Smart Data

# Smart Data Business – 10 statements on the use of big data solutions in business

Key results of a study conducted by Smart Data Accompanying Research in cooperation with the Business Application Research Center (BARC) and VOICE Bundesverband der IT-Anwender e. V.

# Publication data

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# Editorial

Dear Reader,

By 2025, the global turnover of big data solutions will increase to more than 85 billion Euros. The processing and use of smart data in even greater volumes will fundamentally change how our economy and society work. This is why the German Federal Ministry for Economic Affairs and Energy is providing around 30 million Euros in funding for the development and application of smart data solutions by companies and public institutions as part of a dedicated technology programme, in order that Germany can develop this future market early on.

There is a huge amount of potential that can be tapped in this field – but what is the situation on the ground? What role does data play in companies today, and how many of them are already making strategic use of it? Who is in charge of developing the use of smart data within businesses, and what are companies hoping to achieve from using it? What obstacles and challenges must be tackled? The Smart Data Business study has been developed by Smart Data Accompanying Research in cooperation with the Business Application Research Center (BARC) and VOICE Bundesverband der IT-Anwender e. V. (German Federation of IT Users) in order to provide answers to these questions.

The survey paints a picture of the scope of big data use among businesses and organisations, and of how this is set to develop in the future. Besides selecting

participants from primary German companies,  businesses taking part in the Smart Data Programme were also interviewed. The way in which these companies approach smart data and the expectations they have of it are, in many cases, significantly different to the answers given by the rest of those surveyed. What is striking is that a large amount of businesses – particularly those pursuing Smart Data projects – are working to develop new products and services based on data, and are striving to use data to improve existing processes. Thanks to the development of these data-based innovations, the companies taking part in the Smart Data Programme are preparing themselves in the best way possible for a future in which data and data-based knowledge is increasingly at the centre of value creation. These key results of the study present findings on how companies and institutions are already using big data today, and on how they plan to use it in the future. Based on these findings, a list of statements have been drawn up which are to intended to stimulate discussion on the opportunities created by the development and application of smart data solutions, as well as the challenges posed. I hope you will enjoy reading this study and that it will provide you with some useful insights.

Yours Dr. Alexander Lenk,
Head of Smart Data Accompanying Research,
FZI Research Center for Information Technology

# Introduction

German businesses can no longer ignore the importance of big data. Most companies have in fact recognised the potential and the opportunities that big data technologies offer for a long time now. The Smart Data Business study considers this development. It explores how big data is currently being used in business and how companies plan to use it in the future.

The study – undertaken by Smart Data Accompanying Research in cooperation with the Business Application Research Center (BARC) and VOICE Bundesverband der IT-Anwender e. V. (German Federation of IT Users) – is based on a non-representative survey of 340 IT and business managers from a diverse cross-section of companies across Germany, Austria, and Switzerland. The survey, which was conducted online, focuses on the use of big data within these businesses. The results of the study provide insights into the development and application of big data technologies across the German-speaking countries.

Of the 340 managers who participated in the survey, 202 came from the Business Application Research Center (BARC) panel, and the answers they gave had already been included in an international analysis entitled 'Big Data Use Cases 2015 – Getting real on data monetization'. Some 103 participants were drawn from 'Smart Data - Data Innovations' technology programme operated by the Federal Ministry for Economic Affairs and Energy and/or were members of the Society for Informatics (GI), and 25 participants were members of VOICE Bundesverband der IT-Anwender e. V.

The survey design was based on that used for the 'Big Data Use Cases 2015 – Getting real on data monetization' study mentioned above – a study conducted among IT users around the world by BARC between December 2014 and February 2015. It was adapted by Smart Data Research and VOICE, who added a number of questions. Some 37 of those surveyed for the international study came from Germany, Austria, and Switzerland, whereas this present study is based on participants from these countries only.

# Statement 1

## Big data helps with the development of new business models, product ideas, and services

Some 63 per cent of those surveyed who work in companies which are running a big data initiative stated that big data solutions enable them to better control operating processes. Not only was big data found to improve process control and help optimise decision-making, but the survey also found that it has a large impact on innovation. Some 56 per cent of participants stated that they were currently developing new product ideas and services. This rises to 67 per cent among participants of the Smart Data Programme. Furthermore, some 48 per cent of those surveyed said that they were developing new business models. This figure is significantly higher for the group taking part in the Smart Data Programme (61 per cent). This means that big data solutions are currently used as a means of making existing processes more efficient and of transforming the business in the long term.

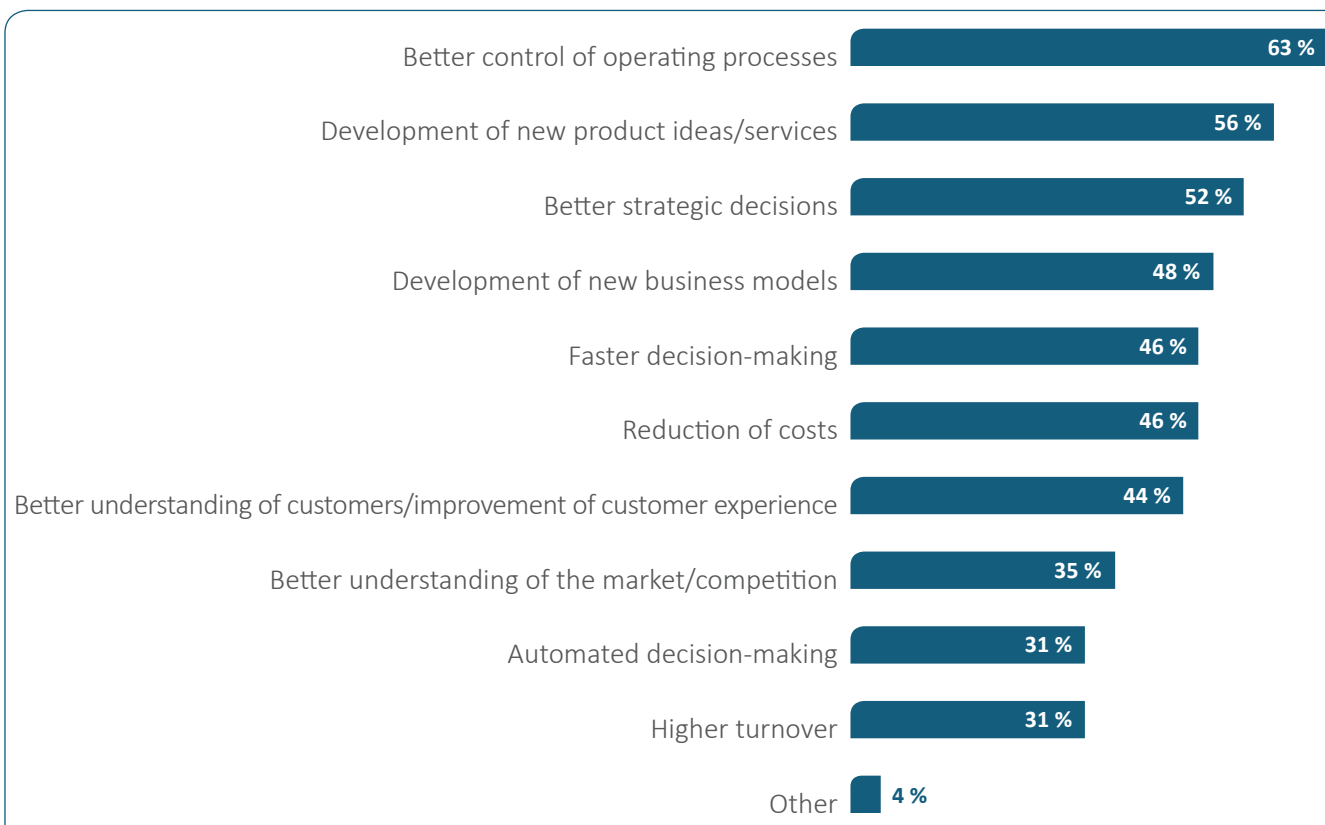| | |
|---|---|
| Better control of operating processes | 63 % |
| Development of new product ideas/services | 56 % |
| Better strategic decisions | 52 % |
| Development of new business models | 48 % |
| Faster decision-making | 46 % |
| Reduction of costs | 46 % |
| Better understanding of customers/improvement of customer experience | 44 % |
| Better understanding of the market/competition | 35 % |
| Automated decision-making | 31 % |
| Higher turnover | 31 % |
| Other | 4 % |

Figure 1 How do your big data analyses/initiatives help you (with analytical tasks)? (n=48/multiple answers possible)

# Statement 2

## Current data-based methods of analysis and predictive models are insufficient – big data is able to remedy this

There is a significant need to improve methods of data analysis at the companies and institutions of those who took part in the survey. Some 64 per cent of those who took part hope that big data technologies will improve or open up new means of data analysis. This would indicate that the companies have recognised the potential of the data they hold but are not yet able to evaluate it in the best way possible. The second most frequent response given was the need

to analyse large volumes of data (55 per cent of those surveyed). What is interesting is that 55 per of those surveyed also stated that they wanted to use big data solutions to develop predictive models. If we consider respondents who are also part of the Smart Data Programme separately, this figure rises to 60 per cent. It thus becomes clear that not only is big data analysis important, but that it can deliver real added value for companies as well.



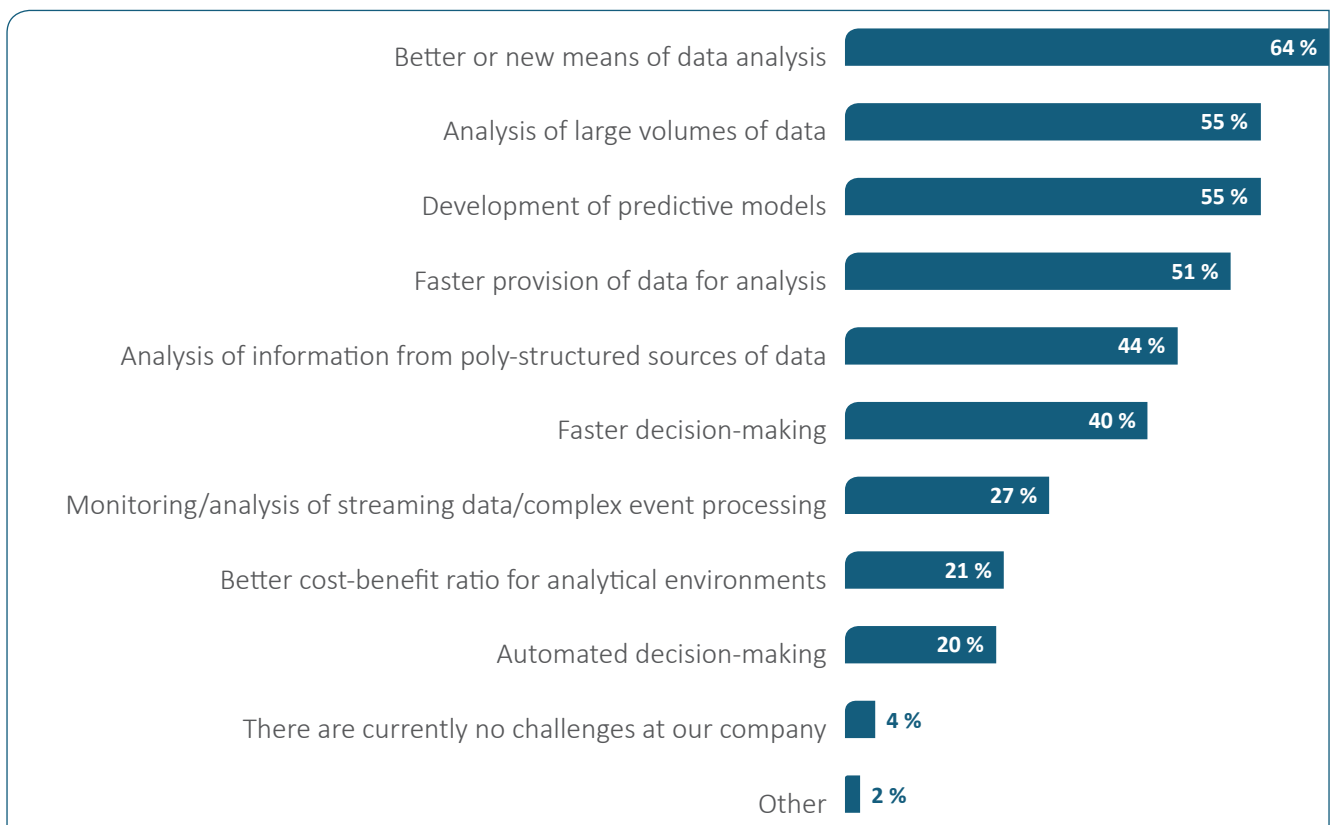| | |
|---|---|
| Better or new means of data analysis | 64 % |
| Analysis of large volumes of data | 55 % |
| Development of predictive models | 55 % |
| Faster provision of data for analysis | 51 % |
| Analysis of information from poly-structured sources of data | 44 % |
| Faster decision-making | 40 % |
| Monitoring/analysis of streaming data/complex event processing | 27 % |
| Better cost-benefit ratio for analytical environments | 21 % |
| Automated decision-making | 20 % |
| There are currently no challenges at our company | 4 % |
| Other | 2 % |

Figure 2 What challenges do you want to address through your big data initiative(s)? (n=255/multiple answers possible)

# Statement 3

## Managing daily business using big data is more important than strategic implications

When asked about the benefits that companies and organisations would like to gain from the use of big data, the most frequently cited answer by those who plan to implement a big data initiative at their company at some point in the future was 'better control of operative processes' (65 per cent). Another popular response was the optimisation of strategic decisions (58 per cent), although this remains – at least for today – a lesser priority. The survey furthermore revealed that a high level of those surveyed desired to use big data for customer-related purposes. Indeed it showed that a large proportion of those who took part wanted to use big data as a means of better understanding customers (51 per cent) or the market and competition (41 per cent), as well as for adapting/developing new products and services tailored to customer needs (38 per cent). This also ties in with the fact that companies would like to develop predictive models that are more accurate.
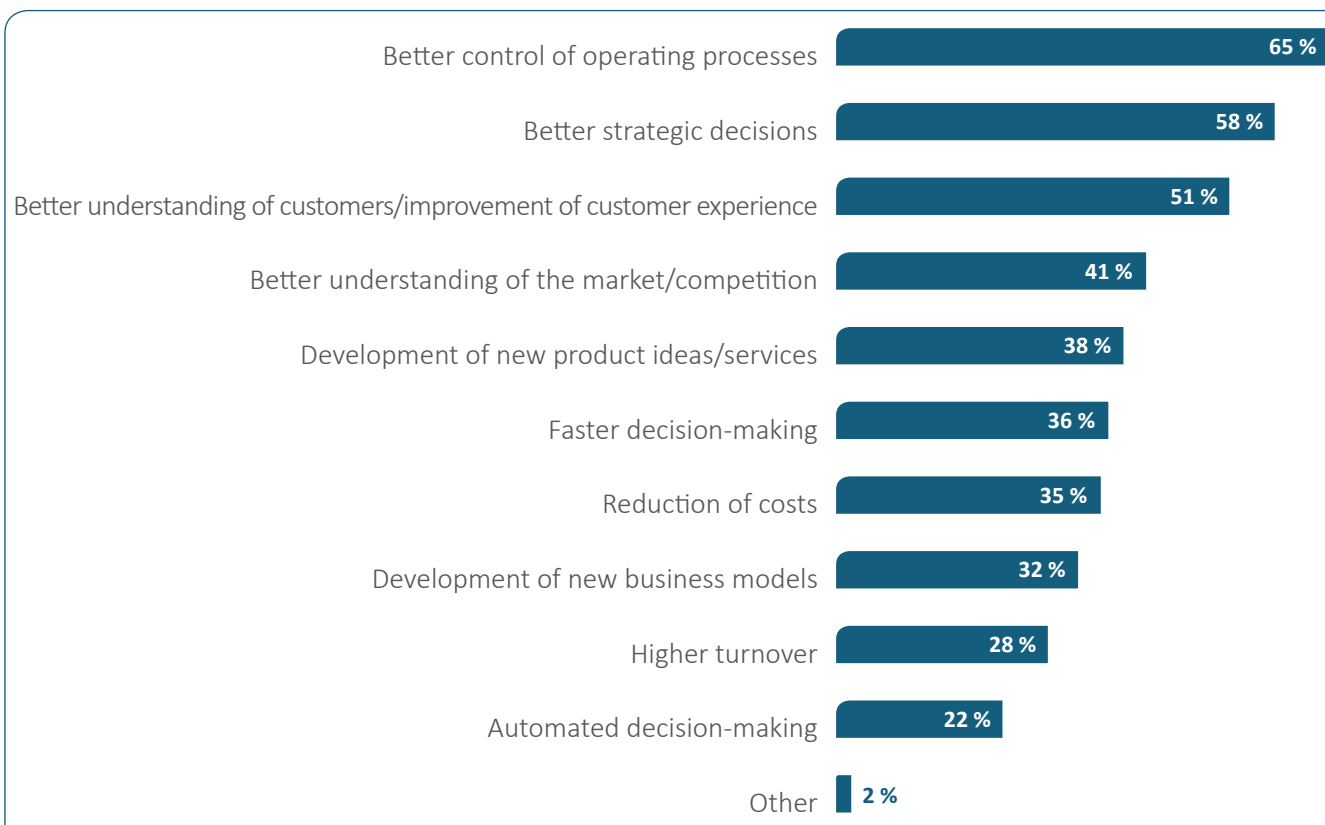
| | % |
|---|---|
| Better control of operating processes | 65 % |
| Better strategic decisions | 58 % |
| Better understanding of customers/improvement of customer experience | 51 % |
| Better understanding of the market/competition | 41 % |
| Development of new product ideas/services | 38 % |
| Faster decision-making | 36 % |
| Reduction of costs | 35 % |
| Development of new business models | 32 % |
| Higher turnover | 28 % |
| Automated decision-making | 22 % |
| Other | 2 % |

Figure 3 In what ways would you like your big data analyses/initiatives to help you (with analytical tasks)? (n=48/multiple answers possible)

# Statement 4

## The greatest challenges are data protection and data security

The largest majority of those surveyed stated that the protection of personal data (61 per cent) and data security (57 per cent) were the greatest obstacles to using big data technologies. These figures rise to 77 per cent and 70 per cent respectively among participants of the Smart Data programme. One reason for this increase is that many user models also incorporate customer data. This means that the necessary level of data protection must be ensured and data be made anonymous. Another reason is that security rules make it difficult for companies to access data. Furthermore, companies lack the necessary experts (55 per cent) and technical expertise (49 per cent) in particular. Companies that are part of the Smart Data programme, of course, considered this to be less of a problem (41 and 37 per cent respectively).
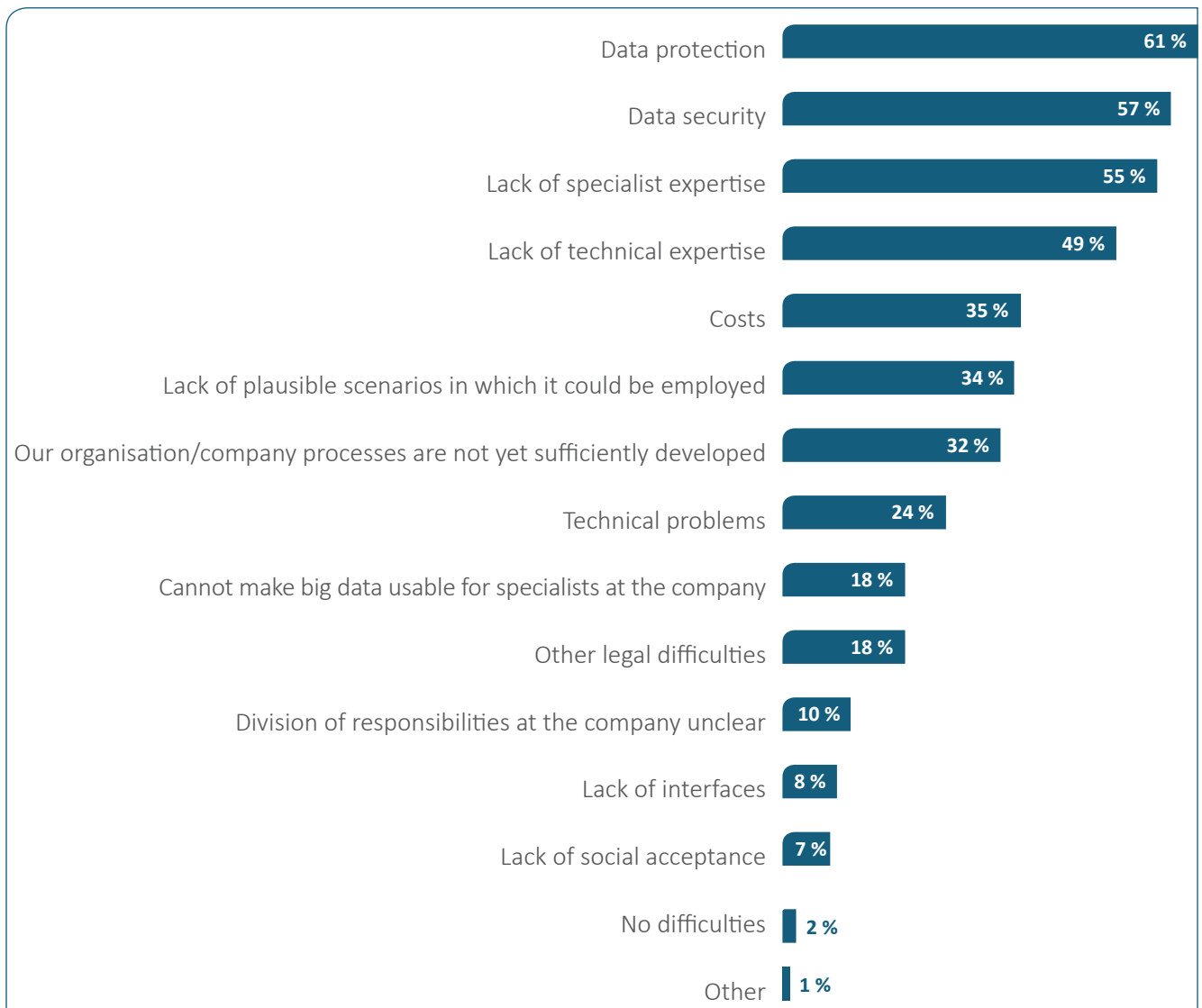
| | |
|---|---|
| Data protection | 61 % |
| Data security | 57 % |
| Lack of specialist expertise | 55 % |
| Lack of technical expertise | 49 % |
| Costs | 35 % |
| Lack of plausible scenarios in which it could be employed | 34 % |
| Our organisation/company processes are not yet sufficiently developed | 32 % |
| Technical problems | 24 % |
| Cannot make big data usable for specialists at the company | 18 % |
| Other legal difficulties | 18 % |
| Division of responsibilities at the company unclear | 10 % |
| Lack of interfaces | 8 % |
| Lack of social acceptance | 7 % |
| No difficulties | 2 % |
| Other | 1 % |

Figure 4 What problems do you see in the use of big data technologies/analyses? (n=343/multiple answers possible)

# Statement 5

## Mobility and the industrial sector are the two areas in which big data can deliver the greatest benefits

Automated traffic guidance systems, systems to prevent road congestion, and smart disaster management are just a few examples of applications for which big data could be harnessed to improve mobility systems and services in a big way. The majority of the decision-makers who took part in the Smart Data Business study agree, with 76 per cent of respondents seeing major potential for big data solutions in the mobility sector. The industrial sector is not lagging far behind, with 70 per cent of those surveyed seeing great business potential for big data solutions in these industries. Agriculture and the public administration are seen as being the fields with the least potential in this regard.
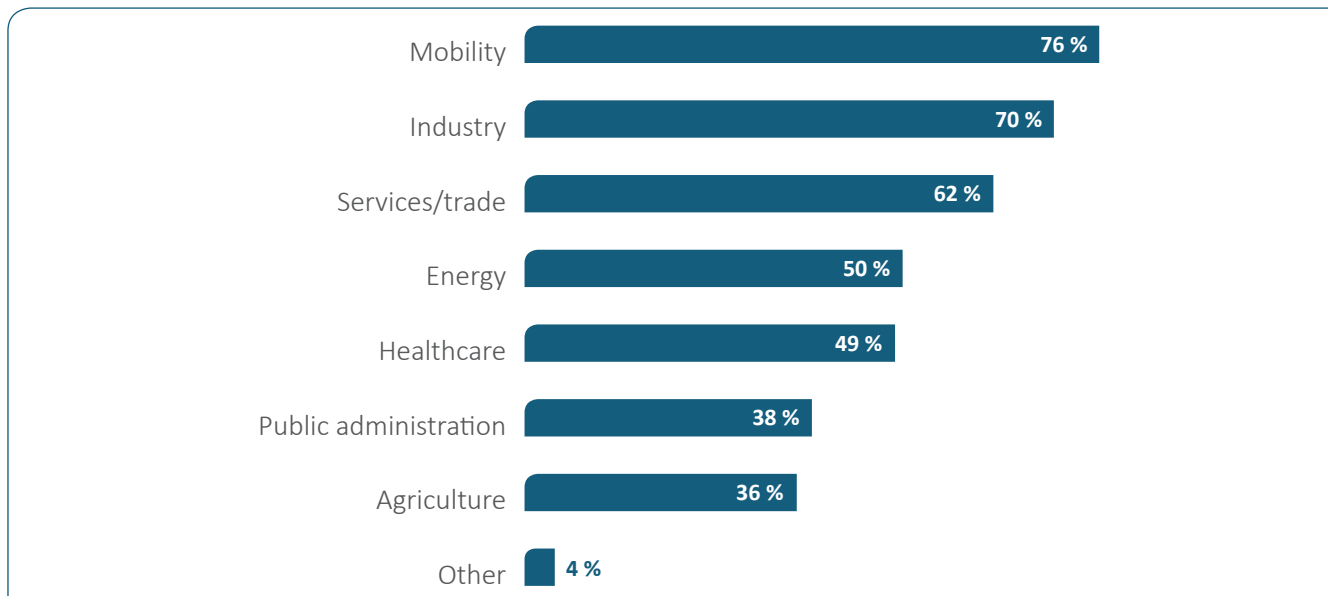


Figure 5 In which area do you see the greatest potential/opportunities for big data technology? (n=98/multiple answers possible)

# Statement 6

## The greatest challenges lie in the healthcare sector

The data that is produced in the healthcare sector and the information that can be deduced from this data is particularly sensitive, which means that very high standards of data privacy and data security are needed. This is also the reason why the respondents see the healthcare sector as the industry that presents the greatest challenges. A massive 63 per cent of those surveyed said that there were risks involved when using big data in this field – a figure that is considerably higher than for all other sectors.
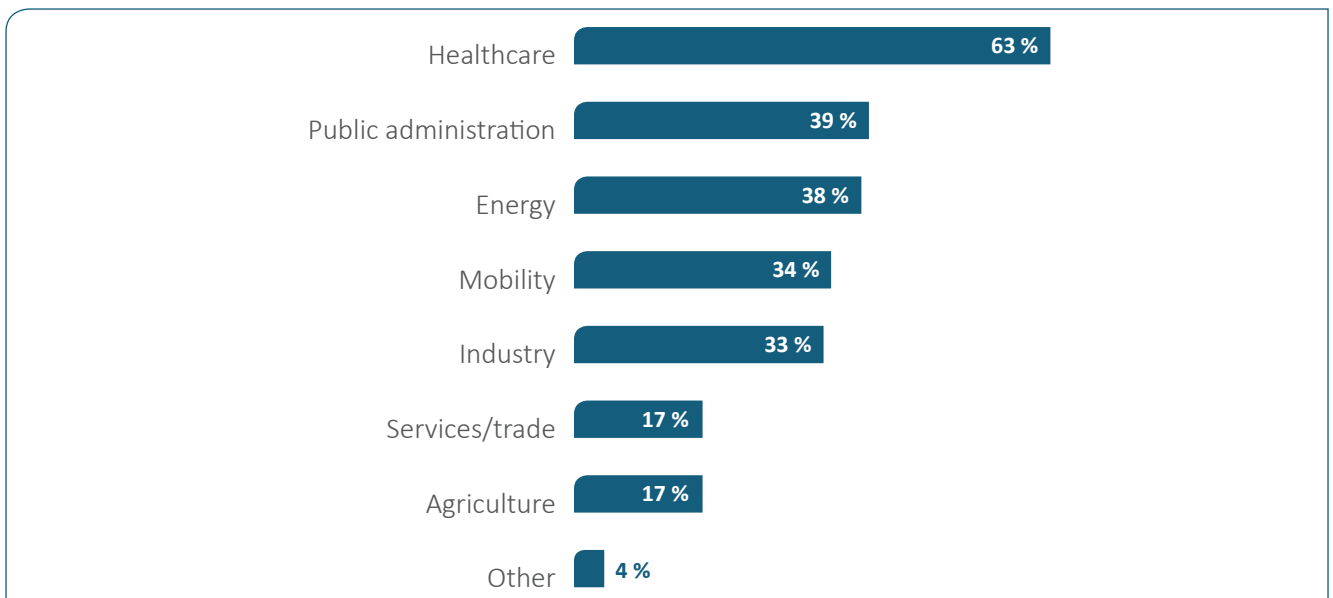
| Sector | Percentage |
| --- | --- |
| Healthcare | 63 % |
| Public administration | 39 % |
| Energy | 38 % |
| Mobility | 34 % |
| Industry | 33 % |
| Services/trade | 17 % |
| Agriculture | 17 % |
| Other | 4 % |

Figure 6 In which area do you see the greatest risks/challenges for big data technology? (n=98/multiple answers possible)

# Statement 7

## Much of the investment in big data applications will be training-related

Most of the investment needed for big data applications will be used to develop and expand IT solutions. Given that the study found that this is an area where companies are lacking specialist and technical expertise (see above), it is only natural that the remaining investment should be used as follows: 24 per cent

of respondents say that they are investing in training their existing staff and 22 per cent say they are investing in additional jobs. This shows just how crucial specialist knowledge is when it comes to using new technologies. If you don't have the skills, you won't be able to generate additional revenue from big data.

| | |
|---|---|
| Higher budget for IT solutions | 24 % |
| Training existing staff | 22 % |
| Creating additional jobs | 17 % |
| Creating a dedicated organisational unit with its own budget | 14 % |
| Using external specialist expertise | 11 % |
| Using external technical expertise | 10 % |
| No additional investment | 2 % |
| Other | 1 % |

Figure 7 In which areas is your company/organisation investing money in big data? (n=124)

# Statement 8

## Companies are continuing to rely on technologies that are less than ideal as tools for analysing big data

The most common type of technology used by companies as part of big data solutions are standard „relational database" technologies (78 per cent), which have been around since the 1970s. These databases are not scalable to the point where they would be able to deal with large quantities of data. Not even one in four companies has introduced technologies developed especially for this purpose, such as NoSQL or Hadoop. Standard tools for business intelligence

(61 per cent) and data integration (55 per cent) are also widely used.

The list of technologies companies are planning to introduce is topped by solutions for data mining and predictive analysis (40 per cent), followed by the Hadoop ecosystem (38 per cent), followed by systems for explorative analysis and analytical databases (both 37 per cent).
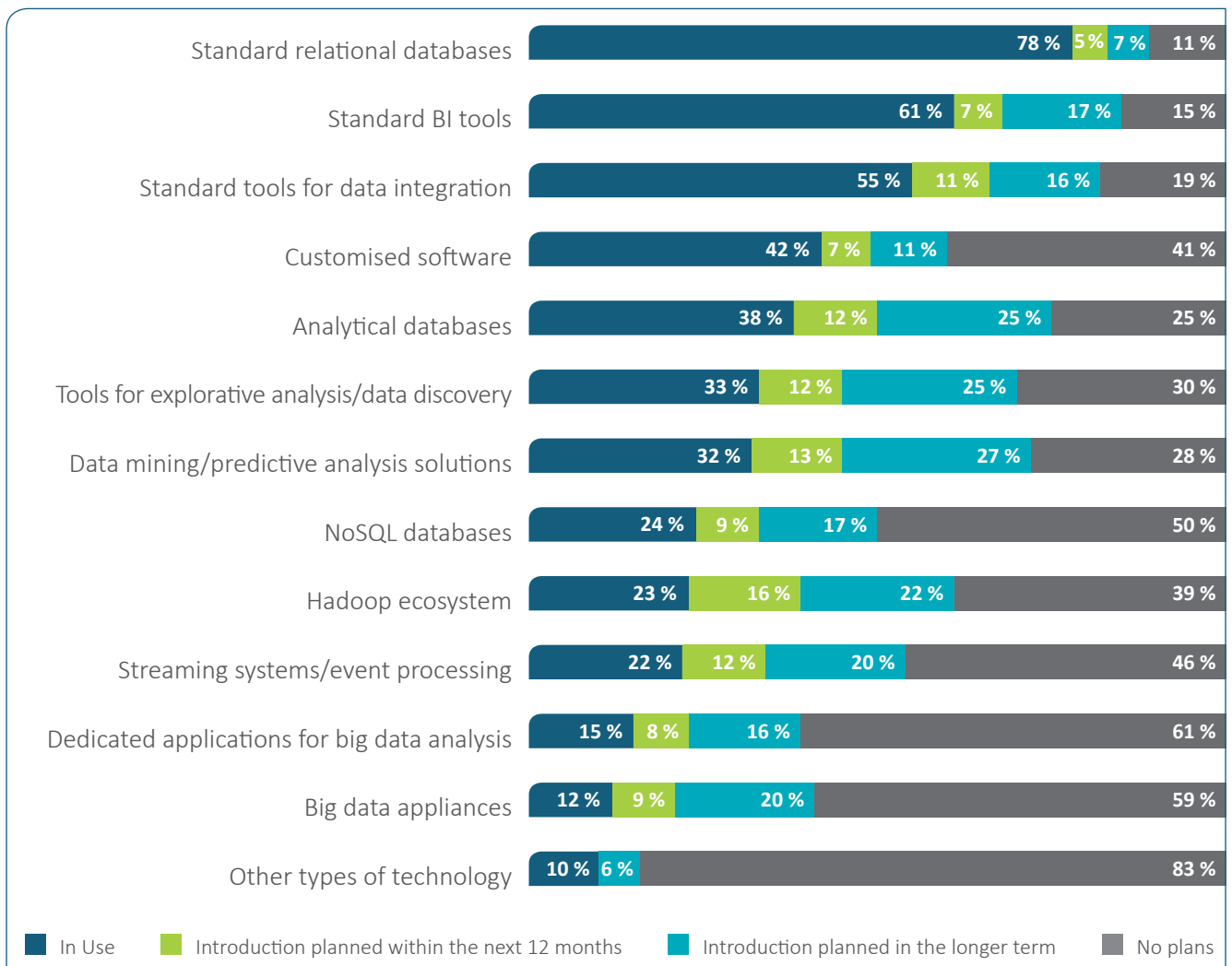


Figure 8 Which types of technology does your company/organisation use for big data and which ones are you planning to use? (n=252)

# Statement 9

## There is major potential for harnessing data from social media

The strong use of standard BI technologies is reflected in the types of data used by the companies, with data harnessed from IT systems topping the list (58 per cent). It seems that this data is mostly used by IT companies to analyse their system landscapes. Data from transaction systems is also commonly used (55 per cent) and is often combined with other types of data. Among the types of data sets in which companies want to invest most are unstructured data from social media, documents and texts. So far, only one in five of the companies surveyed (22 per cent) use this data, but nearly half are planning to do so in the future (47 per cent). The companies involved in the smart-data programme seem to have a very strong interest in this data, with 32 per cent of them saying they want to start using social media as a source for data.
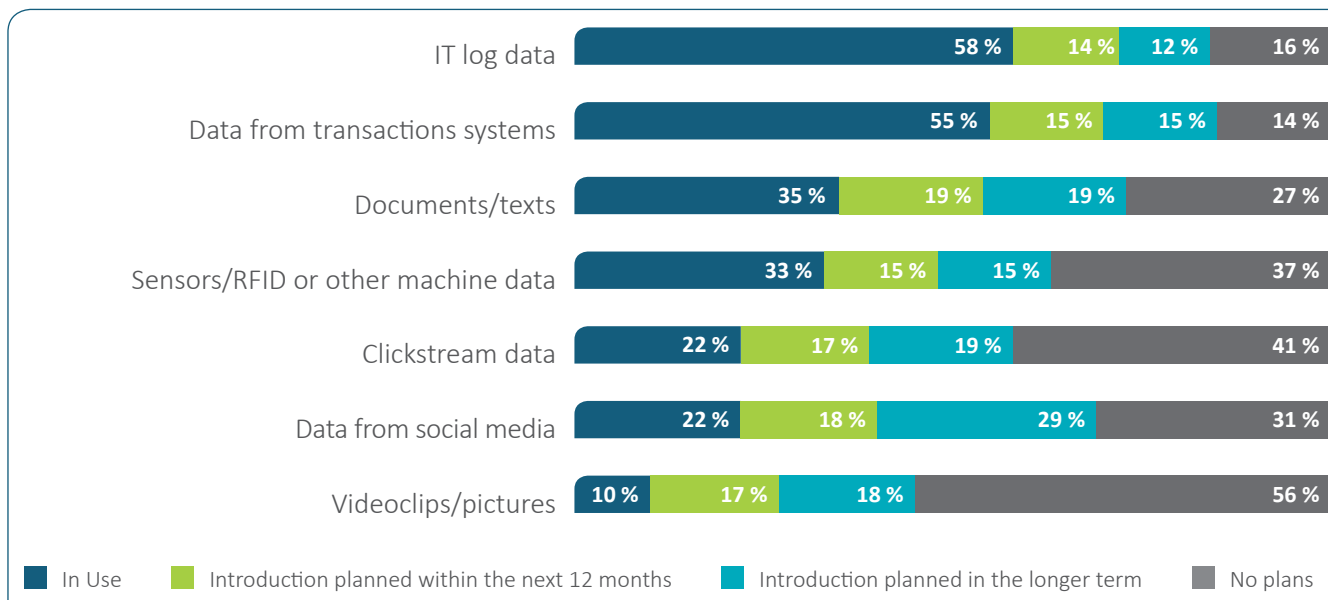
| | In Use | Introduction planned within the next 12 months | Introduction planned in the longer term | No plans |
|---|---|---|---|---|
| IT log data | 58 % | 14 % | 12 % | 16 % |
| Data from transactions systems | 55 % | 15 % | 15 % | 14 % |
| Documents/texts | 35 % | 19 % | 19 % | 27 % |
| Sensors/RFID or other machine data | 33 % | 15 % | 15 % | 37 % |
| Clickstream data | 22 % | 17 % | 19 % | 41 % |
| Data from social media | 22 % | 18 % | 29 % | 31 % |
| Videoclips/pictures | 10 % | 17 % | 18 % | 56 % |

Figure 9 Which of the following types of data does your company/organisation use for big data analyses? (n=208)

# Statement 10

## The IT department is responsible for advancing the use of big data at companies

IT departments are the most important agents in the development and operating of big data technologies within companies and organisations. Some 47 per cent of the respondents said that IT departments were the pioneers and front-line agents responsible for developing the use of big data at the company.

The second most frequently cited answer was that it is company management and executives (40 per cent) who push the use of big data forward. This clearly indicates that the importance of big data for business, product, and price models has been recognised by company hierarchy.
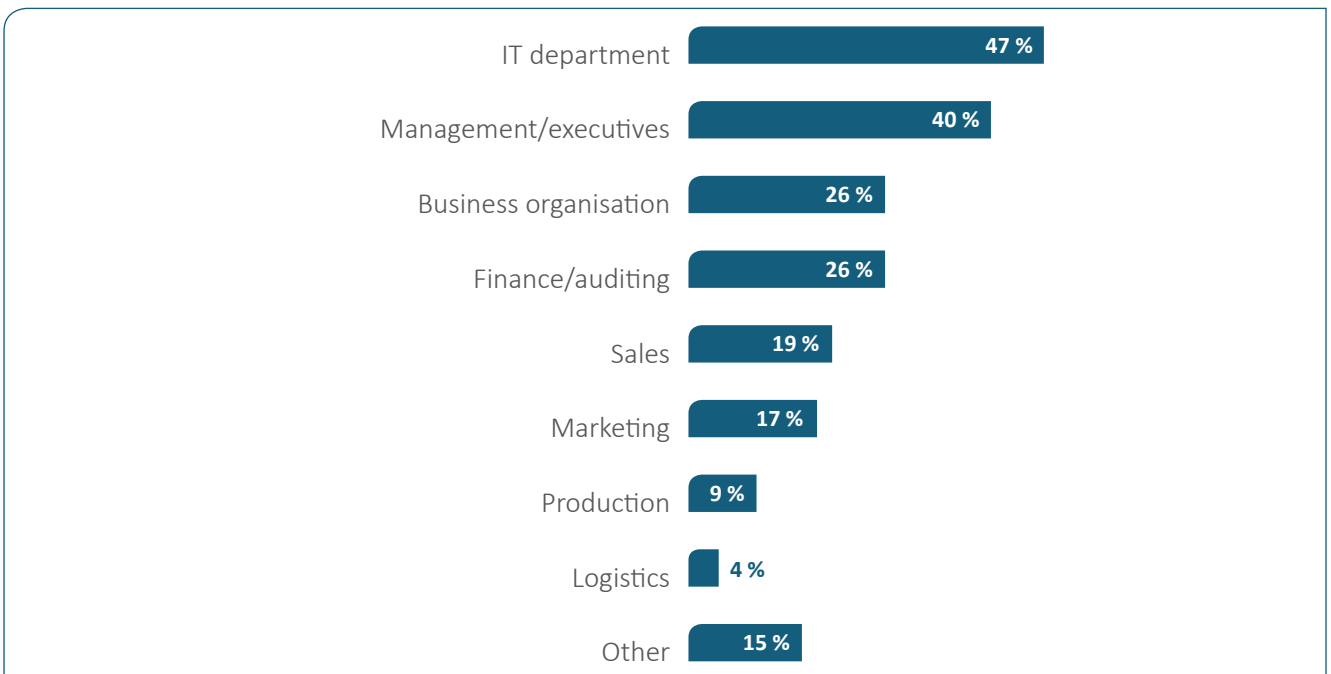


Figure 10 Who are the major opinion leaders regarding big data? (n=253/multiple answers possible)

# About the Smart Data Business study

Of the 340 managers who participated in the survey

- 202 came from the Business Application Research Center (BARC) panel, and the answers they gave had already been included in an international analysis entitled 'Big Data Use Cases 2015 – Getting real on data monetization'.
- 103 participants were surveyed by Smart Data Accompanying Research – of which around a quarter (26 respondents) are also part of the 'Smart Data - Innovations from Data' technology programme operated by the Federal Ministry for Economic Affairs and Energy.

- The remaining 35 participants are members of VOICE Bundesverband der IT-Anwender e.V.

Data plays an important role for all of the companies included in the study. Three out of five respondents stated that their company/organisation used ongoing data analysis as a basis for optimising decision-making and processes (21 per cent) or that decisions are made based on data-based analysis, throughout the whole of the company (39 per cent). At an international level (BARC study), some 28 per cent of companies rely on ongoing data analysis in order to help them make their decisions.
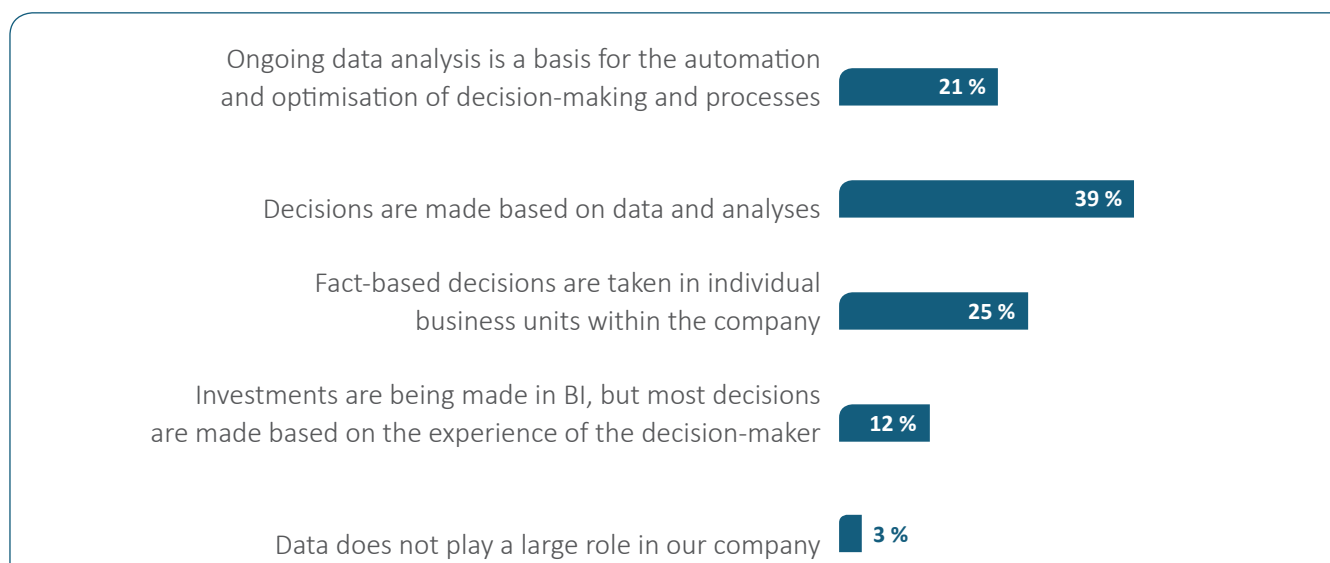


Figure 11 What is the role of data in your company or organisation? (n=332)

As little as 15 per cent of respondents said that big data initiatives formed a core part of company processes, and 24 per cent are currently piloting a big data initiative. However, a clear trend can be identified here: according to the 'Big Data Use Cases 2015 – Getting real on data monetization' study by BARC, the corresponding figures in 2013/2014 were 12 per cent and 18 per cent respectively (n=340).
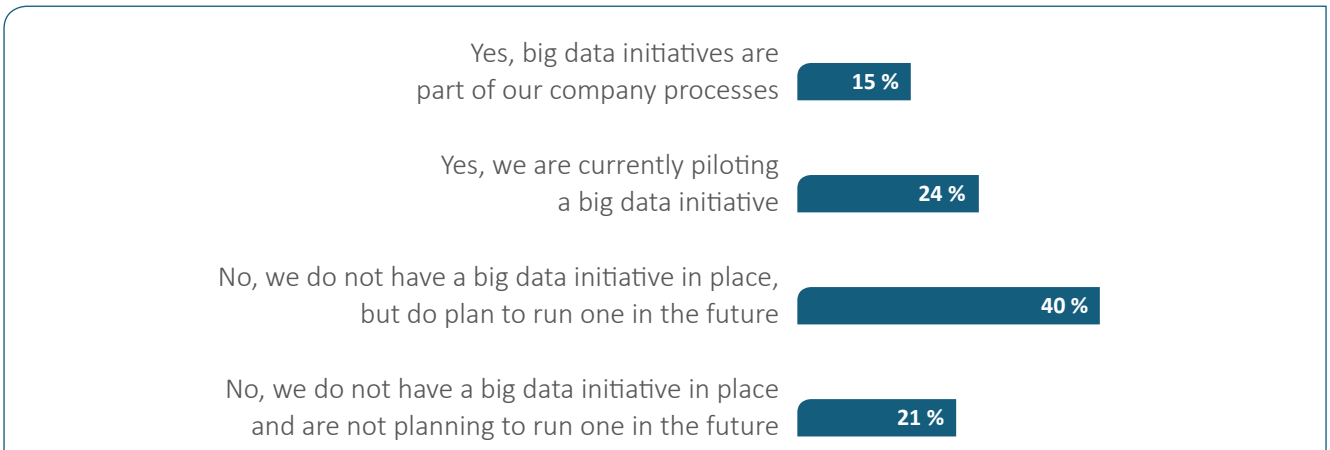
Figure 12 Does your company/organisation have a big data initiative in place? (n=327)

- Yes, big data initiatives are part of our company processes: **15 %**
- Yes, we are currently piloting a big data initiative: **24 %**
- No, we do not have a big data initiative in place, but do plan to run one in the future: **40 %**
- No, we do not have a big data initiative in place and are not planning to run one in the future: **21 %**

Most of the respondents came from industry (22 per cent), the services sector (21 per cent), and the IT sector (15 per cent). Other experts were drawn from the public sector, trade and finance, and energy and logistics.

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| Sector | Percentage |
|---|---|
| Industry | 22 % |
| Services | 21 % |
| IT und telecommunications | 17 % |
| Public Sector | 10 % |
| Trade | 9 % |
| Finance | 6 % |
| Energy and utilities | 4 % |
| Transport | 3 % |
| Other | 8 % |
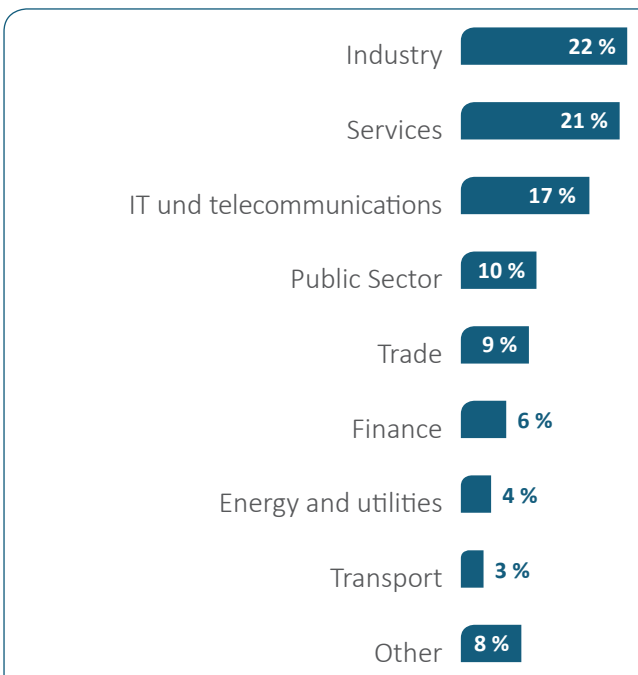
Figure 13 In what sector does your company work? (n=340)

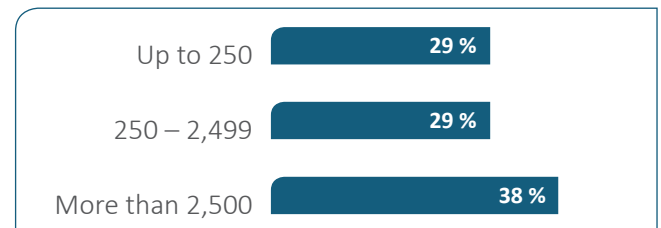| Employees | Percentage |
|---|---|
| Up to 250 | 29 % |
| 250 – 2,499 | 29 % |
| More than 2,500 | 38 % |

Figure 14 How many employees work at your company world-wide? (n=339)

A third of the respondents (34 per cent) work in IT. One in five work in finance/auditing, and 14 per cent in management. Similarly, some 14 per cent work in research and development, and in science.



Figure 15: In what area do you work? (n=296)

# About the participants

**Smart Data - Data Innovations**

As part of its technology programme entitled 'Smart Data - Data Innovations', the Economic Affairs Ministry is providing approx. €30m in funding from 2014 to 2018 towards a total of 13 flagship projects which are intended to open up the future big data technology market for German firms. The participating companies and organisations are contributing an additional €25m meaning that the programme has a total funding volume of approximately €55m. Smart data is part of the German government's new High-tech Strategy and the Digital Agenda. Smart Data Accompanying Research is supporting the research projects being undertaken as part of the technology programme so that they are implemented as efficiently as possible. It works to link up the individual research projects and ensures that findings are translated into marketable products and services as far as possible. More information about the smart data technology programme can be found here: www.smart-data-programm.de.

**Business Application Research Center**

As part of its technology programme entitled 'Smart Data - Innovations from Data', the Economic Affairs Ministry is providing approx. €30m in funding from 2014 to 2018 towards a total of 13 flagship projects which are intended to open up the future big data technology market for German firms. The participating companies and organisations are contributing an additional €25m meaning that the programme has a total funding volume of approximately €55m. Smart data is part of the German government's new High-tech Strategy and the Digital Agenda. FZI Smart Data Research is supporting the research projects being undertaken as part of the technology programme so that they are implemented as efficiently as possible. It works to link up the individual research projects and ensures that findings are translated into marketable products and services as far as possible. More information about the smart data technology programme can be found here: www.smart-data-programm.de.

**VOICE Bundesverband der IT-Anwender e. V.**

VOICE Bundesverband der IT-Anwender e. V. (German Federation of IT Users) brings together and represents the interests of IT users. Its core focus is on cooperation and networking, which makes it an ideal platform for dialogue, the transfer of knowledge, and exchange of best practices between decision-makers in applied IT. VOICE provides its members with targeted and tailored services that support them as in their work to create the right environment for the application of IT systems, in order to make companies even more successful. It not only organises regular meetings based on different working groups and meeting formats (round tables, special interest groups etc.), but also provides access to information and the opportunity for exchange via its online community platform. More information is available at www.voice-ev.org.

# List of figures

# Notes

# Notes