Deloitte.

Age of disruption

Are Canadian firms prepared?

Deloitte Future of Canada series

EXECUTIVE SUMMARY

Disruption is coming – and Canadian firms are not prepared

The way Canadians live and work is about to change profoundly. Rapid advances in technology are poised to disrupt many of the sectors that anchor Canada's economy. The impact will be felt across the country – and Canadian businesses aren't prepared for it.

Advanced technologies are driving the disruptive innovations that will bring significant and permanent change to Canada's business landscape. In this report, we've focused on five technologies we believe have considerable disruptive potential: artificial intelligence, advanced robotics, networks, advanced manufacturing and collaborative connected platforms. Whether profound change comes from these technologies, others, or some combination that has yet to be conceived, the incredible disruptive potential of these five will illustrate the importance of being prepared.

Our study

For over a year, Deloitte studied the Canadian economy to better understand whether Canadian companies have what it takes to withstand significant technology-driven disruption. We also surveyed 700 business leaders across Canada to gain their insights into the issue.

We evaluated each firm's performance in four areas we believe to be vitally important to disruption preparedness:

- **Awareness:** understanding changing technologies, the accelerating pace of change, and the potential for technology-driven disruption in the firm's industry and business environment
- **Organizational culture:** the extent to which a firm promotes, encourages and provides incentives for innovative behaviours and practices
- **Organizational agility:** the ability to rapidly redeploy systems, assets and people to address external opportunities or threats
- **Effective resources:** the technology, human capital and financial assets that firms can use to enable change

We feared that Canada's businesses were ill-prepared for the disruption challenges to come. Unfortunately, we were right.

The bitter truth about Canada's disruption preparedness

The results of our research are startling:

- We categorized only 13% of firms as **highly prepared**, excelling in all four key areas of preparedness
- We considered 23% of firms to be **single-minded**, taking action in one area but not prepared overall
- We called 29% of firms **tentative**, organizations that aren't wholly unprepared but are struggling in their efforts
- We deemed 35% of firms – more than one in three – wholly **unprepared** and struggling across all four areas of preparedness

To improve preparedness, look to Canada's best-prepared

All is not lost, however. By understanding what sets Canada's highly prepared firms apart from their peers, we can identify how the country's numerous, poorly prepared businesses can change.

The highly prepared firms in our study all excel in the key preparedness areas: awareness, culture, agility and resources. Yet we also found that these same organizations exhibit attitudes and behaviours of *highly productive* companies, as identified in our previous studies on Canadian productivity. Specifically, highly prepared firms:

- Remain committed to research and development investment, and more than half of them plan to boost R&D spending over the next five years.
- Are more likely than their peers to focus on national or international markets, which brings them into contact with new ideas and approaches and gives them a different perspective on how to create and sustain success.
- Were almost 25% more likely than unprepared firms to report revenue growth over the past five years.

The implication? Investments that can improve a company's productivity today can enhance its preparedness for the wave of technology-driven disruption tomorrow.

Preparing for disruption: Recommendations for Canadian companies

Based on our research, we believe Canadian companies can take concrete steps to dramatically improve their capacity to anticipate, respond to and capitalize on the disruptive forces heading our way.

- **Cultivate awareness:** Fostering awareness of the forces that have the potential to disrupt a business or industry better positions a firm to take action today to prepare for disruption's impact tomorrow.
- **Build the right culture for preparedness:** Developing a resilient, innovative organizational culture can help companies withstand disruption in the future, and it also offers important benefits today.
- **Foster organizational agility:** Embracing new ways of working and making decisions can help firms avoid becoming mired in the bureaucracy that can bring change to a screeching halt.
- **Develop effective resources:** Investing in advanced technologies and using resources effectively can increase companies' resilience in the face of change. Acquiring and deploying the best people, technology and financial resources can help firms become more competitive as they prepare for future disruption.

Key recommendations for government and academia

While it's very difficult for governments – and academic institutions – to directly influence the actions taken by Canadian businesses, at Deloitte we believe that both can take steps to support firms in their preparedness journey. Some key examples of our recommendations are:

- **Evolve education at all levels.** Governments must use their funding and regulatory levers to encourage a shift in how Canada's students are educated at the elementary, secondary and post-secondary levels, embracing new education practices, models and partnerships.

- **Alter protectionist regulations in Canada's visa regime.** The government must review its visa processes to ensure our companies can compete with their worldwide peers for the best global talent. Improving the speed and efficiency of the application process is a start, but governments must also resist the tendency to establish protectionist policies that make it more difficult to work in Canada than in many other countries.

- **Redesign post-secondary institutions into vibrant, diverse learning zones.** Canada's post-secondary education system was built at a time when only a small proportion of people attended university. At that time, highly specialized learning, housed in silos and based on static curricula, proved a successful format for producing successful students. However, the past 50 years have seen unparalleled change, and our education system must adapt.

- **Invest strategically in building true business ecosystems.** Governments must work to deepen the impact of existing clusters of businesses and help them transform into full-fledged ecosystems that support and promote business. While having a cluster in every major Canadian city is an excellent goal, what's needed now is a transition from clusters to world-class business ecosystems.

The time for action is now

Canadian firms face serious, significant challenges in their preparedness for disruption. But they also face incredible opportunities to improve their productivity and to become better prepared for what's to come. Our research has shown that the best-prepared companies share characteristics that other organizations can adapt for themselves. If Canadian businesses, together with governments and academia, take concrete action today, we know that the results will yield stronger, more profitable companies that are able to withstand – and thrive within – a storm of change.

CONTENTS

PREPARING FOR DISRUPTION

The way Canadians live and work is about to go through a profound change. Rapid advances in key technologies are poised to disrupt many of the industries that anchor our economy, and the impact will be felt across the country. Yet the majority of Canadian businesses aren't prepared for the coming age of disruption – and many of the unprepared won't survive.

For over a year, Deloitte has studied the Canadian economy and surveyed 700 business leaders across the country to better understand whether our companies are prepared to withstand the disruptive power of new technologies and to thrive in the aftermath.

We feared that firms were ill-prepared for the challenges of disruption. Our prior research into this country's stubborn productivity challenges showed that Canadian firms are more risk-averse than those in the United States, that they struggle to maintain a high rate of growth and that many have little to no idea that they're investing less than their peers on technology and R&D.[1] After evaluating firms' performance in four key areas associated with disruption preparedness – awareness, culture, organizational agility and resources – our fears were confirmed. Very few Canadian organizations are ready to withstand the disruption that is rushing towards them.

However, our research also uncovered traits shared by companies that are well-prepared to adapt and evolve in the face of industry disruption. These highly prepared firms achieve rapid revenue growth, sustain innovation successfully and make significant investments in R&D – all indicators of very productive businesses.

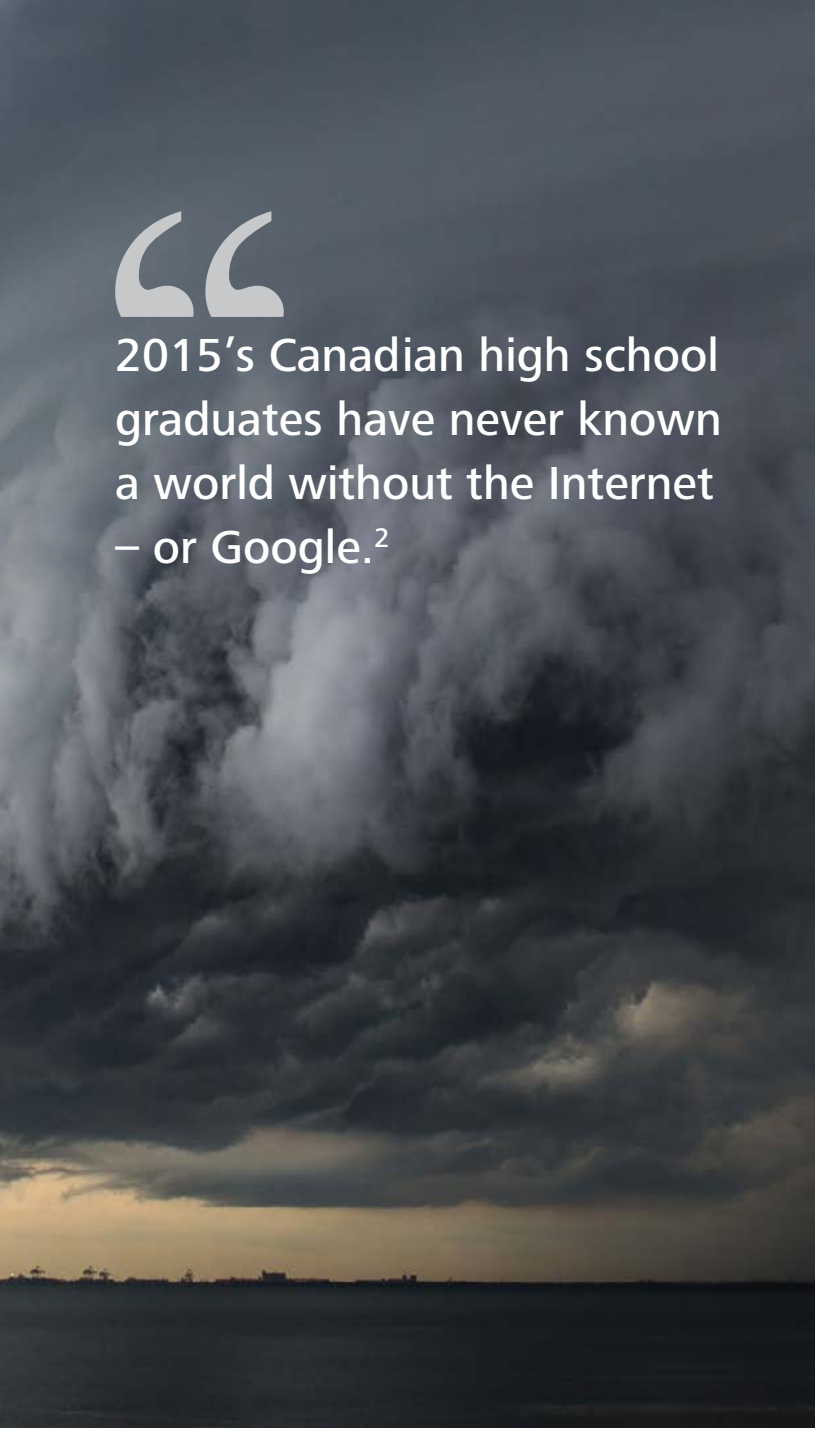
The implication is clear: Companies that invest in productivity improvements today will be far better prepared for the disruption to come. Those that don't may find themselves quickly overwhelmed by the coming change.

We urge businesses, governments and academic institutions to take action to improve their disruption preparedness and position Canada to seize the opportunities to come. Businesses in particular must improve their awareness of technology and disruption. To thrive, they will need to build a strong culture that engages staff and embraces bold leadership; they also need to decentralize accountability to become more agile; and finally, they need to invest in the right technology and people.

The time to act is now. The next wave of disruption is already happening and will accelerate over time.

DISRUPTION IS UNAVOIDABLE

Technology has long been a disruptive force, radically changing the nature of work and society. In the 19th century, the Industrial Revolution altered our world profoundly and permanently. Electrification, the automobile and mass production, just to name a few massive technological changes, reshaped the 20th century. Today, powerful digital technologies and ubiquitous connectivity have created a knowledge economy that promises to spark the greatest changes in human history.



> 2015's Canadian high school graduates have never known a world without the Internet – or Google.[2]

Each period of technology-driven disruption has seen business models go extinct and be replaced by ones never before considered. Some companies couldn't evolve and went out of business, while others adapted, seized opportunities and continued to thrive by taking advantage of the new environment. What's different today is that technology is advancing at a pace we have *never* experienced before in human history – and the pace of change will only increase.

Consider this: In 20 years, we've gone from early electronic mail, hand-coded HTML pages and PCs running DOS to social media, the mobile web and incredibly powerful smartphones, tablets and wearables. How we interact with each other, and our world, has evolved in ways we couldn't have imagined a few years go. These same technologies are changing the nature of work as well, forcing companies and workers alike to rethink where, when and how work gets done.

A vast range of ever-improving advanced technologies are driving the disruptive innovation that will soon change our world and define the century to come. In this report, *advanced technologies* are defined as emerging technologies that may enable new ways of doing business that result in more economical consumer trade-offs. *Disruptive innovation*, a term coined by Harvard professor Clayton Christensen, describes "a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors."[3]

The coming age of disruption will forever change the nature of business, work and society in Canada. We're already seeing the first signs of the change to come. Technology is lowering barriers to entry, increasing efficiency and cost savings, and even launching new industries.[4] It has given rise to a "freelance economy" of independent workers, collaboration without boundaries – and technological unemployment.[5]

Disruption will hit every business

Disruptive innovation has the potential to impact each and every business, no matter its size, sector or location. No business is immune. The development and application of advanced technology is accelerating at such an exponential rate that people have difficultly coming to grips with the pace of change. Among the key factors propelling these advanced technologies is the exponential growth in computer processing power – and the staggering drop in the price of computer chips. In 1992, you'd pay $222 for a million transistors; today you'd pay $0.06 (see Figure 1).[6]

To better put this in perspective, Apple sold 25 times more CPU transistors during the iPhone 6 launch weekend (September 19–21, 2014) than existed in all the PCs on Earth in 1995.[7]

Advances in technology have also increased the rate of business growth – and business failure. Since 2003, a new company has reached a $1-billion valuation every three months in the United States.[8] Yet the time it takes to reach that valuation has shrunk considerably: Shopify took nine years; Slack took one (see Figure 2).[9, 10]

If businesses are growing faster, they're also exiting much more quickly. In 1960, the average lifespan of an S&P 500 company was around 56 years; by 2014, it had dropped to nearly 15 years (see Figure 3). Some even suggest that in just 10 years, 40% – nearly half – of today's Fortune 500 companies will no longer exist.[11]

This dramatic increase in the pace of change has not gone unnoticed by Canadian firms. In fact, nearly 60% of respondents to our survey think the pace of change will increase over the next five to 10 years (see Figure 4). As it does, the likelihood of technology-driven disruption will grow too – and Canada's economic well-being will depend, more than ever, on how well our companies are prepared for what's to come. However, the question remains: If the majority of firms admit that the pace of change is increasing, then why are so few doing anything to prepare for the new economy in which they'll find themselves?

FIGURE 1

Cost of one million transistors from 1992 to 2012[12]

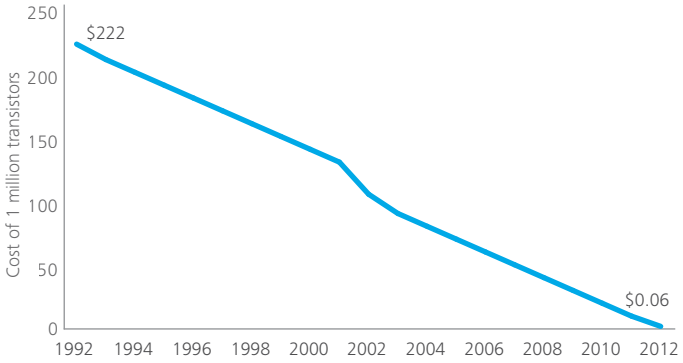


FIGURE 2

Number of years to reach $1-billion valuation from date founded[13]

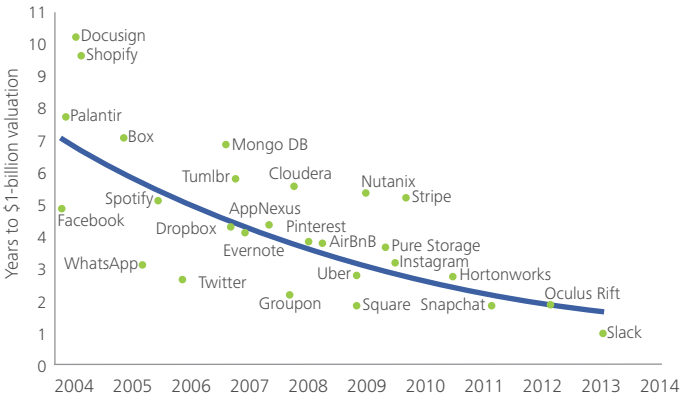


FIGURE 3

Average company lifespan on the S&P Index from 1960 to 2014[14]

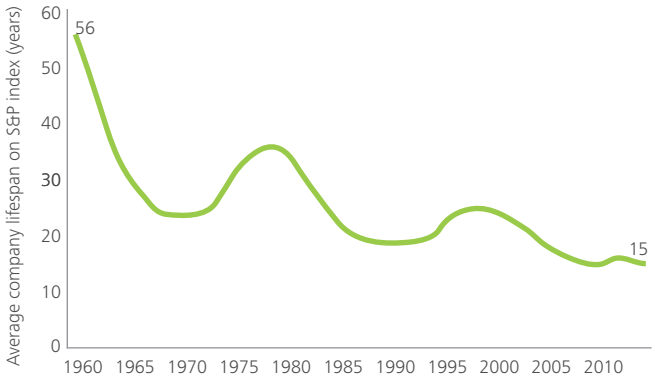
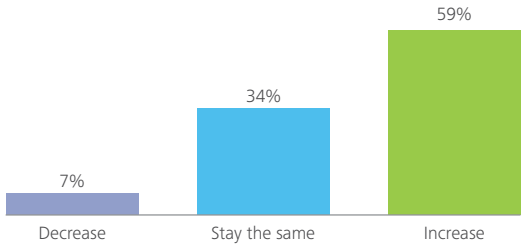


FIGURE 4

Thinking about things such as firm turnover, economic growth and new business models, do you think the pace of change in your industry will increase, decrease or stay the same when compared to the past five to 10 years?



THE FIVE ADVANCED TECHNOLOGIES DRIVING DISRUPTIVE INNOVATION

Advanced technologies are driving the disruptive innovations that will bring significant and permanent change to Canada's business landscape. In this report, we've focused on five technologies we believe have considerable disruptive potential: advanced robotics, artificial intelligence, networks, advanced manufacturing and collaborative connected platforms. Whether profound change comes from these five technologies, others, or some combination that has yet to be conceived, the incredible disruptive potential of these five will illustrate the importance of preparedness.

ADVANCED ROBOTICS

Robots started to change the industrialized world more than a half century ago. Since then, they've transformed how businesses manufacture goods large and small, and replaced the need for human labour in a vast range of applications, from fulfilling warehouse orders to maintaining nuclear reactors.[15]

And industrial robots are only part of the story. Personal and domestic robots are now changing our lives at home. Robotic vacuum cleaners learn their environment, clean rooms and recharge themselves without the need for human intervention, completely automating a chore that people once had to do themselves.[16]

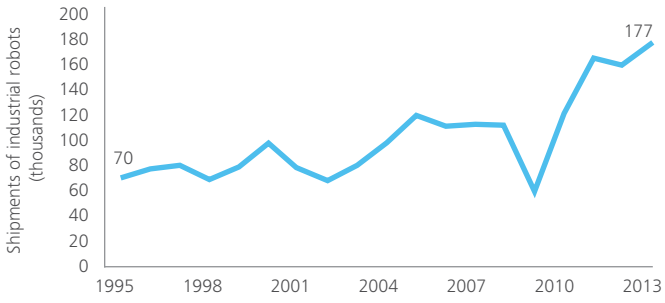
Soon, robots will enable us to surpass our ordinary capabilities. Personal drones that cost a few hundred dollars now allow people to take photographs and shoot videos that once required hiring a crane, helicopter or plane.[17] The impact of these robot drones on sectors like agriculture, energy and security is only starting to be discovered and understood.

Why robotics will disrupt businesses

The robotics industry is growing fast. Annual shipments of industrial robots have nearly tripled in 20 years, from just over 70,000 units in 1995 to nearly 180,000 units in 2013 (see Figure 5). Also, four million personal and domestic service robots were shipped in 2013, a 28% increase over 2012.[18] As robots become more useful and less expensive, these numbers will increase and robots will permeate more and more aspects of business and life.

FIGURE 5

Estimated worldwide annual shipments of industrial robots from 1995 to 2013[19]



How robotics will disrupt businesses

The convergence of robotics with artificial intelligence, connected devices, cloud computing, biometrics and other technologies is creating the potential for large-scale, exponential disruption. Today, robots perform many increasingly complex tasks 24/7 without the need for breaks, holidays, insurance or contract negotiations. For example, the industrial robot Baxter is able to learn tasks by mimicking humans and can be retrained across a variety of jobs. Baxter can be used for loading, sorting and handling materials at a cost of only US$4.32 an hour.[20, 21] Robots enable companies to lower labour costs, achieve better productivity and deliver consistent, superior quality.[22] As robots evolve from executors of repetitive tasks to adaptable artificial intelligence systems, we will see them take on many roles and duties once believed to be beyond them.

For Canadian businesses, the use of robots can already open up new opportunities to improve efficiency and achieve cost savings. As robots become more commonplace, it's clear that businesses and governments will need to reconsider their traditional thinking about Canada's labour force and the skills it will require in the future.

DISRUPTOR

Robotics

Clearpath Robotics specializes in automating the dirtiest and dullest jobs by creating robots to do them instead.

- In partnership with Thalmic Labs, Clearpath has created a robot that is entirely controlled by arm gestures using Thalmic's Myo Gesture Control armband.[23]
- The robot is a field-deployed all-terrain vehicle that can traverse rough terrain.

LINK 1 LINK 2

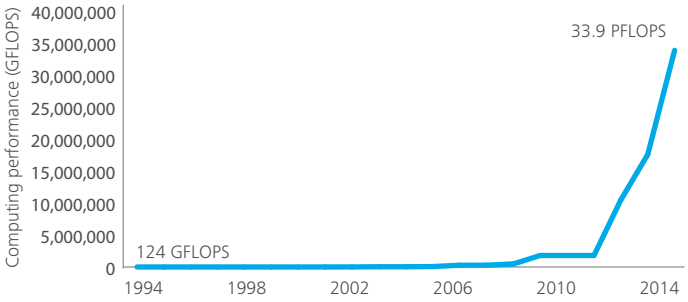
ARTIFICIAL INTELLIGENCE

American computer and cognitive scientist John McCarthy first used the term artificial intelligence (AI) while at MIT in the mid-1950s, defining it as "the science and engineering of making intelligent machines."[24] Since then, AI has evolved into a multidisciplinary field that includes not only computers and robotics but computer science, mathematics, neuroscience, linguistics and psychology.[25]

Thanks to 20 years of dramatic improvements in computer processing power (measured in floating-point operations per second, or FLOPS), machines process much more information far faster than ever before (see Figure 6).[26]

FIGURE 6

Computing power of the most powerful supercomputer[27]



Today, machines can recognize faces and translate speech in real time; as machine learning and natural language processing continue to improve, AI's ability to mimic human behaviour and functions will continue to grow.[28]

Why AI will disrupt businesses

AI capabilities are based on raw computer processing power – and with the price of servers, cloud computing and other computer architecture falling rapidly, AI technology will continue to surge forward.[29]

Between 2010 and 2013, the cost of the servers that comprise Watson, IBM's AI supercomputer, fell by at least 50%.[30] Watson can understand and process human language, and evaluate arguments by parsing through relevant data from hundreds of millions of pages of structured and unstructured content. In 2011, Watson became a champion on the television game show *Jeopardy* by defeating two of the greatest human *Jeopardy* players of all time. Today, the combination of cheaper processing power and a growing developer community is enabling Watson to take on tasks such as diagnosing diseases and writing detailed legal briefs.[31] Machine learning, statistical analysis and natural language processing allow Watson to provide educated, evidence-based answers to anything from complex statistical problems to plain English questions.

How AI will disrupt businesses

Advances in AI have accelerated in the last five years, as a new generation of AI systems has begun to harness the power of cloud computing and crowdsourcing.[32] Modern AI systems are now capable of displacing human workers in professional practices such as accounting, engineering and law, which have traditionally relied on the deep, narrow knowledge of experienced subject-matter experts.[33]

AI systems will provide businesses with the means to become much more efficient and reduce their cost of doing business, as computers perform analytical tasks that once required dozens of workers (e.g., pricing optimization, portfolio optimization and claim predictions) – and they do it faster, more accurately and at a fraction of the price.[34]

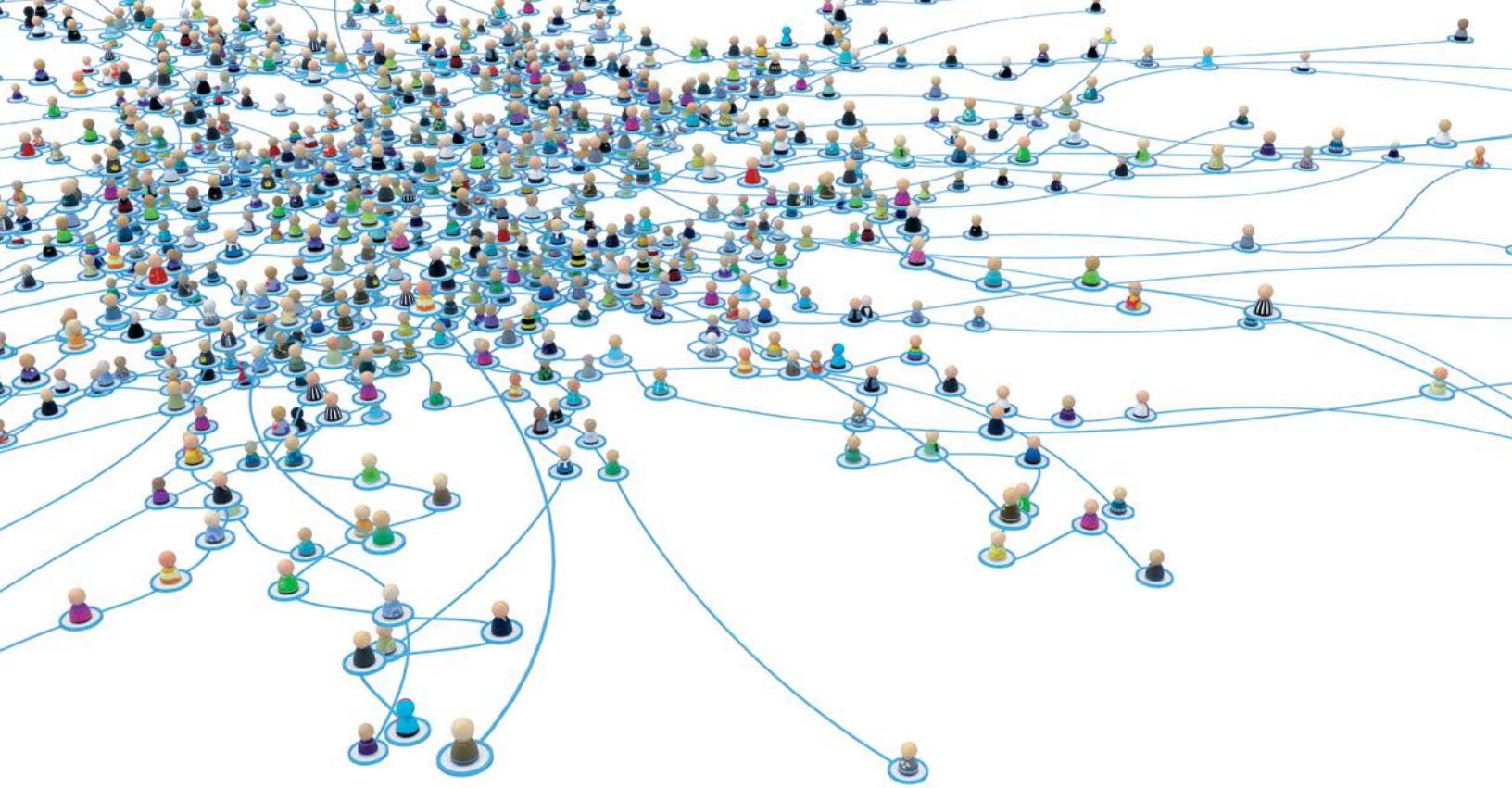
DISRUPTOR

Artificial Intelligence

Through an IBM university challenge giving students cloud-based access to Watson, University of Toronto students developed an app called Ross that acts as a legal assistant.

- The app allows users to ask a plain-English legal question, then returns an answer with case references. The case database is updated in real time and notifies users of new cases that might be relevant to the question asked.[35]

LINK 3 LINK 4 LINK 5



NETWORKS

Some identify the start of modern digital networks as we know them with the establishment of Integrated Services Digital Networks (ISDN) standards in 1986.[36] ISDN enabled voice *and* data to be transmitted simultaneously over traditional copper phone lines, sparking a technological revolution that led to widespread Internet adoption, mobile connectivity, online commerce, social media and more.

DISRUPTOR

Networks and sensors

Physicalytics uses simple plug-and-play devices to track people's smartphones as they pass physical locations.

- The city of Toronto is looking to use Physicalitics' technology to track traffic patterns and optimize flow – a job previously performed by human traffic watchers with clipboards.[37]

LINK 6

The world's digital networks continue to grow in size and capability as the number of connected devices explodes.[38] As more and more servers, personal computers, mobile devices and sensors of all kinds connect to the Internet – and to each other – the Internet of Things (IoT) has become a reality. Our technologies now connect in unexpected and once-unimaginable ways. We can open our front door with our smartphone, control a distant robotic device with sensors attached to our arm, and let our appliances decide when they should run.[39, 40, 41] The power of an IoT network creates incredible opportunities for businesses worldwide, but also new kinds of challenges, as those who remain unconnected will inevitably fall behind.

Why networks will disrupt businesses

Gartner forecasts that the global incremental GDP of the IoT will grow to $1.9 trillion by 2020 (see Figure 7).[42] The IoT is already spurring the development of innovative, life-altering technologies. Biometric sensors embedded into clothing now transmit data to smartphones, enabling us to track vital health information; this same data could be used by doctors or emergency personnel.[43] As more and more everyday items connect, consumers and businesses alike will come to expect more advanced, personalized interactions, and companies will be able to provide products and services that adapt immediately to their customers' needs and preferences.

How networks will disrupt businesses

As millions – if not billions – of devices and sensors connect to the IoT (see Figure 8), the amount of data that exists will grow at an exponential rate.[45] This flood of data can help companies achieve an intimate understanding of their customers and deliver a level of customization never before possible, as well as enhance business-to-business services. This will rapidly shift customers' expectations around responsiveness and tailored offerings.

With more data than ever before being created, shared, analyzed and stored, concerns around data security and privacy will rise. Companies will be under growing pressure to ensure they use customer data responsibly, and the implications will be felt across industries. The data-security sector will grow in both size and importance in the years to come as businesses look at how to exploit digital networks and the IoT.

FIGURE 7

Forecasted global incremental GDP of the Internet of Things[44]

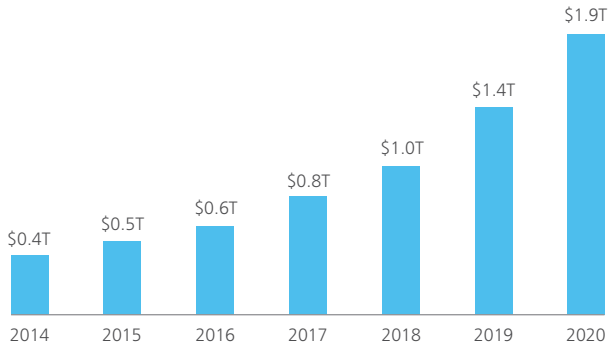
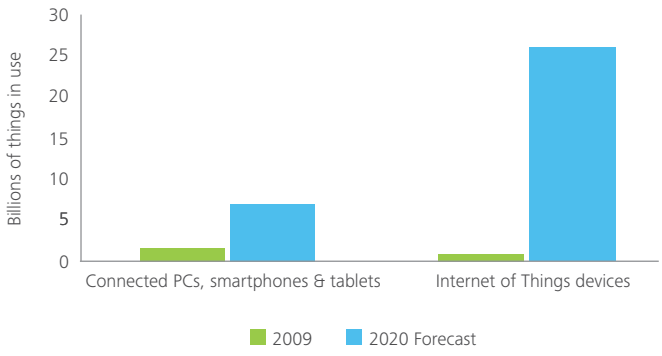
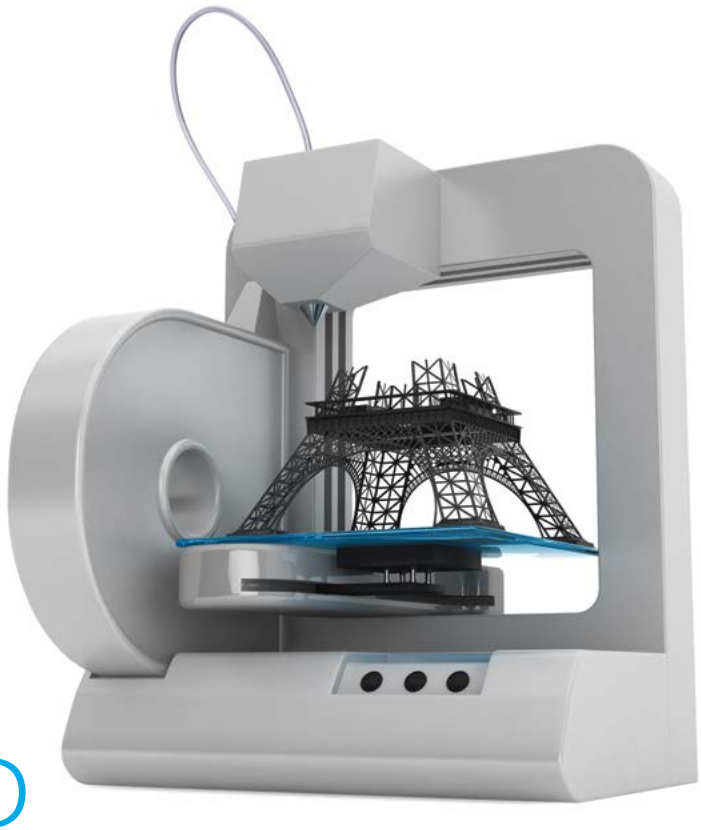


FIGURE 8

Billions of devices connected to the Internet of Things in 2009 and 2020 forecast[46]





ADVANCED MANUFACTURING

Technological advances have always had dramatic impacts in the manufacturing sector. Each new leap – from steam to electrical power or from manual to robotic assembly – has driven great progress in manufacturing productivity and efficiency. What hasn't changed in over a century, however, is the industry's reliance on the mass-production model.[47] Those days are now numbered, as advanced technologies and processes forever alter how we manufacture goods.

3D printers, nanomaterials, biomaterials, rapid prototyping, custom product creation – these advanced technologies and approaches will define 21st-century manufacturing. The days of mass-produced, one-size-fits-all goods are rapidly drawing to a close.[48] Even today, consumers can have running shoes and other apparel quickly made-to-order at relatively low cost using a 3D printer and precise, personal measurements.[49] The advent of "total customization" will reshape the consumer goods industry throughout the supply chain.[50] As fabrication becomes decentralized, it will reduce companies' need for factories, warehouses and shipping agents.

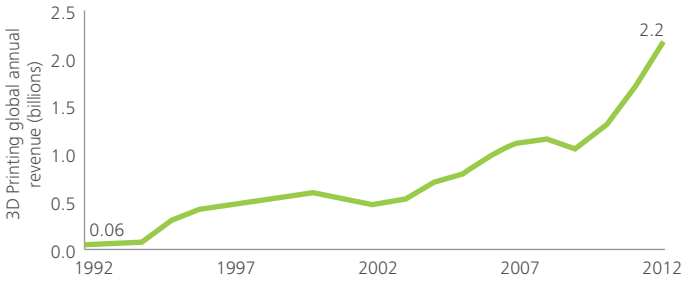
Advanced manufacturing is not only making one-off, bespoke production viable, it's enabling companies to make, test and modify new products at a speed and cost never before possible. Some analysts predict that the Global Rapid Prototyping Equipment market will grow at a compound annual growth rate of 26% from 2014 to 2019.[51] This rapid prototyping is opening up traditional industries, such as auto manufacturing and tool and die making, to new entrants as the time and expense needed to design, produce and deliver goods drop precipitously.

Why advanced manufacturing will disrupt businesses

To understand the disruptive potential of advanced manufacturing technologies, one need only look at the rise of 3D printers. The number of 3D printers in use is expected to double every year, from almost 62,000 in 2013 to nearly 2.5 million in 2018.[52] Annual global revenues from the sale of industrial 3D printers grew from around $1 billion in 2006 to almost $2.5 billion in 2012 (see Figure 9).[53] In addition, a key concern for Canadian manufacturers should be that 3D printer adoption is growing faster in China and Asia/Pacific countries than it is in North America and Europe.[54]

FIGURE 9

Global industrial 3D printer sales from 1992 to 2012[55]



How advanced manufacturing will disrupt businesses

As advanced manufacturing materials and processes become more commonplace and less expensive, they will vastly increase customer choice and drive further growth in the market for customized goods. Nike and New Balance plan to introduce to the general public the technology used to provide elite athletes with race shoes tailored to their exact, personal specifications.[56] As personal 3D printers become more affordable and capable of printing with increasingly diverse materials (e.g., metal alloys, plastics and even sugars), they could enable a completely new shopping experience. It's possible that sometime in the future consumers will buy licences or plans for consumer goods and simply print them at home.[57]

For businesses, on-demand manufacturing with 3D printers will reduce or eliminate the need to maintain large amounts of stock – a hardware store, for example, could simply fabricate a tool as needed rather than store a dozen of them in the back room.[58] As new advanced manufacturing technologies go mainstream, their impact will be felt all along supply chains and across industries, changing decades of traditional business practices.

COLLABORATIVE CONNECTED PLATFORMS

The Internet has revolutionized how we communicate and interact with each other. Today, we take for granted our ability to connect with people and participate in activities thousands of kilometers away. Increased connectivity and Internet capacity have made crowdsourcing, crowdfunding and cloud computing possible, giving people and organizations alike access to skills, knowledge, funds and resources in ways that were never before possible.[59]

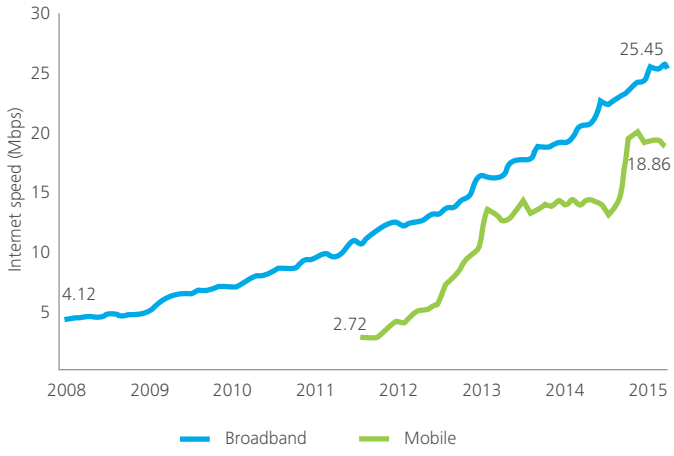
For businesses, the advent of collaborative connected platforms is providing the opportunity to tap into expertise and analytical ability outside their organizations – and in some cases transcend industries and areas of expertise. More and more companies are using crowdsourcing to find solutions to complex business problems more quickly and cheaply than using traditional methods.[60] Workers themselves are discovering that these platforms enable more of them to work as independent contractors rather than remain with a single company for years.[61]

Why collaborative connected platforms will disrupt businesses

Thanks to the increasing speed and capacity of the Internet (see Figure 10), collaborative connected platforms are growing rapidly: In 2010, Kickstarter raised $2 million per month in pledges; by 2014, it was raising $44 million per month.[62] As Internet capacity continues to increase and the number of people connected to it continues to grow, companies will use these platforms more and more.

FIGURE 10

Increasing average speed of broadband and mobile Internet in Canada[63]



TopCoder, a platform that brings together more than 750,000 members to grapple with complex data-coding challenges, already organizes contests in computer programming, and together with NASA has held multiple contests to enhance asteroid tracking, deep-space networking and astronaut health.[64] General Electric engaged Kaggle, the world's largest community of data scientists, to predict runway and gate arrival times for domestic flights in the United States using multi-source flight and weather data.[65] GE offered a prize of US$250,000, and over four months it received 3,067 entries. The winners produced a 40% accuracy improvement over industry standards – equivalent to saving five minutes at the gate per flight, or an annual savings of US$6.2 million for a mid-sized airline.

How collaborative connected platforms will disrupt businesses

Increased connectivity has helped businesses in many sectors achieve superior results. It enables companies to easily collaborate with colleagues around the world – as well as with a new cadre of independent workers that choose who they work with. The sheer number of people a firm can now inexpensively access is staggering. Canadian companies that don't seize the opportunity to use these new collaborative platforms to access resources and talent risk being outrun by competitors that do. This will require a rethinking of how work is done and of the workplace needed to support this new way of working.

DISRUPTOR

Connectivity

Chaordix is a crowdsourcing tool that allows companies to engage employees and external stakeholders in a variety of innovation goals.

- The goal is not to simply generate a long list of ideas but to facilitate the growth, maturation and realization of innovative solutions by involving the right people in the right steps of the process.
- LEGO recently launched LEGO Ideas using the Chaordix platform, which allows customers to submit ideas for new LEGO products, gather support for them, have them reviewed by LEGO, and then follow them into production.[66]

LINK 7 LINK 8

LIVING LONGER, HEALTHIER LIVES **THANKS TO TECHNOLOGY**

One area deeply impacted by rapid advances in technology is healthcare. Canadians' average life expectancy has risen every year for two decades, from 77 years in 1990 to 82 years in 2012, and it continues to rise.[67] Technology, especially biotechnology, has been a key factor in improving – and saving – Canadians' lives. Biotech has given us MRI and CT scanning machines, the Human Genome Project and rapid advances in how we understand and treat thousands of diseases.

Technology is quickly changing how the medical profession diagnoses and treats illnesses. DNA mapping, AI systems and data analytics are now being brought to bear in diagnosis. Doctors at the Memorial Sloan Kettering Cancer Center in New York, for example, are teaching IBM's Watson AI system how to diagnose patients based on medical analysis.[68]

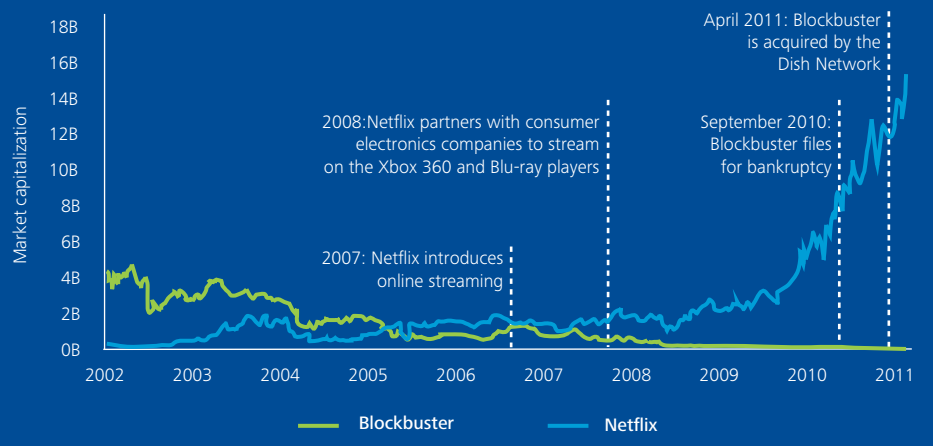
Connected, collaborative platforms combined with massive amounts of data are enabling doctors around the world to work together and combine their expertise to innovate at a pace that would have been impossible just a few years ago. This collaboration, coupled with manufacturing advances, has been responsible for amazing progress in human tissue engineering. 3D printing of working human organs is a rapidly expanding field. Having begun with simple organs like the trachea, researchers are now moving on to more complex structures like the kidney.[69]

A BUSINESS DISRUPTED: BLOCKBUSTER

Blockbuster, once one of the world's largest video-rental chains, found itself outmanoeuvred by nimble new competitors such as Netflix in the rise of digital video streaming. Within a decade, Blockbuster's US$5-billion business fell into bankruptcy and took the traditional video-rental model with it (see Figure 11).[70, 71]

FIGURE 11

Blockbuster and Netflix market capitalization from 2002 to 2011[72, 73]



AN INDUSTRY FACING DISRUPTION: TRAVEL

Travel agencies find their business model under siege thanks to digital technologies. Agencies have watched their business dwindle as online travel services have achieved staggering growth. Between 2003 and 2013, Expedia's revenues grew from $9.8 billion to $39.4 billion (see Figure 12).[74] Over that same period, the number of full-time travel agents in the United States fell by nearly 50% (see Figure 13).[75]

FIGURE 12

Gross annual bookings through Expedia from 2003 to 2013[76]

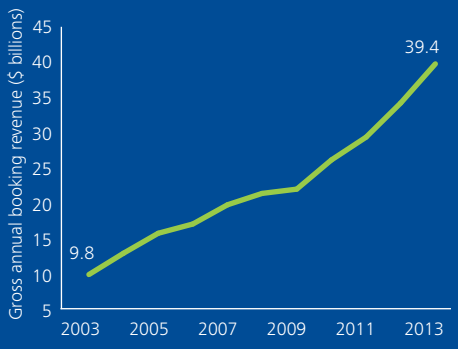
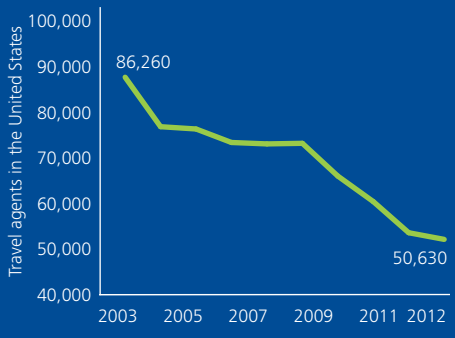


FIGURE 13

Number of full-time travel agents in the U.S. from 2003 to 2012[77]



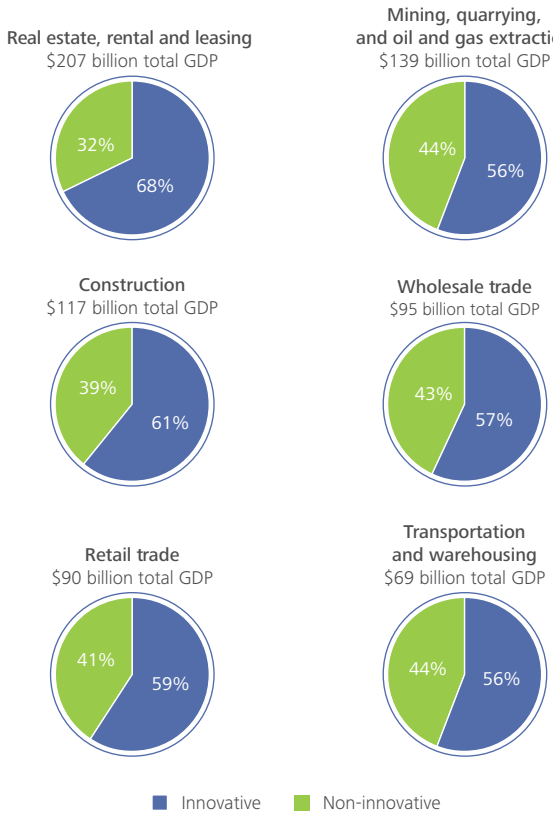
CANADA'S PRODUCTIVITY GAP **LEAVES US OPEN TO DISRUPTION**

Deloitte has been studying Canada's stubborn productivity problem since 2011. Through this research, we have uncovered several important factors that contribute to our lagging productivity, and yet the productivity gap has not improved.

Why does Canada continue to suffer from lower productivity? For one thing, Canadian businesses are more risk averse than those in the United States.[78] While Canada is a leader in high-growth start-up ventures, our businesses fail to maintain their momentum. As a result, we have a much lower proportion of mature, high-growth firms than the United States.[79] We also discovered that one in three Canadian businesses invest less than their sectors' average on innovation and improving productivity – and they don't know it.[80]

FIGURE 14

Six self-described least-innovative Canadian industry sectors in 2010/2012[82]



From our perspective, these three factors make Canada's business landscape ripe for disruption. Our risk-averse, slow-growing, underinvesting businesses will be caught off guard by the rapid changes transforming our world.

Other research paints an equally troubling picture of Canadian companies' ability to withstand change and disruption. According to a Statistics Canada study of innovation among Canadian firms, more than one-third (37%) of them – representing roughly $740 billion of Canada's GDP – describe themselves as non-innovative (see Figure 14).[81] In sectors such as mining and oil and gas, that proportion rises to nearly 50%. These non-innovative firms and sectors will be among the first to feel disruption's sting.

In the same Statistics Canada study, only one-quarter of Canadian firms said their goods or services were unique, with few or no substitutes. This means that most Canadian businesses produce goods or services that could be easily replicated – or superseded – by competitors, and many sectors of our economy are vulnerable to significant upheaval.

The combined impact of non-innovative firms coupled with fewer unique goods or services could be significant regardless of industry. We've already seen this cause upheaval in Canada's manufacturing sector. In Ontario, manufacturing jobs recently hit their lowest point since record-keeping began in 1976.[83] External economic factors have been responsible for some of this change – yet so too has manufacturers' own unwillingness to embrace automation. Today, the survivors are modernizing their plants and equipment in order to become more competitive. As they do so, they require fewer workers – making it clear that the traditional manufacturing model in many sectors is unlikely to return.

AN INDUSTRY FACING DISRUPTION
OIL AND GAS

Recent technology advances have led to North America's shale gas boom. Modern processes that were under research and development in the mid-1970s didn't become widely popular until the late 1990s.[84] In 2000, shale gas supplied 1% of the United States' domestic gas production; today, shale is responsible for 40%. U.S. gas prices have fallen, imports have dropped and the United States is now much more of an energy exporter than it was even a decade ago. The country could become energy independent, at least in terms of natural gas, in the next decade (see Figure 15).[85]

FIGURE 15

U.S. natural gas import and export volumes from 2005 to 2014[86]

CANADA'S DISRUPTION PREPAREDNESS

THE BITTER TRUTH

Are Canadian businesses prepared for the technology-driven disruptions about to hit them and the Canadian economy overall? Unfortunately, our research clearly says no. Most of Canada's businesses are unprepared for what's coming – woefully so, in many cases.

We came to this conclusion by analyzing Canadian organizations using our definition of preparedness. After speaking with business leaders, consulting frameworks from a number of key thinkers and researching successful, sustainably innovative companies, we settled on four key elements of a prepared company: awareness, culture, organizational agility and resources.

Our research and analysis leads us to believe that, in order to be highly prepared, an organization must be *aware* of the disruptors in its industry, possess a flexible *culture* that is willing to react, maintain *agility* to shift people and capital towards the right business endeavours, and invest in effective *resources*, like people and technology, to enable the organization to succeed.

Using this definition of preparedness, we surveyed Canadian organizations and found they fell into four main groups:

- **Highly prepared** firms that are excelling in all four key areas of preparedness
- **Single-minded** firms that are taking action in one area but aren't prepared overall
- **Tentative** firms that aren't wholly unprepared but are struggling with their preparedness efforts
- **Unprepared** firms that are struggling across all four areas of preparedness

In each category, we found firms of every size, from every sector and from every region of the country. This runs counter to conventional wisdom, which holds that a company's size or sector dictates its ability to deal with disruption. This includes the highly prepared companies, which are just as diverse as the others, from the smallest bakery to the largest bank.

The problem is that there aren't many of them. Our research found that very few Canadian companies – a mere 13% – can be considered highly prepared for disruption. We found that 23% are prepared in one key area, but not others. Another 29% are struggling with their preparedness efforts. And finally, 35% of Canadian firms are very poorly prepared (see Figure 16).

The implication is dramatic. More than four out of five Canadian businesses aren't well-prepared for disruption.

FIGURE 16

Canadian firms' level of preparedness for disruption

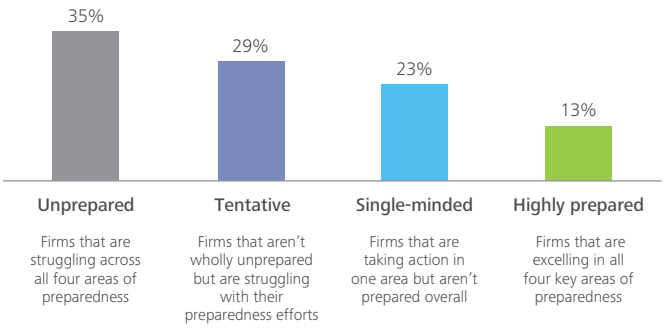
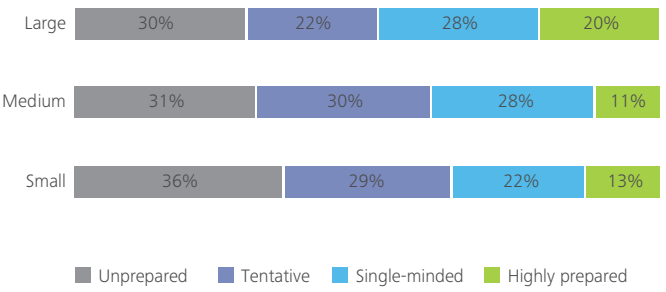


FIGURE 17

Preparedness of Canadian firms by size



Lack of preparedness is a widespread issue

A company's size, age or sector has little bearing on its preparedness, according to our research. Only 20% of the largest firms can be considered highly prepared, which is not dramatically more than the 13% of small and 11% of mid-sized firms that are equally well-prepared (see Figure 17).

Eleven percent of the oldest firms in our survey are highly prepared, with the youngest ones faring only somewhat better at 19%. Preparedness also varies little by sector. No more than 19% of firms in any sector are highly prepared. No matter the measure, Canada has a preparedness problem.

Self-perceptions can be deceiving

We also discovered that some companies suffer from a preparedness "perception gap," much like the gap we observed in our 2013 productivity study. A sizeable 68% of unprepared firms believe themselves to be somewhat or fully prepared. Furthermore, 29% and 48% of tentative and single-minded firms, respectively, believe themselves to be fully prepared as well. Overall, this equates to a stunning 43% of Canadian firms that see themselves as better prepared than they are, based on our definition of preparedness. This subset of unprepared firms is among the most at-risk, since they're resting on their laurels instead of taking much-needed action.

Canada's preparedness: All is not lost

Fortunately, by understanding what sets Canada's highly prepared firms apart from their peers, we can identify ways in which the country's numerous, poorly prepared businesses can change.

The Canadian firms we have dubbed "highly prepared" share several characteristics. They all excel in terms of the four areas we believe greatly impact a company's ability to withstand disruption (awareness, culture, agility and resources). Yet we also discovered that these same firms exhibit attitudes and behaviours of highly productive companies, as we identified in our previous studies into Canadian productivity.

- Highly prepared firms are better able to sustain innovation and embed it into their business DNA. More than four out of five (85%) highly prepared firms report successfully sustaining innovation, compared to only 39% of unprepared firms (see Figure 18).

- Highly prepared firms remain committed to R&D investment. More than half of the highly prepared organizations in our study plan to boost R&D spending over the next five years, compared to only 7% of unprepared ones. (Alarmingly, nearly one in four unprepared firms plan to cut R&D spending over the same period; see Figure 19.)

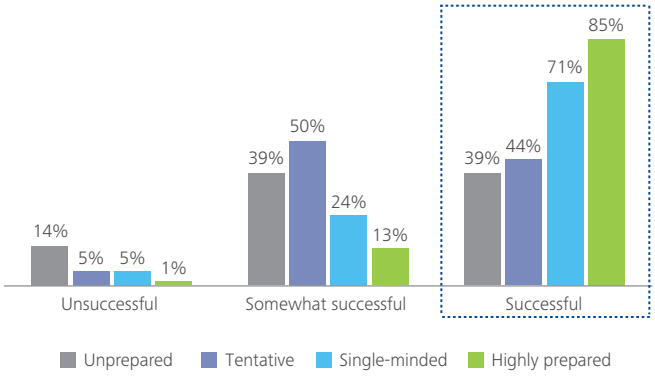
- Highly prepared firms are more likely than their peers to focus on national or international markets, rather than local or regional ones. This external focus brings firms into contact with new ideas and approaches and gives them a different perspective on how to create and sustain success. Our 2014 productivity research also found that export-oriented firms were more innovative, were more stable, achieved better growth and saw less business risk (see Figure 20).

- Highly prepared firms were almost 25% more likely than unprepared ones to report revenue growth over the past five years (see Figure 21).

The implication is clear: the same investments that can improve a company's productivity today can enhance its preparedness for the wave of technology-driven disruption tomorrow. What's more, companies that avoid making these investments in productivity and preparedness will only fall further and further behind.

FIGURE 18

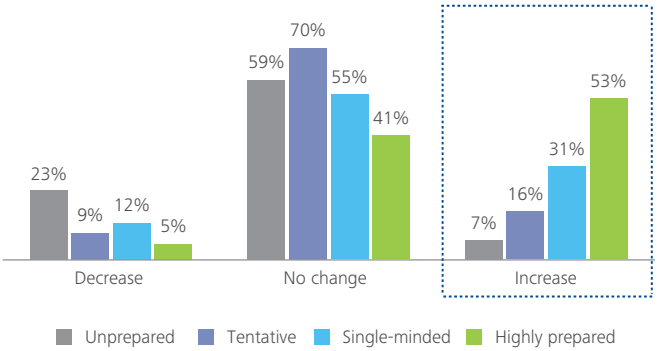
How successful has your firm been in sustaining innovation to enhance its competitive position?



Note: Some totals do not add to 100%, due to non-responses

FIGURE 19

Does your firm plan to increase or decrease its spending on research and development over the next five years?



Note: Some totals do not add to 100%, due to non-responses

FIGURE 20

Would you say that your company's primary market is local, regional, national or international?

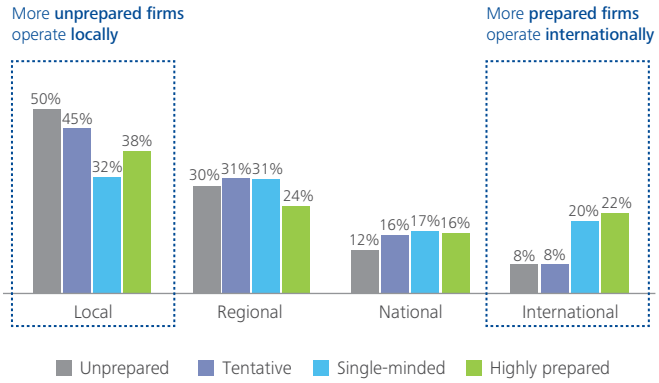
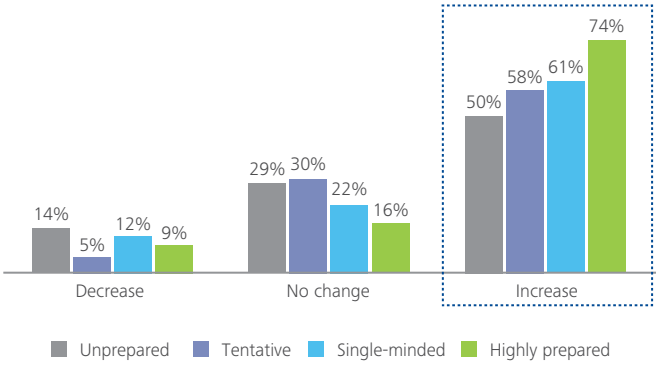


FIGURE 21

Over the past five years, has your firm's revenue increased, decreased or stayed the same?



Note: Some totals do not add to 100%, due to non-responses

THE PATH TO PREPAREDNESS

Our research into Canadian firms' preparedness focused on four areas that play a vital role in an organization's ability to withstand disruption: awareness, culture, organizational agility and resources. Taking concrete steps in each of these four areas – and learning from Canada's highly prepared firms – can enable an organization to dramatically improve its capacity to anticipate, respond to and capitalize on the disruptive forces heading our way.

CULTIVATE AWARENESS

Awareness refers to a firm's understanding of changing technologies, the accelerating pace of change itself and the potential for technology-driven disruption in its industry and overall business environment.

PREPAREDNESS POINTER

Knowing is half the battle

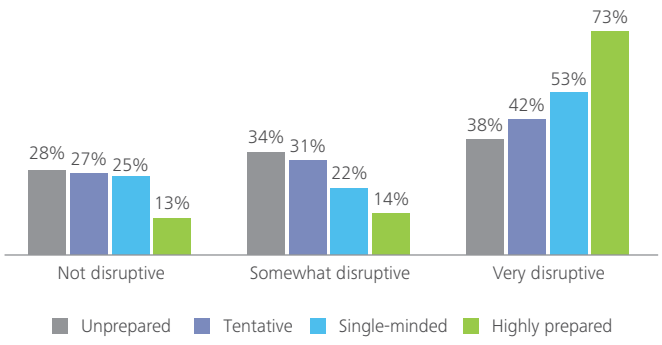
You can't prepare for a threat you don't know about, so you need to build your own early warning system. Be aware of developments in your sector – and in others, because disruption can come from surprising directions. Talk to your customers, front-line staff and suppliers to understand emerging trends. Engage with your wider business ecosystem, especially startups, business incubators and accelerators, and postsecondary institutions. And above all, always be curious.

Our analysis reveals that disruption awareness is a fundamental differentiator between highly prepared and unprepared organizations. Our study shows that Canada's highly prepared companies take a very different view of technology's impact on the competitive landscape from their less-prepared counterparts. Highly prepared companies are 35% more likely than unprepared ones to view advanced technologies as "very disruptive" to their business (see Figure 22).

Firms that are more aware of the forces with potential to disrupt their business or industry are better positioned to take preparatory action today. This action can help firms bolster their competitive position and "future-proof" their businesses – from improving customer engagement or strengthening the bottom line to transforming a product offering or uncovering new production or delivery methods.

FIGURE 22

What potential does artificial intelligence have to disrupt your industry over the next five to 10 years?



How to cultivate awareness

- **Get reports from the front lines.** Companies need to stay abreast of what's happening at the points where their business and customers meet. They should engage with their customers to understand how their needs, behaviours and expectations (stated and unstated) are changing. Front-line managers and staff should be encouraged to share what they're learning day to day. Suppliers can be asked about what they're observing in the market. These conversations can be a valuable early-warning system alerting firms to market shifts and giving them precious time to develop a response.

- **Nurture curiosity throughout the organization.** Building awareness requires deliberate, sustained curiosity that leaders must nurture within themselves and their organizations. Firms should take steps to continually monitor global trends in technology, industry developments and even business models to identify those that may prove of strategic value.

- **Engage with the broader ecosystem.** Every firm, regardless of its size, industry or location, can benefit from engaging with the innovation and technology ecosystems of which it is a part. Firms should connect with post-secondary institutions, business incubators and business hubs that bring together diverse experiences and perspectives. They can also establish formal or informal partnerships with university researchers and cutting-edge start-ups. Taking part in such ecosystems can help companies better understand technology's cutting edge – and either prepare for the blow or find a way to wield the tools.

- **Invest in R&D and innovation.** One of the best ways firms can cultivate awareness is by investing in research, development and innovation – experimenting with new products, services and ideas themselves. We found that some of the most highly prepared firms in Canada committed boldly to new, creative ways to solve customer and business challenges.

BUILD THE RIGHT CULTURE

In the context of this report, culture is the extent to which a firm promotes, encourages and provides incentives for innovative behaviours and practices. Our research clearly showed that executive leadership, employee engagement and cross-enterprise collaboration are essential to creating the kind of organizational culture that stimulates innovation.

PREPAREDNESS POINTER

Culture matters

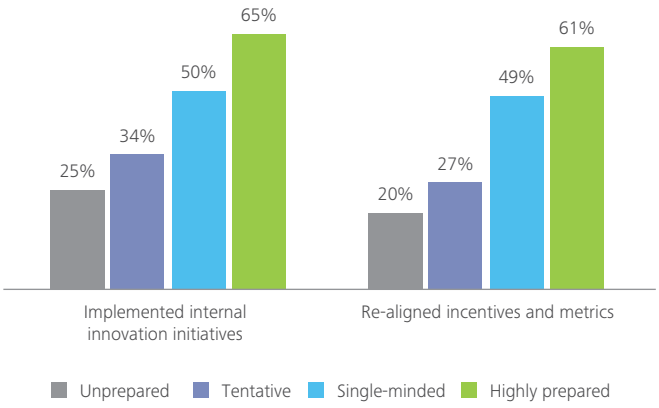
Surviving disruption takes resilience, adaptability and creativity. Leaders can encourage those qualities in their people by embracing them each day and being open to new ideas and new ways of working. Give your people the freedom to pursue creative ideas and bold innovations – and reward them for doing so. You'll create a workforce that will rise to disruption's challenge.

Highly prepared firms are far more likely to support innovation efforts within their businesses. Compared to their unprepared counterparts, highly prepared firms are 40% more likely to sponsor internal innovation programs and initiatives – and 41% more likely to develop incentives that promote innovation (see Figure 23).

Developing a resilient, innovative organizational culture can help companies withstand disruption, yet it also offers important benefits today. Engaged, empowered employees look beyond meeting the day's objectives and become true partners in striving to achieve the company's larger, longer-term goals. Businesses grow more creative, innovative and bold. Productivity and quality improve. And when disruption comes, the firm's people are well-prepared to respond.

FIGURE 23

In the past five years, what actions has your firm participated in to enable innovation?



How to build the right culture for preparedness

- **Get buy-in and sponsorship from senior leadership.** If an organization is to be resilient and adaptable in the face of rapid change, leaders must themselves embody those qualities and demonstrate their openness to new ideas and new ways of operating. A growing number of firms have appointed "innovation champions" – senior leaders responsible for promoting innovation by engaging with staff, encouraging creative risk-taking and investing in technology, people and processes. These champions are challenging their firms to look past mere incremental improvement and instead adopt a more daring approach to innovation and doing business.

- **Define an ambition that drives the firm's innovation.** Many leaders at highly prepared firms articulate an ambition or purpose for their organization that goes beyond financial targets and market share. While targets and share are both important, a firm must set its sights even higher if it is to create long-term value. Examples of higher-purpose goals include becoming a world leader in additive manufacturing or making a significant impact in the community. These ambitions are used to guide how leaders and staff direct their efforts, improving employee engagement and pushing the entire organization to take bold action.

- **Use metrics and incentives to encourage preparedness.** What gets measured gets done. Therefore, firms need to develop clear metrics to measure their success at preparing for disruption and spurring innovation. It is important to reward the types of behaviours that lead to innovation. When a firm rewards employees for exploring and experimenting in their work, more of its people will gravitate to these kinds of activities. This, in turn, will help a firm create a virtuous cycle of innovation.

FOSTER ORGANIZATIONAL AGILITY

Agile organizations are those able to respond rapidly – even proactively – to changes and challenges in their environment. They are structured for quick deployment of systems, assets and people to address external opportunities or threats. They continually challenge the status quo, testing new processes and products to stay nimble and competitive.

PREPAREDNESS POINTER

Is your company light on its feet?

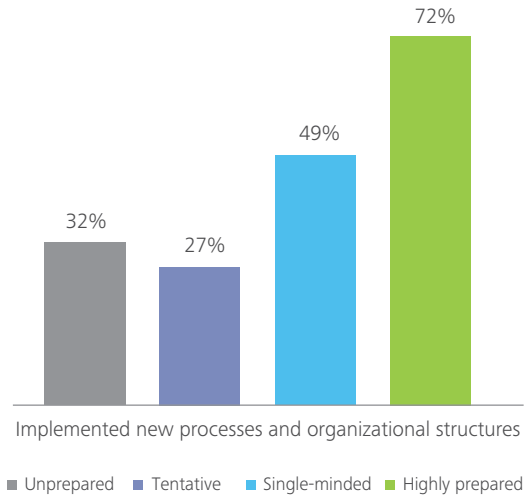
These days, change happens *really* fast. To keep up, you need to be agile. Does your company encourage innovation or just pay lip service to it? Are decisions made quickly, or are they subject to endless deliberation? When a new opportunity arises, can you rapidly assign people, capital and other resources to exploit it? If not, then it's time for some fresh thinking.

Not surprisingly, highly prepared firms are much more likely than unprepared ones – 40% more – to develop and implement new processes and organizational structures that build agility and foster innovation (see Figure 24).

Organizational agility is becoming increasingly essential in a world that can change incredibly fast. Embracing new ways of working and making decisions can help firms avoid becoming mired in the bureaucracy that can bring change to a screeching halt. GE has responded to the need for agility and close alignment with customer needs by training their staff through its FastWorks program, which encourages employees to develop new products by iterating often, gauging customers' reactions and working cross-functionally.[87] IBM's CEO, Virginia Rometty, told her employees to "think fast, move faster" in a company-wide video and instituted a new policy to respond to customer requests within 24 hours.[88]

FIGURE 24

In the past five years, has your firm implemented new processes and organizational structures to enable innovation?

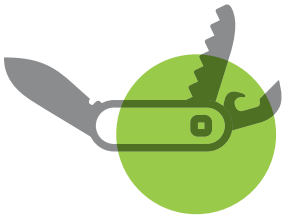


How to develop agility

- **Drive the spirit of innovation throughout the organization.** Innovation must be more than a buzzword – it's an attitude that needs to be embraced and encouraged at all levels of the organization. Some firms establish innovation groups that push the organization to be more creative in how it approaches the opportunities and challenges presented by advanced technologies. These innovation groups encourage dynamic, creative thinking in developing new products, services and business models – and the result can be dramatically faster innovation and a much more agile firm.

- **Empower staff as partners in decision-making and execution.** Highly prepared firms embrace a consultative, team approach to work, where diverse, cross-functional teams collaborate around business problems to speed decision-making and solution development. Establishing cross-functional teams that include leaders, managers and employees will allow firms to benefit from the full range of knowledge and expertise at their disposal. As well, by pushing decision-making authority further down the organization to these cross-functional teams, companies empower staff to react quickly to new opportunities or changes.

- **Develop streamlined processes that allow for rapid iteration and learning.** Firms should be able to rapidly respond to changes in their business environment and redeploy resources to align with changing priorities. Increasingly, firms are building agility into their resources and capital allocations. This approach enables organizations to quickly scale up – or down – in response to changing market needs, improving their responsiveness and enabling them to focus on other strategic priorities. Firms are also embracing rapid iteration, pilot testing and product and service experimentation to boost their agility.



DEVELOP EFFECTIVE RESOURCES

We describe the technology, human capital and financial assets that enable change as effective resources. Access to the right people, capital and partnerships is critical to a firm's capacity to respond to disruption – or create it on its own. It's vital that companies have the right people and technology to compete and evolve effectively; having just one or the either is a recipe for failure.

PREPAREDNESS POINTER

No firm is an island

In today's business environment, there's no need to go it alone. Solve vexing business problems through the wisdom of the crowd. Gain access to innovative thinking and exciting new technology by tapping into local incubators and innovation hubs. Find funding sources before you need them. And make sure your people have up-to-date tools and the training to use them like pros.

Predictably, highly prepared firms are more likely to be using advanced technologies. For example, they are 25% more likely to have used AI technologies than their unprepared counterparts. Even relatively common technologies, such as connectivity or networks, are more likely to be employed by highly prepared companies to further their business.

Using resources effectively can increase companies' resilience in the face of change. This is why we're seeing highly prepared firms boost R&D spending, invest in technology acquisitions and embrace partnerships with universities, incubators and innovation hubs around the world. Firms that focus on getting the best people, technology and financial resources – and use them as effectively as possible – solidify their competitive position today and prepare for the disruption to come.

> Taking concrete action now can help firms dramatically improve their ability to capitalize on the disruption to come.

How to develop effective resources

- **Leverage the crowd.** The most highly prepared firms engage with their broader ecosystem through crowdsourcing of all shapes and sizes. By bringing to bear thousands – or millions – of connected minds to a problem, a firm can bring an idea to scale with tremendous speed.

- **Identify and access the expertise, technology and other resources needed to achieve the firm's ambitions.** Firms should take steps to ensure they can access the expertise, technologies and financial resources they need to respond in a rapidly changing world – whether through recruitment, merger, acquisition or partnership. Strategic partnerships in particular can enable firms to collaborate to achieve economies of scale, share knowledge and improve competitiveness. Over time, these strategic partnerships can foster a growing ecosystem of like-minded businesses, post-secondary institutions and governments at various levels. These ecosystems, in turn, will enable their members to better access and deploy the resources needed to innovate and thrive in the midst of disruption.

- **Train and retrain staff.** Firms of every size, from the smallest start-up to the largest enterprise, must consider how they support their employees' training and retraining. In a future characterized by rapid technological change, firms that can ensure their staff have the right training for the right tools will have a competitive advantage. It's also crucial that managers and other leaders have input into decisions about which technologies get used and what training takes place, to ensure that firms make the right choices.

RECOMMENDATIONS FOR GOVERNMENTS AND ACADEMIA

Our research shows that only 13% of Canadian firms can be considered highly prepared for disruption. The majority of Canada's businesses are struggling to get prepared – and one in three are totally unprepared. This lack of preparedness means that Canada's economy is very vulnerable to the technology-driven disruption that's set to transform businesses and industries here and around the world.

It's very difficult for governments and academic institutions to directly influence the direction and actions taken by Canadian businesses. Yet at Deloitte we believe that both can take steps to support Canadian firms in their preparedness journey.

RECOMMENDATIONS FOR GOVERNMENTS

Enhance education and training

Governments must use their influence to evolve education at all levels. Access to well-educated, high-quality employees is fundamental to a firm's success in today's economy – and a major factor in its ability to withstand disruption. Governments must use their funding and regulatory levers to encourage a shift in how Canada's students are educated at the elementary, secondary and post-secondary levels. They must also embrace new education practices, models and partnerships that seek to evolve the way we educate our students into the future.

K-12 education must be overhauled. Canada needs a renewed focus on not only key standards, but on developing world-class students who can learn, relearn and adapt as a matter of course. Most importantly, curricula must be reimagined and updated to focus on critical thinking and practical applications of learning. Students must have a broad education that exposes them to a great diversity of subjects, and provide a hands-on foundation in innovation and emerging technologies that can set the next generation of leaders on a path to success. Developing students with diverse backgrounds who are able to think laterally is crucial for the future economy.

Universities and colleges must be remade into nimble, cross-curricular institutions that are truly built for the 21st century. Post-secondary education is already experiencing disruption, but we believe the pace of this disruption will speed up substantially. In some subjects, particularly science and engineering, updating course curricula annually or even semi-annually still means students graduate with out-of-date knowledge. While colleges are increasingly focused on shorter-term, highly practical learning, universities still generally adhere to traditional four-year bachelor degree programs that may not provide opportunities for practical experience. For the future success of the Canadian economy, post-secondary education must have direct links to the world outside the ivory tower.

Evolve immigration for the global economy

Protectionist policies in Canada's visa regime must be altered to allow companies to access talent from all over the world. Business leaders from all over Canada complain about the serious challenges they face in attracting and retaining skilled workers from around the globe. For our companies to be recognized as global leaders, the best and the brightest need to be working here – regardless of where they're from. The government must review its visa processes to ensure our companies can compete with their peers worldwide to bring the best global talent to Canada. Specifically, the government must improve the speed and efficiency of the application process and resist the temptation to establish protectionist policies that make it more difficult to work in Canada than in many other countries.

The temporary foreign workers (TFW) program must be reformed to take a worker's profession into consideration. There is an urgent need to reconsider some of the recent changes to the TFW program. It's crucial to Canada's economy that firms be able to get the right workers in the right location and at a price that allows them to continue to compete. Treating university professors and researchers in the same manner as service employees will stifle our productivity and competitiveness as a nation.

Improve tax credits and repurpose funding to build the Canada of the future

Tax credits must be expanded to encourage partnerships between start-ups and mature companies. Canadian companies have come to rely on tax credits that support important R&D. It's crucial that these incentives be protected and expanded, especially as they pertain to advanced technologies. Furthermore, rather than providing tax credits simply for the development of new technologies, we recommend introducing funding that supports bold investment in partnerships with Canadian companies – bringing companies together to learn from one another. A tax system that makes forming partnerships between established Canadian businesses and start-ups "frictionless" will serve to build up new companies while ensuring mature companies stay at the cutting edge of technology. To encourage further investment in start-ups, we also recommend introducing an angel tax credit to mitigate the risks associated with these investments.

Governments should invest in sectors Canada can excel at now and in the future. Canada's governments should lay out strategies for our country to become the undisputed world leader in key industry sectors. To decide which sectors to focus on, governments must consider our current and future competitive advantages and invest heavily in those areas. This may require governments to stop funding sectors whose glory days have long since passed, and instead redirect those investments into industries with the potential to propel Canada forward in a new, global economy. These kinds of initiatives provide a rare opportunity for all three levels of government to come together to help shape the economy of Canada's future.

Transform Canada's best hubs into world-class ecosystems

Governments must invest strategically in building true ecosystems that bring together start-ups, mature companies and post-secondary institutions. In recent years we've seen "business clusters" form across Canada – organizations and spaces where start-ups, mature businesses, post-secondary institutions and governments can collaborate to accelerate learning and innovation. Examples include the Waterloo Region's Communitech, Toronto's OneEleven and Vancouver's Launch Academy. While having a cluster in every major Canadian city is an excellent goal, what's needed now is a transition from clusters to world-class business ecosystems.

Governments must work to deepen the impact of existing clusters, and help them transform into full-fledged ecosystems that support and promote business. In some cases, this will mean supporting their specialization into areas like healthcare or big data; in others, it will mean bringing new partners of different sizes and from diverse sectors to an ever-growing table. It will also mean promoting these ecosystems to the world, so that our incredible networks are no longer our best-kept secrets.

RECOMMENDATIONS FOR ACADEMIA

Evolve the format of institutions

Post-secondary institutions must be redesigned into vibrant, diverse learning zones. Canada's post-secondary education system was built at a time when only a small proportion of people attended university. At that time, highly specialized learning, housed in silos and based on static curricula, proved a successful format for producing successful students. However, the past 50 years have seen unparalleled change, and our education system must adapt. While learning and teaching at some institutions has evolved, the entire sector must embrace a highly creative, practical form of education that is deeply connected to the world outside the institutions' walls.

Support commercialization

More research dollars must be oriented towards commercially viable innovations. Canadian researchers often struggle to turn their discoveries and innovations into marketable businesses. While Canadian governments have begun to tie university research funding to partnerships with business, notably with the Canada First Research Excellence Fund and the Ontario Research Excellence Fund, more must be done at post-secondary institutions to build out these partnerships. Universities should develop robust strategies to bring the best of their applied research out of the labs and into the market – perhaps in collaboration with other business or ecosystem partners. As well, universities should create systems that support the identification and protection of the intellectual property of its students and faculty.

THE TIME IS NOW

"As a long-term participant in, advisor to and observer of Canadian business, the public sector and academia, Deloitte Canada is concerned with the future of our country." We wrote those words four years ago, in Deloitte's first report on Canadian productivity. The sentiment is as true today as it was then – and our concern for the future of our country has only grown.

Disruption is not going to happen in some distant future. It is happening now. With one in three Canadian companies unprepared for disruption – and a mere 13% considered highly prepared for it – there is reason for concern over our ability to compete and our overall economic and societal well-being.

It's true that Canadian firms face serious, significant challenges in terms of their preparedness for disruption. But they also face incredible opportunities to improve their productivity and to become better prepared for what's to come. Our research shows that the best-prepared companies share characteristics that others can adapt for themselves. If Canadian businesses, together with governments and academia, take concrete action today, we know that the results will yield stronger, more profitable firms that will be able to withstand – and thrive within – a storm of change.

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