

Interactive Analytical Storytelling

From the Fireplace to the Boardroom

2017

BARC Research Study

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This independent study was conducted and written by BARC, an objective market analyst.

This study is available for free thanks to Cognizant and Qlik.



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From the Fireplace to the Boardroom

Companies around the world are being flooded with data from an ever-growing number of sources. Pulling information and insight out of this data is a complex venture, but data discovery endeavors don't end when new patterns have been detected and possible measures have been derived from the insight gained. Communicating insights and proposed measures in an inspiring way is crucial to change the behavior of the individuals within an organization and the behavior of the organization itself.

Storytelling has a long tradition in human history. It is used to transmit important messages and make them more memorable by wrapping them in stories that resonate with the audience. A trend called "data storytelling" has emerged recently. Data storytelling is used to support the communication of insight gleaned from complex analytics within corporations. It uses methods originally developed at the fireplace, long before the invention of writing, to complement traditional reports in the delivery of information. When the interactive discussion of stories leads to collaborative analysis and new findings, data storytelling advances to interactive analytical storytelling, which makes use of special features and functions in tools to actively promote collaborative analysis.

This survey will answer the following questions:

- Are companies familiar with data storytelling and do they already embrace it to spread knowledge gained from complex analysis?

- What is the current value of information for decision-making?
- How do companies tackle the challenge of linking discovery with the communication of insight to a growing audience?
- What foundations have companies developed to support efficient data storytelling based on the growing number of data sources now available as a result of the accelerating progress of digitalization in recent times?

This study is based on empirical research and explores the current state and future plans of data storytelling within European organizations. It is being distributed free of charge thanks to sponsorship from Cognizant and Qlik. The survey was conducted and written independently by BARC. The sponsors had no influence over the BARC panel (the main source of responses to this survey), the data cleansing and data analysis processes or the presentation of the results.

The survey on data storytelling was conducted in September and October 2016 by BARC – a CXP group company. BARC is a leading enterprise software industry analyst and consulting firm delivering information to more than 1,000 customers each year. For more details on demographics and methodology, please refer to the appendix.

The authors would like to thank all participants of this and future BARC surveys for their valuable input.

Management Summary

Data relies on us to give it a voice. Data storytelling has emerged as a sophisticated method for explaining the meaning of data and insights gleaned from complex analytics to foster action. In the age of digitalization, acting on insights from data is key to staying ahead of the competition. Gaining insights from data sources increasing in number, volume, variety and complexity requires state-of-the-art analytics.

Data lakes, data preparation and advanced analytics deliver insights that often need more in-

terpretation and explanation than traditional reports. Data storytelling is a method to provide context, meaning and a call to action. This survey examines the complete information chain from retrieving data from its sources to preparation for analysis, the analysis itself, the visualization of findings and finally the composition of data stories.

The key findings of the study can be summarized into three hot spots to highlight their importance:

Hot Spot 1

Data storytelling has the potential to enhance the understanding and spreading of knowledge gleaned from data and analytics

Management is reported to be the main recipient of data stories within corporations. This is perfectly understandable. Strategic decisions can have a big impact on the profitability of an

enterprise so they should be well founded. The benefits of evidence-based decisions as opposed to gut decisions justify the extra cost of preparing data stories.

Hot Spot 2

Despite the perceived importance and expected benefits of data storytelling, its usage is still low compared to other analytical formats

The concept of data storytelling is a relatively new trend in analytics. It is not widely known and few tools support it properly. PowerPoint and Excel are the most widely used tools for creating data stories, followed by enterprise or departmental BI solutions. Analytics solutions with specialized features to facilitate interactive

analytical storytelling are used less frequently than the aforementioned alternatives. Still, evidence shows that much can be accomplished without huge investments in front-end solutions, but increasing maturity and competition will bring with it improvements in dedicated features for data storytelling.

Hot Spot 3**Power users rather than quants are the primary storytellers in European organizations**

Contrary to our expectations, data scientists and data artists, two professions explicitly devoted to analyzing data and communicating results, only play minor roles in data storytelling. Data stories in today's companies are mostly built around data from internal and structured sources. Understanding these data sources is the domain of tech-savvy power users who

know their business well rather than that of specially trained statisticians. Our survey respondents attach little importance to advanced and predictive analytics, corroborating the assertions above. Limited technical expertise and a focus on internal data also limit the vision of what's already possible and feasible when dealing with data, leading to less than perfect results.

What is Interactive Analytical Storytelling?

Today's advanced analysis methods and the increasing availability of data are putting ever more pressure on established business structures to change. Decisions based on intuition and experience are increasingly being challenged by decision-making driven by data or unbiased statistics. This is not just a trend in business driven by technological progress, but it also applies to society in general. However, organizations are exploring new approaches to include the collective knowledge of employees in the decision-making process.

Spreading information stored in business intelligence systems and analytical insights, an important part of the collective knowledge, is still a major issue for today's organizations. Low adoption rates of classical BI systems, as regularly shown in BARC's BI Surveys, and the benefits companies expect from the pervasive usage of their information assets prove that there is a huge gap between wish and reality that many companies have to close in order to survive the pressures of digitalization.

Many software vendors are currently evolving their analytics suites to promote the use of information for decision support. Most approaches towards pervasiveness are based on facilitating

the consumption of predefined content or on easy-to-use analytics with better visualization, user guidance or flexibility. However, not too many vendors currently focus sufficiently on the explanation and dissemination of findings from analytics journeys. The explicit goal of solutions supporting this last mile of the data journey is to alter the way organizations react to changes in their environment.

Connecting, enhancing, explaining and enriching the output from analytics is the basis for a shared vision on a problem. We have seen that traditional reports or dashboards, even when enriched with annotations, usually fail to convey their messages. Stories allow isolated findings to be connected and weave them into a fabric of reasoning leading to a dedicated call to action. By setting out these connections, the audience can see things they haven't noticed before.

The transparency provided is the ideal ground to question assumptions made with analytics, which is a basic feature of the scientific method. Questioning a message is vital to support its purpose and corporations should no longer live in a pre-fact era. Facts that are the basis for recommendations have to be easily accessible to be accepted or disproved.

Data Storytelling and Interactive Analytical Storytelling

The increasingly complex environment we live in today leaves many of us puzzled. How do we decide which treatment we should consider for our sickness? Which diet will help us to lose weight? Which charity will make the biggest impact with its projects and therefore deserves my donations?

Today we can answer many such questions with a high degree of reliability. How can we do that? We use evidence in the form of data that was collected to support or disprove a hypothesis. But if we want to influence people to pursue the course suggested by evidence (and science), we

need more than mere data or "boring" statistics. We need to create a narrative that not only persuades the audience that a statement is correct, but also encourages them to act in the desired manner. In other words, we have to "sell" our idea to the audience, be they colleagues, business partners or prospects and customers.

Analytics and business intelligence are used to answer complex questions that arise in the course of everyday business. With today's tools, many questions can be answered efficiently and with a high degree of reliability. To get the most out of an analytics landscape, the dissemination

of information is every bit as important as the analytical side of the data discovery process (i.e., data acquisition, selection, filtering, joining and presentation).

Data storytelling augments tables and graphs with annotations, it connects isolated findings through a narrative and does so based on data (i.e., evidence). When using increasingly complex analytics, an important means of building credibility is to not only explain the insight gleaned from data, but also the analytic journey that builds the foundation of the recommendations made. While visualizations are used to present data in an easily digestible form, the narrative transports the explanation of the findings and should always include recommendations on what to do next.

This is why we see data storytelling as the connective tissue and intersection where rational thought meets emotion. The right measures based on proven facts have to be proposed and their execution has to be fuelled by emotion. These two items should not be seen as adversary but should rather be aligned. The full potential of a data-driven organization can only be unleashed when using emotion as a driver for action and doing so based on proven facts.

To sum up our view on data storytelling, BARC uses a definition by Miriam Gilbert describing a

holistic approach: Data storytelling is “a method of delivering messages derived from complex data analysis in a way that allows the audience to quickly and easily assimilate the material, understand its meaning and draw conclusions from it.”¹

Interactive analytical storytelling is an extension of this concept that allows us to dive into the heart of a story as it is being told. The increased interactivity supports storytellers by explaining their story. Questions asked by the audience can be answered instantly without leaving the presentation environment, even if they were not anticipated by the person crafting the story. New angles to look at a problem can be tested or additional data can be used to test or reject a hypothesis.

This conduit enables iterative and collaborative analysis, a precondition to get the most out of your data by allowing business experts to ask and answer the right questions. Storybooks are an integral part of interactive storytelling. They help storytellers share their findings by facilitating the publication of content without losing the interactivity that allows consumers to thoroughly analyze it. Interactive stories can also be updated easily and automatically with new data to check whether the premises a story was built on still exist.

Data Lakes

The data lake is a broad data management concept and is commonly understood as a vital enabler for data-driven companies. It promises a fast, efficient, low-cost way to manage, use and analyze any amount of data from different systems with varying structures. In general, data lakes focus on data availability and providing

downstream applications with schema-free data that is close to its raw format, regardless of origin. A systematic review of the concept of data lakes, its benefits and potential can be found in this year’s BARC survey “Hadoop and Data Lakes”.

¹ Data Stories, Miriam Gilbert <http://de.slideshare.net/miriamgilbert08/data-stories-workshop-34390209>

Data Preparation or Data Integration for Business Users

Business users demand a fast and flexible analytical landscape from their IT departments. However, a lack of resources and complex, historically grown systems are common obstacles standing in the way of efficient and agile delivery. Smart data management is key for business success, especially in the field of digitalization where data and analytics are of growing importance and influence on businesses.

As a result, data management tasks, primarily in the field of data integration, are being shifted

from IT to business departments. Deployment scenarios for data preparation range from self-service BI tools directly accessing operational or analytical systems to specialized self-service data integration (DI) tools for supplying analytical models or explorative sandboxes with data. Self-service data integration tools enable business users to deploy and maintain sandboxes in a fast, flexible and self-reliant manner and use them for explorative analysis.

The Current State of Data Storytelling and its Analytical Preconditions

The ultimate goal of data-driven decision support is to gain tangible benefits from analytics. The value of information and how it is used to save costs (e.g., optimization) or increase revenues (e.g., new offerings) show how effectively organizations use their information assets. The importance of certain aspects of data storytelling serves as the starting point for our analysis to find out what mindset fosters successful storytelling initiatives. Currently 36 percent (Figure 1) of our respondents say they use data as a revenue generator to increase the company's turnover by enabling new offers or addressing new

markets. For another 38 percent, this is at least partly the case. An astonishing 85 percent say they are able to use data to optimize resource allocation, which allows them to save costs and act more efficiently throughout their value creation chain.

Compared to the 2014 BARC survey on Information Culture, a greater proportion of respondents in 2016 agreed with all but one of the statements in Figure 1. This verdict doesn't come as a huge surprise considering the buzz around digitalization and associated topics like customer experience, IoT, mobility and cloud.

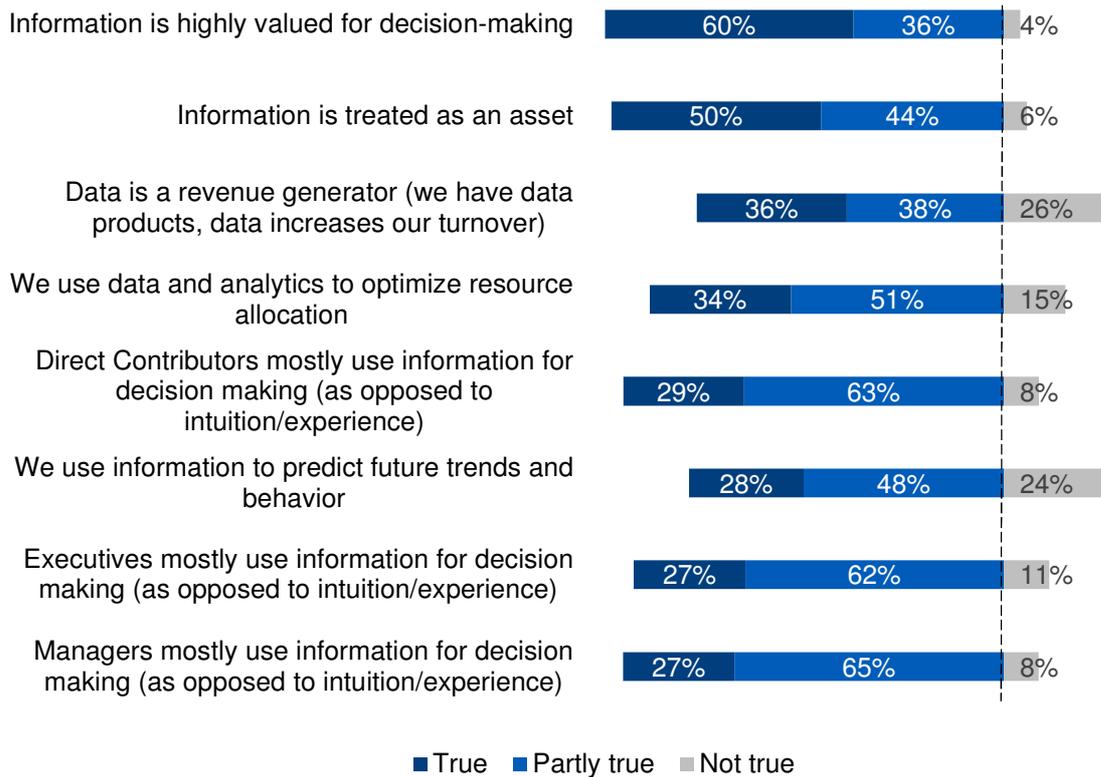


Figure 1: Which statements about the value of information in your organization do you agree with (today and in the foreseeable future)? (n=250)

Classic BI is still dominant when it comes to distilling insights from data. Standard or enterprise reporting is used in almost every company (95 percent, see Figure 2) leaving little room for improvement. Dashboards, which also deliver a strong information push, are available in most companies as well (82 percent). Model-based analysis like OLAP analysis on cubes or ad hoc analysis based on semantic models provides more flexibility for end users to pull information out of their information landscape.

While the need for tool support in traditional areas seems to be mostly satisfied, companies are now planning to invest more in modern approaches. Self-service BI and data discovery have already gained in relevance in today's analytical landscapes with nearly half of those surveyed already providing self-service capabilities to their users. Despite this broad usage, companies are still willing to expand end-user-driven content creation towards a stronger democratization of data access with the ultimate goal of getting the most out of their data.

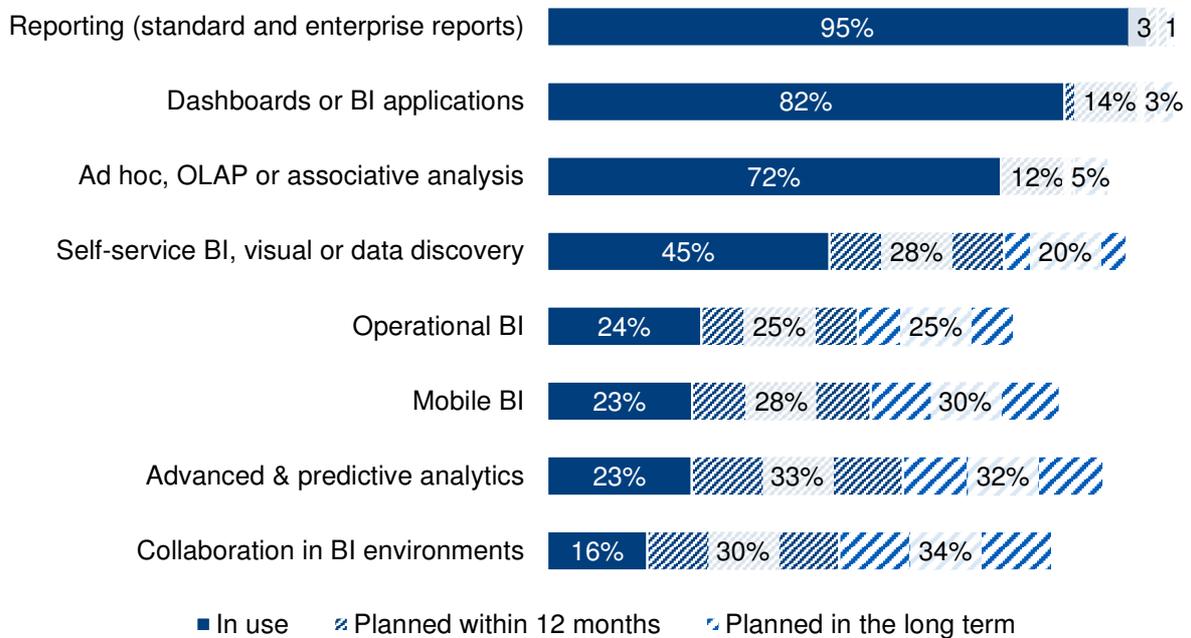


Figure 2: Which analytical formats does your company currently use, or plan to use in the future? (n=249)

Having laid out the analytical formats companies currently have in place, we now turn to the aspects of analytical landscapes that require attention in order to deliver the information needed to enable sustainable success. The most important problem currently appears to be the time needed to adapt to changes in requirements coming from either the evolution of businesses over time or from changes in source systems. Nearly half of all respondents report massive shortcomings when it comes to reacting to changes (48 percent, Figure 3). Another 43 percent somewhat agree they need to be more agile. While the lack

of agility mostly concerns the data delivery back end, the number of people that report issues with communicating insights from data (i.e., the front end), is equally high. One way to address these needs is to complement widely used analytical formats with more context, thus making them easier for recipients to digest. Explaining the meaning of patterns and proposing concrete measures are in the realm of data storytelling. But storytelling also needs to be supported by a flexible back end to facilitate the inclusion of external data to enhance data stories.

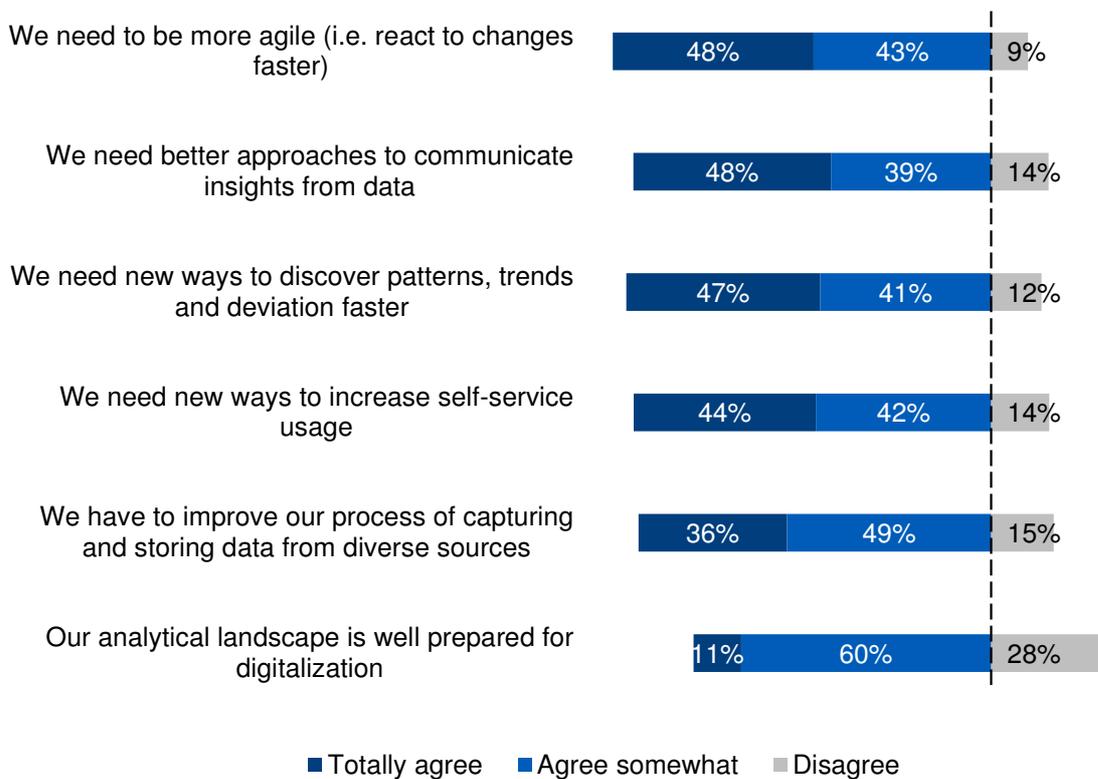


Figure 3: Which statements about digitalization and your organization's analytical capabilities do you agree with? (n=250)

Data Storytelling – Current Usage

Adoption of data storytelling is still relatively low compared to other analytical formats. When analyzing usage patterns in more detail, the adoption rate resembles those of other immature trends quite well. One in ten organizations use data storytelling on a regular basis (Figure 4) to communicate insight and recommended actions to internal or external recipients. 15 percent of respondents state that they have already started to use or are currently evaluating the challenges and benefits of storytelling with a prototyping approach.

About the same number of companies have concrete plans for implementing data storytelling (17 percent). The majority (four out of five) of these respondents want to bring storytelling live in their organizations within the next 12 months. Nearly half of our survey participants have no timetable for the launch of their data storytelling initiatives (49 percent) but still recognize the possibility that the concept will become relevant for them in the future.

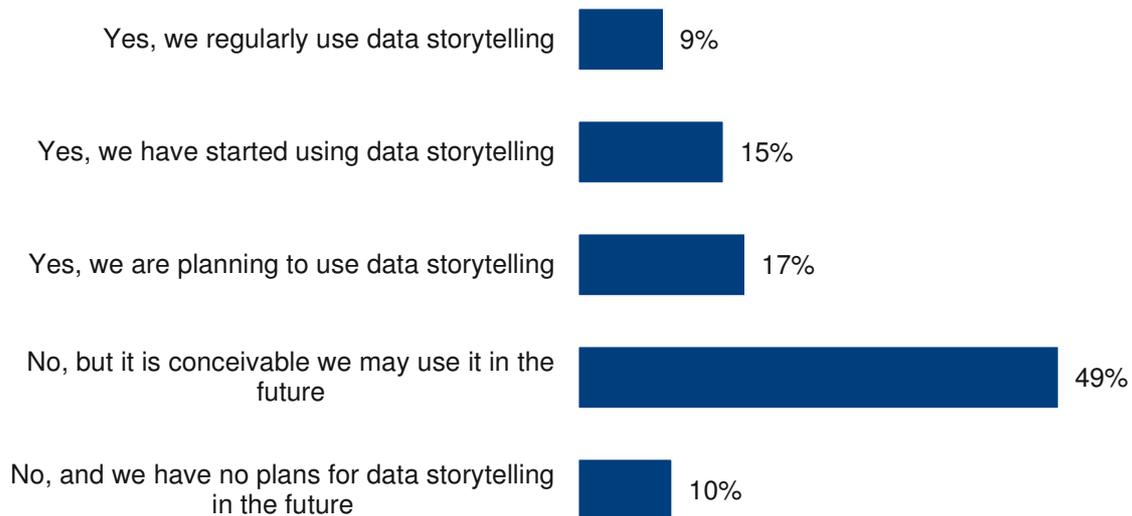


Figure 4: Does your company currently use or plan to use data storytelling? (n=227)

Of those participants who already have initiatives in place or expect to work intensively with storytelling in the future, 19 percent tell us that storytelling already helps them to gain a competitive advantage (Figure 5). Not nearly as many respondents report no impact at all (8 percent).

In general, despite data storytelling’s lack of maturity or broad usage, expectations for it are quite high. Its anticipated benefits are the major rationale for planned spending. Furthermore, these expectations reflect the need to reap the rewards of continuous efforts to improve the an-

alytical landscape by using new ways to communicate insight that actually make a company more data-driven in its approach. So companies see data storytelling as one piece of their analytical landscape that already helps, or will help in the future, to get the most from their data by aligning their method of communication to the demands of the audience.

While the proliferation of self-service tools seems to embrace all parts of the analytical landscape, it hasn’t significantly increased the number of people using BI or analytics. Due to this slow change in usage patterns, BARC cautiously

predicts that storytelling will emerge as the preferred channel for business users to transmit

complicated messages to colleagues or business partners.

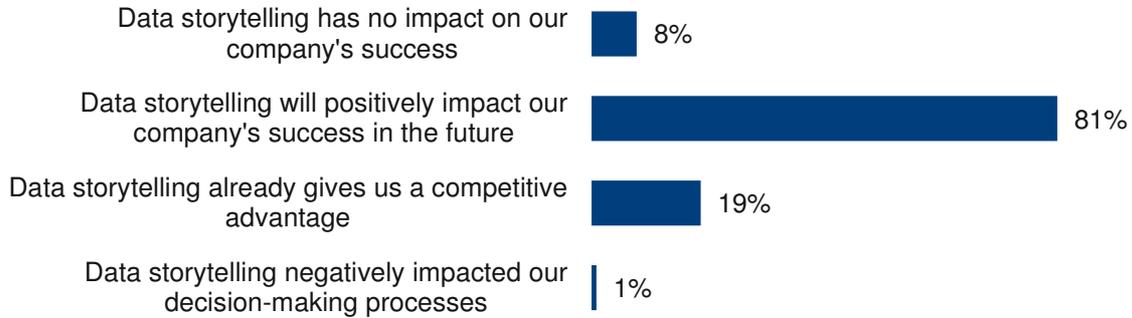


Figure 5: Which statement about the contribution of data storytelling to your company's success do you agree with? (n=171)

Of the few companies that don't have plans or see advantages in using data storytelling, almost two-thirds are not familiar with the concepts of data storytelling or interactive analytical storytelling (Figure 6). Besides this, lack of knowledge, skills and resources are the most frequently cited bars to using data storytelling. Despite the low

coverage of storytelling in specialist BI tools, technical challenges are not the primary inhibitors of adoption. The availability of PowerPoint and Excel, which are currently the main tools for compiling data stories, seems to limit the pressure to implement new tools.

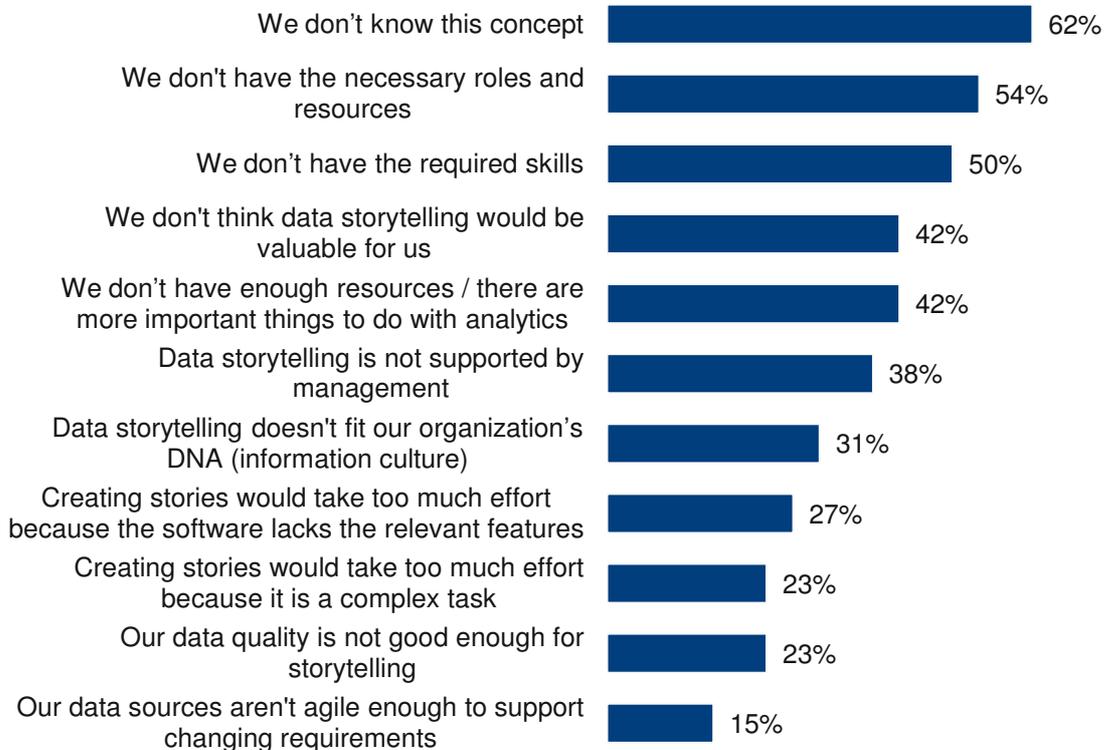


Figure 6: Why does your company not use or plan to use data storytelling? (n=26)

The Organizational Framework

Participants were asked to reveal which departments in their company use data storytelling as a means to spread ideas that are developed on the basis of data. Data storytelling seems to be the domain of management. More than half of recipients said their management level actively creates or receives data stories (56 percent, Figure 7). This comes as no surprise, because data storytelling is meant to influence decision-making. The importance and impact of decisions rises with every level in an organization’s hierarchy and the effort to ground decisions on thorough investigation is outweighed by the cost of wrong decisions.

Among the most important duties of finance and especially controlling departments is to inform management about the current state of the enterprise and assist in the decision-making process. That explains why finance and controlling are so well represented among data storytelling users (46 percent). Marketing and sales have a special affinity to storytelling as a tool in the sales process to convince prospects to become satisfied customers. The skills acquired and the trust in the method lead to a high utilization rate in these departments. At 38 percent, it is much higher than that of most other departments in the value chain.

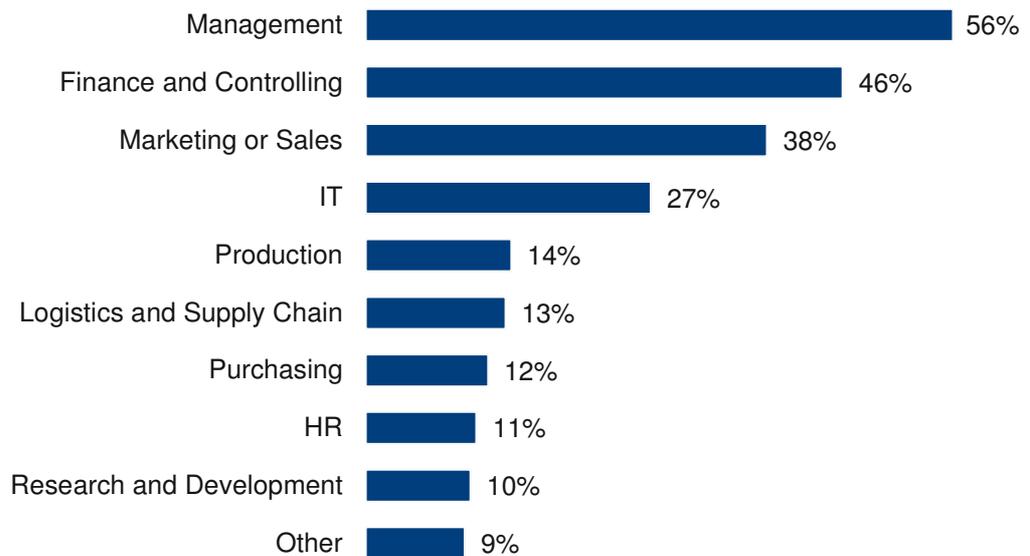


Figure 7: Which departments in your company use data storytelling (as recipients or producers)? (n=180)

Power users, the backbone of many BI and analytics initiatives and the bridge between IT and the various business departments are the key contributors to data stories as they are assigned to perform this task in two out of three companies (Figure 8). Among the most important skills that have to be mastered to build compelling stories and communicate messages convincingly are

the ability to link data and information to developments in the course of business and the environment. Equally important is the understanding of information needs and the motivation of the audience. These skills are regularly attributed to line-of-business employees who are familiar with the available data and the analytic process – which is exactly how you would describe the ideal power user.

Data scientists, although their title might suggest they lead storytelling initiatives, only contribute to storytelling in 23 percent of the cases our survey covered. Employing a specialized data scientist only makes sense if data comes from sources not yet accessible to business users. Applying data science becomes necessary too when data comes in forms or quantities that render the human eye inefficient for pattern detection. Technical skills for preparing data or statistical capabilities for advanced analytics are only required in special use cases. Usually they are not essential when developing stories on top of the structured and cleansed data provided by data warehouse environments. The data artist is

a role created to help communicate results from complex data analysis mostly through visual communication. Only 9 percent of respondents say that data artists are engaged in storytelling endeavors on a regular basis in their companies. This is most likely due to the limited awareness the role still has.

In BARC’s experience, managers (23 percent) are usually the presenters of finalized stories, while members of IT (15 percent) facilitate data acquisition. Going into detail on usage patterns for different roles might be an interesting question to pursue as we observe how data storytelling evolves in the market.

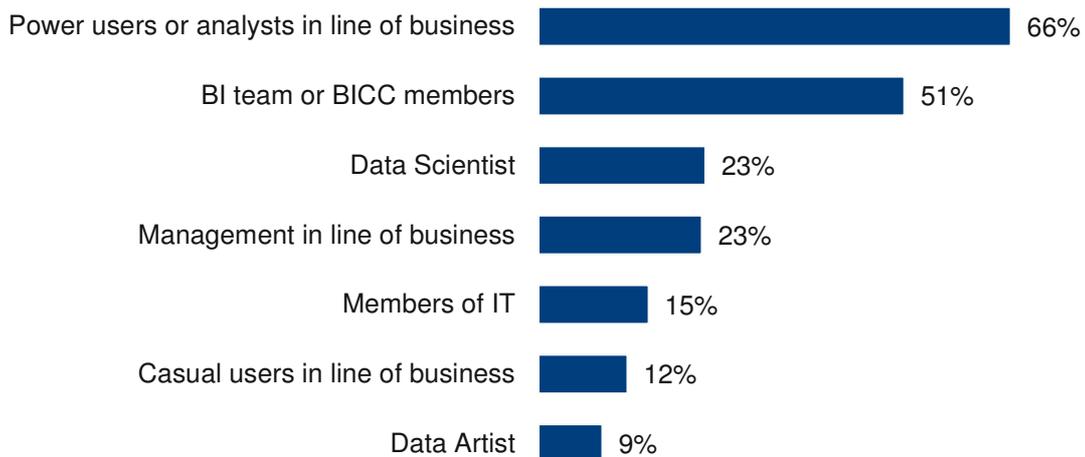


Figure 8: Who (role) is actively creating, contributing or presenting stories today or in the future in your company? (n=201)

Benefits of Data Storytelling

To discover the motivation behind the implementation of data storytelling in organizations, we asked participants whether they agreed with a series of statements about storytelling. These possible answers ranged from a clear commitment to the goals of storytelling to labelling storytelling as just another IT buzzword. More than one half of those surveyed believe that enhancing graphs and tables with a call to action amounts to more than just adding comments. It is seen as a way to increase the chances that

new findings will lead to proper changes (52 percent, Figure 9). Even more respondents think that mere commenting of reports is not sufficient to achieve change.

Beyond the enthusiasm, there is also some skepticism towards data storytelling. For some, traditional reports serve information needs sufficiently (25 percent) without the need to connect isolated information through a narrative. Only a minority feels that there is no need for specialist software to fulfil storytelling requirements.

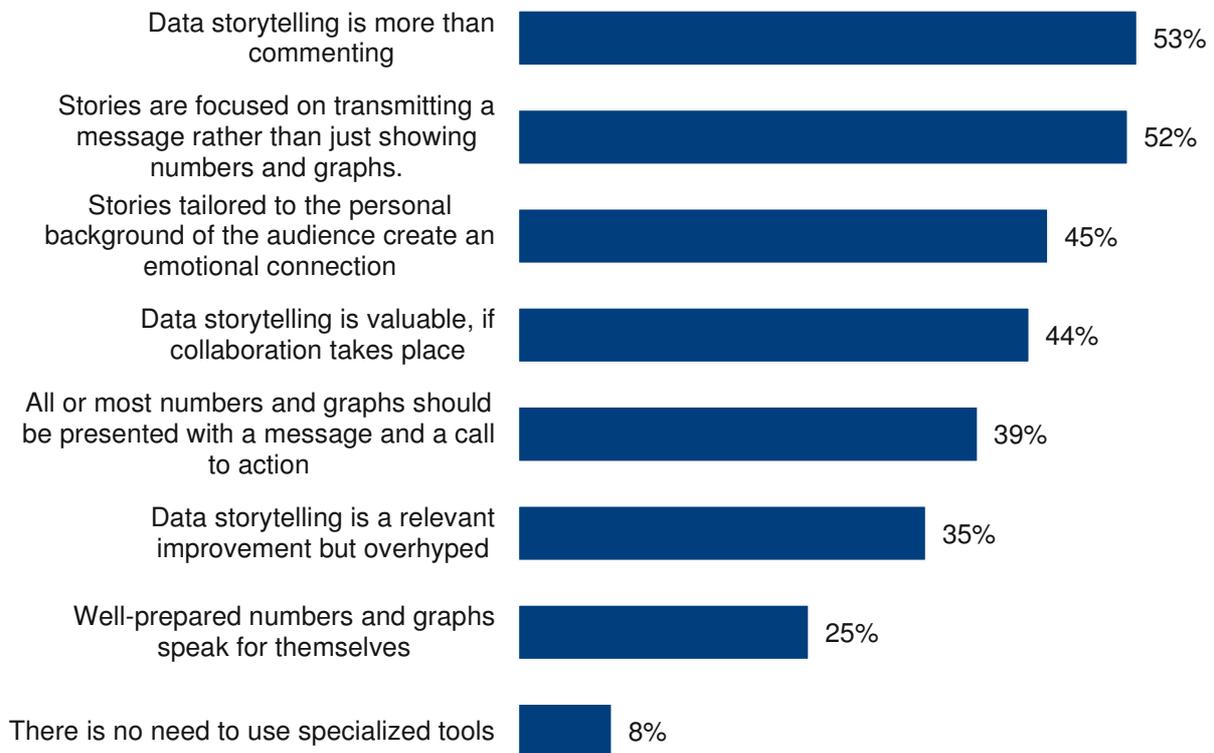


Figure 9: Which statements regarding data storytelling match your personal views? (n=249)

Software Support for Storytelling

The majority of companies surveyed have not yet adopted tools with specialized capabilities for data storytelling or interactive analytical storytelling. Only 19 percent of participants say they use tools specifically designed for storytelling (Figure 10). Office software is currently of paramount importance to companies compiling and presenting their data stories with presentation software (73 percent), well ahead of spreadsheets (54 percent). Excel is often used to prepare data and visualizations despite its lack of features for visual analysis, connectivity and data cleansing. But as we see in many planning and still some reporting landscapes, Excel is held in high esteem for the flexibility it provides as well as the availability of people skilled in using it. Therefore, in use cases where automation and repeatability are less important than speed and flexibility, users often resort to what they know best. However, the evolution of purpose-built functions in BI tools will soon combine the best of both worlds.

Stories are written to be read and data stories are crafted to be presented and discussed. PowerPoint is widely used not only in corporate settings but also in education for that purpose. Again, its availability (software and skills) as well as its rich features for optimizing presentations are more important than the currently available functions for data access and automation in BI tools.

Much like traditional stories, every data story is pretty unique in its design, visualization and message. This inherent uniqueness makes it less feasible to compile stories with today's BI suites that focus on automated delivery of information. Therefore enterprise BI suites focused on classic BI (52 percent) or departmental tools for explorative BI (19 percent) significantly lag behind Office products in terms of deployment or utilization for storytelling. BI tools designed for visually aided data discovery suit storytelling very well due to their flexibility during analysis and their quick and easy approach to visualizations.

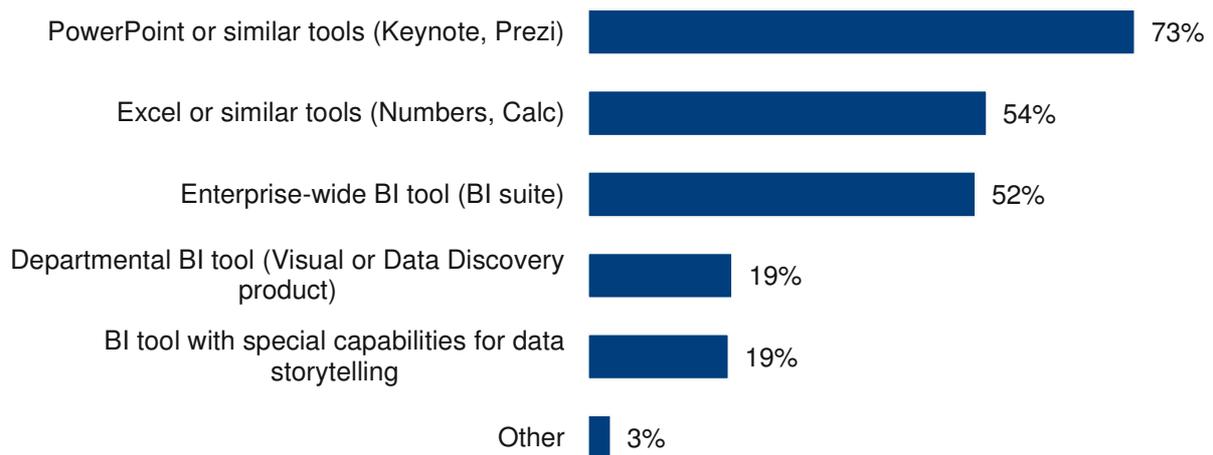


Figure 10: Which tools do you use to create and present stories based on data? (n=178)

Data storytelling is more than just the assembly of nice-looking charts. Nevertheless, supporting good visuals and visual analysis (61 percent use

that feature, Figure 11) is the top priority function adopters should look out for when deploying so-

lutions for storytelling. Comments and annotations are on par with visualization (60 percent). Together with support for highlighting detected patterns or outliers (47 percent), these are the key features necessary to create the building blocks of a story, once the data is available and patterns have been detected.

Snapshots are extremely handy when documenting the analytic journey behind a story. Capturing data and graphs at a certain point in time augmented with information about filters and conditions is a key feature to quickly build transparent and interactive stories. Due to the limited availability of specialized software, snapshots

(33 percent) and similar features are not used too often today.

The huge gap between visualization and storybooks (24 percent) in particular shows that the features valued most in the creation of data stories are the ones that help to produce the content and not those that are used to compile the available components to stories. But we can conclude that if visualization and commenting are covered adequately, adopters can move on to streamline the process of compiling the components. Today this is done in most companies with the help of PowerPoint and therefore without the possibility of providing interactivity and its associated potential.

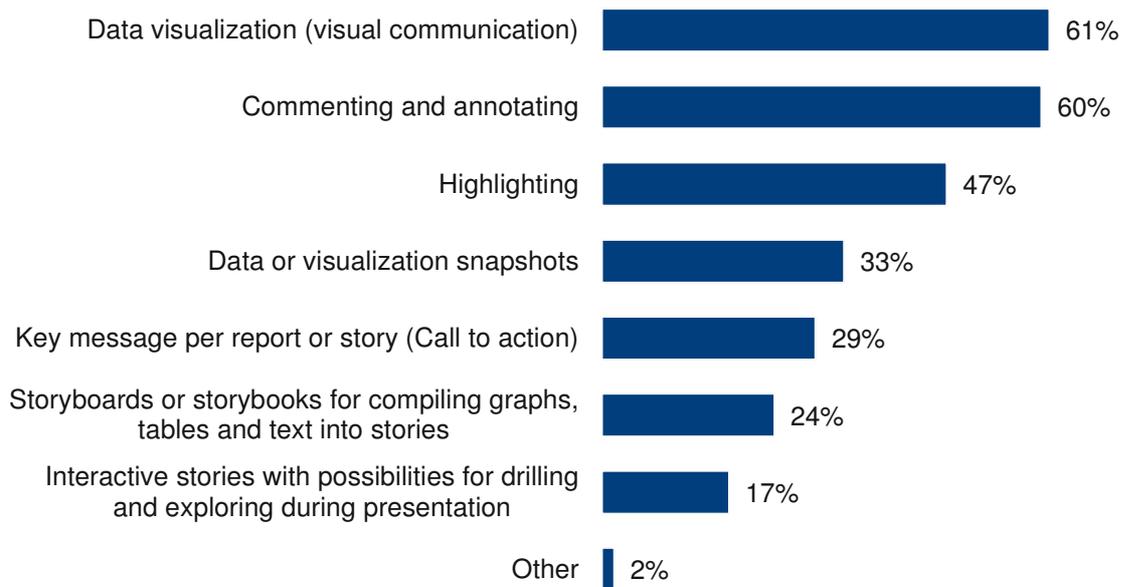


Figure 11: Which features or functions do you use in your company to support data storytelling? (n=178)

The Foundation for Efficient Data Storytelling

Self-service BI and data discovery usage is already widespread in today's businesses. But still, supporting these processes to further increase the number of analytics users is a top priority currently sought by one in five organizations

(21 percent, Figure 12). Organizational improvements are also pursued by a significant proportion of respondents. 14 percent want to focus on empowering users, a necessary step to help build a broader user base.

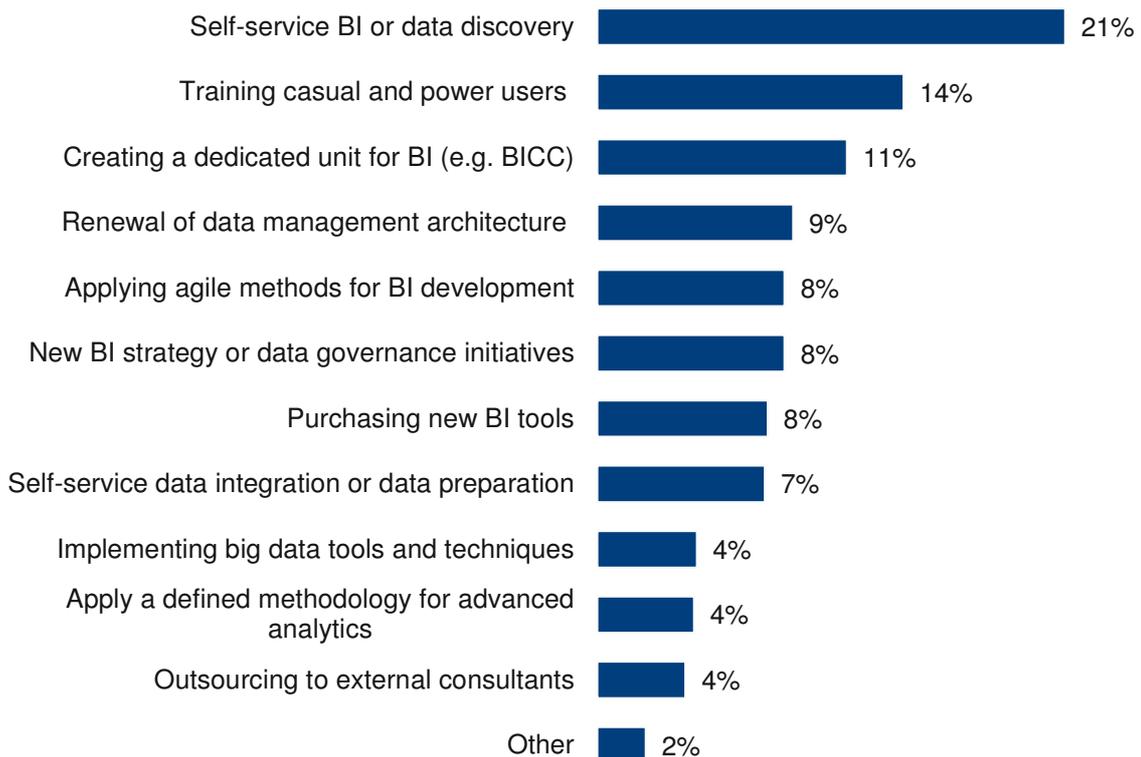


Figure 12: What approaches do you pursue to improve the analytical landscape of your company? (n=250)

While respondents heavily rely on traditional BI to support their rapidly changing information needs, the use of more advanced analytical capabilities to gain insight worth spreading with data stories is quite common. 61 percent of respondents state that visual discovery or data discovery, without the need for comprehensive upfront modeling, are helpful techniques for finding anomalies, patterns or correlations in their data (Figure 13). Roughly the same amount of survey

participants use some form of analysis that relies on predefined models (e.g., OLAP, ad hoc analysis on semantic models or associative analysis), which emphasizes the importance of discoveries in structured and governed data. Regardless of the hype about polystructured data and external data (e.g., open data), companies still see high potential in their internal data. This observation is supported by the breakdown of data sources for storytelling in Figure 14.

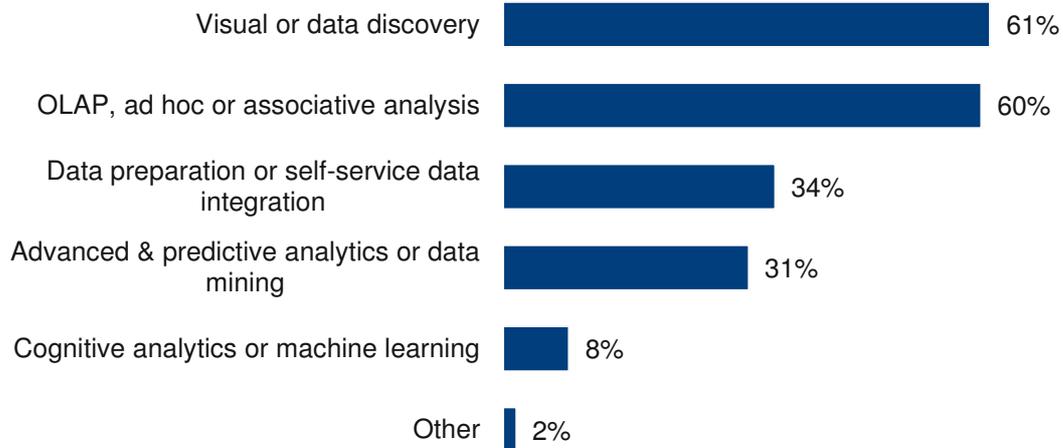


Figure 13: What techniques do you use to find anomalies, patterns or correlations? (n=182)

The availability of external data is often seen as a driver for storytelling, as it can augment internal data and provide context that was much less accessible only a few years ago. But internal and mostly structured data sources (ERP 63 percent and data warehouse 58 percent, Figure 14) are still by far the most important basis for storytelling. So open and external data are nice, but in

most cases they should be blended with internal data and not used as the exclusive source for data stories. Data lakes, which facilitate the use of raw data, are also rarely used (10 percent), as are cloud-based data sources (7 percent), which are still not very popular in Europe.

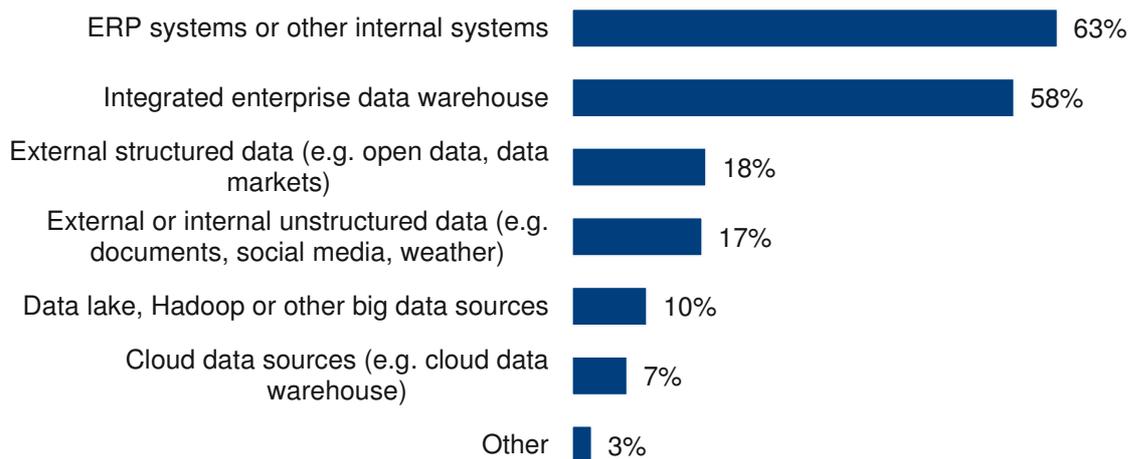


Figure 14: Which data (sources) do you develop stories on? (n=194)

The relatively low importance of data lakes as a major source for explorative use cases (13 percent, Figure 15), which include pattern finding

for storytelling, amplifies our sample’s assessment of the importance of internal and structured data. The ambivalent verdict in BARC’s

recent study on Hadoop and Data Lakes² is shared by the respondents of this survey, show-

ing that the market has yet to offer a clear definition and a common understanding of the concept of data lakes (35 percent).

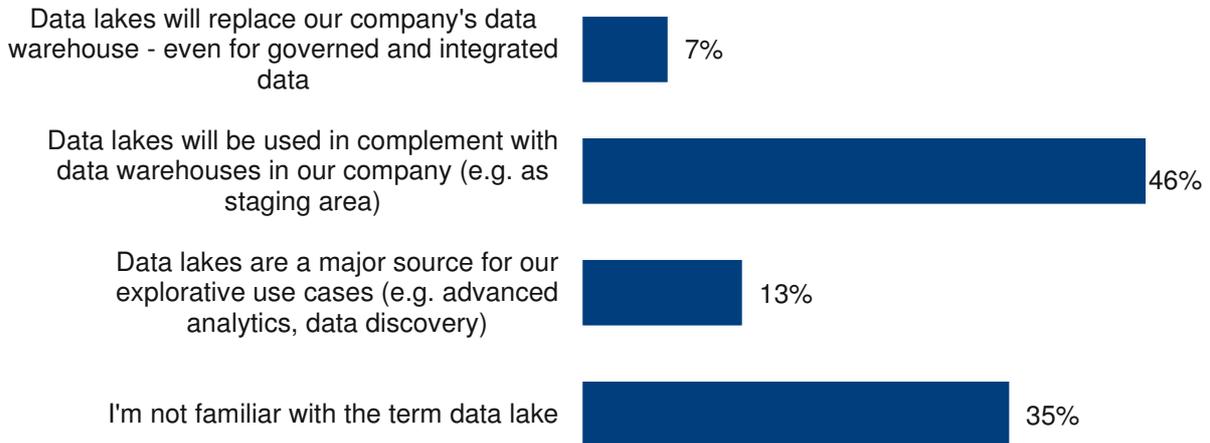


Figure 15: Which statements about data lakes do you agree with? (n=200)

The flexible and agile provision of quickly changing data sources is an imperative for sophisticated analytical landscapes. Data preparation (or data prep) has emerged as an umbrella term for tools supporting data integration for analytics by business users. The majority of our respondents see data prep as an essential piece of the puzzle to provide more agility. 43 percent say they think data preparation is useful to explore new data combinations, which is mostly done using an iterative approach often not feasible in traditional BI delivery models (Figure 16). Quick and self-reliant access to

new or changed data sources is considered important by 40 percent of respondents. On the other hand, a fifth of those surveyed express the opinion that data prep is largely a marketing term used to sell data integration tools usually aimed at IT professionals to business users. Only a minority think that data integration should always be done centrally. The creation of data stories demands more flexible data access and the possibility to quickly and intuitively “play” with data, as opposed to classic reporting where requirements are known upfront and are not expected to change significantly during data analysis.

² BARC Research Study: Hadoop and Data Lakes, Use Cases, Benefits and Challenges

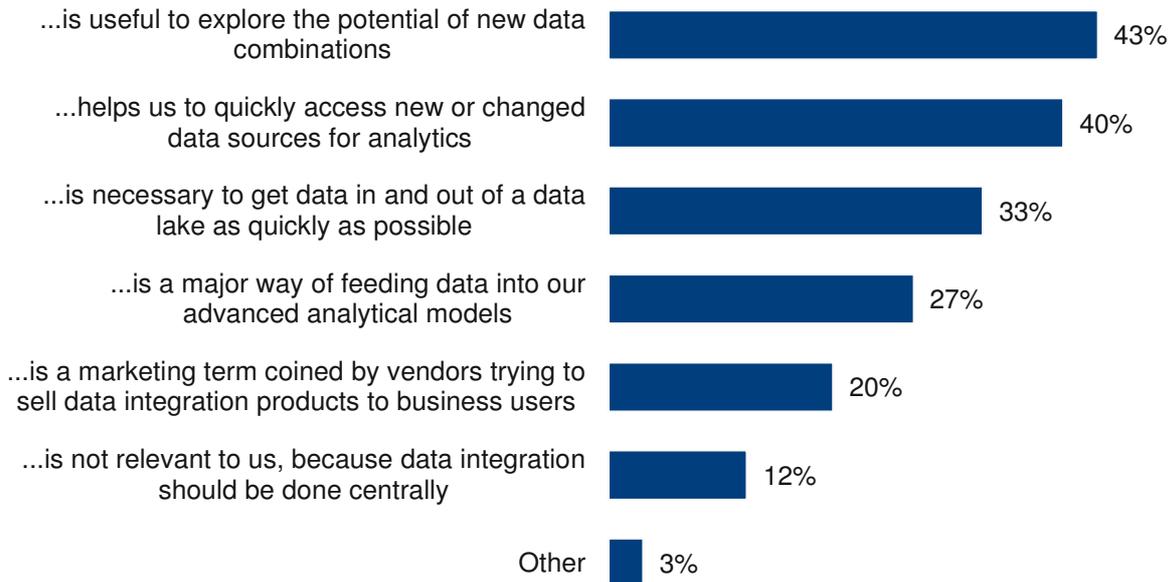


Figure 16: Which statements about data preparation (i.e., self-service data integration) for enabling data storytelling do you agree with? Data preparation (n=197)

To substantially support interactive analytical storytelling, companies have to ensure that their analytical landscape is able to meet requirements for both trust and agility on top of exploding data volumes and sources. While not yet the number one source for data storytelling insight, advanced analytics needs improvement in 83 percent of the organizations surveyed (Figure 17). Enhancing self-service is essential for

79 percent of the European companies questioned. Changes in the data warehouse such as automation (61 percent), alternative modeling approaches (59 percent), use of data virtualization technology or a cloud-based approach (both 62 percent) are at the bottom of corporate wish lists.

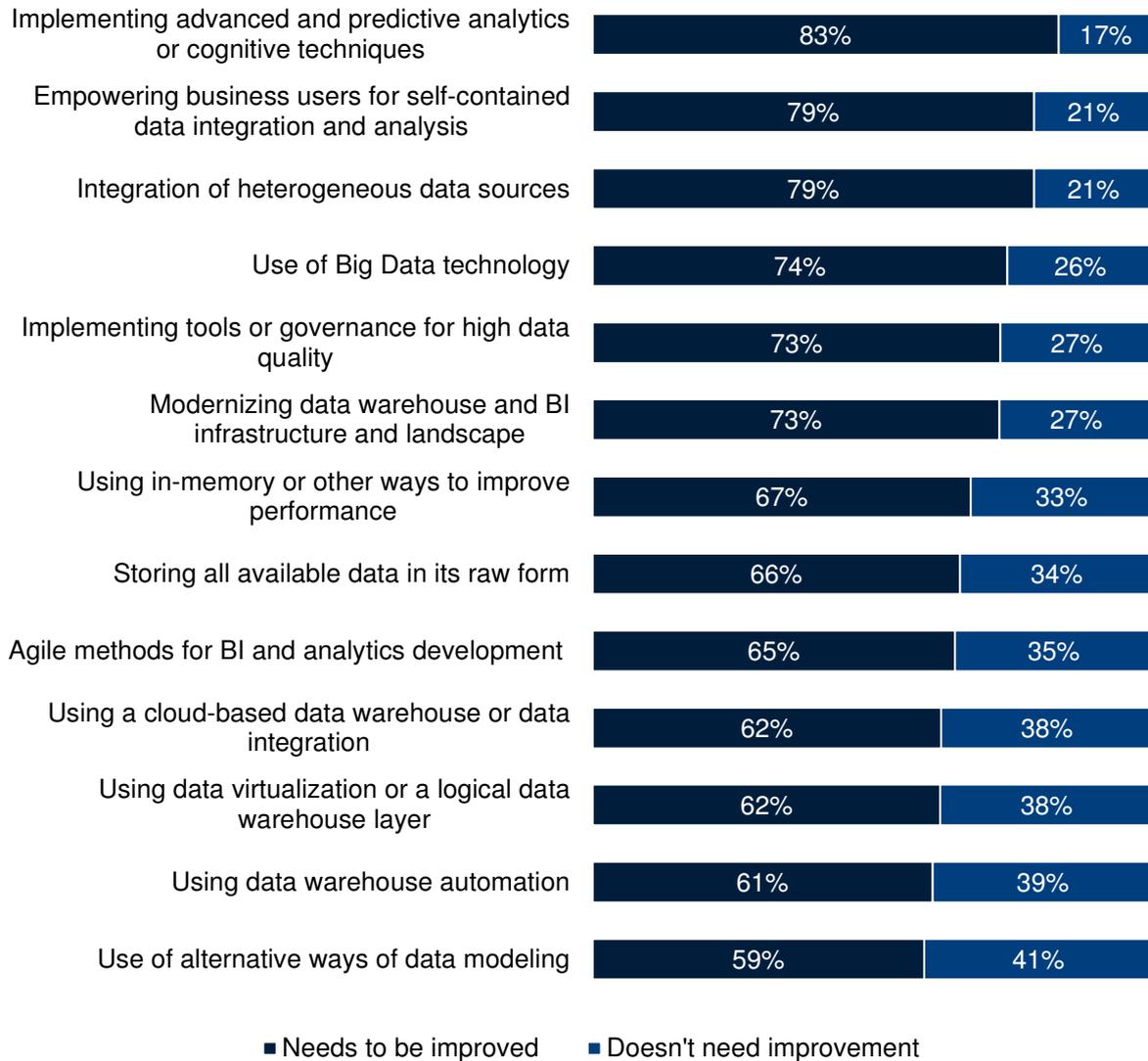


Figure 17: Which of these areas have to be improved to make your analytical landscape more agile and ready for recent trends in analytics (e.g., advanced analytics, data storytelling)? (n=193)

Problems and Challenges

In today’s digital economy, understanding the meaning of data and information has become a vital skill for more and more employees in every company. However, it’s not only the skills to interpret data that have to be nurtured. Providing a large audience with compelling stories requires a different set of skills, which the majority of our respondents seem to be lacking in their organizations (54 percent, Figure 18).

Unlike today’s data science, storytelling is not limited to highly trained specialists. As self-service BI and analytics enable business users to answer their own analytical questions, they are becoming potential storytellers because every insight might be worth passing on. However, 37 percent of our survey respondents indicate that more training is required to make better use of new findings from data research.

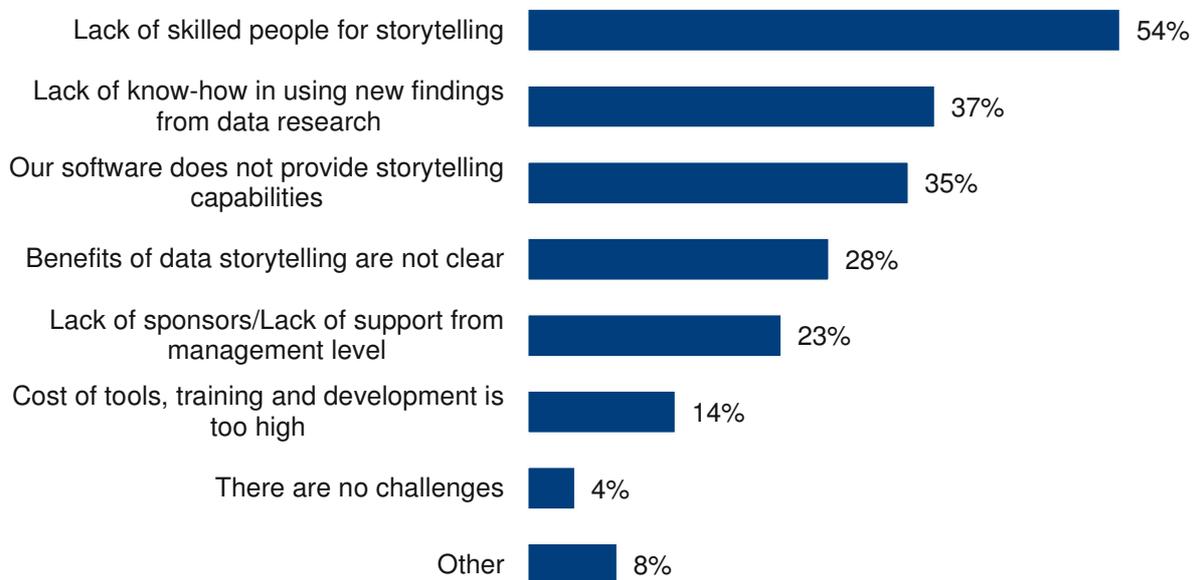


Figure 18: Which problems do you encounter when using data storytelling in your company? (n=207)

The Age of Facts is about to begin

Data storytelling is a relatively new trend in BI and analytics and has yet to gain traction in continental Europe³. This study shows that significant benefits can be achieved by thoughtfully explaining and presenting stories based on facts. The ability to craft sophisticated stories that open new perspectives for their audiences and encourage change relies on a highly effective and agile analytical landscape capable of ensuring the delivery of trusted data. Empowering business experts to search for answers is vital in this age of increasing digitalization. Without efficient and, more importantly, effective means to communicate insight that are easy for

an audience to digest, discoveries will not promote real change. Interactivity is key to support collaboration by enabling “data-dives” in the boardroom, a feature not provided by the ubiquitous Office tools, but one that is increasingly found in modern BI and analytics software. In present-day politics, commentators often argue that the age of facts is over, but storytelling can become a cornerstone in reinforcing data-driven decision-making in today’s leading enterprises.

Based on data from the survey and the findings presented in this study, BARC makes the following four key recommendations:

Point 1: Dedicated features for interactive analytical storytelling

In general, data storytellers are not very well supported by the front ends available on the market today. Although BI tools are used for reporting in almost every company surveyed, they typically do not provide the features and functions needed for interactive analytical storytelling. Due to this shortcoming, Office is by far the software most commonly used for storytelling. BARC expects more and more BI and analytics vendors to blend storytelling capabilities into their products. The most efficient solutions will

be those that are an integral part of an organization’s BI or analytics solution, or are tightly integrated in a way that not only allows the semantic models for data access to be reused, but also the composition of stories built from available report and analytics content. However, efficiency is only one side of the story. Bearing in mind the benefits that can be gained from successful storytelling initiatives, users should consider complementary solutions for a best-of-breed approach if their vendor fails to deliver a compelling roadmap.

Point 2: Power users often make the best storytellers

The professional expertise of business users combined with profound data handling skills is the mixture data storytellers are made of. Business acumen and an intimate knowledge of customer needs gained through everyday experience often trump data science skills. Tool support has to be geared to the needs of these

power users, enabling them to quickly craft convincing stories grounded on trusted data. The dominant storytellers in companies have to be trained in storytelling to spread usage. Power users should also be empowered and motivated to access external or unstructured data to complement and enrich their analysis.

Point 3: Make use of what you already have to get a head start with storytelling

External or open data is an important driver for data storytelling initiatives, yet its relevance for companies already using or experimenting with

storytelling is finite. In an iterative approach towards sustainable adoption, companies should start with data they have already integrated in

³ BARC Research Study: BI Trend Monitor 2017 <http://barc-research.com/research/bi-trend-monitor/>

their analytical landscapes to get to know the upsides and challenges of storytelling in their own unique environments. Storytelling can draw a lot of additional insight from data that is

already in use. The major value data storytelling can add to analytics is in arousing emotions by connecting to people's feelings and thus persuading them not only to think but to act as well.

Point 4: What's the next chapter in interactive storytelling?

The limited technical skills of business users and the current focus on internal data limit what's possible and feasible when dealing with data, leading to less than perfect results. To ensure that data storytelling experiments are rolled out, organizations have to guarantee the continuous flow of data. Only if diverse and comprehensive data is available can storytellers evaluate the advantages of new data combinations. To support this influx of ever-growing

sources and quantities of data, companies need modern analytical landscapes. They should evaluate concepts like data lakes or data preparation as well as creating the organizational framework for substantial collaboration between data science specialists and power users. While power users are the backbone of storytelling in companies, deeper insight relies on teamwork connecting business acumen with a good nose for the right statistical models.

Appendix A: Demography

The online user survey was conducted across Europe from September to October 2016. BARC promoted the survey through Web sites, at events and in email newsletters.

A total of 250 people participated in the survey. Most participants (40 percent) came from Ger-

many, Austria and Switzerland (Figure 19) followed by France and the United Kingdom (both 18 percent), the Nordics (13 percent) and Benelux (12 percent).

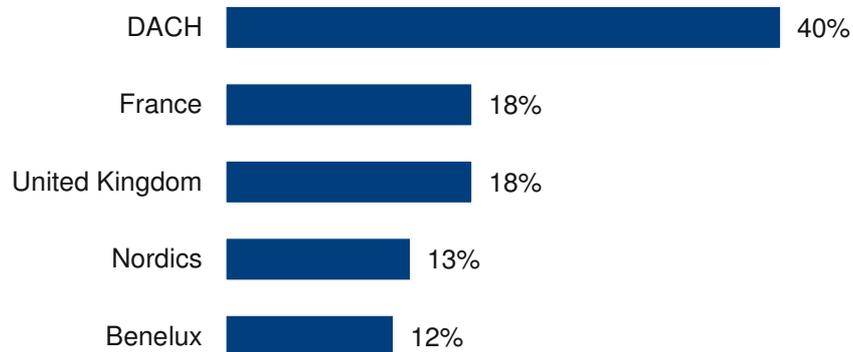


Figure 19: Countries and regions (n=250)

Respondents came from a wide range of industries (Figure 20), most notably services (30 percent), manufacturing (17 percent), finance and

retail (both 12 percent), IT (11 percent) and the public sector (8 percent).

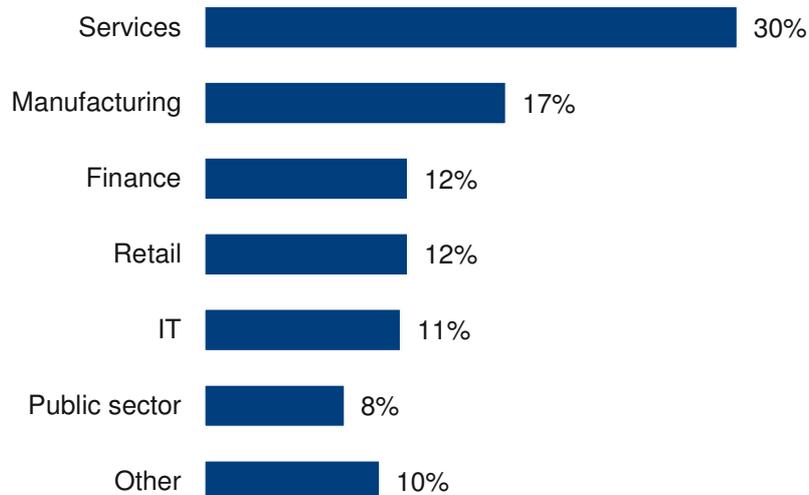


Figure 20: Which of the following best describes your organization's industry sector? (n=250)

Figure 21 shows respondents' company sizes by the number of employees. All company size

classes were well represented in the survey.



Figure 21: How many employees are there in your entire organization? (n=250)

Business Application Research Center (BARC)

www.barc.de

Company profile

BARC is a leading enterprise software industry analyst and consulting firm delivering information to more than 1,000 customers each year. Major companies, government agencies and financial institutions rely on BARC's expertise in software selection, consulting and IT strategy projects.

For over twenty years, BARC has specialized in core research areas including Data Management (DM), Business Intelligence (BI), Customer Relationship Management (CRM) and Enterprise Content Management (ECM).

BARC's expertise is underpinned by a continuous program of market research, analysis and a series of product comparison studies to maintain a detailed and up-to-date understanding of the most important software vendors and products, as well as the latest market trends and developments.

BARC research focuses on helping companies find the right software solutions to align with their business goals. It includes evaluations of the leading vendors and products using methodologies that enable our clients to easily draw comparisons and reach a software selection decision with confidence. BARC also publishes insights into market trends and developments, and dispenses proven best practice advice.



BARC consulting can help you find the most reliable and cost effective products to meet your specific requirements, guaranteeing a fast return on your investment. Neutrality and competency are the two cornerstones of BARC's approach to consulting. BARC also offers technical architecture reviews and coaching and advice on developing a software strategy for your organization, as well as helping software vendors with their product and market strategy.

BARC organizes regular conferences and seminars on Business Intelligence, Enterprise Content Management and Customer Relationship Management software. Vendors and IT decision-makers meet to discuss the latest product updates and market trends, and take advantage of valuable networking opportunities.

Along with CXP and Pierre Audoin Consultants (PAC), BARC forms part of the CXP Group – the leading European IT research and consulting firm with 140 staff in eight countries including the UK, France, Germany, Austria and Switzerland. CXP and PAC complement BARC's expertise in software markets with their extensive knowledge of technology for IT Service Management, HR and ERP.

Cognizant

www.cognizant.com

Company profile

Cognizant (NASDAQ: CTSH) is a leading provider of information technology, consulting and business process services with annual revenue of US \$12.41 billion (2015). Headquartered in Teaneck, New Jersey (U.S.), Cognizant combines a passion for client satisfaction, technology innovation, deep industry and business process expertise, and a global, collaborative workforce that embodies the future of work. With over 100 development and delivery centers worldwide and approximately 255,800 employees as of September 30, 2016, Cognizant is a member of the NASDAQ-100, the S&P 500, the Forbes Global 2000, and the Fortune 500 and is ranked among the top performing and fastest growing companies in the world. Today, Cognizant enables global enterprises to address a dual mandate: to make their current operations as efficient and cost-effective as possible, and to invest in innovation to unleash new potential across their organizations. Visit us online at www.cognizant.com or follow us on Twitter: [Cognizant](#).

About Analytics and Information Management (AIM)

Cognizant AIM is a leading provider of consulting and technology services in the analytics and information management space. Our vision is to be a defining partner to our customers through their business transformation journey and deliver business outcomes. We achieve this vision by combining in-depth domain expertise with analytics and information management best practices that help clients optimize their business decisions. AIM has revolutionized the information management space and helped its clients shape the future with next-gen technologies by leveraging Fast Data (Big Data 2.0), Geo Spatial, IoT (Internet of Things) Data/Analytics, Machine Learning, Cognitive Analytics and Analytical Storytelling. We are aspiring to be the pre-eminent connectors of insight to action in the digital economy.



In this transformational era where data and analytics drive growth there is a need to make sense of this voluminous amount of data. AIM is a committed **data and analytics partner** that organizations can trust to make their best possible **business decisions** to continually improve business and outperform competition. We help clients employing analytics strategy to support business strategy with the help of our proprietary analytics platforms built specifically for better decision-making and timely actions aligned to their business strategy.

Our key offerings include:

BigDecisions™ - Prebuilt Business Solutions Platform to help organizations leverage structured and unstructured data to derive meaningful insights

Biz Apps – Over 20 ready to use business applications on top of BigDecisions™ that span Life Sciences, Banking, Manufacturing, Logistics, Healthcare, Insurance, Telecommunications and Retail.

Data Science Analytics as a service – Our Data Science practice helps our clients apply sophisticated computation techniques on data collected helping clients gain meaningful insights

Cognizant AIM is continually recognized as a Global Business Leader in the data and analytics space by leading industry analysts – IDC MarketScape, Forrester Wave™, Gartner Magic Quadrant, HFS Blueprint, The Kennedy Vanguard™. We have a testimony to our technology excellence and innovation with 40+ industry and customer awards. We have a global client base that includes the leading Fortune 500 companies in Banking and Financial Services, Healthcare, Consumer Goods and Retail, Telecommunications and more.

Qlik

www.qlik.com

Company profile

Qlik® is the leading visual analytics platform and the pioneer of user-driven business intelligence. Its portfolio of cloud-based and on-premise solutions meets customers' growing needs from reporting and self-service visual analysis to guided, embedded and custom analytics, regardless of where data is located. Customers



using Qlik Sense®, QlikView® and Qlik® Cloud, gain meaning out of information from multiple sources, exploring the hidden relationships within data that lead to insights that ignite good ideas. Headquartered in Radnor, Pennsylvania, Qlik does business in more than 100 countries with over 40,000 customers globally.

Company

Founded in 1993 in Lund, Sweden
Global headquarters in Radnor, Pennsylvania (USA)

Products

Qlik provides a fully integrated, simple, and intuitive visual analytics platform that delivers insight at the point of decision. The Company delivers a complete analytics solution that includes:

- Simplified visual data preparation
- Cloud-based upstream data sourcing and delivery
- Self-service and governed data visualization
- Centralized guided analytics
- Collaborative analytics and reporting
- Embedded analytics in any application or web page

Customers

Approximately 40,000 worldwide

Alliances

Approximately 1,700 partners, OEMs, and resellers

Global Presence

More than 50 offices in over 20 countries, including France, Germany, Netherlands, Scandinavia, Spain, United Kingdom, and Japan.

With partner network presence throughout 105 countries in Asia Pacific, Middle East, Africa, and Latin America.

Employees

2,200

Executive Team

Lars Björk, Chief Executive Officer
Anthony Deighton, Chief Technology Officer and Senior Vice President, Products
Rick Jackson, Chief Marketing Officer
Debbie Lofton, Vice President and General Counsel and Secretary
Tim MacCarrick, Chief Financial Officer
Mike Potter, Senior Vice President, Global Engineering
Mark Thurmond, Executive Vice President, Worldwide Sales and Services

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