BUILDING SKILLS FOR THE CHANGING WORKFORCE

AWS GLOBAL DIGITAL SKILLS STUDY

NOVEMBER 2021
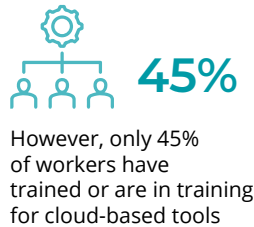
BUILDING SKILLS FOR THE CHANGING WORKFORCE

COVID-19 HAS ACCELERATED THE NEED FOR DIGITAL SKILLS

87% of organizations accelerated their pace of digital adoption during the pandemic

85% of workers say they now need more digital skills to cope with changes in their jobs

#1 The use of cloud-based tools is the top-most in-demand skill by employers by 2025

45% However, only 45% of workers have trained or are in training for cloud-based tools

TACKLING INCREASED WORKER RESIGNATIONS DURING THE PANDEMIC

56% of organizations report increased worker resignations, but training can help
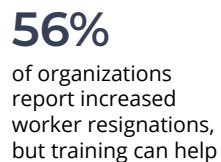
Training can help, driving...

84% Higher employee retention[1]

80% Higher job satisfaction[2]
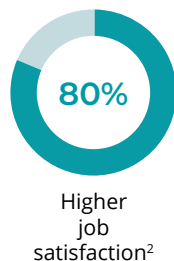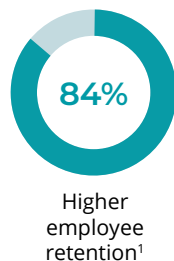
BUT WORKERS ARE NOT GETTING THE TECH SKILLS THEY NEED FAST ENOUGH

### WORKERS ARE AT RISK OF BEING LEFT BEHIND

2 in 3 workers are not confident that they are gaining digital skills fast enough to meet future career needs

THERE IS A HEIGHTENED NEED FOR DIGITAL SKILLS TRAINING

174 million An estimated 174 million more people in the 12 countries[3] will need digital skills training over the next year alone to meet future digital skill needs
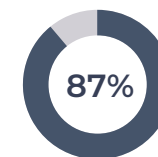
19% This makes up 19% of the total workforce
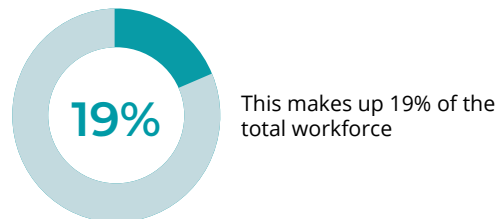
OVERCOMING TRAINING BARRIERS IS KEY TO UNLOCKING FUTURE WORKFORCE POTENTIAL

AWARENESS AND TIME ARE THE TOP BARRIERS TO DIGITAL SKILLS TRAINING

70% of employers and workers have limited awareness of the available training options

69% of employers and workers cite the lack of time as a barrier to training

BENEFITS OF DIGITAL SKILLS TRAINING FOR ORGANIZATIONS

87% Accelerated digitization
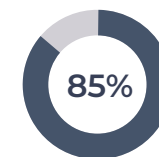
85% Cost efficiencies

WORKERS WHO EXPERIENCE IMPROVED EMPLOYABILITY AFTER DOING TRAINING
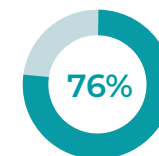
83% Tech workers

76% Non-tech workers

1. Share of organizations that report the benefit
2. Share of workers who report the benefit
3. The 12 countries are: Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, the United Kingdom and the United States

CONTENTS

Important Notice on Contents

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.
Cloud-based tools	On-demand services, applications or other resources that are accessed with an Internet connection through a cloud computing provider's servers.
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. In this report, this term is sometimes used interchangeably with "organizations" as employers represent the views of their organizations.
Organizations	Entities that workers are employed in. These can be public sector, private sector or not-for-profit organizations.

EXECUTIVE SUMMARY

The world is becoming increasingly digital, a trend accelerated by the COVID-19 pandemic. A survey conducted by McKinsey & Company in 2020 found that globally, the COVID-19 pandemic has accelerated the digitization of business operations by four years.[1] Even as the world emerges from the COVID-19 pandemic, the strong demand for technology talent will continue. In fact, a recent report by the World Economic Forum shows that advancements in artificial intelligence (AI), robotics and other emerging technologies are happening in increasingly shorter cycles, changing the nature of jobs faster than before.[2] As new roles emerge and skill requirements evolve rapidly, the workforce will need to undertake digital skills training more regularly to keep up with emerging job needs.

While the digital skills gap, referring to the shortage of talent supply to meet employer demand for digital skills, has been widely discussed, little attention has been paid to the role of training in addressing this gap, as well as the barriers to and benefits of greater training adoption. To better understand digital skills training adoption trends, AWS commissioned AlphaBeta to conduct an in-depth study on the state of digital skills training and examine its importance in improving business outcomes and individual career opportunity.

Covering 12 countries,[3] this study surveyed employers and workers to understand the benefits of digital skills training, the barriers to training, and the gap in digital skills training actions undertaken in organizations and among workers to meet future digital skill needs in the economy. The study developed an indicator, the AWS Global Digital Skills Index, which explores the global training shortfall – referring to the gap between digital skills training efforts in organizations and among workers, and the identified training needs. Given that skills take time to build, employers and workers need to be forward-looking in their training efforts today. However, this Index finds **a significant global training shortfall: digital skills training efforts today are not sufficient to meet evolving business needs**.

1. McKinsey & Company (2020), *How COVID-19 has pushed companies over the technology tipping point – and transformed business forever.* Available at: *https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever*

2. World Economic Forum (2019), "The digital skills gap is widening fast. Here's how to bridge it". Available at: *https://www.weforum.org/agenda/2019/03/the-digital-skills-gap-is-widening-fast-heres-how-to-bridge-it/*

3. These countries are: Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, the United Kingdom and the United States.

THE ACCELERATED NEED FOR DIGITAL SKILLS

1. **The need for cloud computing and technical skills training is increasing, a global trend intensified by technology changes driven by the COVID-19 pandemic.** 87 percent of employers agree that the COVID-19 pandemic has accelerated the pace of digital adoption in their organizations. Additionally, 85 percent of workers feel that they now need more digital skills to cope with changes in their jobs due to the COVID-19 pandemic. Past AWS research in the Asia Pacific region has also shown that with more remote working and the digitization of customer interaction, the COVID-19 pandemic has increased the need for digital communication skills, such as the ability to use cloud-based tools for remote collaboration.[4]

2. **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.[5] This study finds that providing support for digital skills training in workplaces can be a helpful employee retention tool – a crucial consideration as employers weather a spike in worker resignations globally. Over half of employers (56 percent) report increased worker resignations since the COVID-19 pandemic started. Training can help, and 84 percent of employers also report higher employee retention after implementing digital skills training in the workplace.

3. **Digital skills training is not just beneficial for tech workers – it is important for non-tech workers too.** 83 percent of tech workers and 76 percent of non-tech workers feel that such

training has improved their employability by allowing them to keep up to date with the latest technologies.

4. **Organizations and workers overwhelmingly agree that digital skills training is a win-win.** 87 percent of organizations that invest in digital skills training have benefited by fast-tracking their digitization goals. 86 percent of workers experience greater efficiency in their work after undergoing such training.

4. AlphaBeta (2021), *Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches.* Available at: *https://alphabeta.com/our-research/unlocking-apacs-digital-potential-changing-digital-skill-needs-and-policy-approaches/*

5. 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*

5. **A global training shortfall exists today – pointing to a gap between digital skills training actions and training needs.** Two-thirds of workers report that they are not confident that they are gaining digital skills fast enough to meet future skill needs in their careers. This is further supported by the AWS Global Digital Skills Index, which shows that, globally, there is a 67 percent gap in training actions to meet the identified training needs of organizations. Although 97 percent of organizations see a need to train their workers on digital skills, only 30 percent have implemented a plan

to do so. Thus, there is a global training shortfall, where 67 percent of organizations are not undertaking training despite identifying such a need.

6. **To help narrow the global training shortfall, an estimated 174 million more people across the 12 countries will need to undertake digital skills training over the next year alone.**[6] Assuming that workers who do not undertake any training today or who undertake training less than once a year (e.g., once every two years) start taking training regularly from next year, and that the share of the workforce who require digital skills in their jobs grows at the same pace as observed over the past five years, an estimated 174 million more workers across the 12 countries will need to take training over the next year alone.[7] This number comprises 19 percent of the total workforce in these countries. These workers will need to undergo training in order to keep pace with technological advancements and gain new digital skills to succeed in their careers.

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 45 percent 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 5th most demanded skill by employers by 2025, and cloud architecture design anticipated to be the 7th. However, only 16 percent of workers have trained or are training in the management of transition from on-premises facilities to the cloud, and 15 percent in cloud architecture design skills.

6. 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.

7. 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.

8. **93 percent of organizations and workers face barriers to accessing the digital skills they need to remain competitive, with time and awareness as top obstacles.** The majority of workers and organizations face challenges to accessing digital skills training today. This number is high across all countries, ranging from 89 percent in Germany to 96 percent in Indonesia. The two most common barriers faced to digital skilling are the limited awareness of training options available (a major barrier faced by 70 percent of employers and workers), and the lack of time to pursue training (69 percent).

9. **There is also an opportunity to provide more skills training to underrepresented communities and those who are unemployed.** Less than a quarter of organizations provide targeted digital skills training support for racial minorities (only 24 percent do), at-risk youth (22 percent), and unemployed individuals (18 percent). Providing more support for underrepresented communities can be beneficial, given that 83 percent of employers in this study report that doing so has resulted in greater employee diversity in their organizations, as they are able to retain and attract workers with more diverse demographics and skillsets.

TOP INSIGHTS

The Accelerated Need for Digital Skills

- **85%** of workers feel that they now need more digital skills to cope with changes in their jobs during the COVID-19 pandemic

- **87%** of organizations are able to fast-track their digitization goals after investing in training

The Global Training Shortfall

- Although **97%** of organizations see a need to train their workers on digital skills, only **30%** have done so, reflecting a **67%** global training shortfall

- To help narrow the global training shortfall, **174 million** more workers will need to undergo digital skills training over the next year alone

- The ability to use cloud-based tools at work is the most in-demand skill by employers by 2025. However, only **45%** of workers have trained or are training in this skill

- The share is even lower for more advanced cloud-related skills, at **16%** for the management of transition from on-premises facilities to the cloud

Unlocking Future Workforce Potential

- **93%** of organizations and workers face barriers to accessing the digital skills they need to remain competitive

- The **lack of time** to pursue training and the **limited awareness** of training options available are the top barriers faced by employers and workers to training

NOTE: The findings in this study are based on results of employer and worker surveys conducted in 12 countries: Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, the United Kingdom and the United States.
SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

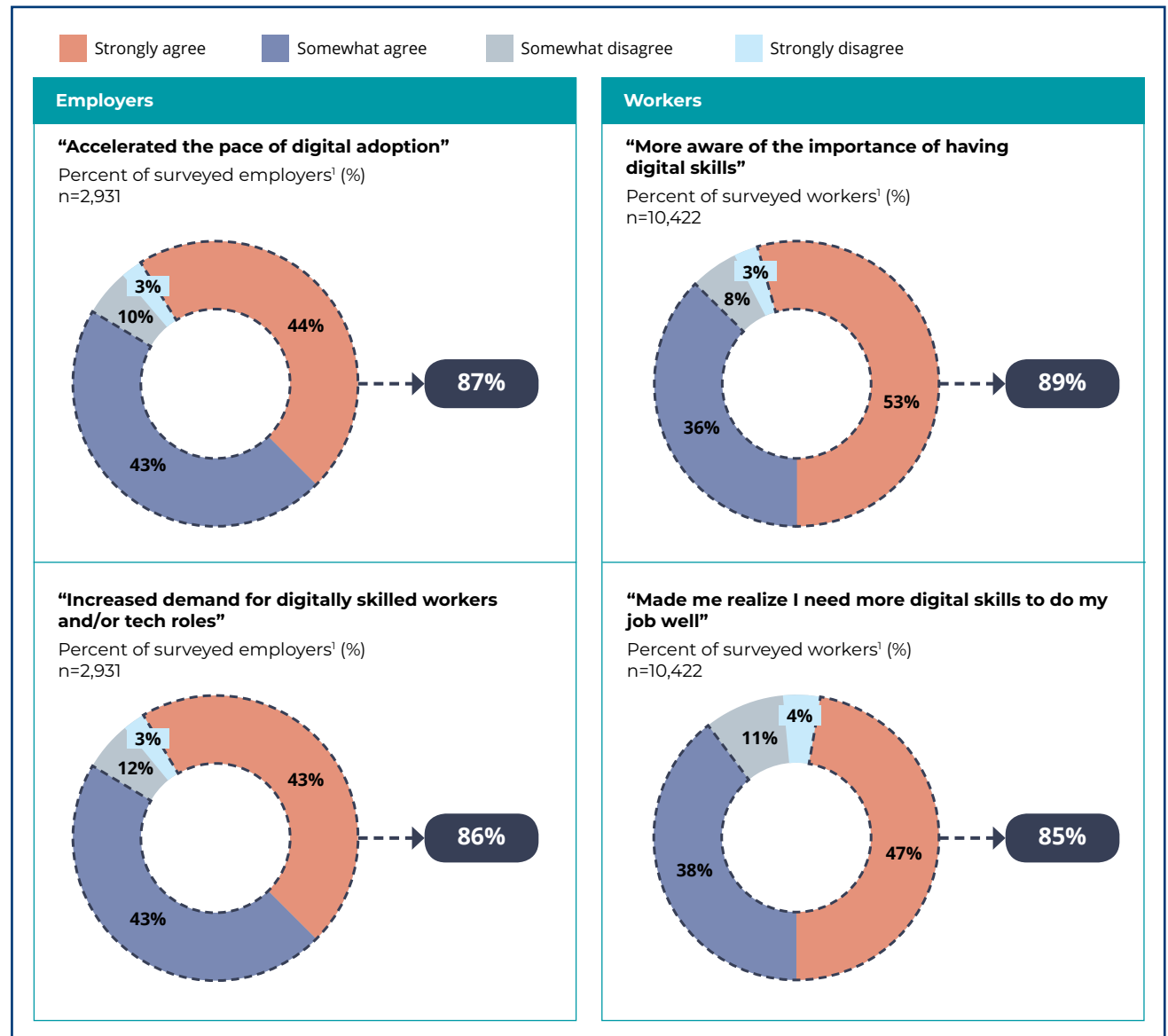# THE ACCELERATED NEED FOR DIGITAL SKILLS

INSIGHT #1:

The need for cloud computing and technical skills training is increasing, a global trend intensified by technology changes driven by the COVID-19 pandemic.

Digital skills have risen in importance during the COVID-19 pandemic. **87 percent** of employers say that the COVID-19 pandemic has **accelerated the pace of digital adoption in their organizations** (Exhibit 1). That is, they fast-track the digitization of their operations such as for customer interactions and remote working to ensure business continuity during the COVID-19 pandemic. **86 percent** of employers also say that the COVID-19 pandemic has **increased their demand for digitally skilled workers and/or tech roles**.

Workers are also acutely aware of the rising need for digital capabilities, with **89 percent** indicating that the COVID-19 pandemic has **heightened their awareness of the importance of digital skills**, and **85 percent now needing more of such skills to cope with changes in their jobs due to the COVID-19 pandemic**. Indeed, past AWS research in the Asia Pacific region has shown that with more remote working and the digitization of customer interaction, the COVID-19 pandemic has increased the need for digital communication skills, such as the ability to use cloud-based tools for remote collaboration.[8] Recent research by the World Economic Forum also found that the adoption of cloud computing, big data and e-commerce remain high priorities for business leaders during this time.[9]

8. AlphaBeta (2021), *Unlocking APAC's Digital Potential: Changing Digital Skill Needs and Policy Approaches*. Available at: *https://alphabeta.com/our-research/unlocking-apacs-digital-potential-changing-digital-skill-needs-and-policy-approaches/*

9. World Economic Forum (2020), *The Future of Jobs Report 2020*. Available at: *https://www.weforum.org/reports/the-future-of-jobs-report-2020*

EXHIBIT 1:

THE COVID-19 PANDEMIC HAS ACCELERATED THE NEED FOR DIGITAL SKILLS

Legend: ■ Strongly agree ■ Somewhat agree ■ Somewhat disagree ■ Strongly disagree

Employers

"Accelerated the pace of digital adoption"
Percent of surveyed employers[1] (%)
n=2,931

44% · 43% · 10% · 3% → **87%**

"Increased demand for digitally skilled workers and/or tech roles"
Percent of surveyed employers[1] (%)
n=2,931

43% · 43% · 12% · 3% → **86%**

Workers

"More aware of the importance of having digital skills"
Percent of surveyed workers[1] (%)
n=10,422

53% · 36% · 8% · 3% → **89%**

"Made me realize I need more digital skills to do my job well"
Percent of surveyed workers[1] (%)
n=10,422

47% · 38% · 11% · 4% → **85%**

1. Percentages may not total to 100 due to rounding.

SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

INSIGHT #2:

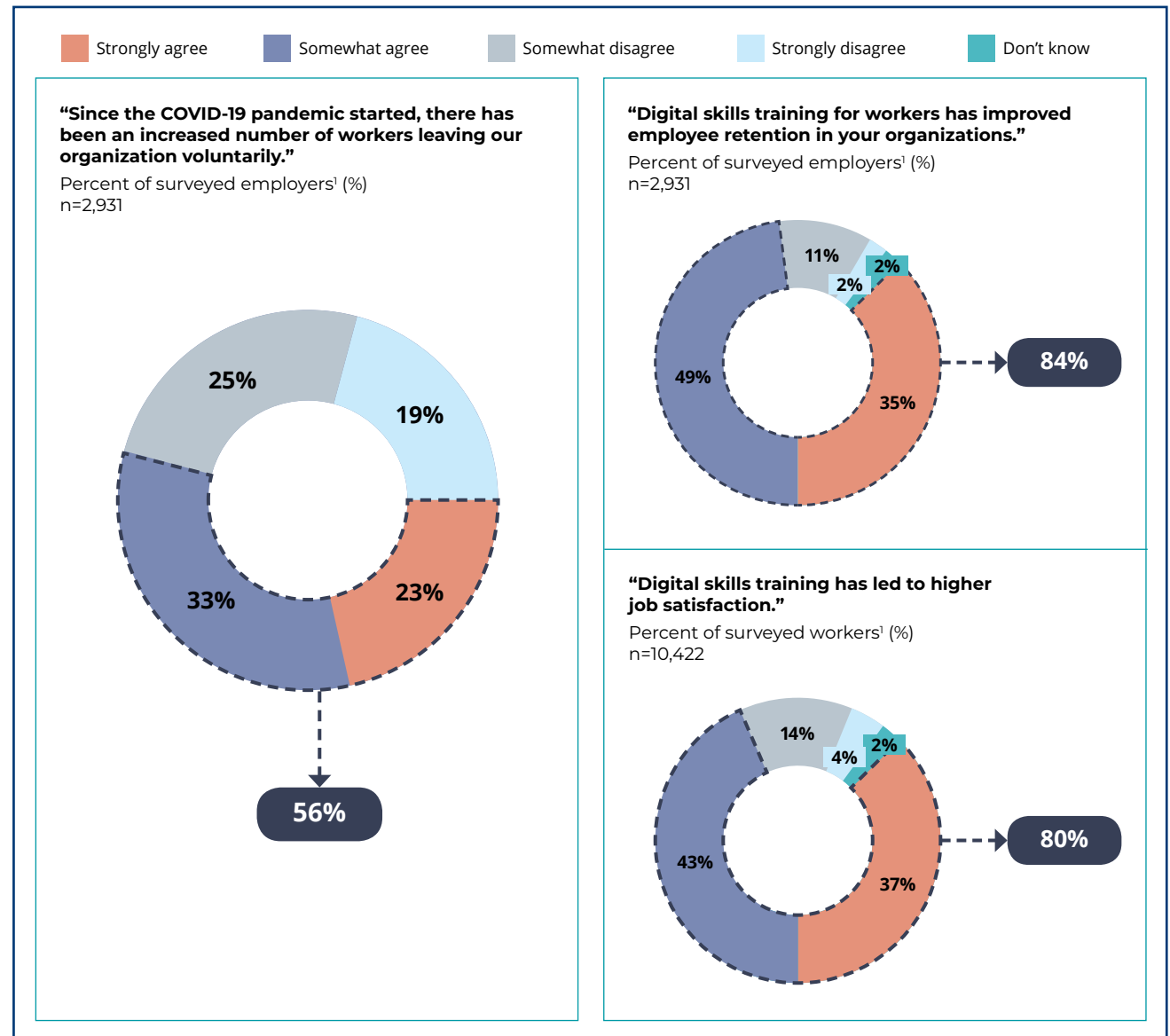### Training can help to slow The Great Resignation trend.

"The Great Resignation" describes the trend of increased employee resignations observed during the COVID-19 pandemic. This study finds that providing support for digital skills training in workplaces can be a helpful employee retention tool – a crucial consideration as employers weather a spike in worker resignations globally.

56 percent of employers report increased worker resignations since the COVID-19 pandemic started (Exhibit 2). Recent studies attribute this trend to burnout and workers rethinking their life and career goals.[10] As this AWS Global Digital Skills Study shows, this trend is especially pronounced in the United States (US), where 71 percent of employers report increased worker resignations – the highest across all 12 countries studied. While this is no silver bullet, employers should consider skills training as a tool to potentially boost employee retention and job satisfaction. **80 percent of workers** in this study report that the opportunity to learn new skills in the workplace **increases their job satisfaction**, and **84 percent of employers report improved employee retention** after implementing such training in the workplace.

EXHIBIT 2:

TRAINING CAN HELP TO SLOW THE GREAT RESIGNATION TREND

■ Strongly agree ■ Somewhat agree ■ Somewhat disagree ■ Strongly disagree ■ Don't know

"Since the COVID-19 pandemic started, there has been an increased number of workers leaving our organization voluntarily."
Percent of surveyed employers[1] (%)
n=2,931

19%
25%
23%
33%
56%

"Digital skills training for workers has improved employee retention in your organizations."
Percent of surveyed employers[1] (%)
n=2,931

11%
2%
2%
49%
35%
84%

"Digital skills training has led to higher job satisfaction."
Percent of surveyed workers[1] (%)
n=10,422

14%
4%
2%
43%
37%
80%

1. Percentages may not total to 100 due to rounding.

SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

Digital skills training is not just beneficial for tech workers – it is important for non-tech workers too.

Digital skills training brings important benefits to all workers, regardless of whether they are in technology-related roles. Both tech and non-tech workers in this study report similar benefits from undergoing digital skills training (Exhibit 3). The most common benefits include: **greater efficiency in doing their jobs (indicated by 86 percent of tech workers and 88 percent of non- tech workers); greater personal satisfaction (85 and 83 percent); improved employability (83 and 76 percent); and greater job satisfaction (82 and 76 percent)**.

This is consistent with other studies which find that workers in non-tech roles increasingly need basic technological skills – at a minimum – in order to cope with the fast-changing nature of their jobs. Recent research by Gartner demonstrates that "the Information Technology (IT) department is no longer the only go-to place for digital talent." Gartner's study finds that 40 percent of job postings in the US[11] that require digital skills are for non-IT roles.[12] In particular, marketing and public relations, sales and business development, finance, and accounting functions together account for a total 19 percent of such job postings. A study by the European Union also shows that digital technologies are required in all types of jobs and industries in Europe, including those not directly related to technology such as agriculture, healthcare and construction.[13]
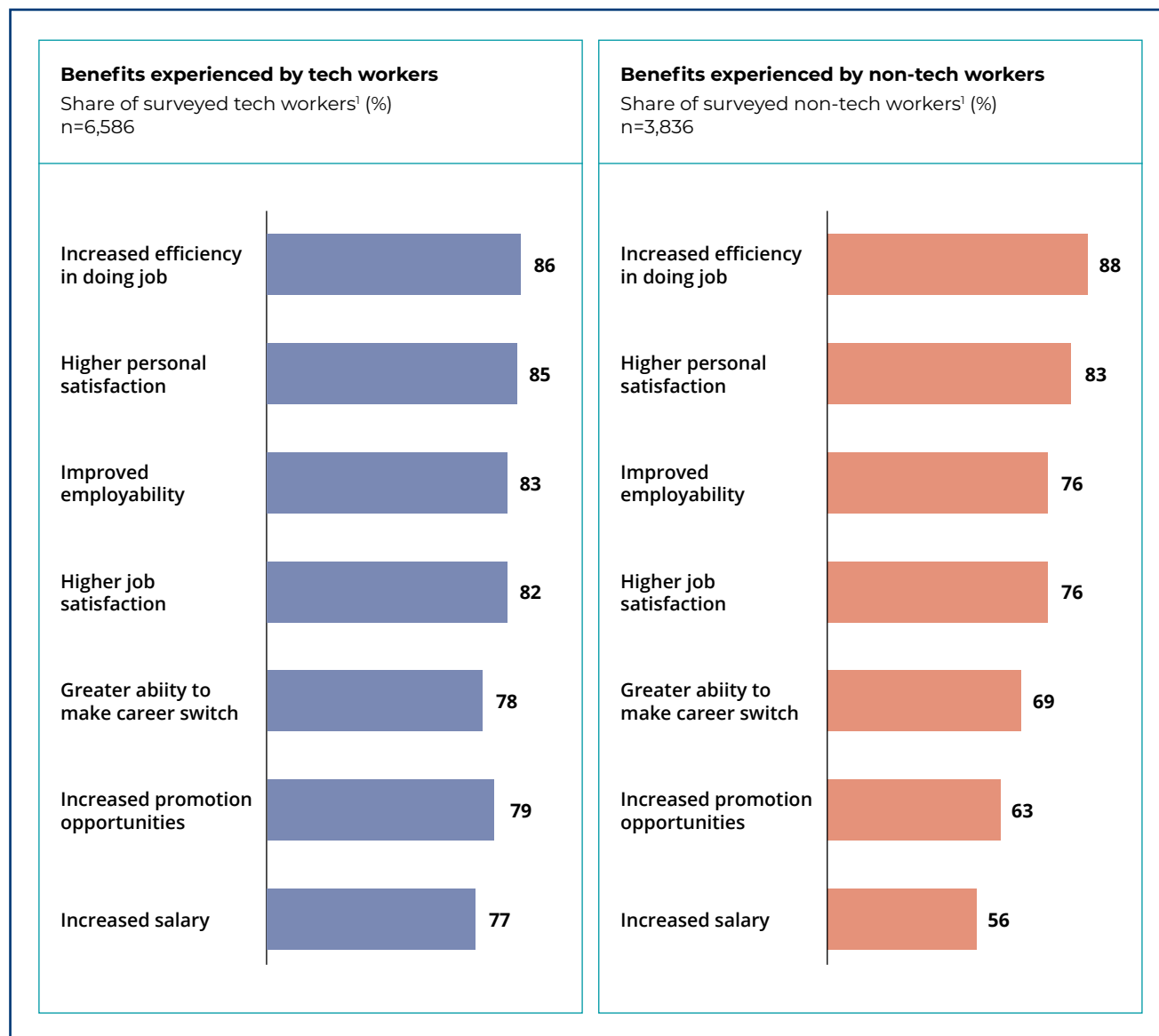
11. These job postings were published between July 2019 and June 2020. Source: Gartner TalentNeuron (2021), "You can find digital skills in non-IT functions". Available at: *https://www.gartner.com/smarterwithgartner/you-can-find-digital-skills-in-non-it-functions/*

12. Gartner TalentNeuron (2021), "You can find digital skills in non-IT functions". Available at: *https://www.gartner.com/smarterwithgartner/you-can-find-digital-skills-in-non-it-functions/*

13. Ecorys and Danish Technological Institute (2016), *ICT for work: Digital skills in the workplace.* Available at: *https://op.europa.eu/s/sBDe*

EXHIBIT 3:

DIGITAL SKILLS TRAINING BENEFITS TECH AND NON-TECH WORKERS

Benefits experienced by tech workers
Share of surveyed tech workers[1] (%)
n=6,586

Benefit	%
Increased efficiency in doing job	86
Higher personal satisfaction	85
Improved employability	83
Higher job satisfaction	82
Greater abiity to make career switch	78
Increased promotion opportunities	79
Increased salary	77

Benefits experienced by non-tech workers
Share of surveyed non-tech workers[1] (%)
n=3,836

Benefit	%
Increased efficiency in doing job	88
Higher personal satisfaction	83
Improved employability	76
Higher job satisfaction	76
Greater abiity to make career switch	69
Increased promotion opportunities	63
Increased salary	56

1. Based on the share of surveyed tech/non-tech workers who somewhat or strongly agree that they had experienced the benefit from undergoing digital skills training.

SOURCE: AlphaBeta survey of 7,021 tech workers and 5,280 non-tech workers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

INSIGHT #4:

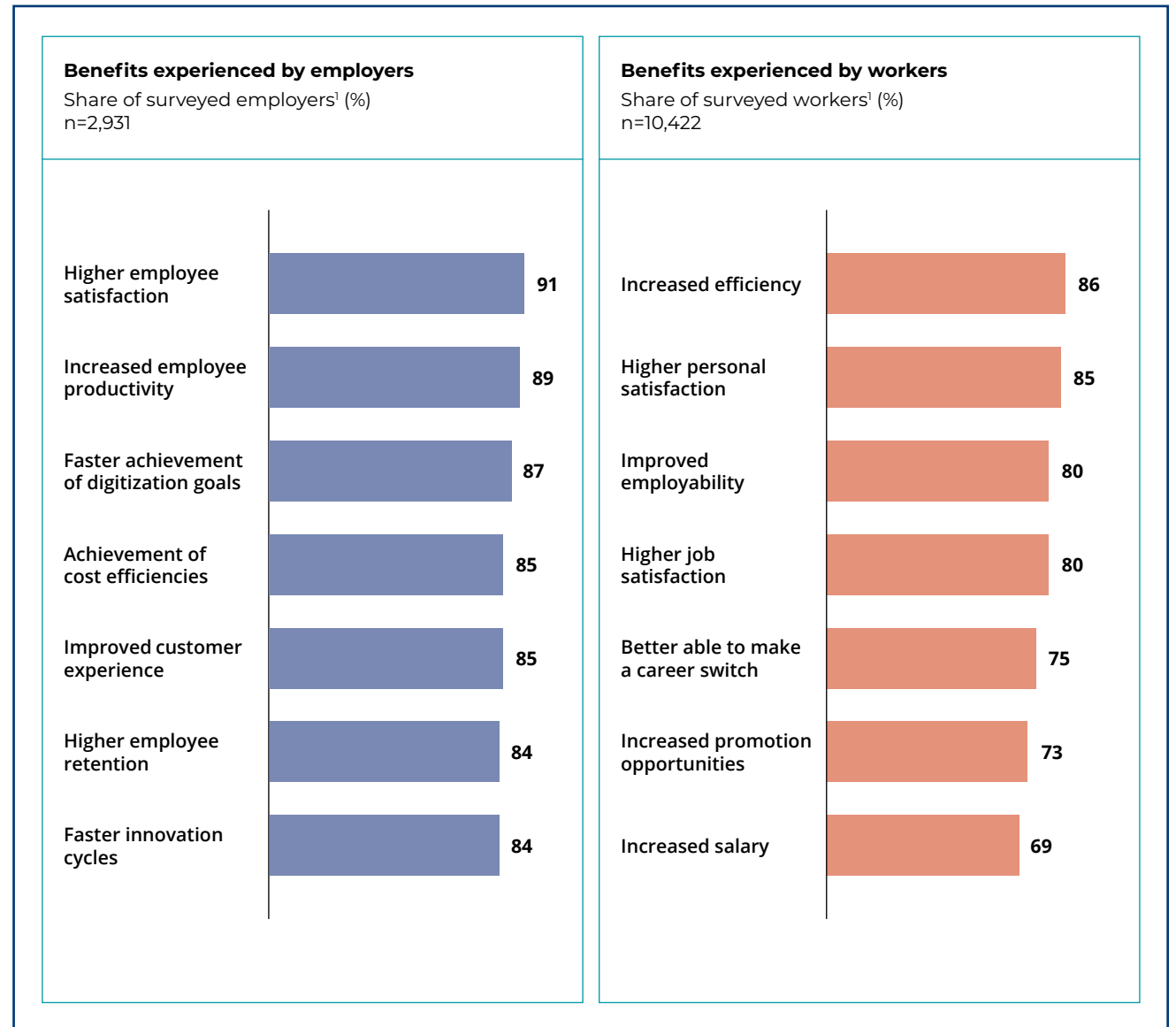## Organizations and workers overwhelmingly agree that digital skills training is a win-win.

By providing their workers with digital skills training support either directly through courses conducted in the workplace or indirectly through training loans and grants, organizations have experienced a range of benefits. **87 percent of employers report that investments in digital skills training for their workers have allowed their organizations to achieve digital transformation goals more quickly** (Exhibit 4), as workers become more acquainted with the latest technologies and can contribute to implementing them in the workplace. Other benefits include higher employee satisfaction (91 percent), cost efficiencies (85 percent) and improved customer experience (85 percent).

Workers have also experienced significant benefits from pursuing digital skills training. **86 percent of workers who have undertaken such training report being more efficient in their jobs** and 85 percent report greater personal satisfaction (Exhibit 4). Other benefits experienced by workers include improved employability (80 percent), and greater ability to make career switches (75 percent).

In addition, though not many workers realize this, **digital skills training efforts are considered in their compensation and promotion reviews**. 89 percent of employers indicate that they factor such efforts into these reviews, but only 74 percent of workers are aware of this. Indeed, 69 percent of workers benefit from increased salaries upon undertaking digital skills training, while 73 percent report increased promotion opportunities (Exhibit 4). In other words, digital skills training can boost one's chances of getting salary increments and promotions in the workplace.

EXHIBIT 4:

DIGITAL SKILLS TRAINING IS A WIN-WIN FOR EMPLOYERS AND WORKERS

Benefits experienced by employers
Share of surveyed employers[1] (%)
n=2,931

Benefit	%
Higher employee satisfaction	91
Increased employee productivity	89
Faster achievement of digitization goals	87
Achievement of cost efficiencies	85
Improved customer experience	85
Higher employee retention	84
Faster innovation cycles	84

Benefits experienced by workers
Share of surveyed workers[1] (%)
n=10,422

Benefit	%
Increased efficiency	86
Higher personal satisfaction	85
Improved employability	80
Higher job satisfaction	80
Better able to make a career switch	75
Increased promotion opportunities	73
Increased salary	69

1. Based on the share of surveyed employers/workers who somewhat or strongly agree that they had experienced the benefit from implementing/undergoing digital skills training.

SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

THE
GLOBAL TRAINING
SHORTFALL

INSIGHT #5:

A global training shortfall exists today – pointing to a gap between digital skills training actions and training needs.

As skills take time to build, employers and workers need to be forward-looking in their training efforts today. However, this study finds a significant global training shortfall today: digital skills training efforts today pale in comparison with the identified training needs.
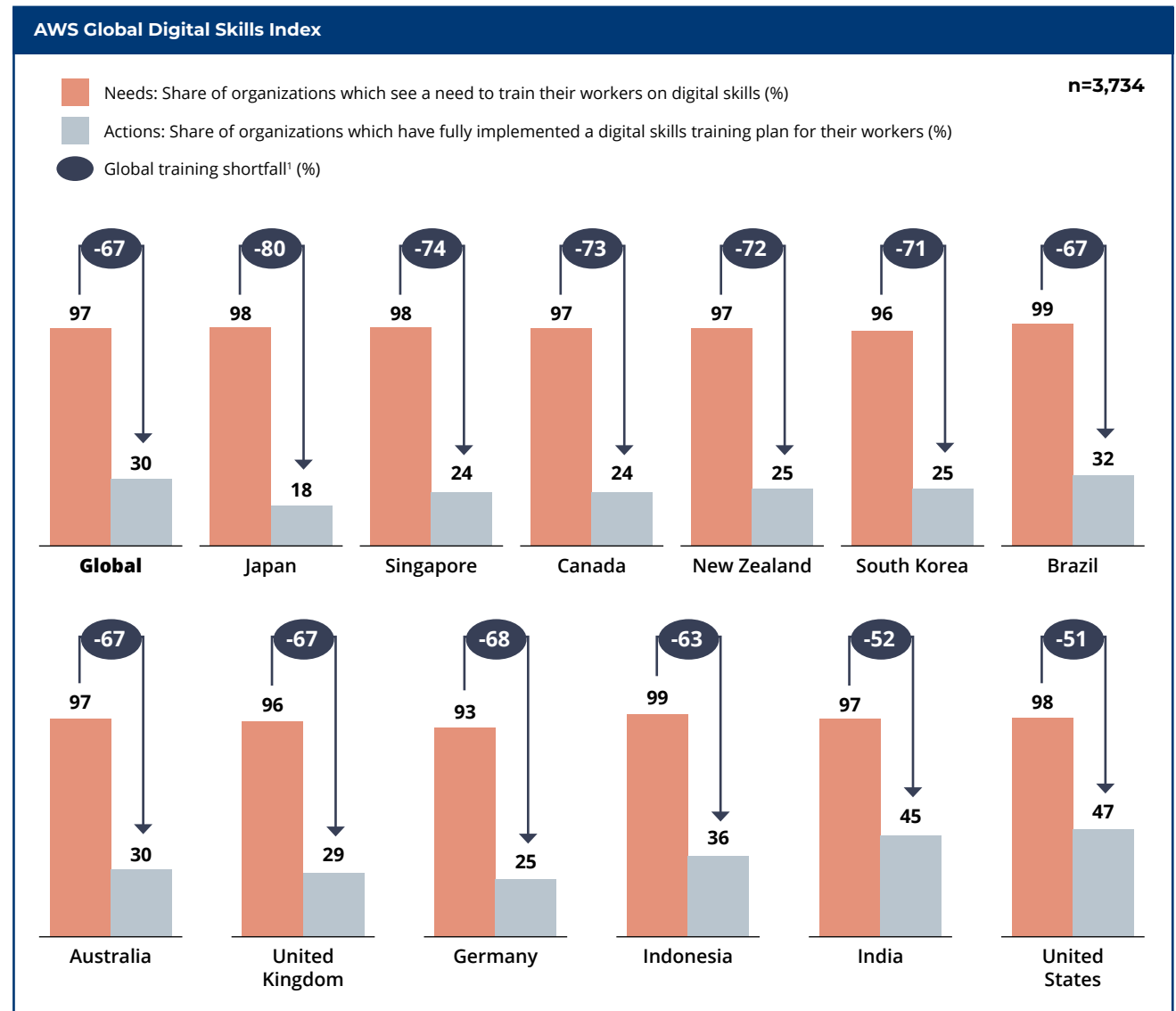
To understand the extent to which future digital skill needs are being met through training efforts today, the AWS Global Digital Skills Index was developed to quantify the gap between training actions and identified training needs. It finds that, **globally, there is a 67 percent gap between training actions and training needs in organizations – that is, 67 percent of organizations acknowledge a need to increase their workers' digital skills, but have not implemented a plan to do so** (Exhibit 5). Although 97 percent of organizations see a need to train their workers on digital skills, only 30 percent have implemented a plan to do so.

Similarly, workers are not committing sufficient training based on what they need. Although 95 percent of workers see a need to learn new digital skills, only 64 percent of them currently undertake training at least once a year. This translates into a **31 percent global training shortfall between training actions and needs by workers.** Despite this, the study also found that two-thirds (66 percent) of workers reported that they are not confident that they are gaining digital skills fast enough to meet future career needs. This indicates that workers need more training to keep up with evolving job needs, and in particular, focus their training on future in-demand skills.

This global training shortfall is evident in all countries. The size of this shortfall in organizations ranges from 51 percent in the US to 80 percent in Japan, while that among workers ranges from 25 percent in the US to 39 percent in Japan. This variation is driven by the difference in training levels across countries, which is in turn affected by factors such as organizational stances on developing in-house tech capabilities and workers' attitudes towards upskilling.

EXHIBIT 5:

THE AWS GLOBAL DIGITAL SKILLS INDEX SHOWS A GAP BETWEEN DIGITAL SKILLS TRAINING ACTIONS AND TRAINING NEEDS

AWS Global Digital Skills Index

n=3,734

Needs: Share of organizations which see a need to train their workers on digital skills (%)

Actions: Share of organizations which have fully implemented a digital skills training plan for their workers (%)

Global training shortfall[1] (%)

1. Difference between the share of surveyed employers who identified the need to train their workers on digital skills, and the share that implement digital skills training.

SOURCE: AlphaBeta survey of 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

To help narrow the global training shortfall, an estimated 174 million more people across the 12 countries will need to undertake digital skills training over the next year alone.

As new roles emerge and skills requirements evolve rapidly, workforces will need to undertake digital skills training more regularly to keep up to speed with emerging job needs.

As mentioned earlier, although 95 percent of workers see a need to learn new digital skills, only 64 percent of them currently undertake training at least once a year – indicating a 31 percent global training shortfall among workers. To help narrow the global training shortfall, the remaining 31 percent of workers will need to undertake digital skills training at least once a year to keep up with evolving job needs.
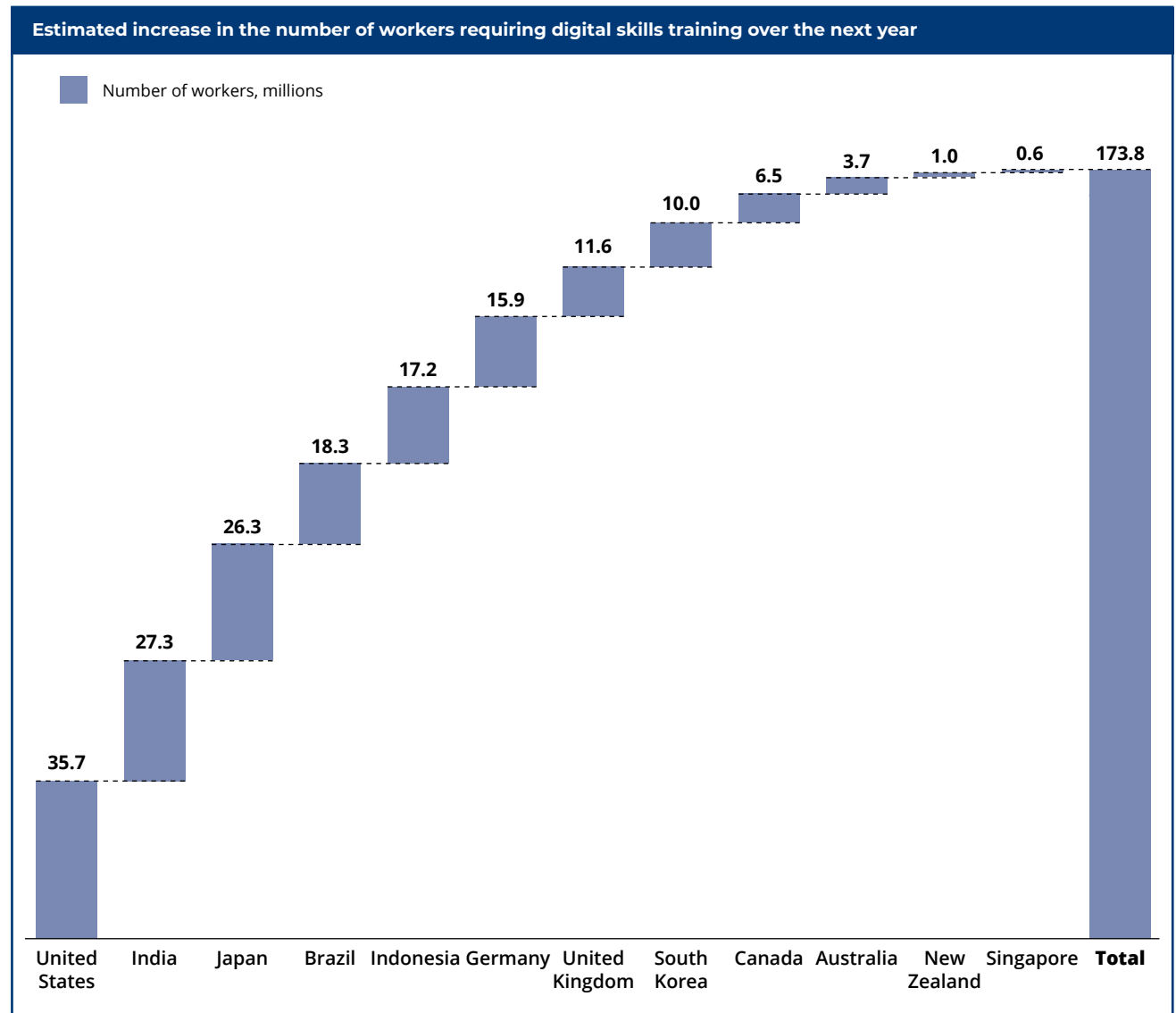
Therefore, assuming that digitally skilled workers who do not currently undertake training regularly start doing so, and that the share of the workforce who require digital skills in their jobs grows at the same pace as observed over the past five years, an estimated 174 million more people in the 12 countries will require training over the next year (Exhibit 6).[14] In other words, **174 million more people will require digital skills training over the next year alone in order to keep pace with technological advancements and gain new digital skills.** 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.

According to workforce data from International Labor Organization, 174 million constitutes close to 20 percent of the total workforce across the 12 countries.

14. 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.

EXHIBIT 6:

ACROSS THE 12 COUNTRIES IN THIS STUDY, AN ESTIMATED 174 MILLION MORE PEOPLE WILL REQUIRE DIGITAL SKILLS TRAINING OVER THE NEXT YEAR

Estimated increase in the number of workers requiring digital skills training over the next year

■ Number of workers, millions

Country	Value
United States	35.7
India	27.3
Japan	26.3
Brazil	18.3
Indonesia	17.2
Germany	15.9
United Kingdom	11.6
South Korea	10.0
Canada	6.5
Australia	3.7
New Zealand	1.0
Singapore	0.6
Total	**173.8**

NOTE: Refer to Appendix for how these estimates were derived.

SOURCE: AlphaBeta survey of 12,301 workers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; Global Innovation Index; International Labor Organization; AlphaBeta analysis.

INSIGHT #7:

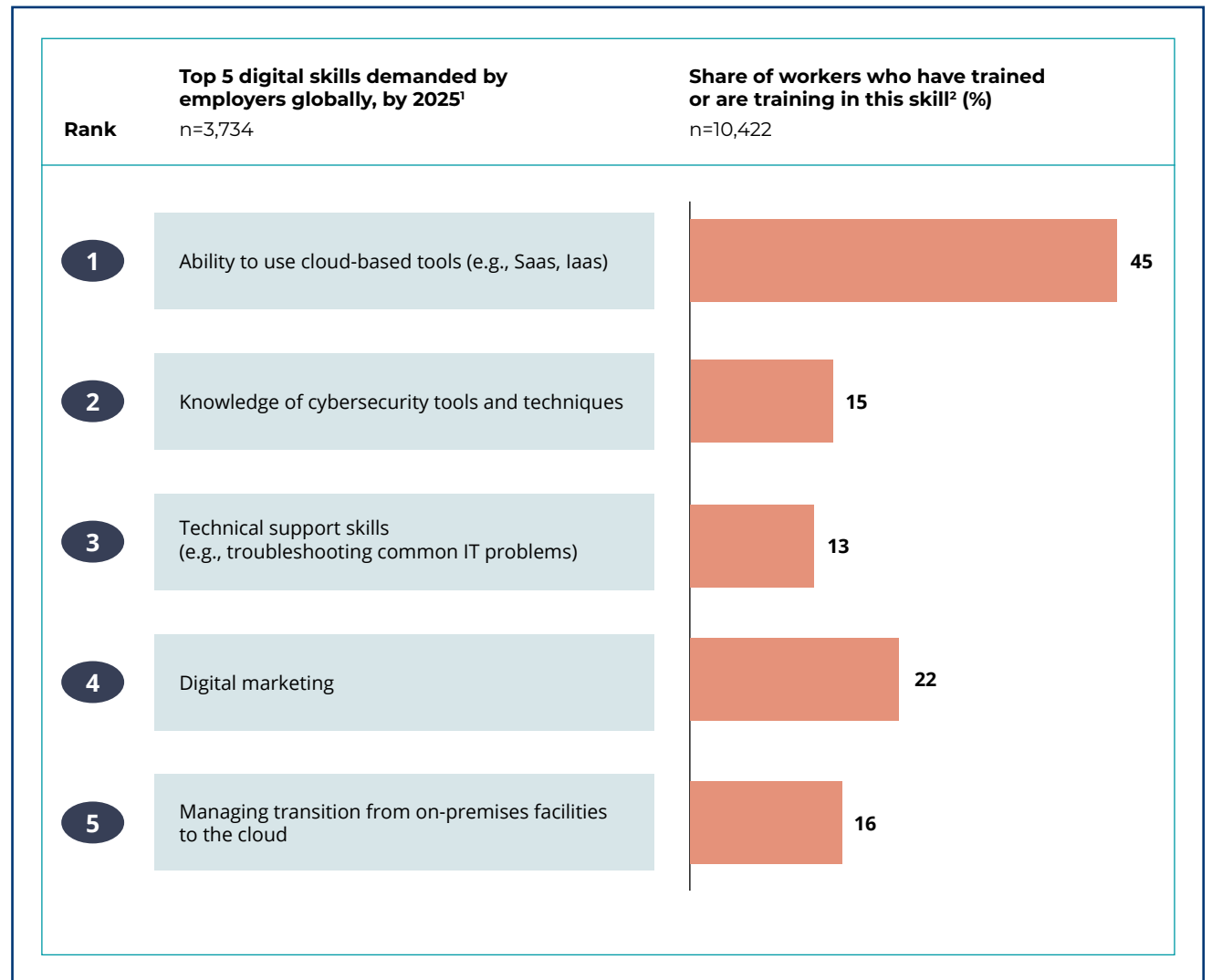**Cloud skills will see some of the greatest demand by employers by 2025, but workers are currently not focusing sufficient training on these skills.**

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 45 percent 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 5th most demanded skill by employers by 2025, and cloud architecture design anticipated to be the 7th. However, only 16 percent of workers have trained or are training in the management of transition from on-premises facilities to the cloud, and 15 percent in cloud architecture design skills.

The low levels of training are also observed for other in-demand digital skills. Not many workers have trained or are training in the most in-demand skills by employers, such as for cybersecurity skills (only 15 percent of workers have trained or are training in this skill), technical support skills (only 13 percent) and digital marketing (only 22 percent) (Exhibit 7).

EXHIBIT 7:

THERE IS AN OPPORTUNITY FOR WORKERS TO BETTER FOCUS THEIR TRAINING ON IN-DEMAND SKILLS

Rank	Top 5 digital skills demanded by employers globally, by 2025[1] n=3,734	Share of workers who have trained or are training in this skill[2] (%) n=10,422
1	Ability to use cloud-based tools (e.g., Saas, Iaas)	45
2	Knowledge of cybersecurity tools and techniques	15
3	Technical support skills (e.g., troubleshooting common IT problems)	13
4	Digital marketing	22
5	Managing transition from on-premises facilities to the cloud	16

1. This list of top 5 digital skills demanded by employers globally was derived based on analysis of employer survey results. Respondents were asked to rank the top 5 digital skills they believe will be in highest demand by 2025. The rank of each skill was estimated based on the share of respondents who rank this skill to be within the top 5.

2. Based on the share of surveyed workers who indicated that they have undertaken training in the digital skill.

SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

UNLOCKING
FUTURE WORKFORCE
POTENTIAL

INSIGHT #8:

93 percent of organizations and workers face barriers to accessing the digital skills they need to remain competitive, with time and awareness as top obstacles.
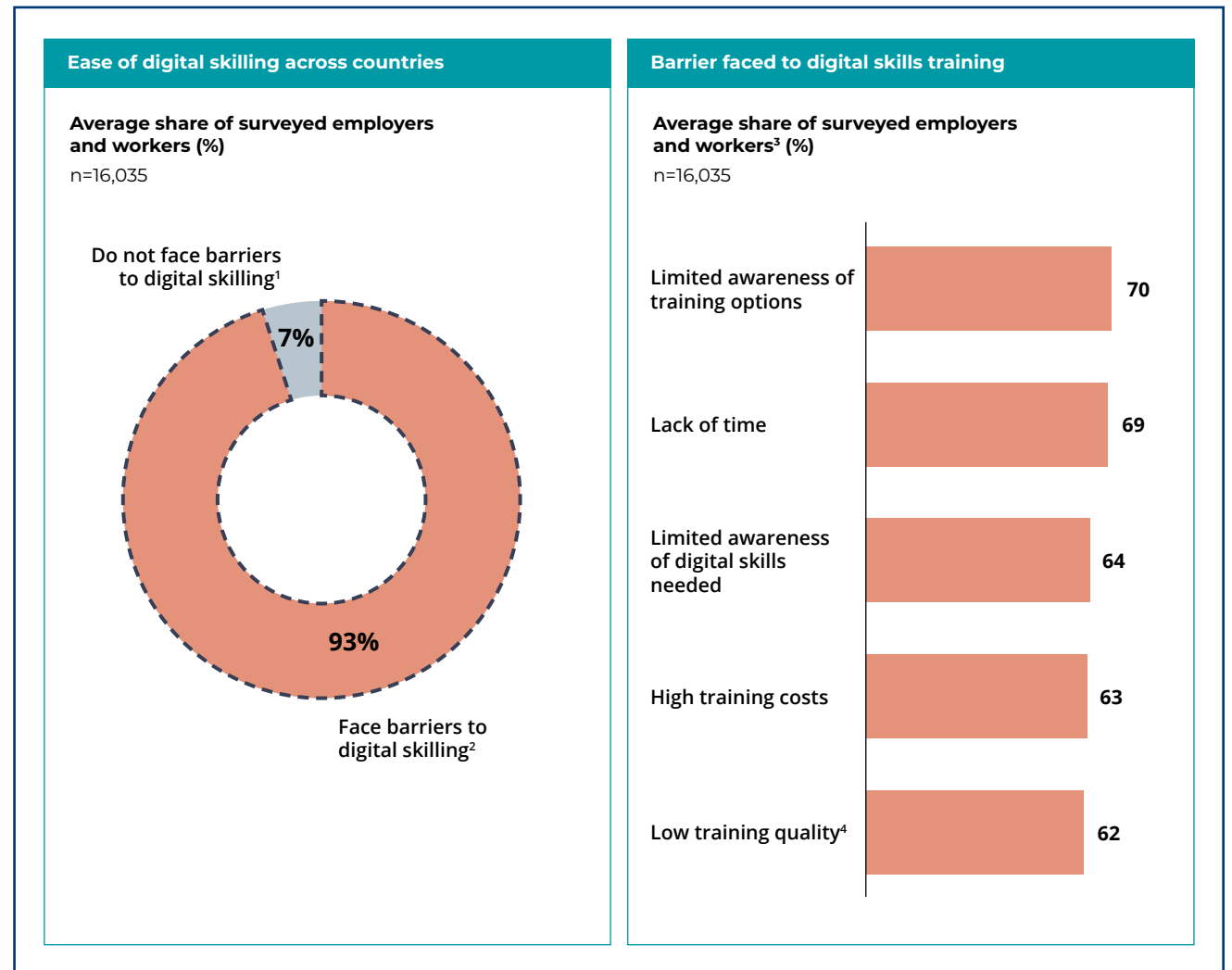
Across the 12 countries, 93 percent of workers and employers face barriers to accessing digital skills training for themselves or their organizations today (Exhibit 8). Although the specific share of workforces that face hurdles to digital skills training varies by country, it is consistently high across all countries – ranging from 89 percent in Germany to 96 percent in Indonesia. **The two most common barriers faced are the limited awareness of training options available (indicated by 70 percent of employers and workers), and the lack of time to pursue training (69 percent)** (Exhibit 8).

The limited awareness of training options available may be driven by the concentrated marketing of such training courses in niche platforms, which are not widely used by all workers within a country. Employers and workers who cite the lack of time as a barrier could also be adopting the mindset that pursuing training requires workers to take an extended time off from their full-time employment, or are unaware of the widely available on-demand courses.

The significant barriers to training reflect the fact that despite being aware of the numerous benefits of digital skills training for both organizations and individuals, a large share of workforces across all countries still face hurdles to training. Tackling these barriers will thus be critical to unlock more digital skills training and the benefits associated with it.

EXHIBIT 8:

MOST EMPLOYERS AND WORKERS FACE BARRIERS TO ACCESSING DIGITAL SKILLS TRAINING

Ease of digital skilling across countries

Average share of surveyed employers and workers (%)
n=16,035

Do not face barriers to digital skilling[1]

7%

93%

Face barriers to digital skilling[2]

Barrier faced to digital skills training

Average share of surveyed employers and workers[3] (%)
n=16,035

Barrier	Value
Limited awareness of training options	70
Lack of time	69
Limited awareness of digital skills needed	64
High training costs	63
Low training quality[4]	62

1. Average share of surveyed employers and workers who somewhat or strongly disagree that they face any barriers in supporting/undertaking digital skills training.
2. Average share of surveyed employers and workers who somewhat or strongly agree that they face at least 1 barrier in supporting/undertaking digital skills training.
3. Average share of surveyed employers and workers who somewhat or strongly agree that they face the barrier in supporting/undertaking digital skills training.
4. This barrier applies only to worker respondents in the study, as workers are the "end users" of such training and are deemed to have a better gauge of training quality.

SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

There is also an opportunity to provide more skills training to underrepresented communities and those who are unemployed.

Targeted digital skills training opportunities are limited for underrepresented communities and individuals who are unemployed. Employers were asked about the groups of people whom they provide targeted digital skills training support for. While, unsurprisingly, the largest share (79 percent) state that they provide at least some level of digital skills training support for their workers,[15] lower shares of employers provide targeted support for underrepresented communities (Exhibit 9). **Communities that receive the least support are unemployed or out-of-workforce individuals (with 18 percent of employers who provide targeted support for them), at-risk youth – referring to youth from low-income families (22 percent), and racial or ethnic minorities (24 percent).** While it could be argued that it is not the responsibility of employers to train those outside the organization such as unemployed individuals, it does highlight the risk of exacerbating the existing digital divide problem.
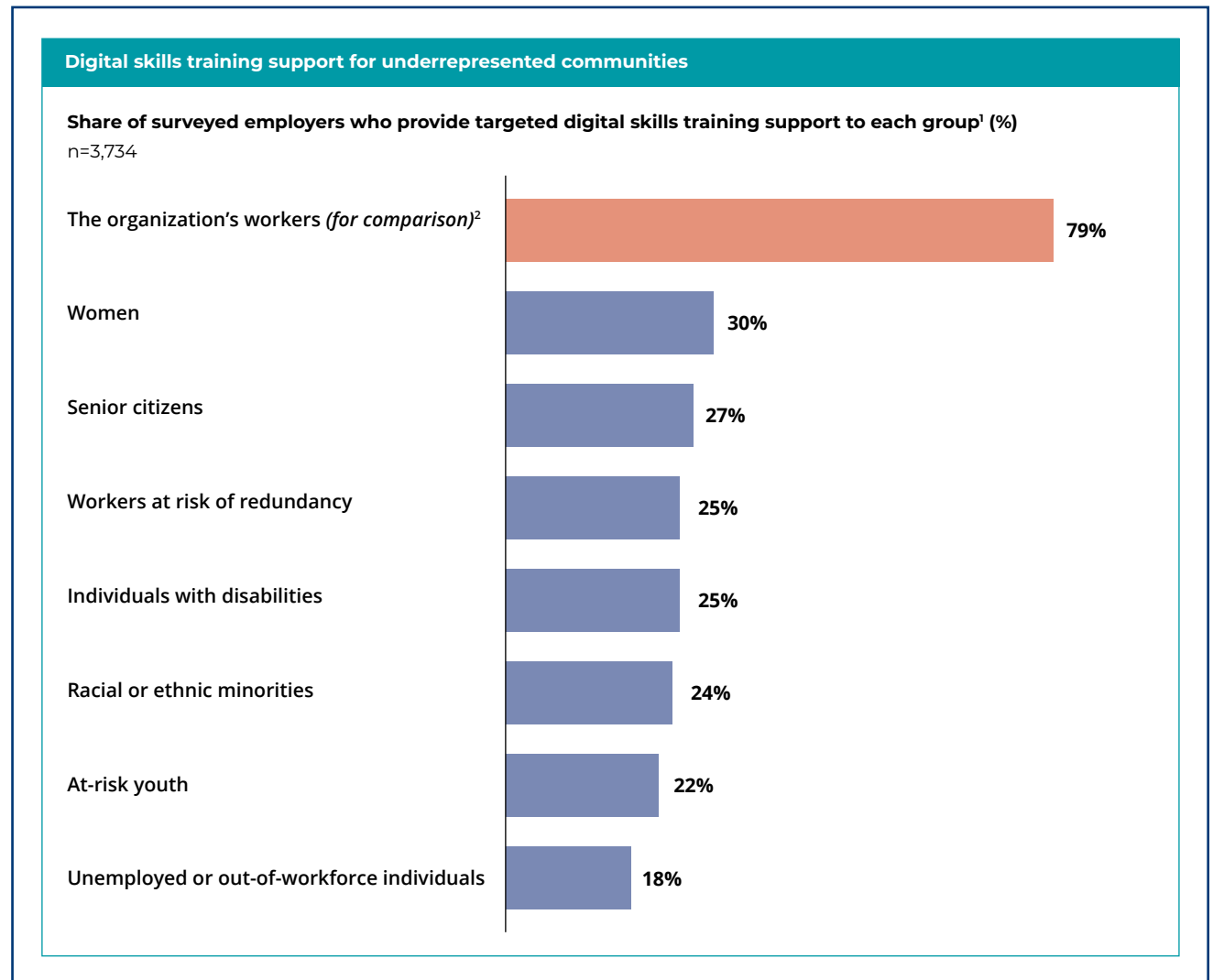
This is a major concern given that digital inclusion is an important step for economies to fully unlock the benefits of digital transformation. **83 percent of employers in this study report that providing digital skills training in the workplace has resulted in greater employee diversity in their organizations, as they are able to retain and attract workers with more diverse demographics and skillsets.** Having a diverse workforce can unlock significant benefits for organizations, such as greater innovation and revenue driven by varying backgrounds and perspectives.[16]

15. Within the 79 percent of employers who provide digital skills training support to their workers, 30 percent have fully implemented a comprehensive plan for training their workers in digital skills, while the remaining 49 percent have implemented some plans for such training.

16. Boston Consulting Group (2018), "How Diverse Leadership Teams Boost Innovation." Available at: https://www.bcg.com/en-us/publications/2018/how-diverse-leadership-teams-boost-innovation

EXHIBIT 9:

DIGITAL SKILLS TRAINING OPPORTUNITIES ARE LIMITED FOR UNDERREPRESENTED GROUPS

Digital skills training support for underrepresented communities

Share of surveyed employers who provide targeted digital skills training support to each group[1] (%)
n=3,734

Group	%
The organization's workers *(for comparison)*[2]	79%
Women	30%
Senior citizens	27%
Workers at risk of redundancy	25%
Individuals with disabilities	25%
Racial or ethnic minorities	24%
At-risk youth	22%
Unemployed or out-of-workforce individuals	18%

1. Respondents in the employer survey were asked which underrepresented groups they provided targeted digital skills training support for. Shares are based on employers who indicate that their organization provides such support for each group.

2. This data point is provided for comparison purposes. This is based on the share of surveyed employers who indicate that they have either partially or fully implemented a program to support their workers with digital skills training.

SOURCE: AlphaBeta survey of 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

CONCLUSION: THE WAY FORWARD

Tackling the global training shortfall will require the collective effort of employers, workers, and governments across countries.

This study finds that workers are looking to employers to provide skills training, creating an opportunity for organizations to take a more active role in providing workers with the time and tools to boost their technical knowledge. The survey undertaken in this study shows that 74 percent of workers believe that employers play an important role in helping them acquire digital skills, as compared to 46 percent who believe that the government plays this role, and 14 percent who believe that the non-profit sector does.

However, the significant gap between training actions and training needs in organizations today – at 67 percent across all 12 countries in the study – underscores the importance of urgent investments in workplace digital skills training. Employers can develop internal company-wide programs that connect their workers to the wide range of digital skills training options available. Other forms of support that employers can provide include workplace-based digital skills training led by internal or external trainers, implementing e-learning courses in the workplace or providing training grants or loans for workers.

Workers also play a pivotal role in setting their careers up for success through digital skills training. This study finds that not all workers who acknowledge the importance of digital skills training do so regularly enough. Although 95 percent of workers see a need to learn new digital skills, only 64 percent of them are undertaking training at least once a year. In addition to the gap in training actions, workers are not focusing their training on skills that will be most sought after by employers by 2025, particularly for cloud computing, cybersecurity, and technical support skills.

This study has shown that the most in-demand skill sought after by employers by 2025 is the ability to use cloud-based tools. The ability to manage transition from on-premises facilities to the cloud also emerges as one of the top five in-demand skills. Others in-demand include: cybersecurity skills, technical support skills and digital marketing skills. Training courses in modular, "micro-skills" in these fast-growing areas are now widely available across countries, many of which are available on-demand and provided for free by industry. These courses can be taken on a flexible basis in the limited pockets of free time that full-time employed workers across industries and roles have, and can be extremely effective in allowing them to rapidly build their competencies and knowledge in fast-emerging technology areas. As this study has found, doing so can be critical to the future success of organizations and workers, such as by fast-tracking organization's digitization goals and improving workers' employability.

Finally, there is an opportunity for governments to work with industry to develop adequate skills training options and to broaden the awareness of such options to both organizations and workers. Governments' role in promoting and strengthening digital skills training in their countries will be important, given that **76 percent of employers and workers in this study do not feel that government support for developing workforce digital skills in their countries is sufficient.** Governments can start with tackling the largest barrier faced to digital skills training: the limited awareness of training options available. Governments can do this by broadening awareness of industry-led digital skills training courses available today, and how organizations and individuals may access them. They can also work with industry to develop skills training options that cover the in-demand digital skills in each country. These training options should be regularly updated to reflect the latest skill needs and technology trends.

This study has uncovered the overwhelming benefits digital skills training can bring to both workers and employers. Looking ahead into a world that will become increasingly digitized, training will be even more imperative to help organizations and workers adapt and make the most of the growing opportunity created by increased digitization.

APPENDIX

Two surveys on digital skills – one for employers and one for workers – were conducted in each of the 12 countries covered in this study: Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, the United Kingdom, and the United States. Conducted online from 7 August to 30 August 2021, these surveys asked respondents for their views on the following: the amount and frequency of digital skills training undertaken, the types of digital skills trained in, the business and career impacts of digital skills training, the barriers faced to undergoing digital skills training, and perspectives on the types of support required for digital skills training. Employers that were targeted for the survey included business managers, IT managers and IT decision makers. Workers that were targeted included full-time workers who require some form of digital skills to do their jobs.

In the 12 countries, a total of 12,301 workers and 3,734 employers were surveyed.[17] For the employer survey, a minimum of 300 respondents per country was targeted to ensure statistically significant results at a 90 percent significance level and 5 percent margin of error. For the worker survey, a minimum of 1,000 respondents per country was set to ensure statistically significant results at a 95 percent significance level and 5 percent margin of error. We did not assign weights to the countries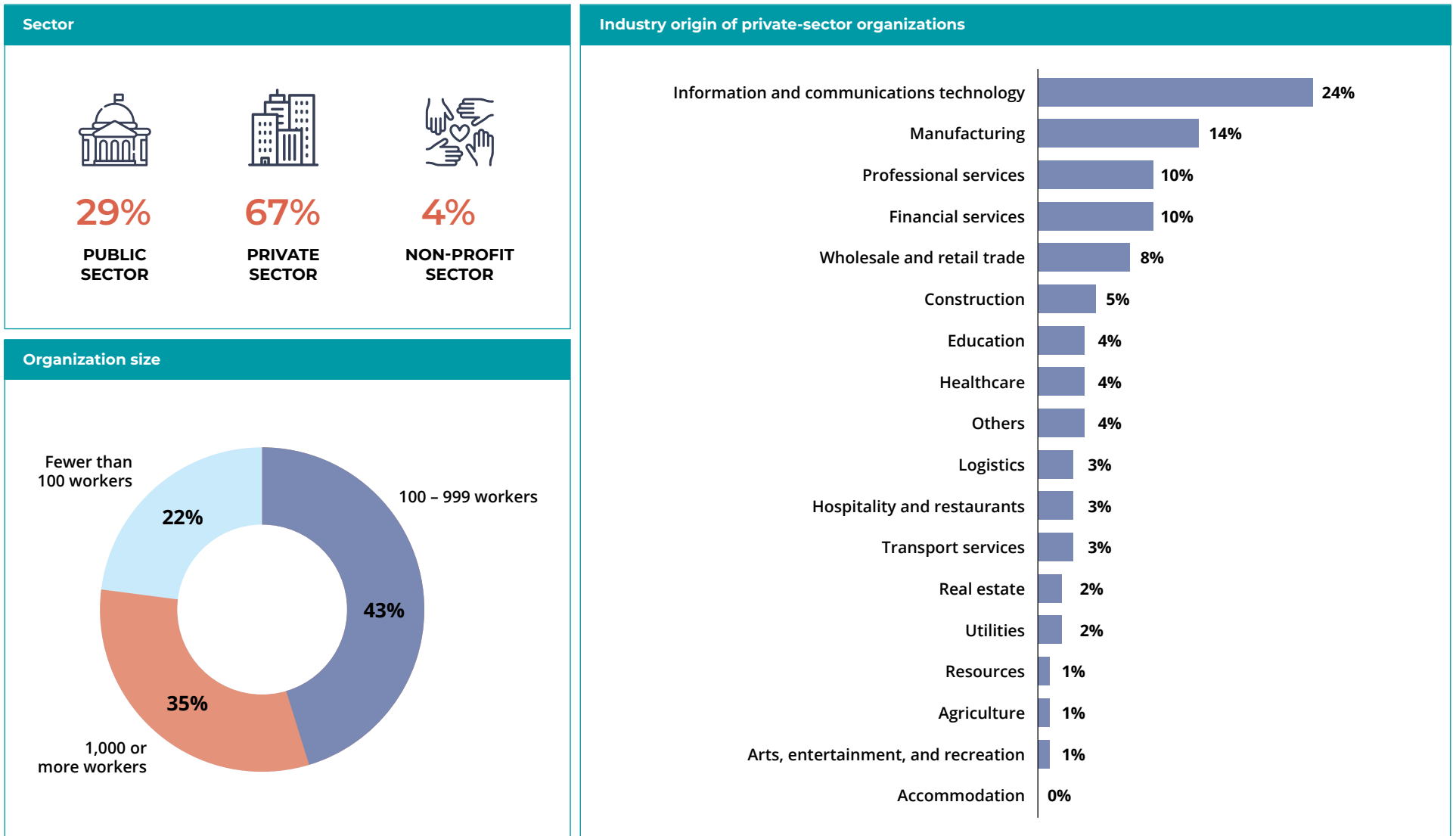 based on the population, and the results for this global study were analyzed based on the absolute total number of responses. This is because all countries have a relatively even split of responses among them – ranging from 300 (Indonesia, New Zealand and the US) to 326 (Australia) for employers, and 1,012 (India) to 1,039 (New Zealand) for workers. This was assessed to be a more robust approach than weighting countries based on their populations given the dramatically larger sizes of a handful of countries among our sample (particularly India), which means that the global survey results would predominantly reflect the situation in those countries; and deriving a simple average of country responses, which would result in any outlier results from particular countries impacting the global result.

For the employer survey, employers from enterprises of different sizes and from different industries were included. The employer survey also had representation across public, private and non-profit sectors. Exhibit A1 shows the full respondent breakdown across different sectors, organization size, and industry origin. For the worker survey, workers in both technology-related and non-technology related roles were included. The worker survey also had representation from workers across different industries and seniority levels. Exhibit A2 shows the full respondent breakdown across gender, seniority level and the technology focus of the job role.

17. 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. 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.

GLOBAL EMPLOYER SURVEY – RESPONDENT PROFILE

Sector

29% — PUBLIC SECTOR

67% — PRIVATE SECTOR

4% — NON-PROFIT SECTOR

Organization size

- Fewer than 100 workers: 22%
- 100 – 999 workers: 43%
- 1,000 or more workers: 35%

Industry origin of private-sector organizations

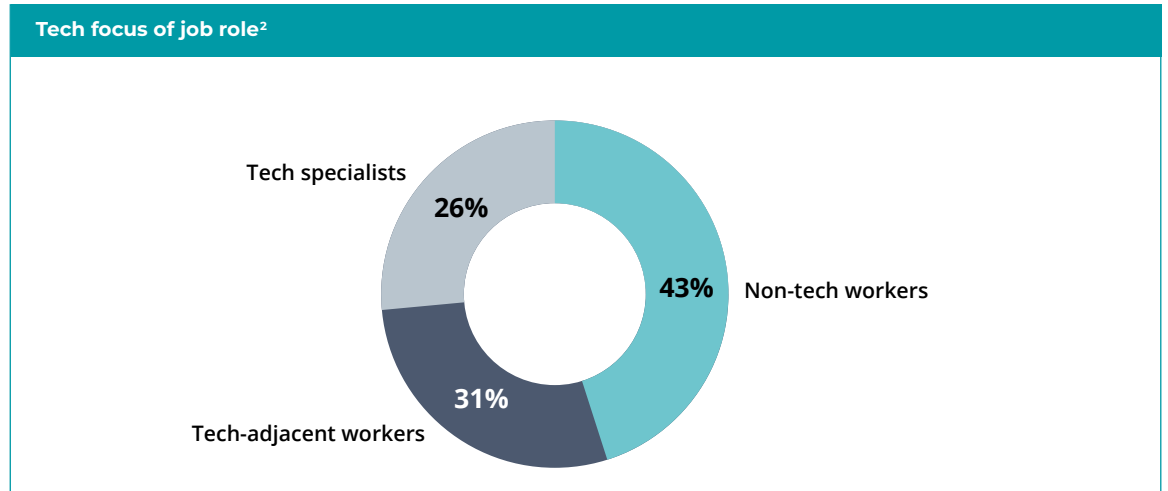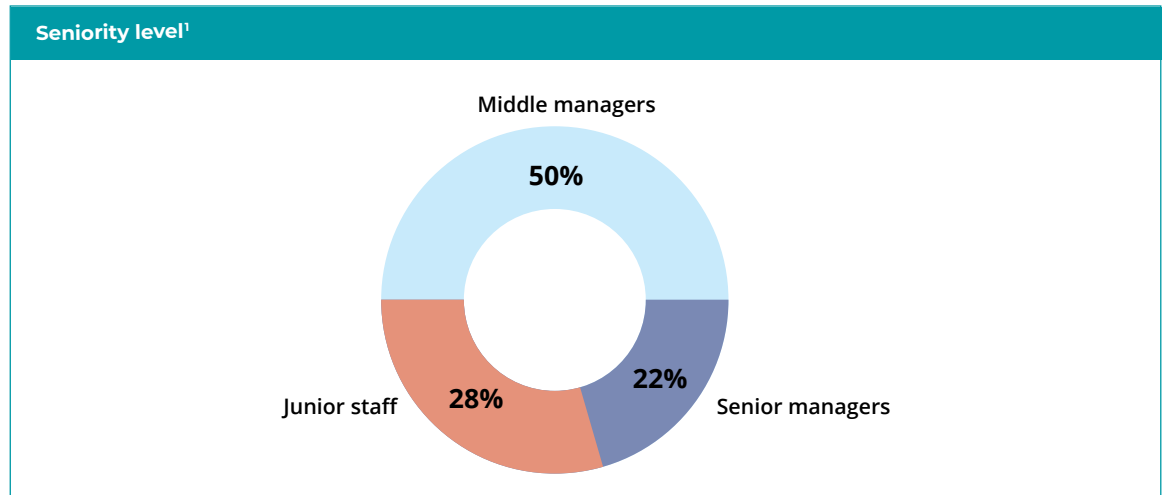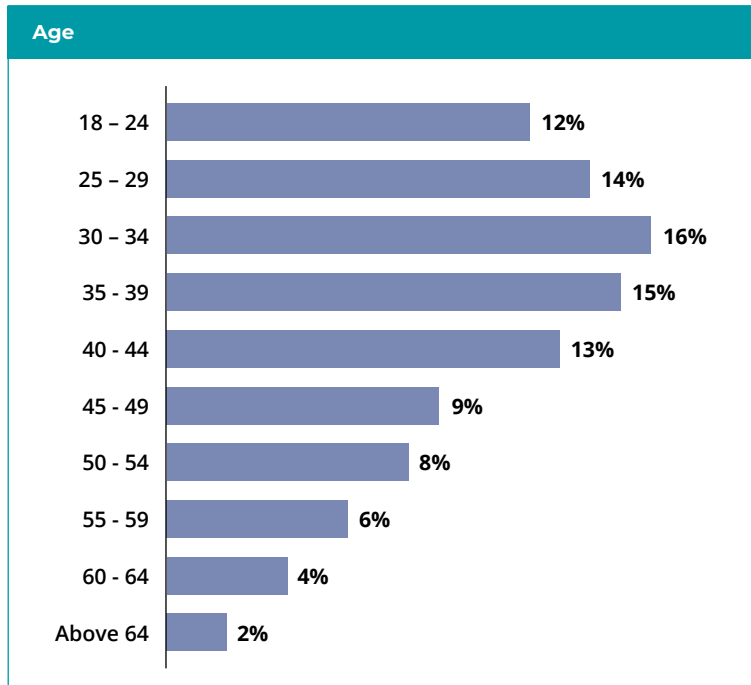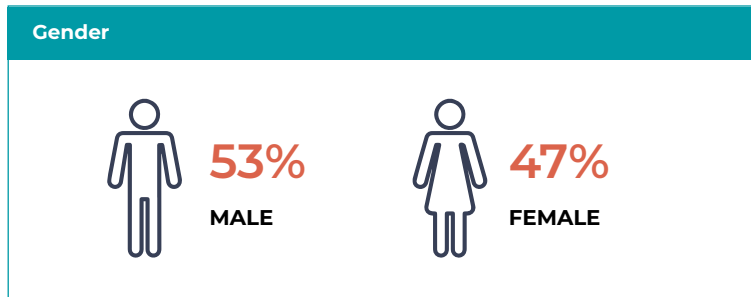| Industry	Percentage
Information and communications technology	24%
Manufacturing	14%
Professional services	10%
Financial services	10%
Wholesale and retail trade	8%
Construction	5%
Education	4%
Healthcare	4%
Others	4%
Logistics	3%
Hospitality and restaurants	3%
Transport services	3%
Real estate	2%
Utilities	2%
Resources	1%
Agriculture	1%
Arts, entertainment, and recreation	1%
Accommodation	0%

NOTE: The breakdown of the profile of employer respondents is based on the respondents in all 12 countries in the study.

SOURCE: AlphaBeta survey of 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States) in August 2021; AlphaBeta analysis

GLOBAL WORKER SURVEY – RESPONDENT PROFILE

Gender

53% MALE

47% FEMALE

Age

Age	%
18 – 24	12%
25 – 29	14%
30 – 34	16%
35 - 39	15%
40 - 44	13%
45 - 49	9%
50 - 54	8%
55 - 59	6%
60 - 64	4%
Above 64	2%

Seniority level[1]

Middle managers 50%

Senior managers 22%

Junior staff 28%

Tech focus of job role[2]

Non-tech workers 43%

Tech-adjacent workers 31%

Tech specialists 26%

1. Examples of senior managers are general manager and chief operating officer. Examples of middle manager are team lead and department head. Junior staff include entry-level staff.

2. Workers are classified into 3 groups based on the degree of tech focus in their job: tech specialists, tech-adjacent workers and other digitally skilled workers. Tech specialists are workers who develop new technologies or technological applications (e.g., software engineers), and/or use specialized tech knowledge to deliver your organization's objectives (e.g., data scientists). Tech-adjacent workers are workers who bridge technological products and services to people and organizations (e.g., tech product managers). 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 (e.g., administrative staff, café owners).

NOTE: The breakdown of the profile of employee respondents is based on the respondents in all 12 countries in the study.

SOURCE: AlphaBeta survey of 12,301 workers and 3,734 employers in 12 countries (Australia, Brazil, Canada, Germany, India, Indonesia, Japan, New Zealand, Singapore, South Korea, United Kingdom, United States); AlphaBeta analysis

ESTIMATING THE NUMBER OF WORKERS REQUIRING DIGITAL SKILLS TRAINING

Our estimate of the number of workers requiring digital skills training over the next 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 do not do any training at all, or if they do training less than once a year (e.g., once every two years);

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.[18] 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.[19] 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.[20] The number for each country was then summed up across all 12 countries in the study.

The numbers from (1) and (2) were then summed up to derive the total number of workers who require digital skills training over the next year.

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18. 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 percent 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 Organization's (ILO) database. The ILO database is available at: *https://ilostat.ilo.org/*

19. 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/*

20. 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 Organization's (ILO) database. The ILO database is available at: *https://ilostat.ilo.org/*

aws

Amazon is committed to investing hundreds of millions of dollars to provide 29 million people around the world with access to free cloud computing skills training by 2025. The company is providing this free skills training through a range of AWS-designed programs, making the latest technical knowledge accessible to anyone who has ever considered a career in cloud computing. To learn more and to get started, visit: aboutamazon.com/29million.

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