



A Survey of ICT/High-Tech Employers in Greater Sudbury

Workforce demand, growth and recruitment practices

July 2020

Prepared by:

Workforce
Planning for

Sudbury
& Manitoulin

Planification en
main-d'oeuvre

www.planningourworkforce.ca

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This project is funded in part by the Government of Canada and the Government of Ontario



AUTHOR'S NOTES

While future workforce demand has been identified in this report, the ICT/High-Tech Workforce Survey was conducted pre-COVID-19 and may not reflect the anticipated increase in demand for the ICT/High-Tech workforce.

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This project was led by Dawn Graham, WPSM Project Coordinator. Also acknowledged for their contributions to this research project and report are: Colleen Johnson Malette, WPSM Administrative Assistant, and Reggie Caverson, WPSM Executive Director, as well as Lindsay Lane, Manager, Marketing and Communications, and Kyle McCall, (formerly) Manager, Innovation at NORCAT. A special note of thanks goes to all ICT/High-Tech employers who took the time to complete the survey and provide their insights.

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EXECUTIVE SUMMARY

In response to various reports indicating that jobs of the future will be heavily reliant on information and communications technology (ICT) and other advanced technologies, the *ICT/High-Tech Workforce Survey* was launched in August 2019. Developed through a partnership between Workforce Planning for Sudbury & Manitoulin (WPSM) and NORCAT Innovation, this survey focussed on tech-sector employers to better understand their current workforce, recruitment practices and the projected workforce they need in order to compete, innovate, and grow their businesses in the future.

It is part of WPSM's mission to coordinate identified education and training needs in order to generate opportunities for economic growth in local communities. The information shared in this report will help inform future programming and training initiatives with education stakeholders and employment services. It is anticipated that this will, in turn, support efforts that assist Greater Sudbury's ICT/High-Tech employers access the talent that they need.

An analysis of survey responses has informed the following key findings:

- Greater Sudbury's ICT/High-Tech industry is experiencing a rapid rate of change and growth.
- Innovations for the mining industry dominate activity in the local tech sector, followed by digital media/ICT, advanced materials and manufacturing, clean tech, and life science and advanced health.
- Full-time employment is anticipated to grow by almost 40% over the next two years.
- ICT/High-Tech employers are most concerned about the recruitment and retention of tech "talent," followed by ICT security and the protection of intellectual property.
- The occupations in highest demand can be grouped by general themes including: software developers, engineers and senior programmers; electrical and electronic technicians and engineers; and applications and/or web analysts, developers, and designers.
- Employers also identified a need for staffing to enhance their business efficiencies and expand operations; as they scale up, tech businesses must evolve to combine their highly technical interests with the mechanics of operating a business.
- Some frequently reported challenges include infrastructure issues, such as limited internet access in rural areas, and equitable access to funding and other resources for innovation and research and development (R&D).
- There is a growing awareness of the need to grow our own talent in and for Greater Sudbury. Currently, local post-secondary institutions offer a variety of ICT/High-Tech programs and may be able to adapt and support the development of programs to meet the needs of tech employers.

And finally, an analysis of the results of the *ICT/High-Tech Workforce Survey* leads to the formation of recommendations for the consideration of educators, employers, employment services as well as public and private funders of the tech sector.

ABOUT THIS RESEARCH

This research project was initiated in response to a number of think-tank reports indicating that jobs of the future will be heavily reliant on information & communications technology (ICT), and the observation that funding bodies and educational programs increasingly channel students in this direction. In exploring this locally it became apparent that very little was known about the size or workforce needs of this sector, yet anecdotal reports signalled that there were workforce challenges affecting Greater Sudbury's growing ICT and high-technology industry.

In order to gather more data, the *ICT/High-Tech Workforce Survey* was launched in August 2019. Developed through a partnership between Workforce Planning for Sudbury & Manitoulin and NORCAT Innovation, this survey focussed on tech-sector employers to better understand their current workforce, recruitment practices, and projected workforce needs so as to compete, innovate, and grow in the future.

ABOUT US

Workforce Planning for Sudbury & Manitoulin (WPSM) is a not-for-profit organization serving Greater Sudbury and the Districts of Sudbury and Manitoulin. Founded in 1997, WPSM is one of 26 workforce planning boards across Ontario funded by the Ministry of Labour, Training and Skills Development. WPSM conducts research, provides labour market information on industry and workforce trends, and connects stakeholders to collaborate through partnership projects, activities and programs to support workforce growth and economic development.

NORCAT Innovation is home to tech start-ups, mid-sized companies, investors, research organizations, mentors, and service providers – all working together to create meaningful and sustainable jobs. As Sudbury's Regional Innovation Centre, NORCAT Innovation is focused on supporting early-stage tech start-ups and the people founding them. NORCAT helps by providing access to key resources and connections to the networks needed to start, grow and scale-up tech ventures.

ABOUT THIS REPORT

PURPOSE Part of WPSM's mission is to coordinate identified education and training needs in order to generate opportunities for workforce development and economic growth in local communities. Information from this report will be shared with education stakeholders, employment services, those interested in entering the tech sector and Greater Sudbury's ICT/High-Tech industry employers. It is expected that this will help inform future programming and training initiatives that ultimately support access to local talent.

DEFINITIONS To provide some context for this report, the following definitions have been applied:

- While the acronym ICT is widely accepted to mean *Information & Communications Technology*, for the purposes of this report it is important to define our use of the term *High-Tech*.
- The Brookfield Institute for Innovation + Entrepreneurship¹ defines digital skills as:
 - **Baseline digital skills** are those needed by everyone to participate in a digital economy, including the ability to use software applications such as the Microsoft Office suite.
 - **Workforce digital skills** are occupation specific and apply to more complex tasks using spreadsheets, digital design, and customer relationship management (CRM) software.
 - **Professional (or advanced) digital skills** are those needed to develop new digital technologies, products, and services.
- For the purpose of this survey then, and in alignment with this last Brookfield definition, *High-Tech* refers to the use and/or development of (non-ICT) advanced technologies.

Advanced digital skills go far beyond coding and web/mobile application development to include: data science; cybersecurity; digital production, creative arts and interaction design; and emerging fields such as machine learning and artificial intelligence.

Levelling Up: The Quest for Digital Literacy, June 2018, brookfield'

- Excluded from this definition of *High-Tech* are those businesses that use a digital platform to market a consumer product or service that does not conform to the above definition. Most of these direct-to-consumer businesses have sub-contracted the development of the applications and sales platforms they use to a small number of key players who dominate this market.
- And finally, the *ICT/High-Tech workforce* refers to those employed in this industry.

METHODOLOGY

- The question format used for the *ICT/High-Tech Workforce Survey* was based on previous employer surveys conducted by WPSM in 2014 through 2018. The final survey questions were designed and vetted by WPSM and NORCAT Innovation.
- The survey was distributed online through the Survey Monkey platform to a database of ICT/High-Tech employers developed from multiple sources.
- Where applicable, additional information gathered through networking exchanges, survey comments, and employer anecdotes has been included to illustrate a point or theme.

DATA SOURCES

- *ICT/High-Tech Workforce Survey* results.
- OMAFRA/EMSI Analyst Q1.2019 data.
- Business and government websites, media articles, and literature review including think-tank research reports.

DATA LIMITATIONS & CHALLENGES

- Results as reported should be seen as a sampling of employer views rather than as comprehensive.
- It must be noted that Greater Sudbury's total ICT/High-Tech workforce represents only a small portion of the overall workforce, and so the actual market share captured by this survey is unknown.
- Tech-sector job titles and terminology, as expressed by employers, are not necessarily consistent with the National Occupational Classification (NOC) codes used by government, creating additional challenges when gathering and analyzing the data.
- Due to the increase in remote work in the tech sector it is not clear if all reported employees are physically based in Greater Sudbury.
- One significant challenge, and a limitation to outreach efforts, has been the lack of a comprehensive database of tech-sector businesses and employers. "Catchy" names make tech businesses difficult to identify and, once located, there is limited contact information provided on business websites.
- The potential sample size of local tech-sector employers is small and the survey response rate smaller, remaining stubbornly low even when identified businesses were contacted multiple times.
- The low response rate may also reflect a case of survey burnout on the part of tech-sector employers, who are continuously surveyed as a condition of various funding streams.
- All percentages have been rounded to the nearest whole number and reflect the number of responses to individual questions.

INTRODUCTION

Greater Sudbury's information & communications technology (ICT) and high-technology industry is growing. Numerous sole-proprietor, micro, and small to medium-sized enterprises are active in developing and producing digital applications, medical technologies, and automation for the mining industry. To sustain and expand this growth, however, tech-sector employers require a skilled workforce.

Workforce Planning for Sudbury & Manitoulin (WPSM) previously explored ICT occupations in *An Occupation Overview of the Digital Economy²* (2018), and has been aware for some time of the growth in this industry and the challenges faced by tech-sector employers when recruiting talent. Further anecdotal evidence has been obtained through attendance at local forums, events and conferences that focussed on digital technologies such as: *Sudbury CodeOp: Tech in the City; Beyond Digital Transformation 2019/2020; Innovation for a Greater Sudbury*; and NORCAT Innovation's *StartUp 101* and *TrailblazHers*.

However, while students at all levels of education are increasingly encouraged to explore studies and careers in science, technology, engineering and mathematics (STEM) fields, it is unclear if there are enough STEM graduates to meet demand across all industry sectors. In addition, not all STEM graduates are interested in working in the ICT/High-Tech industry. These and other factors contribute to the current and projected challenges facing this industry regarding the development, attraction, recruitment and retention of a skilled and talented ICT/High-Tech workforce.

To gain a better understanding of employer needs, WPSM in partnership with NORCAT Innovation launched the *ICT/High-Tech Workforce Survey* in August of 2019. Responses to the survey have provided insights into current recruitment strategies, desired skill sets and levels of education, and "pain points" or challenges facing local tech-sector employers when building their workforce. This report summarizes these responses, identifies key findings and themes, and recommends further actions to support workforce development for this industry.

ABOUT GREATER SUDBURY'S TECH SECTOR

As stated under data limitations, it is challenging to arrive at an accurate count of the businesses and number of people employed in our local tech sector, or even to fully define its parameters. This is partly due to the high level of cross-over between digital and innovative technologies and all other industries as "tech" does not stand alone. Another complicating factor when seeking to define this industry is that the terminology and job titles used by tech-sector employers often do not align with the National Occupational Classification (NOC) codes used by governments to compile labour market data.

Some government-sourced data has been made available through EMSI Analyst, the economic modeling and analysis software tool previously accessed through the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). An occupational report retrieved from the Q1.2019 dataset can be viewed in Appendix A, and indicates that the total ICT workforce for Greater Sudbury as of December 31, 2018 numbered 2,003 employees. With a projected growth rate of 3.9%, the total ICT workforce is anticipated to reach 2,081 employees by the end of 2022. While this information is somewhat out-of-date and may not reflect all occupations within the local ICT/High-Tech industry, it is clear that this survey has captured only a fraction of the total workforce and provides a snapshot of the industry rather than the big picture.

ICT/HIGH-TECH WORKFORCE SURVEY RESULTS

- 21 employers, representing **23 businesses**, responded to the survey.
- **91% of respondents** are the owner/director/CEO or a department supervisor/manager.

INDUSTRY & TECHNOLOGY FOCUS

The ICT/High-Tech employers who responded conduct their business in the following industries:

INDUSTRY & TECHNOLOGY FOCUS		
<ul style="list-style-type: none"> ☐ Mining 67% ☐ Digital Media & ICT 44% ☐ Other 33% ☐ Advanced Materials & Manufacturing 33% 	<ul style="list-style-type: none"> ☐ Clean Tech 29% ☐ Life Science & Advanced Health 24% ☐ Forestry 19% ☐ Education 15% 	<ul style="list-style-type: none"> ☐ Tourism & Culture 14% ☐ Agriculture 5% ☐ Finance 5%

CURRENT ICT/HIGH-TECH WORKFORCE

- 23 businesses employ an **ICT/High-Tech workforce of 330 people**.
- **96% (n=317) are full time**; 24 of these positions are filled by contract employees.
- **16% of this workforce is female** compared to an estimated Canadian average of 25%³.
- Based on the number of employer responses the demographic distribution (age) of this workforce is:

28% are 29 and under	38% are 30-39	19% are 40-49	14% are 50+
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FUTURE ICT/HIGH-TECH WORKFORCE

- Over the next two years **95% plan to hire** a total of 123 full-time and 34 part-time employees.
- 54 of these positions are expected to be filled on a contractual basis.
- This represents **an increase of 39%** above current full-time staffing levels.

OCCUPATIONS IN HIGHEST DEMAND

Job titles and terms vary widely in the tech sector; therefore, these responses have been grouped by general themes and include the number of responses for each theme.

THEME	EXAMPLES AND (#) RESPONSES
SOFTWARE	Developer, Engineer, Senior Programmer (12)
ELECTRICAL/ELECTRONICS	Assembly Technician, Engineer (7)
APPLICATIONS/WEB	Developer, Senior Application Analyst, U/X Designer (5)
OTHER	Network & IT Systems Administrator/Analyst (5)
	Client & Server Support Technician (4)
	Mechanical Designer/Engineer/Technician (4)
	Data Analyst/Scientist (2)

Reflecting the diversity of Greater Sudbury’s tech sector, some employers are seeking highly-specialized skill sets such as: 3D modeling, animation, controls specialist, senior researcher and technical designer. Employers also identified a need to fill positions to support their business operations such as: business analyst, outside salesperson, production manager, and quality assurance (QA) analyst.

GEOGRAPHIC AREA FOR RECRUITMENT

Greater Sudbury’s ICT/High-Tech employers express a clear preference to hire locally. The following percentages reflect the number of employers who “sometimes or often” recruit in these geographic areas:

100% recruit in Greater Sudbury	95% recruit in Ontario
76% recruit in Canada	48% recruit internationally

JOB POSTING METHODS

Greater Sudbury’s ICT/High-Tech employers prefer digital recruitment platforms. 100% of respondents use online job boards and job-posting websites, with LinkedIn and Indeed receiving specific mention. However, 91% of employers continue to use good old-fashioned word of mouth, personal contacts, referrals, and informal networks when recruiting talent for their workforce.

JOB POSTING METHODS USED	
100%	Online job boards & job-posting websites
91%	Word of mouth, personal contacts, referrals & informal networks
76%	Corporate website
76%	Social media
48%	On-site recruitment at colleges & universities
38%	Unsolicited resumes
33%	Government employment centres/websites (jobbank.gc.ca)
24%	Community-based employment services/websites (Employment Ontario Services)
19%	Job fairs
19%	On-site job signs or posters
19%	Trade or professional publications & websites
19%	Newspaper ads
10%	Executive search companies (head-hunters)
5%	Temporary help agencies or services

RECRUITMENT & HIRING INSIGHTS

Based on their experience with the recruitment and hiring of an ICT/High-Tech workforce, employers in Greater Sudbury indicated their level of agreement with the following statements:

STATEMENT	AGREE/ STRONGLY AGREE	DISAGREE/ STRONGLY DISAGREE	NOT CERTAIN
The supply of qualified ICT/High-Tech workers is adequate for my business	38%	62%	0%
Applicants have the required education and credentials for the position	76%	24%	0%
Applicants do not have the work experience required for the position	76%	24%	0%
Applicants have the technical skills required for the position	71%	29%	0%
Applicants meet the language requirements for the position	76%	24%	0%
We have difficulty evaluating credentials of foreign-trained workers who apply	52%	10%	29%
Our wage and benefit packages are competitive with similar employers with whom we compete for talent	62%	33%	5%
We have difficulty competing with other employers for skilled ICT/High-Tech workers	48%	43%	10%
Retaining talent is a problem for our business	43%	48%	10%
We have limited opportunities for advancement for our ICT/High-Tech workers	33%	67%	0%
"Poaching" of talent by another employer is a problem for our business	48%	48%	5%

There appears to be general agreement among employer respondents that job applicants possess the education, credentials and technical skills required to fill positions, but that the supply of **experienced** applicants is inadequate to meet demand. In addition, 52% of respondents agree they have difficulty evaluating foreign credentials, and another 29% express some uncertainty. Since 48% of the employers surveyed do recruit internationally, it will be important to consider measures to adequately evaluate foreign credentials so that this does not become a barrier to addressing local talent shortages.

Once positions have been filled, employers express confidence that their wage and benefit packages are competitive within the sector, and that staff have opportunities for internal advancement. However, opinion is almost evenly divided regarding employers' ability to compete for talent, retain that talent, and prevent "poaching" of that talent by another employer.

HARD-TO-FILL POSITIONS

Greater Sudbury's ICT/High-Tech employers report that they have the most difficulty filling these jobs:

POSITIONS HARDEST TO FILL	PERCENTAGE
Software Engineer/Developer	57%
Computer Programmer	43%
Artificial Intelligence Engineer	29%
Computer Engineer/Scientist	24%
Electrical/Electronic Engineer	24%
ALSO NOTED	
Other including: Mining Engineer, Senior Researcher, Automation Specialist, Help Desk & Service Staff, Business Analyst, Power Engineer	24%
Engineering Manager	19%
Instrumentation Technician/Technologist	19%
Mechanical Engineer	19%
Mechanical Engineering Technician/Technologist	19%
Computer/Information Systems Manager	14%
Data Engineer/Scientist	14%
Machine Learning Engineer	14%
Project Manager	14%
Database Administrator/Analyst	10%
Computer Network Architect	10%
Manufacturing/Production Worker	10%
Product Manager	10%
Industrial Designer	10%
Technical Sales	10%
Technology Business Manager	10%
Web Designer/Developer	10%
None of those listed	10%
Database Administrator/Architect	5%
Graphic Designer/Illustrator	5%
User Experience (U/X) Developer	5%

EDUCATION & TRAINING

“We need to grow our own talent ... you can’t decide today that you need a senior ICT person tomorrow and expect to fill that with someone for a year contract to complete a project.” Survey Respondent

When hiring their ICT/High-Tech workforce, employers indicate that the following levels of education and training are somewhat or very important:

EDUCATION & TRAINING			
College Diploma 100%	Undergraduate Degree 100%	Professional Accreditation 75%	Trade Certificate 52%
OTHER CREDENTIALS WANTED			
<input type="checkbox"/> Professional Engineer (P. Eng) <input type="checkbox"/> Engineer in Training (EIT) <input type="checkbox"/> Certified Engineering Technologist (CET)		<input type="checkbox"/> Project Management Professional (PMP) <input type="checkbox"/> Cisco Certifications	

SKILLS WANTED

ICT/High-Tech employers in Greater Sudbury also express a strong desire for foundational and interpersonal skills in their workforce. **Almost 100% of employers agree** that the following skill sets are somewhat or very important:

SKILLS WANTED	
<input type="checkbox"/> Analytical & Research Skills <input type="checkbox"/> Ability to Follow Instructions <input type="checkbox"/> Interpersonal & Relational Skills <input type="checkbox"/> Oral & Written Communication <input type="checkbox"/> Problem Solving & Creativity	<input type="checkbox"/> Professionalism <input type="checkbox"/> Self-motivation & Independence <input type="checkbox"/> Time Management & Organizational Skills <input type="checkbox"/> Willingness to Learn <input type="checkbox"/> Work Ethic, Dedication & Dependability

SUPPORTS FOR EDUCATION & TRAINING

The survey asked employers if, in the last 12 months, their businesses had financially supported or directly provided any of these educational and/or training opportunities for their ICT/High-Tech workforce. The following percentages of respondents reported that they had.

SUPPORTS FOR EDUCATION & TRAINING	
<input type="checkbox"/> On-the-job training 81% <input type="checkbox"/> Third-party training or education 57% <input type="checkbox"/> Formal mentorship program 24%	<input type="checkbox"/> Apprenticeship 24% <input type="checkbox"/> Internships 5% <input type="checkbox"/> Co-ops 5%

TRAINING FORMATS

When asked their preference for various training and/or skills development delivery formats, employers stated that they are **somewhat or very interested** in:

Online Modules 91%	Workshops 91%	Webinars 86%
Bootcamps (1+ week) 76%	Custom and/or Corporate Training 71%	

WORK-INTEGRATED LEARNING

Work-integrated learning (WIL) provides skill-building opportunities for students by combining their academic studies with a workplace or practicum setting. While some respondents noted that they do hire students for summer work, this is not the same as an intentional, formalized WIL program. ICT/High-Tech employers in Greater Sudbury report providing the following WIL opportunities for students:

WIL OPPORTUNITY	HIGH SCHOOL	COLLEGE	UNIVERSITY	NONE
Paid Co-op	19%	38%	29%	52%
Unpaid Co-op or Placement	24%	52%	33%	43%
Paid Internship	5%	19%	29%	57%
Unpaid Internship	10%	24%	10%	71%
Apprenticeship	5%	24%	10%	71%

CHALLENGES FOR EDUCATION & TRAINING

Despite their desire to provide training and educational opportunities for their workforce, Greater Sudbury's ICT/High-Tech employers are experiencing some of the following challenges:

CHALLENGE	VERY/SOMEWHAT SIGNIFICANT
Cost of training	81%
Lack of awareness of available training programs	71%
Distance to travel for education and/or training	62%
Lack of awareness of training funds for employers	62%
Loss of productivity during training periods	57%
Loss of trained employees to other employers	52%
Relevant programs not offered in the region	52%
Lack of awareness of legislated training requirements	19%

INTEREST IN FURTHER TRAINING & SKILLS DEVELOPMENT

Employers also report an interest in further training and skills development for their current ICT/High-Tech workforce. Their top areas of interest reflect a desire for business growth and improved efficiencies. Employers are **most interested** in training and skills development in:

TOP TRAINING/SKILLS DEVELOPMENT AREAS	PERCENTAGE
Product Development	86%
Agile Project Management	81%
Sales	81%
Lean Management Systems	76%
Marketing	76%
User Interface (UI)	76%
OTHER AREAS OF INTEREST	
Programming Languages (Python, Ruby, etc.)	67%
User Experience (UX)	67%
Value Stream Mapping	67%
Front-end Web Development	62%
Human Resources Management	62%
Back-end Web Development	57%
Full-stack Web Development	52%
Embedded Programming	5%

TOP GROWTH OPPORTUNITIES NEXT 2-5 YEARS

There is very little consensus among Greater Sudbury's ICT/High-Tech employers on the top growth opportunities over the next two to five years. While there is **some agreement in three general categories**, most responses express the specific needs of individual businesses. The top three opportunities for growth have been identified as:

GROWTH OPPORTUNITY	EXAMPLES
THE INTERNET OF THINGS (IoT)	<ul style="list-style-type: none"> □ IoT devices, hardware and software development □ Interoperability/collaborative platforms that integrate various tech solutions □ Integration of digital tech into operations
ARTIFICIAL INTELLIGENCE (AI) & MACHINE LEARNING (ML)	<ul style="list-style-type: none"> □ Data analysis & AI □ Machine learning/prediction modeling
THE CLOUD	<ul style="list-style-type: none"> □ Cloud security □ Cloud-based computing & technologies

Reflecting the wide variety of business operations represented in this survey sample, other potential growth opportunities that received a first-choice mention from employers are: app development; business analysis; environmental; med tech; mining technology; mobile technology and use; programmers; remote work; sales with the adoption of new technology; sustainability; and training. It is interesting to note that, despite frequent mention of blockchain technology in tech media and its potential for the further development of AI⁴ and ML⁵, blockchain appeared only once as a third-choice selection.

TOP ISSUES & CHALLENGES NEXT 2-5 YEARS

“All the talent goes to Toronto, San Francisco or larger urban centres. [We are] competing with the likes of Amazon, Facebook, Google that are making Toronto their Canadian hub.” Survey Respondent

A broader consensus was demonstrated by responses to this question. Generally speaking, the top three issues and/or challenges facing Greater Sudbury’s ICT/High-Tech industry over the next two to five years reflect themes of human resources, funding, and the security of intellectual property.

ISSUES	CHALLENGES
PEOPLE, SKILLS & TALENT	<ul style="list-style-type: none"> <input type="checkbox"/> A lack of qualified people with relevant skills and experience <input type="checkbox"/> Boomer departure from the workforce <input type="checkbox"/> The cost effectiveness of front-line talent <input type="checkbox"/> A lack of senior IT skills <input type="checkbox"/> Employee burnout from never being able to get away from work
FUNDING & RESOURCES	<ul style="list-style-type: none"> <input type="checkbox"/> A lack of support funding for innovation and the research and development (R&D) needed to compete against large corporations <input type="checkbox"/> A lack of government-level support resources in northern Ontario noted
INTELLECTUAL PROPERTY (IP)	<ul style="list-style-type: none"> <input type="checkbox"/> Cyber & IT security/privacy <input type="checkbox"/> The high cost of the protection/defense of IP



ISSUES & CHALLENGES FOR TECH IN GREATER SUDBURY

"Lots of programmers, but no other advanced skill sets with experience."

Survey Respondent

When asked their views on the top issues and/or challenges that **specifically** face the ICT/High-Tech industry in Greater Sudbury over the next two to five years, employer responses were essentially the same as their responses regarding the sector in general: **talent and resources**. Employer comments also highlight what they consider to be lacking in the local tech "ecosystem."

▪ TALENT ATTRACTION & RETENTION

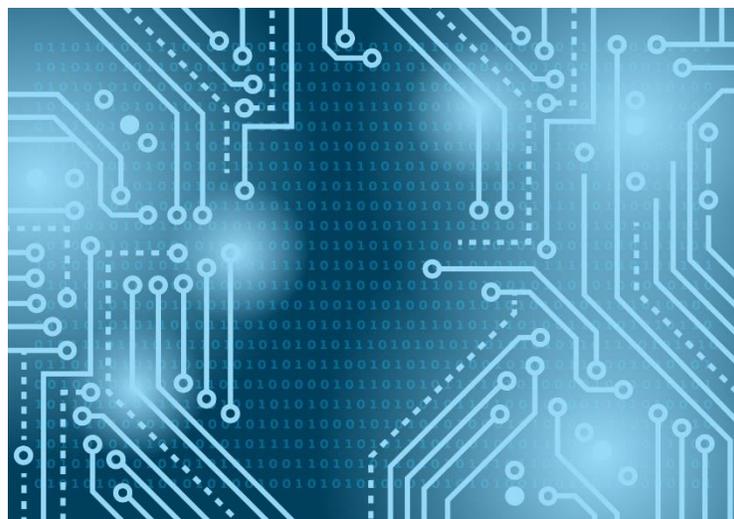
- It is difficult to attract other than entry-level staff/talent
- Due to stiff competition for talent some employers resort to outsourcing work internationally

▪ FUNDING & RESOURCES

- Access to/competition for funding and "resources" are of great concern (note that respondents did not clarify the exact meaning of these "resources")
- Employers also note the rising cost of salaries for senior ICT/High-Tech talent

▪ ECOSYSTEM - ROOM FOR IMPROVEMENT & KEY DEFICIENCIES

- Lack of infrastructure and access to high-speed symmetrical internet in rural areas
- Lack of relevant programs/degrees at local university and colleges (i.e. electrical engineering)
- Lack of standards in tech design, development, and manufacturing
- Too much focus on/disproportionate allocation of tech development resources to mining



KEY FINDINGS

An analysis of the *ICT/High-Tech Workforce Survey* results leads to some interesting findings:

- Greater Sudbury's ICT/High-Tech industry is experiencing rapid change and growth, making it a challenge to clearly define the sector let alone gain a full picture of the needs of local employers.
- It is not surprising that innovations for the mining industry dominate the local tech sector. It is however encouraging that 29% of employers reported business activities and R&D in clean technologies like recycling, waste management, energy and power, and asset monitoring.
- Employers' plans for hiring over the next two years - an anticipated 39% increase above current full-time employment - may indicate that some tech-sector micro and sole-proprietor enterprises are ready to scale up, while larger enterprises continue to grow.
- As tech-sector businesses grow, so too does their need to recruit "talent." Survey responses and anecdotal reports indicate that the competition for qualified applicants is fierce, and that the lack of specialized skills in the local workforce can add significantly to business costs, since filling key positions with short-term contracts can be very expensive. It also appears that many skilled technology workers are unwilling to relocate to smaller centres such as Greater Sudbury.
- Despite the increased awareness that we must grow our own tech talent, there are many missed opportunities to provide students with skill-building work-integrated learning (WIL) experiences. Between 40% and 70% of the employers surveyed **do not** currently provide any form of WIL, whether paid or unpaid, such as: co-ops and other placements, internships or apprenticeships.
- Another challenge noted by tech-sector employers is the retention of their skilled workforce. The loss of a key employee not only results in a loss of skills and operational capacity, but many employers are concerned about potential loss of their corporate and proprietary knowledge. Some hesitate to hire and train new staff for fear of losing them to poaching by other employers.
- ICT security and the protection of intellectual property (IP) are also of great concern as Greater Sudbury currently lacks specialists in intellectual property law. Note: WPSM staff has spoken to the partners in the Sudbury Catalyst Fund who said they are making it a priority to recruit this expertise and fill this gap in services.
- On a positive note, local post-secondary institutions offer a variety of ICT/High-Tech courses and programs that can support the development of the skills employers need. High schools in all four area school boards offer technology courses in line with provincial curriculum requirements, while the English-language boards also offer ICT-related Specialist High Skills Major (SHSM) programs for students interested in this industry. Please consult each organization's website for current offerings.
- However, employers also identified some growth-limiting deficiencies in the local tech eco-system. Infrastructure issues such as limited internet access in rural areas, and broader issues such as a perceived lack of standards in tech design, development and manufacturing were cited.
- Access to funding and other resources for innovation and R&D is a "pain point" cited by many tech-sector employers. It is challenging for small companies to compete with larger companies for these supports, and there is some sentiment expressed that a disproportionate amount of this funding is allocated to the mining sector.
- Finally, while the growth in Greater Sudbury's ICT/High-Tech sector is encouraging, "scaling-up" may also result in moving out, through the loss of some local businesses and local talent to larger markets.

CONCLUSION

As demonstrated by the results of the *ICT/High-Tech Workforce Survey*, Greater Sudbury's information and communications technology and high-technology industries are growing, thriving and innovating. At the same time, since 48% of the employers surveyed recruit internationally, it will be important to consider measures to adequately evaluate foreign credentials so that this does not become a barrier to addressing local talent shortages.

Secondary and post-secondary education systems are being revolutionized through the increased use of virtual reality, hybrid models that utilize technology for training and online delivery of programs that support employment, including specialized ones such as industrial training and workplace safety. Local tech businesses are also driving innovation in the mining industry through smart supply chain and inventory management systems, wearable sensors to improve worker safety, and wireless systems for underground communications. Manufacturers of traditional mining equipment are pivoting to supply battery-powered and automated machinery. Medical and biotech companies are developing wireless, wearable sensors and devices that use smart phone apps to remotely monitor patients' conditions. Some products have received international attention as well as significant public and private-sector investments.

However, this growth in our local tech sector is not without its challenges. The survey results have also revealed some general themes that illustrate these challenges:

- **THEME 1.** The first theme involves a perceived inequity around access to resources and funding and how these are allocated to local tech-sector businesses. It is not possible to explore this further as respondents did not elaborate except to say that mining appears to receive more money.
- **THEME 2.** A second theme reflects the need to grow our own tech talent in the north. This is imperative considering that the rapid pace of change in the ICT/High-Tech industry requires continuous skill development and upgrading in this workforce. Talent shortages can be relieved to some degree by providing work-integrated learning opportunities for local students, hiring and training recent graduates, and by offering upgrading and professional development for existing staff.
- **THEME 3.** Human resources (HR) concerns represent a third theme. Beyond the recruitment and retention of tech talent, other HR issues that employers will need to consider include:
 - **Succession planning for key positions and business continuity.** While this may not be front-of-mind for struggling start-ups, an aging workforce will have an impact on this industry as with any other. Employers reported that 33% of their tech workforce is aged 40 and over.
 - **Greater awareness of the HR and legal responsibilities of employers.** This includes worker safety regulations, employment standards, and other legislative responsibilities. Many tech-sector employers are founders and entrepreneurs and may not have a great deal of training or experience in managing a business or staff.
- **THEME 4.** The final theme to emerge is an identified need to enhance business efficiencies and expand operations. Along with tech talent, employers are seeking to hire: product and technology business managers, business and quality assurance (QA) analysts, industrial designers, and expertise in technical sales and marketing. As start-ups scale up they must combine their highly technical interests with the mechanics of operating a business.

Regardless of these challenges, the most encouraging sign of continued growth in Greater Sudbury's ICT/High-Tech industry is that 95% of the employers who responded stated that they plan to hire over the next two years. With an anticipated staffing increase of 39% above current full-time levels, and a stated preference to hire locally, there is a real need for employers and local educational organizations to collaborate in order to build a better tech-talent pipeline. If the same growth rate extends to all tech businesses in the region the employment picture for tech talent is very promising.

RECOMMENDATIONS

An analysis of the *ICT/High-Tech Workforce Survey* results also provides an opportunity to identify some recommendations for the consideration of educators, employment services, employers, those seeking employment in this sector, as well as public and private funders of the tech sector in Greater Sudbury:

- **Develop a comprehensive database** of Greater Sudbury's technology-related businesses as a tool for economic growth and workforce development and for future research opportunities.
- **Establish a centralized tech job-bank** that is free for local tech employers to post job vacancies.
- **Recruit expertise in intellectual property (IP) law** to Greater Sudbury. Efforts should be made to support the acquisition of this professional service to assist local entrepreneurs and businesses who develop innovative and proprietary tools, products, programs and services.
- **Initiate a discussion** around the need for a local university-level electrical engineering degree program. According to respondents, this appears to be the missing educational element that could enable a full range of mechatronics programming and assist the ICT/High-Tech and mining industries develop the workforce they need.
- **Provide more work-integrated learning (WIL) opportunities** to connect secondary and post-secondary students to tech-sector employers. Co-ops, work placements and internships allow employers to mentor and guide students toward an interest in this industry, to develop the skills they want in their workforce, and to ease recruitment challenges by growing their own local talent pool.
- **Explore opportunities to attract young women** to the ICT/High-Tech industry. According to the employers who responded, 16% of Greater Sudbury's tech sector employees are female compared to an estimated national average of 25%³. Women are an untapped source of potential talent for this industry and exposing girls to tech at a younger age will improve engagement levels.
- **Increase efforts to promote ICT/High-Tech careers to secondary and post-secondary students** as a way to support and grow the local talent pool.
- **Support strategies to better assess foreign credentials** for the tech-sector workforce. Since 48% of the employers surveyed **do** recruit internationally, it will be important to consider measures to adequately evaluate foreign credentials to avoid creating a barrier to addressing talent shortages.
- **Expand tech-sector employers' awareness of existing resources such as:**
 - Business management training programs available through NORCAT Innovation, the Regional Business Centre and corporate training vendors including Greater Sudbury's local community colleges.
 - Publicly-funded human resources (HR) and training supports available through Employment Ontario employment service providers. Currently, employers may receive assistance with: HR policy development; staff recruitment, interviewing and hiring; and access to funding for professional development. At the time of this writing, Employment Ontario offers the Canada-Ontario Job Grant (COJG) which provides financial support for employers to share in the cost of professional development and training for their employees.

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Acknowledgement is given to insights gained from media, think-tank reports and various local ICT/High-Tech related conferences too numerous to list.

APPENDIX A – ICT OCCUPATIONAL DATA CHART

INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) OCCUPATIONS GREATER SUDBURY / PROJECTED JOB GROWTH 2018–2022				
NOC	OCCUPATION	JOBS 2018	PROJECTED 2022	% CHANGE (+/-)
0213	Computer and information systems managers	140	148	+ 5.7
2147	Computer engineers (except software engineers and designers)	57	58	+ 1.8
2281	Computer network technicians	183	195	+ 6.6
2174	Computer programmers and interactive media developers	277	294	+ 6.1
2172	Database analysts and data administrators	66	70	+ 6.1
2242	Electronic service technicians (household and business equipment)	279	286	+ 2.5
2171	Information systems analysts and consultants	325	345	+ 6.2
2283	Information systems testing technician	31	34	+ 9.7
2241	Electrical and electronics engineers, technologists, and technicians	169	170	+ 0.6
2173	Software engineers and designers	78	80	+ 2.6
2255	Technical occupations in geomatics and meteorology	43	46	+ 7.0
2282	User support technicians	283	284	+ 0.4
2175	Web designers and developers	72	71	- 1.4
TOTAL		2003	2081	+ 3.9

NOC: National Occupational Classification 2016; Version 1.3 <https://www.statcan.gc.ca/eng/subjects/standard/noc/2016/indexV1.3>
SOURCE: OMAFRA/EMSI Analyst Q1.2019 data set accessed on September 26, 2019; reflects data to December 31, 2018
PREPARED BY: Workforce Planning for Sudbury & Manitoulin