living paycheck to paycheck.

The middle class may be disappearing and overstretched by debt, increasing the polarization between rich and poor.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

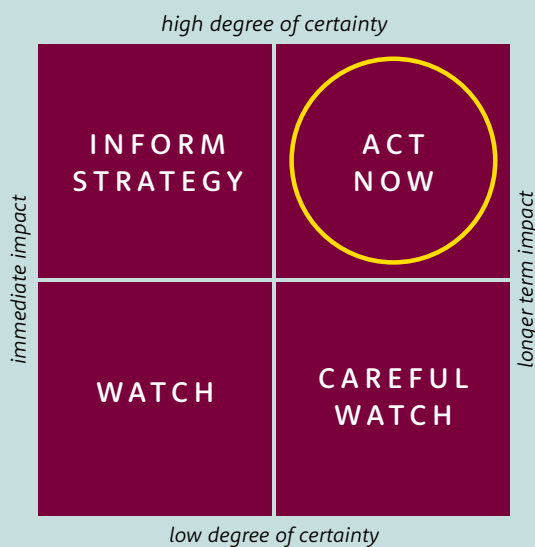
- + Businesses could aim to capitalize on the wealth of the upper class by providing high end and specialized products and services across all sectors.
- + Retail services may continue to transform, given declining demand, and may follow in the footsteps of Amazon GO and others, experimenting with formats operated entirely by robots and technology, in order to reduce operating costs.

PRESENT DAY STUDIES + PREDICTIONS:

- + In 2016, according to The Walrus, Canadians owed a total of \$2 trillion in mortgages, consumer credit, and loans.¹
- + A poll conducted by Ekos Research in 2017 identified that fewer than 50% of Canadians consider themselves members of the middle class, dropping from 70% in 2002.²
- + According to the Conference Board of Canada, income inequality in Canada has increased over the past 20 years with Canada scoring a “C” grade and ranking 12th out of 17 peer countries.³
- + A Deloitte report, the Great Retail Bifurcation, shows increased revenue of 81% in high end stores and 37% in discount and dollar stores over the past 5 years with only a 2% growth in the middle range.⁴
- + A study conducted by the Federal Reserve finds that millennials are poorer than previous generations.⁵

SAMPLE EVIDENCE OF CHANGE:

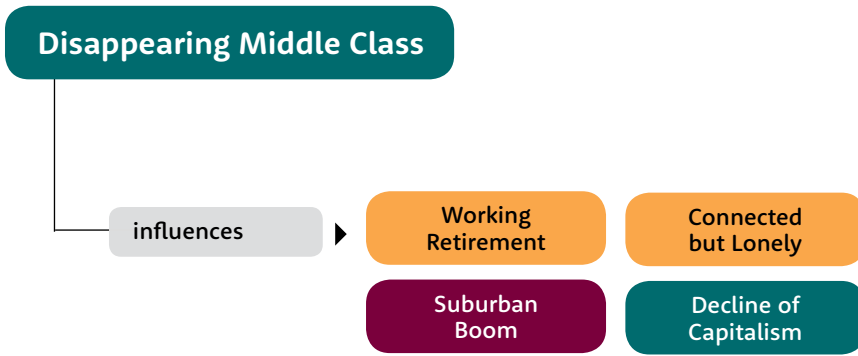
- + According to a *Globe & Mail* article, housing prices have soared, making ownership unattainable and prices have risen much faster than salaries.⁶
- + A retail alert announces extensive store closures—Sears closing 40 stores, Lowe’s closing 51 stores, Toy R Us closing 735 stores, Starbucks closing 150 stores, Chipotle closing 65 stores, and yet online sales only account for 10% of all retail sales.⁷
- + According to CareerBuilder’s Economic Modeling Specialists International, middle-income jobs are disappearing the fastest. More than 60% of 173 occupations projected to decline through 2021 are middle-class jobs.⁸
- + According to a *Maclean’s* article, retirees today will likely go into retirement with a mortgage.⁹
- + *The Washington Post* explains how France has grown the middle class through various policies including guaranteed minimum income, health savings accounts, student debt forgiveness, paid parental leave, affordable child care, and restructured taxes for families with children.¹⁰



IN 2030 THIS COULD MEAN:

- + Cost-effective, high-speed transportation becomes an even greater priority to bring workers who are living where they can afford into urban centres.
- + Families could become fragmented if one parent lives in a city for the work week.
- + Household debt could become less attractive with banks and other financial institutions reducing their lending-related products as a result.
- + The tension between rich and poor could heighten and create greater political polarization.
- + Manufacturing low-cost goods on-site and on-demand could become mainstream with 3D printing.

CONTEXT OF THE TREND:



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REBALANCING GENDER EQUALITY

WEAK SIGNALS EMERGING MATURE



There is significant pressure on certain aspects of current power structures, as groups of people who have historically been marginalized make their voices heard. This is particularly true for women and the efforts to shift power relationships by bringing to light sexual harassment and violence through the #MeToo movement. While not all equity seeking groups are benefiting from this shift, gender equality may be on the rise broadly.

TURN AND FACE THE STRANGE

The rebalancing of gender equality could disrupt private and public institutions.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

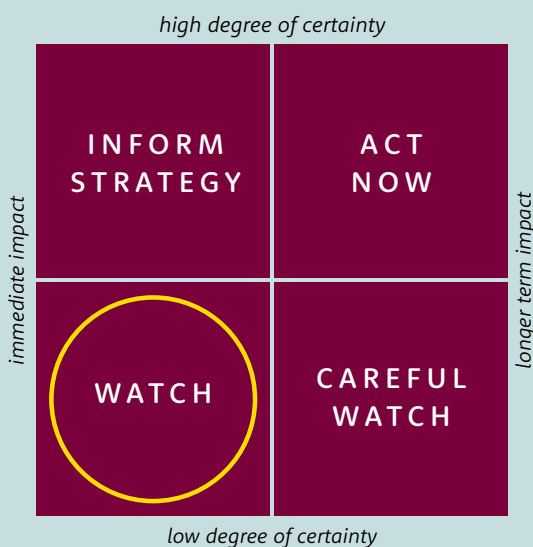
- + Increase in demand for employee diversity and cultural sensitivity training products and services, as well as diversity-focused recruiting efforts.
- + Greater demand for products and services that are customized to the unique needs of women.

PRESENT DAY STUDIES + PREDICTIONS:

- + According to the Canadian Women’s Foundation, full time working women in Canada earn 75 cents for every dollar earned by a man.¹
- + Bloomberg claims there is only one female CEO in Canada’s top 100 most influential companies within the S&P/TSX composite.²
- + A report by Statistics Canada indicates that visible minority women working full-time earn an average of 33% less than Caucasian men, earning 67 cents to the dollar, while full-time Indigenous women earn 65 cents to the dollar.³
- + According to the 2006 Census, women accounted for 60% of university graduates between the ages of 25 and 29.⁴

SAMPLE EVIDENCE OF CHANGE:

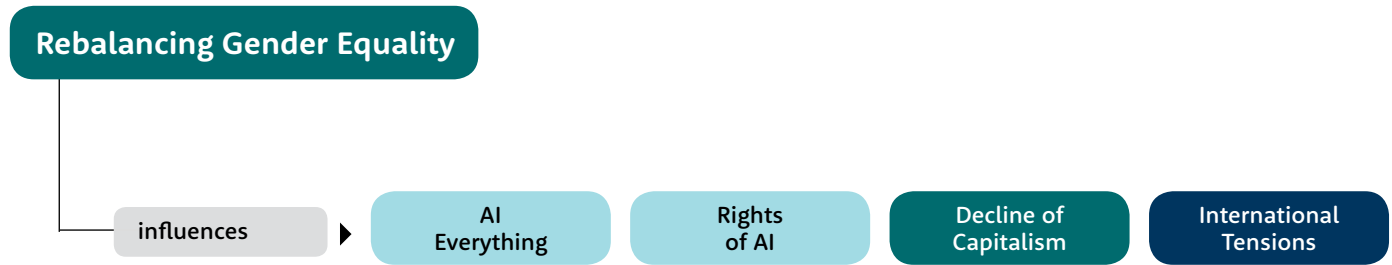
- + The 2017 Women’s March was the largest protest in US history with more than 4 million in attendance.⁵
- + As of 2019, a record 127 women will serve in US Congress, with 106 Democrats and 21 Republicans. This represents approximately 24% of all the seats.⁶
- + The US House of Representatives elected at least 90 women, a record number. Individual candidates also achieved historic firsts. Democrats Ilhan Omar and Rashida Tlaib became the first Muslim women elected to Congress. Republican Marsha Blackburn became Tennessee’s first female Senator. Democrats Deb Haaland and Sharice Davids became the first Native American women elected to Congress. Republican Kristi Noem became South Dakota’s first female governor.⁷
- + The #MeToo movement became prominent in October 2017, after women came forward publicly with allegations of sexual harassment and assault by producer Harvey Weinstein. Women shared their stories of being harassed or assaulted in the workplace.⁸
- + *The New York Times* reported that Tarana Burke, an African-American civil rights activist who founded #MeToo in 1997, did not receive support from prominent white feminists over the years.⁹
- + A Hidden Brain podcast explored “masculinity status” and explained that it is causing men to exclude themselves from parts of the economy that are booming. If women are attracted to an occupation, men will actively avoid it.¹⁰



IN 2030 THIS COULD MEAN:

- + There may be continued pressure on companies to represent gender diversity in all components of their work. Hiring practices and workplace supports will continue to evolve to ensure employee inclusion.
- + This could lead to a backlash where new companies are created that are intentionally defined by a lack of diversity.
- + The women’s movement may evolve to better represent and advocate on behalf of all equity seeking groups.

CONTEXT OF THE TREND:



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PERSONAL DATA OWNERSHIP

WEAK SIGNALS EMERGING MATURE



As concerns over the protection and use of personal data grow, new models of data ownership are emerging. Third party governance systems, such as data trusts, may shift the ownership from private corporations or public institutions to individuals. This could disrupt the business model of data driven companies and public institutions. It may also make it possible for individuals to start financially benefiting from sharing their data.

Concerns over personal data may create new ownership and revenue models.

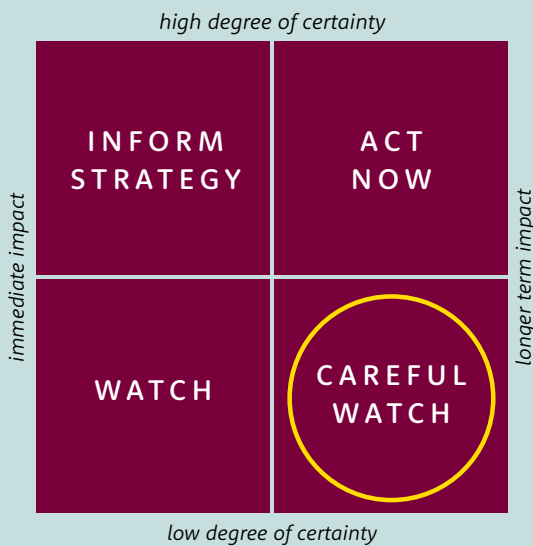
POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + The disruption of data-reliant business models, such as Facebook, Google, and Amazon: these companies will need to consider new data governance and contractual arrangements with users.
- + New products and services could emerge supporting individual security or monetization of personal data.

SAMPLE EVIDENCE OF CHANGE:

- + Data co-operatives such as Zurich-based Mindata are forming to manage data on behalf of their members and provide democratic control over data.¹
- + The Collective Data Trust is a group of internet users who are advocating for the personal ownership of data, and the opportunity for individuals to monetize their data.²
- + The Open Data Institute set to establish UK’s first ever data trust, which will establish third party stewardship of data related to cities, the environment, biodiversity, and transport.³
- + Sidewalk Toronto proposes establishing a civic data trust to control all data collected as part of their smart city project on Toronto’s waterfront.⁴
- + Toronto Board of Trade proposes that Toronto Public Libraries oversee Sidewalk Toronto’s data trust.⁵

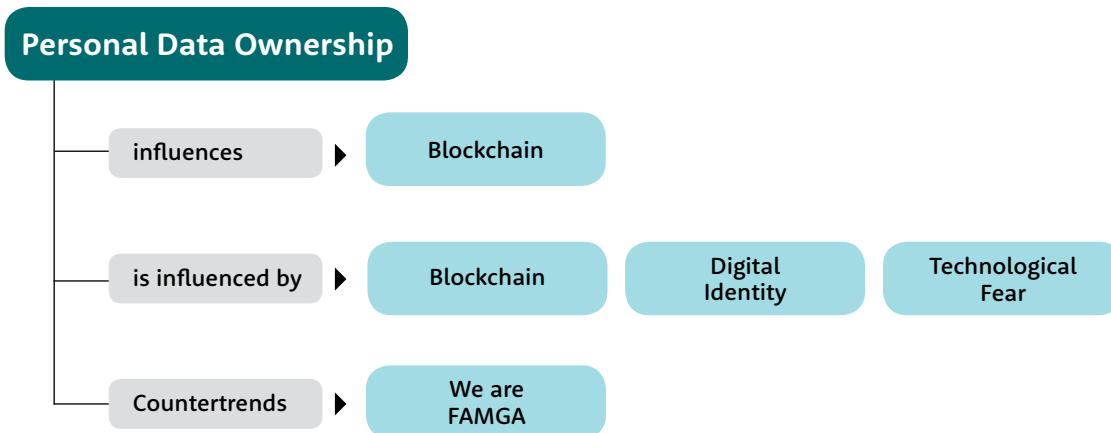
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IN 2030 THIS COULD MEAN:

- + New software products and services may be created to provide virtual security fortresses for all individual personal data.
- + Individual trust in data-driven companies could increase on digital platforms as Canadians see opportunity for personal revenue generation.
- + Individuals without access to home internet and mobile data packages may not be able to benefit from the monetization of their personal data.

CONTEXT OF THE TREND:





DECLINE OF CAPITALISM

WEAK SIGNALS EMERGING MATURE

More than half of young Canadians aged between 18-37 are indicating they no longer support capitalism. Concerns are raised related to fairness, inequality, and the creation of value at all costs. Younger generations may start to demand a new, and better, economic system.

Millennials may push for a new economic system to replace capitalism.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

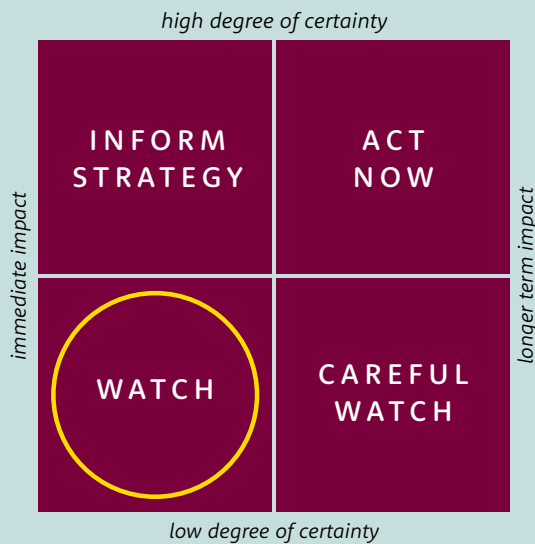
- + Declining support for current economic norms could lead to radical changes in the rules governing markets, resulting in changes in consumer behaviour, worker rights, worker-employer relationships, company behaviour and growth patterns, and overall income distribution.

PRESENT DAY STUDIES + PREDICTIONS:

- + In a Canadian survey of 18- to 37-year-olds, 40% of participants said their generation is mostly or much worse off compared with their parents and 54% said the economic system in Canada benefits other generations over theirs.¹
- + According to the same survey, 54% of those between 18 and 37 years of age believe we would be better off with a “more socialist system”.²
- + A study by Harvard University shows that 51% of Americans between the ages of 18 and 29 no longer support a capitalist system.³

SAMPLE EVIDENCE OF CHANGE:

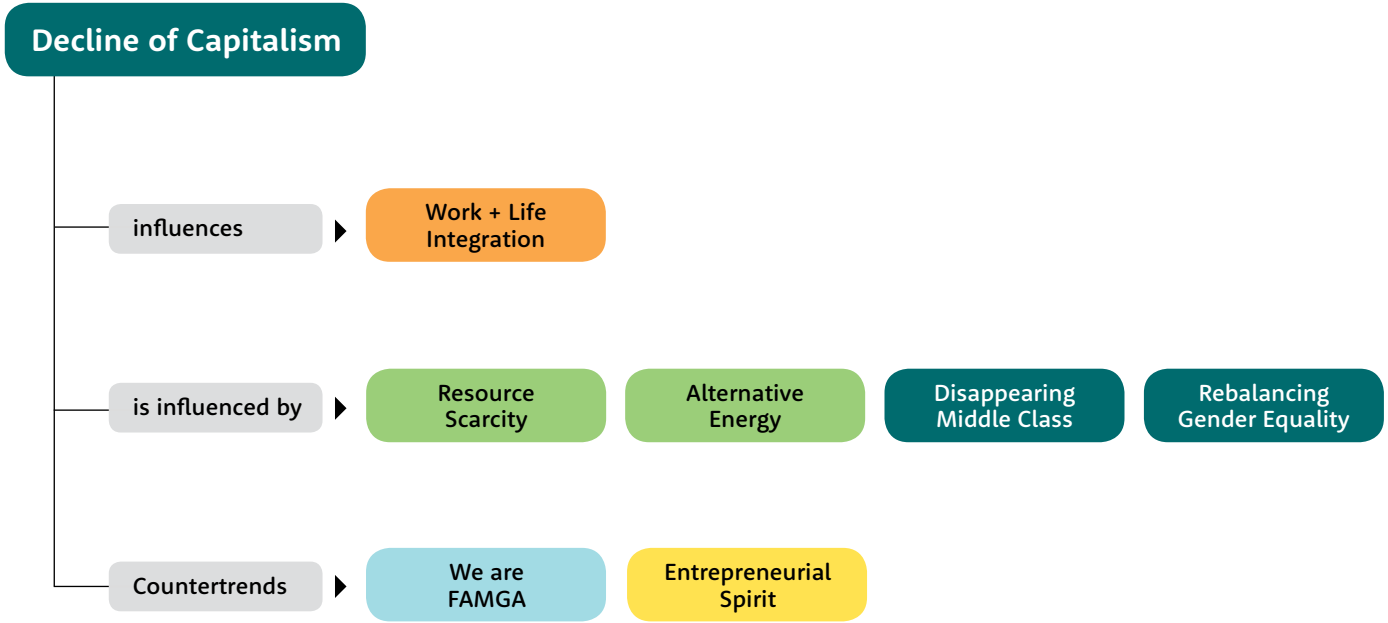
- + In February 2017, a college student asked a question about capitalism to the leader of the Democrats in the House of Representatives during a televised town hall meeting in New York that went viral.⁴
- + In 2008, Ecuador recognized in law, at the level of the nation’s constitution, that nature has “the right to exist, persist, maintain, and regenerate its vital cycles”.⁵
- + A Stanford study shows that those entering the workforce today “are far less likely to earn more than their parents when compared to children born two generations before them”.⁶



IN 2030 THIS COULD MEAN:

- + Life could slow down if people have greater focus on sharing, bartering, and community benefit, and less on advancing individual interests.
- + New political parties may be created to respond to this sentiment.
- + There could be public unrest, including marches and walkouts, as Canadians navigate the transition to a new economic system.
- + The desire to support local and smaller companies may increase, resulting in the destruction of the trillion-dollar company.
- + There could be an increased number of small and medium sized enterprises (SMEs) utilizing quadruple bottom line—infusing purpose into business model design along with the traditional people, planet, and profits.

CONTEXT OF THE TREND:



1. Carrick, R. (2018). Feeling snubbed by the economy, some millennials are looking to socialism. Retrieved December 10, 2018, from <https://www.theglobeandmail.com/investing/personal-finance/gen-y-money/article-lingering-economic-woes-sow-seeds-of-millennial-discontent/https://www.theglobeandmail.com/investing/personal-finance/gen-y-money/article-lingering-economic-woes-sow-seeds-of-millennial-discontent/>
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5. Revkin, A. C. (2008). Ecuador Constitution Grants Rights to Nature. Retrieved December 10, 2018, from https://dotearth.blogs.nytimes.com/2008/09/29/ecuador-constitution-grants-nature-rights/?_r=0
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POLITICAL UNCERTAINTY

As Nesta's trends report outlines, there was a spike in geopolitical uncertainty around September 11th, an increase that has persisted since. Political uncertainty and policy uncertainty go hand and hand. They can lead firms and consumers to defer spending decisions, which can negatively impact investment and hiring.¹ This has the potential to impact all economic activity, with disproportionate impacts on government-influenced sectors such as defence, construction and healthcare.²

Canada, like many countries, is not immune to this trend. The following section explores one dimension of this trend—international tensions—and what it could mean for the future of employment.

-
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INTERNATIONAL TENSIONS

WEAK SIGNALS EMERGING **MATURE**

International tensions have existed for decades with Canada experiencing ripples based on actions taken by the US government. Acts of conflict are taking new forms, including cyber warfare, autonomous warfare, immediate return of foreign workers, and trade wars. Canada has responded with investment in defence, including cybersecurity.

New sources of international tensions may drive investment in security, including security applications of AI.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + Investment in national security programs could grow the defence and security industry, creating new jobs.
- + Cyber conflict may drive investment in AI and robotics sector, resulting in the emergence of tech-defence jobs.
- + Domestic travel and tourism industry could boom as Canadians choose to travel within the country due to unsafe conditions elsewhere.

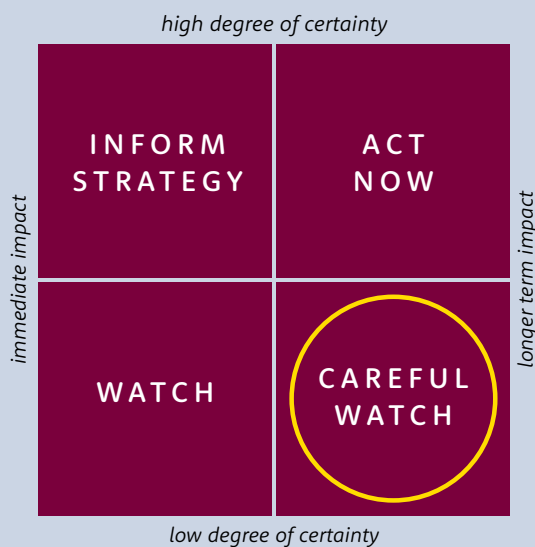
PRESENT DAY STUDIES + PREDICTIONS:

- + In 2018 the Global Peace Index (GPI) found that the global level of peace has deteriorated by 0.27% in the last year, marking the fourth successive year of decline.¹
- + The Institute for Economics and Peace reports that one hundred countries experienced increased terrorist activity, and the death toll due to conflict increased by 264% between 2006 and 2016.²
- + In 2017, the Federal budget announced a 70% increase to defence spending over the next decade, reaching \$32.7 billion by the 2026/27 fiscal year, as part of the new defence policy, *Strong, Secure, Engaged*.³

SAMPLE EVIDENCE OF CHANGE:

- + Trade tariffs contribute to deteriorating US-China relationship. While trade is currently at the forefront, cyber hacking and high-tech espionage are also core to this confrontation. China conducted military drills with Russia. A show of cooperation and military strength was to remind the US that adversaries could bury their differences and mount an offensive.⁴

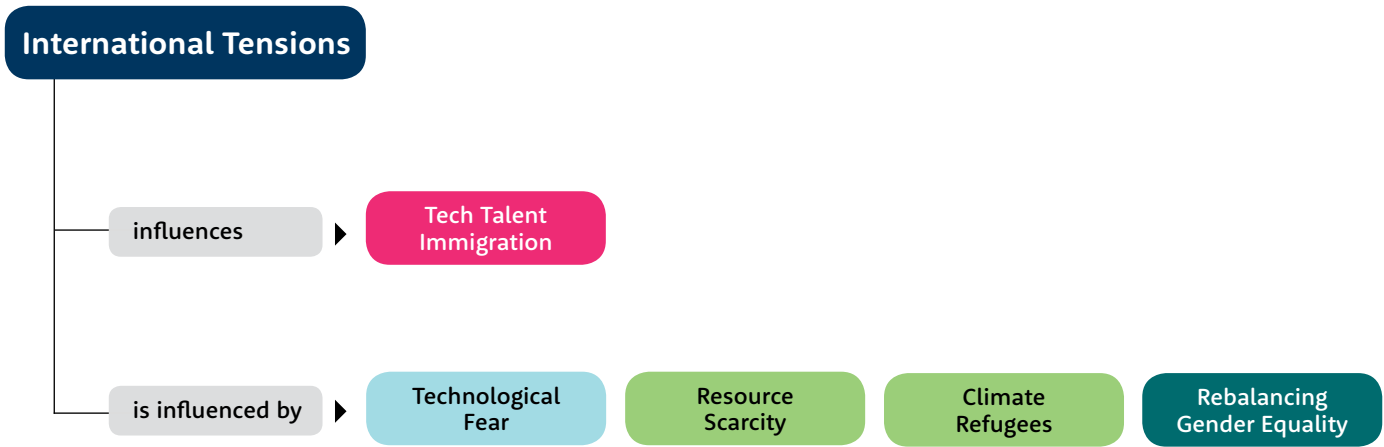
- + According to an article in Foreign Affairs, the US and the EU want to move past issues of territory and military power to focus on world order and global governance: trade liberalization, nuclear nonproliferation, human rights, the rule of law, and climate change.⁵
- + The British Ministry of Defense is developing several AI systems where military robots are being given more control over what to do in battle.⁶
- + Diplomatic issue between Canada and Saudi Arabia over human rights resulted in Saudi Arabia calling back more than 8000 students, initially including all medical students and residents.⁷
- + Retired Navy Admiral stated that “there was at least a 10% chance of a nuclear war between the US and North Korea, and a 20-30% chance of a conventional conflict that could kill a million people or more.”⁸
- + Research compiled by BrexitLawNI—a partnership from Queen’s University Belfast, Ulster University and human rights experts from the Committee on the Administration of Justice (CAJ) highlights that Brexit could ‘re-ignite conflict’ in Northern Ireland.⁹



IN 2030 THIS COULD MEAN:

- + Global interest in Canada’s energy and natural resource sector could provide Canada leverage during international negotiations.
- + Canadian border control may tighten as immigration and tourism demands increase.
- + More people may move to settle in northern Canada, moving farther from the US border which may be seen as an unsafe zone. This may create opportunities to plan new towns from the ground up.
- + Given safety concerns, Canadians opt to “visit” other countries through VR and AR experiences.

CONTEXT OF THE TREND:



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9. Watson, T. (2018). Brexit could "re-ignite conflict" in Northern Ireland - BBC News. Retrieved November 28, 2018, from <https://www.bbc.com/news/uk-northern-ireland-45513462>

OTHER

The following section outlines a range of other changes that are outside of the scope of mega trends identified in Nesta's work, but which could impact Canada's labour market in the coming years.



ENTREPRENEURIAL SPIRIT

WEAK SIGNALS	EMERGING	MATURE
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The desire for autonomy, positive media presence of entrepreneurs, and the on-demand economy is supporting an increase in entrepreneurial spirit. This is occurring by choice and by necessity through entrepreneurship, self-employment, freelance, and gig work. Protections for freelance and gig workers, which is being explored by various governments, could make this type of employment even more desirable where entrepreneurship-related work becomes the dominant career path compared to full-time employment with a single employer

Entrepreneurship-related work may become the dominant career path with many Canadians creating their own opportunities rather than committing to a single employer.

POTENTIAL IMPLICATIONS FOR CANADA’S LABOUR MARKET:

- + Employers may find it difficult to maintain a full-time, stable labour force. Labour costs may change, with higher-cost specialized labour offset by lower-cost contract labour for less specialized tasks, more efficient resource allocation, and fewer employer obligations.

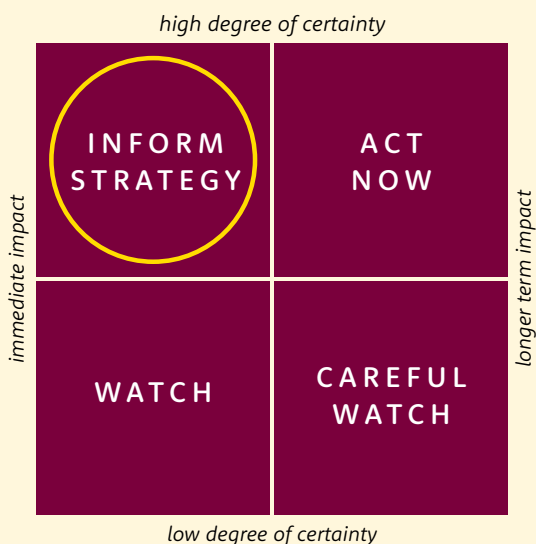
- + Products and services that support freelance or self-employed workers could increase in demand, including by the hour work space, temporary housing, legal advice, and networking.
- + Educational offerings may be needed for students who want to learn about entrepreneurship and prepare for adaptability. This could create the opportunity for extracurricular services to supplement what is available within the formal education system.

PRESENT DAY STUDIES + PREDICTIONS:

- + The Brookfield Institute and Centre for Innovation Studies in Calgary found that entrepreneurship in Canada ranks 2nd in the world with 13% of Canadians identified as entrepreneurs.¹
- + According to staffing company Randstad Canada, 20-30% of the Canadian workforce are “non-traditional workers”—contingent workers, freelancers, independent contractors and consultants. This is likely to increase with 85% of companies saying they will be shifting to a more agile workforce in the future.²
- + Intuit Canada predicts that freelancers, independent contractors, and on-demand workers will make up 45% of the Canadian workforce by 2020.³

SAMPLE EVIDENCE OF CHANGE:

- + Government of Canada launches a new Start-Up Visa to attract immigrant entrepreneurs.⁴
- + Higher education offers new curriculum as self-employment becomes as desirable as getting full time employment.⁵
- + The founder of the SAT tutoring company Prep Expert that coaches teens for the SAT says GenZ is attracted to entrepreneurship more than traditional occupations.⁶
- + Bill C-86, a second Act to implement certain provisions of the budget tabled in Parliament on February 27, 2018 and other measures, will come into force later in 2019 and includes protections for precarious workers. It includes equal pay for equal work, pay equity, and improved vacation entitlements.⁷
- + Airbnb has requested the Securities and Exchange Commission revise its rules so that hosts can become shareholders in the company.⁸
- + The Self-Employed Mortgage Access Act is proposed in the US to expand permissible sources to verify incomes so that those who are self-employed or in the gig economy can access mortgages.⁹
- + A California Supreme Court ruling limits businesses from classifying workers as independent contractors who aren’t eligible for certain benefits and employment protections.¹⁰
- + However, according to the Society for Human Resources Management’s 2017 survey, the demand for full-time employment including better pensions and four-day work weeks is on the rise.¹¹



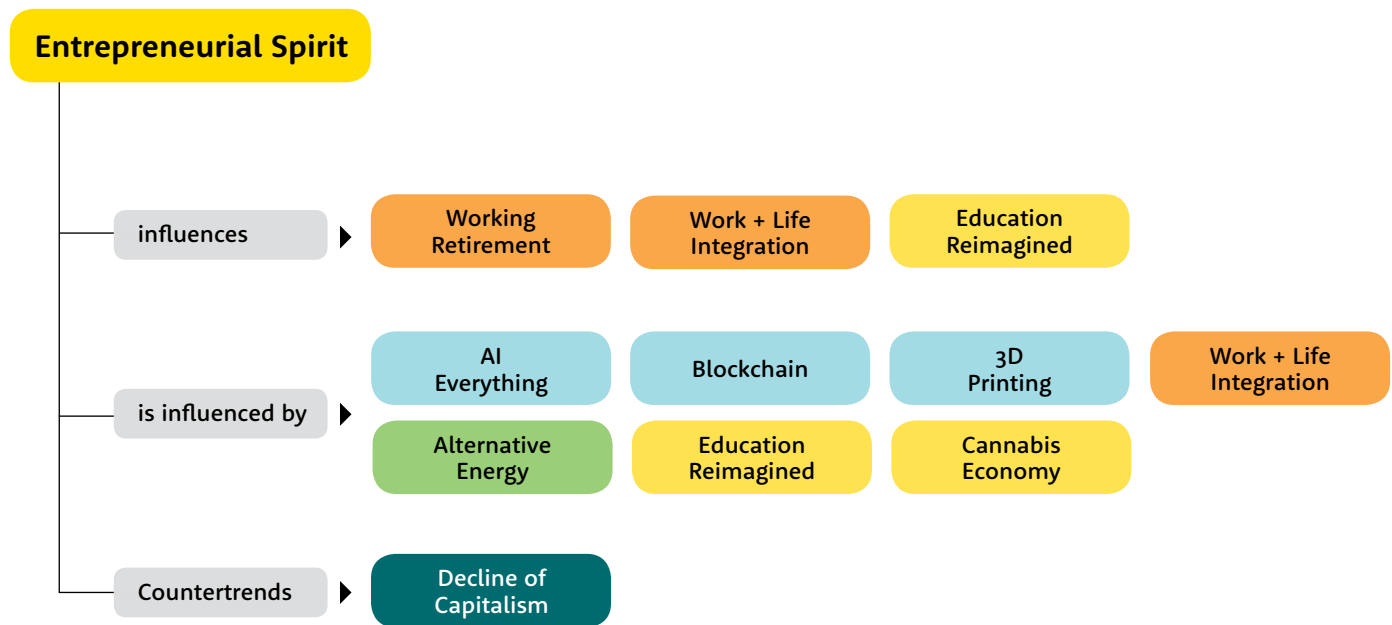
IN 2030 THIS COULD MEAN:

- + Perception of ideal employment conditions may shift from a focus on job security and loyalty to freedom and choice.
- + Workers could choose and sign up for the work they want to complete so it could prove difficult for employers to find staff to complete tasks that are perceived as undesirable.
- + The precarity of work may lead to an even wider income inequality across the country.
- + Workers may find new ways of organizing within this on-demand economy and may start to demand fair pay and benefits from multiple employers, and new policies and protections from governments.
- + Canadian workers may need to be nimble and flexible – requirements to work in multiple offices at one time requires

organization, communication and time management skills that may not have been required in previous decades.

- + Workers could become more transient and may move every few months to work for a wider range of companies across the country. This becomes an attractive lifestyle for those wishing to see and experience the country and world.

CONTEXT OF THE TREND:



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MANDATORY CREATIVITY

WEAK SIGNALS **EMERGING** MATURE

In order to maintain a competitive edge in innovation, all companies may expect their employees to provide creative input. Creativity could no longer be relegated to the arts and design community and may become a core skill for every occupation in the future. Once believed to be an innate skill, new methods for teaching creativity, such as creativity gyms, are cropping up to teach non-creative professions this critical skill.

Creativity could become critical for all Canadians, not just for the arts and design community.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

- + Creativity could be the most in-demand skill sought by employers across all industries.
- + Growing demand for creativity skills could push the education system and employers to teach creativity and creative confidence. As a result, new products and services may be needed to support workers who hail from non-creative fields to develop this critical skill.

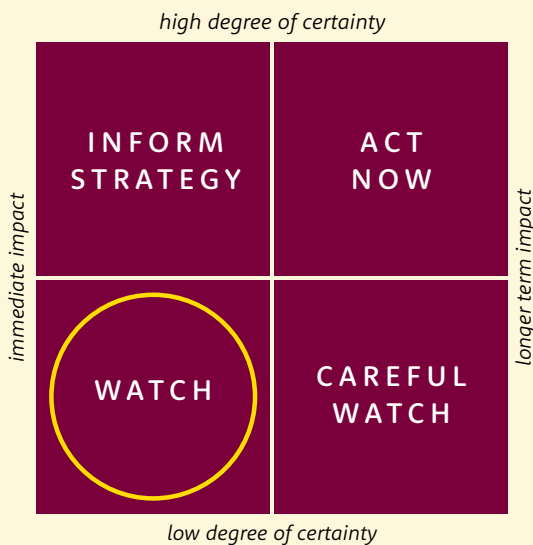
- + Employers may need to navigate the tension between the dynamic nature of the creative process, and productivity goals.

PRESENT DAY STUDIES + PREDICTIONS:

- + Adobe reports that 10% of the Fortune 500 companies have stated that design is their number one priority.¹
- + According to a survey by Forrester, 61% of executives do not see their companies as creative.²
- + A study by Adobe and Forrester Consulting found that 82% of companies believe there is a strong connection between creativity and business results.³
- + A study finds a high correlation between a broad undergraduate education and financial success. It was found that those who take arts and humanities in addition to their main field of study are 31-72% more likely than others to have higher-level positions and earn more than \$100,000.⁴

SAMPLE EVIDENCE OF CHANGE:

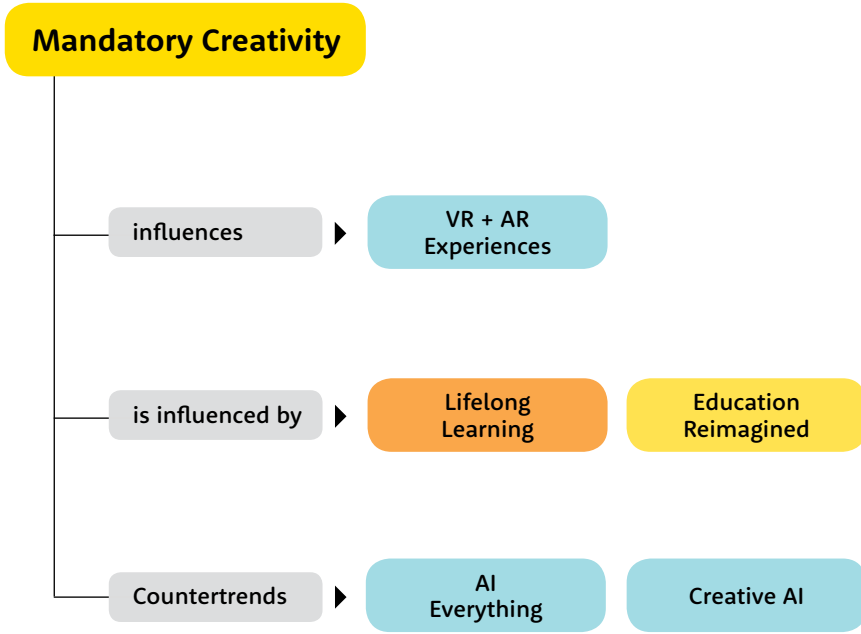
- + Consulting firms have been buying design firms. Deloitte and Accenture have, between them, acquired close to fifteen agencies in the last couple of years.⁵
- + The Stanford D school opens a creativity gym to teach white collar workers creativity skills.⁶
- + According to an article in *The Walrus*, Gen Z may be losing curiosity and patience because there has been so much technological advancement, they do not need to figure things out independently.⁷
- + *Harvard Business Review* suggests that “the future of human work is imagination, creativity, and strategy”.⁸
- + Futurist Josh Catone claims that the future depends on humanity’s ability to master creativity.⁹
- + According to Philippe Destatte from the Institut Destree, the intelligence revolution will have increased focus on developing creativity, critical thinking, human relations, philosophy, entrepreneurship, art, self-employment, social harmony, ethics, and values.¹⁰



IN 2030 THIS COULD MEAN:

- + New types of educational programs could emerge that include art and design as mandatory curriculum.
- + Everyone may create and maintain an online portfolio to demonstrate their creativity.
- + Instead of ping pong tables, employers could offer painting and drawing classes for their employees.
- + The art and design community may be frustrated with the dilution of their specialized knowledge and skills.

CONTEXT OF THE TREND:



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2. Landry, L. (2017). The Importance of Creativity in Business. Retrieved January 1, 2019, from <https://www.northeastern.edu/graduate/blog/creativity-importance-in-business/>
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E D U C A T I O N
R E I M A G I N E D

WEAK SIGNALS	EMERGING	MATURE
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Unlimited access to free information online is shifting learning from memorization to learning how to learn, problem solving, resilience, and flexibility. New educational formats, such as self-directed learning, are emerging and increasingly in demand to help prepare children for continuous change.

Work is changing, driving demand for learning how to learn instead of memorizing information, paving the way for new models of education for K-12 learners.

POTENTIAL IMPLICATIONS FOR CANADA’S LABOUR MARKET:

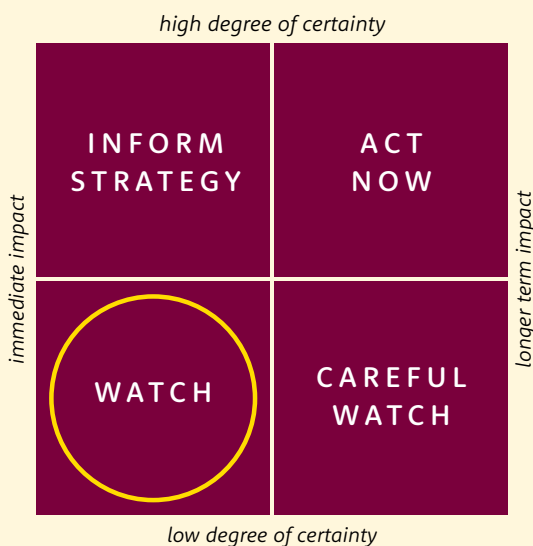
- + Demand may increase for educational programs and services offered outside of the formal school system to address specialized educational needs and interests.

PRESENT DAY STUDIES + PREDICTIONS:

- + The Natural Start Alliance says that the number of “nature-based preschools” has grown at least 500% since 2012.¹
- + According to Statistics Canada, 428,625 students were enrolled in French immersion programs across Canada, up 4.6% compared with the 2014/2015 school year, following a trend of similar annual increases since 2011/2012.²

SAMPLE EVIDENCE OF CHANGE:

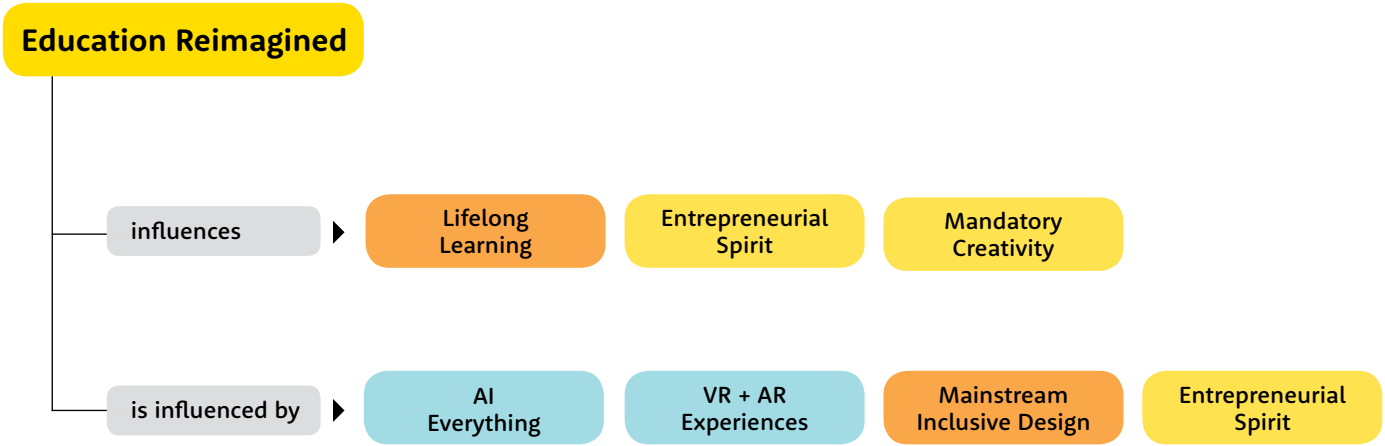
- + There are 361 private alternative schools in Canada, according to OurKids.net.³
- + Amy Harrington, an education activist states that demand for alternative schools is increasing.^{4,5}
- + According to an article published in Perspectives on Psychological Science, self-directed learning helps us optimize the educational experience, with focused effort on useful information that is not already possessed and helps to encode information and retain it over time.⁶
- + The Toronto Sun reports that new education models are being explored for K-12 schools in Canada such as Charter Schools.⁷
- + A number of recent studies have pointed to curiosity, critical thinking, communication, collaboration, and creativity are becoming much needed skills.⁸
- + RMIT School of Education Professor Tricia McLaughlin explained that the future of learning and teaching will involve customization and learning anytime and anywhere.⁹
- + A Masters of Strategic Communication (MSC) program at Westminster College in Utah is online, self-directed, competency-based, and the teachers have become coaches.¹⁰
- + However, the Government of Ontario has committed to focusing on standardized testing.¹¹



IN 2030 THIS COULD MEAN:

- + More Canadians may become entrepreneurs as a result of self-directed learning.
- + Education may become more privatized, as those who can afford specialized skills-based education opt to pay.
- + Every student could learn future studies as a means for preparing for regular shifts in skill demands.
- + Future employees may expect employers to accommodate their individual needs because the education systems they have moved through have done so.

CONTEXT OF THE TREND:



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CANNABIS ECONOMY

WEAK SIGNALS **EMERGING** MATURE



The legalization of cannabis in the fall of 2018 is resulting in the growth of an entirely new industry with new businesses and job opportunities emerging to serve the demand across the country. This demand is expected to exponentially increase with the sale of edibles and innovative new products.

Canada becomes second nation in the world to legalize marijuana, creating immense new market opportunities.

POTENTIAL IMPLICATIONS FOR CANADA'S LABOUR MARKET:

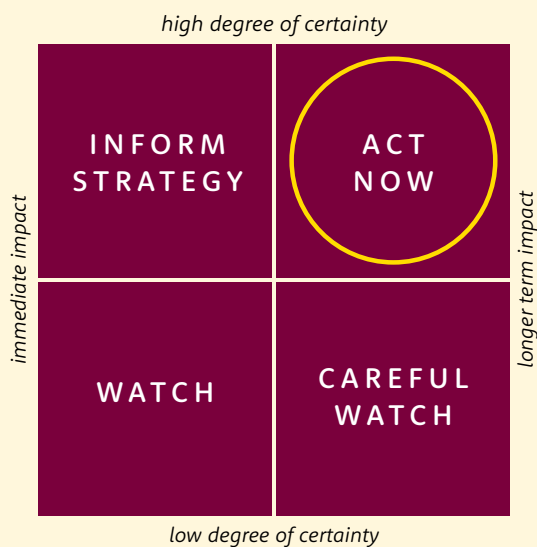
- + This new industry could have extensive opportunities for growth—retail, product development, and healthcare.
- + Large companies may continue to invest in R&D to develop new cannabis product offerings.
- + Farmers may abandon traditional lower-profit farming, leaving Canada with gaps in food supply chain.
- + Employers may create new policies to address greater cannabis use by employees.

PRESENT DAY STUDIES + PREDICTIONS:

- + Deloitte forecasts that “smokable” weed will be a \$5 billion market in Canada, while related products and services, including beverages, edibles, and vapes, will be worth up to \$22 billion.¹
- + According to Statistics Canada, 4.9 million Canadians used cannabis and consumed more than 20 grams of marijuana per person in 2017.²

SAMPLE EVIDENCE OF CHANGE:

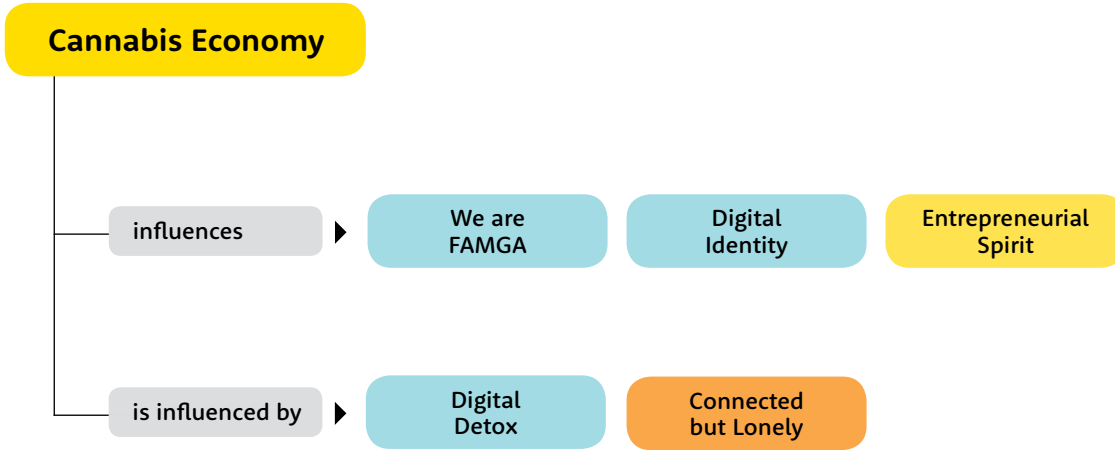
- + \$81 million in federal funding can be accessed by provinces and territories over the next five years for law enforcement training to help with the transition to cannabis legalization.³
- + According to US law, legal cannabis use can still result in being banned at the US border.⁴
- + The Canadian Press reports that Molson entered into a joint venture to develop cannabis infused beverages.⁵
- + According to Indeed.com, job openings in the cannabis industry have tripled in the last year and expected to spike even more as edibles become legal.⁶
- + Statistics Canada finds that residents of Halifax use the most cannabis in Canada based on sewer water testing.⁷
- + National Access Cannabis Corporation, the country’s largest private marijuana retailer with 17 stores, has a team of five people watching 24/7 for new inventory from Alberta’s provincial regulator, which controls wholesale pot distribution.⁸
- + The Canadian government lists 27 health warning messages associated with cannabis use on the official website.⁹



IN 2030 THIS COULD MEAN:

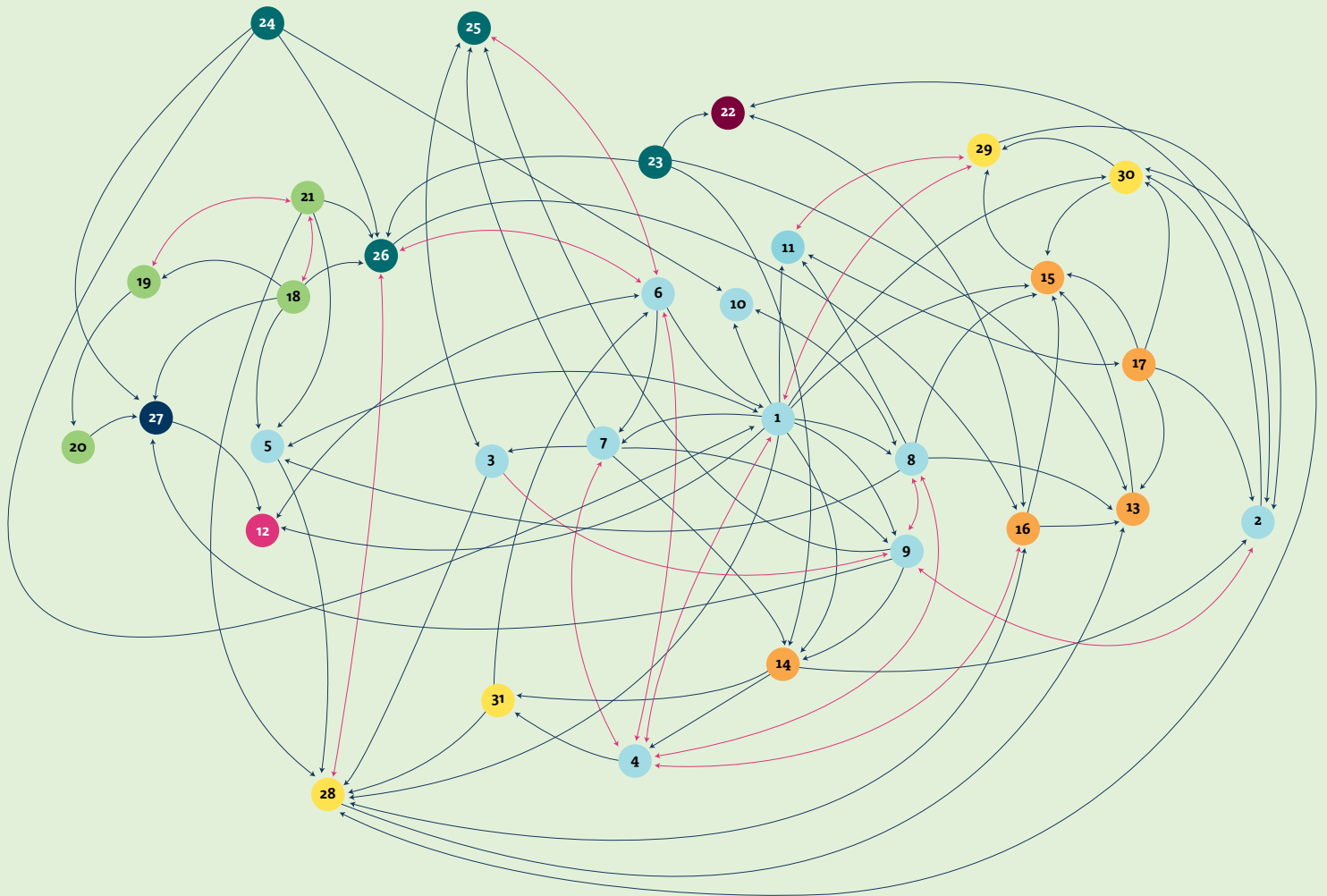
- + Over time, the negative connotations of cannabis use could diminish resulting in a large segment of entertainment and retail spaces dedicated to cannabis-related products and services.
- + Individuals may have an entire career in the cannabis industry and target their learning to meet the demands for innovation in the sector.
- + Public health campaigns may emerge to address concerns about smoking among youth.

CONTEXT OF THE TREND:



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SUMMARY + NEXT STEPS



- | | | | |
|------------------------|-----------------------------|-------------------------------------|-----------------------------|
| 1. AI Everything | 9. Technological Fear | 17. Mainstream Inclusive Design | 25. Personal Data Ownership |
| 2. VR + AR Experiences | 10. Rights Of AI | 18. Resource Scarcity | 26. Decline Of Capitalism |
| 3. Blockchain | 11. Creative AI | 19. Wildfires, Flooding + Mudslides | 27. International Tensions |
| 4. Digital Detox | 12. Tech Talent Immigration | 20. Climate Refugees | 28. Entrepreneurial Spirit |
| 5. 3D Printing | 13. Working Retirement | 21. Alternative Energy | 29. Mandatory Creativity |
| 6. We are FAMGA | 14. Connected but Lonely | 22. Suburban Boom | 30. Education Reimagined |
| 7. Digital Identity | 15. Lifelong Learning | 23. Disappearing Middle Class | 31. Cannabis Economy |
| 8. Humans, Augmented | 16. Work + Life Integration | 24. Rebalancing Gender Equality | |

While there is a tendency to focus attention on one specific trend, this report paints a complex picture of a range of trends currently impacting Canada's labour market. To this end, this report shares 31 changes underway that relate to technological change, globalization, demographic change, environmental sustainability, urbanization, increasing inequality, and political uncertainty.

As articulated throughout this report, these trends do not exist in isolation. The systems diagram above presents the connection points between trends, illustrating related trends (blue arrows), as well as counter trends (pink arrows).

This report draws attention to multiple, intersecting drivers of change with the potential to impact Canada's labour market. While it is not possible to predict the future of any of these trends, some are more uncertain than others. As the diagram on the previous page illustrates, not all trends pull in the same direction, and several have counter trends complicating their trajectory.

The purpose of this report is to provoke new thinking about the range of changes impacting Canada's labour market, in order to facilitate imaginative thinking. As governments, employers, and education institutions invest in preparing Canadians for the future, it will be critical to consider emerging trends and weak signals alongside more mature trends, and to monitor how these trends interact, which will in turn shape future skills demand.

NEXT STEPS

The information presented in this report will form the basis of the next phase of research, which will involve workshops held in six Canadian locations throughout the spring of 2019. At these workshops, participants will be asked to provide a rating of how select occupations will change in the next 10-15 years while taking these trends into consideration. This data will be used to project broader impacts across the labour market. Based on these workshops, a preliminary workshops insights report will be shared in summer 2019, followed by the report outlining final data analysis in early 2020.

Turn and Face the Strange is the BII+E's first project using strategic foresight to explore future focused topics impacting Canada's innovation economy. We look forward to working with others to build upon these ideas and explore how strategic foresight can be applied to other topics.