Context

This evidence-based publication is part a series of policy papers that ICTC will be releas- ing to address the innovation catalysts for Canada in a global economy. The intent here is to stimulate dialogue on this important agenda, that is destined to shape Canada’s economic and social prosperity for years to come.

This first release sheds light on the changing face of the digital labour market in Canada and highlights potential measures for building an innovation nation. Highly-skilled talent is increasingly in short supply in Canada and abroad, faced with this reality many businesses are now deploying workplace recruitment strategies that either compete for global talent in a tight labour market, or are relocating their offices to geographies where skilled talent is plentiful. While technologies are increasingly redefining business models and challenging incumbent industries, tomorrow’s talent strategies will no doubt be as distributive as the technologies transforming them.

Introduction

“It’s about the people you have, how you’re led, and how much you get it,” noted Steve Jobs of Apple in a 1998 interview when asked about his company’s innovation success over competitors. The key resource for innovative industries is digitally-skilled workers who can develop, implement, and manage new technologies. In the foreseeable future, major economic growth will be driven by industries’ ability to fully leverage advanced technologies to provide new products and services as well as expand scale and scope globally. For Canada to remain competitive in the innovation race – and shift from resource workers to ‘resourceful workers‘ – it needs people with digital skills. Canada is not alone as global demand for digital talent has exceeded the supply by far. Canada’s economic and societal prosperity will depend on how quickly we respond in the face of such adversity.

The Challenge

Talent Gap
Canada faces a growing talent gap in technology workers: By 2019, Canada will need to fill 182,000 technology jobs as workers retire and demand grows for skilled workers. Canada will need to find ways to meet this demand or lose economic opportunities. As noted above, Canada is competing globally for talent. The US needs 1.4 million ICT workers while the EU will need 825,000 by 2020. ICTC’s survey found that 1 in 3 companies list finding people with the right skills as a significant challenge. Similar statistics have been found in global polls with 38% of firms globally finding it hard to find talent. For Canada, our talent shortages can be attributed to skills mismatches of many post-secondary graduates; complicated immigration processes; and shortage of training initiatives to train people with the right skills for the demands of industry. For some Canadian technology firms, it has meant that they may have to recruit abroad or move work to other countries – finding it more efficient to build jobs elsewhere than grow in Canada.
The Quest for Talent with the Right Skills

Technological evolution and innovation have increased rapidly, leading to the World Economic Forum’s declaration of a Fourth Industrial Revolution characterized as “a technological revolution that will change the way we live, work and relate to one another transformation will be unlike anything humankind has experienced before”. This revolution is built on the Internet of Things (IoT): A hyper-connected world that leverages device-to-device communications, automation, and artificial intelligence to achieve new efficiencies. The global opportunity is said to exceed $19 trillion by 2020 through more than 50 billion devices connected to the internet. The Internet of Things is not just phones and computers, but houses, lighting, streets, transportation and much more all connected and communicating automatically. An estimated 5-to-10-fold growth over 5 years could mean significant job opportunities – if we have the talent to attract businesses.

The Impending Talent Paradigm

This innovation often can create market disruption: Jobs in transportation and warehouses could eventually be replaced by autonomous delivery vehicles and automated warehouses. Manufacturing plants are shifting to robotics-based assembly and employees need new skill sets like engineering and coding. The Sharing Economy, sometimes called the “Gig Economy”, is empowering workers with high-demand skills to freelance globally from any location, providing knowledge economy jobs and growth to the countries that have the workforce. Workers can choose to supplement their earnings working outside the 9-to-5 regular hours; start a new company slowly and part-time; or shed the standard workplace and hours for term contracts and higher wages. Companies, once limited to recruiting local talent into an office space, can now resource globally for available skills to deliver work and products remotely. For Canadians, “gigs” can mean higher incomes, flexible work hours, better quality of life on their own terms and may open doors for firms to access a more diverse pool of talent. For firms it could also mean acquiring the skills needed short term, quickly and efficiently. Talent and skills will be the defining resource to retain these jobs, and the key attribute for a diverse and technology-ready country.

In the face of growing global competition, having innovative firms that can develop and bring products to market is essential. Investment in technological skills by companies and government will pay significant dividends. Ireland, dubbed the Celtic Tiger, has been ahead of the curve on attracting technology start-ups as well as building a supply of skilled workers leading to a resurgence in economic development and growth. As a result, even after the global recession of 2008, Ireland’s talent pool remains strong – with only 11% of firms reporting a gap in talent (versus 38% globally).6

Canada’s Talent Supply

Canada is home to many top-tier technology firms that leverage national and international talent – Canada’s technology workforce is 60% Canadian and 40% immigrants. Demand has risen for digitally-literate workers while supply has not kept up. This is in
part because Canadian youth are dropping science and math at the first opportunity. In fact in Ontario alone, more than half of Ontario’s high school students have dropped math and science when it is no longer mandatory. 7 On a positive momentum, enrolment in technology programs at universities and colleges in Canada has increased to 29,000 technology graduates in 2015 – a recent peak. However, with the rising need for digital skills across sectors, this still falls well shy of the demand, especially when accounting for some occupations-in-demand requiring experienced workers. And, the immediate trends suggest this will continue – there are twice as many humanities graduates as STEM. 8 A job market mismatch is why many of these humanities graduates are part of a growing youth challenge — Canada’s high youth unemployment (13%) 9 and the estimated under-employment rate (graduates with jobs beneath their education level) reaching almost 1 in 4 (24%). 10 A long term approach to change this is needed for tomorrow’s youth, while a short term system could help educated students obtain in-demand skills.

With growing talent demand and a lack of sufficient skills in Canada, firms are turning to immigration as a potential solution. Canada is able to recruit technology workers from around the world, most coming from China, Europe and South Asia. 11 As the demand heats up globally for skills, technology workers can often choose their preferred country. Complex Canadian labour market solutions and immigration programs add extensive process and paperwork. Delays of 6 months may be tolerable for larger firms seeking a unique or very hard to find skill, but does not help smaller firms with short windows of opportunity. A project may only take 5 months, making this length of hiring process ineffective. High growth firms may be more likely to open an office near talent sources – such as Silicon Valley – or move the operation all together.

The imperative to invest in technological and digital skills is a national and global one – Canadians who want to obtain high-paying, stable and interesting jobs will need more skills related to coding or computational thinking, digital literacy, and use of technology. For example: Manufacturing technicians who can code; transportation experts with GPS and data analysis skills, (i.e. digitally-skilled truck drivers); remote robotics operators and repair technicians, (i.e. digitally-savvy miners). Failing to enhance STEM learning, upskill our workers or attract global talent with in-demand skills could result in jobs to relocating to other countries.

The trend is already present with more of Canada’s top digital entrepreneurs moving to other international jurisdictions to gain access to more resources – both capital and human. Silicon Valley has been able to thrive by drawing in top talent from around the globe, including an estimated 350,000 Canadians12. Losing highly-skilled workers, executives and graduates to other locations exasperates Canada’s talent gap, at times creating a self-defeating pattern – entrepreneurs are warned to relocate towards talent and investment or see their ideas and dreams fade.

There is no single cure to making an economy more effective and growing new age jobs. But there is an answer to improving our overall opportunities by developing the digital skills of our people. If Canada wants to be one of the fastest growing technology and
innovation economies in the world, it needs to start by having the strongest digital workforce in the world and by building pathways to attract and retain diverse talent to meet the needs of the digital economy. From students and new graduates, to global talent to mature workers and established executives, Canada needs to have a competitive advantage over the world in the most in-demand resource – digital skills.

Unlocking the Talent Code

A Better Start for our Youth
British Columbia is one of the first provinces to publicly launch a technology strategy that includes STEM education goals that will prepare youth with digital skills in early years. In BC, students will start building skills in areas like collaboration, critical thinking, and communications and will also start coding in Grade 6. By moving in this direction, BC is establishing a baseline of digital literacy – a standard level of computer science, technology and STEM competencies that allows us to understand, use and create using technologies. We can only achieve this new level of literacy by maintaining education levels in the basics – math, reading and writing – while building up new, critical skills like entrepreneurship, computational thinking and digital and financial literacy. Just as literacy rates have improved and increased the overall economic opportunities of many in the first industrial revolution, so too will digital literacy be the overall requirement for future economic prosperity.

ICTC’s recommendations for Canada’s education:

> Mandating science, technology and math through secondary school, or at minimum embedding technology as a base for all subjects.

> Integrating computer science, including computational thinking, design thinking and coding into integrated learning from K-12.

> Introducing entrepreneurial skills (ex. Ideation, creation, enablement, prototyping) as critical digital skills throughout K-12 and into post-secondary.

> Increasing enrollment spaces for technology-related degrees and diplomas.

> Integrating technological skills into other university disciplines to provide in-demand skills for graduates.

> Providing training for educators to be able to enhance student learning with technology as well as to increase their skill sets to more effectively teach and integrate STEM across subjects/disciplines.

> Increasing experiential learning opportunities for students to apply their skills, and learn new skills for in-demand workers.
Addressing Immediate Skills Needs
It is immensely important to continue to support and advance Canada’s education system to prepare tomorrow’s workforce. However, we cannot stop there. Canadian employers still need highly-skilled technological workers now – and are competing against other countries and well known clusters like Silicon Valley. To keep our technology sector growing, Canada will need to continue to access internationally educated technology professionals and bring them to Canada quickly. This will help firms continue to build Canada’s digital economy, increase our global competitiveness, and strengthen our workforce overall. But we have to recognize that to secure the best talent, we will need to compete with the best countries to become the first choice to skilled global talent and this will mean ensuring effective immigration programs and policies as well as attraction campaigns to brand Canada as the destination of choice.

Additionally, displaced workers could have a potential role to play in the technology sector with the help of successful training interventions that can provide alternative career pathways into technology roles. Research has demonstrated that displaced workers – workers who lose a job due to no fault of their own like industry outsourcing or plant closures – are more likely to have long-term economic hardships due to lack of skills\(^\text{14}\). They will usually have longer post-layoff unemployment as well as sustained lower income due to lacking in-demand skills by the market. This may include recent graduates who find themselves in similar scenarios with a degree or diploma but no tangible path to a rewarding career. Transitioning both these groups into skilled technology or digital professions will have significant economic returns for them and the national economy, as well as providing added social benefits.

ICTC’s recommendations for Canada’s upskilling & talent recruitment:

- Seek to provide a competitive advantage for Canada with the fastest immigration system, provide fast track for in-demand skills
- Brand Canada as a digital/technology-forward country that attracts internationally educated technology professionals (IEPs)
- Work with industry and the education sector to provide targeted, short-term skill development programs
- Continue to offer pre-arrival labour market services to IEPs to support their economic integration and connections to job opportunities.
On the horizon

The gig economy can impact the labour market around the globe quickly to where skilled workers are in abundant supply, with potential impacts on immigration. In an increasingly robotics driven environment workers without applicable digital skills will continue to be displaced in the absence of relevant up-skilling. All of this could also be impacted if Canada ratifies trade agreements like the Trans-Pacific Partnership (TPP) and the Canada and European Union (EU) Comprehensive Economic and Trade Agreement (CETA).

How do you see that talent agenda unfolding, and what should be our priorities to better position Canada at the forefront of this digital race?

Comments, suggestions, or additional areas to explore, please write to Stephanie Wilson, Director of Strategic Outreach s.wilson@ictc-ctic.ca

- Expand experiential learning to give under/unemployed workers hands-on experience
- Incentivize companies to provide on-the-job training that leads to digital skills learning
References – revised for Talent Imperative


2. ICTC (2016), National Digital Talent Strategy


10. Miner, Rick (2014)


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