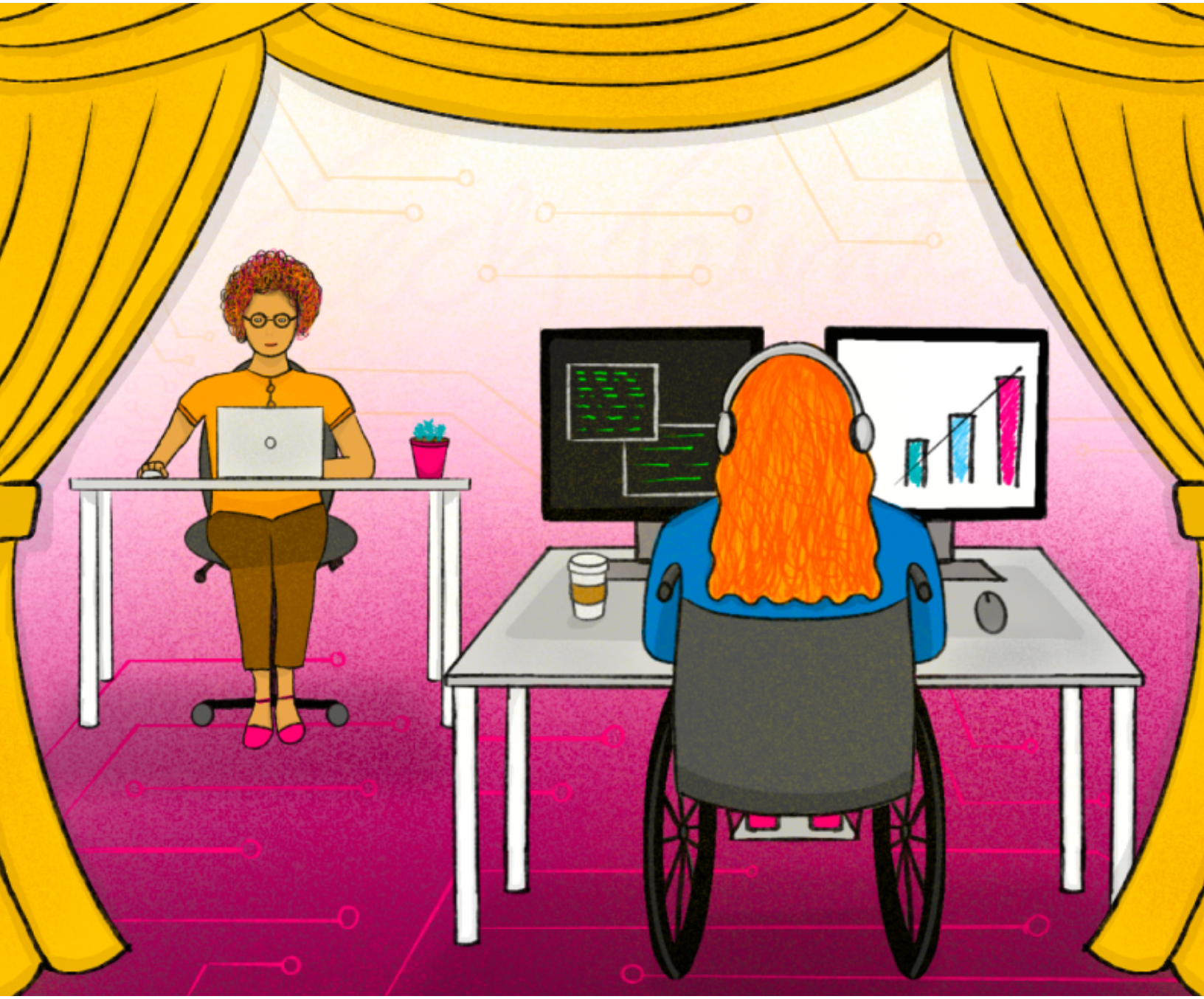
Canada's Got Tech Talent

Diversity of Canada's tech workers

Angus Lockhart and Viet Vu | June 2024



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The Dais is a public policy and leadership think tank at Toronto Metropolitan University, working at the intersection of technology, education and democracy to build shared prosperity and citizenship for Canada.

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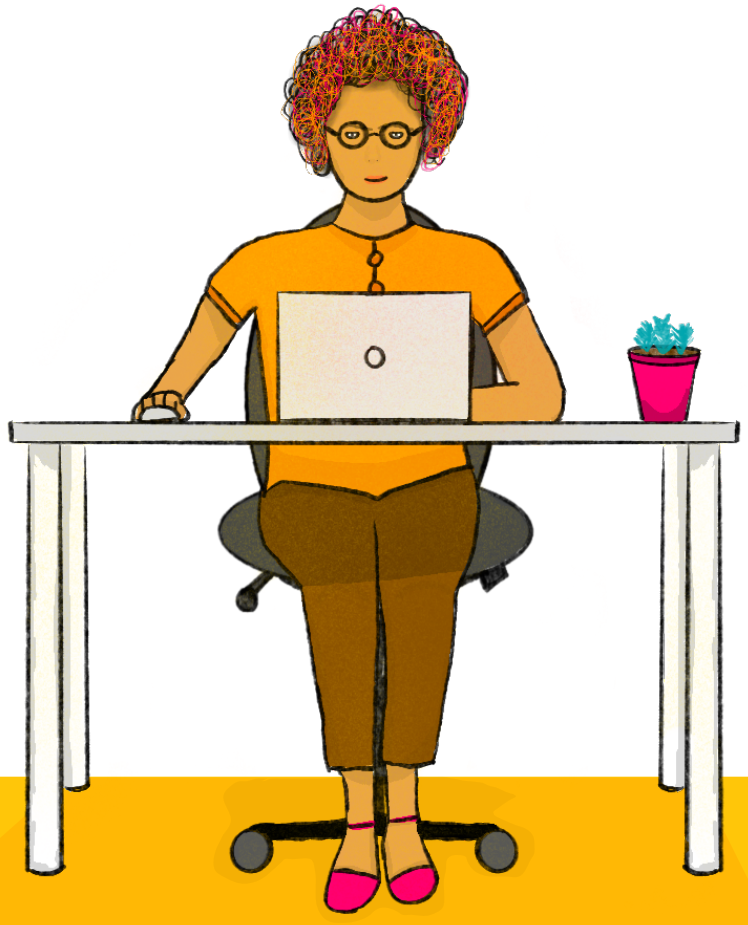


1 Introduction and Key Findings

Technology is essential to the Canadian economy and so are its workers. To ensure that technology benefits everyone in Canada, we need to study the composition of the tech workforce and determine any improvements that could help boost progress and productivity. In the first part of our Canada's Got Tech Talent series, we explored broad trends that relate to the numbers of tech workers in the country and their compensation. We found that there are nearly one million tech workers in Canada. These positions are desirable—they pay much better than the average job. However, they are not distributed equally across all demographics. Given the high pay that these jobs garner, inequalities both in terms of pay and demographic composition within the tech field contribute to overall inequality in Canada.

Using the same "tech worker" definition, in the second part of our *Canada's Got Tech Talent* series, we break down the demographic composition of tech workers in Canada to understand who is benefitting from these jobs, and which groups within the tech workers category are most advantaged.

We find:

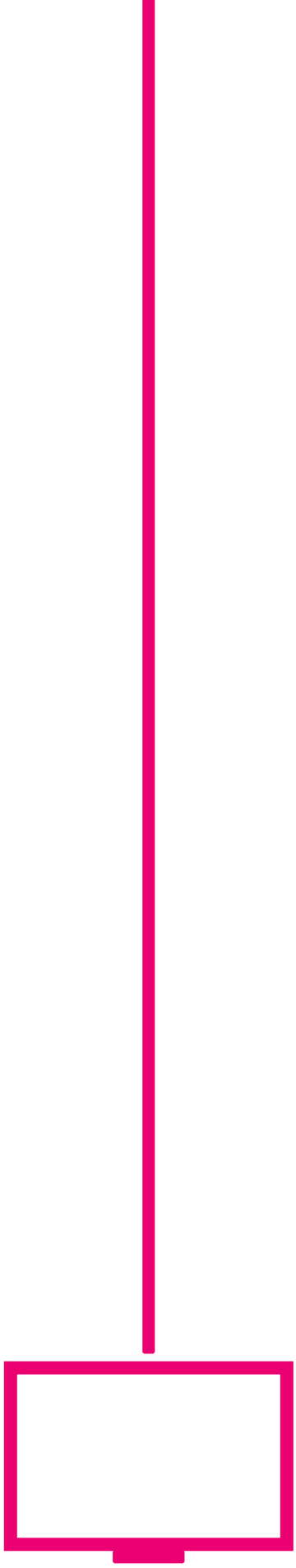
- **The gender pay gap in Canada's tech workforce has almost tripled since 2016.** According to the latest Census data, men in the Canadian tech sector earned $20,000 on average more than women annually. The gender pay gap has grown since 2016, when men earned $7,200 more than women.

- **Visible minorities in Canada are more likely to hold tech jobs, but are underpaid compared to non-visible minorities.** Overall, 6.6 percent of workers in Canada with a visible-minority identity work in tech, compared to 3.8 percent of non-visible minorities. However, those with visible-minority identities only earn an average of $78,800 a year compared to $93,000 for non-visible minorities.

- **Non-permanent-resident tech workers earn only $52,000 a year compared to immigrant and non-immigrant tech workers, who make $88,000 and $89,800 respectively.** Canada's efforts to attract foreign tech workers have worked—tech workers are disproportionately either immigrants or non-permanent-residents, but they are paid less than their counterparts.

- **Indigenous Peoples in Canada earn on average $14,000 less than non-Indigenous tech workers annually.** Indigenous Peoples are also 70 percent less likely than others in Canada to work in tech. Only 1.4 per cent of employed Indigenous Peoples are currently working in tech occupations, compared to 4.8 percent of non-Indigenous workers.

- **On average, Canadian tech workers earn $40,000 more per year than workers employed in other fields.** The salary gap with non-tech work has narrowed since 2016. Canada's tech workers, however, are still underpaid compared to the same occupations in the United States. According to our previous research, tech workers in Canada earn 46 percent less than tech workers in the US.



2 Key Categories and Concepts

Before we discuss the experiences of tech workers who hold identities made marginalized, we provide a brief overview of the identities that we address in this work, noting as well some identities that we do not address.

Gender

The Canadian Institute of Health Research defines gender as: "socially constructed roles, behaviours, expressions, and identities of boys, girls, women, boys, men, and gender diverse people."[1] This definition differs importantly from the definition of sex, which is "a set of biological attributes in humans and all animals."[2] Often, an individual's sex and gender tend to reflect broad societal expectations, but in many cases this is not true. Up until 2021, the Canadian Census only collected data that relates to a respondent's sex but not their gender. The 2021 Canadian Census was the first in Canadian history to ask a separate question for both sex and gender.

As a result, we primarily use the gender identifier in our work. However, this gender identifier deserves some additional exposition. As the gender question on the 2021 Census allowed a respondent to identify specifically if their gender identity does not fit into the gender binary (of being a man or a woman), there's a distinct category of "non-binary" individuals captured in the Census. In 2021, 0.33 percent of people in Canada identified with at least one non-binary identity. This relatively small population makes it challenging to do further disaggregated research as the risk of compromising the identity of an already-marginalized respondent is high. As a result, a standard analytical tool that Statistics Canada developed for analysis that isn't primarily focused on gender includes randomly assigning non-binary individuals into the analytical sub-population as men and women, creating categories of "men+" (gender category that include men and half of non-binary people) and "women+" (gender category that includes women and half of non-binary people). It is important to note here that the assignment is entirely random, and should not be implied as a judgment on whether or not a specific non-binary individual is "more men" or "more women", a notion that is derogatory.

However, for purpose of ease of reference, we will refer to "men+" as **men** and "women+" as **women** in our work. We hope in the future to be able to do research to understand the experiences of non-binary people in technology that specifically separates out their experiences from that of people who are within the gender binary.

Age

For this study, we focus on working-age populations of Canada, which is defined by Statistics Canada as those 15 years of age or older.

Formal education

For this report, we focus on the concept of "highest degree obtained" as set out by Statistics Canada. Specifically, the concept notes formal credentials that are obtained by an individual through a federally- or provincially/territorially- recognized degree program. Statistics Canada then generates an implied hierarchy of these degrees, starting with not having any formal degrees, to a high school diploma, then an apprenticeship or trades certificate, to CEGEP (in Quebec), college, and university diploma or certificate below a bachelor level, bachelor's degrees, university diploma or certificate above a bachelor level, a master's degree, and finally a doctoral degree. Only the respondent's highest educational credential (as ranked in the list) is captured.

While this approach reduces the nuance of one's educational experiences (both formal and informal), it continues to be a useful approach as it generally captures the progressive nature of the time and financial costs associated with obtaining each subsequent credential. To ensure we capture key dynamics, we further aggregate bachelor's degrees, university diploma above a bachelor's degree, master's degree, and doctoral degree into a single category of "bachelor's degree or above".

Visible Minority identities

An important aspect that we focus on for this study is one's ethnic, cultural, or racial identity. In Canada, the framework to describe these groups is captured by the concept of "visible minority identities", as defined in the federal *Employment Equity Act (EEA)*. While minor changes to the classification have been made over the years, much of the work to define the current categories date back to the 1980s, with the process to establish the EEA. In the EEA, four distinct classes were enumerated as having protected status: women, visible minorities, Aboriginal peoples, and persons with disabilities. As such, it is important to note that "visible minorities" as a concept is distinct from Indigenous identities. In fact, Indigenous Peoples in Canada are classified as "non-visible-minorities" in this definition, and we discuss measurements of "Indigenous Identities" separately below.

While the Government of Canada is currently undertaking a process to modernize and update the federal employment equity framework (including updating the term used to refer to "visible minorities"). For this study, we still focus on the groups identified in the EEA. They include: South Asian, Chinese, Black, Filipino, Arab, Latin American, Southeast Asian, West Asian, Korean, and Japanese.[3]

Immigration status

For the purposes of this study, we divide everyone in Canada into one of three categories: "non-immigrants", "immigrants", and "non-permanent-residents". The first group, "non-immigrants" are narrowly identified to be those who held Canadian citizenship at birth, and "non-permanent-residents" are defined to be those who have temporary status in Canada, including those who hold study permits and work permits, as well as refugee and asylum claimants. Importantly, as the data on an individual's immigration status comes from administrative data held by Immigration, Refugees, and Citizenship Canada, it does not capture those who are undocumented.

The category of "immigrants" requires the most detailed explanation. It includes those who did not hold Canadian citizenship at birth, but became a "landed immigrant" (a common way to refer to those who obtain permanent residence status in Canada). An individual could have arrived first in Canada as a non-permanent-resident (e.g., as a student) who then obtained permanent resident status. Such an individual would be categorized in the "immigrants" category if they obtained permanent residence status prior to Census collection. Some of these individuals also subsequently become Canadian citizens, however, as long as they held a permanent resident status prior to becoming Canadian, they would also be considered an "immigrant" for the purposes of our study. As a result, people who were born with Canadian citizenship, who grew up outside of the country and are now residing in Canada - sometimes referred to as "hidden immigrants" - are treated as citizens and so are not captured in this category despite having a distinct experience immigrating to Canada.

Indigenous identities

Canada has a long history of injustice towards Indigenous Peoples in Canada. As a result, data collection as it pertains to Indigenous Peoples deserves to be approached with sensitivity to historical trauma. One key agreement that the Government of Canada reached with Indigenous Nations is the ability for a recognized Indigenous Reserve to deny Statistics Canada access to their on-reserve peoples for purposes of census enumeration. As a result, any results as they pertain to Indigenous Peoples in Canada, arrived at by way of the Census, should be understood to represent an incomplete picture.

While before 2021 the number of reserves that were incompletely enumerated had declined with each successive census, in 2021 that number increased from 14 census subdivisions to 63 census subdivisions.[4]

For those that do participate in the census enumeration process, the census allows for self-identification of Indigenous Identities. People are then broadly categorized as holding one (or more) of the three main Indigenous identities: First Nations, Métis, and Inuit. This is the main classification we focus on. At the same time, we recognize the complexity of Indigenous identities, and the debates taking place surrounding self-identification, formal "Indian" status, as well as Indigenous identities more generally.

Identities we do not address

While we strive to include and understand the experience working in technology for multiple intersecting identities, the data we use does not allow us to focus on some specific identities. While we focus on two such identities in this section, there are likely others we miss.

The first identity we do not fully capture is diverse sexual orientations. The Canadian Census currently does not ask questions regarding one's sexual orientation, and the only subset of queer people that can be identified in the data are those who co-habitate with their same-gender (and/or same-sex) partner. As a result, any analysis we could do with such a group will likely not show the full range of experiences of those who are not heterosexual.

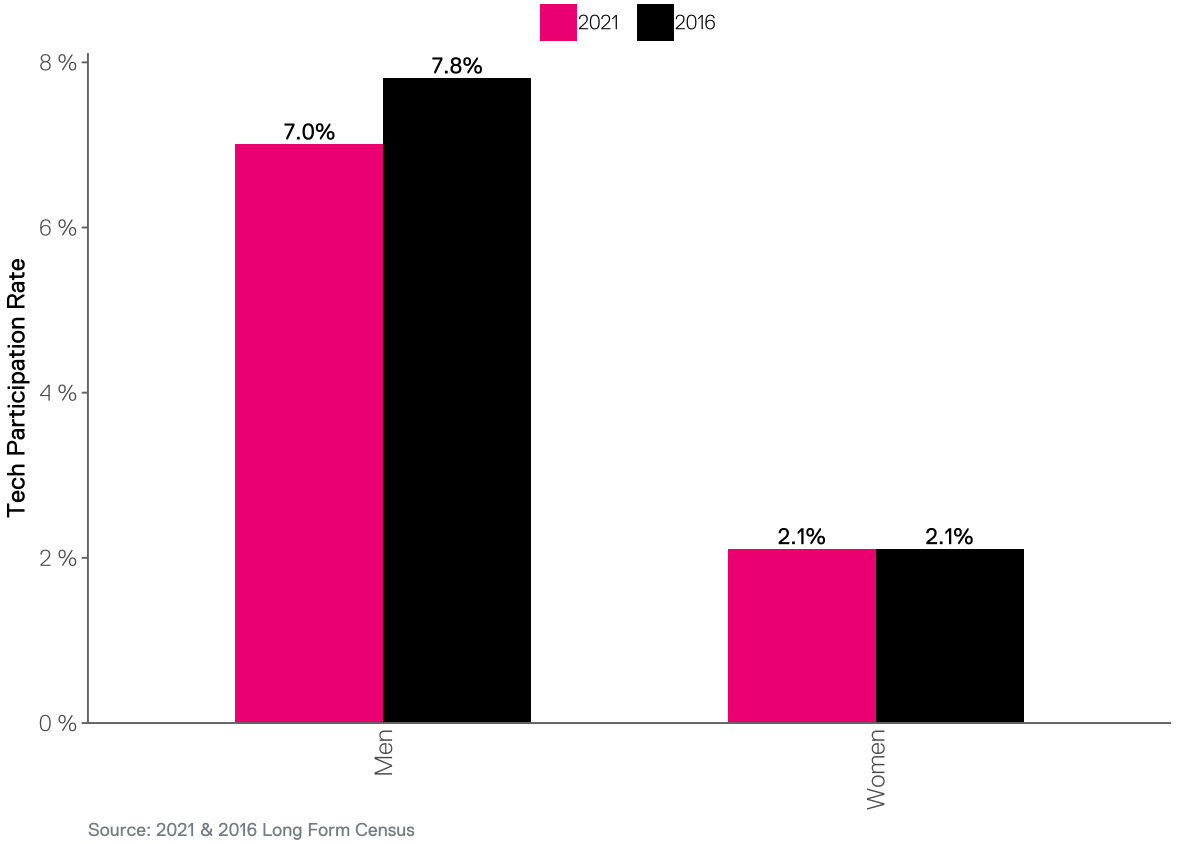
The second identity we do not capture are experiences of those with a disability. While the 2021 Census does capture whether a respondent has "difficulty" engaging in specific activities (such as seeing, hearing, mobility, concentrating), and other long-term health conditions, such data has been shown to have a high rate of "false positives", and captures many who may not have a disability, impacting accurate reporting in experiences of those with disabilities.[5]

3 Demographics of Tech Workers

Gender

The gender disparity in tech work is well established, with previous research showing that there is a significant and persistent gap both in participation in tech work and pay from tech work.[6] Unfortunately, as of the latest census, this remains true in Canada. While seven percent of men working in Canada are engaged in tech work, only 2.1 percent of women working in Canada are in tech jobs. The participation rate for women remains identical to that identified in 2016, while men's participation rate has dropped by almost one percent (from 7.8 percent in 2016).

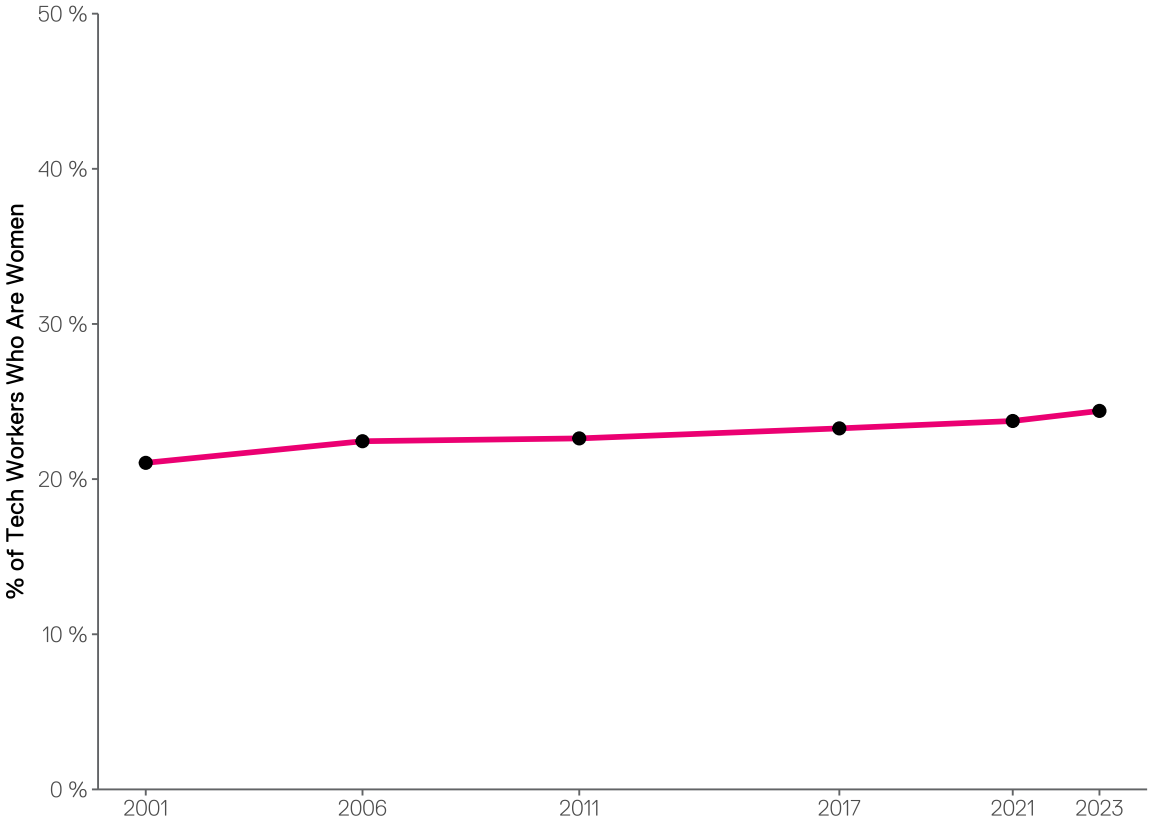
Figure 1: Tech Participation Rate by Gender



Source: 2021 & 2016 Long Form Census

However, the composition of the tech workforce has moved marginally towards equality, albeit slowly. In 2016, only 20 percent of tech workers were women, whereas now that figure has increased to 22.1 percent of tech workers earning income. This is still significantly lower than the 49.4 percent of all workers who are women, and at this rate of change, it would take nearly 100 years for the gap to completely close. Longitudinal data from other sources, such as Labour Force Survey shown in Figure 2 also show that this has been a persistent trend for more than 20 years.

Figure 2: Share of Women in Canada in Tech

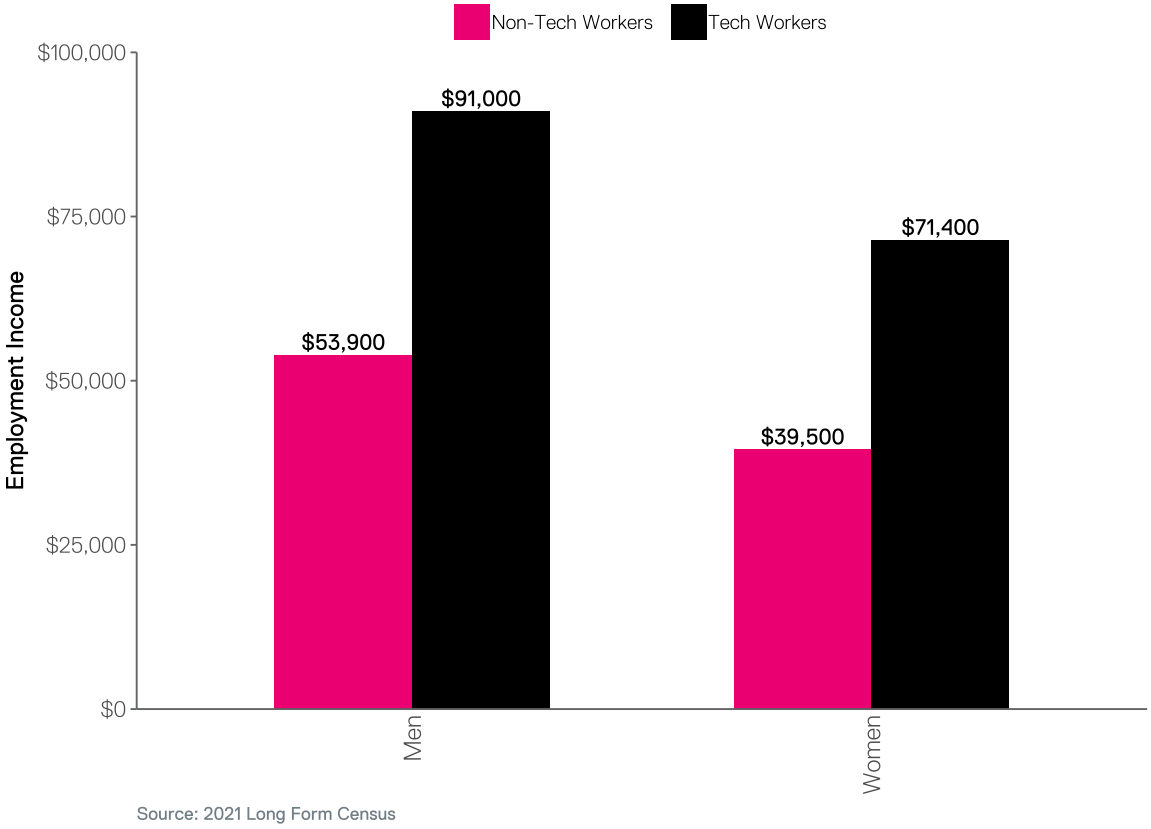


Source: Labour Force Survey

Table 1: Tech work participation by gender

	Non-tech workers	Tech workers	Participation rate
Women	9,111,635	199,585	2.1%
Men	9,348,840	702,840	7.0%

Figure 3: Average Income by Gender

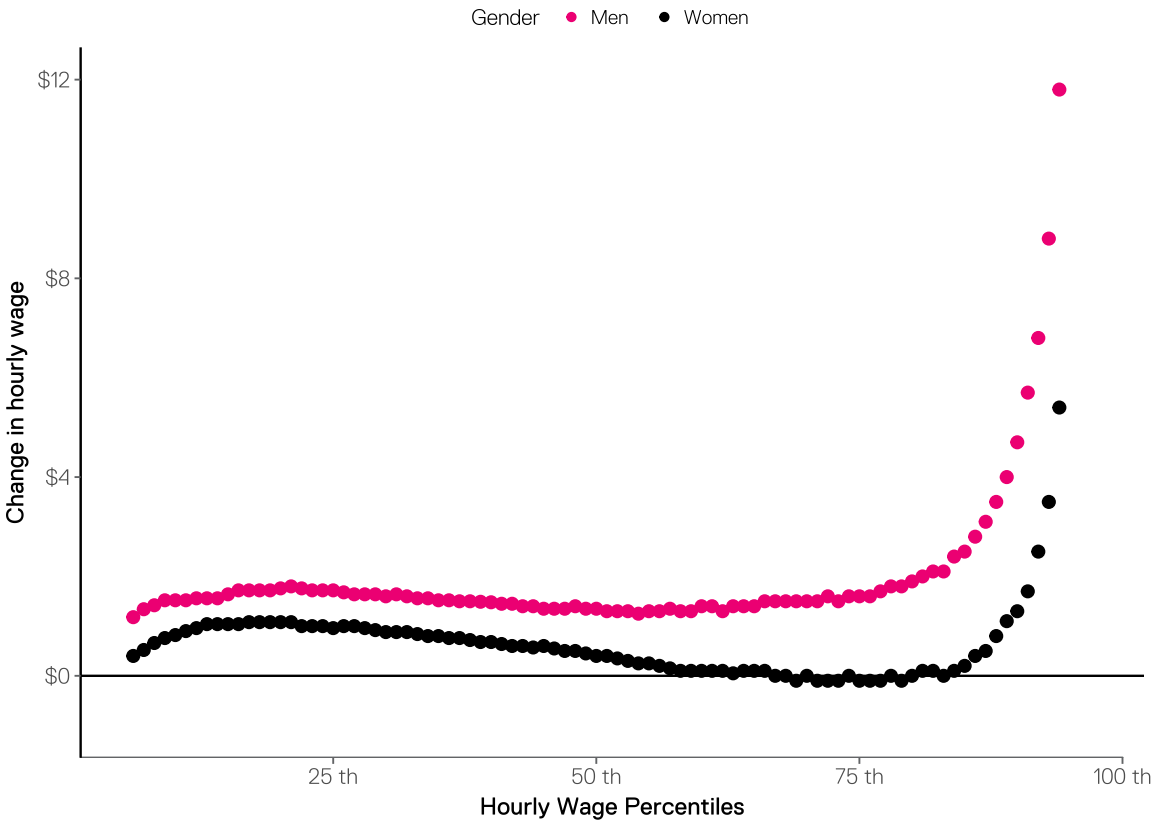


Source: 2021 Long Form Census

Despite the increase in representation in tech work by women, the pay gap not only persists but has grown since 2016. Men in tech occupations now earn nearly $20,000 more than women in the same occupations. This is an increase of more than $12,000 from 2016, when men in tech earned only $7,200 more than women.

Despite the increase in representation in tech work by women, the pay gap not only persists but has grown since 2016.

Figure 4: Change in Income Since 2016 by Income Percentile



Source: 2021 & 2016 Long Form Census

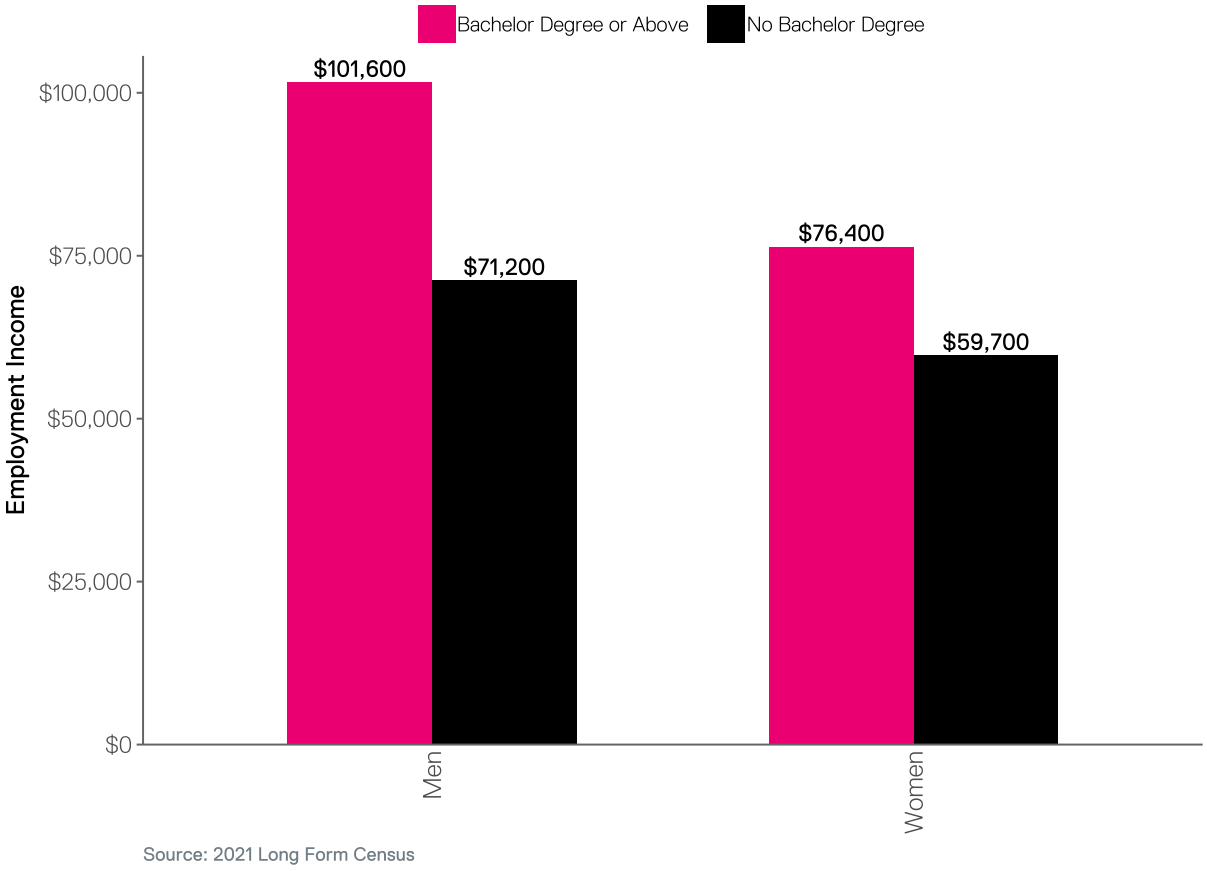
A notable trend emerges when we investigate this widening gender pay gap. When we compare wage growth between 2016 and 2021 for every income percentile for each gender group, we observe that on average, while women tech workers experienced wage growth between this period, the rate of such growth was lower than compared to men for every percentile, with men in higher percentiles receiving hourly wage increases of $15 more than women received.

However, the story is markedly different when we focus on women tech workers in the 60th to the 80th percentile. These tech workers experienced no real wage growth over the period of 2016 to 2021, and is the main reason for the widening gender pay gap.

The growth in this disparity is concentrated largely in a widening of the gap between men and women's earnings in roughly the 60th to 80th percentile groups of income. Importantly, the changes we capture here are specifically with regards to hourly wage, and is not the result of women working fewer hours (though hours worked has stayed consistent in the 2016 to 2021 period). We also investigated a number of additional hypotheses (such as presence of a new child, rate of job-switching by gender) and none satisfactorily explained this gap. However, the lack of growth of wages for women tech workers in this income quintile is primarily responsible for the widening gender pay gap between 2016 and 2021 and is a cause for concern. Further work should be conducted to understand the cause of this pay gap.

While the pay gap between men and women in tech is nearly $20,000 overall, there are significant differences across different levels of education. Looking specifically at those tech workers who have a Bachelor's degree, men in tech occupations earn $25,200 more than women in tech roles. Comparatively, for those without Bachelor's degrees, the difference is $11,500 which is smaller but still significant. For those with Bachelor's degrees, this is an increase of over $5,000 since 2016, while for those without it is an increase of $4,000.[7]

Figure 5: Average Tech Occupation Income by Gender

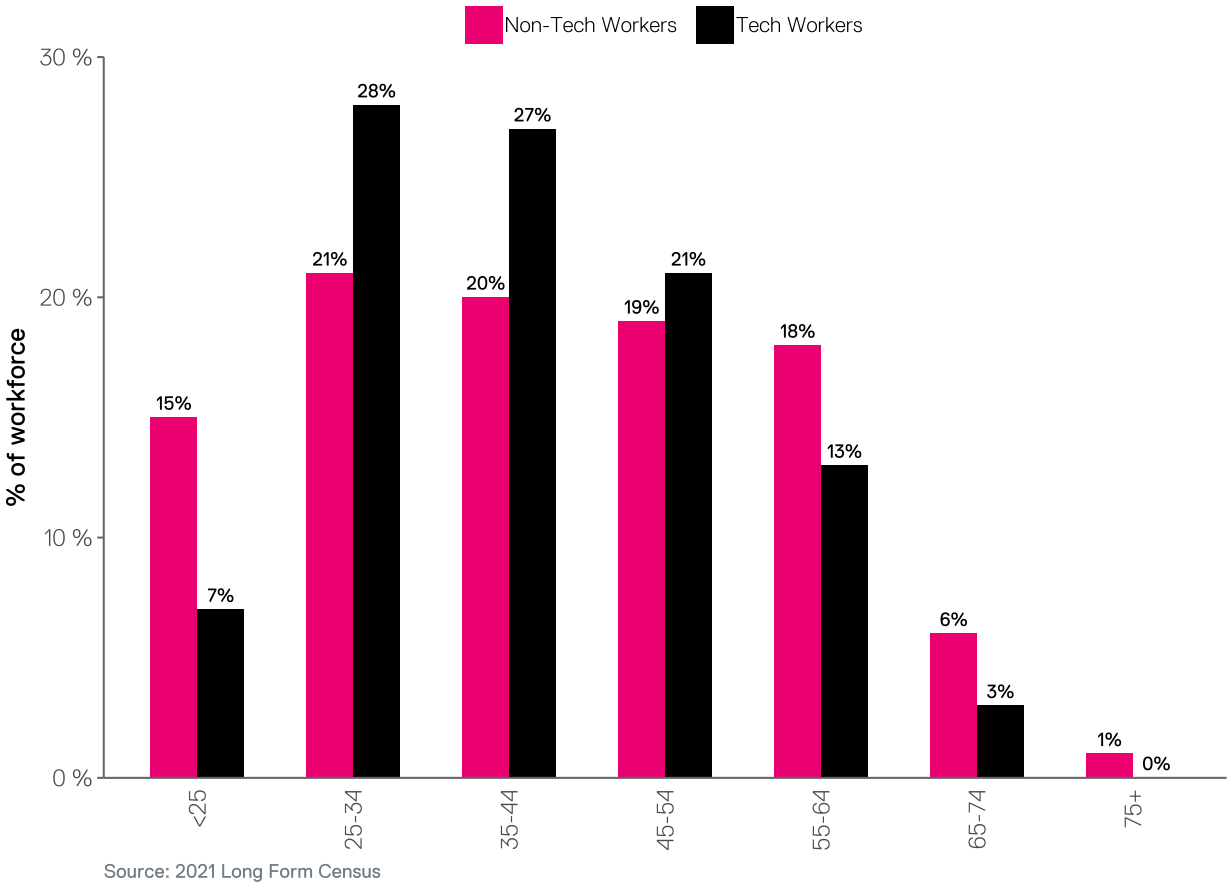


Source: 2021 Long Form Census

Age

Tech workers are less likely to belong to both the youngest cohort of workers (aged under 25) and to the oldest cohorts (aged 55 and older). While only 41 percent of non-tech workers are between the ages of 25 and 44, the same age group makes up 56 percent of tech workers. When we include workers up to the age of 54, this accounts for 77 percent of all tech workers.

Figure 6: Tech versus No-Tech Workforce Age Composition



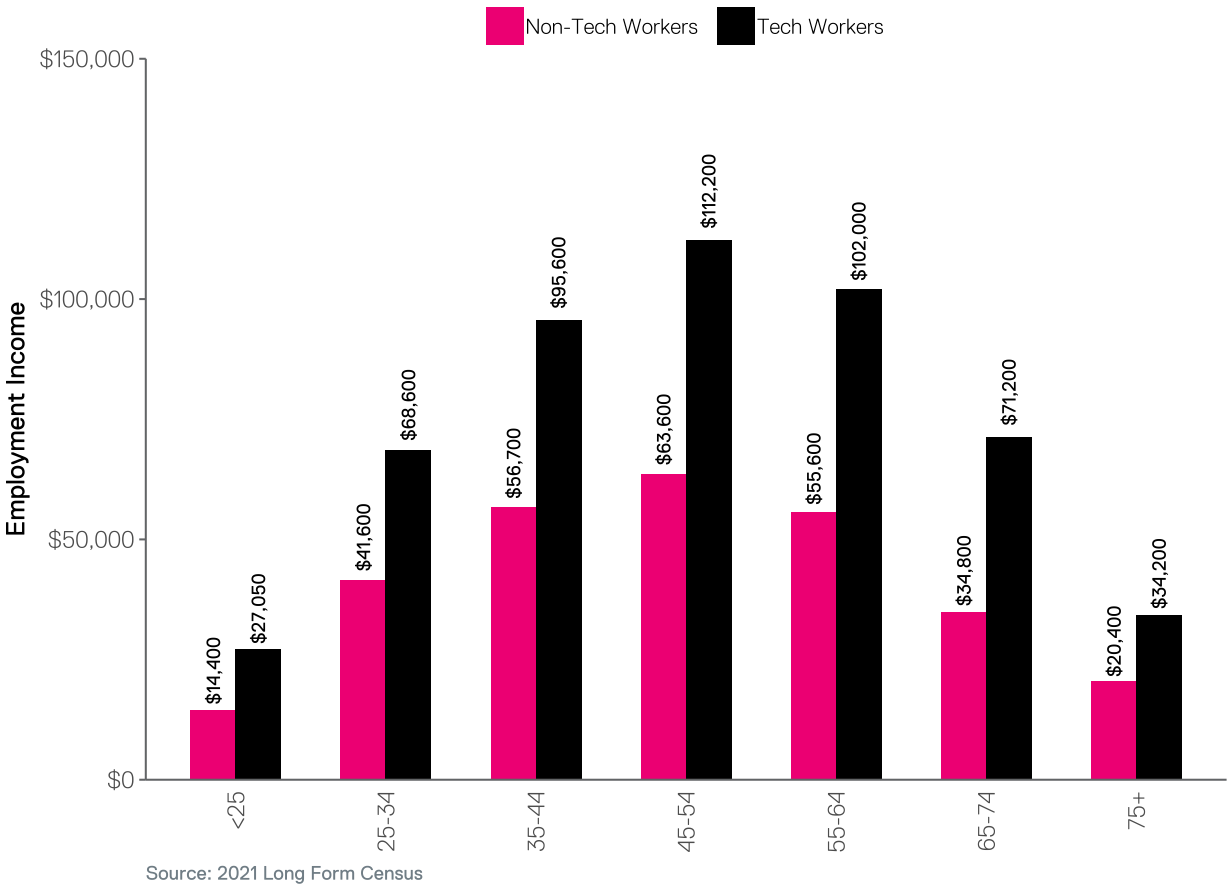
Source: 2021 Long Form Census

This age configuration is likely the result of two distinct patterns. For the youngest age group, tech work requires a greater degree of training than other occupations. As discussed below, tech workers are significantly more likely to have a university degree than other workers. This means they are joining the workforce later—closer to age 25—as they spend more of that time on their education.

For the older cohorts, there are likely two factors influencing the smaller numbers. Firstly, as tech work is defined by those currently engaged in technical occupations, whenever a worker is promoted into a management role that is less directly working with technology, they risk moving out of the tech occupation classification. For older workers who are more likely to have been promoted, there is a matching increase in likelihood that they no longer work in a tech occupation, having moved to a less technical role in management.

Secondly, as discussed above, the tech sector grew significantly in the 2000s and early 2010s. This means that workers who entered the workforce in that period were more likely to enter a career in tech as compared to those who entered the workforce in preceding decades. Those in the 55+ age group likely first entered the workforce in the 1990s or earlier, when there were fewer tech occupations available. When those in the 35-to-44 age cohort entered the workforce, there were comparatively many more tech occupations available.

Figure 7: Average Income by Age



Source: 2021 Long Form Census

Despite differences in concentration of tech workers in different age groups, the income curve for both tech and non-tech occupations is similar. Income for both groups peaks in the 45-to-54 age cohort and declines for older workers.

Education

As tech occupations are highly-skilled jobs, it should not be surprising that the tech workforce is significantly more likely to have a university education. Two-thirds of tech workers (66 percent) have at least a bachelor's degree, compared to only 29 percent of workers employed in other fields.

Table 2: Tech work participation by educational attainment

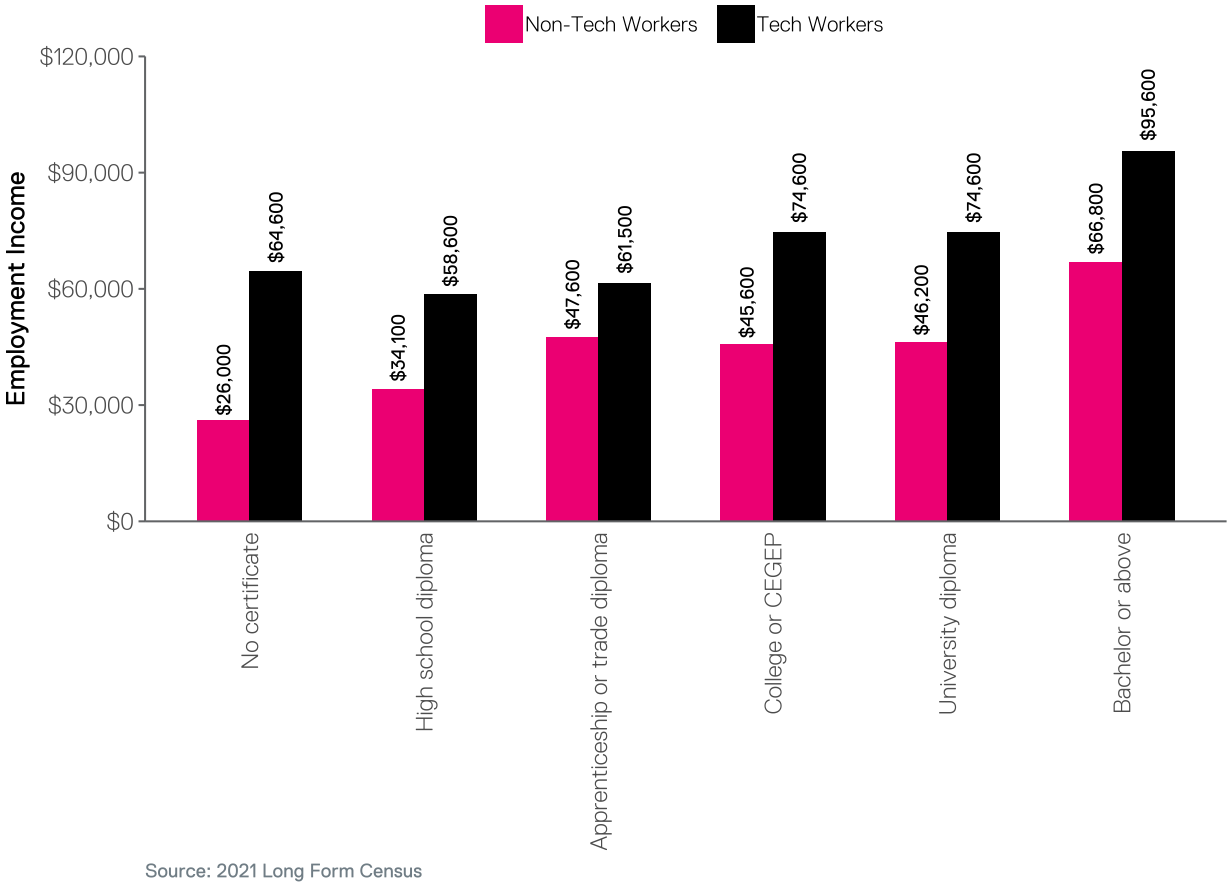
	Non-tech workers	Tech workers	Participation rate
No certificate	1,976,245	4,725	0.2%
High school diploma	4,915,210	86,965	1.7%
Apprenticeship or trade diploma	1,821,095	20,525	1.1%
College or CEGEP	3,802,965	162,585	4.1%
University diploma below a Bachelor's degree	558,170	29,100	5.0%
Bachelor's degree or above	5,386,790	598,525	10.0%

The reputation that people can succeed in tech with only a high school diploma may be true for a small number of workers, but the tech participation rate in these groups is very low: only 0.2 percent of those without any certificate and 1.7 percent of those with a high school diploma are engaged in tech work. For university graduates, this rises to 10 percent engaged in tech work.

Broadly, participation rates in tech occupations are significantly higher for those who have done any kind of post-secondary education outside of the trades. Participation among those who attended college or CEGEP is 4.1 percent and for those with a university diploma its five percent—continuing on to a full bachelor's degree further increases this participation.

The reputation that people can succeed in tech with only a high school diploma may be true for a small number of workers, but the tech participation rate in these groups is very low.

Figure 8: Average Income by Educational Attainment



Source: 2021 Long Form Census

The income benefit of working in tech is more significant for those with a lower level of education. While workers with any level of education make more in tech than non-tech, those with no certificates working in tech earn more than twice as much as those with no certifications working in other industries.

Table 3: Most common fields of study for tech workers and average income

Program of study (Classification of Instructional Programs)	Total workers	Average income
Computer and information sciences and support services	257,925	$90,799
Engineering	247,290	$99,604
Business, management, marketing and related support services	126,810	$108,795
Engineering/engineering-related technologies/technicians	60,105	$83,660
Social sciences	24,475	$103,634
Visual and performing arts	18,445	$68,374
Physical sciences	17,340	$99,058
Mathematics and statistics	14,135	$113,719
Biological and biomedical sciences	9,910	$81,488
Health professions and related programs	8,560	$71,716

The most common field of study for tech workers is unsurprisingly Computer and Information Sciences and Support Services along with Engineering. These fields of study alone produce more than half of all tech workers in Canada. About half as many workers with a background in business, management, and marketing also work in tech, before another sharp drop off to other educational backgrounds.

While Visual and Performing Arts is one of the more common fields represented in tech work, the salary for those workers is far below the average in tech. This is because for those with a background in visual arts, the most common tech occupations are industrial design, web development and programming, and web design. These three occupations represent nearly 9,000 tech workers with visual arts backgrounds and the highest paid of them is industrial design with an average income of only $54,000 suggesting that design work is not compensated as well as other technical work.

Visible Minorities

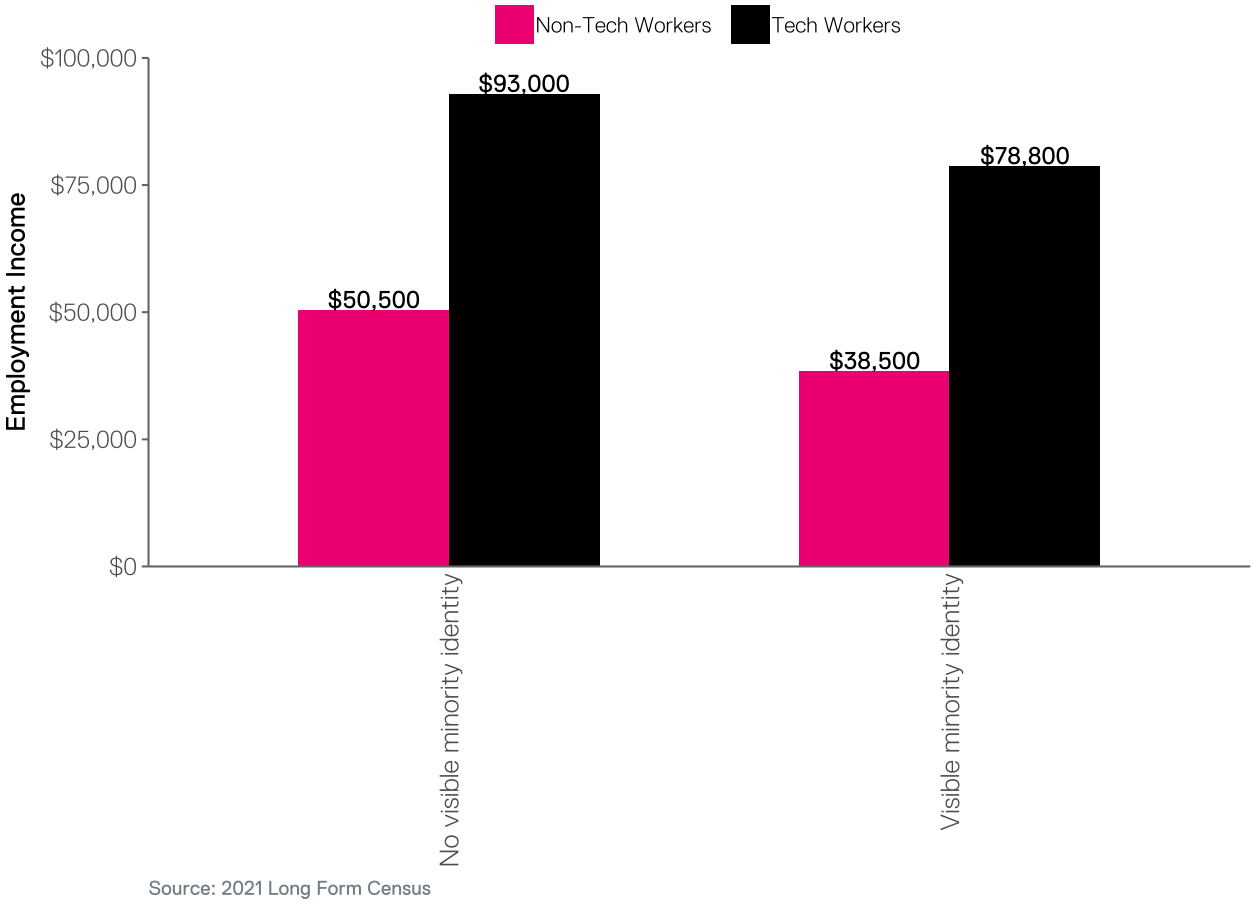
Visible minorities in Canada are over-represented within tech occupations—while only 31 percent of all Canadian workers are members of a visible minority, they make up 44 percent of tech workers. This means that visible minorities have a participation rate in tech work of 6.6 percent, 2.4 percentage points higher than the rate of 3.8 percent among non-visible minorities.

Table 4: Tech work participation by visible-minority identity

	Non-tech workers	Tech workers	Participation rate
No visible-minority identity	12,809,260	502,070	3.8%
Visible-minority identity	5,651,215	400,350	6.6%

Despite a higher participation rate in tech, visible minorities in Canada earn significantly less in tech roles than other Canadians. For those who are not part of a visible minority, the average income is $93,000. This is $14,200 more than the average income of Canadians who are visible minorities employed in tech, who on average earn only $78,800.

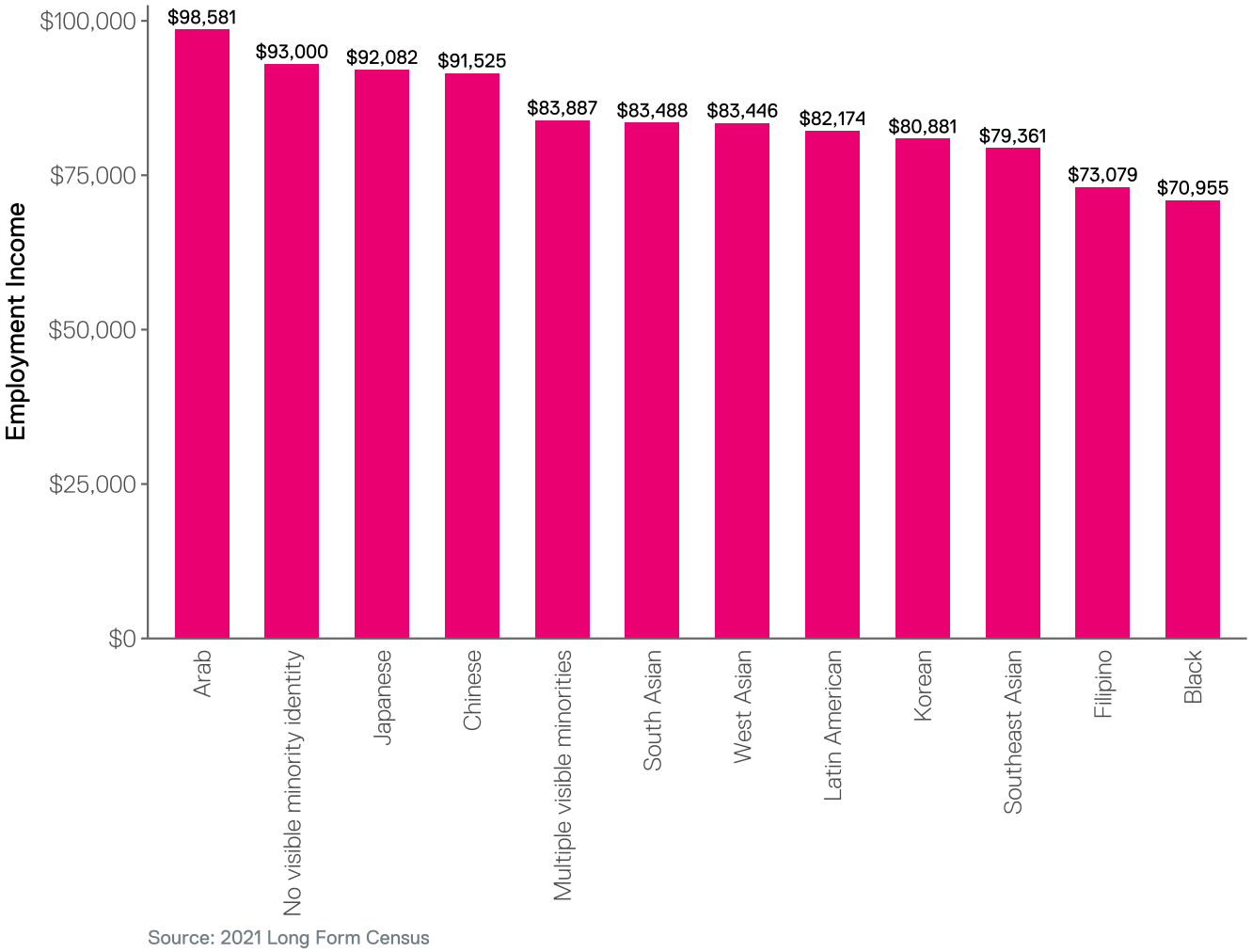
Figure 9: Average Income by Visible Minority Identity



Source: 2021 Long Form Census

This is not an issue unique to tech work—visible minorities in Canada earn significantly less than other Canadians as a whole. Outside of tech occupations, visible minority workers earn 76 percent as much as other workers—within tech, the gap is smaller with visible-minority tech workers earning 85 percent of what other tech workers earned. There is a gap in both cases, but this data suggests the gap is one that needs to be solved at a larger systemic level and not specifically at the level of the tech industry.

Figure 10: Average Income by Visible Minority Identity (Detailed)



Source: 2021 Long Form Census

Figure 10 shows the difference in average income across different visible-minority identities. We find that while Arab Canadians earn more than average for tech workers, most individual identities earn less. In particular, Black Canadians working in tech earn the least of any visible-minority identity. While the gap between Black Canadians and other tech workers has decreased since 2016 when Black tech workers earned only an average of $63,000, this still remains the largest disparity in tech salaries.

Immigration

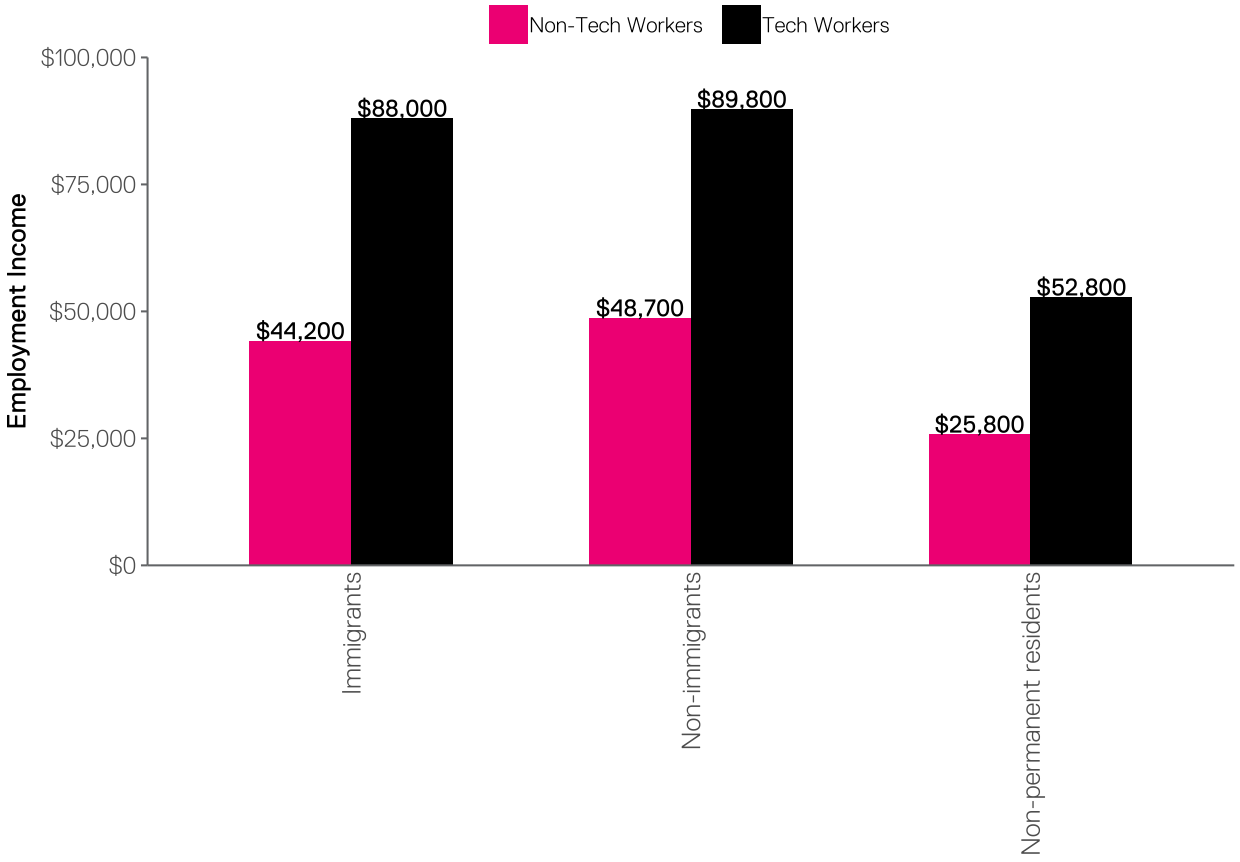
Immigrants and non-permanent-residents in Canada are far more likely to be tech workers than other Canadian workers: eight percent of immigrants participate in a tech occupation and nine percent of non-permanent residents do the same. This is significantly higher than the rate of three percent for other workers.

Table 5: Tech work participation by immigration status

	Non-tech workers	Tech workers	Participation rate
Non-immigrants	13,203,725	460,895	3.4%
Immigrants	4,665,720	385,075	7.6%
Non-permanent residents	591,030	56,455	8.7%

However, the impact on income is very different between immigrants and non-permanent-residents. Immigrants working in tech occupations earn nearly as much as non-immigrants in the field: only $1,800 less, which is significantly closer to equal than the $4,500 gap between the pay of immigrant workers outside of tech and other workers outside of tech. Non-permanent-residents, however, only earn an average of $52,800 working in tech occupations—more than $30,000 less than either immigrant tech workers or non-immigrant tech workers.

Figure 11: Average Income by Immigration Status



Source: 2021 Long Form Census

In recent years, Canada has actively used immigration to support the workforce in high-skill occupations. Of the 22 National Occupation Classifications (NOC) that are eligible for Canada's Global Talent Stream of immigration, 15 are classified as tech occupations by our definition.[8] This stream offers expedited work permits in as quickly as two weeks for workers who fall within the scope of skilled labour.

Canada faces an uphill battle in attracting immigrant tech workers, with the United States directly on our border offering salaries that are on average 46 percent more than what Canadian tech workers can expect.[9] However, Canada does have an advantage in this competition— the Canadian immigration system is substantially more permissive than the American immigration system. In addition, Canada launched a program in 2023 to offer work permits to 10,000 workers who already held H1-B visas (i.e. specialty occupation work visas) in the US.[10]

Indigenous Peoples in Canada

Previous research from the Dais has highlighted the significant gap in tech work participation between Indigenous Peoples and other workers in Canada.[11] We saw that not only are Indigenous youth employed at less than half the rate of other youth in professional, scientific, and technical industries, but that the COVID-19 pandemic exacerbated this difference.

Using data from the 2021 census, we find that this holds true for all Indigenous Peoples in Canada. While 4.8 percent of others are engaged in tech work, only 1.4 percent of Indigenous Peoples work in tech occupations. When it comes to compensation, Indigenous Peoples in Canada earn 83 percent of what other Canadians earn, regardless of whether they are engaged in tech work or not.

Table 6: Tech work participation by Indigenous identity

	Non-tech workers	Tech workers	Participation rate
Not Indigenous	17,704,950	891,610	4.8%
Indigenous Peoples	755,525	10,810	1.4%

For Indigenous Peoples living on-reserve, there are unique challenges in entering tech occupations. These communities are often under-served by broadband providers, meaning that access to the internet is a challenge.[12] For the same reason, access to both digital devices and digital literacy education is harder to access in rural communities. These factors create structural barriers for Indigenous Peoples to enter into tech occupations. Given the incomplete data collection by the 2021 Census in these areas (with 63 census subdivisions containing reserves that have not been fully enumerated), the impact of these barriers is likely higher than what is represented in census figures.

In addition, Indigenous Peoples in Canada face structural barriers in accessing formal educational credentials, which is a strong predictor of participation and pay premium in tech work in the country. Addressing the participation and pay gap for Indigenous Peoples involves also addressing these broader structural challenges they face.

Figure 12: Average Income by Indigenous Identity

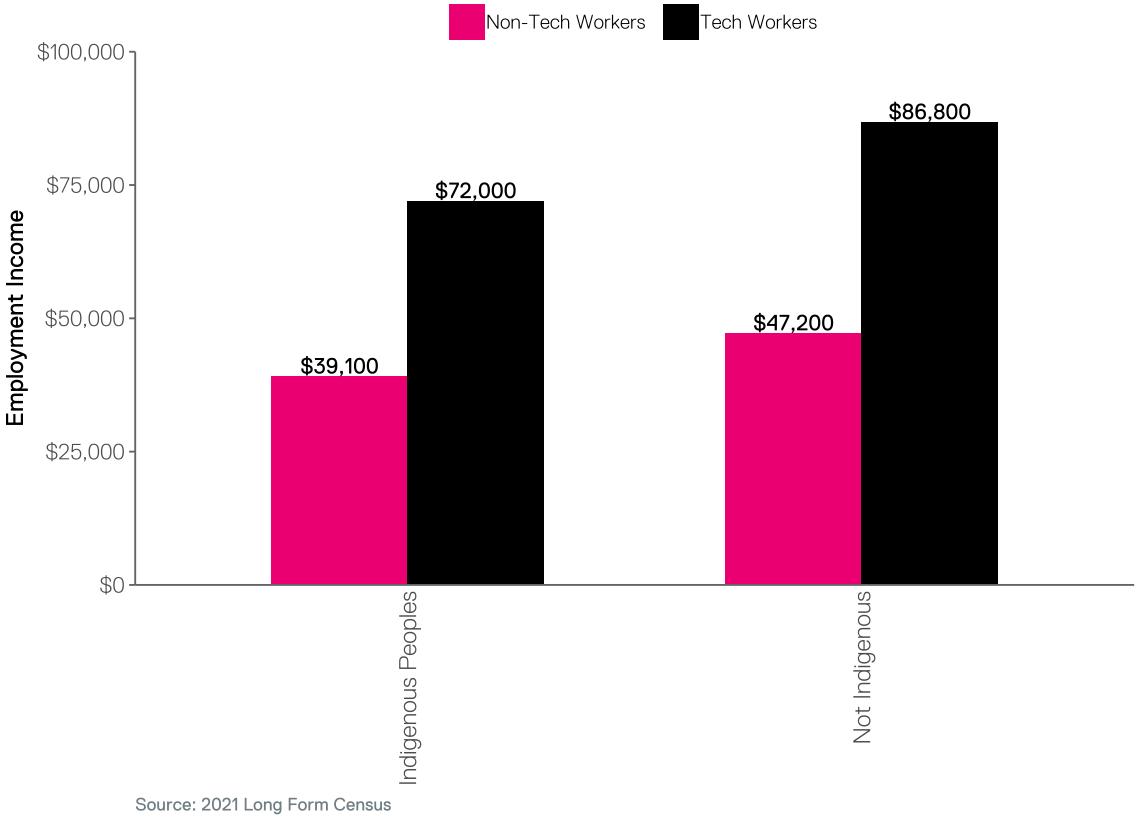


Figure 12 illustrates this point, where we see that simply closing the gap in participation rate is not the only hurdle to overcome. Within the tech space, Indigenous Peoples are paid significantly less than other workers. While outside of tech there is an $8,000 difference in income between Indigenous and non-indigenous workers, within tech this difference grows to over $14,000.

When it comes to compensation, Indigenous Peoples in Canada earn 83 percent of what other Canadians earn, regardless of whether they are engaged in tech work or not.

4 Conclusion

Highly-skilled tech occupations in Canada are among the most desirable—requiring significant levels of education to often get in the door, they offer substantially higher salaries than the average occupation in Canada. Given the benefits of working in these jobs, the lack of equality across demographic lines yields significant equity differences in Canada.

Canada's efforts to date have been successful in targeting immigration specifically for technical occupations, which has meant that for immigrant Canadians, tech work is equitably distributed. However, for women and Indigenous Peoples, the story is starkly different. Both groups are significantly underrepresented in tech occupations, and even in tech roles they are both significantly underpaid compared to other workers.

However, the structural barriers facing these two groups are different. Enabling both women and Indigenous Peoples to equitably participate in and be compensated for tech work requires systemic changes that address each group's unique barriers to entry.

Importantly, these two groups do not represent the total of marginalized groups in Canada that may potentially face barriers to working in tech. Further research is needed to understand whether marginalized Canadians, including those who live with disabilities or those who are members of the LGBTQIA+ community, are able to effectively participate in tech work, and if not, unpack why any differences might exist. Understanding and addressing the barriers that exist for all Canadians will be critical in ensuring that the benefits of increasing digitization are felt by all.

Endnotes

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[12] Ibid.