



Federal Ministry  
for Economic Affairs  
and Energy

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# DIGITAL Economy Monitoring Report 2018

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*Compact*



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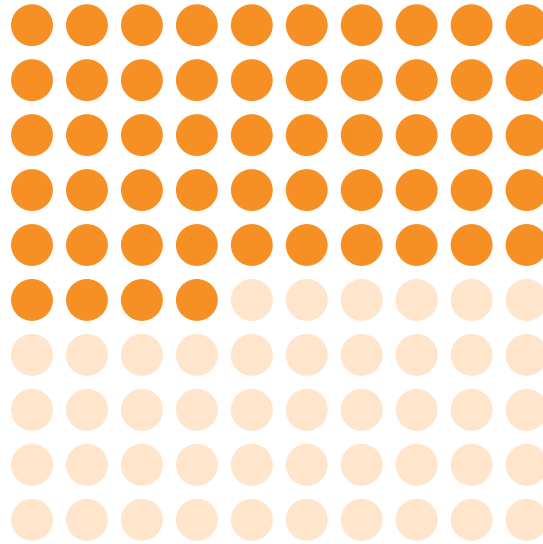
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# The 2018 DIGITAL Economy Index

The DIGITAL Economy Index provides a number to show the level of digitalisation in the German economy. It is based on a survey of high-ranking decision-makers from 1,061 businesses. Three aspects are incorporated in the economy index: the use of digital devices, the state of internal company digitalisation, and the effect of digitalisation on the company.

Index (total):  
**54** Points



## Stationary terminals



81.6%

## Use

More than half of employees use:

## Mobile terminals



50.7%

## Digital services

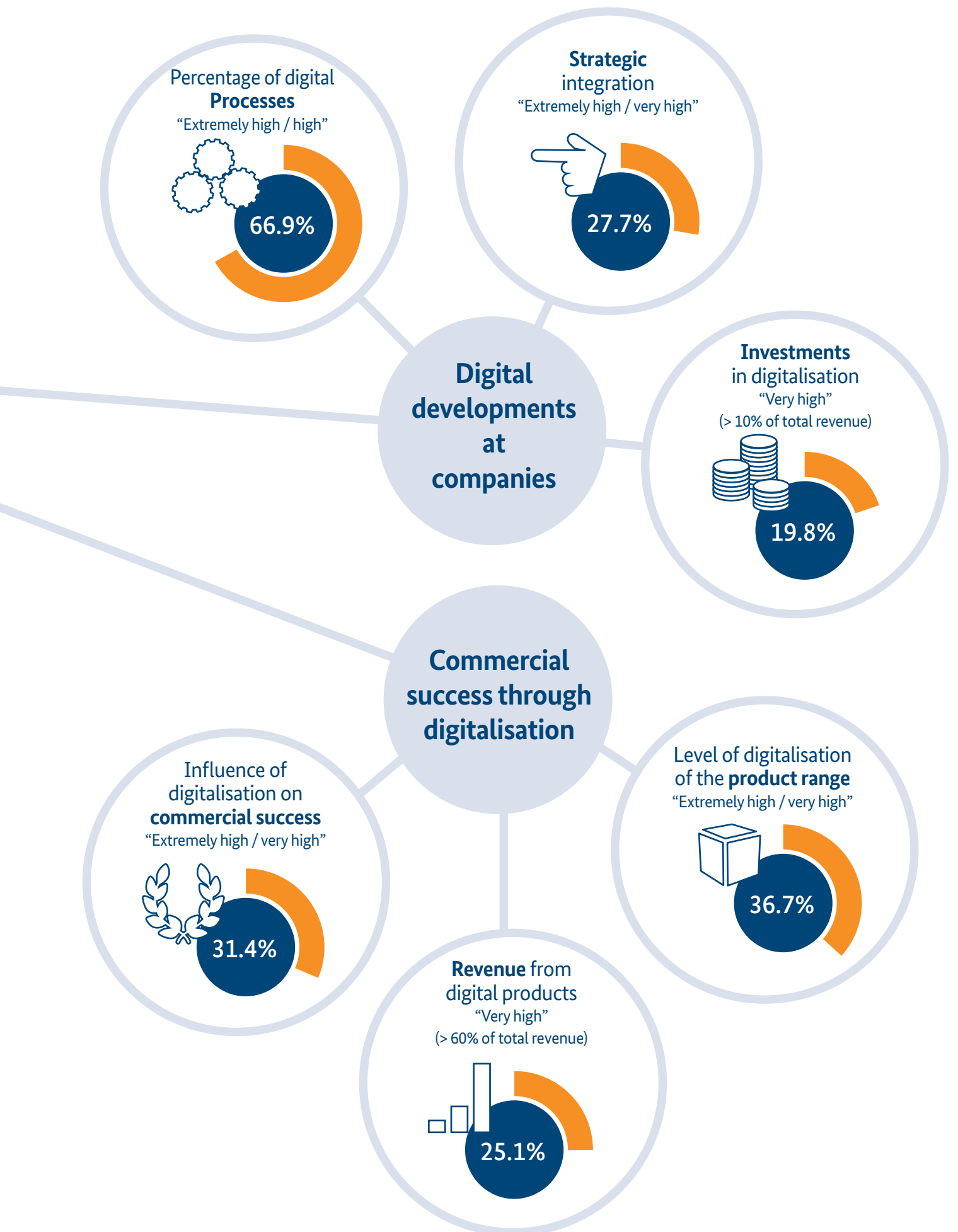


26.3%

## Digital infrastructures



72.6%



# The level of digitalisation remains stable

## Commercial sectors are developing in opposite directions

The DIGITAL Economy Index score, which sums up the digitalisation of the German economy in a number, was 54 points (out of a possible 100) in 2018 - the same as the previous year.

A closer analysis of the factors the index is based shows that, in some sectors of the economy, years of digital

progress and associated investments are being followed by a period of consolidation. In addition, the focus of digitalisation has shifted. While in the past, it was the service sector that was making significant progress in terms of digitalisation, it is now the turn of the industrial sector.



Stefan Beck, CIO BASF Group

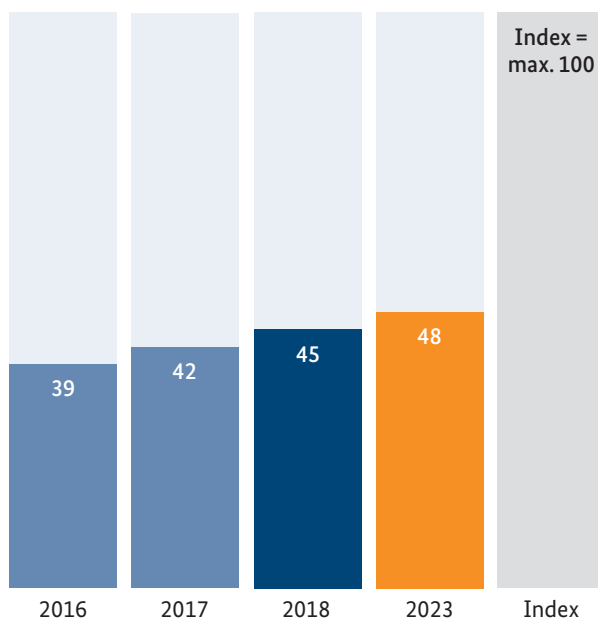
*“The world around us is moving forward with digitalisation. We must become faster and streamlined in Germany in order to keep up.”*

### Reversal of digital trends in industry

The digitalisation index of German industrial companies has improved significantly since 2016: from 39 points to its current level of 45 points.

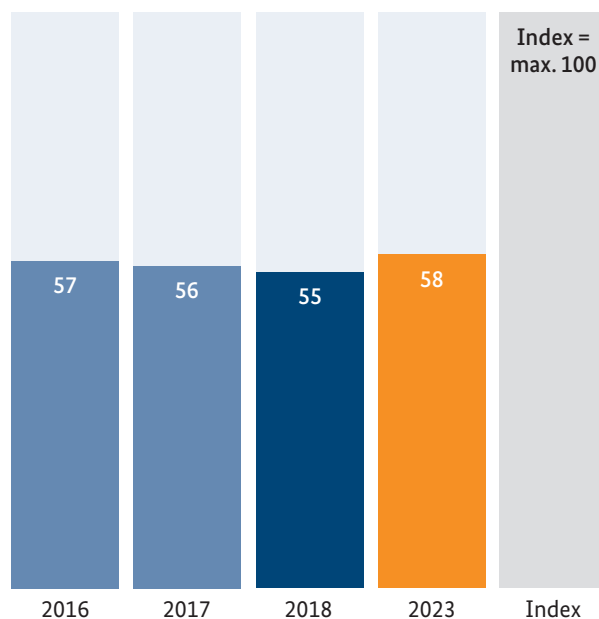
In terms of both the use of stationary and mobile digital devices, and the use of digital infrastructures (such as the internet and intranet), industrial companies are improving. The improvements are also clear with regard to internal processes. In 2016, only 46% of industrial companies said they had highly digitalised internal processes; in 2018, this has increased to 58%. With regard to digitalisation, industry has reversed a trend. In 2016, almost half of all industrial companies indicated (48%) that they considered digitalisation unnecessary. That figure is now only 29%.

## Increased digitalisation in industry



Development of digitalisation. ■ = Forecast

## Consolidation among service providers



Development of digitalisation. ■ = Forecast

### Level of digitalisation among service providers remains above average

Service companies had already reached an above average level of digitalisation by 2016. The slight decline, from 57 points then to 55 now, can be explained by the fact that this sector of the economy has already dealt with a lot of digitalisation tasks. As a result, 90% of the most digitalised businesses - the so-called “digital pioneers” - are service providers (see page 8).

Because of what they have already achieved, digitalisation is no longer of such strategic importance for these companies. In fact, 30% of service providers

still consider digitalisation a key strategic issue in 2018. However, the proportion of businesses that attribute such importance to it has fallen by six percentage points since 2016. Overall, the development of digitalisation in the service sector can best be described as consolidation at a high level.

### Cautiously optimistic forecast

Overall, German companies expect the digitalisation index to improve by two points to 56 points by 2023. Companies were significantly more optimistic in recent years and had forecast increases of up to four points.

## Current digitalisation trends

The DIGITAL Economy Index is based on three pillars: the importance of digitalisation in general and for a company's individual success, the state of digitalisation within a company, and the use of digital technologies

(see page 4). But where are the positive and negative developments happening? Where is there a phase of consolidation? Here is a selection of interesting trends compared to the previous year:



The percentage of companies that consider digitalisation to be important or very important in general has increased significantly in 2018 compared to the previous year - by around 10 percentage points - and now stands at 46%.

The influence that digitalisation has on the success of their own company is also rated as very or extremely strong much more frequently this year than in the previous year. In 2017, just under a quarter of companies attached such high importance to digitalisation (to be precise: 24%). In 2018, this percentage had increased to almost a third (32%).



The percentage of companies that generated more than 60% of their revenue through digital products and services was 25% in 2018, and is, therefore, currently very stable (one percentage point higher than in the previous year).

However, the percentage of companies that give themselves very good marks in terms of digitalisation shows an almost constant, slightly upward trend: 37% say that their product and service portfolio is very or extremely highly digitalised (previous year: 36%).



The proportion of companies at which more than half of employees use digital services professionally has fallen by five percentage points to 26% within a year. Digital services include, for example, cloud computing and big data applications, as well as messenger services. 37% are satisfied with their company's current level of digitalisation - four percentage points fewer than in 2017. Consequently, the decision-makers surveyed see an increasing need for action.

# One company in four is still having difficulties with digitization

Approximately 7.7% of the service sector demonstrates high digital competence

Slightly fewer than seven per cent of companies in Germany are considered “digital pioneers”. They possess a very high degree of digitization (between 81 and 100 points). Just under one company in three can be attributed to the next category, the “digitally advanced”. They reach the economic index DIGITAL of between 61 and 80 points. The “digital midfield” with its approx. 34 per cent is somewhat larger (index: 41 to 60 points). By way of contrast, more than one company in four is struggling with digitization: 19 per cent are still “digital beginners” (digitization between 21 and 40 points). Almost eight per cent of companies – the so-called “digital laggards” – have so far largely ignored the achievements of digitization.

Particularly clear differences can be seen in the comparison between the industrial and service sectors: For example, seven per cent of all service companies are “digital pioneers”, while only two per cent of industrial companies belong to this category.

The largest share of industrial enterprises with almost 40 per cent belongs into the “digital midfield” (digitization index between 41 and 60 points), while the largest share of service providers with 34 per cent can be found among the “digitally advanced” (61 to 80 points).

The two groups of companies with the lowest level of digitization include twelve per cent (“digital laggards”) and 26 per cent (“digital beginners”) of industrial companies. On the other hand, only seven per cent of the service providers are attributed to the “digital laggard” and 18 per cent to the “digital beginners” category.

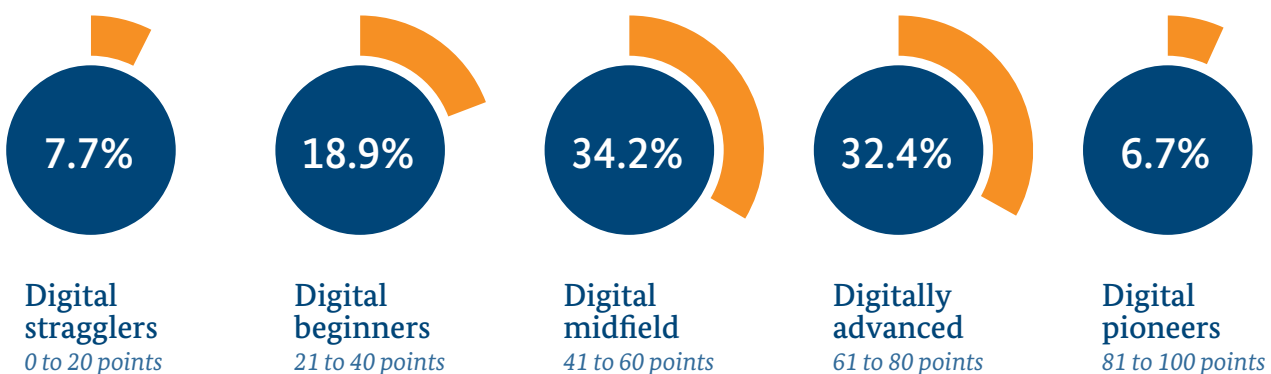


*Martin Hölz, thyssenkrupp AG, CIO*

*“In German industry, investments in digitalisation projects have increased significantly in the last year. However, with regard to the concrete implementation of completely new business models, we are still just getting started.”*

The distribution of digitization categories across the two major sectors of the economy reveals that industry still has some catching up to do with respect to digitization (see page 6), whereas service providers, on average, have already achieved a higher level of digitization.

Almost 40% of all companies are digital pioneers or digitally advanced



Business categories by level of digitalisation



# Digitalisation push in financial and insurance service providers

## Sector-by-sector overview of status and forecasts

The ICT sector (information and communications technology) remains - as you would expect - a pioneer of digitalisation. In 2018, it achieved a DIGITAL Economy Index score of 74 points, which was 20 points above the average for all companies in the commercial sector. In the next five years, the level of digitalisation in the ICT sector is expected to increase by a further three points.

Financial and insurance companies, which currently rank third in the sector-by-sector ranking, are expecting a significant digitalisation push. They expect an increase of eight points to 69 by 2023. If their forecast is correct, the finance and insurance sector would overtake the knowledge-based service sector (for example, management consultancies, market research institutes and the media industry) and move up to second place in the sector-by-sector ranking.

At 54 points, the level of digitalisation among retailers was at exactly the average for all companies in the commercial sector. The sector is cautious about further digitalisation projects. They do not expect any significant progress in the next five years.

In the same period, the mechanical engineering sector expects a moderate increase in digitalisation (up two to 50 points), which would mean they remain the most digitalised industrial sector. In comparison, the automotive industry still has a lot of catching up to do with a current digitalisation index score of only 40 points. This may not change much in the next five years - the sector only expects a small increase in digitalisation.

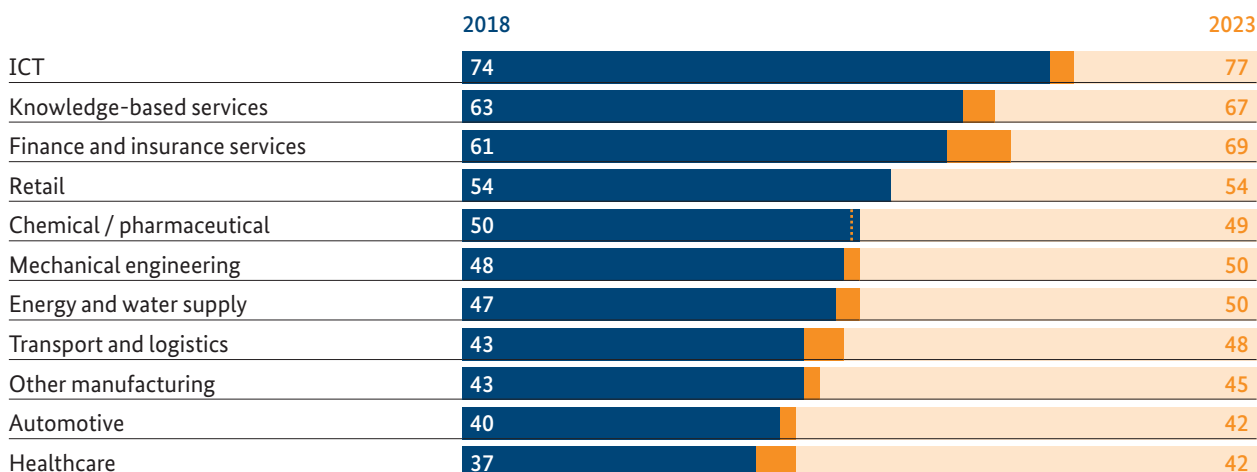
As in previous years, healthcare - at 37 points - is at the bottom of the sector-by-sector comparison. However, companies expect a significant improvement in the level of digitalisation - an increase of five points in the next five years. This would bring the healthcare sector to the same level as the automotive sector - both sectors expect the digitalisation index score to increase to 42 points by 2023.



*Dr Edeltraud Leibrock, Connected Innovations, Managing Director*

*“Next to AI, blockchain is the key issue for the future - and not just in the financial sector. However, we still lack the budgets, resources and know-how required to push the issue forward at full speed.”*

## The ICT sector is the most digitalised by far



Ranking by sector

Index = max. 100

# German companies are becoming smarter



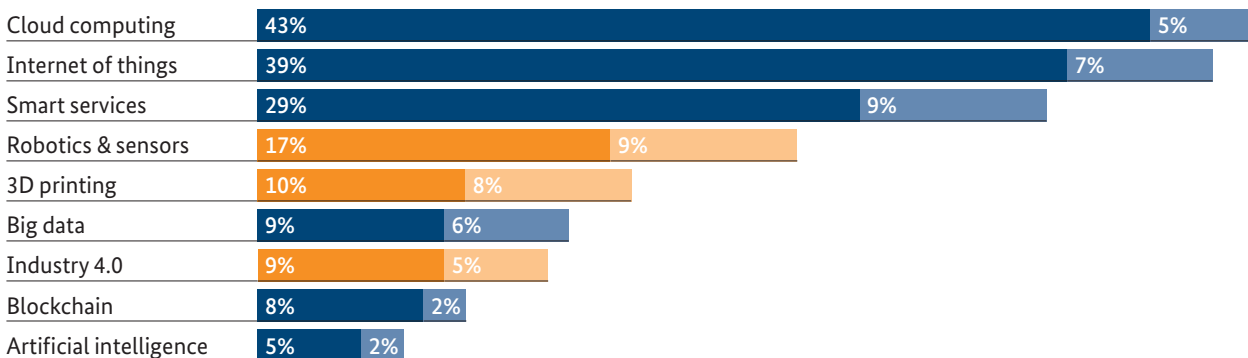
## The use of innovative applications is changing

### Cloud computing and big data are driving digitalisation forward

Cloud computing and big data are the technologies that advance a company's level of digitalisation the most. But while cloud-based services are frequently used (43%), only 9% of companies currently use driver technology that enables the analysis of large datasets. The importance of the different innovative applications differs from sector to sector: While cloud computing and big data are proving themselves to be significant drivers of digitalisation in the service sector in particular, in industry it is the internet of things that is most important.

**Cloud computing:** In the future, almost half of companies in the commercial sector in Germany will use IT infrastructures on the internet. In addition to the businesses already working with cloud computing (see above), another 5% are planning on using this technology. Beyond that, the market appears to be saturated, as 87% of companies have already looked at the technology and decided for or against using it. Only 13% of companies have not yet looked at the issue - accordingly, the need for information reported by the companies is low.

## Cloud computing: An innovation that is establishing itself



### Use of innovative applications.

■ = Industry and services ■ = Use planned / ■ = Only industry ■ = Use planned

## Innovative technologies at a glance

**Big data** – The collection and evaluation of large datasets from different sources and their use for the optimisation of corporate strategies or processes.

**Blockchain** – A decentralised, shared database that contains a growing list of transaction data and that cannot be subsequently changed. Blockchain is intended to improve trust, predictability and transparency in transactions between market partners.

**Cloud computing** – The use of IT infrastructure, such as storage space, computing power or application software, as a service via the internet.

**3D printing** – A manufacturing process used by companies, for example, for the production of tools, finished parts or three-dimensional prototypes.

**Industry 4.0** – Intelligent, networked systems that can not only be used for individual production steps, but that can also be optimised for the entire value chain. They are strictly defined as technologies for

the cross-company and cross-location networking of systems or processes that were previously operated.

**Internet of things** – The digital networking of devices and objects, and also entire industrial plants or buildings.

**Artificial intelligence (AI)** – For the monitoring report, AI is defined as computer systems or software programs that are capable of acting independently and of self-improvement. Examples are self-learning software and machine learning. AI is the main focus of this year's monitoring report (see page 16).

**Robotics / sensors / automatic process control** As these innovative applications often work together in production, they were also grouped together into one category in the study.

**Smart services** – The digitalisation of services of all kinds, both for private customers and for business processes (also known as the “internet of services”).

**Internet of things:** The networking of devices and objects is already being used in 38% of service companies and 45% of industrial companies. The overall usage rate of use is 39%, with another 7% of companies planning to use the technology. As with cloud computing, 39% of companies have already consciously decided against using the internet of things because they do not consider it relevant for their company.

**Smart services:** 29% of companies are active in this area; 36% have decided against using them. Therefore, there is still a not-insignificant scope for development – both for companies who plan to start using smart services in the near future (9%), as well as those who have not yet looked into these technologies at all. It is noteworthy that small business have the greatest need for information regarding smart services.

**Robotics & sensors:** These applications are also innovative technologies that are more common in the industrial sector: 17% of industrial companies use robotics, sensors or automatic process control in production; a further 9% are planning to introduce these technologies. Almost half of industrial companies (47%) have decided against using these technologies.

**3D printing:** 10% of industrial companies in Germany use this technology in production. Looking at enterprises by size class, large companies are again the pioneers: their overall rate of 3D printing use is 14%. The fact that another 8% are planning to use the technology suggests positive growth prospects.

**Big data:** Only 15% of all companies use big data applications or at least plan to use them soon. More than half of all companies (55%) have looked at the subject, but do not consider their use as advisable for their own company. The situation is quite different if we look at large companies separately: for these companies, large data volumes are indeed an issue. Two thirds of these companies are looking for, or have already found, big data solutions: 39% use the technologies, another 25% want to follow suit soon.



Thomas Wittmann, Deutsche Lufthansa AG, Head of IT Domain Digitalization, Innovation & Architecture

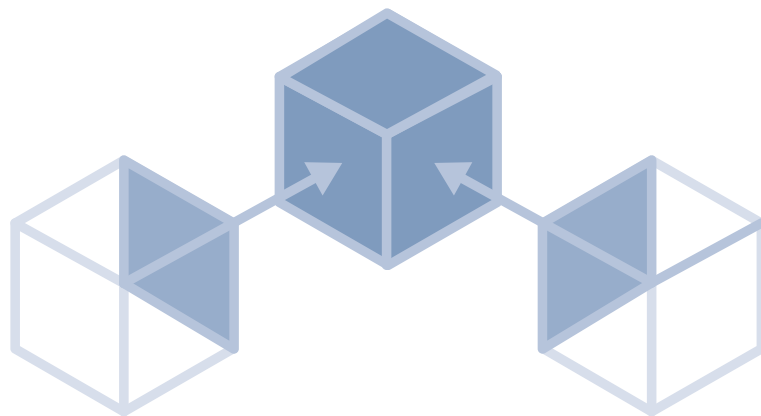
*“Innovative technologies and platform models are becoming more and more important for digitalisation. This also raises the issue of who owns the data generated, for example, during the operation of machines.”*

**Industry 4.0:** Some innovative technologies whose use was surveyed are mainly used in industrial companies: The applications, which are grouped together under the umbrella term “Industry 4.0”, are already linked to this sector by their name. To clearly define the term, industry 4.0 technologies were defined as technologies for the cross-company and cross-location networking of systems or processes that were previously individually operated (see info box on page 11). In the manufacturing sector, 9% of companies say they use Industry 4.0 applications, and another 5% want to follow their example soon. A clear majority of all industrial companies (60%) do not want to use these technologies.

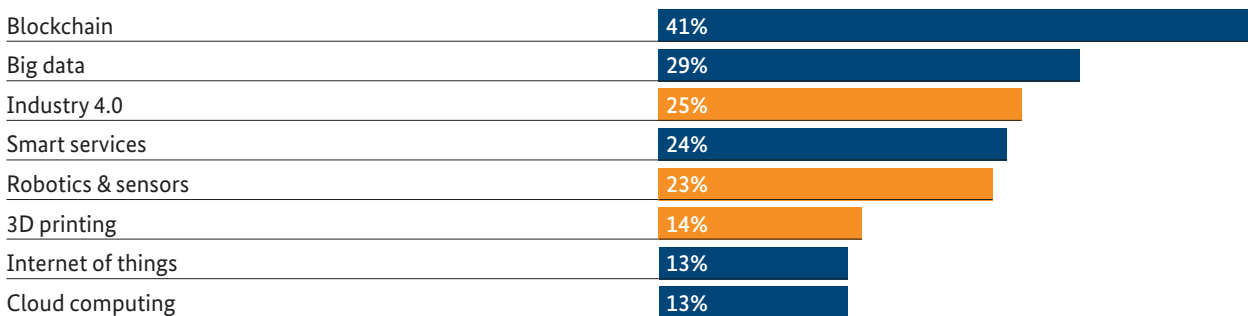
**Blockchain:** The technology that is supposed to bring transparency has not yet managed to ensure its own transparency. 41% of all companies say that they have

not yet looked into blockchain applications; this is reflected in the very high demand for information on the topic. However, 8% of companies already use blockchain. A further 2% of all companies say that they want to start using the technology, which has been primarily talked about with relation to the cryptocurrency Bitcoin, soon. Again, large companies could provide the impetus, as they are significantly more likely than other companies to start using blockchain in the near future.

**Artificial intelligence (AI):** 5% of companies in the commercial sector already use AI solutions and applications. A further 2% plan to do so in the near future. Furthermore, the growth prospects for this trend technology in German companies are positive, as the “Main focus: Artificial intelligence” section of this year's monitoring report shows (see page 16).



**Blockchain: Companies need more information**



**Need for information on innovative applications.** ■ = Industry and service providers ■ = Industry only

# High-speed internet as the most important policy task

## Companies barely make any other demands

Companies consider policy being chiefly responsible when it comes to expanding and securing broadband networks. 61% of the companies surveyed named high-speed internet as one of the framework conditions that policy must provide in order to encourage digitalisation in companies. Therefore, broadband remains the top issue for the commercial sector.

Aside from the availability of broadband, only a few company representatives expressed other policy demands: the creation of pro-digital environment and financial support for digitalisation projects were only mentioned by 13% percent of those surveyed. 10% wanted simplified regulations regarding data protection.



Christian Niederhagemann, Mann + Hummel GmbH, CIO

*“Broadband availability and speed are key issues, particularly for small and medium-sized enterprises. The uninterrupted availability of mobile internet outside the big cities as well is absolutely vital.”*



## Broadband supply should be guaranteed

Ensuring broadband availability and expansion	61%
Create a pro-digital environment	13%
Financially support digitalisation projects	13%
Simplify data protection regulations	10%
Promote IT security	8%
Create a uniform legal environment for all market participants	6%
Support uniform standards	6%
Improve digital education and further training	5%

## Companies' policy demands

# Around two thirds of companies communicate digitally with their customers

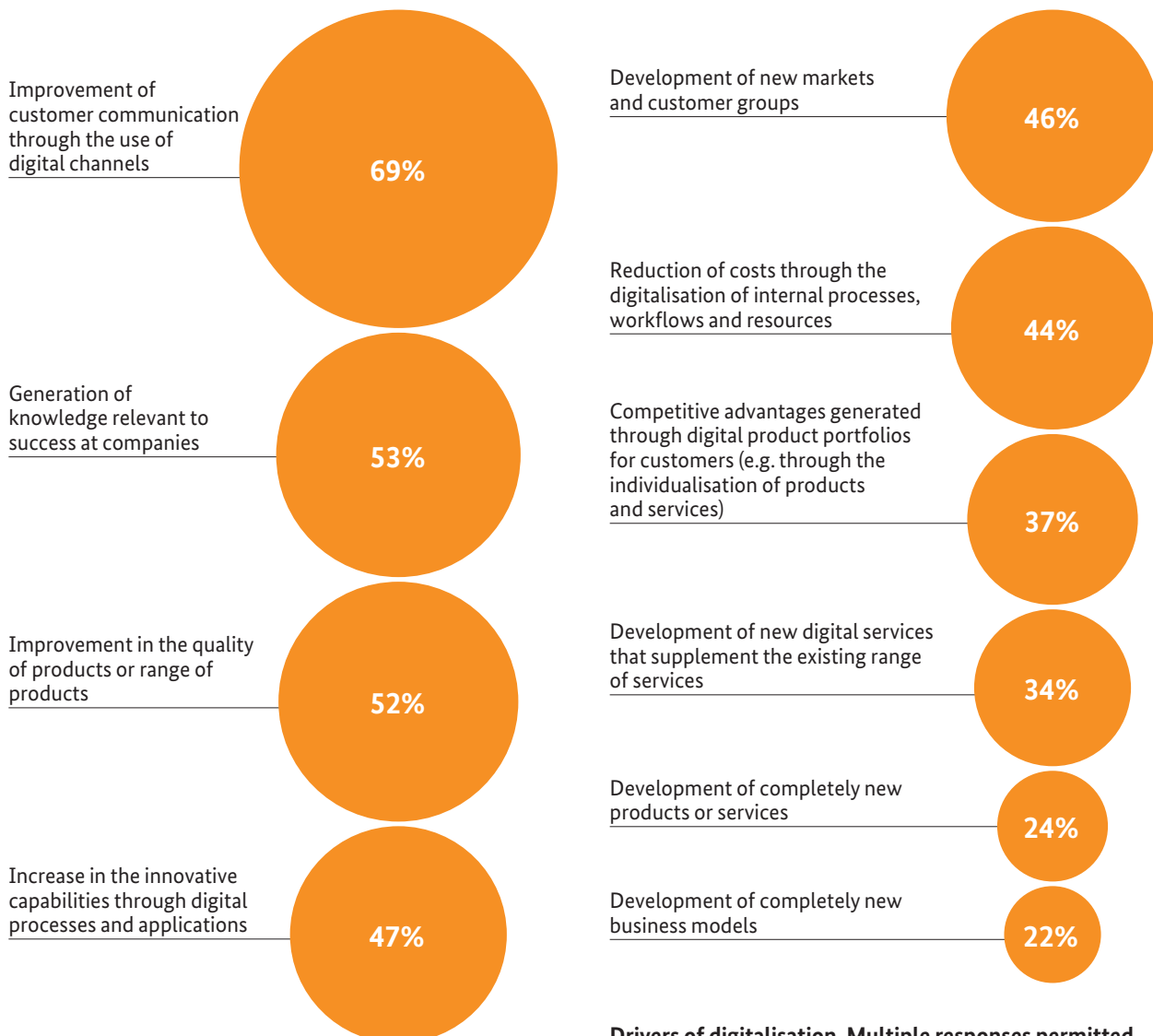
There is still the potential for digitalisation in the development of new products and services

### Current and future digitalisation success factors

More than two thirds of companies in Germany (69%) say that communication with customers has been improved through the use of digital channels. This makes customer communication as the most frequently stated digitalisation success factor. From the companies' perspective, past drivers include the generation of the knowledge required for success, and the improvement of product quality or range of products, which were cited by around half of the companies as achieved digitalisation successes.

However, the possibilities offered by digitalisation have already largely been exhausted in the three most successful fields of application. Innovations that have not yet been implemented by the majority of companies may provide potential for further digitalisation successes in the future. For example, only 34% of companies consider the development of new, expanded product portfolios as a digitalisation success story at their company. Completely new products and services have been developed successfully at 24% of companies, and new business models at 22%.

### Digital successes in customer communication, knowledge generation and quality improvement



Drivers of digitalisation. Multiple responses permitted.

**A quarter of companies consider digitalisation unnecessary**

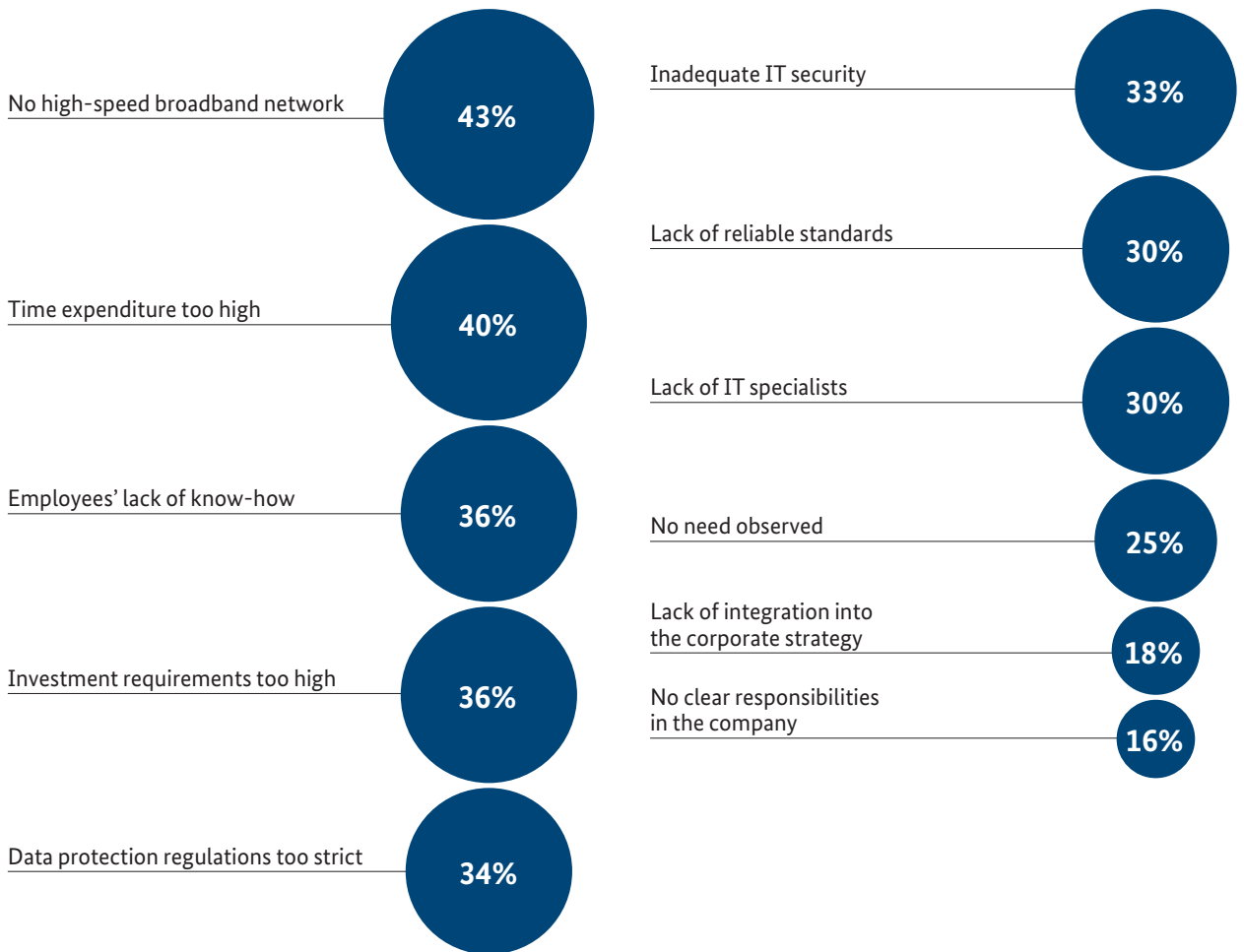
A lack of broadband coverage is now almost traditionally cited by companies as the most common obstacle to digitalisation (43%). The excessive time or organisational effort required was almost as daunting (40%).

When asked about the factors that represent an obstacle to digitalisation, participants made active use of the option to give multiple responses – and critically examined their own company thoroughly. 36% of those surveyed cited their employees’ lack of

knowledge as an obstacle, 30% stated that there is a shortage of IT specialists. The same applies for both these issues: the bigger the company, the more pressing the problem.

Companies are now more aware in terms of data protection and IT security. Around a third of companies think that data protection regulations that are too strict can represent an obstacle to digitalisation projects. Almost as many see inadequate IT security as an obstacle to digitalisation. Digitalisation projects may be doomed to failure from the outset at a quarter of companies: they do not see the need for such projects.

**Too slow, too time consuming, too expensive: Factors that inhibit digitalisation**



**Obstacles to digitalisation, multiple responses possible.**

# The use of artificial intelligence is still not widespread

## Very good long-term growth prospects for artificial intelligence

### Growth for the technology of the future Artificial intelligence (AI)

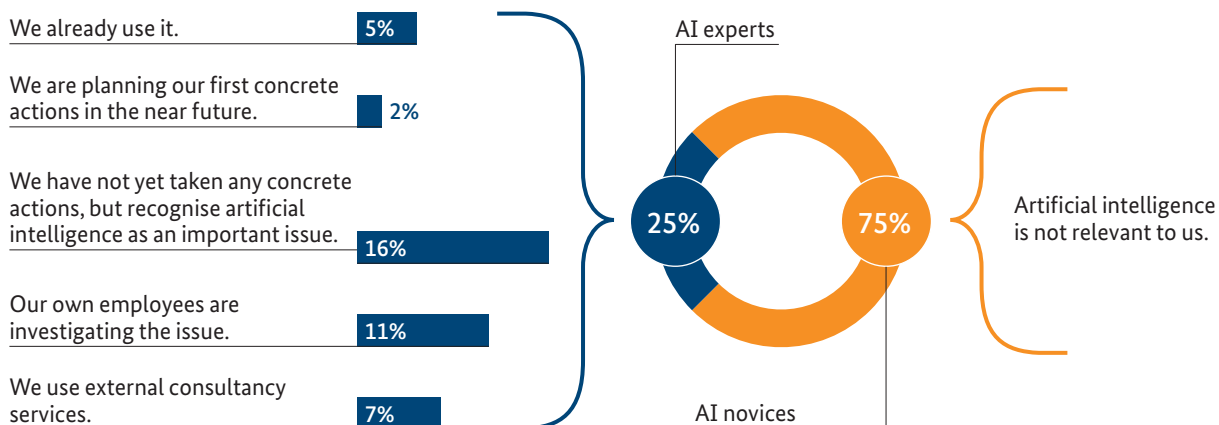
The percentage of companies using AI solutions currently appears to be negligible: only just under 5% of companies in the commercial sector use AI applications. The growth rates of this technology of the future and its prospects are much more impressive: the percentage of companies using AI was only 2% in 2017, it has doubled within a year. Although only about 2% of companies say they intend to take such measures in the near future, the pace of development of AI applications is unlikely to slow down. This idea is supported by several results from the survey on the main focus topic:

- In one in ten companies, company employees are looking at AI, investigating potential applications or planning specific projects.
- 7% of companies already employ external AI consultants.
- 16% of companies have, according to the information they provided, identified AI as a key issue.
- 31% assume that their company will use AI solutions in ten years' time (see page 19).

The level of information regarding artificial intelligence is significantly higher within commercial business than current rates of use would suggest: the percentage of companies that already feel well or very well informed about the topic is just under one third. Service providers rate their information level more positively (33%) than industrial companies (18%), which in turn reflects the generally higher level of digitalisation in the service sector (see page 6).

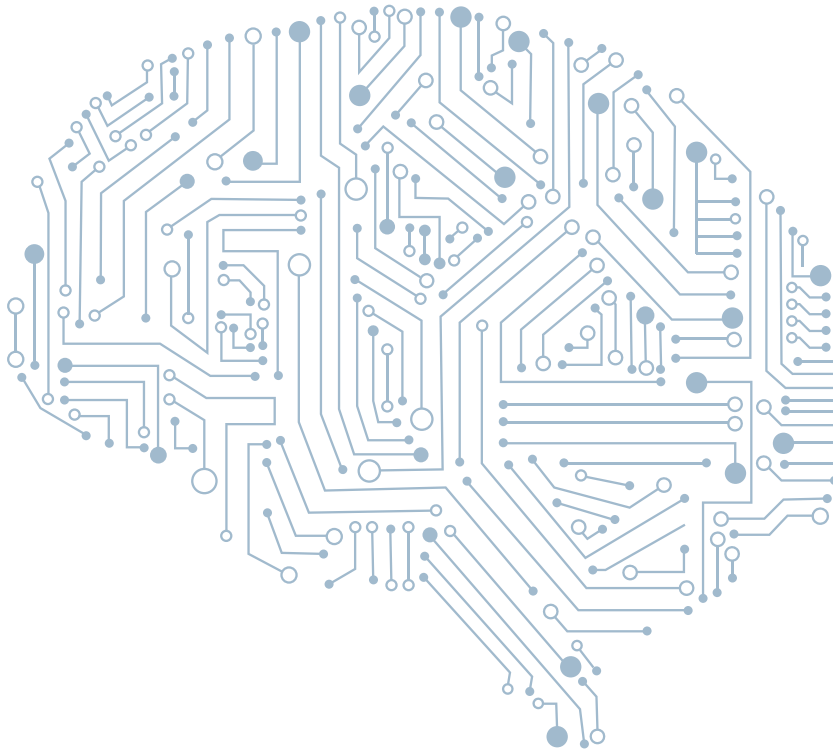
Around a quarter of companies already use AI, are investigating it, planning to do so in the near future or at least consider it important. This group, hereinafter referred to as “AI experts”, is characterized not just by its particular interest and level of information, but above all by the high expectations they have for artificial intelligence and its solutions. They have a more nuanced view of the topic, which is why it is worth paying special attention to their opinions. Three quarters of companies are so-called AI novices, who say: “artificial intelligence is not relevant to us”.

## A quarter of companies have already looked at the issue of artificial intelligence



Multiple responses permitted.





**What does “artificial intelligence” mean?**

For the monitoring report, AI was defined as computer systems or software programs that are capable of acting independently and of self-improvement. This means that they can independently perform and optimise certain business processes. Examples are self-learning software and machine learning. There are a wide range of applications for AI in companies - from production to communication. And the more progress that is made with regard to AI developments, the more potential uses there are for companies.

**Level of knowledge shapes the assessment of AI**

Not surprisingly, there is a large difference between the two groups with regard the forecasts for the next ten years. Overall, 70% of AI experts, but only 18% of AI novices expect to use artificial intelligence in their company in this period. It is noteworthy that the percentage of experts who want to introduce AI in industry is, at 86%, significantly higher than in the service sector (68%). A glance at the most important fields of for the application of AI: process automation, big data and customer service provides an explanation for this discrepancy.

**AI experts are technology optimists**

The use of artificial intelligence could affect businesses in many ways. Three quarters of AI experts expect these technologies to have a positive or even very positive impact on the competitiveness of their own company in the next five to ten years. Only 4% of AI experts are pessimistic in this respect (22% are undecided). High expectations are also being placed on AI in terms of flexibility and product quality as well: Around 70% of AI experts expect positive or very positive effects in this regard.

**Three quarters of AI experts expect an increase in competitiveness**

Competitiveness	74%	4%	22%
Flexibility	70%	10%	20%
Product quality	69%	13%	18%
Quality of work	65%	21%	13%
Productivity and efficiency	63%	23%	14%

AI experts only. ■ = Positive ■ = Negative ■ = Don't know

Of those who are informed regarding AI, 74% expect a positive or very positive influence on the competitiveness of their company, while 4% fear a negative influence from AI and 22% are still undecided.



Elf Theike, TÜV NORD Systems GmbH & Co. KG, Managing Director

*“Artificial intelligence will have a great influence on Germany - and on Europe - as a business location. In order to continue to provide integrated protection for consumers, security standards must be set.”*

**Disputed: the effect of AI on the labour market**

Opinions differ on the question of future employment demands. While 41% of companies assume that AI will reduce the employment demand at their company, 35% forecast that it will actually create additional jobs. Given the diverging opinions, it is hardly surprising that almost a quarter of AI experts find it difficult to forecast the impact of artificial intelligence on employment demand in the next five to ten years. The respondents are more decisive in other categories.

**AI can change business models**

Progress and innovation in the field of artificial intelligence could change existing business models, or even make them obsolete. A clear majority (59%) of AI experts assume that their current business model will continue to function, even when taking AI innovations into account. In contrast, about a quarter (26%) consider their business model vulnerable.

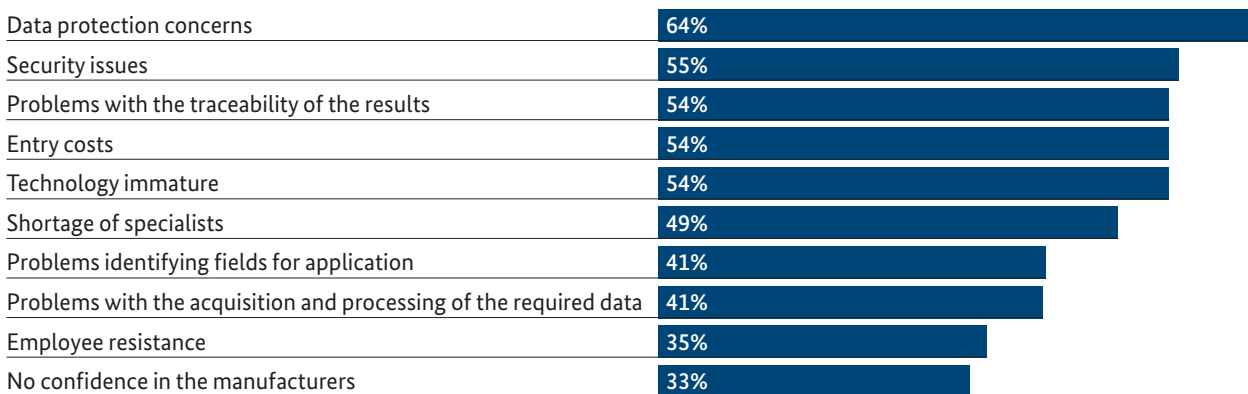
The percentage of AI experts who describe their company's business model as resistant is significantly higher in industry (71%) than in the service sector (58%).

**Data protection and security concerns**

When it comes to implementing AI in business processes or models, almost two thirds of AI experts have concerns regarding data protection. This confirms that the quantity and quality of data are seen as essential elements for the successful use of artificial intelligence.

In addition, more than half of AI experts consider security aspects, the inadequate traceability of the results of AI systems, high entry costs, and solutions that are not yet sufficiently developed as relevant or very relevant obstacles. Almost half also believe that the lack of qualified specialists is making the implementation of artificial intelligence significantly more difficult.

**AI: Data protection concerns are the most important obstacle**



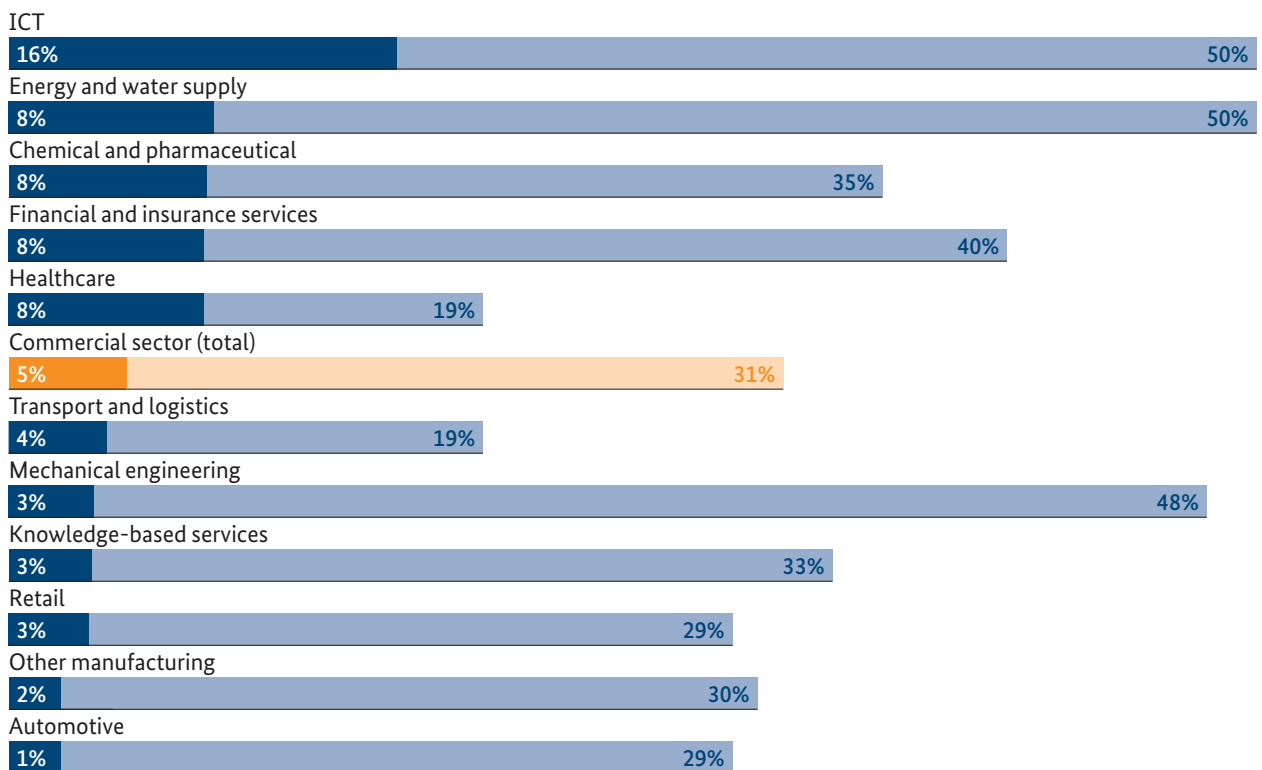
**AI experts only. 64% of AI experts have concerns regarding data protection when it comes to implementing AI into business processes or models.**

### Energy and water suppliers are planning on catching up

Across all sectors, AI is used in just under 5% of companies in 2018. As is standard with other technologies, the information and communications technology (ICT) sector is the leader here as well: Nearly 16% of companies in the sector already use AI, and just under a further 5% are planning to use it in the near future. Among energy and water suppliers, only half this number are currently using such solutions (around 8%). However, this sector has big plans when it comes to AI: if the long-term forecasts of those surveyed come to pass, energy and water suppliers will catch up with the ICT sector in the next ten years. Around half of companies in these two sectors want to work with artificial intelligence by 2028.

The chemical and pharmaceutical sector currently follows the ICT and energy and water sectors in third place in the AI sector-by-sector ranking. Finance and insurance service providers as well as the healthcare sector are also active to an above-average extent. In the healthcare sector, the current rate of AI use is similarly high at 8%. However, this sector is not planning any additional AI activities in the near future. The forecasts for the healthcare sector with regard to AI are also very modest for the next ten years. Although the chemical and pharmaceutical sector and the finance and insurance sector are currently using AI to the same high level, these two sectors will leave the healthcare sector far behind over the next ten years, with rates of use of 35% and 40%, respectively (forecast rate of use for the healthcare sector in 2028: 19%).

### The ICT sector uses AI the most and wants to continue being a pioneer



■ = Current use ■ = Use in ten years ■ = Current use ■ = Use in ten years

# Expert workshop

On 16/05/2018, the Federal Ministry for Economic Affairs and Energy (BMWi) held an expert workshop with the title “The Digitalisation of the German Economy - Artificial Intelligence as a Key Issue for the Future”. The conference was attended by high-rank-

ing representatives from industry and science who discussed the results of this study in detail in a discussion chaired by the BMWi. The quotations used in the report are taken from this workshop.

The participants were (from left to right):



## Front row

Professor Dr Astrid Nelke	FOM University of Applied Sciences for Economics and Management	Professor of Corporate Communication and Innovation Management
Dr Christine Kahlen	Federal Ministry for Economic Affairs and Energy	Head of the Digital Economy, start-ups, Digital Summit Department
Christa Koenen	Deutsche Bahn AG	CIO DB Group
Prof. Dr Key Pousttchi	University of Potsdam	Professor of Business Informatics and Digitalisation
Thomas Siekmann	Müller - Die Lila Logistik AG (at the time)	CIO & CDO
Gerd Niehage	B. Braun Melsungen AG	CIO
Christine Grabmair	E.on Business Services	Head of Strategy & Architecture
Gabriele Rittinghaus	bdp GmbH	Moderator / Managing Director
Prof. Dr Svenja Falk	Accenture Research	Managing Director
Martin Hölz	ThyssenKrupp AG	CIO <del>Group Processes &amp; Information Technology</del>
Christian Rasche	Coca-Cola European Partners Deutschland GmbH	CIO
Frank Pörschmann	Digital Analytics Association	Management Board member
Attila Réti	GE Digital Germany GmbH	Managing Director
Prof. Dr Irene Bertschek	ZEW Mannheim	Manager of the “Digital Economy” Research Area

## Back row

Dr Jörg Ohnemus	ZEW Mannheim	Deputy Manager of the “Digital Economy” Research Area
Rudy Nolde	Federal Ministry for Economic Affairs and Energy	Civil Servant
Thomas Wittmann	Deutsche Lufthansa AG	Head of IT Domain Digitalization, Innovation & Architecture
Tobias Weber	Kantar TNS	Director, Business Intelligence
Dr Markus Eberl	Kantar TNS	Head of Applied Marketing Science
Lutz Gärtner	Federal Ministry for Economic Affairs and Energy	Consultant
Dr Uwe Riss	SAP (Schweiz) AG	Senior Researcher
Max Telgkamp	Brose Group	Head of Digital Transformation
Michael Weinzierl	Kantar TNS	Associate Director, Business Intelligence
Christian Niederhagemann	Mann + Hummel GmbH	CIO
Karsten Vor	Friedhelm Loh Group	CIO
Alfred Ermer	Arago AG	COO
Christoph Volkmer	ServiceNow (Germany)	Senior Director
Frank Ramsak	BMW AG	Head of Enterprise Architecture Management
Ulf Theike	TÜV NORD Systems GmbH & Co. KG	Managing Director
Stefan Beck	BASF Business Services GmbH	CIO, Head of the Global Process / Enterprise Architecture & Region Europe department

## Not in the picture

Dr Andreas Goerdeler	Federal Ministry for Economic Affairs and Energy	Head of the “National and European Digital Agenda” Sub-Department
Dr Edeltraud Leibrock	Connected Innovations	Managing Director

# About the study

**Key questions:**

What is the status of digitalisation in companies and what are its prospects?  
What is the overall level of digitalisation, by sector, sub-sector and company size?  
What are the drivers of digitalisation in the German economy? And what are the barriers?  
How is artificial intelligence viewed and used in companies?

**Study participants:**

High-ranking decision-makers at 1,061 companies

**Survey period:**

March and April 2018

**Institutes:**

Kantar TNS conducted the interviews. The questionnaire was prepared in close cooperation with the ZEW Mannheim.

**Method:**

Quantitative, computer-assisted and standardised telephone interviews with 30 closed and open questions. The disproportionate stratification of the random sample ensured that the number of companies represented from different sectors and size categories was sufficient for statistical analysis.

**Representativeness:**

The survey is representative of the commercial sector, i.e. the following eleven sectors: mechanical engineering, the automotive industry, the chemical and pharmaceutical industry, other manufacturing industries, the information and communications technology sector, energy and water supply, retail, transport and logistics, the finance and insurance sector, knowledge-based services (such as management consultancies, market research, media industry), and the healthcare sector.

**DIGITAL Economy Index:**

The key findings of the survey are summarized in the DIGITAL Economy Index. It provides a number between 0 and 100 that shows how far digitalisation has progressed and how it will change by 2023. A score of zero on the index means that no business processes or internal company processes have been digitalised and that digital technologies are not yet being used. An index score of 100 represents complete digitalisation. Digitalisation is measured in three core dimensions: the effect of digitalisation on commercial success, the penetration of digitalisation into internal company processes and workflows, and the intensity of use of digital technologies and services.

**Development of digitalisation:**

Comparisons with the surveys from 2016 and 2017 are possible. They show how the digitalisation of companies has developed, and make it possible to identify medium-term trends.

# Contacts



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