Black Women in Tech: A Desk Research Report Identifying and Addressing the Systemic Barriers to the Participation of Black Women and Girls in Western Canada's Tech Ecosystem.

A Black Women Business Network (BWBN) report.

BWBNCanada Black Women Business Network Canada. BCIT Women and Gender Equality Canada Femmes et Égalité des genres Canada Canada

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THIS SUMMARY REPORT IS PART OF A LARGER RESEARCH REPORT.

Introduction

Even with national and global conversations about gender diversity in the tech sector, women remain grossly underrepresented, particularly in technical roles, and even less represented in senior and leadership positions. Considering the ample evidence that diversity fosters innovation, problem-solving skills, and creativity, this is a significant concern.

Although the number of women in tech is significantly lower than that of their male counterparts, this gap widens when considering women of colour. A Statistics Canada study from 2020 showed that Black women had lower rates of employment than other visible minorities. They were also underrepresented in the professional and technical fields. In computer and information systems, for example, about

15% of women were Chinese, **11%** were South Asian, **2.5%** were Blacks

(for context, Chinese, South Asian and Black women were about 4.8%, 5.4% and 3.5% of all women in Canada). Black women were mostly health care assistants, cleaners, and cashiers (Gagnon and Milan 2020).

Increasing the number of Black women in technical jobs is not only a matter of equity, diversity, and inclusion (EDI) but also one of socioeconomic importance. COVID-19 brought to light the disproportionate socioeconomic impact of job inequalities for Black women, especially their under-representation in high-paying and pandemic resilient tech jobs. Almost a third of employed Black women work in health care and social assistance. Although health care and social assistance workers have been at the forefront of Canada's public health response to the COVID-19 pandemic, employment in this industry declined by 225,000 in March and April 2020 and returned to its pre-COVID-19 levels only in January 2021 (monthly estimate, seasonally adjusted) (Statistics Canada 2021).

The COVID-19 pandemic upended the lives of many, but it also has presented unique opportunities for tech workers. With many people's daily lives taking place online and businesses increasingly relying on online ordering and service channels, tech workers are becoming a critical component of most industries. Technology will become even more important as the pandemic continues to reshape work (Vu and Kim 2020). As Canada recovers from the pandemic, digitization and technical jobs will be in high demand. For black women to be competitive in the post-pandemic economy, they must possess the necessary digital literacy and skills. Consequently, policies and practices that limit access to and participation in tech jobs for black women need to be addressed.

As a response to the above, this study is part of the Feminist Response and Recovery project. It highlights the root causes of the barriers to the attraction, training, upskilling, re-skilling, recruitment, retention, and promotion of Black girls and women in tech jobs within their current industry and other industries. It also identifies interventions to address these barriers and increase access to tech jobs and tech training for Black women and girls. The project focuses mainly on the tech sector in Alberta and British Columbia.

Research Questions

- What is the level of participation of Black women in tech in Canada, Alberta, and British Columbia?
- What factors hinder the participation and interest of Black girls in tech education in Canada, and more specifically in Alberta and British Columbia?
- What factors limit or hinder the employment of Black women in tech jobs in Canada and specifically, Alberta and British Columbia?
- What initiatives and interventions are currently available to improve the representation of Black women in tech across Canada and specifically, Alberta and British Columbia?
- What initiatives and interventions can be used to improve the representation of Black women in tech?
- What is the current state of knowledge, networks, and resources that inform, attract, skill, upskill, re-skill, and support entry and growth of Black women and girls into tech jobs?
- What are the gender, cultural, racial, and stereotypes that limit the opportunities and participation of black women in the sector (within the black community and outside the community)?
- Are there any specific networks that promote and support black women to join the tech sector? Are there any barriers to black women accessing these networks?

Who is Black in Canada?

Statistics Canada defines the black population in Canada based on an individual's self-identification; the black population in Statistics Canada's census data and reports refers to persons who self-identify as "Black" in the population group question in the Census of Population.In the 2016 Canadian census, the Black population makes up

3.5% (1.2 million Canadians) of the total population and 15.6% of the visible minority population. According to the projections from Statistics Canada, the Black population is expected to continue to grow and could represent between 5.0% and 5.6% of the Canadian population by 2036 (Statistics Canada 2022).

Importantly however, being Black is deeper than the colour of a person's skin, and this identifier is sometimes a weak link to others who may self-identify as black (The Environics Institute 2014). For instance, the black experience of a black person born in Canada to several generations of black Canadians is vastly different from that of someone born in Nigeria or Jamaica and admitted to Canada under the economic program, and this is again different from the black experience of someone born in Haiti or Ethiopia and admitted to Canada under the refugee program. In this sense, there is no single black experience, but rather 'Black experiences' shaped by a combination of factors related to community, culture, and environment. This diversity within the community needs to be recognized and will need to undergird any interventions aimed at the community to ensure relevance and success and could also present the need to keep the category of "Black" as open as possible in moving through this project.

Methodology and Statistics

This report is primarily an extensive literature review of the barriers to the full participation of black women in tech occupations in Canada. It presents evidence from other studies collected through extensive literature reviews and desk research. The review is supported by statistical analysis of secondary data obtained mainly from Statistics Canada 2016 census. The study is also supported by interviews with four black women working in tech to better contextualize some of the findings from the literature reviews. Those interviewed have varied profiles experiences and have been in the tech sector for periods ranging from 7months to 25years at the time of the interviews.[1]

[1]Interviews
- Motilewa, Debbie (PhD), interview by Anointing Momoh. 2022. (8 April).
- Romeo-Gilbert, Susan, interview by Anointing Momoh. 2022. (7 April).
- Udo, Jessica, interview by Anointing Momoh. 2022. (21 April).
- Nyarko, Venessa, interview by Anointing Momoh. 2022. (23 April).

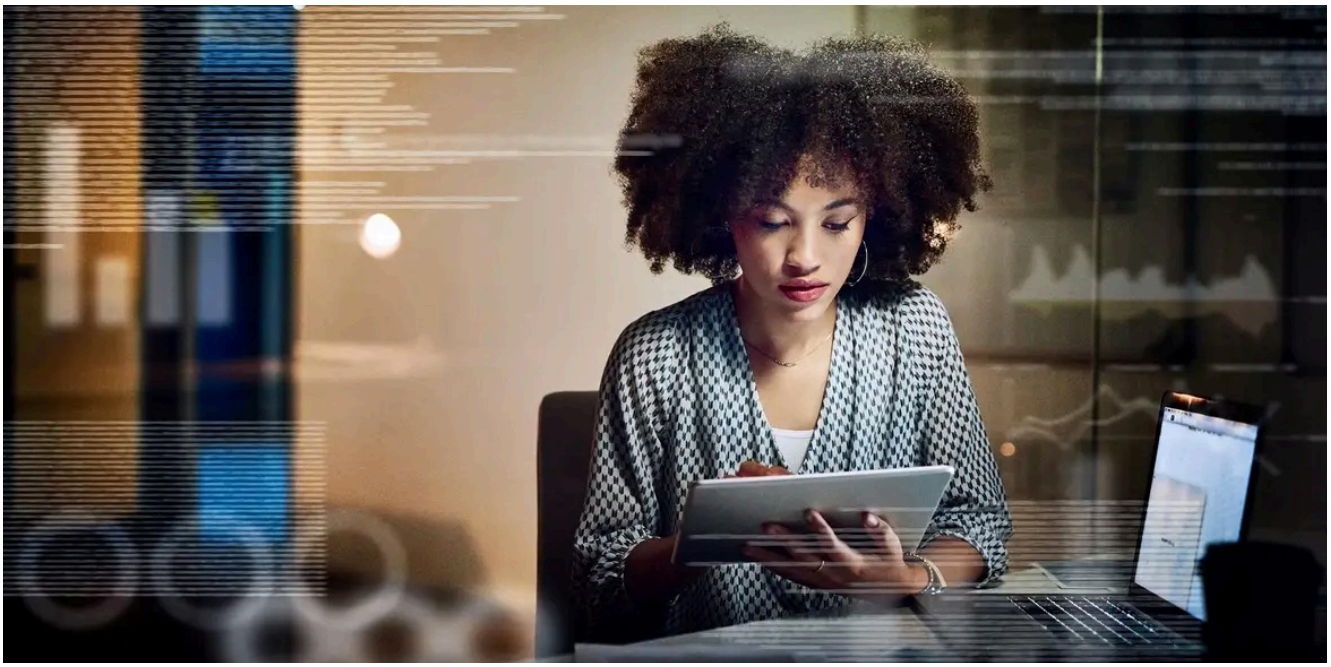
Identifying Tech Occupations

In this study, we define tech occupations as "occupations that entail the use or development of high technology". To better contextualize this definition, we adopted an approach partly informed by the work of Brookfield Institute for Innovation + Entrepreneurship[2], and we employed National Occupation Classification (NOC) data. Using Employment and Social Development Canada's (ESDC) occupation descriptions, we examine each NOC category to determine if they were users or developers of high technology (Lamb and Suddon 2016). However, compared with BIIE, we adopt a relatively broad definition of what constitutes a tech occupation based on the NOC categories. The reason is that, at least in the context of this study, the other occupations selected typically require some STEM training, so individuals in these occupations tend to be closer to high-tech occupations; regardless of how high-tech is defined, and they can be up skilled and re-skilled to take on more tech intensive jobs. Studies have found that receiving training in science, technology, engineering, or mathematics (STEM) fields increases the likelihood of finding employment in an ICT occupation by as much as 15 percent. They also indicate that ICT participation is dependent upon the fields of study pursued by women; when women and men both hold degrees in STEM disciplines, they have similar likelihoods of being employed in ICT occupations (Seward, Truong, and Kapadia 2019).

To allow for a more focused discussion later, we also categorize the tech occupations which we have identified as either digital tech occupations or not.[3] BIIE defines digital tech jobs as those contributing to the development of computer hardware or software (such as software developers or technology architects). We make some judgment to identify specific digital tech occupations as those that are more directly tied to the ICT sector, and which have a relatively wider application across industries. In the final analysis, our list of tech occupations has some overlap with those of BIIE, BC Stats (Norton 2020) and BC Tech Talent Report 2016.

Who are Canada's Tech Workers?

Regardless of the definition adopted, the technology sector in Canada as well as employment in the sector has grown significantly compared to most other sectors. According to the BIIE, between 2006 and 2016, employment in tech occupations grew by 24 percent; faster than most other occupational categories (Vu, Lamb, and Zafar 2019).

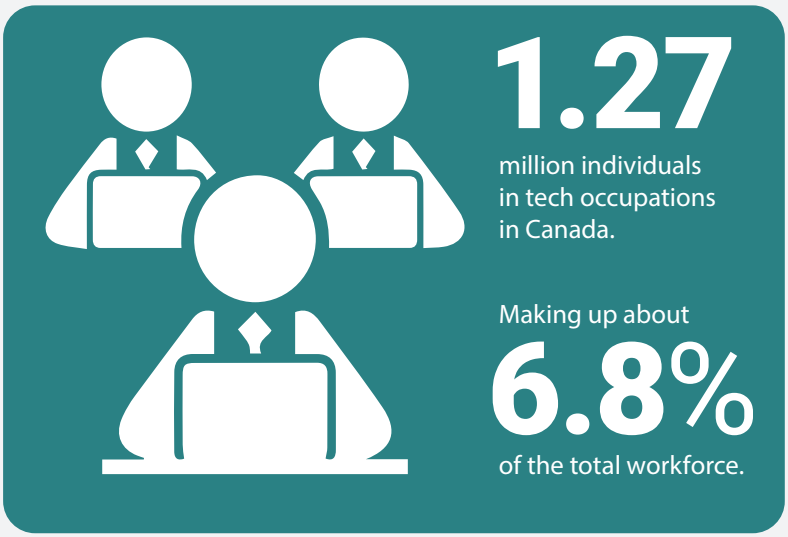


[2]They follow a three-step mapping exercise as follows - Step 1: Determine which occupations are considered 'technology occupations. Step 2: Map technology occupations against industries to determine the industries with the highest proportion of tech occupations, termed their 'tech intensity'. Step 3: Determine the industrial composition of the tech sector based on the proportion of tech occupations.

[3]A full list of these categories is contained in the Appendix.

Size and Sex

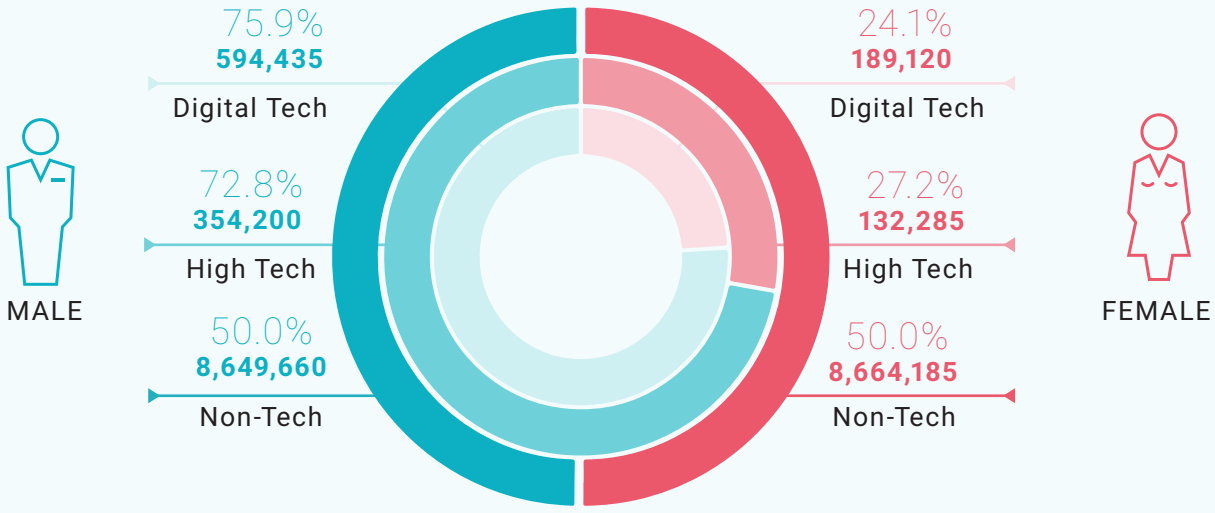
In 2016, which is the most recent census data from Statistics Canada, there were about 1.27million individuals in tech occupations in Canada. This was about 6.8% of the total workforce. About 74.7% of these tech workers were male and only 25.3% were female. Further, breaking down the tech workforce into digital and high-tech occupations, while 75.9% and 72.8% respectively were male, only 24.1% and 27.2% were female. This is compared to a near 50:50 representation in non-tech jobs.



About
74.7%
of these tech workers were male

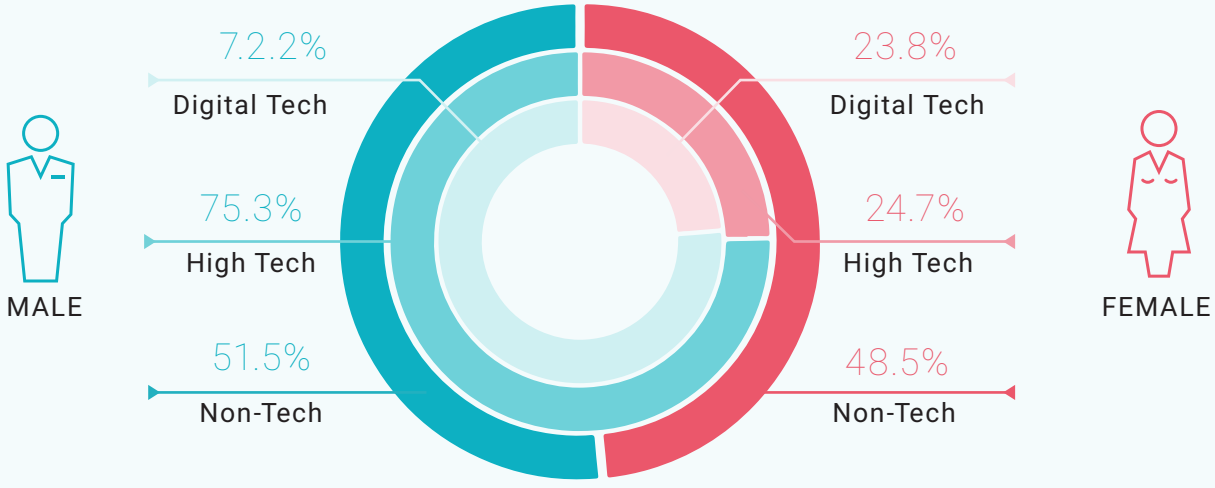
Only
25.3%
were female

Figure 1: Individuals in Digital Tech, High Tech and Non-Tech Occupations in Canada (see appendix)



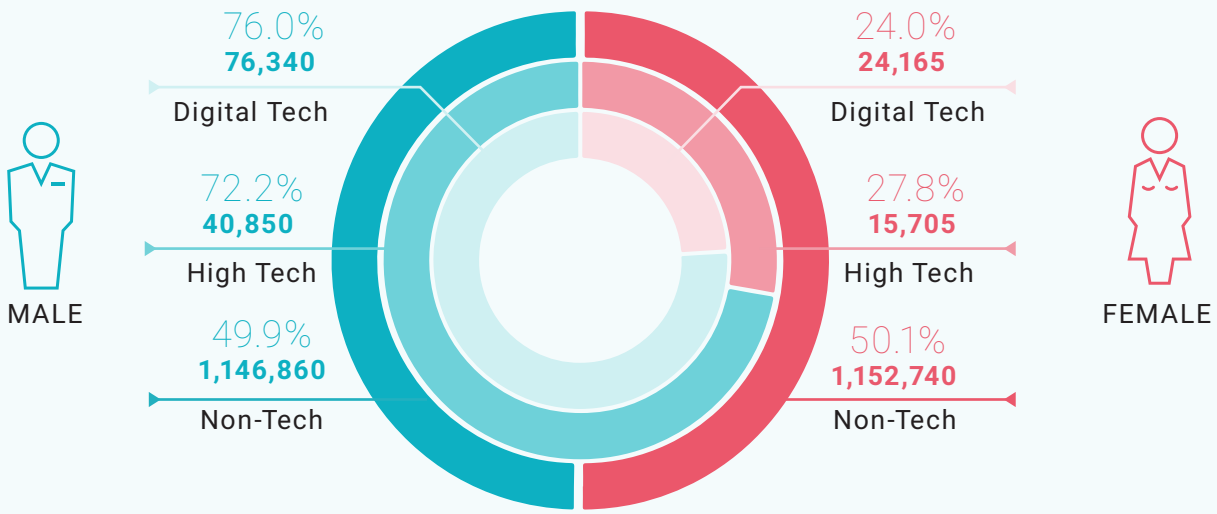
Alberta had 155,070 workers in tech occupations, making up about 6.8% of the province's workforce. Only about 24.4% of these tech workers were female. Breaking this further, 76.2% and 75.3% respectively of those in digital and high-tech were males, while 23.8% and 24.7% were females.

Figure 2: Individuals in Digital Tech, High Tech and Non-Tech Occupations in Alberta (see appendix)



In British Columbia, there were about 157,475 tech workers, making up 6.4% of the total workforce. Of this number, only 39,870 (25.4%) were female. Breaking this further, 76.0% and 72.2% respectively of those in digital and high-tech were males, while 24.0% and 27.8% were females.

Figure 3: Individuals in Digital Tech, High Tech, and Non-Tech Occupations in British Columbia (see appendix)



Visible Minorities in Tech

In terms of the racial makeup and diversity of tech workers, some visible minorities are overrepresented in the tech workforce and others are less so. For example, South Asians and Chinese are very much represented in the tech workforce. They are 5.6% and 4.6% of the Canadian population, and 8.1% and 8.9% of Canada's tech workforce respectively. On the other hand, Blacks and Filipinos are underrepresented as they are 3.5% and 2.3% of the population respectively but only 2.4% and 1.9% of the tech workforce. Interestingly also, the not-a-visible minority population is also underrepresented in the tech workforce; they are 77.7% of the population and 71.1% of the tech workforce.

The trends are mostly similar in Alberta and BC. In Alberta, where South Asians and Chinese are about 5.8% and 4.0% of the population, they are 8.8% and 9.3% of the province's tech workforce. On the other hand, Blacks and Filipinos are 3.3% and 4.2% of the population but are only 2.4% and 2.9% of the tech workforce. In BC, Chinese are about 11.2% of the population and are 16.3% of the province's tech workforce. On the other hand, Blacks, Filipinos and South Asians are 0.9%, 3.2% and 8.0% of the population but are 0.8%, 2.7% and 6.2% of the tech workforce respectively.

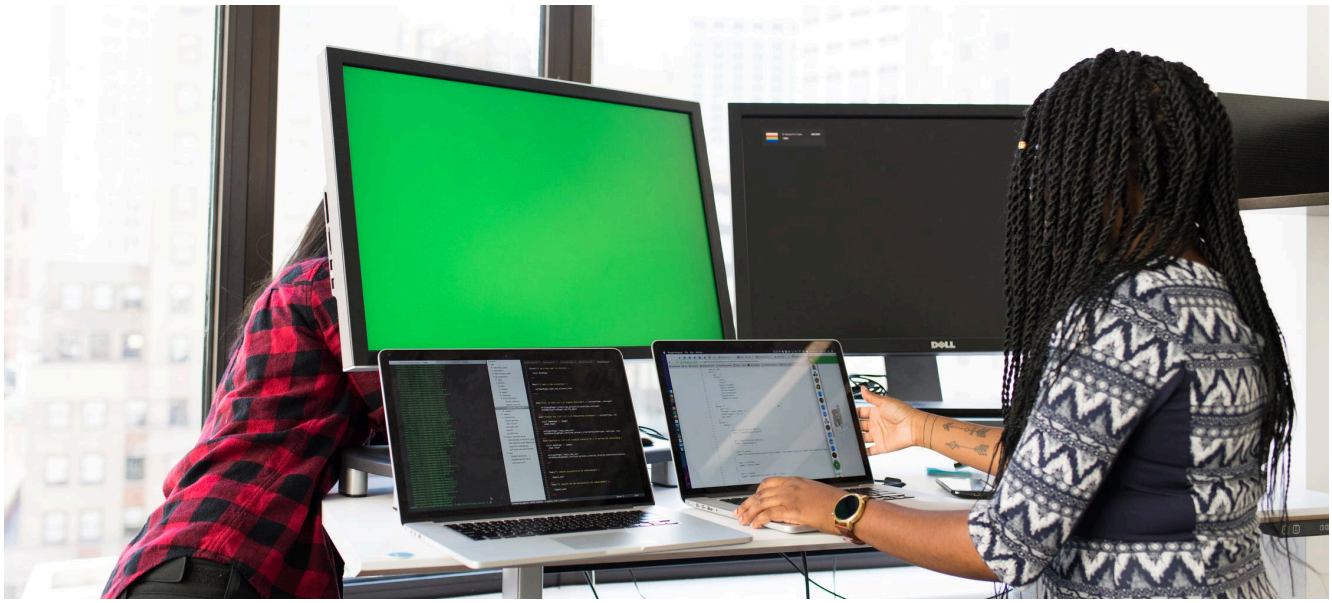


Table 1: Visible minority groups in the overall population compared to visible minorities in the digital tech workforce in Canada, Alberta, and British Columbia (Males and Females).

	Canada		Alberta		British Columbia	
Visible Minority	Percentage of the female population	Percentage of all women in digital tech workforce	Percentage of the female population	Percentage of all women in digital tech workforce	Percentage of the female population	Percentage of all women in digital tech workforce
Arab	1.5%	1.8%	1.4%	1.5%	0.4%	0.5%
Black	3.5%	2.4%	3.3%	2.4%	1.0%	0.8%
Chinese	4.6%	8.9%	4.0%	9.3%	11.2%	16.3%
Filipino	2.3%	1.9%	4.2%	2.9%	3.2%	2.7%
Japanese	0.3%	0.3%	0.3%	0.3%	0.9%	0.9%
Korean	0.5%	0.6%	0.5%	0.6%	1.3%	1.2%
Latin American	1.3%	1.6%	1.4%	2.0%	1.0%	1.5%
Multiple visible minorities	0.7%	0.7%	0.7%	0.8%	0.9%	1.0%
South Asian	5.6%	8.1%	5.8%	8.8%	8.0%	6.2%
Southeast Asian	0.9%	1.0%	1.1%	1.2%	1.2%	1.0%
Visible minority, n.i.e.	0.4%	0.4%	0.2%	0.2%	0.2%	0.2%
West Asian	0.8%	1.2%	0.5%	1.1%	1.1%	1.9%

Source: Statistics Canada 2016 Census data, Author's Analysis

Black Women in Digital Tech

In this section, we turn to examine closely the case of Black women in tech. Looking at the percentage of Black women in the overall Canadian population compared with their proportion in the tech workforce immediately shows that Black women are underrepresented in tech jobs. Despite being about 1.8% of Canada's total population, Black women make up less than 0.6% of Canada's total tech workforce. This is also the case in Alberta where Black women are about 1.6% of the population, but only 0.4% of the tech workforce, as well as in BC where Black women are about 0.5% of the population but less than 0.2% of the tech workforce.

Table 2: Black women in the overall population compared to Black women in the tech workforce (digital and high-tech) in Canada, Alberta and British Columbia.

	Canada	Alberta	BC
Percentage of Black women in the overall population	1.79%	1.57%	0.46%
Percentage of Black women in the tech workforce	0.56%	0.43%	0.18%

Source: Statistics Canada 2016 Census, Author's Analysis

The remainder of this section focuses on the representation of Black women in digital tech jobs.

Black women and other visible minority women in digital tech

The intersection of race and sex means Black women are often underrepresented in tech jobs. On the one hand, women have a lower participation in tech, and on the other, the black population is underrepresented in tech. The combined effect of this is that black women have a lower participation in tech compared to women in several other visible minority groups. For example, while Black women are 3.5% of Canada's overall female population, they are less than 2.5% of the women in digital tech (see table 3). Compared to women in all other visible minority groups, Black women are among the least represented in digital tech jobs in Canada, and the same can be said for black women in Alberta and British Columbia.

Table 3: Visible minority groups in the overall population compared to visible minorities in the digital tech workforce in Canada, Alberta, and British Columbia (Females only).

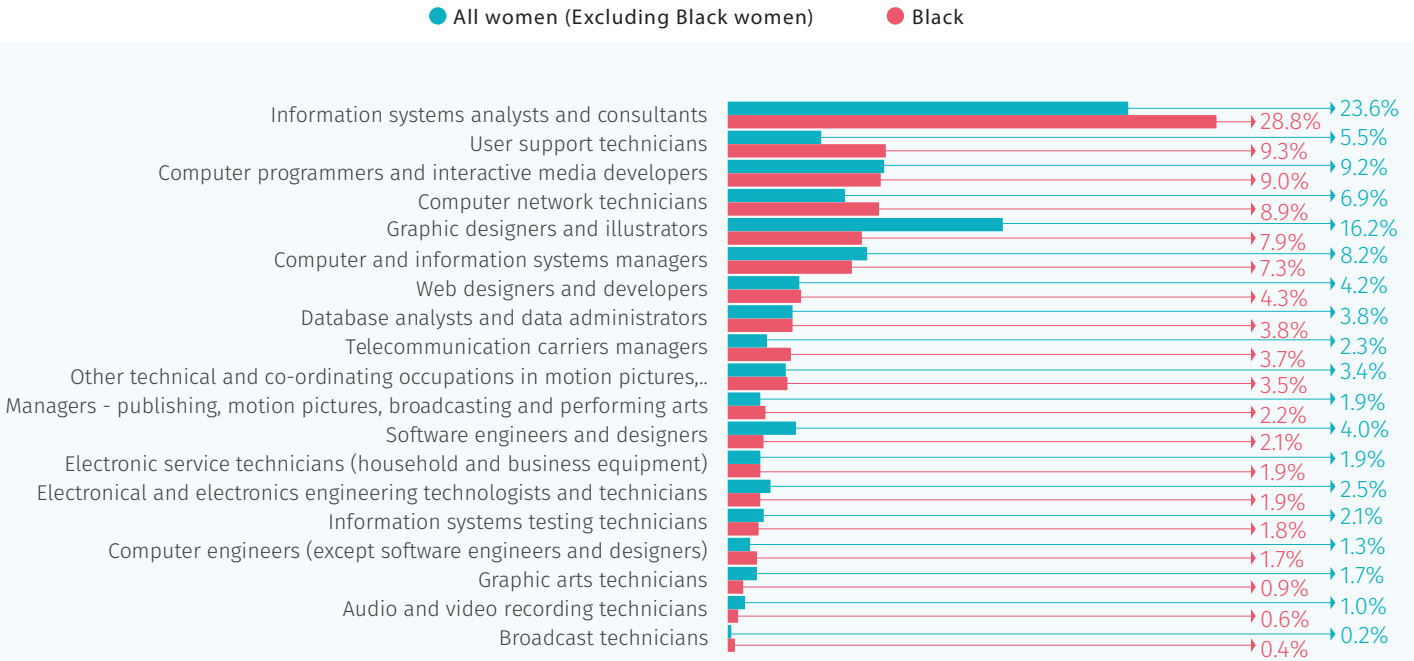
	Canada		Alberta		British Columbia	
Visible Minority	Percentage of the female population	Percentage of all women in digital tech workforce	Percentage of the female population	Percentage of all women in digital tech workforce	Percentage of the female population	Percentage of all women in digital tech workforce
Arab	1.4%	1.2%	1.3%	0.5%	0.4%	0.3%
Black	3.5%	2.4%	3.2%	1.8%	0.9%	0.5%
Chinese	4.7%	10.8%	4.1%	9.5%	11.7%	18.3%
Filipino	2.5%	2.1%	4.6%	3.2%	3.6%	2.8%
Japanese	0.3%	0.4%	0.3%	0.4%	1.0%	1.0%
Korean	0.6%	0.7%	0.6%	0.3%	1.4%	1.5%
Latin American	1.3%	1.8%	1.4%	2.0%	1.0%	1.6%
Multiple visible minorities	0.7%	0.8%	0.7%	0.9%	0.9%	1.2%
South Asian	5.4%	7.8%	5.7%	8.2%	7.8%	5.7%
Southeast Asian	0.9%	1.1%	1.2%	1.2%	1.2%	1.2%
Visible minority, n.i.e.	0.4%	0.4%	0.3%	0.2%	0.2%	0.1%
West Asian	0.7%	1.2%	0.5%	0.7%	1.0%	1.8%
Not a visible minority	77.4%	69.4%	76.2%	71.2%	68.9%	64.0%

Source: Statistics Canada 2016 Census data, Author's Analysis

Black women in digital tech jobs

As of 2016, there were about 4,620 Black women employed in digital tech jobs across Canada (2.4% of all women in the field). Comparing Black women to all women in digital tech jobs, Black women tend to work as Information systems analysts and consultants (28.8%, compared to 23.6% of all other women), User support technicians (9.3% compared to 5.5%), Computer network technicians (8.9% compared to 6.9%). They are, however, less likely to work as Graphic designers and illustrators (7.9% of Black women in digital tech compared to 16.2% of all women in digital tech) and Computer and information systems managers (7.3% compared to 8.2%). They are almost as likely as all other women in digital tech to be Computer programmers and interactive media developers (9.0% compared to 9.2%), Web designers and developers (4.3% compared to 4.2%) or Database analysts and data administrators (3.8% compared to 3.8%).

Figure 13: Distribution of women in digital tech occupations in Canada (see appendix)



In Alberta, as of 2016, there were about 300 Black women in digital tech jobs (1.8% of all women in digital tech in Alberta). They were more likely to be Information systems analysts and consultants (41.7%, compared to 28.3% for all women in digital tech), Computer network technicians (13.3%, compared to 8.7%), User support technicians (8.3%, compared to 5.1%), Information testing technicians (6.7%, compared to 1.8%), and Electrical and electronics technicians (6.7%, compared to 3.6%). Conversely, Black women in Alberta are less likely than other women to work as Graphic designers and illustrators (6.7% compared to 15.0% of all women in digital tech) or Computer programmers and interactive media developers (3.3%, compared to 6.1%).

In British Columbia, there were about 125 Black women in digital tech jobs (0.5% of all women in digital tech jobs in BC). They were more likely to be Computer and information systems managers (20.0%, compared to 6.8% of all women in digital tech), User support technicians (16.0%, compared to 5.4%), Database analysts and data administrators (8.0%, compared to 2.9%), Web designers and developers (8.0%, compared to 5.8%). In contrast, compared to other women, they are less likely to work as Information systems analysts and consultants (16.0% of Black women, compared to 17.7% of other women) or Graphic Designers and Illustrators (8.0% compared to 21.4%).

Figure 14: Distribution of women in digital tech occupations in Alberta (see appendix)

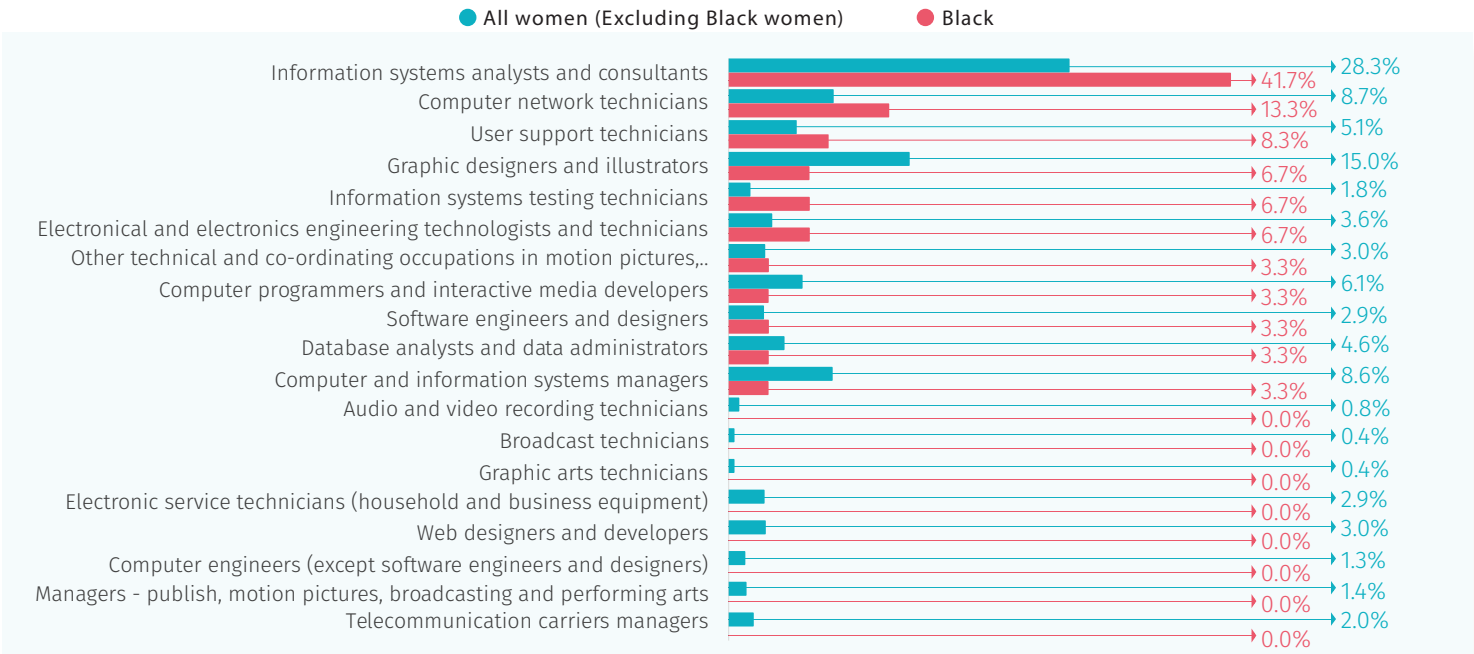
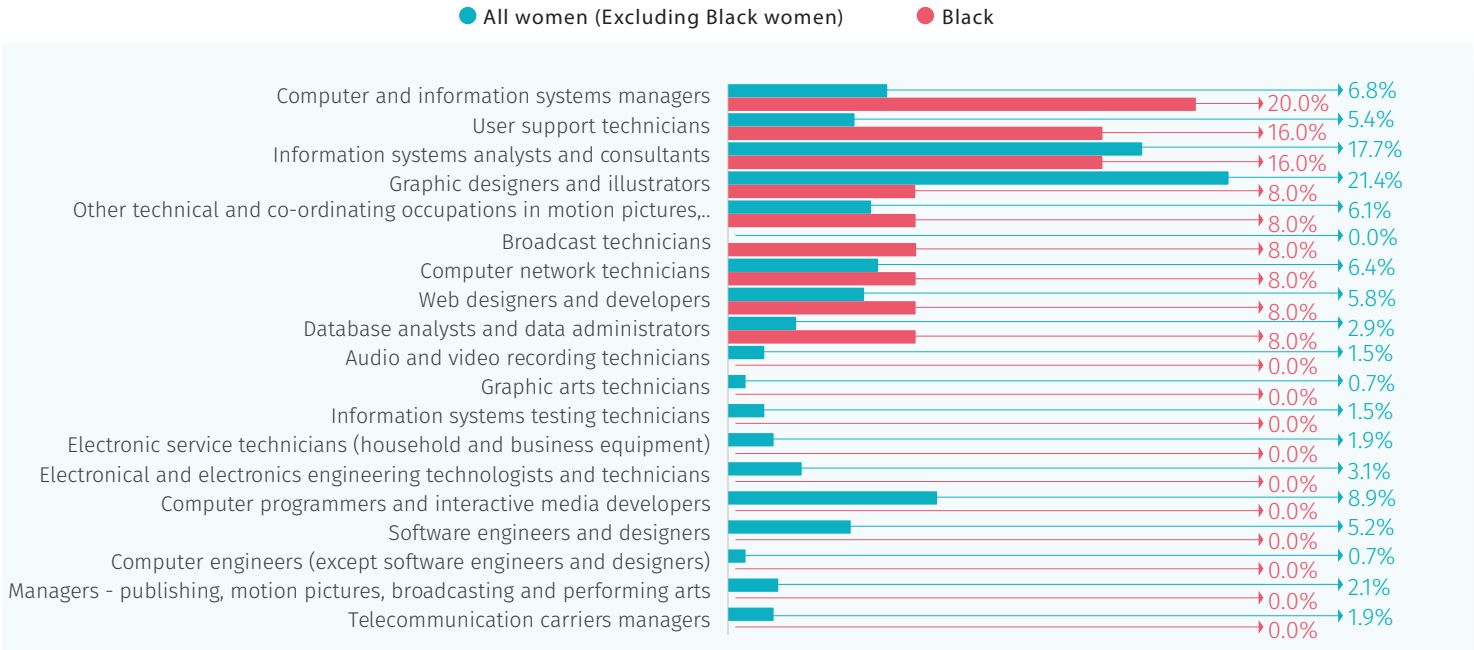


Figure 15: Distribution of women in digital tech occupations in British Columbia (see appendix)



It is not all bad news as there are a few digital tech jobs which Black women are more likely to be employed in compared with other women, such as Computer and Information Systems Managers, Computer Network Technicians and User Support Technicians. Deeper consideration of these occupations could point to good practices in attracting and retaining black women in tech. The overrepresentation of black women in these jobs might perhaps more so reflects their resilience and commitment to exert themselves and progress in tech regardless of the barriers that they often come against as they navigate the tech ecosystem. However, also several jobs where they are under-represented or not employed in at all depending on the province being considered. For example, there were no Black women Telecommunication carrier managers in Alberta or BC, there were no Black women Software engineers in BC despite the province's large tech ecosystem, and there were no Black women Web designers and developers in Alberta. These jobs could offer indications of what specific areas policy should be focused on improving the knowledge, networks, and resources that inform, attract, skill, upskill, re-skill, and support entry and growth of Black women and girls into tech jobs.

Implications of the Under-representation of Black Women in Tech in Canada

Overall, the under-representation of women and minorities across Canada's technology ecosystem is a cause for concern for several reasons, including:

- Increasing diversity in Canada and the need for a strong workforce. Maintaining current participation rates across racial and gender groups will not be enough to meet the workforce requirements required to maintain Canada's economic growth. It is crucial therefore to develop tech talent beyond the groups who have traditionally worked in the sector.
- The benefits of a diverse workforce: In addition to meeting future workforce needs that will include diverse populations, research shows that diversity increases revenue, profits, and employee satisfaction/engagement. It has been demonstrated that diverse companies and teams are more likely to innovate and introduce new products to the market (Scott et al. 2018).
- Under-representation in diverse communities exacerbates inequality: While diversity in the technology workforce has economic benefits for a nation and for individual companies, a lack of opportunity, access, and inclusion in occupations with the highest wages and jobs is equally damaging for communities of colour. Disparities in economic opportunities have the potential to further exacerbate economic inequality by race and gender (Manyika et al. 2015).

The "Leaky Tech Pipeline" Framework

The Leaky Tech Pipeline Framework draws upon social science research and data, as well as the experiences and insights of tech professionals, to describe the lack of diversity as a result of a complex set of structural and social/psychological barriers, or "leaks," which occur across the length of the technology pipeline (Scott et al. 2018). In our attempt to name and identify the numerous intersectionalities at play as Black women engage with the tech sector (and the labour market more broadly), we adapt the "leaky tech pipeline framework" and identify broad themes across different life stages for Black women. There are four stages identified in the technology and entrepreneurship pipeline: (1) Pre-K-12 Education, (2) Post-Secondary Education, (3) Tech Workforce, and (4) Entrepreneurship and Venture Capital.

Barriers to the Entry of Black Girls into Tech Education from Pre-K-12

In this stage of the leaky tech pipeline, lack of opportunities to develop early tech skills and knowledge, as well as many socioeconomic and psychological barriers affect the interest, engagement, and motivation of black girls to pursue tech. Racial and socioeconomic barriers exist in public education with respect to access to high-quality preschool, school funding, resources, qualified teachers, internet access, and rigorous and advanced courses. This stage of the tech pipeline is very critical to ensuring higher representation of girls in tech. This is more so, given research (Seward, Truong, and Kapadia 2019) that suggests that the ICT gender gap in Canada is driven less by technically trained women foregoing ICT careers, and more by young women choosing not to pursue training leading to ICT occupations.

- Access to preschool among low-income racialized Canadian children.
- School funding, resources, and qualified teachers in low-income and racialized areas.
- Internet, technology, and extracurricular computing activities for low-income racialized Canadian families compared to their non-racialized, high-income counterparts.
- Access to advanced STEM and computing courses.
- Discrimination, stereotypes about math, science, and computing abilities which negatively affect interest self-efficacy, and aspirations in STEM for black girls.
- Environmental cues in the tech classroom which suggest membership or exclusion for different groups of students in subtle and overt ways.
- Absence of role models and mentors.

Barriers to the Entry of Black Girls into Tech in Higher Education

Not all students have equal chances to pursue the post-secondary degree of their choice. High school preparation, coursework, and quality (all of which are affected by race and income) can impact the type of college and field of study students can attend (Schneider and Saw 2016). There are systemic and structural barriers throughout pre-K-12 education that impact the preparation of Black girls for college; wealth gaps affect college choice, affordability, and degree completion time. These barriers are compounded by several of the additional social and psychological barriers which also impact pre-K-12 education, including classroom climate, stereotype threat, and the lack of role models, mentors, and peers. In this stage of the leaky tech pipeline, all of these factors influence enrolment, persistence, and completion of STEM-related degrees among black girls.

- Poor academic preparation from earlier education in STEM courses in high school.
- Wealth and income inequality.
- Discriminatory campus and classroom climate for students from underrepresented backgrounds.
- Conscious and unconscious stereotypes and biases held by faculty members and other gatekeepers.
- Lack of role models, mentors, and peer networks to support women and students of colour in STEM education and careers.
- Implicit exclusion from internships and workforce pathways.

Barriers to the Transition of Black Women and Girls into the Tech Workforce

Despite the large loss of black female tech talent during K-12 and post-secondary education, the disparity in the tech workforce is not exclusively caused by the lack of available talent. Rather, the trend of the barriers to women entering tech occupations continues into the labour market as lower participation in science and tech occupations, and the STEM sector (and by extension Tech) has been failing to hire and retain women and people of colour in these occupations (Vu, Lamb, and Zafar 2019). Recruiting and hiring discrimination prevents women and underrepresented people of colour from entering the STEM (and broader) work force. Meanwhile, inequities in pay, negative stereotypes, harassment, and bias in promotion result in decreased satisfaction and high turnover.

- Interviewing, hiring, and recruitment biases.
- Workplace racism and stereotyping may discourage underrepresented professionals from pursuing careers where they might be threatened by these threats.
- Workplace culture, bullying and harassment of women and underrepresented people of colour.
- Biases in promotion and advancement.
- Gender pay inequalities.
- External stressors & work-Life balance.

Barriers of Black Women and Girls in Tech Entrepreneurship & Venture Capital

Having few social networks, little access to social and financial capital, and experiencing bias in investing decisions, women, and underrepresented people of colour face significant barriers in launching technology startup companies, getting venture capital funding, or becoming tech investors. Tech entrepreneurship in Canada can be viewed as an intricately related but much more exclusive element of the broader tech ecosystem, with nearly insurmountable obstacles for a large majority of people. Tech entrepreneurship is even more difficult for individuals from underrepresented racial and gender groups.

- Limited education and career pathways.
- Generational wealth and startup capital.
- Social networks and social capital.
- Biases and stereotyping in investment decisions.

Beyond the leaky tech pipeline: Barriers to Black women in other fields

Transitioning to tech jobs

Another group of Black women worth considering are those who do not have education and careers in the tech sector, but who wish to make the transition to tech. To get more of these women into tech, we need to understand what's holding them back. First, it is important to note that the barriers for this group of women are similar to those faced by other women in tech, but with some added layer of complexity arising from being "outsiders" to tech.

- Traditionally, universities have been the primary channel for developing new technology professionals, but traditional 4-year technical degrees take time and are expensive.
- Alternative educational paths in the form of Massive Open Online Courses (MOOCs), Boot camps, peer-to-peer knowledge transfer, and other resources to facilitate careers in tech, are not equally available to Black women owing to several of the same factors identified within the leaky tech pipeline framework.
- There is also the assumption that tech is complex and mastering it requires a lot of technical background and knowledge and heavy coding experience.
- Potential entrants to tech are faced with the dilemma of how to navigate a field in which they don't know where to begin.

Black Women in Tech: An Equity, Diversity, and Inclusion (EDI) Perspective

The under-representation of Black women in tech is in a much broader sense an equity, diversity, and inclusion (EDI) concern. Although there are unique EDI concerns about the under-representation of Black women in tech, there are also commonalities with other under-represented groups. In this section, we consider the current landscape of EDI within the tech industry. This will attempt to paint a tech employers' perspective and identify how tech companies are addressing (or failing to address) these issues of gender equality, racism and discrimination, workplace diversity, and a host of others.

The need for diversity in tech and other industries in Canada makes good business sense and is the right thing to do. Year after year, the body of knowledge about the positive impacts of diversity grows. Companies are identifying the need to improve their EDI practices to attract and retain the best talent and improve their business performance. However, despite the interest and effort, the tech sector has struggled to implement EDI strategies and increase the representation rates of women and minority groups in high-paying jobs across the sector. There are still significant gaps in representation. More so, with respect to this study, the literature reviewed shows that Black women face double jeopardy in this arrangement.

- Perhaps, one of the most significant reasons tech companies struggle to achieve success in EDI strategies aimed at a more diverse tech workforce is a tendency to treat underrepresented groups as a single group. One size does not fit all when it comes to women.
- Often, the issue is framed as simply or primarily a result of a lack of diversity in the available tech talent. However, simply focusing on the available talent misses the mark and is a failure to effectively name the issue as even in the cases where there is an availability of talent, the prevailing culture in the sector plays a significant role in driving women and underrepresented groups away from these jobs.
- Arguably, the drive for diversity within corporate Canada (including the fast-evolving tech sector) is only recently catching on. There are significant examples of EDI strategies from the US tech sector (there are varied opinions on the success of these strategies), but a glossary examination of the Canadian tech space reveals an absence of similar examples.
- To address EDI issues, well-intentioned tech companies need more than passion and commitment; they also need a plan. But only few tech companies are connecting EDI directly to the achievement of business results, such as innovation and improved financial performance.
- The resources and constraints facing companies of different sizes will influence how they think about and inevitably act on people-related strategies. Tech companies at different stages; Start-ups (1 to 120 employees), Scale-ups (121 to 500 employees), or Large Enterprises (500+ employees), will therefore inevitably think and act (or fail to act) on EDI strategies differently.
- Large tech firms have the advantage of being able to collect rich demographic data and use an intersectional analysis approach to identify nuanced challenges and opportunities. The challenge is to use these intersectional datasets to facilitate meaningful investment EDI strategies for individuals with a diverse range of backgrounds, identities, and experiences, while also ensuring that silos are not created.
- Ironically, a resistance to change by the old guard of employers and employees is another impediment to progress on EDI in tech. Leaders need to believe and strive towards a trickle-down effect.
- Representation at the top impacts the conviction an organization has towards diversity. It is important to enable a non-discriminatory environment across all levels and teams.

Interventions and Recommendations

Building awareness among the several tech ecosystem players and stakeholders is key to improving the representation and experience of Black women in tech, as it is impossible to address an issue that has not been effectively named and identified. Flowing from the leaky tech framework previously outlined, we use a career or life stage approach to categorize the interventions and recommendations for addressing the under-representation of Black girls and women in tech as follows:

Engendering interest and opportunities for Black girls and women in tech from K-12 to higher education

These interventions are aimed at engendering interest and creating opportunities for Black girls and women in tech. They focus mainly on addressing the barriers faced by girls and women who have the potential to enter the tech industry; they may be in school (from K-12 to higher education, all ages) and/or are considering a career in the tech industry. Some relevant interventions include the following.

- Implicit bias trainings for parents, teachers, school counsellors and instructors.
- Tech education for Black Girls.
- Cultural ambassadors and "women in tech" role models.
- Scholarships and Alternative Education Paths.
- Tech Internships for students to explore careers and even land jobs after graduation.

Encouraging and enabling Black women to start or transition into tech jobs, including from other fields

These set of interventions focus on Black women newly entering tech. This includes those with previous tech education and training, as well as those with no previous tech experience but are wanting to transition to tech jobs. Effectively, they are interventions aimed at encouraging and enabling Black Women to transition into tech jobs.

- Promote diversity in recruiting and unconscious bias training for tech recruiters.
- Recruit using inclusive and less conventional methods.

Retaining Black Women in Tech

These set of interventions draw from the reality that women are leaving tech occupations at higher rates than their male counterparts. They therefore seek to address the challenges faced by Black women currently working in tech.

- Women in tech meetups and discussions.
- Strategic partnerships with equity seeking organizations.
- Formal and informal mentorships.
- Increase visibility of female role models.
- Working groups and employee resource groups.
- Supportive Management and Policies on workplace diversity.

Conclusion

This report has reviewed the literature on the barriers faced by black women and girls as they navigate the tech ecosystem in Canada. The examination of the barriers to the full participation of black women in tech has been structured around the "Leaky Tech Pipeline" Framework which captures the end-to-end reality of the tech talent flow, rather than focus only on immediate barriers at any one life stage as there are leaks and barriers throughout the length of the pipeline that siphon talent, particularly talent from underrepresented backgrounds.

Black women in tech are not a monolith. Rather as one of our interviewees pointed out, the black woman in tech experience "is a mosaic of people and of the methods they've adopted to get in (into the tech sector) because they've had to jump through so many hurdles and so many hoops. And sometimes the way in which you find you're able to get through obstacles means you have to do a lot of creative thinking and creative thinking is different for everybody". This report is therefore limited in the number of voices it has been able to capture. It will however in several ways support further and more extensive engagements with black women and girls, the black community in Alberta and BC and with the several other stakeholders and players in the tech ecosystem – including employers, IT training institutions – through focus groups and knowledge sharing and development events.

Increasing the number of Black women in technical jobs is both a matter of equity, diversity, and inclusion (EDI) as well as a socioeconomic imperative. Coming out of the pandemic and seeing its disproportionate impact on low-income communities and black women, the need to get more black women into high paying and resilient tech jobs cannot be overemphasized. As we have pointed out through this report, the issues begin from as early as childhood when young black girls are steered away from STEM fields through stereotypes and biases that undermine their interest in technology. This ab initio means fewer of them get into the tech talent pipeline to begin with.

However, it is not solely a matter of starting through the tech pipeline as several of those who get in the pipeline continue to face biases and stereotypes throughout their education and careers in tech. In some ways it appears to be a vicious cycle of under-representation leading to more under-representation. The lack of black women in the sector propagates stereotypes among black girls causing them to think or believe that the tech sector or certain tech roles are not ones that they can undertake or get far doing. When they don't see themselves adequately reflected in the space or they see a particular type of person in that space, there is a perception that is created that they need to be a certain way to make it there, otherwise, they won't be successful. This keeps them from getting into the sector and the cycle goes on.

A common retort regarding the underrepresentation of black women in tech is that there is no black talent out there. But there is black talent everywhere that is not afforded full participation in the sector due to the several systemic barriers in the later stages of the pipeline. Employers and other stakeholders must be deliberate and intentional to do the work that needs to be done to be equitable, diverse, and inclusive. This would include committing the extra resources and doing the extra work to reach out to black women and other underrepresented communities to attract and retain them in tech. Another key aspect of the work that tech companies need to do is creating the right culture where EDI is not simply an add-on, but rather a central part of their businesses and their work. A culture where EDI goals are actively set and tracked holistically, and perhaps where management across the board is compensated, promoted and performance reviewed based on progress on EDI goals. Employees need to be offered the necessary supports to thrive in the sector. In all this, care must be taken to ensure that the representation of black women is not reduced simply to a matter of numbers but more so it should ensure that tech spaces are more equitable, diverse, and inclusive in every sense.

The historical gaps, stereotypes and biases in tech also mean that throughout the black community, there is need for the important work of creating awareness and showcasing the tech sector and its several opportunities: especially for black women and girls. There is every need to change the narrative from tech not being something for black women to that of tech being an area that black women excel in. There is the need to change the narratives among black parents and to show them that their girls can do monumental things and have stellar careers in tech, and that the industry needs voices like hers. For black women in the tech sector already, it is important to build stronger communities that serve as safe spaces where black women in tech can engage with and lean on each other; allyships and partnerships, and for them to be supported in this.

Overall, it is important to point out that in all this, black women are not helpless victims of the tech sector. Black women everywhere through the entire length of the pipeline, including those that have contributed their experiences to this research through interviews are breaking the barriers in several ways and are doing important,

interesting, and impactful work. Everyone has had their unique path, with examples of how they have and continue to brave the odds and navigate the sector. They have grown to be adaptive and ingenious in the ways that they navigate the tech sector, and they continue to break and rise above the glass ceilings regardless of the forms these come in. Even more so, some of them have taken the under-representation of black women in the tech sector as a motivation to stay in the sector and be the examples that other black women and girls can point to and be drawn into the sector.

Appendix

Tech Jobs in Canada - Digital and High-tech National Occupational Classifications (NOCs)

Digital Tech	High-Tech
0131 Telecommunication carriers' managers*	0211 Engineering managers*
0213 Computer and information systems managers*	0212 Architecture and science managers*
0512 Managers - publishing, motion pictures, broadcasting and performing arts~	2111 Physicists and astronomers*
2147 Computer engineers (except software engineers and designers) *	2112 Chemists*
2171 Information systems analysts and consultants*	2113 Geoscientists and oceanographers*
2172 Database analysts and data administrators*	2114 Meteorologists and climatologists*
2173 Software engineers and designers*	2115 Other professional occupations in physical sciences*
2174 Computer programmers and interactive media developers*	2121 Biologists and related scientists*
2175 Web designers and developers*	2131 Civil engineers~
2241 Electrical and electronics engineering technologists and technicians~	2132 Mechanical engineers*
2242 Electronic service technicians (household and business equipment) ~	2133 Electrical and electronics engineers*
2281 Computer network technicians~	2134 Chemical engineers*
2282 User support technicians~	2142 Metallurgical and materials engineers*
2283 Information systems testing technicians~	2143 Mining Engineers ^
5223 Graphic arts technicians*	2144 Geological Engineers ^
5224 Broadcast technicians~	2145 Petroleum Engineers ^
5225 Audio and video recording technicians~	2146 Aerospace engineers*
5226 Other technical and coordinating occupations in motion pictures, broadcasting and the performing arts~	2148 Other professional engineers, n.e.c.*
5241 Graphic designers and illustrators*	2161 Mathematicians, statisticians and actuaries*
	2211 Chemical technologists and technicians*
	2211 Chemical Technologists and Technicians ^
	2212 Geological and Mineral Technologists and Technicians ^
	2221 Biological technologists and technicians*
	2231 Civil engineering technologists and technicians ^
	2232 Mechanical engineering technologists and technicians
	2233 Industrial engineering and manufacturing technologists and technicians ^
	3211 Medical Laboratory Technologists ^
	3211 Medical Laboratory Technologists ^
	3215 Medical Radiation Technologists ^

- * included in Lamb, Greig., Suddon, Matthew., Brookfield Institute for Innovation and Entrepreneurship.,. The State of Canada's Tech Sector, 2016. Toronto, Ontario: Brookfield Institute for Innovation + Entrepreneurship, 2016.;
- ~ included in BC Tech Talent Report 2016 N.d. https://www.workbc.ca/getmedia/8d38ac6f-82d4-4db1-b0bf-ac0f77d78af5/2016_techtalentbc_report.pdf.aspx.;
- ^ included in Norton, Jade. "High Technology Occupations in British Columbia." BC Stats, May 2020. https://www2.gov.bc.ca/assets/gov/data/statistics/business-industry-trade/industry/tech_occupations.pdf.

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