



Vodafone Institute  
for Society and  
Communications

# THE TECH DIVIDE

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



**PEOPLE AND  
SOCIETY**

A representative study in nine countries,  
October 2018



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# A Digital Future for Everyone

## Foreword by Joakim Reiter



**Joakim Reiter,**  
Group External Affairs Director, Vodafone

Before joining Vodafone in April 2017, Joakim Reiter was the Assistant Secretary-General of the United Nations and the Deputy Secretary-General of the United Nations Conference on Trade and Development (UNCTAD). Prior to that, he spent more than 15 years in the foreign service of Sweden, including as Deputy Director-General of the Ministry of Foreign Affairs, Ambassador to the World Trade Organization and at the Permanent Representation to the European Union. He also served as an EU negotiator with DG TRADE at the European Commission. A Swedish national, Joakim Reiter holds a Masters in Economics from the London School of Economics and a Masters in Political Science from Lund University. Joakim Reiter is the Chairman of the Advisory Board of the Vodafone Institute.

Visions of the future always put technology at the centre of our lives. Robots that interact with us like humans, driverless cars, and spaceships that take us on holiday to faraway lands. These are all images that have made an appearance in past articles and books about what the future may hold. Over the years, these predictions have always imagined what our lives may look like many years from now - as the saying goes "far, far away." And we have thought of them as highly unlikely to happen any time soon.

However, over the past decade, something has changed. Technology and connectivity have advanced at such a pace that some of these visions of our future, along with many other innovations that were not predicted, are starting to become a reality. Driverless cars are being tested on our roads, a range of objects are now connected to the Internet, artificial intelligence is being widely used, and companies are building rockets that they hope will take holidaymakers into space.

It's undeniable that advances in technology can bring significant benefits to society, but the ubiquity and the speed that technology is evolving can also cause concern. This concern is not unfounded: some of today's technologies have the potential to fundamentally change our societies, economies and even challenge our view of what it means to be human.

As digitisation plays a greater role in our future, it's imperative that we not only understand the benefits it can bring, but also how we can mitigate the risks. And we can only do this if we understand in detail people's perceptions, hopes, and fears about how technology and digitisation affects their lives. This is why the Vodafone Institute, in cooperation with Ipsos, has conducted one of the largest international studies into people's perceptions and attitudes towards digitisation across Europe, Asia and North America. The study, conducted with 9,000 people across nine countries, explores the difference in attitudes towards digitisation and people's perceptions of the benefits and risks.

Research, analysis, and debate are the foundations of good decisions and we hope that this study will help to contribute to the global dialogue on how to capture the many benefits of digitisation while avoiding the pitfalls. We also look forward to bringing together academics, technologists, and policymakers to discuss the findings and what they mean at our Digitising Europe Summit in February 2019.

# Three Lessons

## Guest Commentary by Luciano Floridi



**Luciano Floridi, OII's Professor of Philosophy and Ethics of Information, University of Oxford**

Luciano Floridi is the OII's Professor of Philosophy and Ethics of Information at the University of Oxford, where he is also the Director of the Digital Ethics Lab of the Oxford Internet Institute, and he is Distinguished Research Fellow of the Uehiro Centre for Practical Ethics of the Faculty of Philosophy and Research Associate and Fellow in Information Policy of the Department of Computer Science. His research primarily concerns information and digital ethics, the philosophy of information, and the philosophy of Technology.

Technological innovation is often described as a force in itself, with a mind of its own. This is a mistake. The truth is that, when innovation works, it is thanks to the right managerial decisions upstream at the beginning of the cycle and positive social acceptance downstream at the end of the first phase of the cycle (then the innovation cycle repeats, in a feedback loop). Innovation in artificial intelligence, robotics, and other smart digital solutions follows the same pattern. However, today much attention is being devoted to decisional processes upstream, in terms of governance, legislation, and self-regulation. The Vodafone Ipsos survey is therefore particularly welcome because it provides a much-needed overview of what is happening downstream at the receiving side of the process. It analyses average citizens' concerns, hopes, and expectations – attitudes in short – towards digital innovation when it is brought about by companies and governments in Europe, the USA, and Asia. The data offer a rich insight worth studying carefully and comparatively. Some macroscopic trends are clear. These are highlighted by the Executive Summary. A few overarching lessons may be worth stressing. Let me offer three.

The first lesson is about grouping. The survey suggests making sense of downstream attitudes by enriching a simple political grid, based on countries, with other filters such as gender, demography, education, income, and, in general, parameters that enable one to parse users and customers across countries and even continents as belonging to similar groups. When it comes to attitudes, language and country of origins may count less than shared values, educational backgrounds, or similar financial conditions. Consider attitudes towards digital education. When asked whether new digital skills<sup>1</sup> and lifelong learning<sup>1</sup> are needed, people in Sweden (Top2 vs. Bottom2 67%) share more in common with people in China (Top2 vs. Bottom2 77%) than with people in Italy (Top2 vs. Bottom2 44%), even though Sweden and Italy are both part of the EU and regulated by similar legislation.

<sup>1</sup> The figures presented here refer to the second part of this study ('Industry'). This will be published, including the complete statistics, in November 2018.

Digital societies, if mapped in terms of attitudes, do not share the same borders as countries. This is a crucial lesson both for multinational innovators and for supranational policy-makers.

The second lesson is about optimism with respect to technological innovation, or what I would like to label op-tech. The survey shows that op-tech is more widespread in countries where there is robust growth in GDP and natality, where the population is younger, and the future seems more likely to fulfil individual projects. Consider the huge gap in positive or very positive attitude towards digitisation and the use of new technologies in different areas of life: India (89%) and China (83%) are at the top, and Germany (48%) and the UK (47%) are at the bottom. Such polarisation may be due to the fact that digital technologies bring a sense of empowerment, social mobility, and achievable opportunities. Where there is hope for the future, they contribute to it with a vision of possibilities and opportunities, but where there is lack of hope, they exacerbate it in terms of risks and concerns. It would be interesting to see whether an extension of the survey to African countries would further corroborate a similar trend. The geolocation and intensity of people's op-tech is significant because it appears to be unrelated to the actual (mind, not the perceived) state of local legislation, in terms of respect for human rights in general, and specific implementations of rights, such as privacy and freedom of expression. This is an important lesson for anyone who still thinks that op-tech and liberal democracy move together as two sides of the same coin called 'good society'. In fact, they are only loosely related.

The last lesson concerns interesting tensions that should be expected, but that still contravene the common view that people's attitudes are fully rational, in the sense that they consistently rank alternatives, respecting the fundamental axioms of choice theory, such as transitivity (if one likes A more than B, and B more than C, then one should like A more than C). The truth is that we often have inconsistent attitudes towards conflicting issues, not least because we may fail to perceive the relation between the

issues in the first place. For example, people in Bulgaria have, on aggregate, a positive attitude about whether there are enough professionals in the field of digitisation in their country<sup>1</sup> (40% says there are not, but 33% says that there are, placing BGR, like Sweden, bottom second with Top2 vs. Bottom 2 7%; only the USA scores better). However, they also have a negative self-perception of the country's degree of digitisation and how much it lags behind compared to other regions or countries (with Top2 vs. Bottom2 38%; only Germany and Italy score higher). This lesson will be useful to anyone wishing to harmonise not only people's attitudes, but also national strategies, both internally, in terms of social acceptability, and externally, in terms of compatibility and interoperability with other countries' national strategies. Coherence in people's attitude should be neither assumed nor underestimated.

The best policies and innovation strategies are always evidence-based; the survey offers some very helpful and indispensable information, which a better view of people's attitudes and hence of what needs to be done so that digital innovation can meet justified expectations, address reasonable concerns, and fulfil realistic hopes.



**Most people have a positive attitude towards digitisation.**

# Executive summary

When it comes to digitisation, America and Asia are dominating the headlines. Why is that? Are people in Europe really technology-sceptic? Do Americans and Chinese think in profoundly different ways about digitisation? What futuristic scenarios would the respondents be willing to get involved in? How do people in different cultures imagine the society of the 21st century? This study is intended to find answers to questions like these. It is one of the first cross-continental surveys on the subject of technology acceptance against the background of digitisation. The results are based on a quantitative survey conducted by the research institute IPSOS and was complemented by qualitative interviews (5 experts per country). This publication comprises the first part of our study titled: "People and Society". Part 2 („Industry“) and Part 3 („Governance“) of will be published in the coming months.

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

**Most people have a positive attitude towards digitisation.** More than 60 percent of all respondents say they see this development as „very positive“ or „positive“. However, there are large regional differences. In contrast to emerging nations such as China and India, Western Europeans as well as people in the USA – the cradle of the digital revolution – are much more skeptical about its social effects. Western industrialised nations have apparently lost their faith in progress. The study shows that many people here see the supposedly secure status quo threatened. On the other hand, China and India have experienced considerable economic growth in recent decades. China's national gross domestic product has overtaken many established economies, and countless people have been pulled out of poverty. This is an economic transformation that has taken place in parallel with the establishment of digital technologies.

While there are virtually no gender differences among the emerging nations, **in Europe women are far less euphoric than men about digitisation.** In the USA, the difference even amounts to 19 percent (64 percent positive attitude among men, 45 percent positive attitude among women). Essentially, attitudes towards digitisation are influenced by five factors: digital literacy, the current state of industrial development, media discourse, cultural attitudes and personal experience.

Furthermore, according to the respondents, the greatest benefits of digitisation is seen in **saving resources through smart systems and improved mobility.** Far less potential is attributed to the fostering of creativity and the use of robots. Smart city technologies have a higher acceptance rate and are perceived as having greater digitisation advantages than, for example, health innovations. The data required for smart city scenarios is less sensitive and the scenarios themselves are more tangible. Nonetheless, 44 percent of Chinese have a positive attitude towards telemedicine and 32 percent can even imagine optimising their DNA. A concept that has been met with widespread rejection in other countries (only 9 percent approval in Germany).

More than half of the respondents stated that in the future **machines and not humans will make decisions.** The concern about losing control due to the growing influence of artificial intelligence (AI) seems to have two main reasons: lack of knowledge and negative portrayal in the media in all countries surveyed.

Nearly 50 percent of respondents see **cyber attacks** as the greatest threat to new technologies. This is no surprise, considering that an increasing number of cyber threats are often discussed in the media. The **fear of job loss** due to digitisation, through the use of robots for example, ranks second. In addition, many respondents are concerned about the negative effects of digitisation on their interpersonal relationships.

# 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 innovative strength.

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

## 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 get 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



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



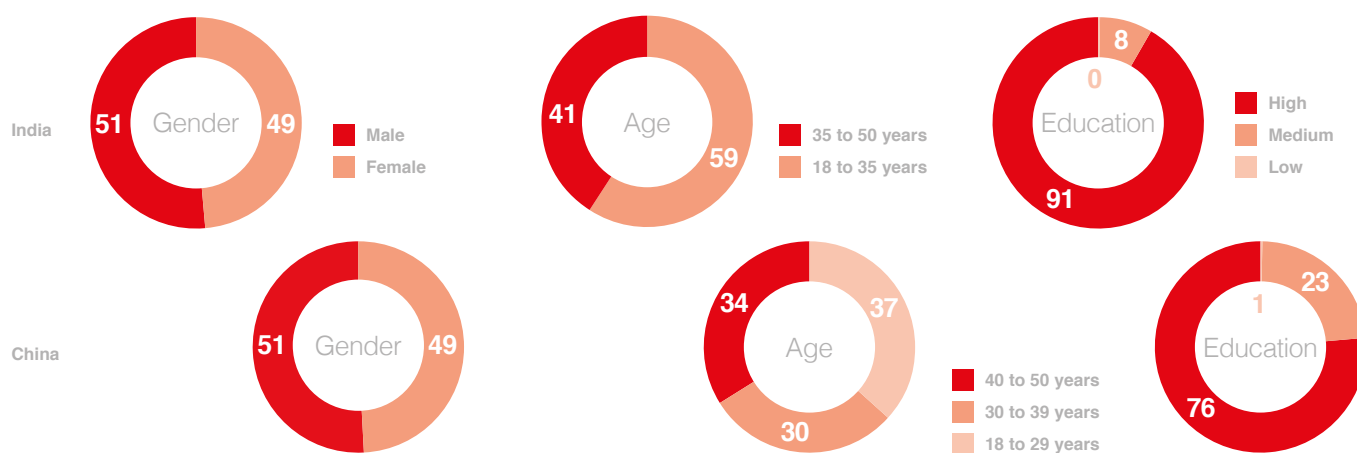
USA:  
n=1,000



Italy:  
n=1,000



## Demographic sample structures of India and China



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. Privacy of respondents furthermore enables respondents to voice their opinions freely without reservations.

## Early and late adopters

To evaluate the importance of technology in life, we categorised participants into two groups.

- 1 Early adopters are characterised by the following attributes:
  - They give others advice when they are looking to buy technology or electronic products;
  - They are usually the first to try new technologies;
  - They actively follow news on the latest technological developments and innovations.
- 2 Late adopters are characterised by the following attributes:
  - They don't think that new technologies have improved their lives;
  - They only use new technical products after most of

their friends, colleagues, etc. have started to use them;  
- Computers confuse them; they'll never get used to them.

Technology plays the most important role in China and Bulgaria, where 44% of participants defined themselves as early adopters (Fig. 1). In contrast, Germany and Sweden have the lowest number of early adopters. Asia (China and India) especially is characterised by a low number of late adopters (less than one in ten). The results of the survey in Asia could be influenced by the tendency of respondents to be young, highly educated, and urban.

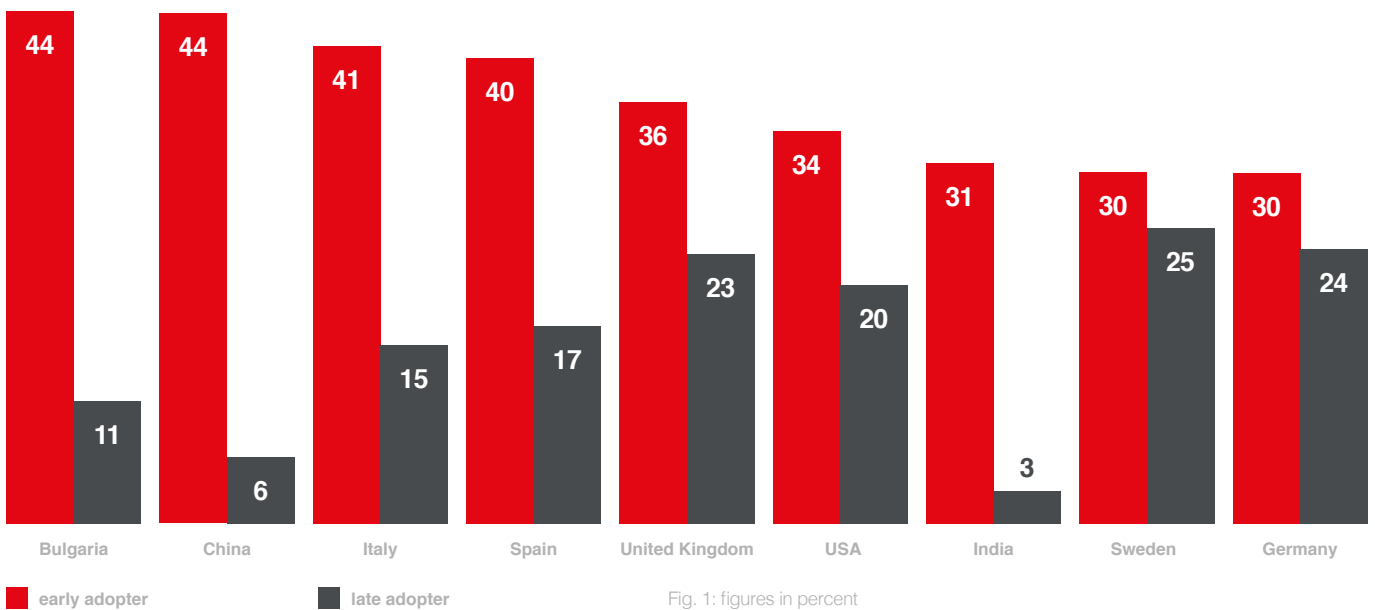
## Personal vs. societal: perceptions on digitisation

For a better evaluation of the data, i.e., understanding of the attitudes towards digital changes, we asked participants how enthusiastic they are about digitisation and the use of new technologies compared to the society they live in. The findings show that respondents feel that they are more enthusiastic about digitisation than their respective societies (Fig. 2). In China and India, big differences exist between respondents and their society. More than 80% say they are (very) enthusiastic compared to their society. China and India's survey results reflect a distinction between affluent and 'connected' respondents and the rest of society.

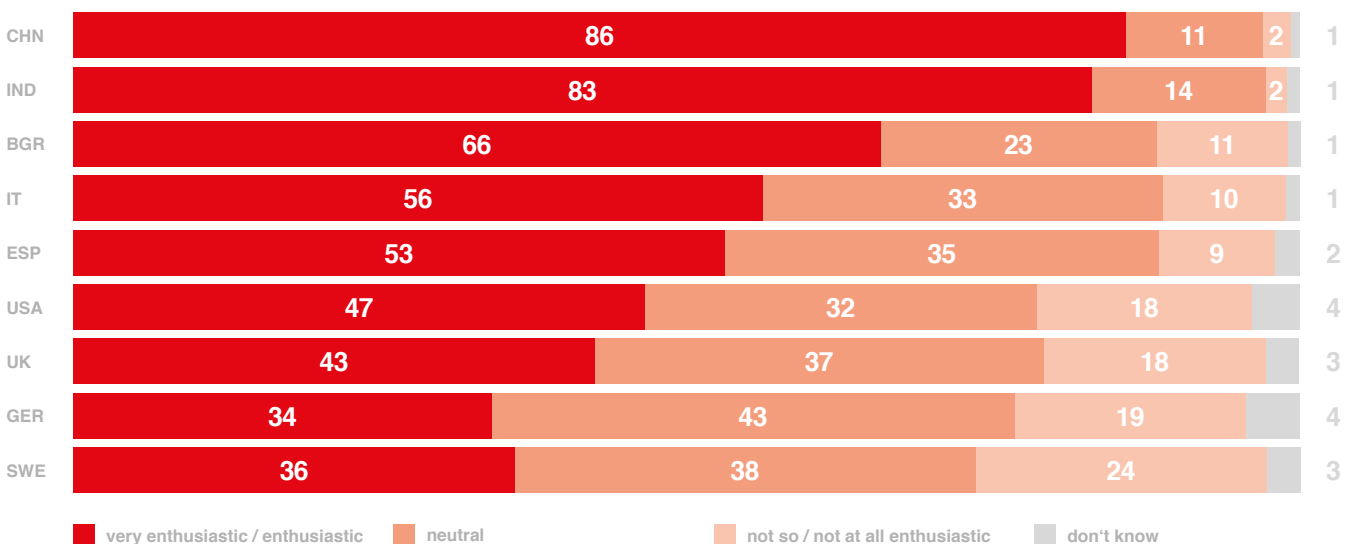


**Technology  
plays the most  
important role  
in China and  
Bulgaria.**

## Role of technology in life: early and late adopters



## How enthusiastic are you about digitisation and the use of new technologies compared to the society you live in?



# Attitude towards digitisation and new technologies

Attitudes towards digitisation are highly heterogenous. The way in which people think about digital technologies, how they transform everyday life, whether they represent a necessary evil, or are an opportunity of change and social progress, largely depends on local context. Overall, we can distinguish people in Asian economies from Europeans and Americans. China and India experienced substantial economic growth. Their national GDPs leapfrogged many established economies and countless people were elevated out of poverty in the last decades. This economic transformation runs parallel with the establishment of digital technologies. Digitisation has come to symbolise a new urban consumer-oriented lifestyle with growing opportunities for social and economic participation. It is therefore not surprising that Asians feel very positively about digitisation. Europeans, on the other hand, but also people in the USA – the cradle of the digital revolution – remain much more sceptical about its social impact. Particularly, Europeans are more ambivalent when it comes to the advantages and disadvantages of technologies. This chapter explores basic attitudes towards digitisation and highlights local differences.

## There are five factors that drive the attitude towards digitisation among the respondents

### Digital literacy

In many countries, there is a lack of knowledge when it comes to digitisation. Respondents usually refer to their own experiences and rarely think of the political or economical impacts of digitisation.

### Level of development

Emerging countries such as China or India see digitisation as positive, since it has brought a fundamental change into people's lives. In industrialised countries, the speed of development has slowed down. Effects of digitisation are therefore rated less euphorically.

### Media discourse

'Everything we know about our society, we know through the mass media.' As sociologist Niklas Luhmann points out, media discourse often forms opinion, whether positive or negative, in a country.

## “Countries with a less developed infrastructure

often have a more positive outlook on digitisation because it creates something functioning where there wasn't anything before.”

INDUSTRY EXPERT, CEO START-UP HUB,  
SWEDEN

## “My hypothesis is that the more collectivistic countries,

India, China, and Bulgaria also, where social factors are more important, they recognize social media as what digitisation is all about and do not think of anything more.”

SOCIETY EXPERT, SOCIAL SCIENTIST,  
BULGARIA

### **Cultural mindset**

Culture is a big influence on the attitude of the citizens. For example, Chinese respondents tend to view technology positively and focus on its advantages.

### **Personal experience**

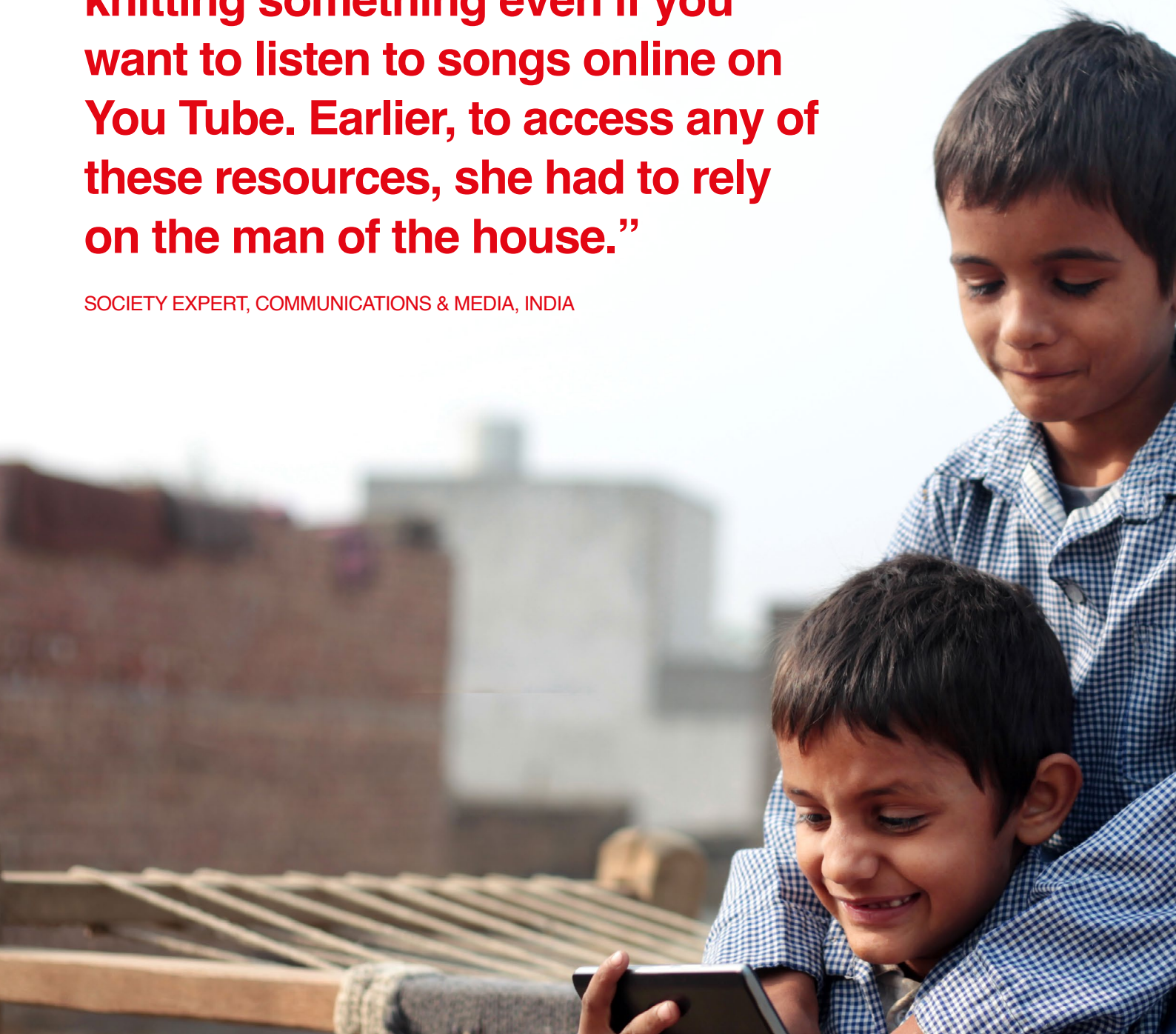
Negative experiences often make people more sceptical of digitisation. In countries with recent data breaches, such as Italy or the UK, attitudes tend to be more negative.

## **Developing and emerging countries associate digitisation with hope and prosperity**

It is not surprising that especially participants from Asia (China and India) are more positive about technology (more than 80%) than people from Europe or the USA (Fig. 3). Coming from production economies, but also given a rather different understanding of digitisation, India and China as well as Bulgaria generally face technological change with a positive attitude and hope as it offers means to escape poverty.

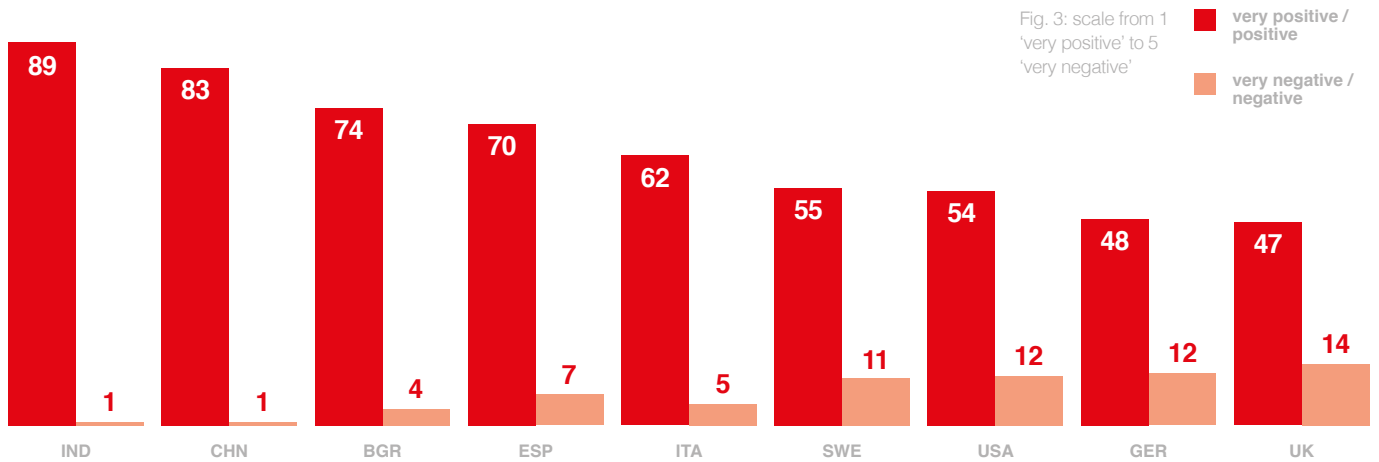
**“The world is mainly a patriarchal society. India being an underdeveloped country, it is still ingrained in its society today. The mobile phone is the device that gives women a little more autonomy of what they want to do. It is as simple as something to look up recipes, patterns or knitting something even if you want to listen to songs online on You Tube. Earlier, to access any of these resources, she had to rely on the man of the house.”**

SOCIETY EXPERT, COMMUNICATIONS & MEDIA, INDIA



## Digitisation euphoria in India and China

Please think about digitisation now, and the use of new technologies in different areas of life. How do you feel about this in general?



Attitudes vary widely in European countries: here, Bulgaria (74%) has the most positive attitude towards digitisation (74%), followed by Spain (70%), and Italy (63%).

Interestingly, Sweden and the US, both countries with high tech-affinity and technological progress, show a rather modest attitude (both 55%). One explanation may lie in the high development and pioneer positions of these countries – they have reached their peak and now euphoria is weakening. Furthermore, especially in Sweden, the media has taken a rather pessimistic turn lately which might explain the results whereas in the US, the 2016 election and possible Russian influence have left the respondents with a bitter aftertaste.

Less surprisingly, Germans (48%) and Britons (47%) have the least positive attitudes. The German population is known for its scepticism and is rather careful and hesitant towards new inventions. For British respondents, the results are more surprising: they usually are quite adaptive to new technology. However, the current instability of politics could be one reason that respondents are more sceptical about digitisation than they normally would be.

**“The tech industry,**

**for example, is a very male dominated industry in the US. It has a reputation for being male dominated and some of the undesirable behaviours that come across from a masculine dominated culture. There are not very many female CEOs in Silicon Valley”**

SOCIETY EXPERT, ASSISTANT PROFESSOR, USA



## Three factors increase the gender gap

### Gender stereotypes are prevalent

Technology is still considered a male field due to social stereotypes reinforcing the idea that certain professions such as tech jobs are more masculine. The lack of female role models and representation of women in tech in the media further fosters these stereotypes.

### Specifics of labour market

Professions with high exposure to technology are often still dominated by men which discourages women from entering STEM education or applying for jobs in that

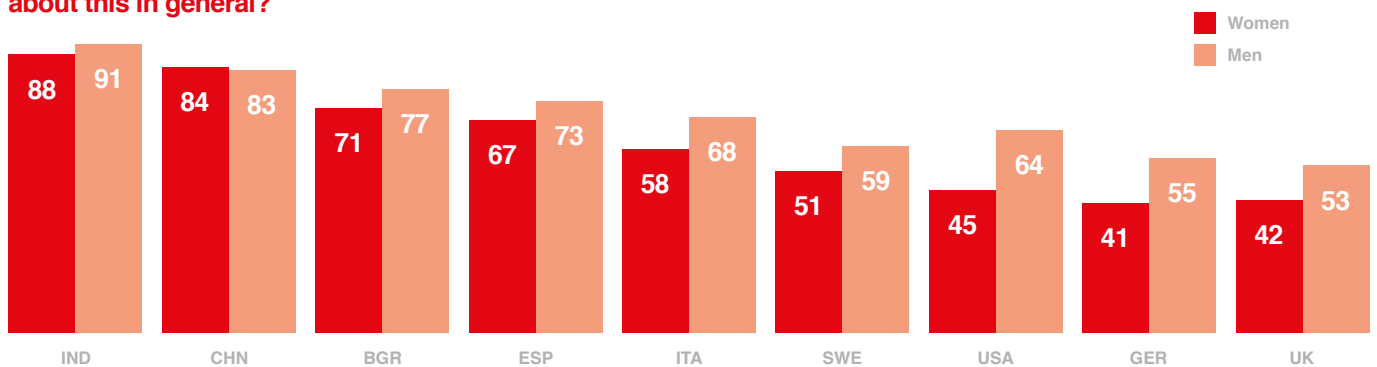
sector. Furthermore, the lack of access to male-dominated networks further puts women at a disadvantage when entering the market.

### Women are neglected in digital education

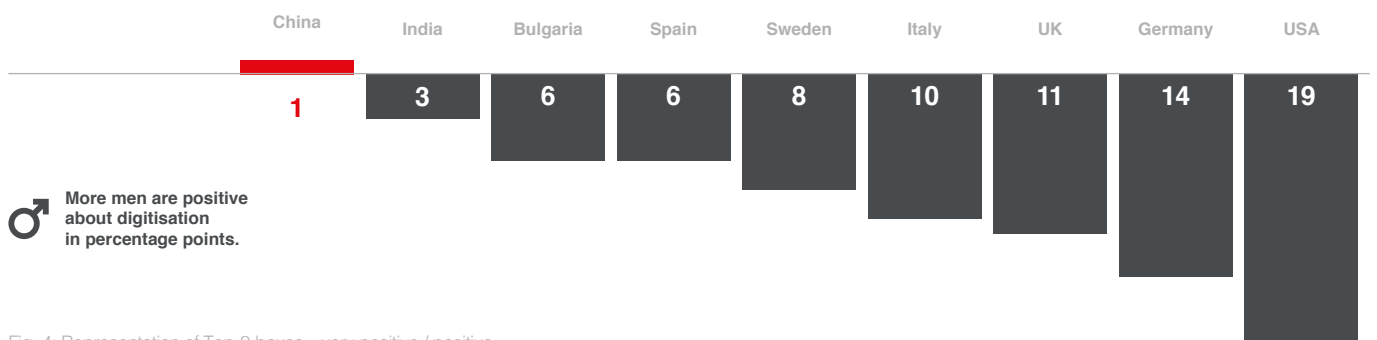
Girls and women receive less encouragement, experience and opportunities to engage in technological education. This consolidates the gender bias that technology is a skill and field men have a higher aptitude for.

## Gender Gap also in new technologies

Please think about digitisation now, and the use of new technologies in different areas of life. How do you feel about this in general?

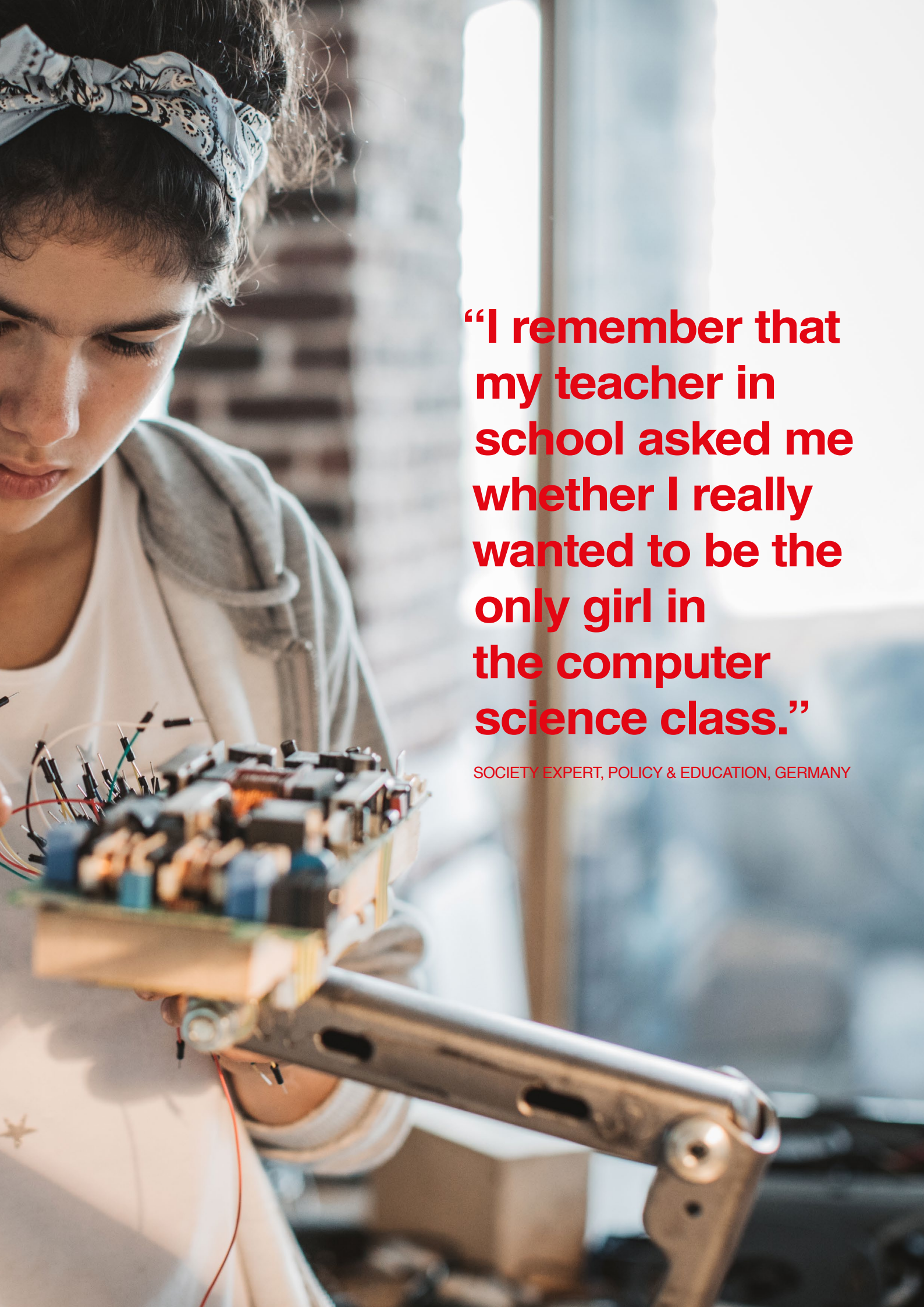


♀ More women are positive about digitisation in percentage points.



♂ More men are positive about digitisation in percentage points.

Fig. 4: Representation of Top-2-boxes – very positive / positive



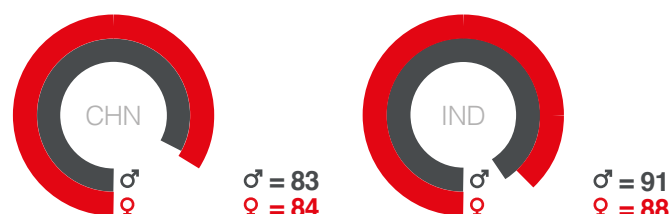
**“I remember that my teacher in school asked me whether I really wanted to be the only girl in the computer science class.”**

**SOCIETY EXPERT, POLICY & EDUCATION, GERMANY**

## In Asia, technology and digitisation empower and strengthen equality

For both China and India, no gender difference exists in attitudes towards digitisation. Both genders have a generally positive attitude towards digitisation and new technology. In India, technology has been seen as positively empowering women as it makes them generally more independent and stronger when it comes to autonomy in managing everyday life. Thanks to technical devices, their daily lives can be managed without the help of their husbands. Furthermore, India has more female role models in the tech industry.

In China, a high gender equality between men and women already exists; this is partially the result of the single-child-policy in the late 70s. Both women and men are equally integrated into society, forming similar cultural attitudes – including those towards technology.



Figures in percent.

## Women in the US and in Europe are less enthusiastic towards digitisation

In Europe and the USA, attitudes towards digitisation and new technologies differ by gender. Men tend to have a more positive view than women (Fig. 4).

# “I think

**this is because the gender equality, education opportunity, and working opportunity conditions are very good in China and there are many working women. I think there is little difference between the impacts of culture and society on men and women, hence the little difference between the opinions from men and women.”**

SOCIETY EXPERT, POLICY & EDUCATION, GERMANY

### 🎯 Key take aways

## Attitude towards digitisation

Attitudes towards digitisation differ highly between countries and genders. However, Asia seems to be an exception to this trend of attitude differentiation between genders, and almost no differences seem to exist.

Attitudes are influenced by five factors: digital literacy, respective level of industrial development, media discourse, cultural mindset and personal experience.

# Level of digital development

**What would be your personal definition of digitisation?**

INTERVIEWER

**Change.**

SOCIETY EXPERT,  
COMMUNICATION SCIENTIST, SWEDEN

This chapter looks at people's perceptions of digital development across countries. We are particularly interested in respondents' views of the status quo in the countries where they currently live and their perceptions of other countries. After these general observations, the chapter continues to examine digital development in specific policy areas, including public administration, education, security, and defence and transport among others. The presence (or lack) of necessary infrastructure, like fast broadband, is also comparatively explored. Surprising differences exist between countries regarding people's views of technological progress and necessary investments to support the digital revolution.

## More than two thirds of Chinese and Indian respondents evaluate their level of digitisation as advanced

In China, digitisation has tremendously changed people's everyday lives: it is very tangible for the respondents and rated as advanced (68%).

This phenomenon is similar for India. In the past, India was an underdeveloped country which was always fighting poverty, draughts, and other forms of (natural) catastrophes. The introduction of the smartphone and mobile Internet immensely simplified people's lives. It is therefore no surprise, that digitisation is evaluated very positively (68%). However, it should be noted that the average respondents in both countries are rather young and very connected.

## 80% of Swedes estimate their level of digital development as advanced; in Italy it is only 28%

When looking at perception of the level of digital development in their own country, large differences arise among respondents. Countries with the highest estimated level of development are Sweden (80%), followed by the USA (70%), and Asia (India and China, both 68%).

## European and US perception of digital development is less enthusiastic with Sweden being a great exception

As for the industrialised countries, especially in Europe and the USA, our hypothesis prevails: Digitisation is not having as much of an impact (anymore) as it (has) had in emerging countries.

Compared to the other industrialised countries in the study, Sweden has the most positive view of the level of their own digital development. That it is a frontrunner in digitisation has not just been confirmed by several international reports (e.g., the World Economic Forum Ranking in 2016) or highlighted by Swedish media, it can be also seen in the early adoption of tech in Swedish society, e.g., the home PC reform in 1998 which pushed Sweden to become the leader of digitisation. These factors might contribute to Swedish respondents' perception that their current degree of digitisation is very advanced (80%).

## Ubiquitous high quality Internet is still a rare commodity in the majority of countries

Despite variety in the current levels of digitisation, participants in the majority of the countries say that good-quality Internet is not available everywhere in their country (Fig. 7).

As highlighted by these results, digitisation should be understood as an ongoing process, and the number of Internet users does not necessarily correlate with the quality of the Internet. For example, 84% of Germans use the Internet, but about 2/3 say that the quality of the Internet infrastructure is improvable.

Especially in China, Italy, Spain, and Germany, the need for investment in digital infrastructure is clear. In contrast, Sweden has the lowest agreement ratings.

## Percentage of individuals using the Internet

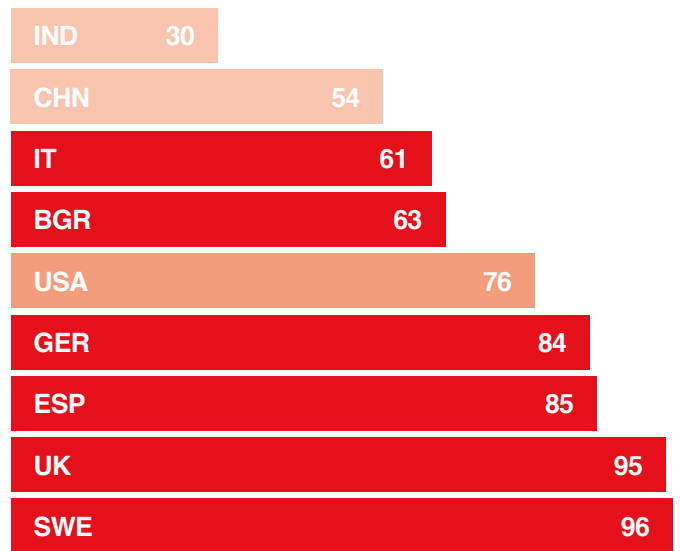


Fig. 6: State 2017; USA, UK, IND: state 2016; source: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

## In my country, good-quality Internet is not available everywhere

To what extent do you agree with this statement?

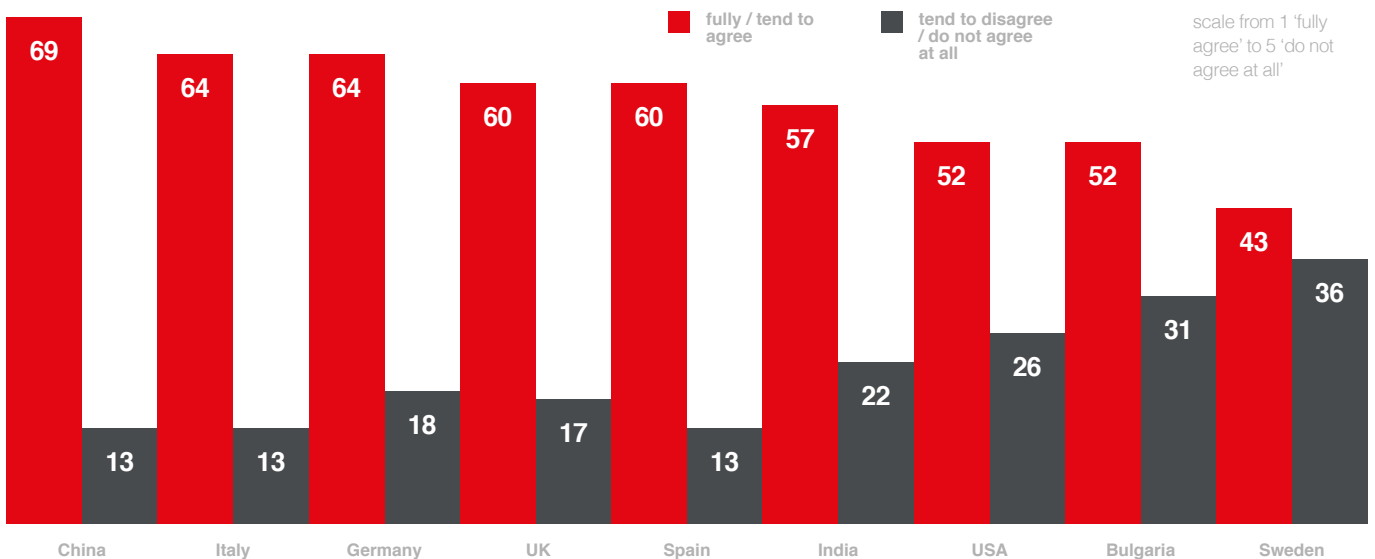


Fig. 7: State 2017; USA, UK, IND: state 2016; source: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

## Sweden sees itself as digitally advanced

Please think about the current situation in your country.  
How would you describe the current level of digital development?

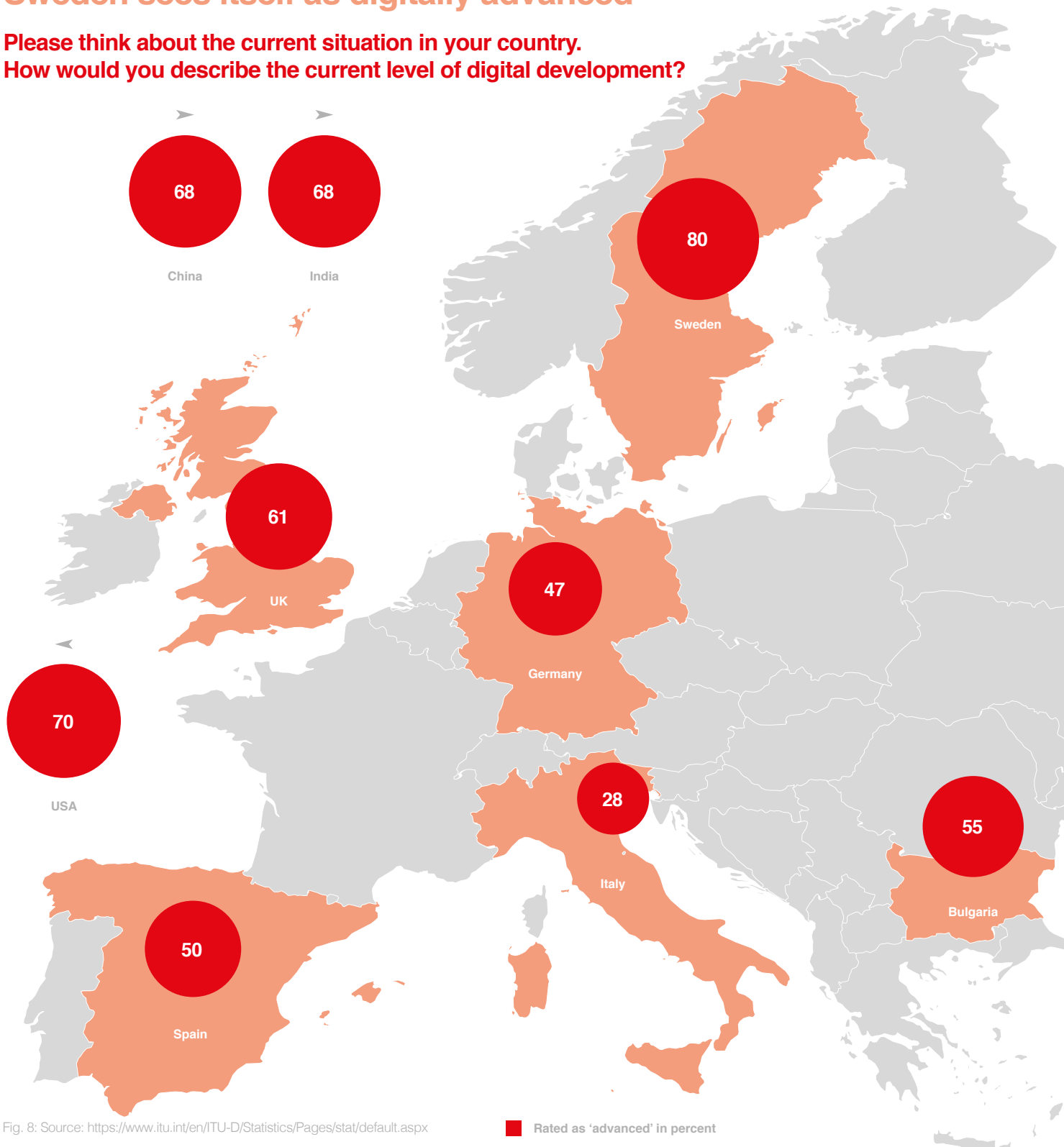


Fig. 8: Source: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>

■ Rated as 'advanced' in percent



**“If we think about the development of Silicon Valley it is obvious that we have a perception of our industries as old and less digital. We still work primarily with steel and automobiles.”**

GOVERNMENT EXPERT, CONSULTANT, ITALY



## “In e-health

**it has been said we are going to be world leader in 2025, and in the application of digital capabilities by 2030. That is the goal that the state has set up.”**

SOCIETY EXPERT, COMMUNICATION SCIENTIST, SWEDEN

## ‘Transport and mobility’, ‘health’ and ‘security and defence’ are the most progressive public areas in digitisation

The three areas considered most progressive are the ones that receive the highest media coverage: ‘transport and mobility’, ‘security and defence’, and ‘health sector’ (Fig. 10, p. 28). The topic most relevant for respondents, ‘transport and mobility’, is not only highly present in the media, but has also already started to transform big cities. Automated driving, for instance, has highly benefited the Chinese urban population. Analysing the data for ‘security and defence’, differences between countries’ progress in this sector become apparent. While in other countries, this sector is perceived as being rather advanced, perceptions lag behind in Germany, Bulgaria, and Italy: this could be the result of public awareness of data breaches and cyber attacks.

## Education and internal administrative processes of the government are the least progressive public areas

‘Education sector’ and especially ‘internal administrative processes of the government’ are rated as the least progressive public areas in terms of technological progress (Fig. 10). Digital education is not a sufficiently established

## “The US is still

**a very car dependent culture, so improving mobility would be a concern especially in our larger cities where they would be likely to implement these”**

SOCIETY EXPERT, ASSISTANT PROFESSOR, USA

subject in many schools; yet, universities often have a low speed of innovation, and focus on traditional curricula.

According to the experts interviewed, in most countries, the government is often perceived as an institution which limits digitisation through regulations. Furthermore, there is a perception that digital literacy among politicians is rather low, which affects the perception of the government as a whole. This is supported by the fact that, as outlined above, ‘security and defence’ is viewed critically in some of the countries.

## Divided Europe: Germany, Italy and Bulgaria lack progress in terms of public digitisation

Europe is again divided when it comes to the progress of digitisation (Fig. 8). Like the frontrunner Sweden, the UK and Spain consider themselves progressive, while Bulgaria, Germany, and Italy do not.

The biggest unfulfilled demand in Germany and Italy is for further progress in 'internal administrative processes of the government'. 'Security and defence' is considered least progressed in Bulgaria.

# “There is our

**Government Digital Service, which was established back in 2012 as one of the leaders in those types of circles. We are not actually doing too well now, given that Government Digital Service has lost lots of its powers to the various departments and ministries in the UK and is actually seen as quite a weak organisation and not able to bring this digital transformation and use of technology that we might have expected of it, say, five years ago.”**

SOCIETY EXPERT, POLICY ADVISOR, UK

# “People

**have an extremely negative attitude towards the people in the government, they fiercely dislike what is happening. [...] People are not sensing that something is being done. Things are changing, but very gradually, and it can't be felt.”**

INDUSTRY EXPERT, VIRTUAL REALITY,  
BULGARIA

**“We use smartphones to a greater extent in Sweden than in many other places. [...] It is also a result of reforms we had long ago, the home PC reform, that we still see consequences of today. [...] It has given people the sense that we are very much in the game.”**

SOCIETY EXPERT, COMMUNICATION SCIENTIST, SWEDEN



## Progress of digitisation in public areas

And how would you assess the progress of digitisation in the following public areas?

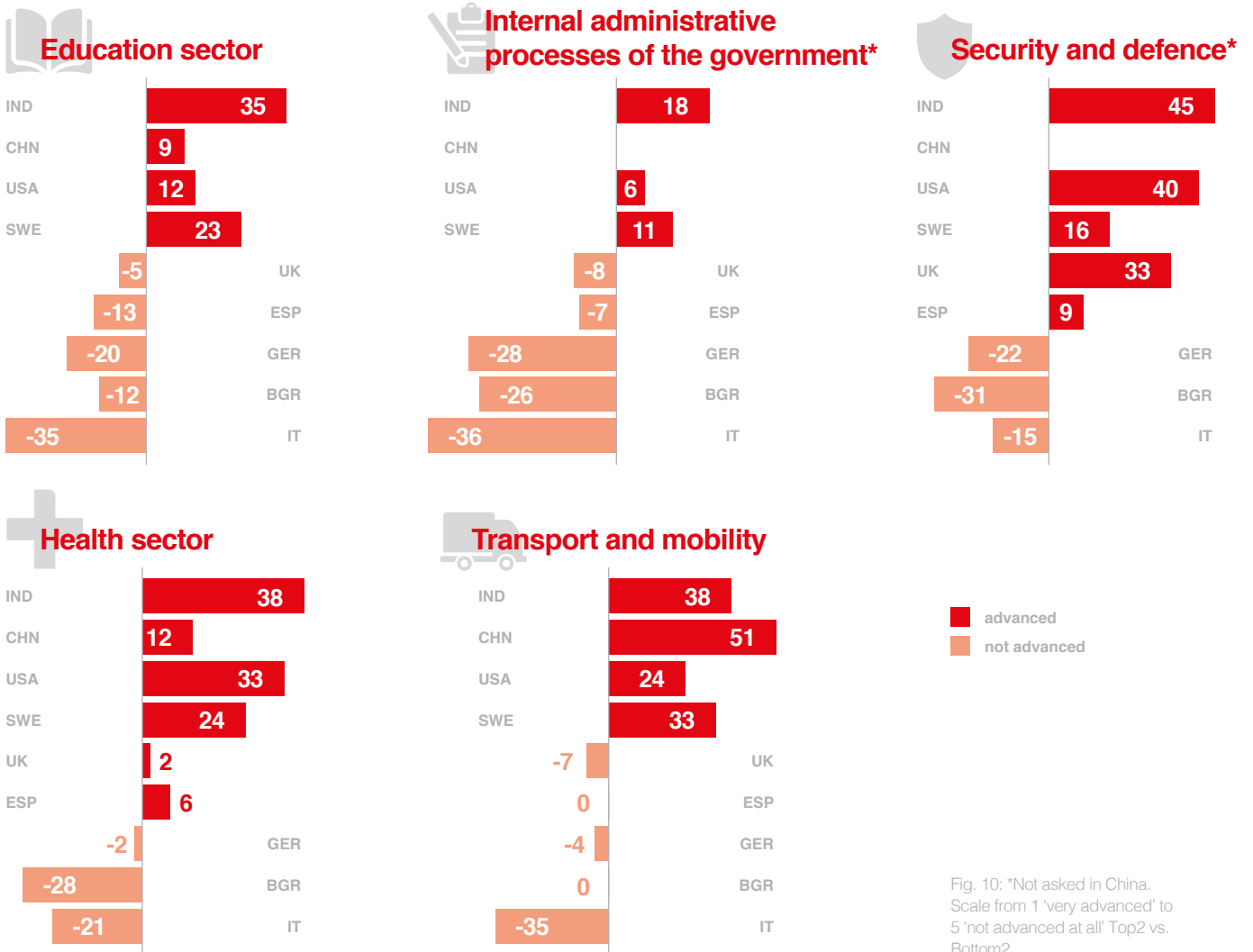


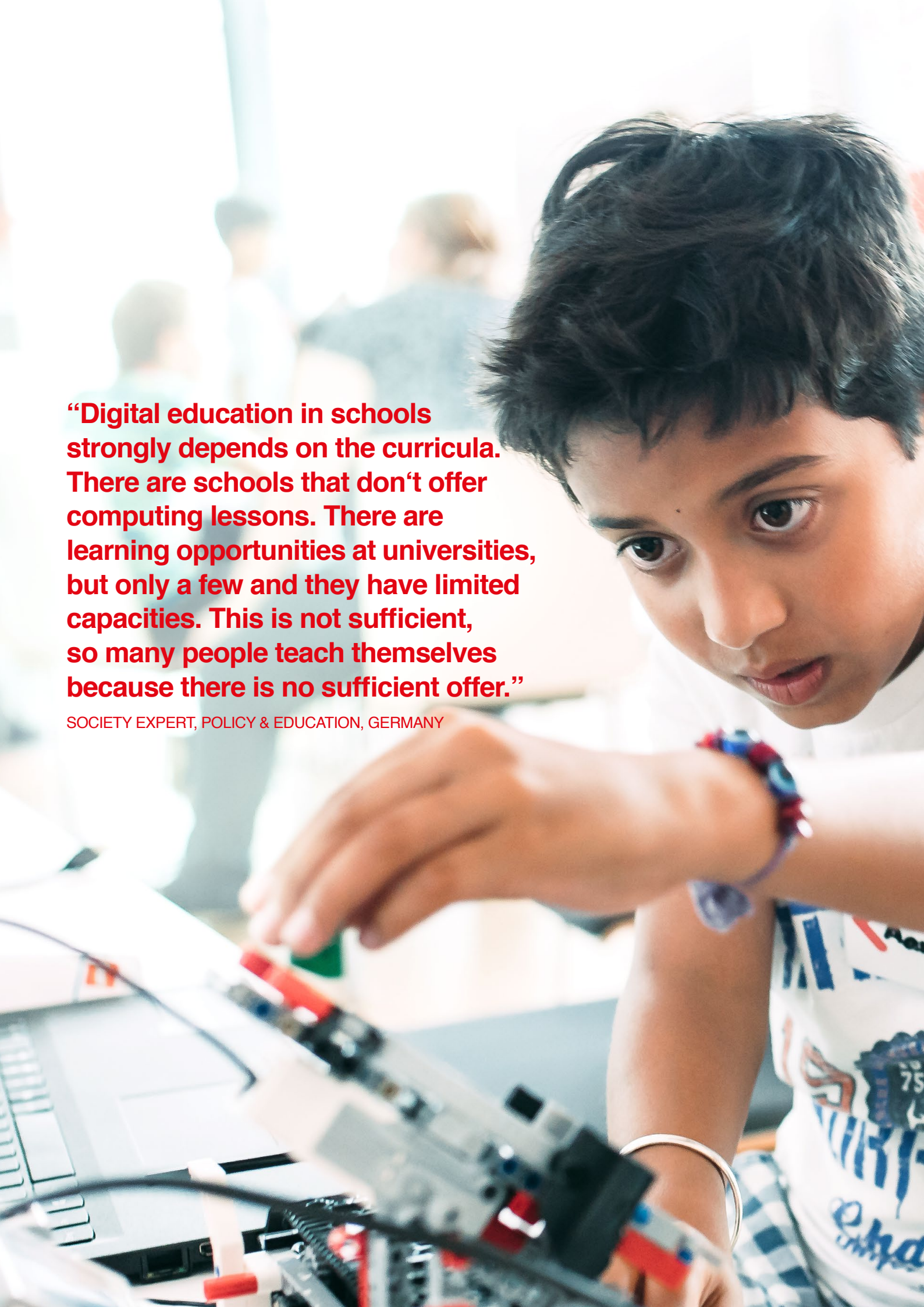
Fig. 10: \*Not asked in China. Scale from 1 'very advanced' to 5 'not advanced at all' Top2 vs. Bottom2.

### Key take aways

## Attitude towards digitisation

The level of digital development differs greatly between the countries (80% in Sweden vs. 28% in Italy). The infrastructure varies between countries: nationwide provision of high quality Internet is not given in the majority of the countries.

The areas of 'transport and mobility' as well as 'security and defence' are rated most progressive in terms of digitisation, while 'education sector' and 'internal administrative processes of the government' are rated least progressive.



**“Digital education in schools strongly depends on the curricula. There are schools that don’t offer computing lessons. There are learning opportunities at universities, but only a few and they have limited capacities. This is not sufficient, so many people teach themselves because there is no sufficient offer.”**

SOCIETY EXPERT, POLICY & EDUCATION, GERMANY

# Effects of digitisation and the use of new technologies

The following chapter will take a closer look at the potential people see in technology to solve some of the major social problems the world is currently facing. Respondents were asked to evaluate the impact of new mobility concepts and smart systems, which aim to tackle congestion and make cities more livable in the future. The survey also provides insights on how people view technology's role in making societies more resource efficient and reducing their environmental footprint. Apart from systemic social questions, this chapter explores more personal issues, such as people's perceptions of the role of technology in future interactions with health professionals and whether they are likely to permanently record and transmit health related data. Again, considerable variations between countries can be observed.

## **Sustainable use of resources is considered the key benefit of using new technologies for Europeans**

Digitisation and new technologies are increasingly being used in various areas of society (e.g. education, health, or housing). As such, the different effects of digitisation, whether positive or negative, may be evaluated differently by different individuals.

Across all countries, respondents view sustainability, 'saving of resources through the use of smart systems', as the greatest benefit of digitisation (Fig. 11). With 'improving mobility', it can be found among the top three greatest perceived benefits of each country.

For Europeans, in each country, saving resources is the number one survey response, and the greatest benefit of digitisation. Smart traffic systems are ranked 2nd or 3rd, comparatively.

In China, however, sustainability is among the top 3 benefits, but is not ranked first. Here, smart transport systems (top answer) are more important than saving resources (2nd choice).

In India and the USA, 'making everyday life more efficient through increasing networking' is viewed as the greatest benefit.

These results reflect current challenges and priorities by region. While mobility and traffic jams are an enormous challenge for China, Europeans are more concerned about resources for the future. The priorities for Indians and US citizens are achieving more efficiency by increasing networking.

## Saving resources, mobility, efficiency – the greatest benefits

Digitisation and new technologies are increasingly being used in various areas of society. In your opinion, what is the greatest benefit of using new technologies?

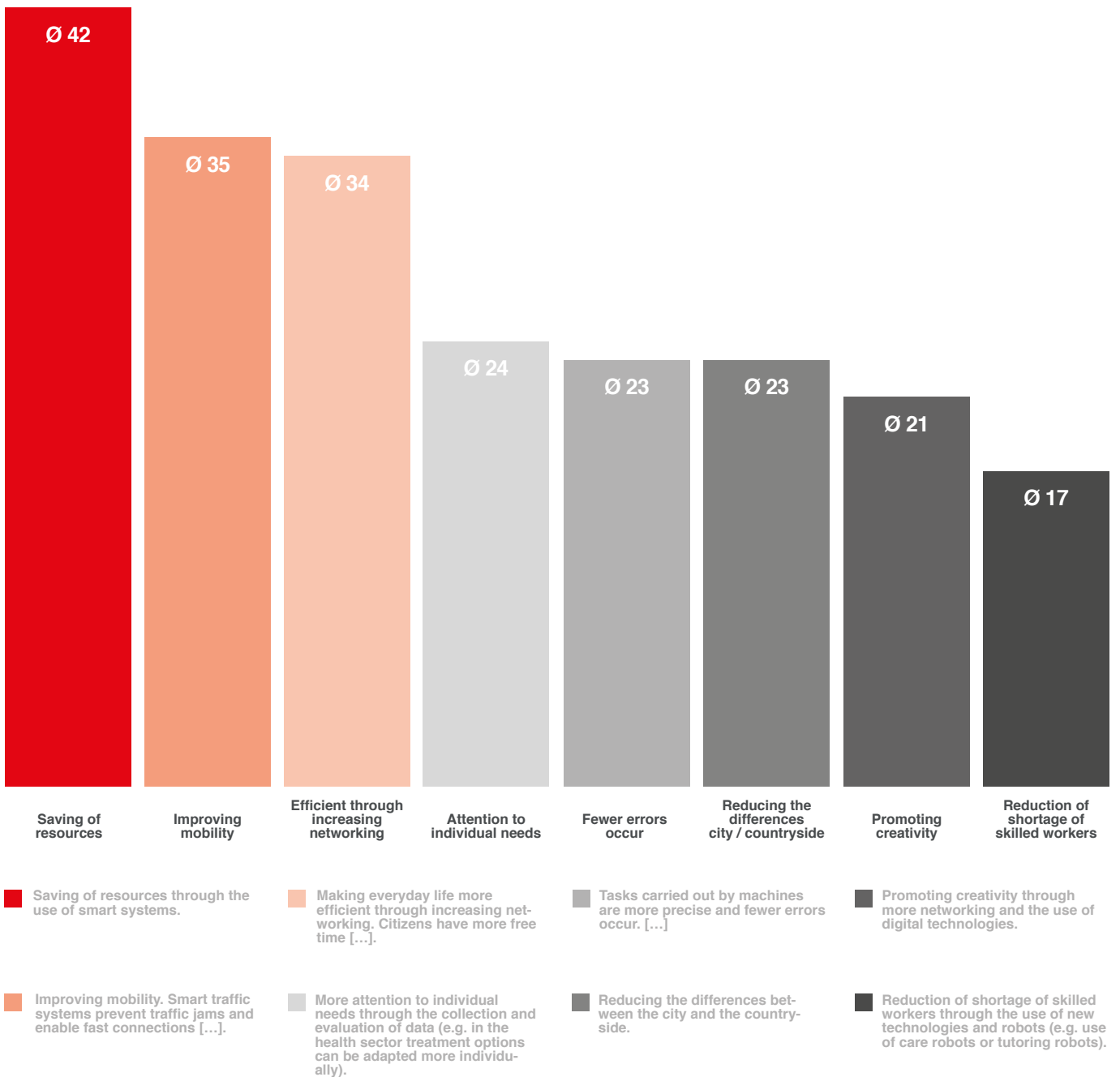



Fig. 11: Three answer options. Figures in percent. Ø = average value for BGR, CHN, ESP, GER, IND, IT, SWE, UK, USA



A woman with long brown hair is sitting on a high-speed train, looking towards the camera with a slight smile. She is wearing a black and white striped long-sleeved shirt. A black backpack is resting on the seat next to her. The train's interior features blue overhead lighting and a red and white striped pattern on the wall behind her. The text is overlaid on the left side of the image.

**“Ten years ago, we had to ride the old diesel-powered trains and it was hard to buy tickets. We have high-speed trains a decade later. The technology has changed a lot.”**

INDUSTRY EXPERT, DIGITAL EDUCATION, CHINA

# “I remember

Tencent once released a research report which mentioned that WeChat helps prolong [the elderly’s] socialisation time. WeChat also helps to connect family members. It is a way to pay back to the elderly.”

INDUSTRY EXPERT, CONSULTANT E-GOVERNANCE, CHINA

## In Asia, digitisation is seen as a door to the world for older people

Another benefit of using new technologies could be the increasing participation of older people in social life. There are clear cultural differences concerning this advantage. The majority of Asian participants assume that digitisation and future technologies enable older people to participate more in social life (Fig. 12).

Especially in China and India, which have large elderly populations and vast physical territories, social media platforms, such as WeChat, are believed to increase

social exchange between young and old. However, this optimism must be treated with caution. With a growing number of elderly citizens in China and changing family structures in which children tend to move out of their parents homes earlier, technology is not the all-round-solution to future problems for the elderly.

Furthermore, as outlined on page 8, the respondent from China and India tended to be younger than the average age of persons in their countries. Respondents are speaking about a share of the population, i.e., the elderly, which they are not a part of themselves.

Compared to Asia, the USA and Europe are more sceptical about the benefit of digitisation for older people. However, about four out of ten in the USA and Spain

## Digitisation and future technologies enable older people to participate more in social life

Digitisation and future technologies have an influence on different areas of life. To what extent do you agree with the following statements?

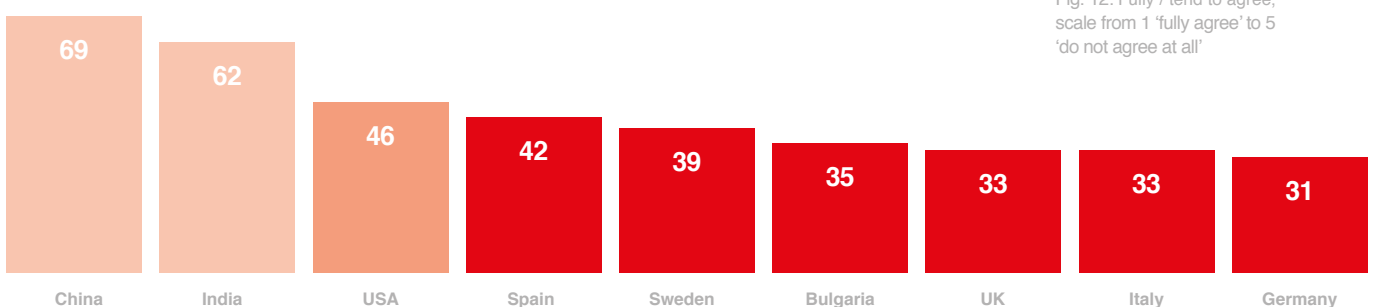


Fig. 12: Fully / tend to agree, scale from 1 'fully agree' to 5 'do not agree at all'

# “Last year our

parliament was [cyber] attacked, and it was quite horrendous. And people are worried about that. It is a lot of work and it costs a lot of money. And firms do get attacked. It is a significant issue. It is also in the media – lots of things about cyber-attacks, and cyber-attacks often mean individual’s own personal data being stolen.”

SOCIETY EXPERT, SOCIAL SCIENTIST, UK

agree that digitisation and future technologies can help in participation in social life. Ratings of the remaining European countries are much lower. In Germany, more participants disagree with that statement than agree.

## Cyber attacks are the greatest fear for half of the respondents

There is still controversy about whether the use of new technologies in society brings more advantages than disadvantages. Of these disadvantages or dangers, participants are most worried about cyber attacks (Fig. 13). More than other citizens, Swedes, followed by British

citizens, identify this as the greatest danger. In every country, cyber attacks are among the top three answers, likely because this issue has been steadily highlighted by global media.

On an international level, the second biggest perceived danger is loss of jobs resulting from the adoption and use of robots and new technologies. British citizens, followed by US-citizens, are most worried about this possibility. This issue is not only discussed in local media, but is also an issue that political programs seek to address.

In Germany, the most stable economy in Europe, technological fears can be traced back to the historical trauma of surveillance in the former GDR.

## Cyber attacks and job losses – the greatest dangers

There is still controversy about whether the use of new technologies in society brings more advantages than disadvantages. What do you think is the greatest danger?

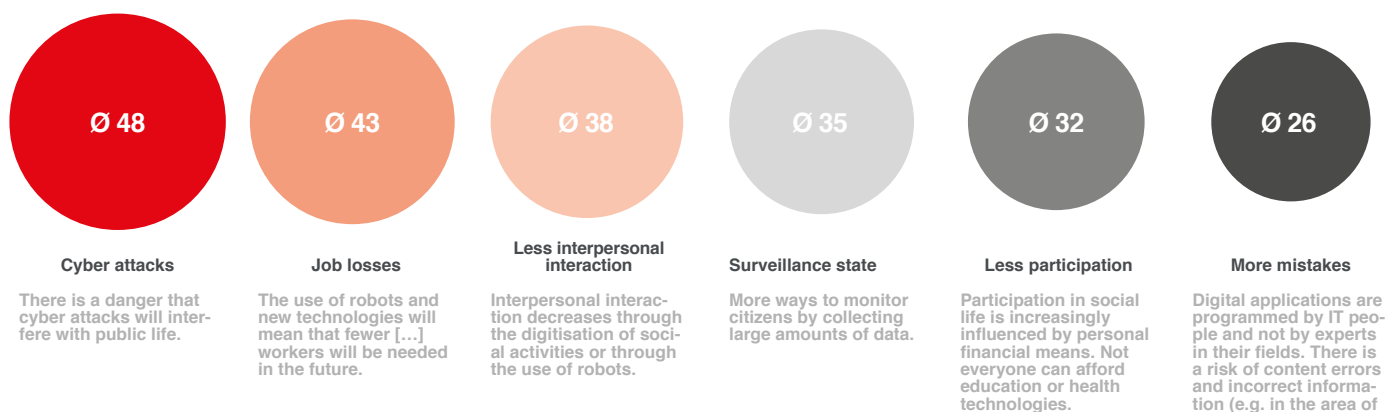


Fig. 13: Three answer options. Figures in percent. Ø = average value for BGR, CHN, ESP, GER, IND, IT, SWE, UK, USA

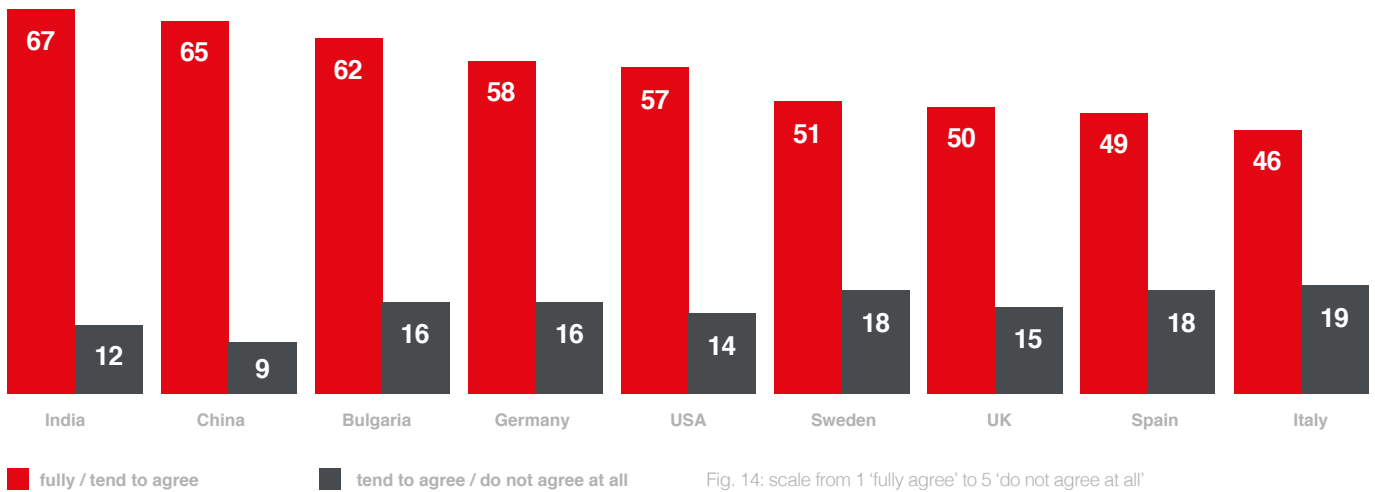
# “The lack

of real knowledge about what artificial intelligence actually is and the fear, because it is something which is not familiar, lead people to agree with this statement.”

GOVERNMENT EXPERT, LEGAL HEALTH, BULGARIA

## People being controlled by machines

Digitisation and future technologies have an influence on different areas of life. To what extent do you agree with the following statements?



## More than half of the respondents fear being controlled by machines in the future

Internationally, the public believes that, digitisation and future technologies lead to people being controlled in the future by computers or self-learning algorithms that make decisions' (Fig. 14). Again, India and China agree the most. Within the EU, ratings differ on a national level. Bulgaria, followed by Germany, has the highest level of agreement. Spain and Italy agree least with the statement.

Fear of losing control by means of the growing power of artificial intelligence (AI) appears to be growing from two sources: lack of knowledge and negative media portrayals across all countries surveyed. The sci-fi nightmare of robot domination over humans has been used by news cycles whenever possible, e.g., Sophia the robot saying on Twitter that she will destroy all humans or Google's Alpha Go AI beating the world's best Go player. Furthermore, the lack of understanding and knowledge on digitisation, as chapter 1 shows, point to a lack of understanding about the process underlying AI. In turn, the lack of tangible footprints that comprise AI lead to it being feared.

**“Lower paid people are starting to worry now, because you can see the automation and digitisation of some of these: like the warehouses, and things like that. It is happening at this moment.”**

SOCIETY EXPERT, SOCIAL SCIENTIST, UK



# “In big cities,

**traffic issues are the particular headache of many. However, the usage of navigational software, artificial intelligence traffic management systems, etc., can really help to ease this real stress that we face in our lives.”**

SOCIETY EXPERT, RESEARCH FELLOW, CHINA

## DNA modification is an option for 32 percent of Chinese respondents

When asked about future health opportunities, the majority of countries prefer traditional health opportunities and regular doctor's visits (Fig. 15, scenario 1). This is most true for Germany and the USA. China is the only exception. However, given the challenges of the Chinese health care system and the difficulties of consulting doctors there, this is not surprising.

On an international level, the highest acceptance for future health innovations regards the willingness of individuals to, disclose personal data and have it analysed' (scenario 2). Chinese respondents and Indians have the highest willingness to use this health innovation. In Europe or the USA, only one of three or less take this health innovation into account.

The use of telemedicine (scenario 3) and the willingness to modify one's own DNA (scenario 4) have the lowest ratings across all countries. However, more than one third of the Chinese respondents are open to these scenarios. The main reason for this high acceptance lies in the current infrastructure and health system in China. There are almost no medical clinics: doctor's visits have to be made to crowded hospitals and waiting times are long. The use of telemedicine would ease this problem. Furthermore, expenses for doctor's consultations and medicine can be extremely high in China, which explains why almost one third of the respondents would accept DNA modification to make health checks obsolete.

By contrast, the advocacy of telemedicine and DNA modification on an international level is very limited. For example, in Germany only about one out of ten say that they would consider these health opportunities. Here, Western countries are more rational and consider the limits and disadvantages of technological possibilities.

## Participants are more open to future smart city technologies than to health innovations

The respondents had to evaluate four different scenarios (Fig. 16). The acceptance of street lamps with high energy-saving potentials (scenario 1) is the highest for all countries.

The highest acceptance rates are in Asia and Bulgaria. Germany and the US are most sceptical concerning smart city innovations. Acceptance is higher the clearer the benefit that is outlined and the more transparently it is communicated which kind of data is used for what purpose.

Compared to future health innovations, participants are generally more open to future smart city scenarios. The main reason lies in their tangibility – future health scenarios seem to be further away and therefore more difficult to imagine. Smart city scenarios, however, have already partly been implemented in many countries. Furthermore, acceptance also depends on the kind of data which will be collected in this context – the more personal the data, the higher the rejection of the scenario.

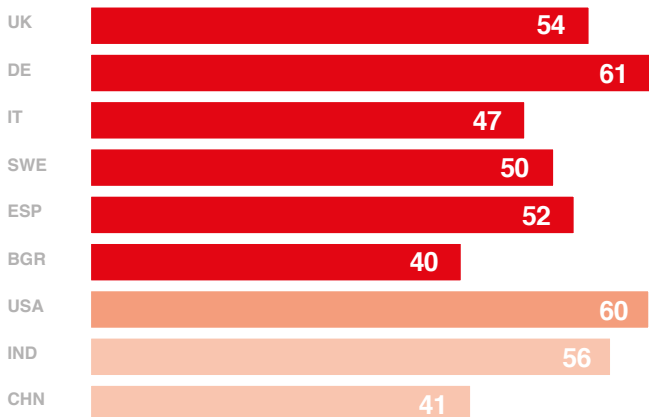
## Health

You have decided to take more care, also in the long term, of your health and have it checked regularly. To achieve this goal, which of the following options would you consider?



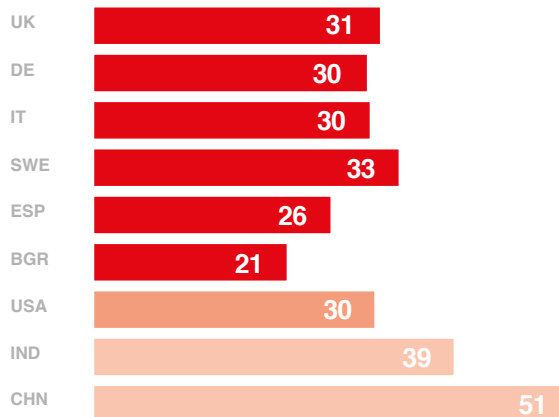
### Family doctor

I would go regularly to my family doctor [...] talking with the doctor in person are more important to me than the use of new technologies.



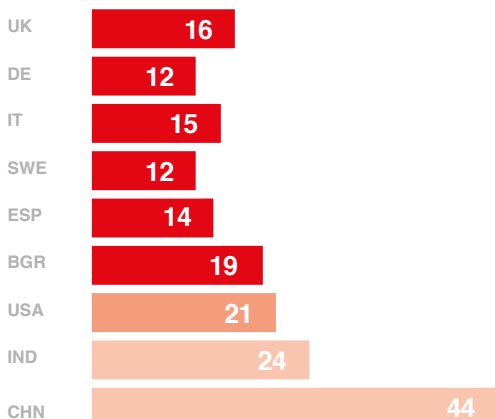
### Disclose personal data

I would be willing to disclose personal data and have it analysed if it would give me a more specific diagnosis of my condition [...].



### Telemedicine

If I would use telemedicine: without actually seeing the doctor in person, I would have myself examined remotely under the guidance of a doctor.



### Modified DNA

I would have my DNA modified to make me immune to bacteria and viruses. Health checks would therefore no longer be necessary.

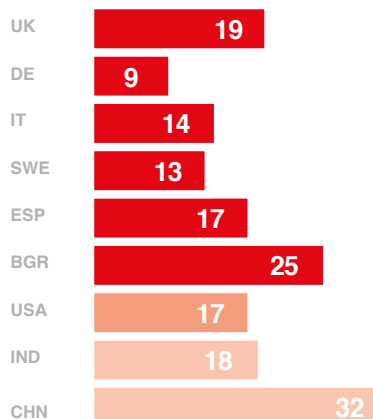


Fig. 15: Figures in percent.

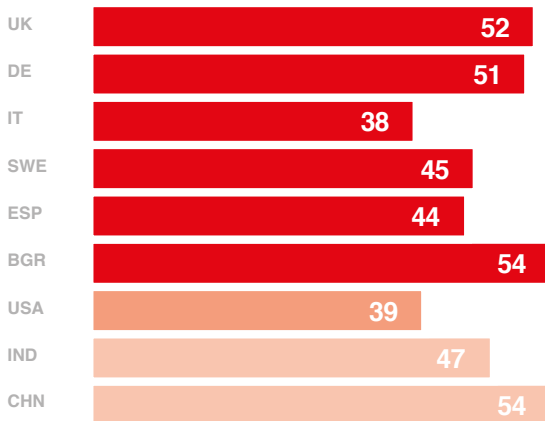
## Smart City

Many technologies can also be used to modernise existing cities to become smart cities. Which options in a smart city would you advocate?



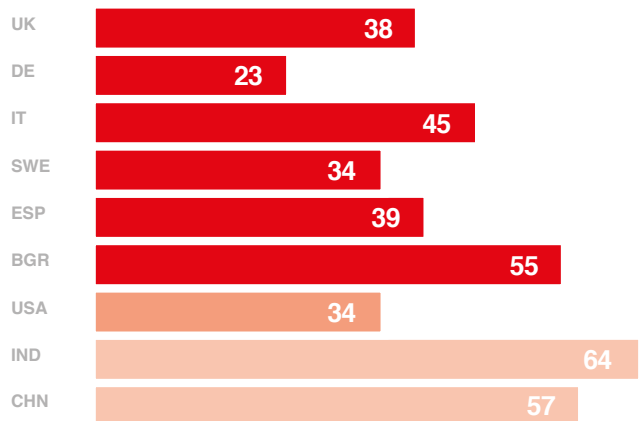
### Street lamps

Street lamps of the future will only come on where there is movement and demand. This can save energy.



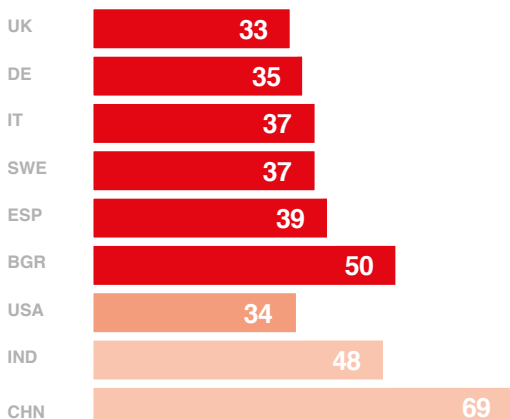
### Lowered energy consumption

In Smart Cities, detailed data on energy consumption is collected with the help of smart meters and sensors in private households. All private data is collected and analysed in order to determine individual potentials for energy saving.



### Autonomous cars

Autonomous cars are the future. They are networked and produce data. This is analysed in order to improve the transport infrastructure and increase driving safety. This means less traffic jams and more safety in the future.



### Collected data

All data collected by city councils are anonymously accessible to the public. On this basis, new, more efficient services and business models are created.

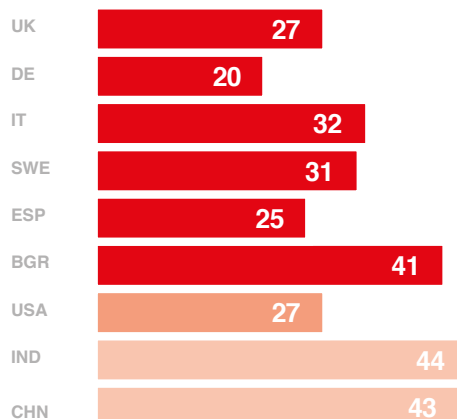


Fig. 16: Figures in percent.



**“We had to draw**

**conclusions from history. It can have consequences that one is not yet able to estimate.”**

SOCIETY EXPERT, POLICY & EDUCATION, GERMANY

**“People are afraid**

**of AI, but are cool with autonomous driving. Through brands such as Tesla, they can imagine it.”**

GOVERNMENT EXPERT, SOCIAL SCIENTIST, GERMANY

**“As long as it solves**

**their problem, the Chinese are not sensitive about personal data and privacy protection, and they are not sceptical about new technology.”**

GOVERNMENT EXPERT, CONSULTANT E-GOVERNANCE, CHINA

## 🎯 Key take aways

### Effects of digitisation

The greatest perceived benefit of digitisation and new technologies in Europe is sustainability. In Asia, smart transport systems are more relevant since they address an urgent problem.

Cyber attacks are ranked as the greatest danger resulting from digitisation. This is no surprise given the variety of cyber threats continuously discussed in the media.

Future smart city technologies have a higher acceptance and are perceived as greater digitisation benefits than health innovation. This is because the data necessary for smart city scenarios are less sensitive and the scenarios themselves more tangible.

# Additional findings

## Asia and Bulgaria are most dissatisfied with the amount of online content

Across all countries, regional differences become obvious. English speaking regions like the UK and the USA say there is sufficient content in their local language available online (Fig. 19). Less than one out of five in these countries has a different view. In a similar vein, participants from Europe (except Bulgaria) are also satisfied with the amount of online content in their local language. On average, one in four is impatient with the available online content.

In Asia and Bulgaria by contrast, more participants are dissatisfied with the amount of online content than satisfied.

Looking across the findings, we can see that the availability of sufficient online content in the local language is not linked to the amount of Internet users per country (Fig. 18). For example, in China there are 750 million Internet users (22% of the world's Internet users), which makes it the biggest group of Internet users in world. Nevertheless, about one out of three Chinese respondents thinks there isn't sufficient content available online in their local language.

In India, language plays an important role in the use of the Internet. 22 official languages are recognized in this country. Of the total number of Internet users in India, 43% are English Internet users and 57% are Indian language users (Fig. 17). It is clear that multilingualism can also be a barrier in terms of the sufficiency of online content in the local language.

## Terms of service agreements read in more detail in Asia and the USA than in Europe

About one in three Asians say that they read terms of service agreements in detail (Fig. 20). In India, the number of respondents reading in detail is the highest across all answer options.

With the exception of China, in each country the number of participants who skim the terms of service conditions quickly is the highest relative to other options.

On average across all countries, one in four say that they click on 'agree' to get access without reading the terms of service conditions.

Generally, the findings show that most countries treat service agreements seriously.

## Internet users in India

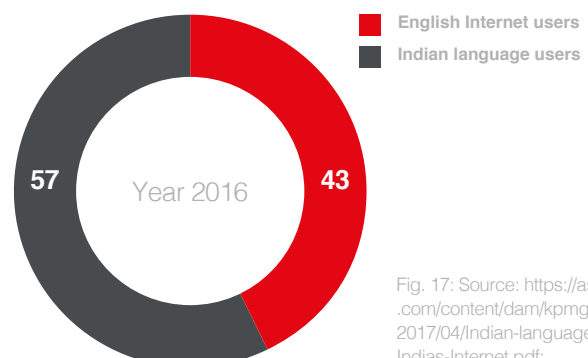


Fig. 17: Source: <https://assets.kpmg.com/content/dam/kpmg/in/pdf/2017/04/Indian-languages-Defining-Indias-Internet.pdf>;

## Number of Internet users in millions. Total number of Internet users: 3385 Million

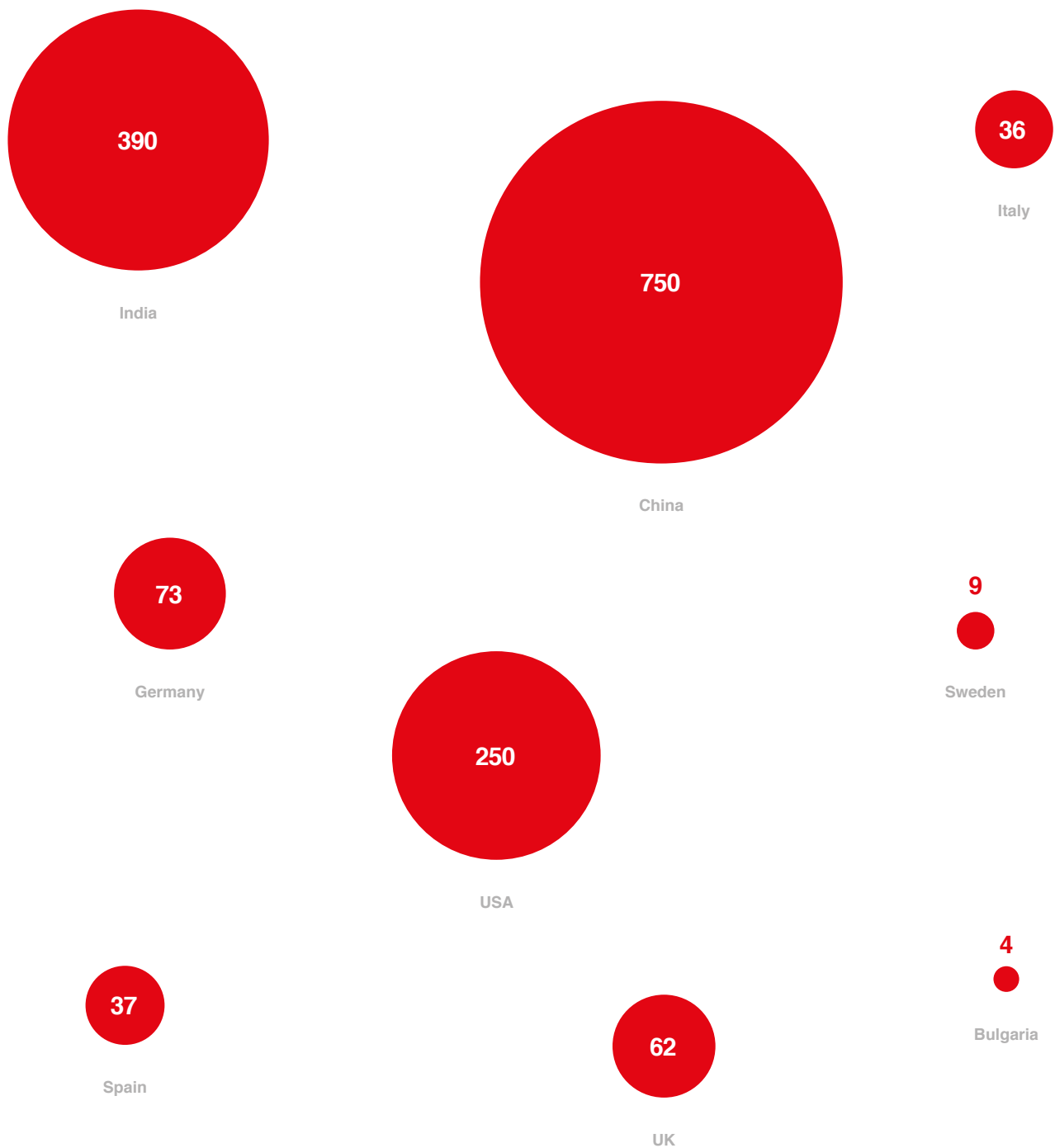


Fig. 18: Source: <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/treemap.aspx>

## There isn't sufficient content in my language available online

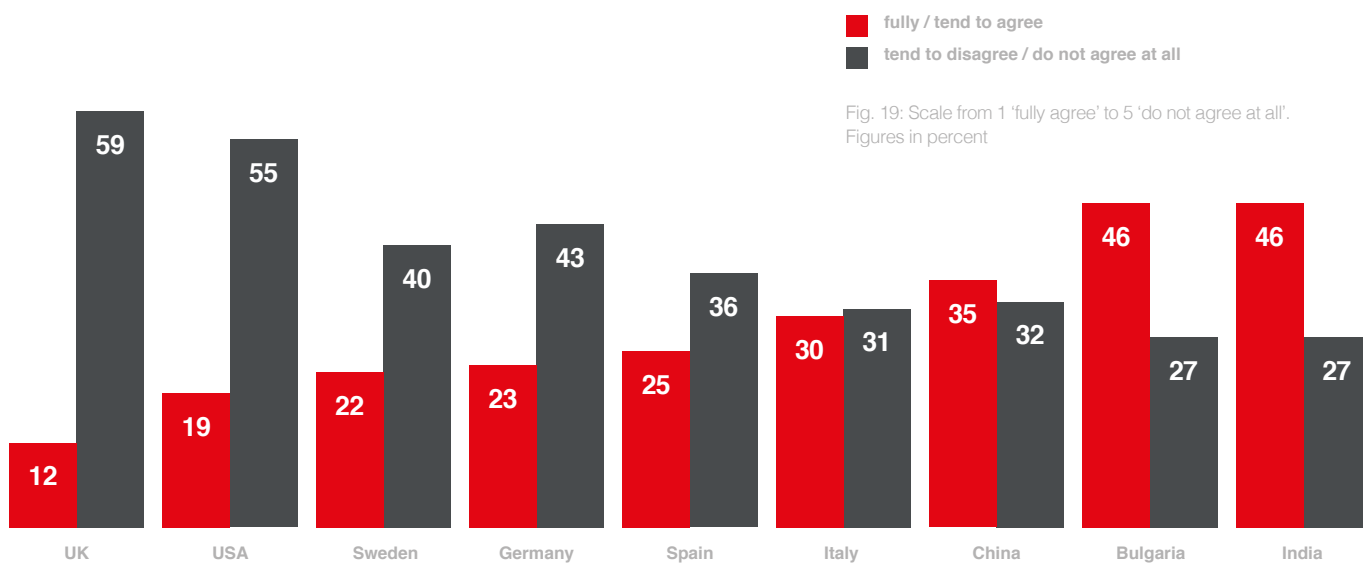


Fig. 19: Scale from 1 'fully agree' to 5 'do not agree at all'. Figures in percent

## How intensively do you usually read the terms of service agreement?

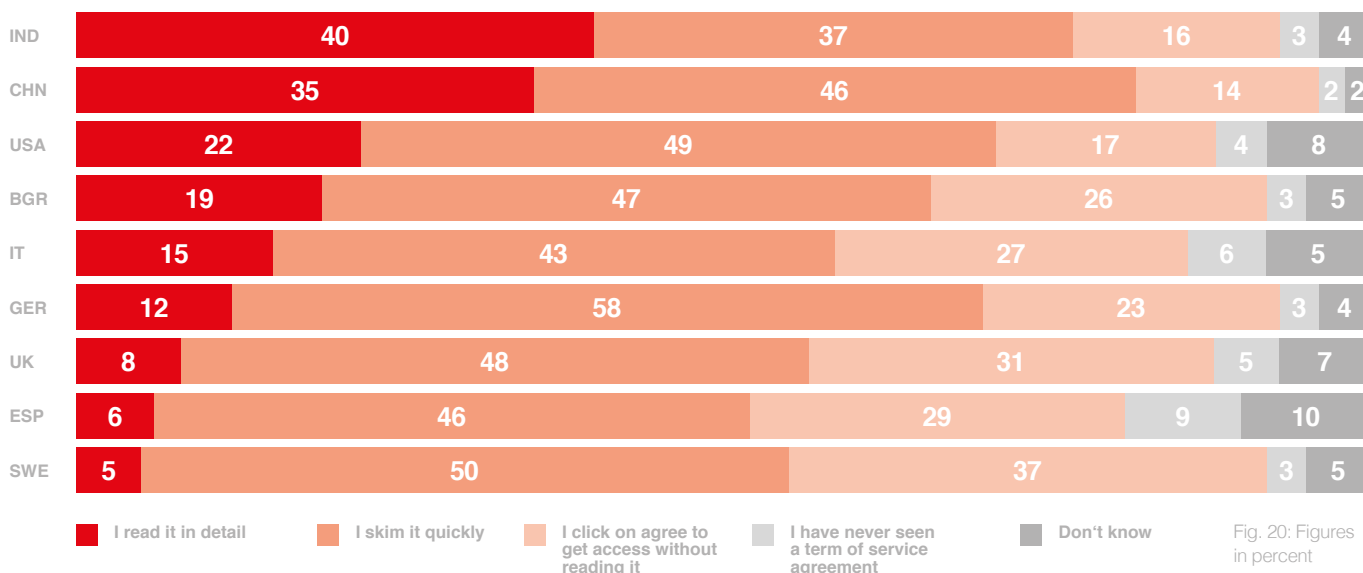


Fig. 20: Figures in percent



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