



Vodafone Institute  
for Society and  
Communications

# THE TECH DIVIDE

## CONTRASTING ATTITUDES TOWARDS DIGITISATION IN EUROPE, ASIA AND THE USA



INDUSTRY AND  
EMPLOYMENT

A representative study in nine countries,  
January 2019



# Content

<b>Executive Summary</b>	<b>3</b>
<b>Degree of digitisation on an international level</b>	<b>4</b>
<b>Effects of digitisation on the labour market</b>	<b>10</b>
<b>Effects of digitisation on educational needs</b>	<b>26</b>
<b>Study Design</b>	<b>38</b>

# Executive Summary

**The economic world is changing with unheard of impact and speed. How do people from different continents view this development? Do they consider their country's reaction appropriate? How important is education in this matter – both at work and outside of it? The latest study 'The Tech Divide – Industries and Employment' offers answers to these questions. It is the second of the Vodafone Institute's technology acceptance publications, for which the polling organisation, Ipsos, surveyed 9000 people, as well as chosen experts, from nine countries. It is one of the first intercontinental studies on the acceptance of digitisation.**

In international comparison, the degree of digitisation and the use of new technologies **is considered most advanced in the USA, China and Sweden**. Here, success stories of well-known Silicon Valley companies and leading Chinese businesses, respectively, play an important part. Sweden's Spotify is one of the few disruptive European enterprises. The country's extensive digitisation since the late 90s, especially as a result of the 'PC reform', has added to a positive impression of digitisation there. In other countries, comparable success stories receive less attention. Over 50 percent of respondents in Germany, India, Bulgaria and Italy think that there are not enough skilled professionals in the field of digitisation. Of the countries tested, India is considered the least digitised – although Indians themselves consider their country more advanced than Europe and China.

A majority of respondents are concerned about possible **job losses** due to digitisation. This worry is widespread in the United Kingdom (70 percent), Germany (65 percent) and the USA (66 percent). On the other hand, in Asia digitisation has in fact created new jobs.

**The shortage of skilled workers is seen as a global problem.** However, the degree of demand varies strongly in different countries: in China and Germany the shortage is felt most deeply, as over 50 percent of respondents state that there are not enough skilled professionals in the digitisation sector. Only 31 percent

of the Swedish share this opinion. Education is considered key to overcoming many challenges. More than half of respondents state that personal digital skills must be improved.

Asian employers grant their staff considerably more **time to improve their digital skills** than employers in Europe and the USA: 40 percent of the Chinese can spend between one and five hours per week of their working time for training and 23 percent even more than five hours. In the United Kingdom, these figures are only 12 and 5 percent, respectively. **In general, Europeans do not consider their employers as digitally advanced.** Furthermore, training opportunities are considered scarce compared to the USA, China and India.

The willingness to **improve skills in one's leisure time** is also far greater in Asia. 50 percent of respondents in China and India are ready to spend between one and five hours per week on improving personal digital skills; 20 percent would invest even more time. In Sweden for example, these figures are 26 percent and 6 percent, respectively. Two-thirds of respondents state that lifelong learning will be a necessity in the future.

**Online courses are used more frequently** in Asia than the USA and Europe. Over one-third of respondents in China and India opt for them. This trend can be explained by the large absence of traditional education institutions along with a generally greater openness towards new technologies in these countries.

Further quantitative results of the study can be found at [www.vodafone-institut.de](http://www.vodafone-institut.de)

# Degree of digitisation on an inter- national level

# “People are exposed

**to applications instead of innovations. We are merely using others' technology, such as phones (...), instead of developing our own innovations. Personally, I think propaganda has played a part.”**

INDUSTRY EXPERT, DIGITAL EDUCATION, CHINA

In this chapter, we will first explore how people evaluate the degree of digitisation in their home countries. There are considerable differences between countries. More importantly, there are substantial disparities between peoples' perception of technological progress in their home countries and reality. Deeper cultural differences between countries, greater acceptance of technological change, a country's level of development and the strength of the transformation experienced there in recent years, as well as local political and institutional contexts, may influence respondents' judgement. Second, we examine people's views of technological development in other countries. Here, too, we identified dissimilarities.

## Germans feel that their country is lagging behind.

Nearly two thirds estimate that Germany is lagging behind the digitisation level of other countries. Large differences arise among respondents concerning their perceptions of digital development levels. Comparisons are often made based on media coverage, as well as the presence of well-known IT and social media companies which respondents can relate to. The majority of German (59%), Indian (57%), Bulgarian (55%) and Italian (54%) respondents say that their country is lagging behind the digitisation level of other countries (Fig. 1, next page). While Germany's perception is primarily driven by a rather pessimistic media discourse which says that the country needs to catch up, India's perception is based on a different digitisation starting point: while other countries have been digitising for years, in India, one of the most populous countries in the world, digitisation is a relatively new concept. In contrast, respondents from China (27%) and Sweden (16%) agree least that their countries were behind in terms of digitisa-

tion: few say that their home country is lagging behind. In these two cases, different experiences drive these differing perceptions. Sweden was one of the first countries to welcome digitisation in their society. This is exemplified by the home PC reform in 1998, which made PCs more cheaply available to citizens. Being highly digitised has become an integral part of Swedish life. Likewise, though China has only recently adapted to digitisation and new technologies, it has done so exceptionally quickly. The Chinese experience of digitisation has been one which highlighted its convenience rather than its challenges. Nevertheless, the speed at which life is changing poses new challenges, e.g., in the labour market.

US respondents are unsure where their country stands compared to others, or whether it's lagging behind. While 33% of respondents feel that the US can compete internationally, an equal percentage disagree. Furthermore, a total of 34% of US respondents were not able to give a clear tendency, that is, they responded 'don't know' or 'neither agree nor disagree'). This reveals that there is not only a lack of knowledge, but also very opposing views in the US on the level of digitisation in other countries, and where the US stands comparatively.

The evaluation of the degree of digitisation is based on the perceptions of respondents. To understand how much perception matches reality, it is necessary to examine the actual degree of digitisation. As a benchmark, we employed the Network Readiness Index 2016 of the World Economic Forum which measures, on a scale from 1 (worst) to 7 (best), the performance of 139 economies in leveraging information and communications technologies to boost competitiveness, innovation and well-being.<sup>1</sup>

<sup>1</sup> <https://wif.widgets.weforum.org/gitr2016/>. Date accessed: 26.10.2018.



**“I think we are most progressive in creating composite services — Spotify is a good example, Klarna another, Swish a third. These are services that require an infrastructure, high internet capabilities and a highly connected population, so you can build services on top of it all.”**

Data for the US exemplifies the gap that can exist between citizens' perceptions and reality. While US citizens are not so sure about their country's level of digitisation, the US ranks 5th highest on the index. In contrast, Chinese respondents' perceptions may be driven by deliberate efforts to boost the population's confidence in digitisation. Out of 139 economies, China ranks 75th. However, as detailed by our research in 2018, only 27% of the respondents see their country as lagging behind the digital level of other countries.

## The US and China are most progressive in terms of digitisation.

When comparing degrees of digitisation, it is no surprise that the US is perceived as a leader (Fig. 2, next page). The entrepreneurial culture present there, as well as the high speed of innovation fostered in Silicon Valley and by the 'Big 5' (Amazon, Apple, Facebook, Google and

# "We have good tech

**minds. But they don't know how to sell their ideas. They can't find the right investments that would help them pitch their ideas and make it big. (...) In addition, we create a lot of apps which are a copy of something that has already been made. We lack original ideas right now."** SOCIAL SCIENTIST, INDIA

## Degree of digitisation – Germany's pessimism

**My country is lagging behind the digitisation level of other countries.  
To what extent do you agree with the above statement?**

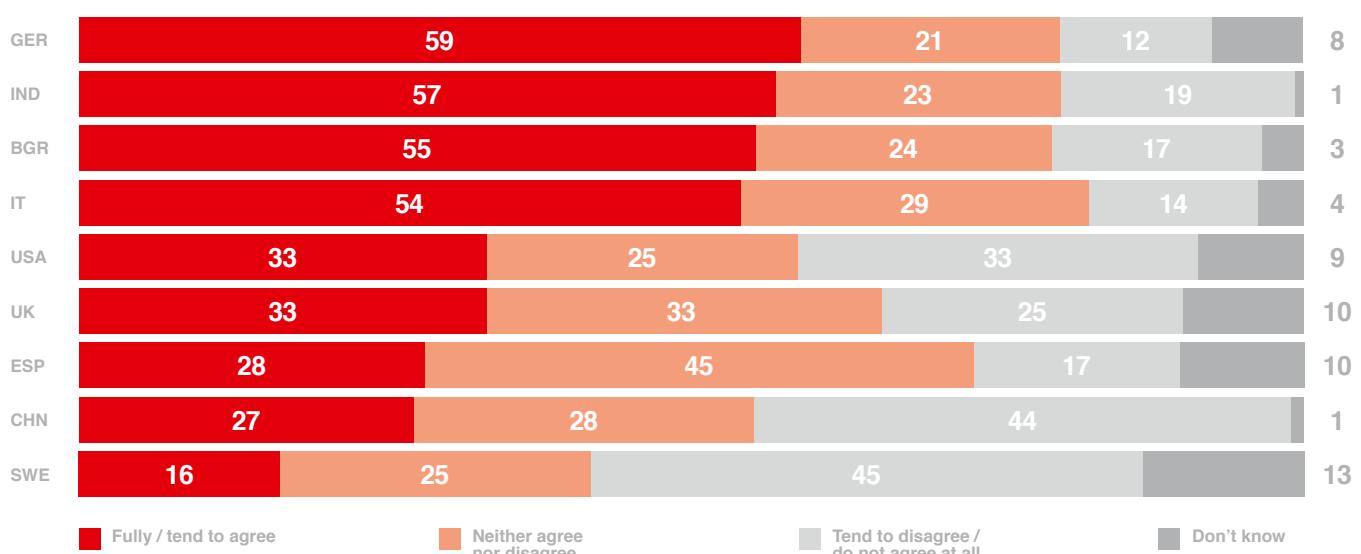


Fig. 1: Scale from 1 'fully agree' to 5 'do not agree at all'. Figures may contain rounding differences. Figures in percent.

Microsoft), are familiar to respondents. Furthermore, there are hardly any European counterparts demonstrating digital entrepreneurship as visibly.

Notably, it is not the US which views itself as most progressive internationally, but Sweden. Sweden has the highest confidence in its level of digitisation compared to other countries. This is potentially based on examples of such successful and innovative companies as Spotify or Klarna and a government which embraced digitisation at an early stage (e.g., the home PC reform in 1998). Sweden is thus home to two of the most visible European unicorns in the B2C market.

While the US is defined as the leader in technology in general, China is viewed as an almost threatening competitor which could soon take over. China's image is that of a country with a fast-growing population that adopts new technologies quickly.

In Europe, with the exception of Sweden, confidence in each country's digital ability is a little dampened. Italy

ranked itself lowest on an international comparison. This low level of confidence is not only driven by an Italian tendency to be more pessimistic, but also by critical media coverage concerning digitisation. Digitisation is not well-promoted by public actors. Neither media, institutions nor the government communicate a prominent desire to promote digitisation.

India stands out because of the strong divide which exists between its self-perception and the perception others have of it. Though each other country sees itself as more digitised than India, Indian respondents believe that their country is more digitised than China or the average European country. In most other countries, India is still viewed as a "third world country" and international media mostly focuses on poor living conditions and infrastructure there, rather than on its IT elite and the technological progress it has sustained in the last few years. Indian experts state that a lack of reputation contributes to perceptions of India's innovative power (see the next chapter for details).

## The USA, Sweden, and China are considered digital leaders.

**How do you assess the degree of digitisation or the use of new technologies in your country compared to other regions or countries? Degree of digitisation compared to ...**

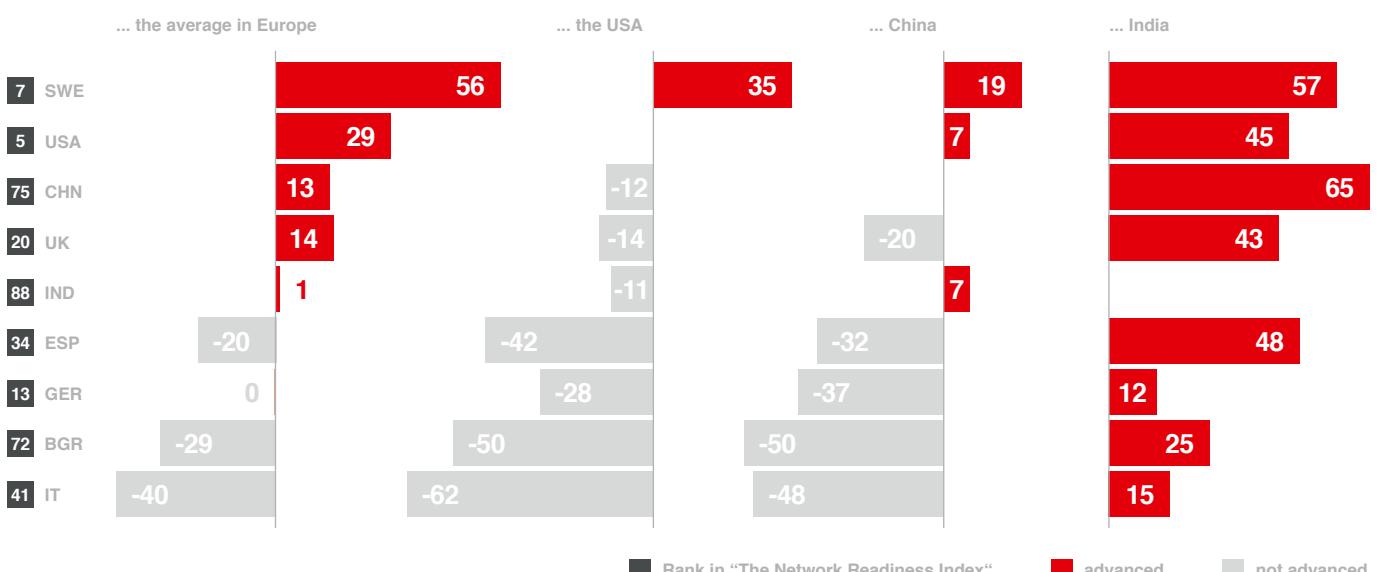


Fig. 2: Scale from 1 'very advanced' to 5 'not advanced at all'. Top2 vs. Bottom2. Figures in percent.

## “We are

**very open to new technology, such as high-speed rail. The direct impact on your daily life is very strong.”**

GOVERNMENT EXPERT,  
CONSULTANT E-GOVERNANCE, CHINA

## “If you think about it,

**six months into the new government, the only words we have heard about digitisation have been vague and there is no real plan for the digitisation of the country. So, if from the media, politicians and schools we do not receive any clear information, or even an idea of what we want to do, it is clear that citizens' perceptions are affected.”**

GOVERNMENT EXPERT, CONSULTANT, ITALY

### ⌚ Key Takeaways

## Degree of digitisation on an international level

More than every second respondent in Germany, India, Bulgaria and Italy says that their country is lagging behind the digitisation level of other countries. Perception does not always match reality. The actual level of ‘connectedness’ varies greatly between these countries.

In our international comparison, the degree of digitisation or use of new technologies is rated most progressive in the US and China. While the Chinese also see their country as progressive, US respondents are not so sure. This difference might be the result of China's strategy to position itself as leader in digitisation.

# Effects of digitisation on the labour market

# “We are in the midst

**of a middle-income trap now. We have to get out of the trap, and at the same time fight the trade war [between China and the US]. And we are dragged into the inevitable war between powerful rising nations. Our sense of insecurity is very obvious.”** GOVERNMENT EXPERT, CONSULTANT E-GOVERNANCE, CHINA

In this part of the report, we first look at labour shortages. The digital economy requires a specialised and highly trained workforce. Our data shows that a lack of skilled professionals, who could bolster digital economies, is an issue in most markets. Demographic pressures, the quality of education and levels of educational attainment differ across countries and impact people's perceptions of the technological savviness of existing work forces and future industry needs. Whether respondents believe that companies can keep up with the unfolding changes will also be investigated briefly. The negative view of European competitiveness is a source of concern in this context.

Second, we take a closer look at people's fears when it comes to technological change. Disruptive technologies always pose a challenge. Digitalisation fundamentally alters the way we produce and consume goods and services. While in some countries this may be perceived as a chance for creativity and innovation, in other societies this change might be perceived as a threat to an established order. A number of respondents feel that technological development will be accompanied by job insecurity and even unemployment. Notably, this perception is also shared among highly skilled employees.

## Germans and the Chinese agree that there is a shortage of digital talent.

More than 50% say there are not enough digitisation professionals. The availability of professionals in the field of digitisation differs by country. For both China (53%) and Germany (52%), estimations of the skilled worker shortage are highest (Fig. 3). Both countries are characterised by

a cultural mindset that focuses on constantly striving for more. Whereas Germany is facing demographic change and alarming media reports on the quality of education and lack of professionals, China has a general feeling of insecurity, induced by economic backlashes resulting from the current trade war between the US and China.

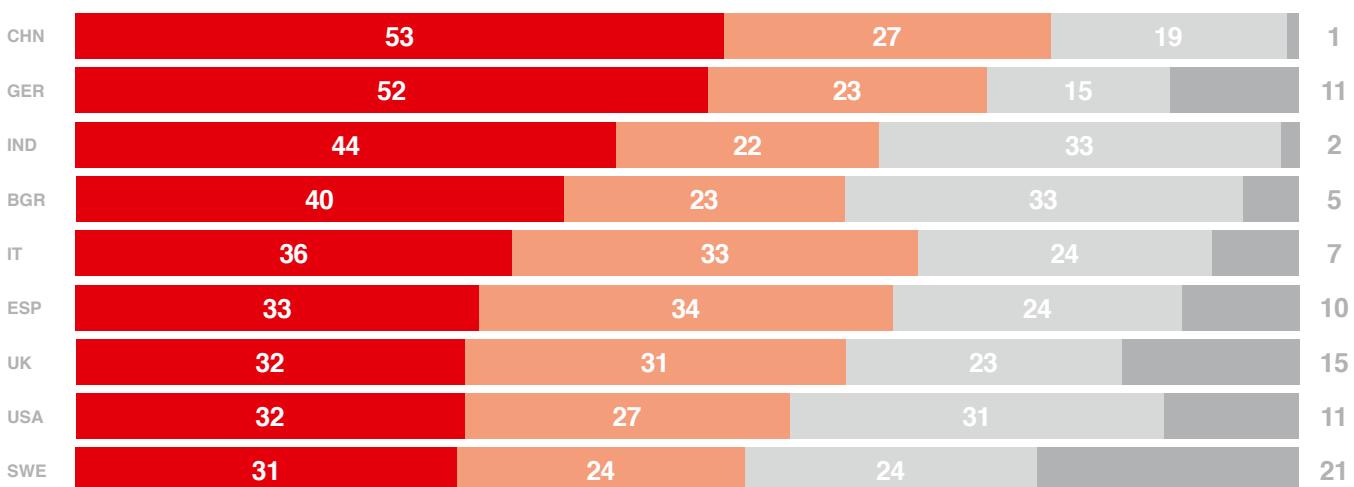
Uncertainty and lack of awareness shape perceptions in other markets. For example, in Bulgaria 40% of respondents agree or tend to agree that there is a lack of professionals, while 33% disagree. Furthermore, in countries such as Spain, the UK or even the US and Sweden, many respond 'don't know' or 'neither agree nor disagree'. The shortage of skilled professionals, an issue relevant in all countries investigated, is not necessarily a societally prevalent concern. This might be the result of several factors:

- Unclear media coverage;
- Unclear understanding of skills required in the field of digitisation, i.e., respondents might only think of IT or programming skills;
- Low awareness of digitisation in general, and, as a consequence, the lack of professionals.

It appears that a country's digitisation progress is not necessarily linked to a perceived lack of professionals in the country (Fig. 3). Respondents do not see the labour and skills shortage of digital professionals and the inability to fill positions in that field because of a lack of qualifications as a hindrance to the progress of digitisation. A case in point is China, where respondents rate the country's degree of digitisation relative to other countries very highly. Nevertheless, about half of Chinese respondents think that there are not enough professionals in the field of digitisation. However, Sweden is an exception: they estimate their level of digitisation very highly and do not say that they

## There are not enough professionals in the field of digitisation in my country.

To what extent do you agree with this statement?



## Digitisation and future technologies lead to high pressure on companies to change in order to keep up with international competitors.

To what extent do you agree with this statement?

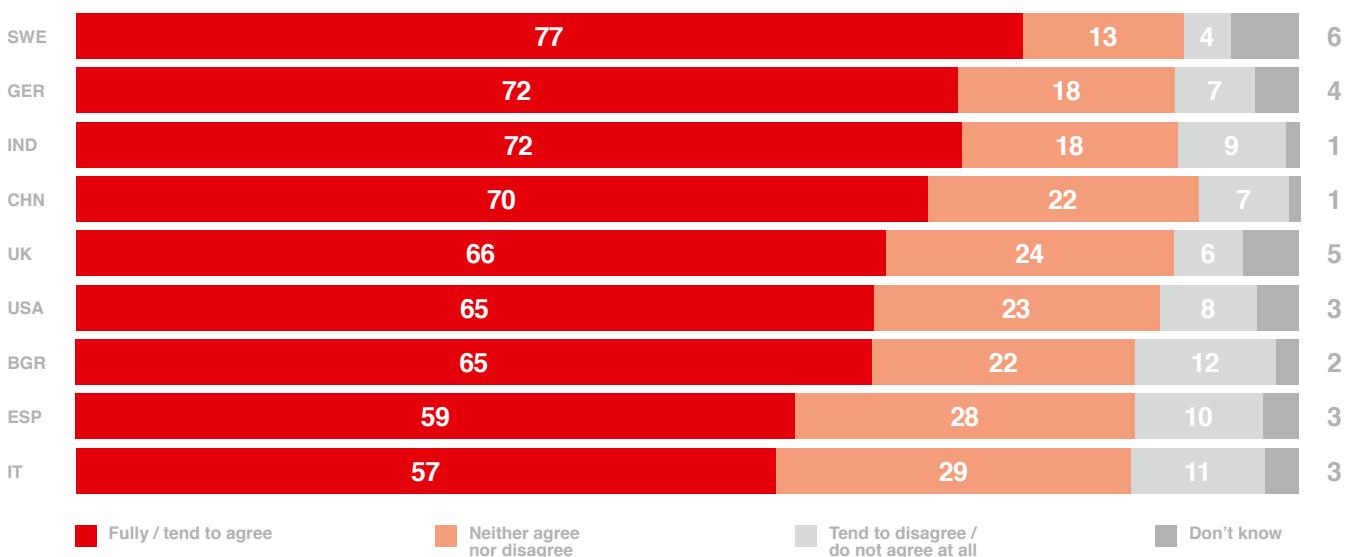


Fig. 3 and 4: Scale from 1 'fully agree' to 5 'do not agree at all'. Figures may contain rounding differences. Figures in percent.

lack professionals. However, according to our Swedish experts, Sweden is also facing a lack of professionals in the field of digitisation - this contradicts the perceptions of respondents.

## The missing skills and types of professions needed vary between industrialised and emerging economies.

A lack of entrepreneurial spirit is hampering Asian digital markets. Experts emphasise that, in theory, there is a high level of entrepreneurial execution by Chinese and Indian professionals, but a clear lack of innovativeness. In Europe, on the other hand, there is great need of professionals who are able to see the 'big picture': strategists, data scientists and visionaries are absent. Furthermore, there is a strong need for professionals who are on the cutting edge of current trends, such as Artificial Intelligence (AI) or machine learning. Professions which require hard skills,

such as engineering, technical implementation or programming, are also generally lacking.

Across markets, the causes of the lack of specialists are primarily threefold, but differ by region: lack of quality education, brain drain and the impact of the gender gap on the labour market.

In terms of the IT brain drain, Bulgaria appears to be somewhat of an exception in Europe. During communist times, Bulgaria, the European Union's poorest country by GDP per capita<sup>1</sup>, developed a high level of maths and science education. While part of the Soviet Bloc, Bulgaria worked towards becoming a centre for IT hardware. In recent years, Bulgaria has become a European destination for outsourcing IT services. While the country is struggling with emigration and brain drain, there appears to be a trend of IT professionals returning to Bulgaria. In 2017,

<sup>1</sup> Volume indices of GDP per capita, 2017 (EU-28=100) [https://ec.europa.eu/eurostat/statistics-explained/index.php/GDP\\_per\\_capita,\\_consumption\\_per\\_capita\\_and\\_price\\_level\\_indices](https://ec.europa.eu/eurostat/statistics-explained/index.php/GDP_per_capita,_consumption_per_capita_and_price_level_indices). Date accessed: 26. 10. 2018.

## Digital progress in companies

### How much do you agree with the following statements?

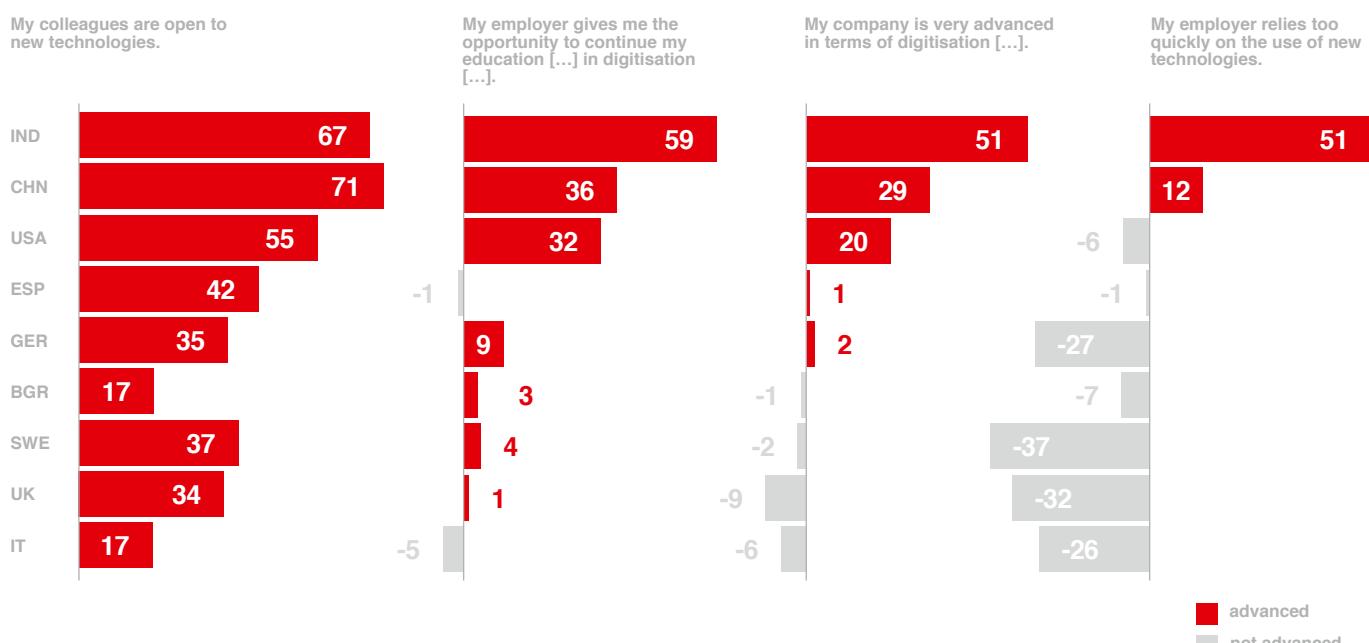


Fig. 5: Scale from 1 'fully agree' to 5 'do not agree at all'. Top2 vs. Bottom2. Figures in percent.

# “Despite the emigration

**from Bulgaria, emigration by those in the IT sector is low. There is a stable tendency of people training abroad and returning to do business in Bulgaria and live here.”**

GOVERNMENT EXPERT, HEALTH LEGAL EXPERT, BULGARIA

Bulgaria's unemployment rate was on par with Sweden's (6.7 %). The greater pressure to find skilled labour on the market may have contributed to a rise in wages. This makes it more attractive to return, or stay, in Bulgaria in the IT industry: the sector's wages now allow for a relatively high standard of living.

Particularly in the Western world, the lack of professionals in the tech industry might be partially explained by the underrepresentation of females in that sector. Women are much less positive about digitisation compared to their male counterparts.<sup>2</sup> Reasons for this start with early education, continue with the choice of university degree and result in underrepresentation in the labour market.<sup>3</sup> In Germany, for example, only 17% of graduates in computer science were female in 2012<sup>4</sup> and women overall hardly choose STEM subjects (Science, Technology, Engineering and Mathematics).<sup>5</sup>

## Digitisation leads to high pressure on companies to change.

Digitisation is changing the labour market worldwide. Across all countries, respondents say that digitisation and future technologies have led and will continue to lead to

high pressure on companies to change and keep up with international competitors (Fig. 4).

The agreement level varies widely among European countries. Interestingly, Sweden (77%), a country with a very high level of digitisation, also has the highest level of agreement, followed by Germany (72%). Spain (59%) and Italy (57%) have the lowest level of agreement with this statement. India (72%) and China (70%) also see the need for companies to stay competitive by adapting to new technologies.

Overall, Sweden, Germany and Asia are most cognisant of the pressure on companies to change. The mix of these markets shows that the pressure for change is independent of the level of digitisation.

## European companies are perceived as not advanced in terms of digitisation.

When it comes to the progress of digitisation in companies, a gap between Europe on the one side and the US and Asia on the other arises (Fig. 5). Companies in Europe are not considered as advanced in terms of digitisation and the use of new technologies. At the same time, European employers do not provide enough opportunities to continue education and acquire skills in digitisation and new technologies. However, respondents consider the openness of their colleagues towards new technologies to be at a high level in all countries.

Respondents from Asia and the US view their own corporate cultures as more progressive. In these countries, opportunities for further skills trainings in digitisation are

2 <https://www.vodafone-institut.de/wp-content/uploads/2018/10/The-Tech-Divide-People-and-Society.pdf>, p. 17. Date accessed: 26.10.2018.

3 For more information, refer to the percentage of female employees at major tech companies: “The Tech world is still a man’s world”, <https://www.statista.com/chart/4467/female-employees-at-tech-companies/>. Date accessed: 26.10.2018.

4 <http://unesdoc.unesco.org/images/0023/002354/235406e.pdf>, Date accessed: 26.10.2018.

5 For more on this, refer to our first report ‘The Tech Divide’, covering People and Society. [https://www.vodafone-institut.de/wp-content/uploads/2018/10/The-Tech\\_Divide\\_People\\_and\\_Society.pdf](https://www.vodafone-institut.de/wp-content/uploads/2018/10/The-Tech_Divide_People_and_Society.pdf). Date accessed: 31.10.2018.

# “In one way,

**there is optimism about the future, and in another way, it feels like life is changing too fast. I am not able to stay alive with my survival skills.”**

INDUSTRY EXPERT, STRATEGIC PLANNER, CHINA

provided. Furthermore, companies are rated as digitally advanced.

However, Asian respondents say that companies in their countries rely too quickly on the use of new technologies. Bearing in mind that our sample includes the connected and digitally savvy populations of China and India, this assessment indicates the extent to which change is happening. It may even signify the first cautious reservations, since those who fail to adapt at the necessary speed are in danger of becoming obsolete in the labour market.

## Digitisation and future technologies are expected to lead to job losses.

Across all countries, six out of ten respondents say that digitisation and future technologies lead to job losses (Fig. 6). This uncertainty in terms of the labour market is particularly severe in the UK, where seven out of ten respondents agree with the statement. Even in the US (66%) and Germany (65%), there are strong fears about the possibility of losing a job. In contrast, the lowest fear of job losses is in China (45%). However, recent economic experience has shown Chinese workers to be extremely adaptive. As a result, while job losses are perceived as a threat, this is accompanied by an expectation that new jobs will also be created in the future.

Especially in the UK and US, this topic is highly salient and heavily discussed in media. A general fear of job loss is paired with evidence from daily life, where staff reductions following automation are visible.

However, fears about the future of the labour market

are not linked to current unemployment rates (Fig. 7). For example, the UK, the US and Germany most agree that digitisation and future technology will lead to job losses, but the unemployment rates in these countries are under 5%.

## Fear of becoming obsolete is driven by age: elderly respondents in the US and Europe are most worried about job losses.

In Europe and the US, attitudes towards digitisation and job losses differ by age (Fig. 8). Elderly respondents agree the most with the statement ‘Digitisation and future technologies lead to job losses’. In Bulgaria and Asia these differences do not exist. The digital literacy gap has led the elderly population to perceive new technologies and digitisation as generally more threatening. In Asia, the difference might be related to the fact that the cut-off point for our sample was 50 years of age and respondents lacked empathy for the older segment of the population.

## Education is not seen as a guard against job losses.

Highly educated respondents also fear job losses. In Fig. 9, we see that the fear of job losses is above 50% across all educational levels. The assumption that highly educated respondents might have less fear of losing their jobs is not entirely supported. Respondents with lower education levels are more afraid of job loss, but the difference is less striking than one might expect.

## Digitisation and future technologies lead to job losses.

To what extent do you agree with this statement?

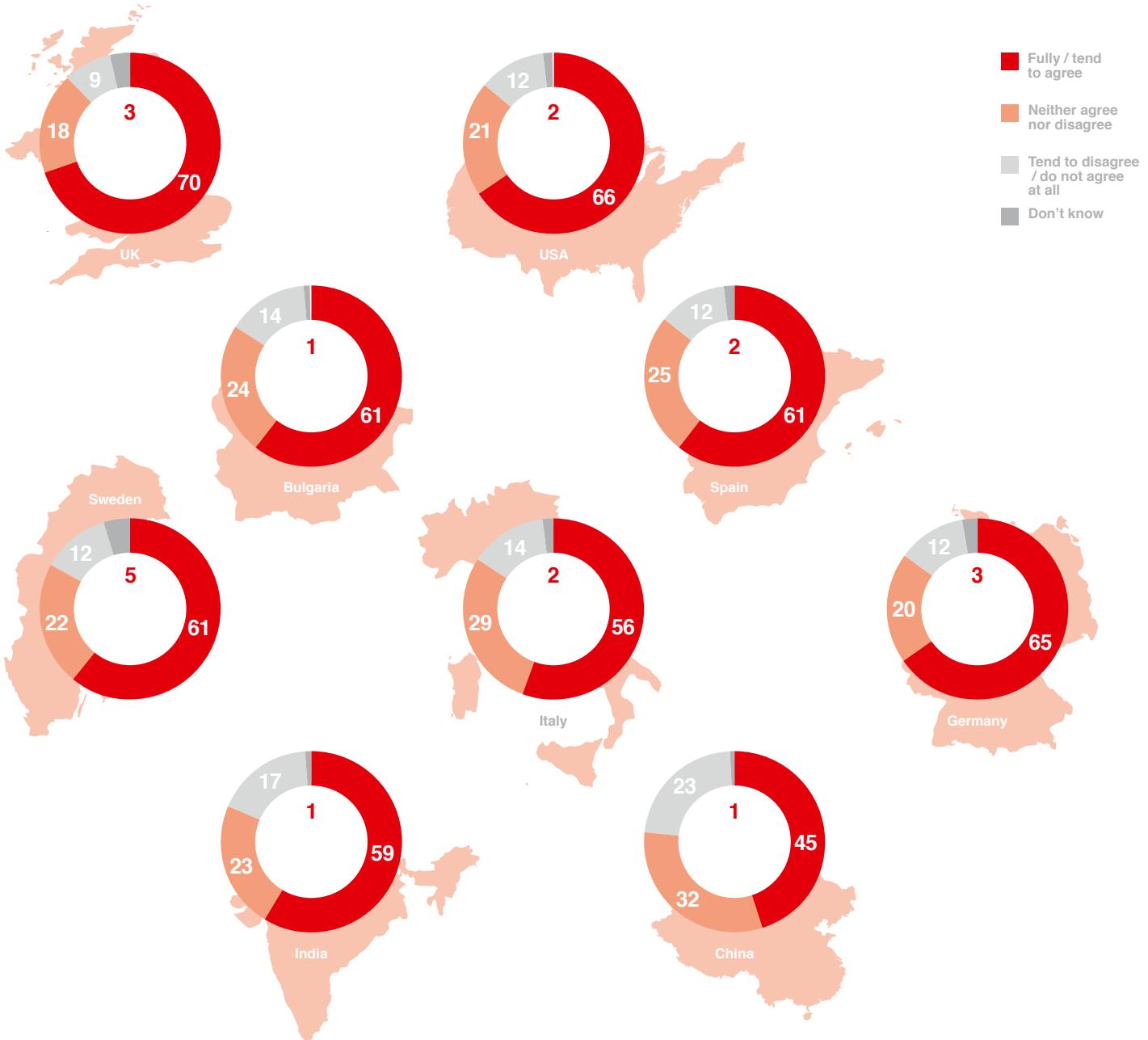


Fig. 6: Scale from 1 'fully agree' to 5 'do not agree at all'. Figures may contain rounding differences. Figures in percent.

**“Your sense of  
insecurity is that either you learn it and enhance your  
competitiveness, or you will be quickly replaced.”**

GOVERNANCE EXPERT, CONSULTANT E-GOVERNANCE, CHINA

### Unemployment rate in percent

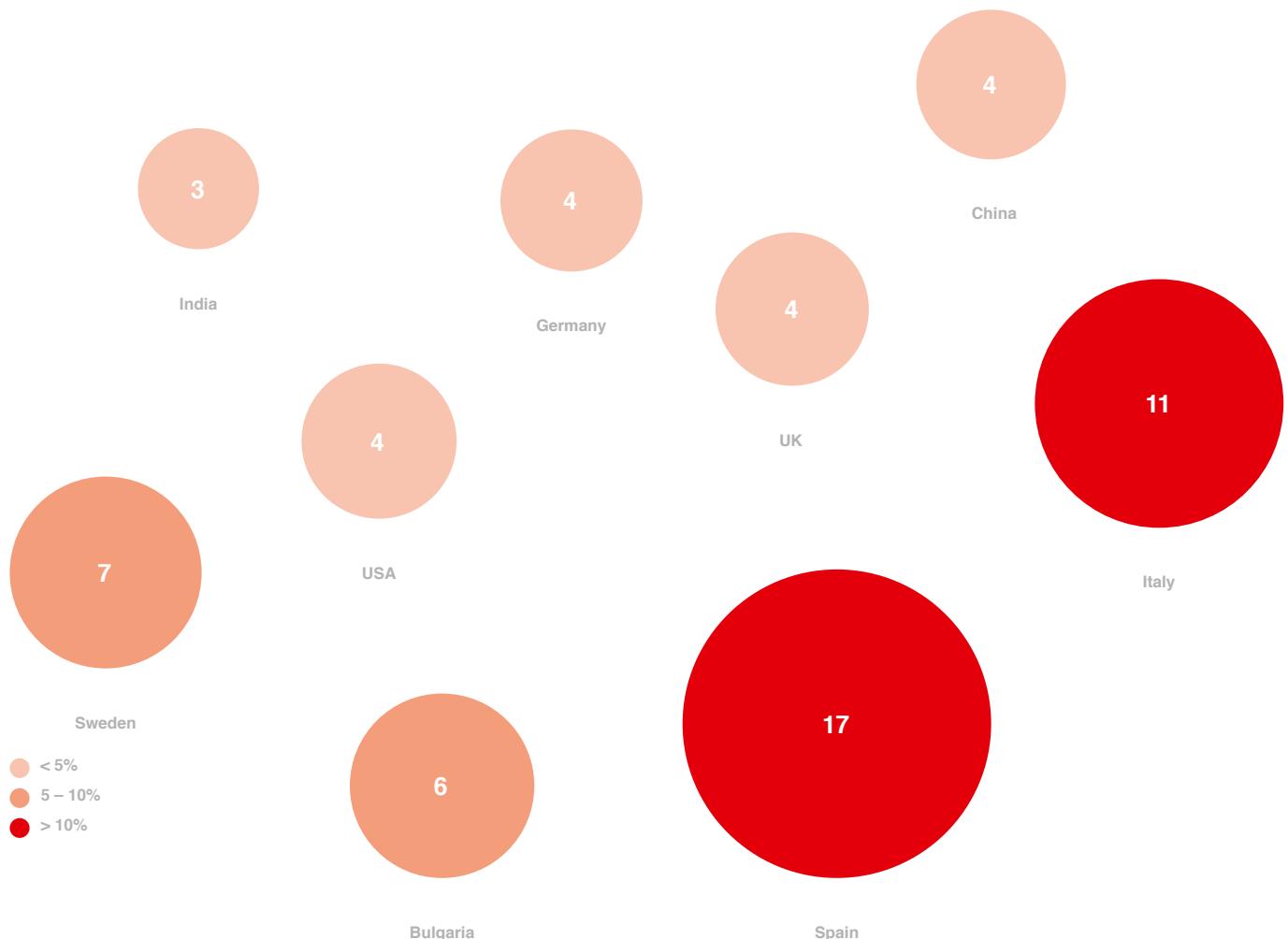


Fig. 7: Percentage of total labour force. State 2012 (IND). State 2014 (CHN). State 2017 (GER, UK, USA, BGR, SWE, IT, ESP). Source: [https://data.worldbank.org/indicator/SI.UEM.TOTL.NE.ZS?end=2017&locations=AL-CN-DZ-US&name\\_desc=true&start=1992](https://data.worldbank.org/indicator/SI.UEM.TOTL.NE.ZS?end=2017&locations=AL-CN-DZ-US&name_desc=true&start=1992)

**Fear of job losses increases with age.**

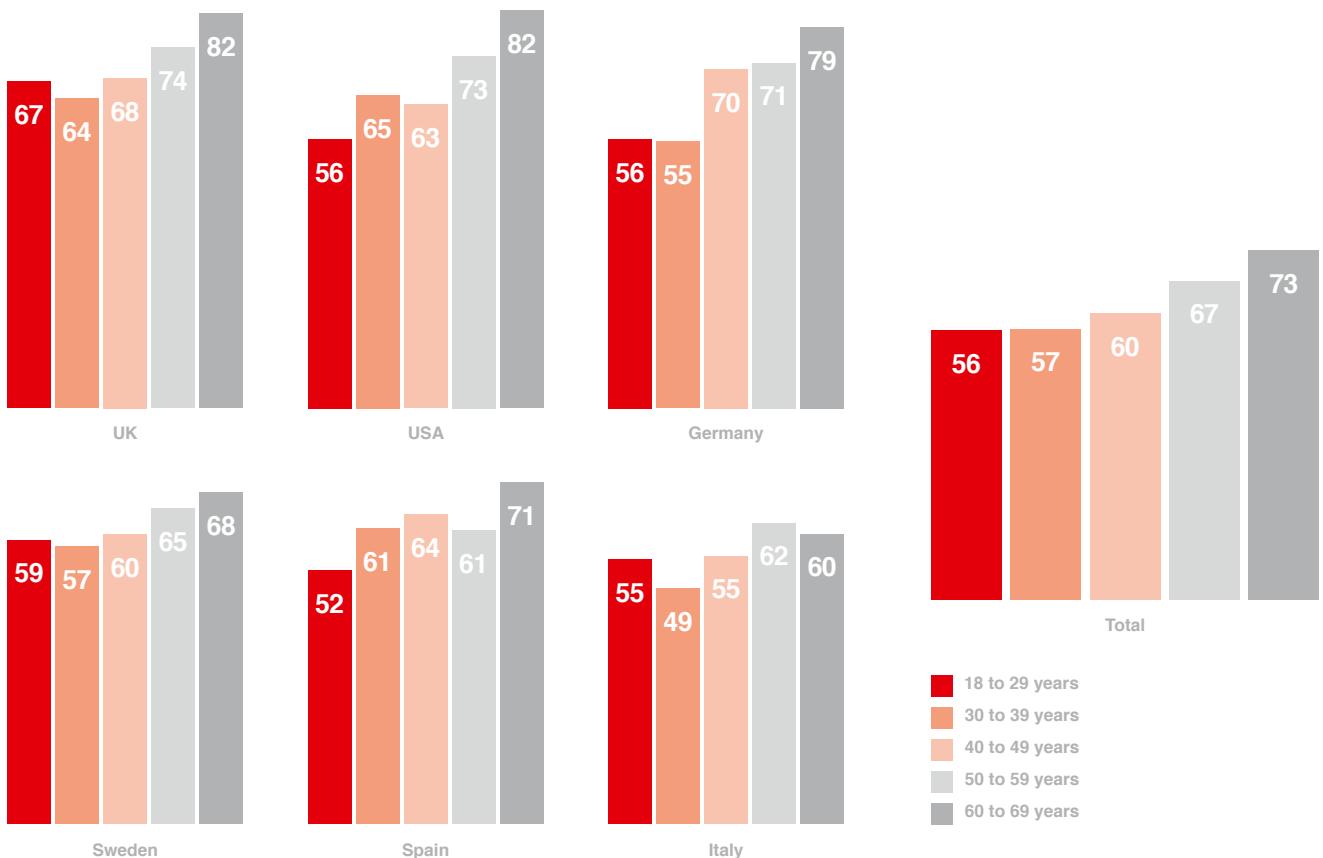


Fig. 8: Top2 values. Scale from 1 'fully agree' to 5 'do not agree at all'. Figures in percentage.

**Fear of job losses is most significant for people with lower levels of education.**

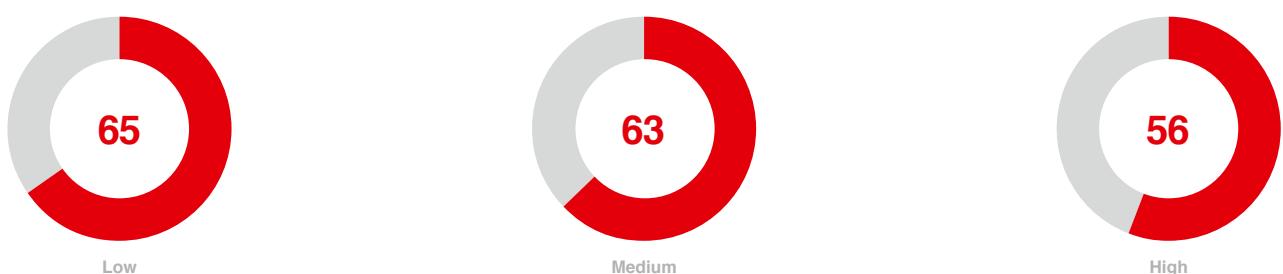
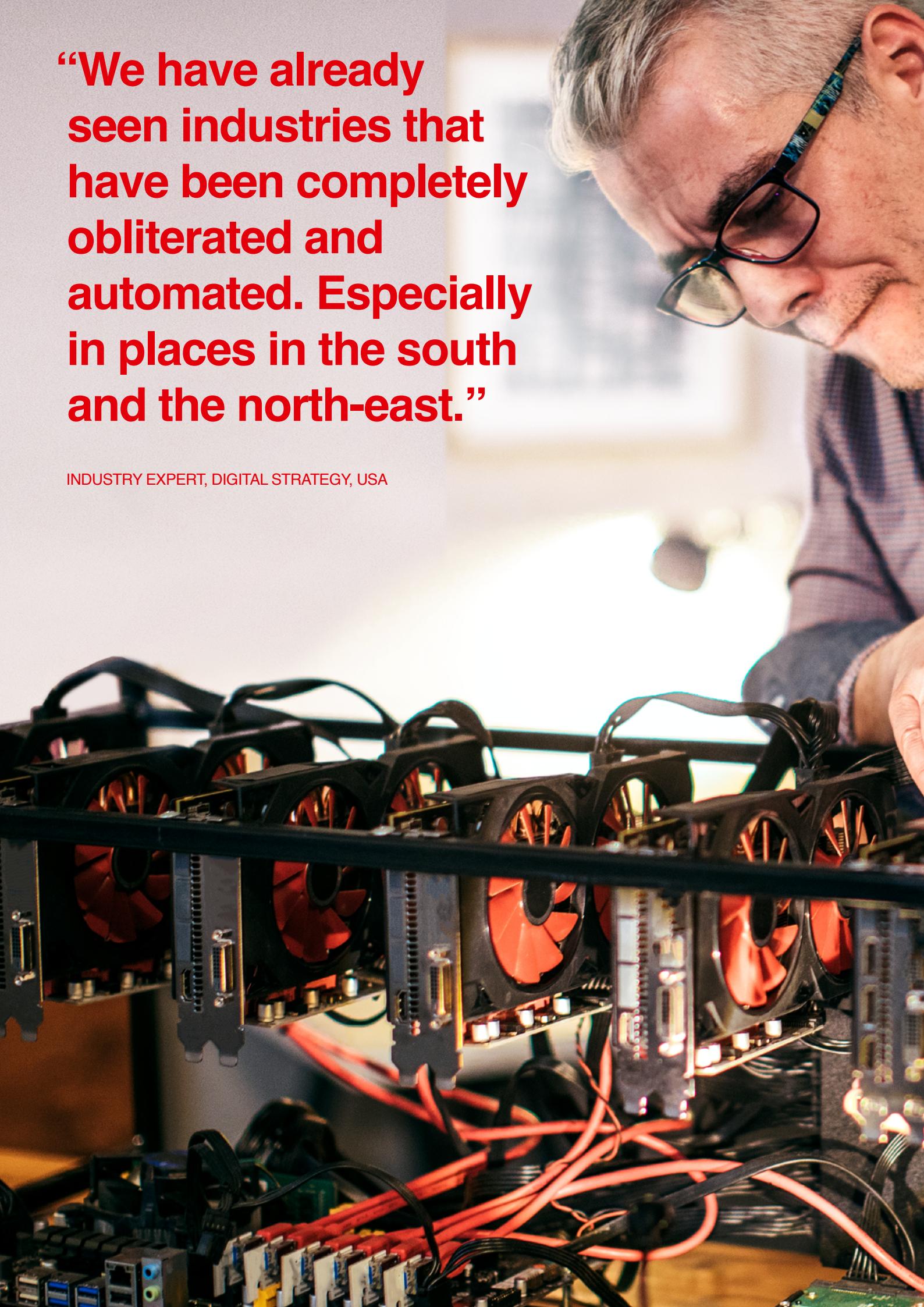


Fig. 9: Top2 values. Scale from 1 'fully agree' to 5 'do not agree at all'. Figures may contain rounding differences. Figures in percentage.

**“We have already seen industries that have been completely obliterated and automated. Especially in places in the south and the north-east.”**

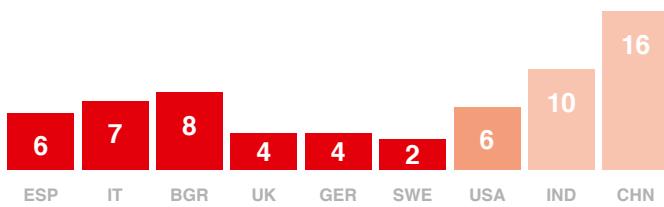
INDUSTRY EXPERT, DIGITAL STRATEGY, USA



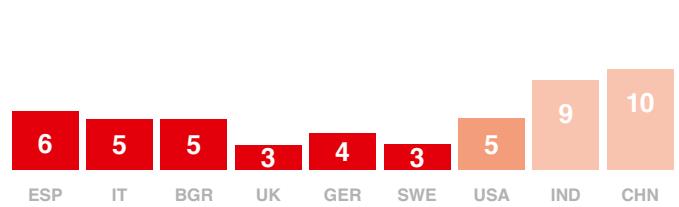
## Concerns of employees

**Which of the following statements do you most agree with? I am concerned that ...**

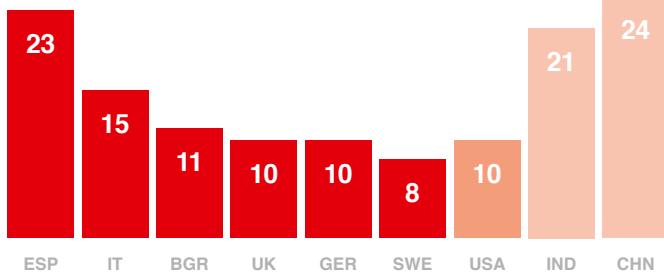
... I could lose my job due to lack of digital skills.



... I could lose my job due to the low level of digitisation in my company.



... my job will be replaced by new technologies.



... my employer could outsource my job activity and I will have to be self-employed in the future.



I am not afraid of losing my job.

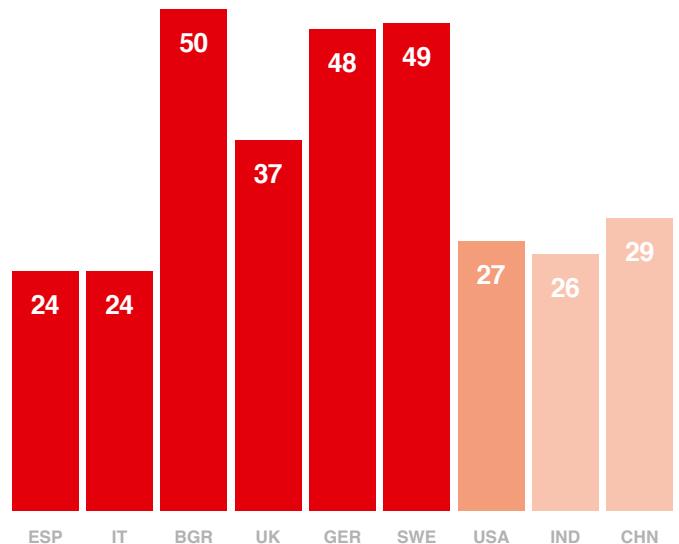


Fig. 10: Single answer question. Figures in percentage.

## **Substituted by technology: fear of losing jobs mainly stems from the potential for replacement by new technologies.**

Among the reasons why respondents fear losing their jobs, the primary one is replacement by new technologies (e.g., robots, algorithms) (Fig. 10). This concern is most widespread in Asia and Spain. In India and China, where a great proportion of IT jobs can be found in call centres and software testing, the fear of job loss due to automation is extremely high. As highlighted earlier, this individual fear about one's own job is coupled with an overall awareness raised by the media that digitisation also creates new jobs.

A lack of digital skills and a low level of digitisation in companies are also reasons some fear replacement, but to a lesser extent. The outsourcing of jobs is also a cause of concern, which is most pronounced in Asia.. Especially in Asian countries, overdependence on foreign, e.g., US or European companies poses a risk, since tasks which once were outsourced to India or China, could be moved to cheaper locations.

However, these fears are not universal. Across all countries, one apparent trend is that most respondents are not worried about losing their jobs. Respondents in Germany, Sweden and Bulgaria are particularly confident (49%, 49% and 50%, respectively) in this regard. In China,

the US, India, Spain and Italy, fears are stronger, with the percentage of confident respondents falling between only 24% and 30%.

## **Digital training hardly occurs during working hours, but more often in free time.**

### **Trainings in free time**

More than six out of ten respondents use free time to develop their own digital skills (Fig. 11). Especially in Asia and Bulgaria, many report using free time for self-development. About nine out of ten are willing to develop digital skills in their free time. In India, digital education is seen as a means to demonstrate one's own capabilities as a matter of distinction and belonging to society. In China, developing digital skills is mandatory to maintain one's own human capital and stay competitive for the future. In China in particular, the middle class is defined by an insecurity that they will no longer be needed.

However, Bulgaria and India are cases where poor quality public education in digital skills makes it necessary to develop those skills in one's free time. Digital skill development can vary significantly. In newer digital markets, development of digital competencies may be as simple as knowing how to use basic software applications.

India's government under Narendra Modi has begun to recognise the need to step up its game in digital training

# **“Because we are**

**not building skills at school or college, companies are forced to do it on the job. When you are working in the corporate sector, your work is entirely in the cloud. You have to learn technology. If schools and colleges have not taught you anything beyond Microsoft and whatever internet you use for consumption, they have to spend money and resources to train people.”**

SOCIETY EXPERT, COMMUNICATIONS & MEDIA, INDIA

## Hunger for education in Asia

**Free time:** More than half of respondents spend up to five hours or more per week on developing digital skills.

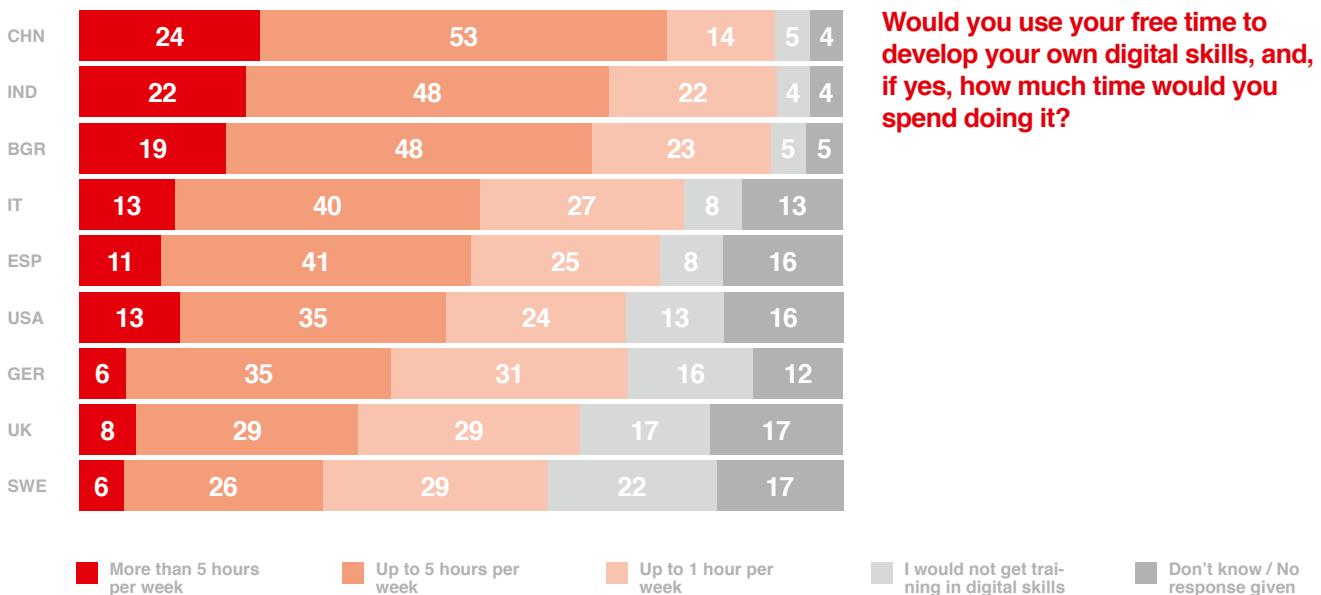


Fig. 11a: Figures may contain rounding differences. Figures in percentage.

**Working hours:** Only about 1/3 of respondents receive more than one hour per week for further training from their employers.

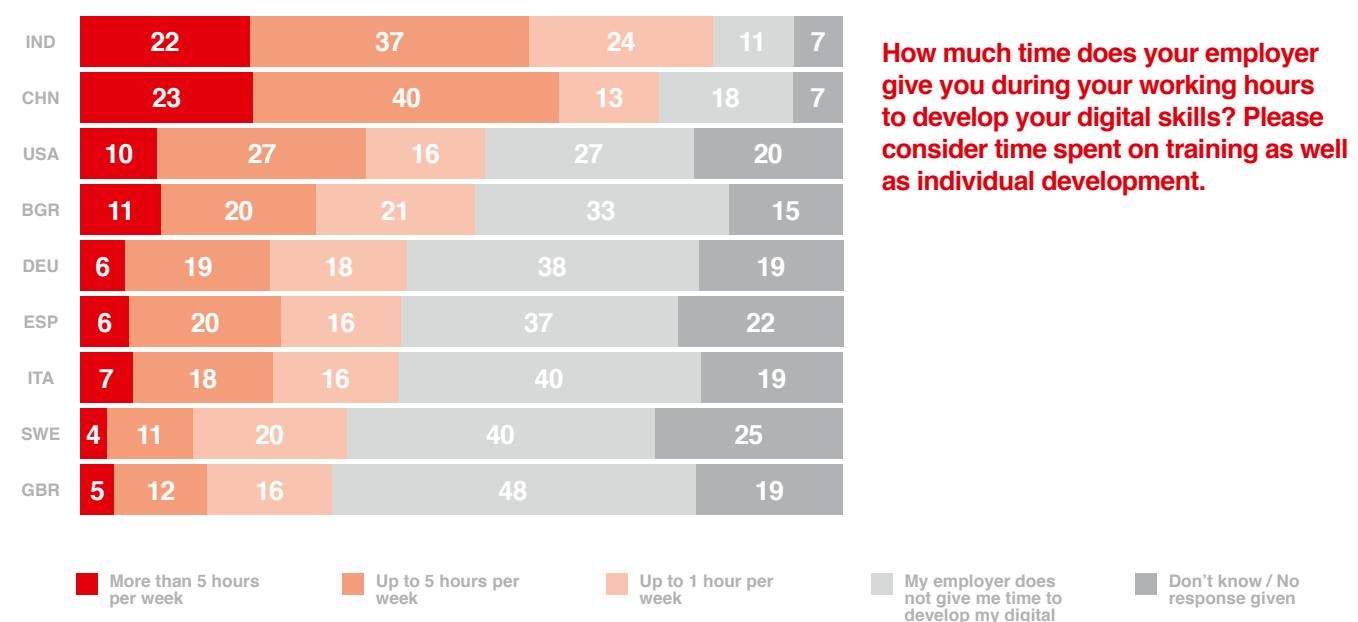


Fig. 11b: Figures may contain rounding differences. Figures in percentage.

and launched an online learning platform in 2016, SWAYAM (Study Webs of Active Learning for Young Aspiring Minds).<sup>6</sup> The government's declared goal is 'to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.' Given Indians' high willingness for personal development, it would seem these efforts will be fruitful.

Citizens in the UK and Sweden show the lowest willingness to develop digital skills during free time. Nevertheless, the perceived need for digital training appears to be high across countries. More than 1/3 of respondents spends at least one hour per week on developing digital skills.

<sup>6</sup> <https://swayam.gov.in>. Date accessed: 26.10. 2018.

## Trainings during working hours

Compared to trainings during free time, the investment of time in digital trainings during working hours is significantly lower (Fig. 11).

Chinese and Indian employers offer the most time for development of digital skills compared to other countries. More than three out of four receive the opportunity to develop their digital skills during working hours. With regard to training in spare time, the level of digital skills differs strongly across markets. In the US, about every second respondent gets trainings to develop digital skills.

The lowest values occur in Sweden and UK: about 1/3 of respondents have digital training during working hours. In Europe, at least every third employee is not given digital skills training during working hours.

## Changes in working life

The next section deals with possible changes in working life.  
How likely do you think the following individual scenarios are?

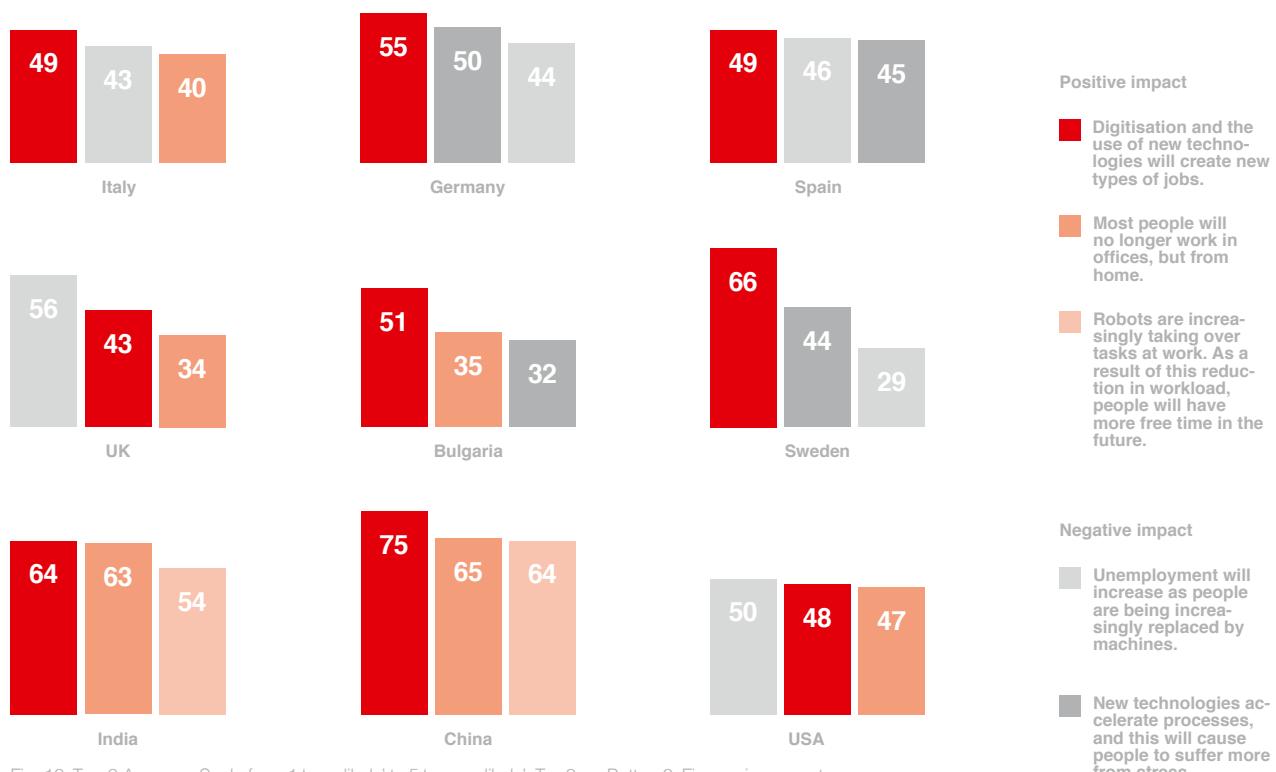


Fig. 12: Top 3 Answers. Scale from 1 'very likely' to 5 'very unlikely'. Top2 vs. Bottom2. Figures in percentage.



**“I do not need to plan my commute around the high-density grid of the city and plan my life around that. I do not need to.”**

INDUSTRY EXPERT, STRATEGIC PLANNER, CHINA

This indicates that the awareness of a digital future is not yet high in all countries or across all types of professions. Sweden might be an exception. As an (actual) and self-perceived leader of digitisation in Europe, there seems to be far less of an immediate need for digital trainings for employees. However, on a broader level, it appears that only a minority of companies and institutions have a designated strategy which includes digital trainings, and this is reflected in the numbers.

## In Asia, digitisation is seen as an opportunity for the 'Future of Work'.

When looking at the general positive attitude towards digitisation and the economic upturn digitisation has already brought India and China, it is not surprising that they are more positive about changes in working life as a result of digitisation than people from Europe or the US (Fig. 12). Indians, as well as the Chinese, mention only positive

impacts within the top three answers, such as the creation of new jobs, working at home instead of in the office or the increasing amount of free time because of the use of robots. For them, digitisation is still associated with many benefits rather than threats.

In Europe and the US, the perspective is different. In countries like the UK, the US and Italy, a conflict exists between the creation of new jobs on the one side and the increase in unemployment due to replacement by machines on the other. Respondents from the UK and US assume that job losses are more likely than the creation of new jobs. In Germany, Spain, Sweden and Bulgaria, respondents expect that people will suffer more from stress because new technologies are perceived to accelerate processes.

Overall, Germany, Spain and Sweden show more negative responses in their top three than other countries. This indicates that digitisation for them means more threats than benefits, especially in the context of labour.

### ⌚ Key Takeaways

## Effects of digitisation on the labour market

**In most of the countries, there are not enough professionals in the field of digitisation. However, this does not match the perception of respondents, highlighting that knowledge regarding digital professions is low and mostly based on media coverage.**

**When talking about digital progress, companies from Asia and the US are perceived as the most advanced. European companies are lagging behind.**

**One of the main concerns is that digitisation and future technologies will lead to job losses. Elderly**

**people in particular are worried about about a negative impact.**

**The perception of changes in working life as a result of digitisation differ regionally. While respondents from Asia think that changes will be mostly positive, respondents from Europe and the US are more sceptical. Asian respondents may already have first-hand experiences that digitisation creates new jobs, thus leading to a more positive outlook.**

# Effects of digitisation on educational needs

# “The mentality is

**[...] that once you finish school you just have to sit and wait for something to happen. They really need to understand how things work or they will never get out of this loop of intellectual decline.”**

GOVERNMENT EXPERT, CONSULTANT, ITALY

# “In Germany,

**we experienced some extreme structural transformations. After the fall of the Berlin wall, some degrees became worthless. For a long time, the onus of unemployment has been thrown onto the employees, who must adapt themselves to the labour market.”**

GOVERNMENT EXPERT, SOCIAL SCIENTIST, GERMANY

In this section, we look at educational needs. Our research confirms that major transformations in education are necessary in order to make people more resilient in a changing labour market where new skills sets are required. Most respondents also agree that a skilled work force is a corner stone for their country's competitiveness. It is noteworthy that respondents have a holistic understanding of education. First, in economies where technology is continuously evolving, education is perceived to be important throughout someone's entire career. Second, responsibility for human capital investment should be shared across public and private institutions. Companies and the government must provide opportunities for lifelong learning. Third, individuals are seen as being equally responsible when it comes to acquiring new skill sets or updating existing ones.

## New digital skills and lifelong learning are needed in each country.

Digitisation leads to changes in education. When looking at the perception of increasing and different educational needs, participants in the majority of countries agree that new digital skills and lifelong learning are necessary (Fig. 13). Especially in China (81%) the need for changes in the educational sector is clear, followed by India, Bulgaria and Sweden. In contrast, Italy (55%) has the lowest agreement ratings.

## Lifelong learning is considered necessary.

**Digitisation and future technologies lead to increased and different educational needs. New digital skills and lifelong learning are needed. To what extent do you agree with this statement?**



Fig. 13: Scale from 1 'fully agree' to 5 'do not agree at all'. Figures may contain rounding differences. Figures in percentage.

Italy's case can be explained by two main factors. For one, the idea that a person takes one job, ideally for life, is still prevalent. Second, individual efforts in lifelong learning are not met with sufficient merits or financial pay-offs from society or employers. As a result, the awareness of lifelong learning made necessary by digitisation has not yet taken hold in Italian society.

In China, lifelong learning is a concept that is already embedded in society and working culture and which existed long before digitisation. It is based on competitiveness and a mindset of constant education, including in employment.

India has the second highest numbers. There, lifelong learning is a relatively new concept, which has evolved alongside digitisation, constant change and the introduction of new technologies. The fact that things have already changed rapidly has instilled an awareness of the need for constant learning: what was true five years ago is often no longer true today. The SWAYAM initiative mentioned earlier can be seen as the government's attempt to encourage an adaptive and curious mentality among Indians.

When we look at other countries, especially Germany, the UK, the US and Sweden, consciousness of lifelong learning exists independently of digitisation, but is less connected to the structural change of the labour market. The concept of having one job for a lifetime is no longer valid and constant learning is required.

Furthermore, changes in daily life, such as coping with new devices or simply using services which have been digitised, have raised consciousness about lifelong learning.

In terms of who is supporting and promoting lifelong learning, it is clear that interest is driven by different sides:

- On the one hand, employers are interested in having highly skilled employees and promote lifelong learning to stay competitive. The introduction of free online courses, such as Massive Open Online Courses (MOOCs), contributes to this.
- On the other hand, the tech industry and digital media have increased the need to develop digital skills to connect with people and participate in society.

## **Older respondents in Sweden, Germany and Spain are more aware that they need to modernise their skill sets.**

In Sweden, Germany and Spain attitudes towards changing educational needs because of digitisation differ by age (Fig. 14). Elderly participants tend to have higher agreement ratings connecting the need for new digital skills and lifelong learning. This underscores why the attitudes of elderly respondents are more critical towards digitisation as it imposes requirements they might not be able to fulfill.

## **Companies should take responsibility for enabling lifelong learning, more so than governments or individuals.**

Differences arise among respondents regarding who they see as most responsible for enabling lifelong learning (Fig. 15).

Three key stakeholders are responsible for providing lifelong learning. In Italy and China, there is an equal distribution between companies, governments and individuals, which indicates that no clear picture exists for respondents. A very different view emerges in the UK and India. There, the government is seen as having the greatest responsibility for providing lifelong learning. Self-directed trainings play the smallest role.

Companies are seen as most important in providing lifelong learning – in ranked order – in Sweden, Spain, Bulgaria, Germany and the US.

## **By comparison Germans are more confident about their digital skills.**

The self-evaluation of digital skills differs widely between countries (Fig. 16). The majority in each country says that their digital skills must be expanded, which is in line with the perceived need for lifelong learning.

The need for lifelong learning is usually valued more highly by older participants.

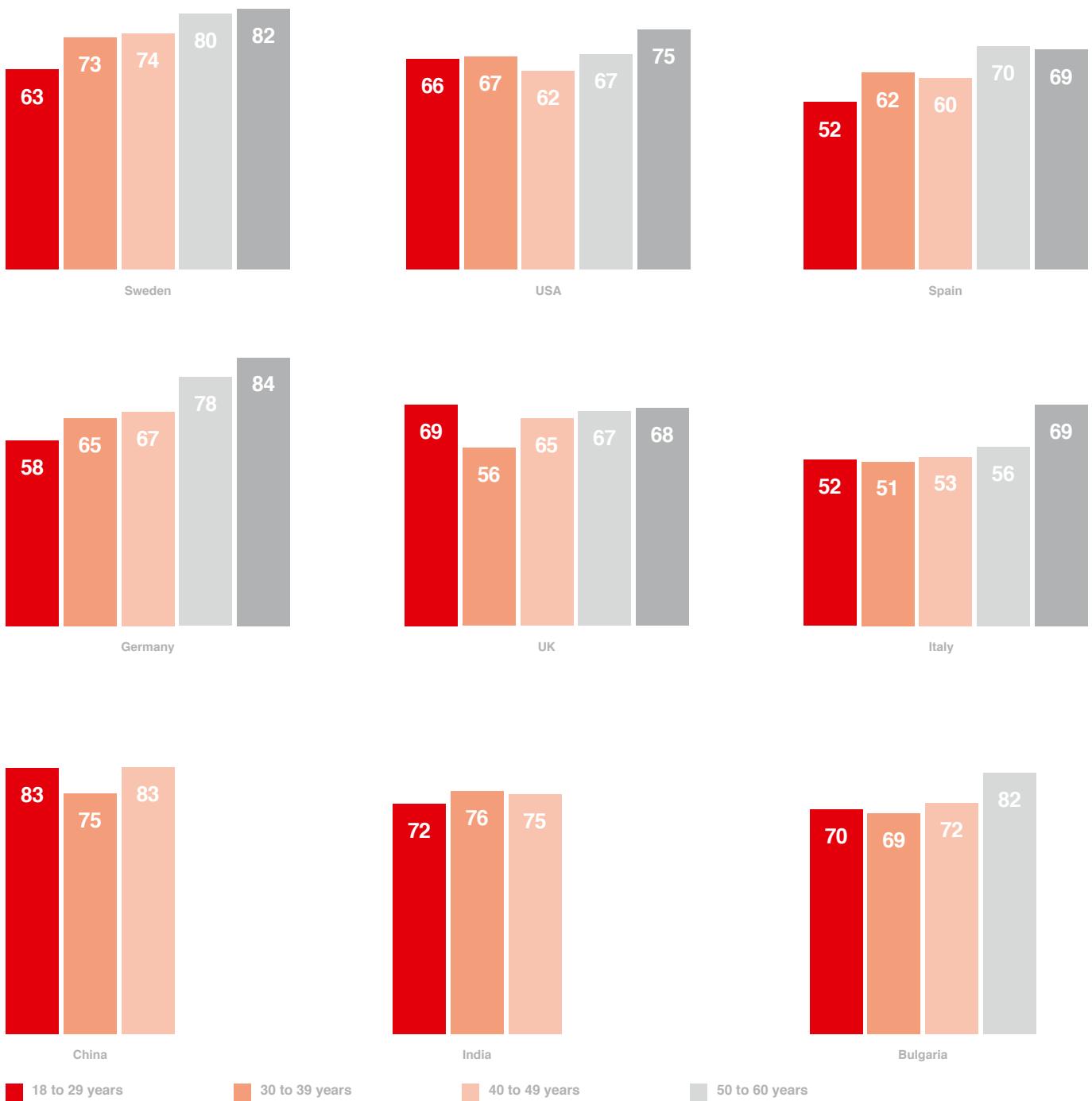


Fig. 14: Scale from 1 'fully agree' to 5 'do not agree at all'. Figures in percentage. In India and China, maximum age of respondents is 50. You can find more information on the complete design of the study in Part 1 "People and Society".

## Companies should play an important role in lifelong learning.

**In your opinion, who is mainly responsible for the urgently required lifelong learning of skilled workers in the age of digital change and the replacing of existing technologies?**

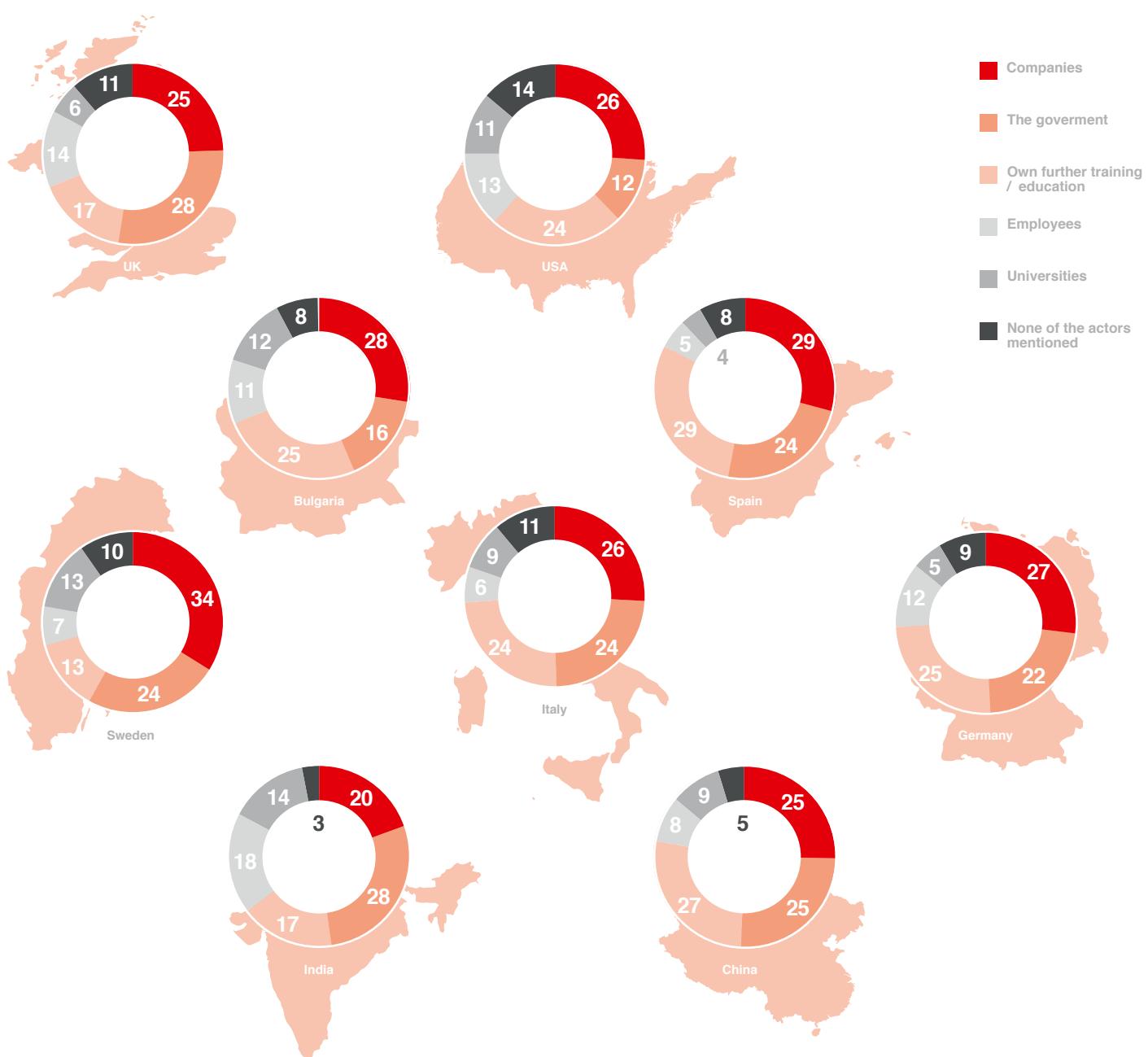


Fig. 15: Figures may contain rounding differences. Figures in percentage.

# “Companies suffer

**from a lack of digitalisation competence in general, both in small and large companies. [...] We are creating training programs for small businesses. [...] There is a built-in fear among Swedes that primarily affects the public sector. You are not driven by change, and the risk of doing something new is big. They feel safer doing just as they have done all along.”**

SOCIETY EXPERT, COMMUNICATION SCIENTIST, SWEDEN

Especially in Bulgaria (70%) and China (78%), the number of respondents who agree that they must advance their digital skills is highest, followed by India and Sweden (both 61%).

Across all countries, less than 1/3 say that their digital skills are sufficient. In Germany (37%), the US (35%), the UK (34%) and India (33%) this proportion is highest among the respondents.

## Respondents are digital autodidacts.

The meaning behind the term ‘digital skills’ is as broad as the possible definitions of digitisation. When talking about acquiring digital skills, the definition of the term ‘digital skill’ was based on respondents’ own definitions. Therefore, when looking at the results, we refer to:

- 1 Digital skills which are required in daily life, e.g., digital devices, online services, etc.
- 2 Digital skills which are required in professional life, e.g., software skills, programming skills etc.

When including both types of definitions, the high number of respondents who are self-taught indicates that developing digital skills is necessary, enabling individuals

to stay up to date and connected in today’s societies. (Fig. 17). Social pressure, for instance, is one reason why Sweden shows the highest ratings for self-teaching.

Furthermore, self-teaching is the most flexible way of developing skills and usually occurs on-demand. India and China, as Asian countries, have the lowest ratings in this regard (both 54%).

In China, high emphasis is placed on online courses and certificates to demonstrate skills. This cannot be achieved by self-teaching. 48% of the Chinese respondents report gaining digital skills through their job. This shows that employers in China are much more willing to provide digital training as a means to educating their staff and staying competitive as a company.

For many countries, especially China and India, but also the US, where university and secondary education are connected to high tuition fees, online courses are a cheap alternative to gain digital knowledge.

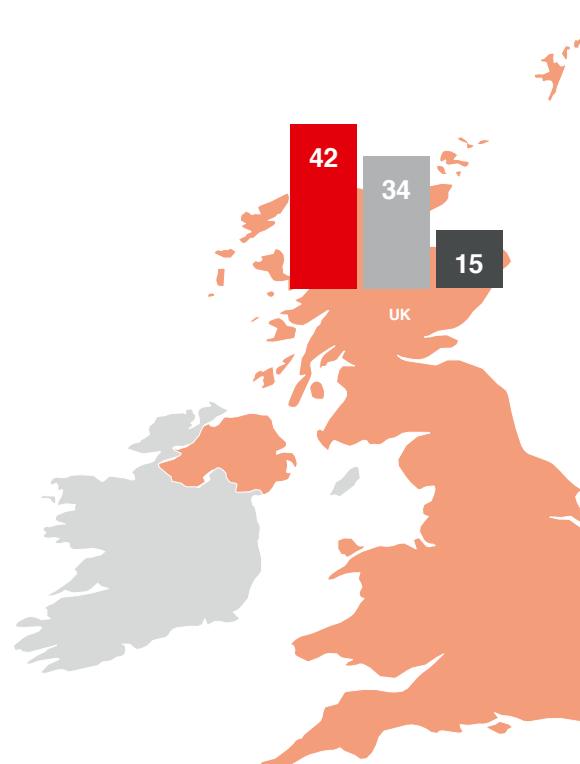
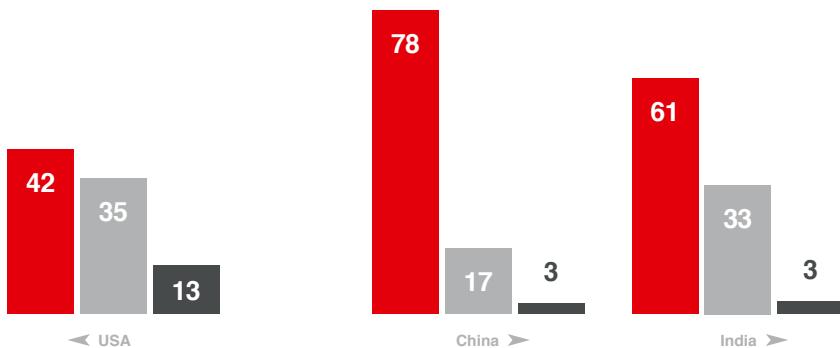
In Asia, a variety of different educational opportunities for acquiring digital skills are utilized, and, as a result, these countries differ from the rest of the sample. Family, friends, work, study and online courses are much more a part of the acquisition process than elsewhere.



**“Motivation is driven by curiosity. Mentality. A desire to show that you can do it and be a part of the group. [...] There is a fear of showing that you are not able to do something, and this fear acts as a motivator.”**

## Current levels of digital skills need to be expanded.

Do you believe that your digital skills will be sufficient for your profession in the future or will you need to expand them?



## “The better

the education system and general digital literacy, the less hours are needed for self-study.”

GOVERNMENT EXPERT, HEALTH LEGAL EXPERT, BULGARIA

■ My digital skills need expanding.

■ My digital skills are sufficient.

■ I don't need digital skills to do my job.

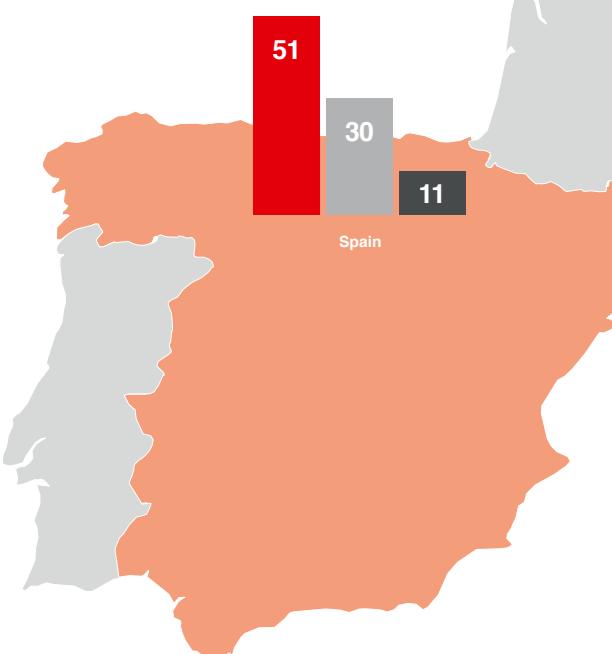
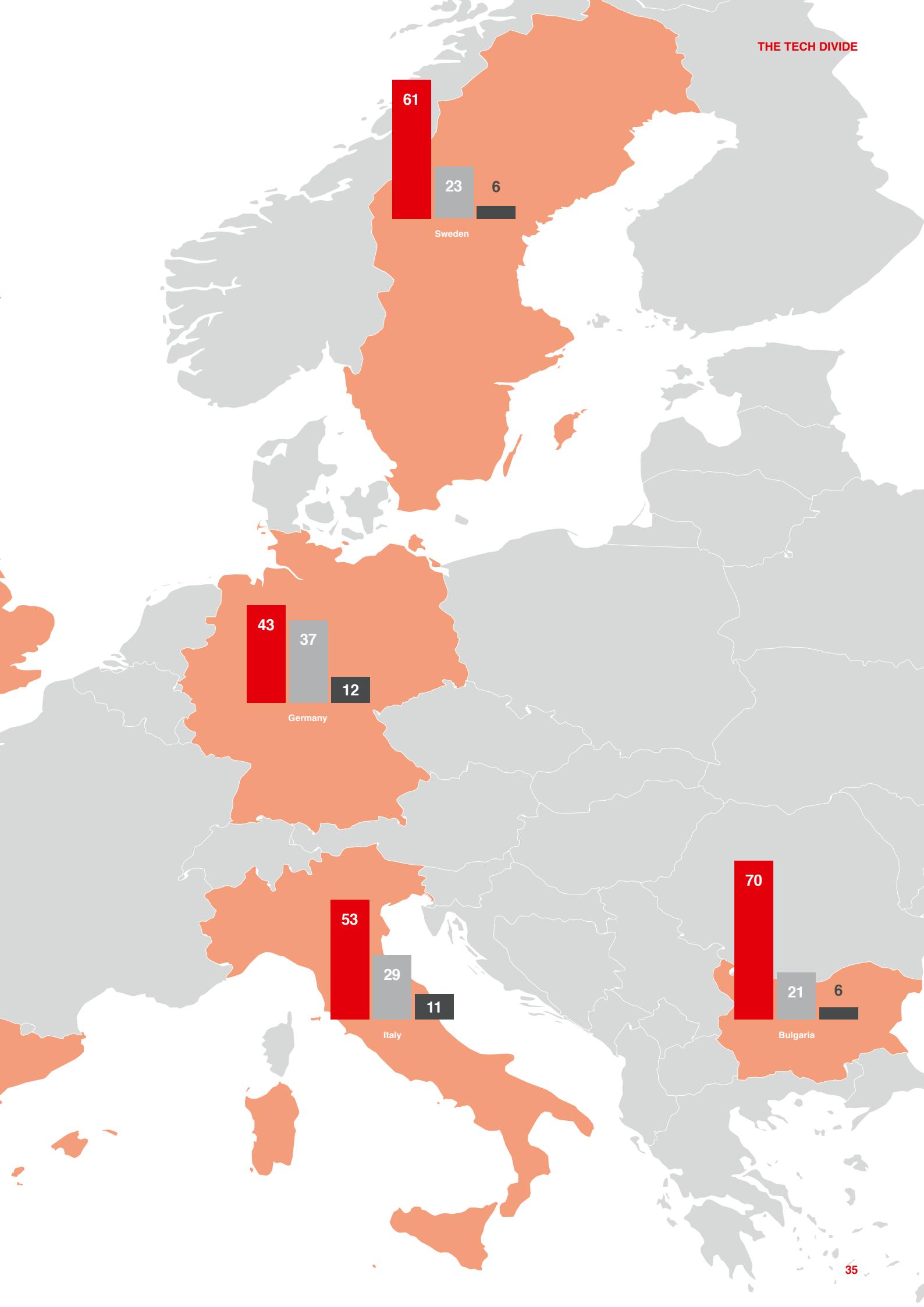


Fig. 16: Figures in percentage.



**“The explanation for using a variety of different educational opportunities lies within our communist ideology. With a centralized government, you will definitely teach, based on one unified system and ideology. It is focused on traditional education and does not have the foresight to teach something so advanced as digital skills.”**

INDUSTRY EXPERT, STRATEGIC PLANNER, CHINA



## How did you acquire your digital skills?

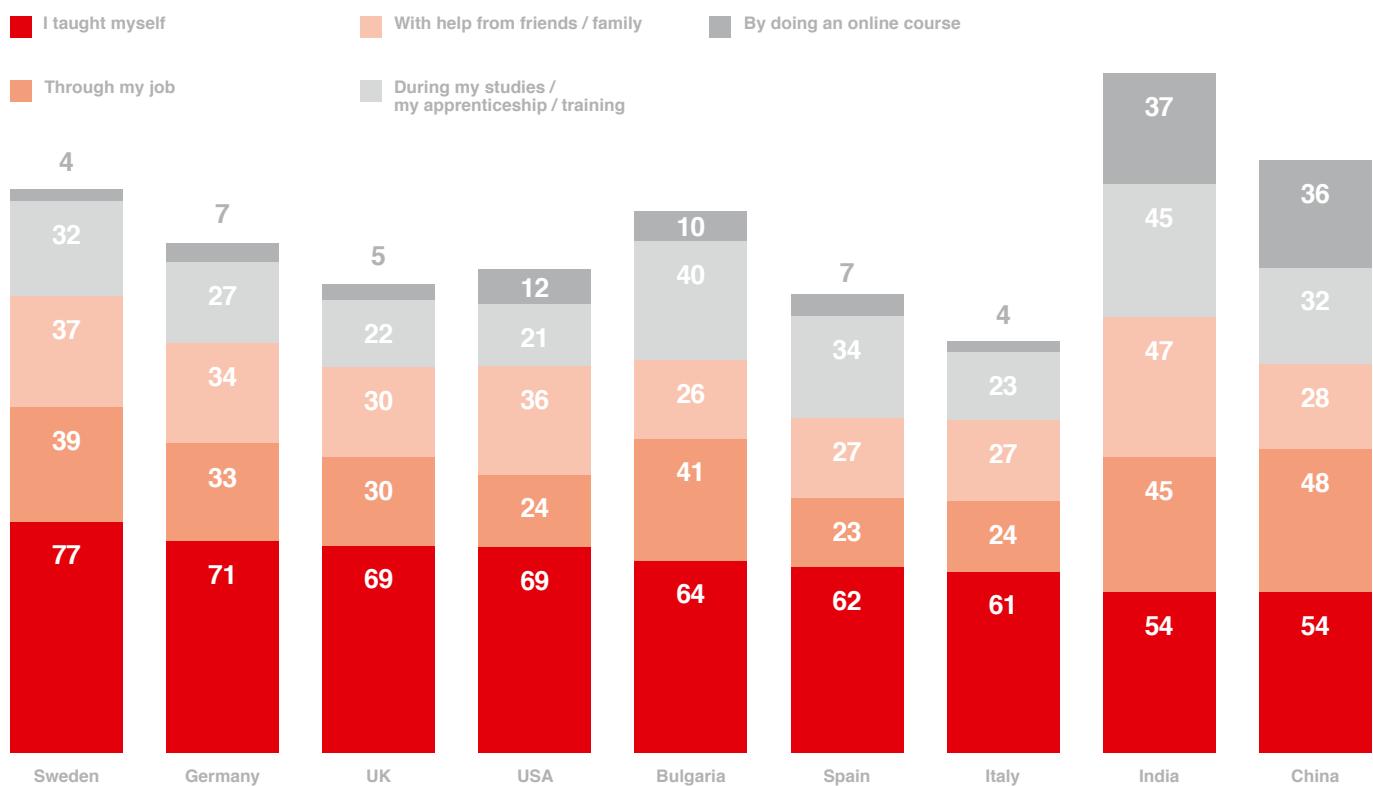


Fig. 17: Top 5 Answers, Figures in percentage.

### ⌚ Key Takeaways

## Effects of digitisation on educational needs

Digitisation and future technologies lead to increased and different educational needs. Across all countries, respondents say that new digital skills and lifelong learning are crucial. Consciousness of the need for life-long learning can develop through cultural factors, structural changes or digitisation itself.

Most respondents, across countries, are aware that their digital skills are not sufficient and need to

be expanded to keep up with new requirements in the labour market, as well as daily life.

The acquisition of digital skills is dominated by self-learning. Asians use a variety of different educational opportunities for acquiring digital skills. This is related to the lack of formal digital education and the high cost of traditional education vs. online courses.

# Study Design

## Quantitative research

Ipsos conducted quantitative research of 9,005 adults aged 18-65 (in Bulgaria 18-60, in India and China 18-50) between June 6th and June 26th 2018. The survey across 9 countries was conducted online using the Ipsos Online Panel System.

When selecting countries within Europe, a variety of different economic and digitisation levels were considered. Fast developing markets, such as India and China, were included as well. The USA was included in the sample because it is characterised by strengths in innovation.

In established markets with a high level of Internet penetration (more than 60% online), the results can be understood as representative of the general working age population. The results are weighted to ensure that the sample's composition reflects that of the adult popula-

tion according to the most recent country census data. However, in emerging markets, such as India and China, Internet penetration is lower. The results should therefore be viewed as representative of a more urban, affluent and 'connected' population.

Looking at the distribution of education and age groups, there are important differences in the samples of India and China. In these countries, the maximum age of respondents is 50 and the education distribution is characterised by highly educated respondents. The higher proportion of younger and highly educated respondents may have had an influence on the survey results. Furthermore, because of the lower level of Internet penetration, respondents tended to be from urban regions (bigger cities).

In China, it was not possible to include questions pertaining to the government in the survey.



Bulgaria:  
n=1,000



China:  
n=1,002



Germany:  
n=1,001



Spain:  
n=1,000



Sweden:  
n=1,000



UK:  
n=1,000



India:  
n=1,002

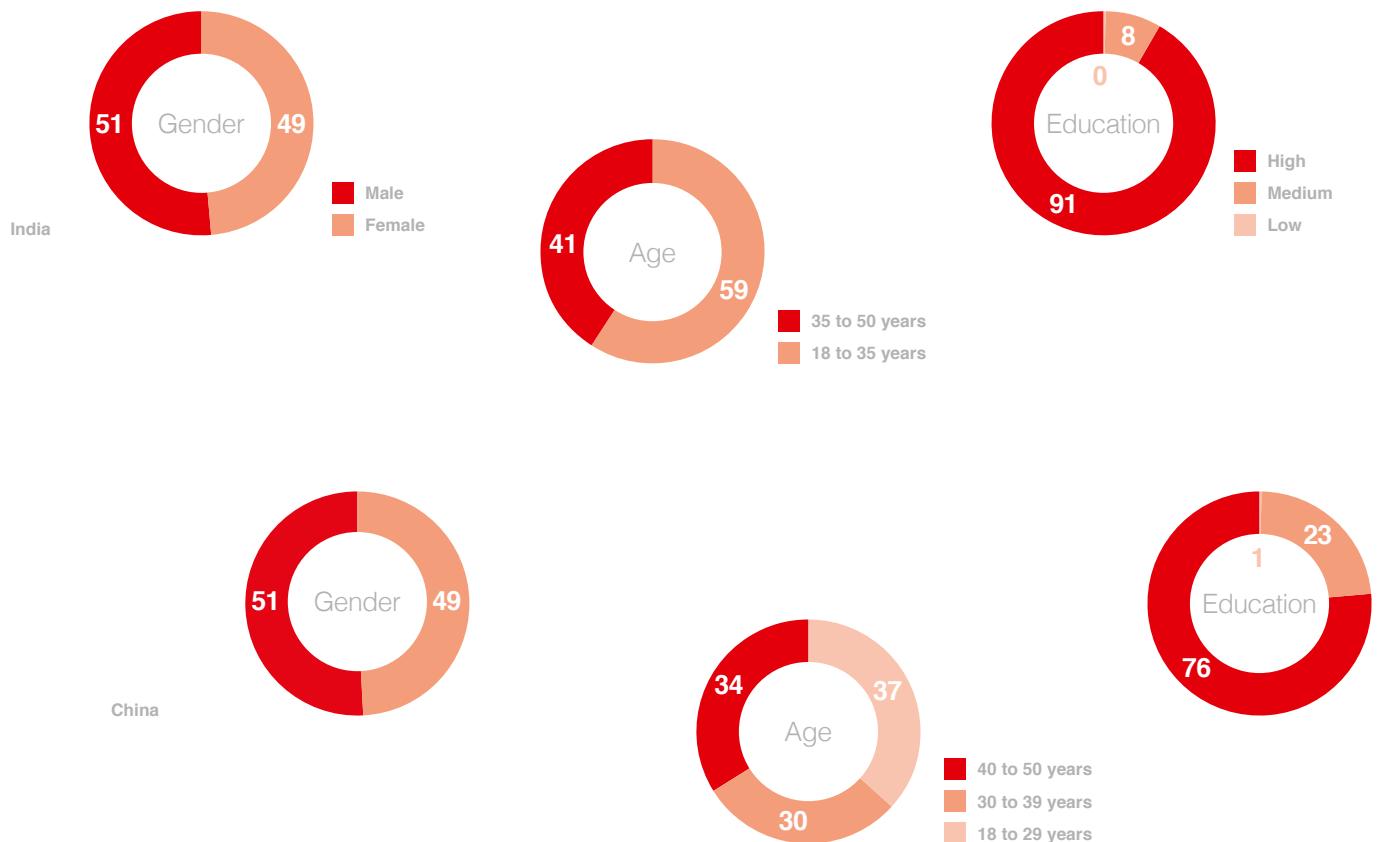


USA:  
n=1,000



Italy:  
n=1,000

## Demographic sample structures of India and China



## Qualitative research

Ipsos identified and recruited n=5 experts from the same markets covered by the quantitative study (except Spain) to discuss the quantitative results and achieve a thorough understanding of the cultural context relevant to each country, thus informing the quantitative findings.

The experts were defined by a relevant background in social science, communication, or economic science and have dealt with digitisation throughout their professional

careers. All of the experts are characterised by a broad as well as more specific understanding of digitisation, depending on their professional background and position. The expert interviews, each lasting about 60 minutes, were conducted by telephone or in person between September 4<sup>th</sup> and October 5<sup>th</sup> 2018. Market research codex ensures the anonymity of respondents, including experts, for reasons of privacy. Furthermore, the anonymity of respondents enabled them to voice their opinions freely without reservations.

# Imprint

## **Authors**

Inger Paus (Managing Director, Vodafone Institute)  
Alice Deißner (Director Strategy and Programmes, Vodafone Institute)  
Friedrich Pohl (Head of Communications, Vodafone Institute)  
Cilia C. Kanellopoulos (Head of Social Innovation, Vodafone Institute)  
Dr. Robert Grimm (Director, Ipsos Public Affairs)  
Liane Stavenhagen (Research Executive, Ipsos Public Affairs)  
Janine Freudenberg (Senior Research Executive, Ipsos Public Affairs)  
Laura Wolfs (Senior Research Executive, Ipsos Public Affairs)

## **Editor**

Vodafone Institute for Society and Communications  
Behrenstraße 18  
10117 Berlin  
Germany

## **Chairman of the Advisory Board**

Joakim Reiter

## **Board of Directors**

Inger Paus, Thomas Holtmanns

## **Design concept**

Nordpol+ Hamburg  
Agentur für Kommunikation GmbH

## **Layout**

Nick Böse, Robin Kupski

## **Photos**

zoranm, iStock (Cover); Criene, EyeEm (p. 6); supersizer, iStock (p. 19);  
aluxum, iStock (p. 24); Lumina, Stocksy (p. 33); Sudalak D., EyeEm (p. 36)

## **Print**

schöne drucksachen

[www.vodafone-institut.de](http://www.vodafone-institut.de)

Twitter: @vf\_institute

LinkedIn: [www.linkedin.com/company/vodafone-institute/](https://www.linkedin.com/company/vodafone-institute/)

Facebook: [www.facebook.com/VodafoneInstitute](https://www.facebook.com/VodafoneInstitute)