

AWS Global Digital Skills Study – Canada

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A. Glossary

Term	Definition in the context of this study
Digital skills	The abilities, knowledge and know-how required to apply digital technologies for tasks in the workplace. These range from basic digital skills, referring to the ability to use digital software and hardware, to advanced digital skills, which entail the ability to draw upon emerging technologies to create new digital tools and applications.
Workers	Individuals engaged in formal, full-time employment.
Digitally skilled workers	Workers who need to apply digital technologies in order to do their jobs. These workers can be technology or non-technology workers.
Technology workers (“Tech workers”)	Workers in occupations that require specialized technology expertise either to develop new technological products, services and applications (e.g., software engineers, data scientists), or to bridge technological products and services to people and organizations (e.g., technology product managers).
Non-technology workers (“Non-tech workers”)	Workers in occupations that do not require specialized technological knowledge and skills but need some basic technological skills such as knowing how to use word processing software and smartphones (e.g., administrative staff, café owners, human resources managers).
Employers	Business managers, information technology (IT) managers and IT decision makers. Business managers are defined as professionals in middle and senior management who perform hiring and/or people management roles. IT managers are middle and senior management executives with a strong focus on the company’s technology-related function. IT decision makers are workers who play a significant role in the selection and implementation of IT solutions for their organization.
Organizations	Entities that workers are employed in. These can be public sector, private sector or not-for-profit organizations.

B. Canada

The Accelerated Need for Digital Skills

1. **Digital skills training is important to boost innovation in Canada.**
 - Past research has shown that a shortage of digital talent is a key factor hampering innovation and technology adoption in the country, particularly in traditional industries.¹ As found in this study, digital skills training can mitigate this problem. 84% of employers report that providing digital skills training for workers has sped up their organizations' innovation cycles. 86% of employers also report that doing so has accelerated the pace of digital adoption in their organizations.
 - Other benefits reported by employers include higher employee satisfaction (92%), increased employee productivity (89%) and improved customer experience (86%).
2. **Digital skills training is also crucial to boosting worker outcomes – it is not just beneficial for tech workers, but also for non-tech workers.**
 - 83% of workers in Canada feel that such training has helped them better apply technologies to become more efficient in their work. Other benefits reported by workers include higher personal satisfaction (82%) and increased promotion opportunities (67%).
 - 82% of tech workers and 76% of non-tech workers in the country say that digital skills training has improved their employability by allowing them to keep up to date with the latest technologies. 65% of non-tech workers also say that pursuing such training has improved their ability to make career switches.
3. **The need for cloud computing and technical skills training in Canada is increasing, a trend intensified by technology changes driven Canada the COVID-19 pandemic.**
 - 86% of organizations in Canada say that the pandemic has accelerated the pace of digital adoption in their organizations. 78% of workers in the country feel that they now require more digital skills to cope with changes in their jobs due to COVID-19.
4. **Training can help to slow The Great Resignation trend.**
 - The term “The Great Resignation” describes the trend of increased employee resignations observed during the COVID-19 pandemic.² Our survey of employers in Canada corroborates this trend, with two-thirds (66%) of employers in the country reporting increased worker resignations since the COVID-19 pandemic started.
 - This study finds that providing support for digital skills training in workplaces can be a helpful employee retention tool. 83% of employers report higher employee retention after implementing digital skills training in the workplace. 74% of workers agree that workplace-based digital skills training opportunities have resulted in greater job satisfaction.

The Training Shortfall in Canada

5. **A training shortfall exists in Canada today – pointing to a gap between digital skills training actions and training needs.**
 - Although 97% of organizations in Canada see a need to train their workers on digital skills, only 24% have implemented a plan to do so. Thus, there is a training shortfall, where 73% of organizations are not undertaking training despite identifying such a need.
 - The study also finds that workers are at risk of being left behind, with over 70% (71%) of Canadian workers reporting that they are not confident that they are gaining digital skills fast enough to meet future career needs.

¹ Skills Next (2020), Bridging the Digital Skills Gap. Available at: <https://technationcanada.ca/wp-content/uploads/2020/10/DigitalSkills-AlternativePathways-PPF-JAN2020-EN-1.pdf>

² Arianne Cohen (2021), “How to quit your job in the great post-pandemic resignation boom”. *Bloomberg Newsweek*. Available at: https://www.bloomberg.com/news/articles/2021-05-10/quit-your-job-how-to-resign-after-covid-pandemic?cmpid=socialflow-twitter-businessweek&utm_medium=social&utm_content=businessweek&utm_source=twitter&utm_campaign=socialflow-organic

6. **To help reduce the training shortfall, an estimated 6.5 million more Canadians, or 36% of the country's workforce, will require digital skills training over the next year alone in order to keep pace with technological advancements and gain new digital skills to succeed in their careers.³**
 - This number comprises two groups of workers: digitally skilled workers who need to refresh their digital skills to remain relevant and advance in their careers, and non-digitally skilled workers who need to meet the changing demands of their jobs or access new jobs requiring such skills.

7. **Cloud skills will see some of the greatest demand by employers by 2025, but workers are currently not focusing sufficient training on these skills.**
 - Cloud skills dominate the list of top digital skills that most employers say will be most in-demand by 2025. Across all digital skills, the ability to use cloud-based tools for work emerged as the top ranked in-demand skill. However, only 48% of workers have trained or are training in this skill.
 - More advanced cloud skills will also be in high demand, with the ability to transition organizations from on-premises facilities to the cloud being anticipated to be the 8th most demanded skill by employers by 2025, and cloud architecture design anticipated to be the 9th. However, only 14% of workers have trained or are training in the management of transition from on-premises facilities to the cloud, and 11% in cloud architecture design skills.
 - The low level of training is also observed for other in-demand digital skills. In order of ranking, the top 5 in-demand skills by employers and the shares of workers training in each of these skills are as follows:
 - Ranked 1st: The ability to use cloud-based tools such as cloud-based accounting software and running AWS cloud computing instance (48% of workers have trained or are training in this skill).
 - Ranked 2nd: Cybersecurity skills, which relate to the ability to implement measures to address cybersecurity risks, threats and vulnerabilities (15% of workers have trained or are training in this skill).
 - Ranked 3rd: Technical support skills, which relate to the ability to diagnose and troubleshoot common technical problems (15% of workers have trained or are training in this skill).
 - Ranked 4th: Computer networking skills, which relate to the ability to link multiple devices for real-time sharing of information and resources (23% of workers have trained or are training in this skill).
 - Ranked 5th: Artificial Intelligence (AI) and Machine Learning (ML) skills, which relate to the ability to develop and apply AI systems and ML models (7% of workers have trained or are training in this skill).

Unlocking Future Workforce Potential

8. **94% of organizations and workers in Canada face hurdles in accessing digital skills training they need to remain competitive, with the lack of time and the limited awareness of training options available as top obstacles.**
 - The two most common barriers faced to digital skilling in Canada are the lack of time (faced by 69% of employers and workers) and the limited awareness of training options available (66%). Other barriers include: limited awareness of the specific digital skills needed (64%), high training costs (63%) and low training quality (61%).

9. **There is also an opportunity to provide more skills training to at-risk youth and unemployed individuals in Canada.**
 - Less than 20% of organizations provide targeted digital skills training support for at-risk youth (only 18% do) and unemployed individuals (9%).
 - 80% of employers in Canada report that providing digital skills training in the workplace has resulted in greater employee diversity in their organizations, as they are able to retain and attract workers with more diverse demographics and skillsets.

³ This estimate comprises both digitally skilled workers who will need to refresh their digital skills more regularly in order to keep pace with future digital skill needs, as well as non-digitally skilled workers who are assumed to need training over the next year as they progress into jobs requiring digital skills. For details of how this number was estimated, please refer to the Appendix.

Appendix – Methodology

A1. About the Survey

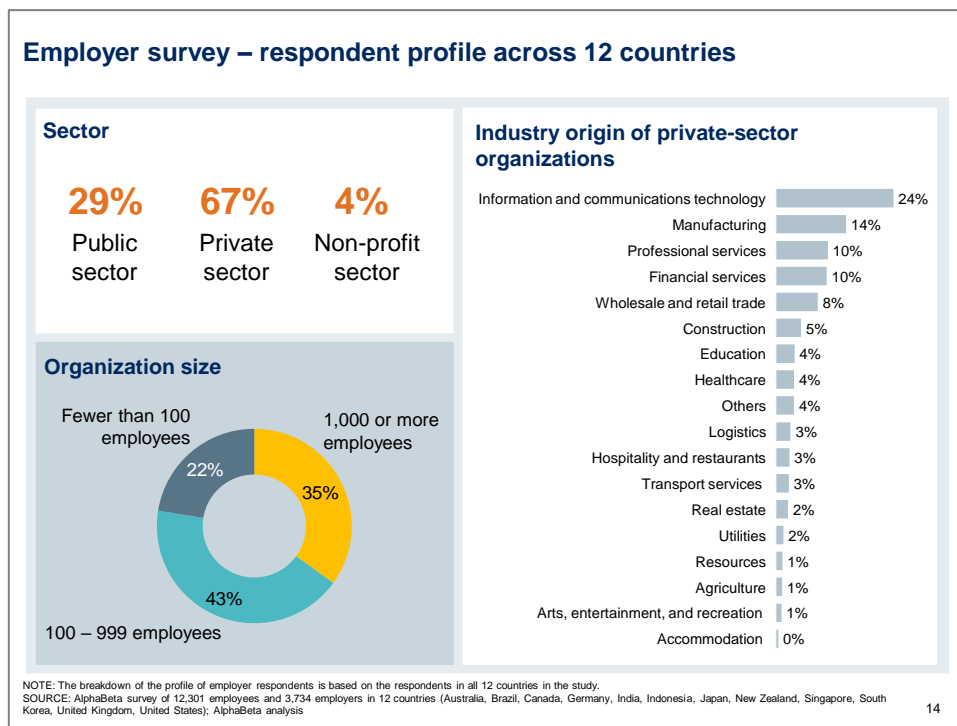
Key facts about the surveys in this study:

- Online surveys were conducted in 12 countries: Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, the United Kingdom, and the United States
- Two surveys were conducted in each country: employer and worker surveys
- A total of 16,035 respondents were surveyed
- The online survey was conducted from 7 August to 30 August 2021

Key facts about the employer survey:

- Targeted 300 respondents per country⁴, which is statistically significant at a 90% significance level and 5% margin of error
- Targeted business managers, IT managers and IT decision makers⁵
- Included enterprises of different sizes and from different industries (Exhibit A1). The employer survey also had representation across public, private and non-profit sectors.

EXHIBIT A1: PROFILE OF EMPLOYER RESPONDENTS



Key facts about the worker survey:

- Targeted 1,000 respondents per country⁶, which is statistically significant at a 95% confidence interval and 5% margin of error
- Targeted full-time workers who make use of digital skills in their jobs⁷

⁴ Here are the specific numbers of employers surveyed in each country: Australia – 326, Brazil – 320, Canada – 307, Germany – 317, India – 303, Indonesia – 300, Japan – 312, New Zealand – 300, Singapore – 314, South Korea – 311, the United Kingdom – 324, and the United States – 300.

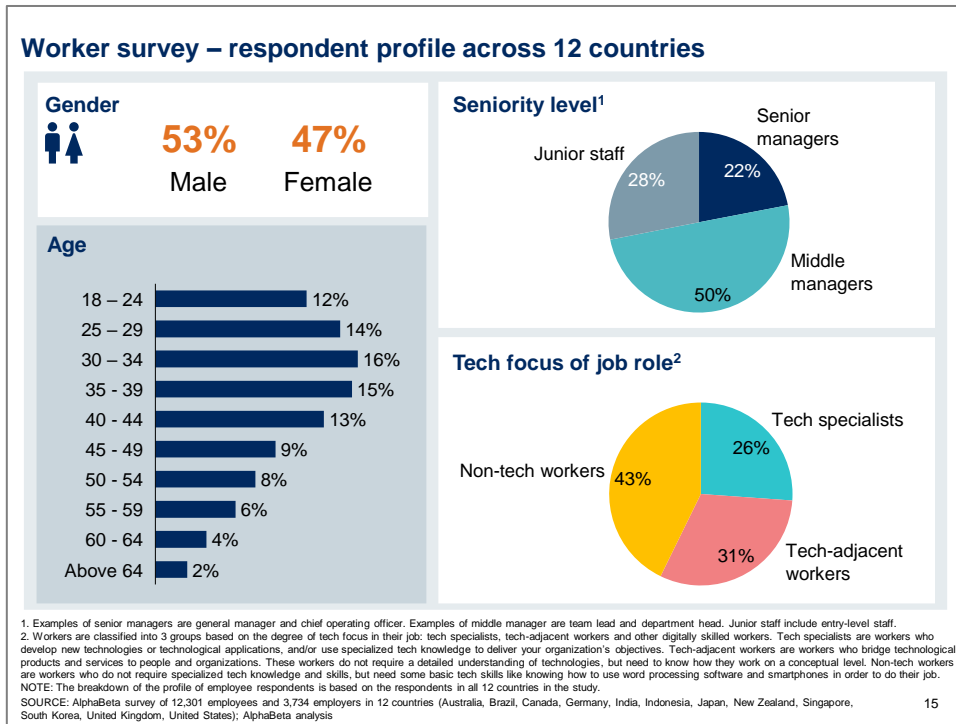
⁵ Business managers are defined as professionals in middle and senior management who perform hiring and/or people management roles. IT managers are middle and senior management executives with a strong focus on the company's technology-related function. IT decision makers are workers who play a significant role in the selection and implementation of IT solutions for their organization.

⁶ Here are the specific numbers of workers surveyed in each country: Australia – 1023, Brazil – 1017, Canada – 1022, Germany – 1028, India – 1012, Indonesia – 1035, Japan – 1032, New Zealand – 1039, Singapore – 1037, South Korea – 1015, the United Kingdom – 1014, and the United States – 1027.

⁷ Digitally skilled workers include tech specialists, tech-adjacent workers and other non-tech workers. Tech specialists are workers who develop new technologies or technological applications, and/or use specialized tech knowledge to deliver your organization's objectives. Tech-adjacent workers are workers who bridge technological products and services to people and organizations. These workers do not require a detailed understanding of technologies but need to know how they work on a conceptual level. Other digitally skilled workers are workers who do not require specialized tech knowledge and skills but need some basic tech skills like knowing how to use word processing software and smartphones in order to do their job.

- Included both tech and non-tech workers (Exhibit A2).⁸ The worker survey also had representation from workers across different industries and seniority levels.

EXHIBIT A2: PROFILE OF WORKER RESPONDENTS



⁸ Tech workers include tech-specialists and tech-adjacent workers. Tech specialists are workers who develop new technologies or technological applications, and/or use specialized tech knowledge to deliver your organization's objectives. Tech-adjacent workers are workers who bridge technological products and services to people and organizations. These workers do not require a detailed understanding of technologies but need to know how they work on a conceptual level. Non-tech workers are workers who do not require specialized tech knowledge and skills but need some basic tech skills like knowing how to use word processing software and smartphones in order to do their job.

A2. Employer survey: Global results

#	Survey question	Global survey results
Digital skills training efforts		
1	Top 5 digital skills employers require today	Use of cloud-based tools; technical support skills; cybersecurity skills; basic digital marketing skills (e.g., producing social media content); computer networking skills
2	Top 5 digital skills employers will require from workers by 2025	Use of cloud-based tools; cybersecurity skills; technical support skills; digital marketing skills; managing transition to the cloud
3	% of employers who agree/disagree that their workers' digital skills level today is adequate to meet the organization's current skill needs	Strongly agree (37%); somewhat agree (50%); somewhat disagree (10%); strongly disagree (2%); don't know (1%)
4	% of employers who agree/disagree that their workers are developing digital skills at a pace that is adequate to meet the organization's future skill needs	Strongly agree (36%); somewhat agree (49%); somewhat disagree (12%); strongly disagree (2%); don't know (1%)
5	% of employers who agree/disagree that digital skills training is relevant for workers' compensation and promotion prospects	Strongly agree (43%); somewhat agree (44%); somewhat disagree (9%); strongly disagree (2%); don't know (1%)
6	% of employers who agree/disagree that employer support for training is adequate	Strongly agree (40%); somewhat agree (45%); somewhat disagree (11%); strongly disagree (3%); don't know (1%)
7	% of organizations by the stage of training support	My organization has fully implemented a comprehensive plan for supporting digital skills training for employees (30%); my organization has started to implement some of the plans for supporting digital skills training for employees (49%); my organization has some plans for supporting for digital skills training for employees but has not yet implemented any of these plans (16%); my organization has no plans at this point to support digital skills training for employees (6%)
8	% of employers who provide comprehensive training support for workers, by sector	Public sector (30%); private sector (29%); non-profit organizations (24%)
9	% of employers who provide comprehensive training support for workers, by cloud adoption	Cloud-adopting organizations (34%); non-cloud-adopting organizations (14%)
10	% of employers who provide the following forms of training support	E-learning courses (52%); workplace-based training led by external trainers (52%); workplace-based training led by internal trainers (51%); financial support (40%); in-kind support (30%); time-off given to workers for training (25%)
11	Top 5 digital skills trained by employers today	Use of cloud-based tools; use of software; basic digital marketing; computer networking skills; advanced digital marketing
12	% of employers who provide training support for different types of workers	All workers (64%); senior managers only (8%); middle and senior managers only (12%); junior staff only (6%); staff in IT role only (9%)

13	% of employers who provide training support due to the following motivating factors	Improve operational efficiency (56%); accelerate the organization's digitization efforts (55%); improve worker productivity (50%); fill knowledge gap in the organization (47%); to better serve customers/stakeholders (39%); realize new revenue opportunities (35%); boost employee retention (25%); high demand from workers (19%)
14	% of employers who somewhat or strongly agree on each statement in relation to the COVID-19 pandemic	"The COVID-19 pandemic has accelerated my organization's digital transformation efforts" (87%); "The COVID-19 pandemic has increased my organization's demand for digitally skilled workers and/or technology-focused job roles" (86%); "Since the COVID-19 pandemic started, there has been an increased number of workers leaving our organization voluntarily" (56%)
15	% of employers who increased their training support due to the COVID-19 pandemic	91%
16	% of employers who increased training support since the pandemic due to the following reasons	Fill new knowledge gaps (67%); accelerate the organization's digitization efforts (57%); boost employee retention (49%)
17	% of employers who provide the following forms of training support due to the COVID-19 pandemic	Workplace-based training led by in-house trainers (55%), e-learning courses (52%), workplace-based training led by external trainers (49%), financial support (41%), in-kind support (32%); time-off given to workers for training (25%)
18	% of employers who provide training support for underrepresented groups	73%
19	Among employers who provide training support for underrepresented groups, % of those who provide support for the different groups	Racial or ethnic minorities (33%); senior citizens (37%); individuals with disabilities (34%); at-risk youth (30%); workers at risk of redundancy (35%); women (41%); unemployed individuals (25%)
Impacts of digital skills training		
20	% of employers who somewhat or strongly agree that digital skills training has brought the following impacts to the organization	Higher employee satisfaction (91%); higher employee retention (84%); boost attractiveness to potential new recruits (85%); increased employee productivity (89%); greater employee diversity (83%); faster achievement of digitization goals (87%); faster innovation cycles (84%); improved cost efficiencies (85%); increased revenue (83%); improved customer experience (85%)
Barriers and support		
21	% of employers who somewhat or strongly agree that they face the barrier in supporting training	Limited awareness of training options (72%); limited awareness of digital skills needed (65%); limited awareness of the benefits of training (58%); lack of time (69%); high cost of training (61%); lack of manpower to plan training support (65%); lack of interest among workers (60%); concern of workers leaving for better opportunities (60%); lack of support from senior management (58%)
22	% of employers who strongly agree that support in the area is sufficient	Financial support from the government (28%); government-led digital skills framework (25%); high-quality training courses (32%); courses in in-demand skills (30%); customizable courses (29%); affordable training courses (30%); no need for worker training (3%)

23	% of employers who believe that the entity is responsible to help workers acquire digital skills	Employers (77%); government (49%); educational institutions (45%); industry/ trade associations (34%); non-profit organizations (16%); workers (45%)
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A3. Worker survey: Global results

#	Information	Findings
Digital skills training efforts		
1	Top 5 digital skills workers apply in their job today	Use of cloud-based tools; technical support skills; cybersecurity skills; basic digital marketing skills (e.g., producing social media content); computer networking skills
2	Top 5 digital skills workers believe they will need by 2025	Cybersecurity skills; use of cloud-based tools; technical support skills; digital marketing skills (e.g., search engine optimization); computer networking skills
3	% of workers who agree/disagree that their digital skills level today is adequate to meet their organization's current skill needs	Strongly agree (42%); somewhat agree (47%); somewhat disagree (8%); strongly disagree (2%); don't know (1%)
4	% of workers who agree/disagree that they are developing digital skills at a pace that is adequate to meet their organization's future skill needs	Strongly agree (34%); somewhat agree (46%); somewhat disagree (13%); strongly disagree (4%); don't know (2%)
5	% of workers who agree/disagree that employer support for training is adequate	Strongly agree (33%); somewhat agree (43%); somewhat disagree (15%); strongly disagree (6%); don't know (2%)
6	% of workers who agree/disagree that digital skills training is considered in their compensation and promotion reviews	Strongly agree (31%); somewhat agree (40%); somewhat disagree (17%); strongly disagree (8%); don't know (4%)
7	% of workers by the frequency of digital skills training	More than 3 times a year (18%); 1-3 times a year (45%); less than once a year (21%); do not undertake any training (15%)
8	Among workers who do not undertake training today, % of those who agree/disagree that they want to do so in the coming year	Strongly agree (20%); somewhat agree (38%); somewhat disagree (17%); strongly disagree (12%); don't know (13%)
9	Top 5 digital skills workers train in today	Use of software; use of cloud-based tools; basic digital marketing; computer networking skills; advanced digital marketing
10	% of workers who undertake training due to the following motivating factors	Improve productivity (57%); increase salary (41%); personal enjoyment (41%); improve employability (41%); improve promotion prospects (39%); job requirement (35%); make a career switch (24%); training is accessible and affordable (15%)
11	% of workers who undertake training through the following channels over the past year	Training delivered by employer (54%); training supported by employer but delivered by another organization (59%); self-initiated training (33%)
12	% of workers who rely on the following funding sources for training over the past year	Employer (64%); self-funding (31%); government (26%); free training (21%); industry association (20%); non-profit organizations (14%)

13	% of workers who somewhat or strongly agree on each statement in relation to the COVID-19 pandemic	“The COVID-19 pandemic has made me more aware of the importance of digital skills” (89%); “The COVID-19 pandemic has made me realize that I need more digital skills in order to do my job well” (85%)
14	% of workers who have undertaken more training since the pandemic	72%
15	% of workers who increased their training since the pandemic due to the following reasons	Job requirement (70%); more time to pursue training (53%); make a career switch (35%)
Impacts of digital skills training		
16	% of workers who somewhat or strongly agree that digital skills training has brought the following impacts to them	Increased salary (69%); increased promotion opportunities (73%); increased efficiency (86%); improved employability (80%); greater ability to make a career switch (75%); higher job satisfaction (80%); higher personal satisfaction (85%)
17	% of tech workers who somewhat or strongly agree that digital skills training has brought the following impacts to them	Increased salary (77%); increased promotion opportunities (79%); increased efficiency (86%); improved employability (83%); greater ability to make a career switch (78%); higher job satisfaction (82%); higher personal satisfaction (85%)
19	% of non-tech workers who somewhat or strongly agree that digital skills training has brought the following impacts to them	Increased salary (56%); increased promotion opportunities (63%); increased efficiency (88%); improved employability (76%); greater ability to make a career switch (69%); higher job satisfaction (76%); higher personal satisfaction (83%)
Barriers and support		
19	% of workers who somewhat or strongly agree that they face the barrier in pursuing training	Limited awareness of training options (68%); limited awareness of digital skills needed (64%); lack of time (69%); high cost of training (64%); low training quality (62%); lack of personal interest (52%)
20	% of workers who strongly agree that support in the area is sufficient	Financial support from the government (26%); government-led digital skills framework (22%); high-quality training courses (29%); courses in in-demand skills (27%); customizable courses (27%); affordable training courses (29%); employer support (34%); no need for digital skills training (5%)
21	% of workers who believe that the entity is responsible to help them acquire digital skills	Employers (74%); government (46%); educational institutions (41%); industry/ trade associations (29%); non-profit organizations (14%); workers (47%)

A4. Estimating the number of workers requiring digital skills training

Our estimate of the number of workers requiring digital skills training over the next one year includes two types of workers:

1. *Digitally skilled workers*: these are workers who already possess digital skills today, but who are assumed to need training over the next year if they currently don't do any training at all, or if they do training less than once a year;
2. *Non-digitally skilled workers*: these are workers who do not possess digital skills today, but who are assumed to need training over the next year as they progress into jobs requiring digital skills each year.

To estimate (1), we multiplied the share of surveyed workers who indicate that they currently undertake digital skills training less than once a year, or do not undergo any such training at all, by the total number of digitally skilled workers in each country.⁹ We then summed up this number across all 12 countries in the study.

To estimate (2), we forecasted the increase in the share of the workforce that is digitally skilled in each country.¹⁰ This forecast was derived based on the historical rate of increase in this share over the past five years (i.e., 2015-2020 – the latest available data). We then multiplied the forecasted increase in this share by the total number of digitally skilled workers in each country.¹¹ We then summed up this number across all 12 countries in the study.

⁹ The number of digitally skilled workers in each country was estimated by multiplying the total number of workers in each country by the share of the workforce with digital skills. This latter share is derived from the Global Innovation Index (GII). This Index contains an "ICT use" sub-index, which measures the share of the population that is digitally skilled. This is a composite index that weights three ICT indicators equally (i.e., 33% weight each): (1) Percentage of individuals using the Internet; (2) Fixed (wired)-broadband Internet subscriptions per 100 inhabitants; (3) Active mobile broadband subscriptions per 100 inhabitants. The GII Index is available at: <https://www.globalinnovationindex.org/>. The size of the workforce was obtained from the International Labor Statistics' (ILO) database. The ILO database is available at: <https://ilostat.ilo.org/>

¹⁰ The forecasted increase in this share was derived from historical data of the share of the population that is digitally skilled from the GII Index. The GII Index is available at: <https://www.globalinnovationindex.org/>

¹¹ The number of digitally skilled workers in each country was estimated by multiplying the total number of workers in each country by the share of the workforce with digital skills. This latter share is derived from the Global Innovation Index (GII). The GII Index is available at: <https://www.globalinnovationindex.org/>. The size of the workforce was obtained from the International Labor Statistics' (ILO) database. The ILO database is available at: <https://ilostat.ilo.org/>