

# **The BI & Analytics Survey 21**

The voice of the BI and analytics community

## **Sample, KPIs & Methodology**

This document provides readers with background information on the survey sample, KPIs and methodology behind The BI & Analytics Survey 21



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## Survey background

The BI & Analytics Survey 21 follows on from 18 successful editions of The BI Survey (also previously known as The OLAP Survey).

This edition features a wide range of products, not only from the well-known industry giants, but also specialist products from much smaller vendors and open source vendors.

The BI & Analytics Survey provides a detailed quantitative analysis of why customers buy BI and analytics tools, what they use them for and how successful they are. The BI & Analytics Survey 21 is based on the analysis of the real-world experience of 2,591 respondents.

The value of a survey like this depends on having a sufficiently large, well distributed and unbiased sample. This section describes the characteristics of the people who took part in the study and how we recruited them.

### Objectives for the data sample

We had a number of specific objectives when compiling the sample. It must:

- Be large, for statistical reliability
- Include viable samples from as many BI and analytics products as possible
- Be well distributed
- Be unbiased

### A large and varied sample

The BI & Analytics Survey 21 has the largest sample of any survey of business intelligence users available on the market. While a sample of 500 respondents may seem impressive and statistically acceptable, the problem comes when trying to compare sub-samples for, say, individual products.

The BI & Analytics Survey has a rule that, as far as possible, only sub-samples containing 30 or more data points should be reported. It is easy to get sub-samples larger than this for the more widely used products, but less easy for others. Sometimes it is surprisingly difficult to find viable sample sizes for products even from large vendors, such as Oracle. This means that the overall sample needs to be at least 1,000 in order to obtain useful sub-samples.

### Unbiased

To produce unbiased results, we encouraged all vendors to promote The BI & Analytics Survey, eliminating the risk of a small number of vendors encouraging their favored customers to participate without our knowledge. This year a number of vendors promoted The BI & Analytics Survey 21 through their websites, and many emailed not just their customers but also their prospects.

It transpires that many vendors' mailing lists include not just their own customers, but also prospective customers who may well be current or previous users of other vendors' products. This meant that we obtained adequate samples even from customers of vendors who did not promote The BI & Analytics Survey.

We thank the vendors for the professional way in which they collaborated in this venture. None of them attempted to influence the questionnaire or the analysis and presentation of the data.

We are always aware that some vendors could be tempted to enter data themselves, purporting to be genuine customers. Vendors are warned that if we discover examples of this practice, all entries that come via their invitation will be removed from our analysis.

We apply increasingly stringent data cleansing rules, using a number of different tests. We remove all suspect data that purports to be from user sites.

## Notes on reading The BI & Analytics Survey documents

Instead of delivering one long document covering all aspects of The BI & Analytics Survey, the information is divided into several smaller documents.

By providing the raw data via a web-based tool - The BI & Analytics Survey Analyzer - users have the ability to carry out their own analysis of The BI & Analytics Survey results.

The BI & Analytics Survey 21 is divided into several documents, as listed below.

Document	Description
<b>The BI &amp; Analytics Survey 21 - The Results</b>	An overview and analysis of the most important product-related findings and topical results from The BI & Analytics Survey 21
<b>The BI &amp; Analytics Survey 21 - Best Practices</b>	Provides advice to buyers of BI and analytics software as well as users and administrators of existing BI and analytics solutions based on the results of our analysis.
<b>The BI &amp; Analytics Survey 21 - Sample, KPIs and Methodology</b>	This document provides information about the sample and an overview of the survey methodology. It also includes descriptions of the KPIs we use in The BI & Analytics Survey, including details of our calculation methods.
<b>The BI &amp; Analytics Survey 21 - Vendor Performance Summaries</b>	A series of executive reports on each product featured in The BI & Analytics Survey 21. Each report contains a product review by BARC's analyst team plus a summary of the relevant product-related results from The BI & Analytics Survey.

**Figure 1: Overview of The BI & Analytics Survey 21**

The BI & Analytics Survey Analyzer contains information on all The BI & Analytics Survey results and key performance indicators (KPIs). This online tool allows users to carry out their own analysis. The entire sample can be analyzed, and it is also possible to filter results by region, company size and other criteria.

## Survey Overview

This screen shows the responses to a single question in The Survey. You can choose the question in the drop down box at the top of the report. The filters and the view picklist to the left of the screen can be used to modify the chart.

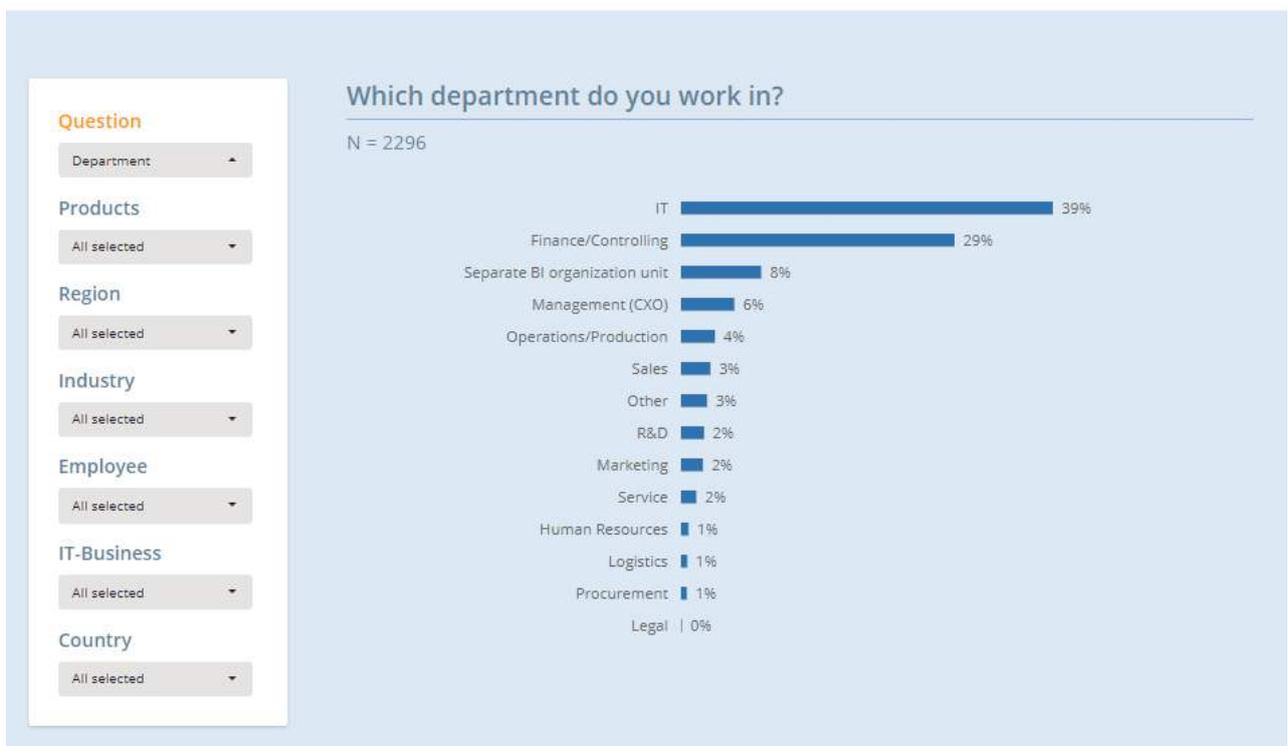


Figure 2: Screenshot from The BI & Analytics Survey Analyzer online tool

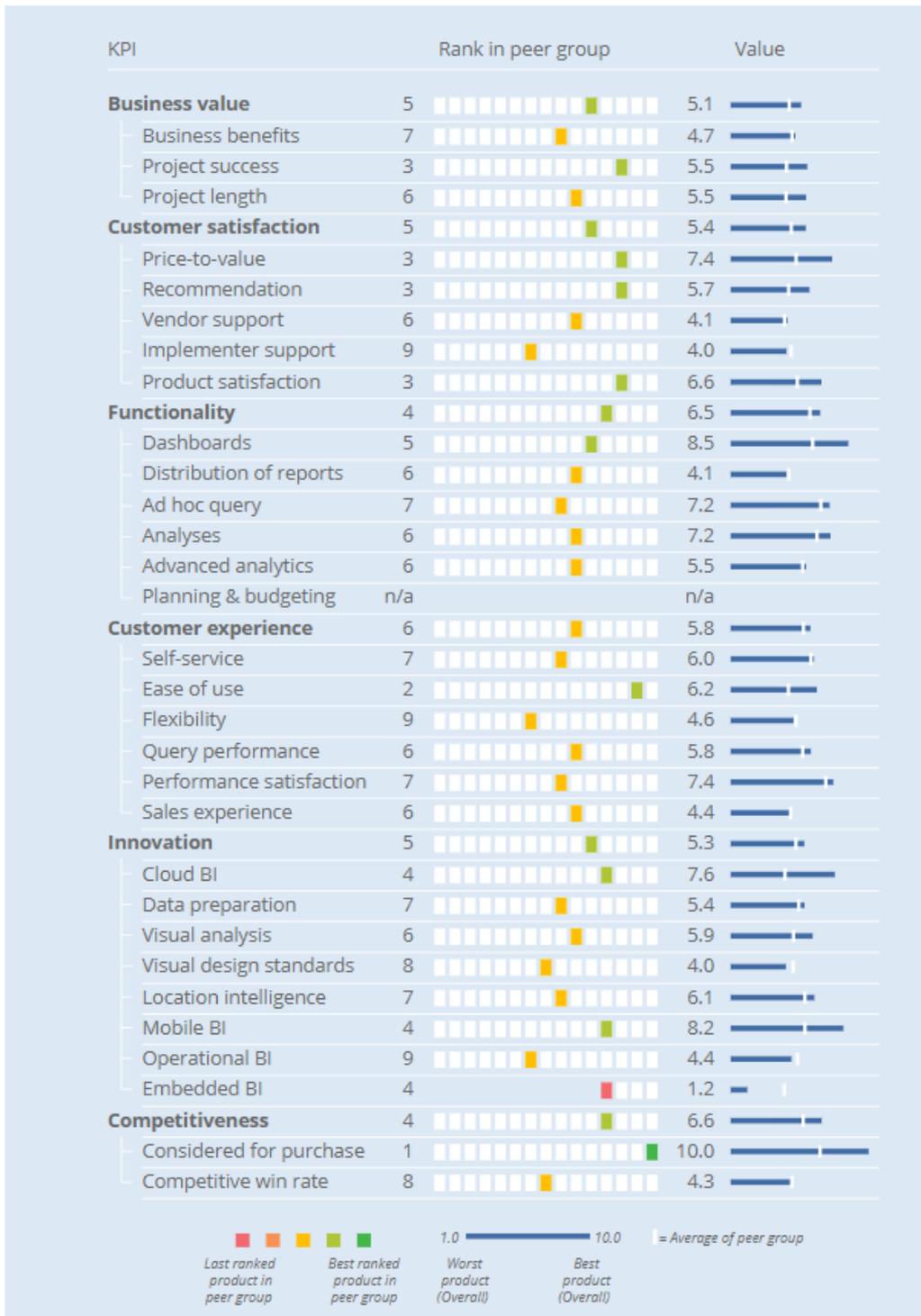


Figure 3: Screenshot from The BI & Analytics Survey Analyzer online tool

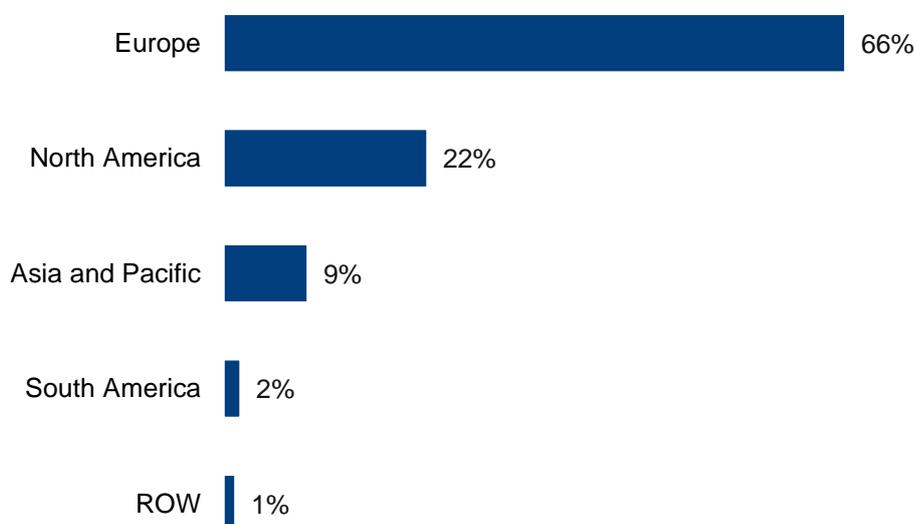
The BI & Analytics Survey documents do not need to be read in sequence. ‘The Results’, ‘Best Practices’ and the ‘Vendor Performance Summaries’ can be read independently.

The ‘Sample, KPIs & Methodology’ (this document) provides additional background information.

## The sample

Most surveys are conducted or sponsored by an organization based in, and focused on, one country. However, BI is a worldwide market and we wanted, as far as possible, to capture a large international sample. This not only presents a more accurate global picture, but also allows international variation to be analyzed.

The three largest BI markets are the United States, Germany and the United Kingdom, so The BI & Analytics Survey 21 was produced as a collaboration between organizations in each of these countries, and in partnership with publishers and vendors in these and other countries. It features not just the well-known US products, but also products from other regions including Europe and Australia.



**Figure 4: Respondents analyzed by region (n=1,675)**

The net result was an extraordinarily international panel. Respondents were located in 88 countries. Four countries were represented by 100 or more respondents, and eleven had 50 or more; 22 countries produced ten or more respondents.

### Sample size and make-up

Hundreds of thousands of people around the world were invited to participate in The BI & Analytics Survey 21 using dozens of email lists, publications and websites. As in previous years, the questionnaire offered different sets of questions for vendors and users (or consultants answering on behalf of users). This seems to produce better quality data as, in the past, some vendors pretended to be users when they saw they were not being asked relevant questions.

Last year's participants who indicated that they would like to be part of our panel received a pre-filled questionnaire with their answers to last year's questions. They were asked to update their responses, and then to answer the new questions in this year's survey.

The results of the online data collected are shown in the following chart, with the numbers of responses removed also displayed.

	Responses	
Total responses	2,591	100%
Filtered during data cleansing	-95	-4%
Remaining after data cleansing	2,496	96%
Not yet considered buying	-54	-2%
<b>Total answering questions</b>	<b>2,442</b>	<b>94%</b>

**Figure 5: Responses removed from the sample**

The number of responses is split between users, consultants and vendors. Vendors answered a different set of questions to those answered by end users. This document focuses on the analysis of the user results.

	Responses	
Users	1,834	70%
Consultants	301	12%
<b>All users</b>	<b>2,135</b>	<b>82%</b>
Vendors/Resellers	307	12%

**Figure 6: Total responses analyzed in The BI & Analytics Survey 21**

## Geographical distribution

One of the key objectives of The BI & Analytics Survey is to achieve a geographically balanced sample that reflects the current global market for BI and analytics products. Therefore, the online questionnaire was published in three languages: English, German and French.

Having a geographically balanced sample has two major benefits:

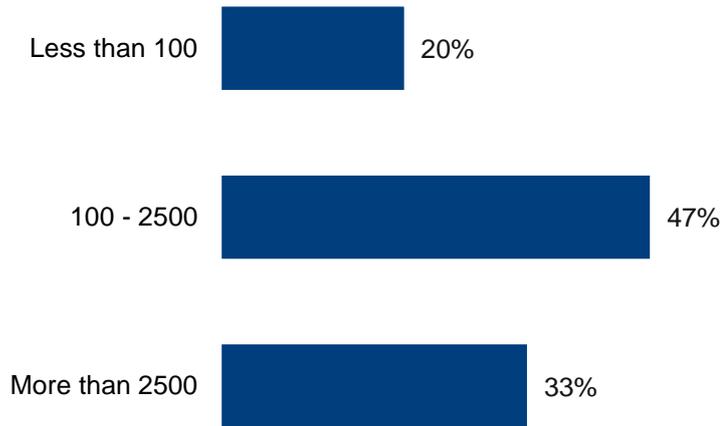
Firstly, the results are more closely representative of the world market, rather than being largely based on US experience, as is the case with many other surveys.

In regions where knowledge of English is sparse, such as South America and much of Asia and southern Europe, it is difficult to obtain a good level of feedback and the BI market is less mature in these countries. Since the fourth edition of this survey, we have significantly boosted the German sample by specifically targeting users in German-speaking countries, using a fully translated online questionnaire. We also used a French questionnaire, further increasing our European coverage.

## Organization sizes by headcount

BI products are most commonly found in large organizations and a high percentage of the responses we receive are from users in companies with more than 2,500 employees.

Nevertheless, we also have a high proportion of mid-sized companies in this year's sample.



**Figure 7: Frequency of employee count in respondent organization (n=2,707)**

The following chart shows the median headcount of respondents' companies analyzed by the product they reported on. Of the products defined in the 'Large international BI vendors' and 'Large global enterprise BI platforms' peer groups, there was a higher median number of employees in customer organizations than the sample average.

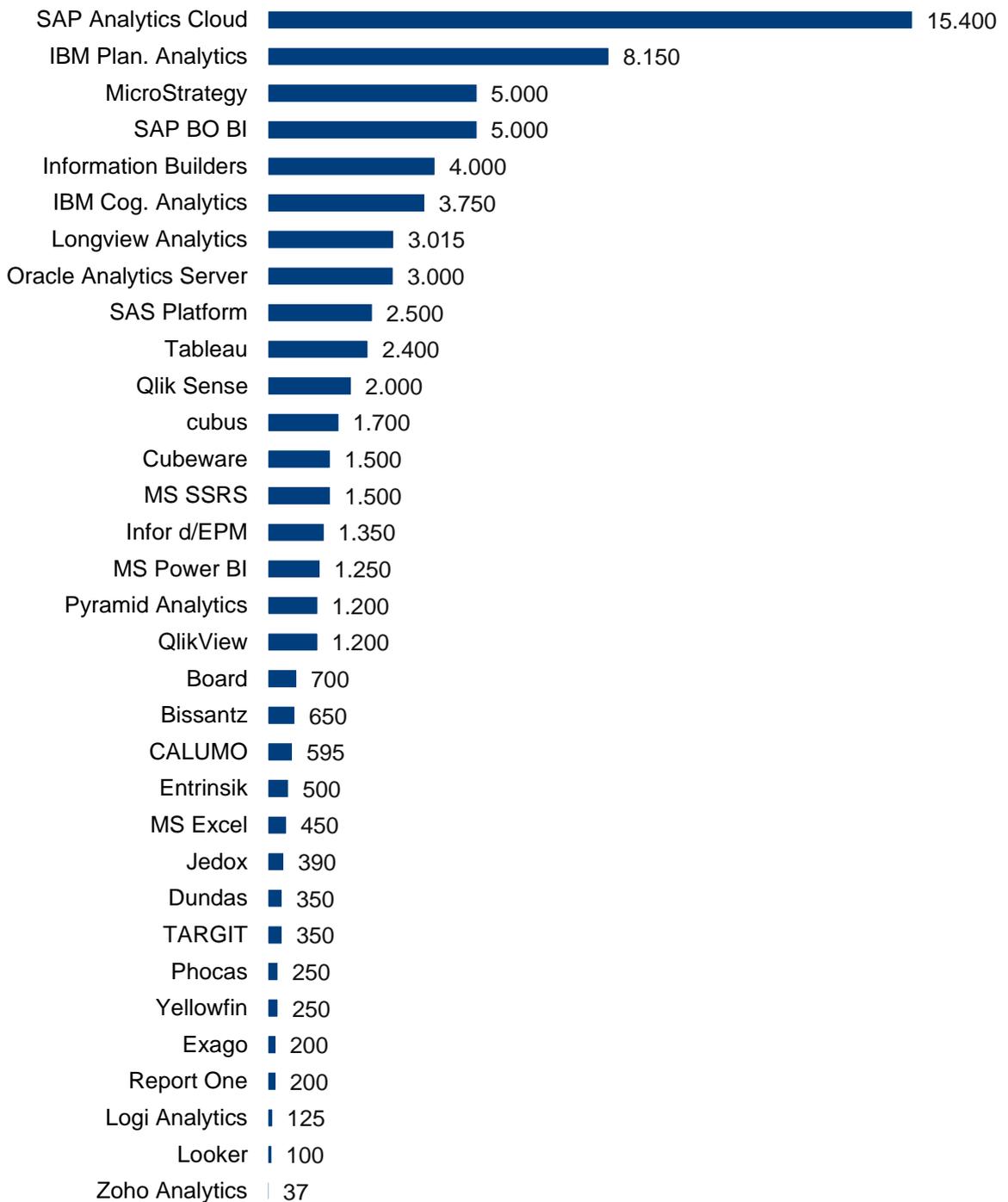
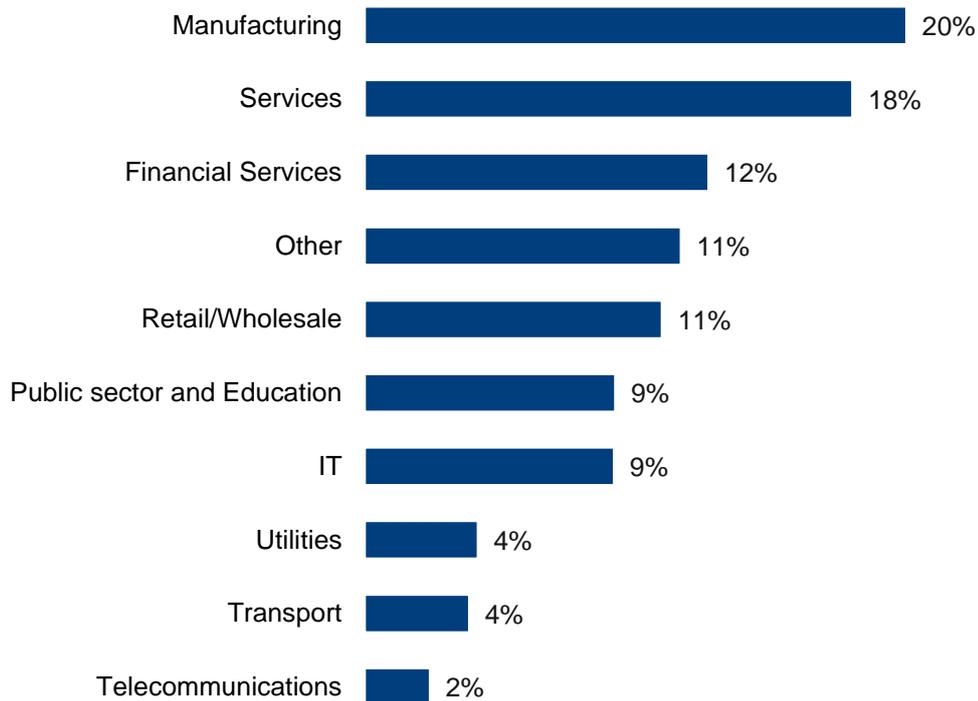


Figure 8: Median employee count of user organizations analyzed by product

## Vertical markets

We asked all respondents their company's industry sector. The chart below shows the results of this question and only includes data from respondents who answered product-related questions in The BI & Analytics Survey. Manufacturing tops the list this year, pushing services back into second place.



**Figure 9: Responses analyzed by industry (n=2,626)**

## Featured products

When grouping and describing the products featured in The BI & Analytics Survey, we do not strictly follow the naming conventions that the vendors use. In some cases, we combine various products to make analysis more convenient. In those cases, we have named the groups of products as shown in Figure 10. Note that the names we use in this document are our own and are not always the official product names used by the vendors.

One of the key reasons for this is that the products we analyze are not necessarily the latest version of the software. Vendors will often change a product's name between versions, making it difficult to have a single official name for several versions of the same product.

Another reason is that we sometimes bundle related products into a single group to increase the sample size, even if the vendor prefers to view them as distinct for marketing reasons. In both these cases, the point is not to challenge the naming conventions of the vendor, but simply to reduce the complexity of the survey findings for the convenience of the reader. In some cases, we also shorten the names of the products to improve the formatting of the charts.

We asked respondents explicitly about their experiences with products from a predefined list, with the option to nominate other products. This list is updated each year and is based on the sample size of the products in the previous year, as well as additional new products in the BI market. Our predefined list can be found at the end of this document. In cases where respondents said they were using an 'other' product, but from the context it was clear that they were using one of the listed products, we reclassified their data accordingly.

We solicited responses on all surviving products with more than a minimal response in last year's survey, plus a few others whose numbers have potentially grown to the point where there is enough data to be analyzed.

The following table shows the products included in the detailed analysis. The number of the 'other' responses is also included in this chart.

Product label	Full product name	
<b>Bissantz</b>	Bissantz DeltaMaster	32
<b>Board</b>	Board	32
<b>CALUMO</b>	CALUMO	30
<b>Cubeware</b>	Cubeware Solutions Platform	40
<b>cubus</b>	Serviceware Performance	44
<b>Dundas</b>	Dundas BI	33
<b>Entrinsic</b>	Entrinsic Informer	33
<b>Exago</b>	Exago	31
<b>IBM Cognos Analytics</b>	IBM Cognos Analytics	52
<b>IBM Planning Analytics</b>	IBM Planning Analytics	32
<b>Infor d/EPM</b>	Infor d/EPM	32
<b>Information Builders</b>	Information Builders WebFOCUS	30
<b>Jedox</b>	Jedox	30
<b>Logi</b>	Logi Analytics Platform	31
<b>Longview Analytics</b>	Longview Analytics	32
<b>Looker</b>	Looker	31
<b>Microsoft Excel</b>	Microsoft Excel	104
<b>Microsoft Power BI</b>	Microsoft Power BI	162
<b>Microsoft SSRS</b>	Microsoft SQL Server Reporting Services	30
<b>MicroStrategy</b>	MicroStrategy Analytics Platform	95
<b>Oracle Analytics Server</b>	Oracle Analytics Server	31
<b>Phocas</b>	Phocas	35
<b>Pyramid</b>	Pyramid Analytics Pyramid	31
<b>Qlik Sense</b>	Qlik Sense	121

<b>QlikView</b>	QlikView	114
<b>Report One</b>	Report One (MyReport Essential, MyReport Business Evolution)	36
<b>SAP Analytics Cloud</b>	SAP Analytics Cloud	44
<b>SAP BO BI</b>	SAP BO Analysis	110
	SAP Lumira Designer	
	SAP Lumira Discovery	
	SAP BO Web Intelligence	
	SAP Crystal Reports	
<b>SAS Platform</b>	SAS Base	31
	SAS Intelligence Platform	
	SAS Visual Analytics and Visual Statistics	
<b>Tableau</b>	Tableau	85
<b>TARGIT</b>	TARGIT Decision Suite	44
<b>Yellowfin</b>	Yellowfin Suite	30
<b>Zoho</b>	Zoho Analytics	32
<b>Other</b>		231

**Figure 10: Products included in the sample (excluding 'don't know')**

The last few years have seen an increase in the proportion of German respondents. This is partly due to cooperation with German vendors and the presence of strong German subsidiaries of international vendors, reflected through providers such as Bissantz, Board, Cubeware, cubus and SAP.

The following table contains the products that generated responses but are not included in the detailed analysis. In The BI & Analytics Survey Analyzer, these products are grouped together under the label 'Other'.

Other Products
Chartio
Corporate Planner
Cyberscience Cyberquery
Dimensional Insight Diver Platform
Domo
evidanza
Halo BI
iDashboards
TIBCO Jaspersoft
OpenText Analytics/Magellan
Pentaho Business Analytics
Unit4 Prevero
CXO Software
IDL CPM Suite
Izenda
DigDash
sales-i
prevero.STARLIGHT BI-Suite
Oracle EPM Cloud
Toucan Toco
JReport
ThoughtSpot
Exago
GoodData
InsightSquared
Dataiku
XLCubed
Qlik NPrinting
Jet Reports

Figure 11: Products in the sample, but not in the detailed analysis

## Peer groups

Peer groups are used to ensure that similar products are compared against each other both in fairness to the vendor and for the benefit of the end user. The groups are essential to allow fair and useful comparisons of products that are likely to compete. They are primarily based on the results from the survey, how customers say they use the product and our knowledge of the products.

Peer groups act as a guide to the reader to help make the products easier to understand and to show why individual products return such disparate results. They are not intended to be a judgment of the quality of the products. Most products appear in more than one peer group.

The peer groups are defined using the criteria described in the following table. These peer groups are used in a consistent way in our analysis as well as in The BI & Analytics Survey Analyzer.

Peer group	Description
<b>Large enterprise BI platforms</b>	Includes products equipped with functionality for enterprise deployments that focus on a broad range of BI use cases.
<b>Dashboarding-focused products</b>	Includes products that focus on creating advanced and highly sophisticated dashboards.
<b>Ad hoc reporting-focused products</b>	Includes products that focus on self-service reporting and ad hoc analysis.
<b>OLAP analysis-focused products</b>	Includes products that focus on analysis in dimensional and hierarchical data models.
<b>Self-service analytics-focused products</b>	Includes products that focus on visual data discovery and advanced data visualization.
<b>Integrated performance management products</b>	Includes products that provide integrated functionality for BI and performance management, especially planning and budgeting.
<b>Embedded analytics-focused products</b>	Includes reporting and analytics products that can be embedded in other business applications.
<b>Large international BI vendors</b>	Includes products from companies with annual revenues of \$200m+ and a truly international reach.
<b>EMEA-focused vendors</b>	Includes products from vendors that have a significant presence in – and focus on – the EMEA region.
<b>Americas-focused vendors</b>	Includes products from vendors that have a significant presence in – and focus on – the Americas region.

**Figure 12: Peer group descriptions**

	Large global enterprise BI platforms	Dashboarding -focused products	Ad hoc reporting-focused products	OLAP analysis-focused products	Self-service analytics-focused products	Integrated performance management products	Large international BI vendors	EMEA-focused vendors	Americas-focused vendors	Embedded analytics-focused products
Bissantz Board			X	X		X		X		
CALUMO		X		X		X		X	X	
Cubeware cubus		X	X	X		X		X		
Dundas		X	X	X	X				X	X
Entrinsik		X	X		X				X	
Exago		X	X						X	X
IBM Cog. Analytics	X						X			
IBM Plan. Analytics			X	X		X	X			
Infor d/EPM			X	X		X	X			
Information Builders	X						X			X
Jedox			X	X		X		X	X	
Logi Analytics		X						X	X	X
Longview Analytics		X						X	X	
Looker			X					X	X	X
MS Excel			X	X			X			
MS Power BI		X			X		X			X
MS SSRS	X						X			
MicroStrategy	X						X			X
Oracle Analytics	X						X			
Phocas		X	X					X	X	
Pyramid		X	X	X	X			X	X	X
Qlik Sense			X		X		X			X
QlikView		X			X		X			
Report One		X						X		
SAP Analytics Cloud		X			X	X	X			
SAP BO BI	X						X			
SAS Platform	X						X			
Tableau		X	X		X		X			
TARGIT		X	X	X				X		X
Yellowfin		X	X		X				X	X
Zoho Analytics		X	X					X	X	X

## Overview of the key calculations in The BI & Analytics Survey 21

### Measuring business benefits

Business benefits are the real reason for carrying out any BI and analytics project and The BI & Analytics Survey has been studying them directly for years. We ask respondents the extent to which they realize a list of benefits.

For each potential benefit, respondents are asked to indicate the level of achievement, if any, with five levels. We use a weighted scoring system, as shown in the table below, to derive a composite score for each of the possible benefits, based on the level of benefit achieved. We call this the BBI (Business Benefits Index).

Level of benefit reported	Weighting
High	10
Moderate	6
Low	2
Not achieved	-2
Don't know	0

**Figure 13: The Business Benefits Index weighting system**

This rating system is the basis of the most important index in The BI & Analytics Survey. It is a dimensionless number with an arbitrary value, but as long as the weighting system remains constant it can be used for comparisons between segments of the sample, such as the sample for individual products or regions, to name just two.

Participants were asked to rate each benefit. Business benefits are calculated by counting the number of each reported level of benefit and multiplying this number by the corresponding weighting. The products are then divided by the number of responses for that particular benefit to find the average response.

The figure below shows the overall answers to the business benefits questions using shortened descriptions. Each column is individually color-coded, with higher scores shown on darker backgrounds. The weighted score in the last column shows which benefits were achieved the most.

	High (10)	Moderate (6)	Low (2)	Not achieved (-2)	Don't know (0)	Weighted score
Weighting	10	6	2	-2	0	
Faster reporting, analysis or planning	66%	24%	5%	1%	4%	8.1
More accurate reporting, analysis or planning	62%	27%	4%	2%	5%	7.9
Better business decisions	50%	32%	6%	3%	10%	7.0
Improved employee satisfaction	46%	36%	8%	2%	8%	6.8
Improved data quality	48%	31%	9%	4%	8%	6.8
Improved operational efficiency	44%	36%	8%	3%	9%	6.7
Improved customer satisfaction	34%	33%	9%	5%	19%	5.5
Increased competitive advantage	25%	33%	12%	5%	24%	4.7
Reduced costs	22%	32%	16%	9%	21%	4.3
Increased revenues	17%	28%	14%	9%	32%	3.4
Saved headcount	15%	25%	17%	16%	27%	3.1

Figure 14: Benefits overview

'Faster reporting, analysis or planning' is the benefit most likely to be achieved. This is a similar result to previous years. We would expect this of any system whose primary purpose is to deliver analysis and reports, but a few respondents said that reporting had worsened after their BI and analytics implementation. A large majority — about 90 percent — said that this benefit had been achieved. However, it could be argued that improved reporting is not in itself a business benefit; it is how the improved reports are used that determines whether business benefits are achieved.

'Better business decisions' is the third most likely benefit to be achieved, with 82 percent claiming to have proven this benefit. We expect all BI and analytics projects would hope to achieve this benefit, but it is not possible to predict this outcome while planning and attempting to cost-justify a project.

### Project success

The 'Project success' KPI is based on three factors. We asked participants to judge their satisfaction level with their implementations. We also asked the level of success with which their projects were completed on time and on budget and weighted the responses to calculate project success.

The weightings of the possible responses are shown in the following chart.

Level of project success reported	Weighting
Good	10
Moderate	5
Poor	0

**Figure 15: Responses and weightings for Project Success**

## Means and medians

This survey makes frequent references to different forms of averages — means and medians. Just in case your statistical knowledge is a little rusty, here is a quick reminder of the definition of the terms:

**The mean** is the usual arithmetic average. Its value is affected by every value in the sample, so a single large outlier can materially affect the mean, particularly with small samples.

**The median** is the value in the middle of the sample; that is, half of the sample is larger than the median, and the other half is smaller. It could be regarded as the ‘typical value’, and is affected by the number, but not the value, of outliers. One or two large or small outliers therefore do not affect the median.

## Understanding multiple response questions

Several questions in The BI & Analytics Survey 21 allow the user to make multiple responses. For example, we asked users what problems (if any) they encountered in their projects. Because many users had more than one problem, the number of responses is larger than the number of respondents.

This means that there are two ways to calculate the percentage of a given response: based on the total number of responses or based on the total number of respondents. We present The BI & Analytics Survey results based on the number of respondents.

Calculating percentages based on the number of respondents tells us how likely a given respondent is to have the problem but results in percentages higher than 100 percent when all the problems are added together. Conversely, calculating percentages based on the total number of responses would result in a total of 100 percent.

## Survey data collection

The BI & Analytics Survey 21 was conducted by BARC, with data captured from the end of February to beginning of June 2020. All data was captured online from a total of 2,591 respondents.

Respondents were solicited individually from dozens of vendor and independent lists and from websites from many different countries, with emailed invitations being sent to the lists in a staggered fashion.

At our request, most of the vendors notified their customers about The BI & Analytics Survey using either their regular newsletters or websites. We also asked some bloggers to mention the survey. Each list

and website had a different URL, though in all cases, the same questionnaire (in English, German and French) was used.

## Product picklist used in The BI & Analytics Survey

Altair SmartSight (formerly Envision, Carriots Analytics)

Birst (an Infor company)

Bissantz DeltaMaster

Board

CALUMO

Chartio

Corporate Planner

Cubeware Solutions Platform (Cockpit)

cubus outperform (Serviceware Performance)

CXO Software (formerly CXO-Cockpit)

Cyberscience Cyberquery

Dataiku

Datapine

DigDash

Dimensional Insight Diver Platform

Domo

Dundas

Entrinik Informer

evianza

Exago

GoodData

Halo BI

IBM Cognos Analytics (formerly IBM Cognos BI)

IBM Planning Analytics (formerly IBM Cognos TM1)

icCube

iDashboards

IDL CPM Suite

InetSoft

Infor d/EPM (formerly Infor BI)  
Information Builders WebFOCUS  
InsightSquared  
Izenda  
Jedox (formerly Palo)  
Jet Reports  
JReport (from Logi Analytics)  
Logi Analytics Platform  
Longview Analytics (formerly arcplan Enterprise)  
Looker  
Microsoft Excel (Excel only and Power Pivot)  
Microsoft Power BI  
Microsoft SQL Server Reporting Services (SSRS)  
MicroStrategy Analytics Platform  
OpenText Analytics/Magellan (Actuate, BIRT)  
Oracle Analytics Cloud  
Oracle Analytics Server (formerly Oracle BI, OBIEE, OBIFS)  
Oracle EPM Cloud  
Oracle Hyperion Planning  
Pentaho Business Analytics (Hitachi Vantara)  
Phocas  
prevero.STARLIGHT BI-Suite (formerly MIK)  
Pyramid Analytics BI Office  
Pyramid Analytics Pyramid 2019  
Qlik NPrinting  
Qlik Sense  
QlikView  
ReportOne  
sales-i

SAP Analysis for Office  
SAP Analytics Cloud  
SAP BO Web Intelligence  
SAP Crystal Reports  
SAP Lumira (Designer, formerly Design Studio)  
SAP Lumira (Discovery, formerly Lumira)  
SAS Base  
SAS Intelligence Platform  
SAS Visual Analytics and Visual Statistics  
Sisense  
Syncfusion Data Platform  
Tableau  
TARGIT Decision Suite  
ThoughtSpot  
TIBCO Jaspersoft  
TIBCO Spotfire  
Toucan Toco  
Unit4 Prevero  
XLCubed  
Yellowfin  
Zoho Analytics (formerly Zoho Reports)  
Other, please specify  
Don't know

## Understanding the KPIs

The goal of this document is to help the reader spot winners and losers in The BI & Analytics Survey 21 using well designed dashboards packed with concise information. The BI & Analytics Survey includes 6 aggregated KPIs, which can be absorbed at a glance. It also includes a set of 30 normalized KPIs, which we refer to as 'root' KPIs for each of the 33 products. The 'aggregated' KPIs are aggregations of these root KPIs.

This year we have calculated a set of KPIs for each of the ten peer groups. The values are normalized on the whole sample. Peer groups are used to enable fair and useful comparisons of products that are likely to compete.

The KPIs all follow these simple rules:

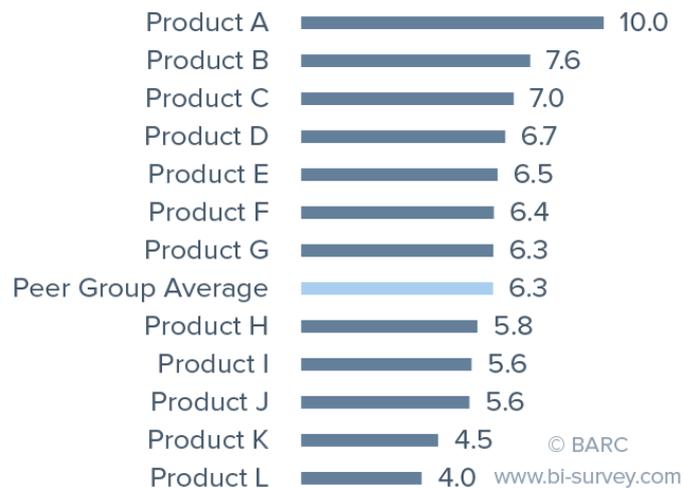
- Only measures that have a clear good/bad trend are used as the basis for KPIs.
- KPIs may be based on one or more measures from The BI & Analytics Survey.
- Only products with samples of at least 20 to 30 (depending on the KPI) for each of the questions that feed into the KPI are included.
- For quantitative data, KPIs are converted to a scale of 1 to 10 (worst to best).
- A linear min-max transformation is applied, which preserves the order of, and the relative distance between, products' scores.
- In some instances, adjustments are made to account for extreme outliers.

KPIs are only calculated if the samples have at least 15 to 30 data points (this varies depending on the KPI) and if the KPI in question is applicable to a product. Therefore, some products do not have a full set of root KPIs. It is important to exclude KPIs based on small (and therefore not representative) samples to ensure that the graph scales are not distorted by outlier KPIs. In such cases, the product is still shown in the tables, but with a blank KPI value in the bar chart.

## Reading the KPI charts

We provide two different types of dashboards for viewing the KPIs. The first type is the Product Dashboard. A Product Dashboard displays all the KPIs for a single product. The second type is the KPI Dashboard, which displays the KPI values for each product in a peer group.

The KPIs are presented using simple bar charts.



**Figure 16: KPI Dashboard used for displaying KPIs**

Products are sorted by value in the KPI Dashboards. The better the product the higher the value. The scale starts at zero and the KPI score of all the products in the chart is indicated. The sample average in each chart is represented by a pale blue bar.

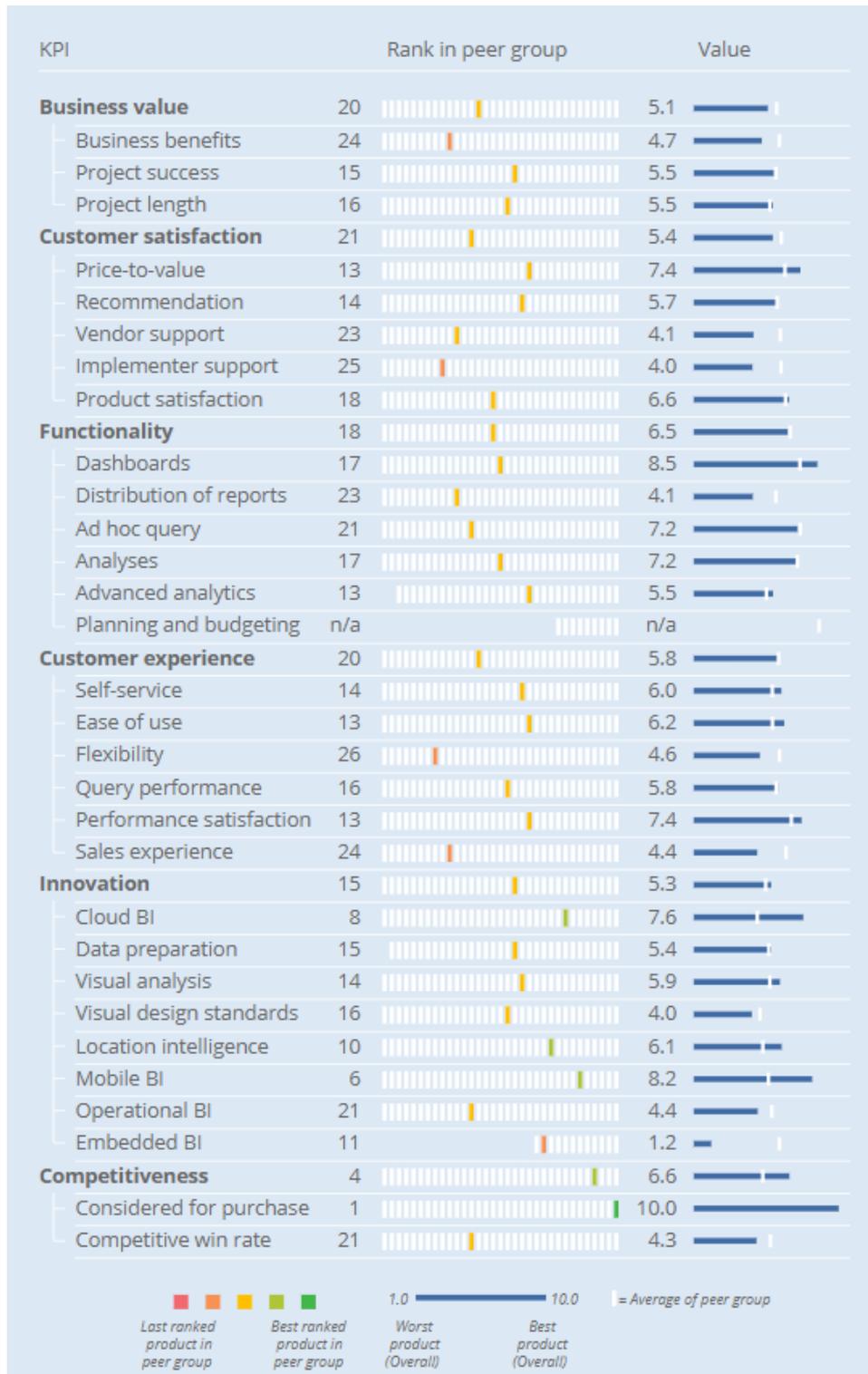
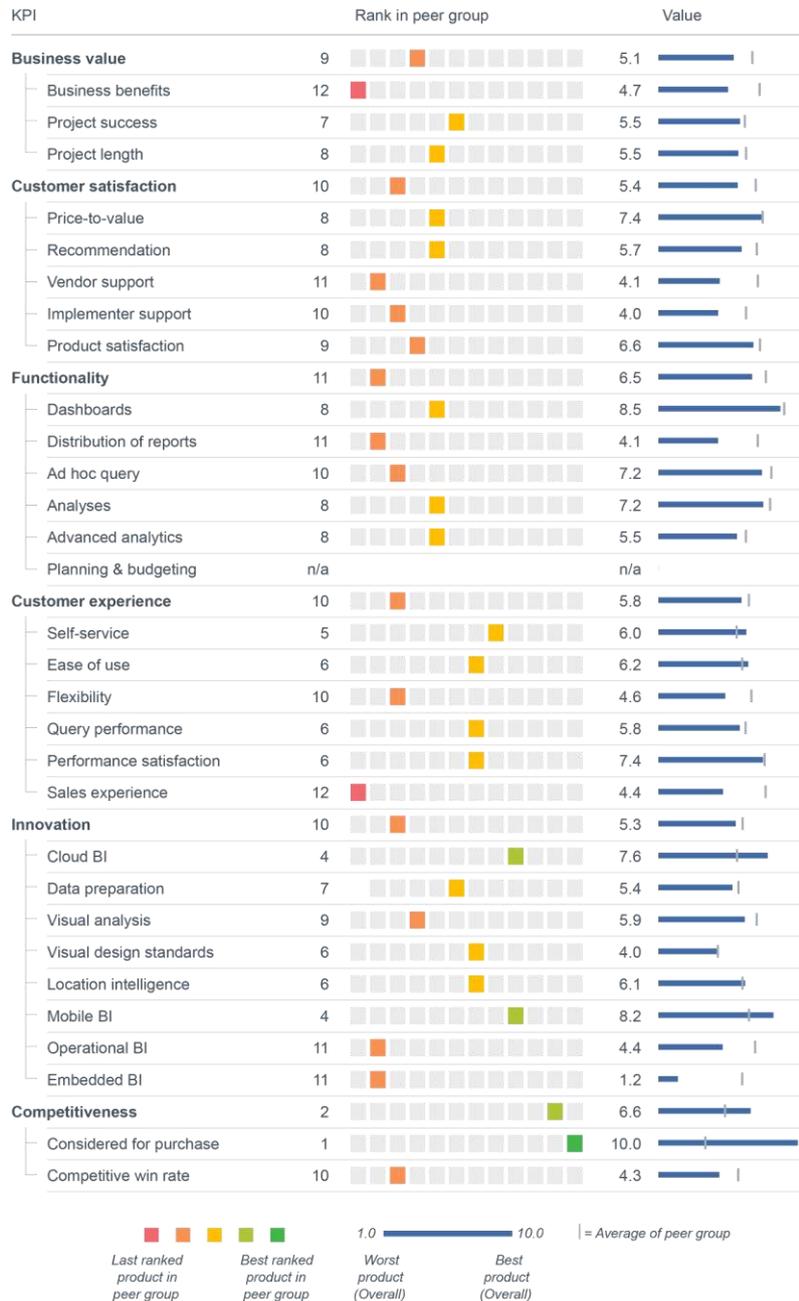


Figure 17: Product Dashboard used for displaying KPIs in the Analyzer



**Figure 18: Product Dashboard used for displaying KPIs in the Vendor Performance Summaries**

In Figure 17 and Figure 18, the blue bars on the right represent the KPI values for the product in question in each KPI. The gray/white vertical line represents the peer group average. The colored bars in the middle represent the product's rank in the peer group for each KPI.

## The aggregated KPIs

The calculation of aggregated KPIs is described in the following table. The aggregates are based on a weighted scoring of the root KPIs according to the importance of each root KPI to the aggregated KPI.

Aggregated KPIs	Root KPIs
<b>Business value</b>	Business benefits
	Project success
	Project length
<b>Competitiveness</b>	Considered for purchase
	Competitive win rate
<b>Customer satisfaction</b>	Price-to-value
	Recommendation
	Vendor support
	Implementer support
<b>Customer experience</b>	Product satisfaction
	Self-service
	Ease of use
	Flexibility
	Query performance
	Performance satisfaction
<b>Functionality</b>	Sales experience
	Dashboards
	Distribution of reports
	Ad hoc query
	Analyses
	Advanced analytics
	Planning & budgeting
<b>Innovation</b>	Cloud BI
	Data preparation
	Visual analysis
	Visual design standards
	Location intelligence
	Mobile BI
	Operational BI
	Embedded BI

Figure 19: Aggregated KPIs and root KPIs

## How to use the KPIs

Different readers will have their own views on which of these KPIs are important to them. For example, some people will regard fast query performance as very important, whereas others may regard recommendation or innovation as more important.

The aggregated KPIs above provide a good selection from which readers can choose those that they regard as key to their requirements.

## Peer groups

### Complete sample

We use responses from users of all products to calculate product-independent analyses. A typical question would be: What proportion of all your organization's employees currently makes regular use of business intelligence software? This question can be analyzed per product, but it can also be analyzed without reference to any specific product to provide insight into the market as a whole.

Products with less than 30 data points are included in the 'others' group.

In The BI & Analytics Survey Analyzer, you will find the results for the complete sample in the 'Survey Results' tab.

## The KPIs

The following section contains the entire list of KPIs calculated for The BI & Analytics Survey 21, as well as a description of the calculations.

KPIs are only calculated if the samples (from The BI & Analytics Survey) have at least 15 or 30 data points (depending on the KPI), so some of the products do not have a full set of root KPIs. It is important to exclude KPIs based on small (and therefore unreliable) samples to ensure that the graph scales are not distorted by outlier KPIs based on small data samples. In such cases, the KPI is displayed in Product Dashboards with a blank value, and the product is excluded from the relevant KPI Dashboards. For example, the sample of responses to our question about data preparation from Looker users was too small to assign a 'Data preparation' KPI value to Looker. Therefore, a blank KPI value is assigned to Looker in the Product Dashboard bar chart and Looker does not appear in the 'Data preparation' KPI Dashboards.

All the KPIs are presented in The BI & Analytics Survey Analyzer web application, both as Product Dashboards and KPI Dashboards.

### Business value

Every BI and analytics project should be conceived with the idea of bringing value to the business, so the 'Business value' KPI is possibly the most important KPI of all, focusing on the bottom-line value of BI and analytics projects. Business intelligence that does not deliver broad business value is superfluous.

The 'Business value' KPI shows how a successful BI and analytics software product can provide benefits in the real world. The KPI is an aggregation of the 'Business benefits', 'Project success' and 'Project length' KPIs.

### Business benefits

#### *What we measure*

We measure the real benefit of projects after implementation whereas other surveys of business intelligence usage limit their questions to technical or organizational issues.

#### *Why it is important*

Unlike core transaction systems, BI and analytics projects are optional, not mandatory, so they must pay their way in terms of delivering business benefits.

#### *How we measure*

We ask users to judge project benefits based on real measurements the company has made. Using this information, we weighted their responses and calculated the Business Benefits Index (BBI). The KPI is a normalized version of this index.

The following benefits were evaluated by survey participants:

- Better business decisions
- Faster reporting, analysis or planning
- Improved customer satisfaction
- Improved data quality
- Improved employee satisfaction
- Increased revenues
- More accurate reporting, analysis or planning
- Reduced costs (IT or non-IT)
- Saved headcount (in business departments and IT)
- Improved operational efficiency
- Increased competitive advantage

## Project success

### *What we measure*

This KPI is based on a combination of three measures: the level of general user and administrator satisfaction with implementations, as well as the frequency with which projects are completed on time and on budget.

### *Why it is important*

The initial success of a BI and analytics project can have a great bearing on the business benefits achieved over time. Previous BI Surveys have consistently found that long-lasting projects are likely to become more costly than first anticipated, deliver fewer business benefits and often lead to other significant problems. Therefore, the speed with which a product is implemented can be crucial. User and administrator satisfaction is also an important indicator that the tool has been adopted as envisaged at the outset of the project.

### *How we measure*

As with our calculation of business benefits, we ask participants to judge their satisfaction level with their implementations. We also ask the level of success with which projects were completed on time and on budget and weight the responses to calculate project success. The KPI is a normalized version of this index.

## Project length

### *What we measure*

We measure how long it takes to implement projects.

#### *Why it is important*

Rapid implementation is a key measure of project success. Our research over the years has shown that projects with about a three-month implementation time deliver the greatest business benefits.

#### *How we measure*

The KPI is based on the proportion of projects implemented in under three months.

### **Customer satisfaction**

We combine the 'Price-to-value', 'Recommendation', 'Product satisfaction', 'Vendor support' and 'Implementer support' root KPIs to calculate this aggregated KPI. These five factors are clearly related: If one is lacking, then the importance of the others is accentuated.

### **Price-to-value**

#### *What we measure*

We ask participants to judge the price-performance ratio of their chosen product.

#### *Why it is important*

Price-to-value is an important metric in today's cost-conscious age. As many companies have found, the cost of buying and supporting BI and analytics software quickly adds up, especially when attempting to cost-justify adding new users. As more BI and analytics capabilities are pushed out to the business, this perception of value becomes even more critical.

#### *How we measure*

We ask participants to rate the price-performance ratio of their chosen product. To obtain the final KPI, we calculate an average weighted score per product.

### **Recommendation**

#### *What we measure*

We measure whether customers who already have the product in use would recommend it to others.

#### *Why it is important*

No one knows more about how a product performs in the real world than the customers already using it. All too often, they find that products do not live up to expectations, or that the vendor does not support the product properly. Therefore, if existing users say they would recommend the product, we regard this as a positive indicator of the product's value.

#### *How we measure*

Users are asked whether they would recommend the product they are most familiar with. This is the sum of positive responses.

## Product satisfaction

### *What we measure*

We ask participants to judge the level of satisfaction with their chosen product.

### *Why it is important*

If a product proves unreliable at a critical time, the results can be debilitating, and can even render an application unusable.

However, not all customers have the same dependency on reliability, as some applications are not mission critical or time critical.

### *How we measure*

We ask participants to rate their satisfaction with their chosen product. To obtain the final KPI, we calculate an average weighted score per product.

## Vendor support

### *What we measure*

We measure user satisfaction with the level of support provided for the product by the vendor.

### *Why it is important*

Product support from the vendor is a key determinant for project success. This is an area where there are major differences between vendor ratings.

### *How we measure*

We ask participants to rate the quality of the vendor's support. To arrive at the final KPI, we calculate an average weighted score per product.

## Implementer support

### *What we measure*

We measure user satisfaction with the level of support provided for the product by the implementer.

### *Why it is important*

Product support is a key determinant for project success. As with vendor support, this is an area where we see major differences between products. The implementer's role is just as important as the vendor's.

### *How we measure*

We ask participants to rate the support received from the implementer. We calculate an average weighted score per product to obtain the final KPI.

## Functionality

We combine the ‘Dashboards’, ‘Distribution of reports’, ‘Ad hoc query’, ‘Analyses’, ‘Advanced analytics’ and ‘Planning and budgeting’ root KPIs to calculate this aggregated KPI. These six factors are clearly related: If one is lacking, then the importance of the others is accentuated.

## Dashboards

### *What we measure*

This KPI is based on how users rate their BI and analytics tool for creating dashboards, analytics applications and scorecards (data selection, data visualization, formatting/layout).

### *Why it is important*

Dashboard applications offer a high degree of flexibility for building screen-based applications. Generally, dashboards display aggregate performance indicators, which usually have a high level of aggregation for management and decision support. Dashboard applications can be very well implemented using BI development environments. Important features for dashboards include data selection, data visualization and formatting/layouting. Buyers should evaluate a product’s functionality and decide whether it matches their present requirements as well as those in the foreseeable future.

### *How we measure*

We ask participants to rate the functionality for creating dashboards/reports (data selection, data visualization, formatting/layouting). To arrive at the final KPI, we calculate an average weighted score per product.

## Ad hoc query

### *What we measure*

This KPI is based on how users rate their BI and analytics tool in terms of its support for ad hoc queries (data access, drag-and-drop, suitability for business users).

### *Why it is important*

Ad hoc query enables business users to create queries and reports with freely definable content themselves. In order to shield business users from the complexity of the data sources and their connections, a semantic layer serves as an abstraction level between data storage and report definition by business users. The semantic layer shows the available report objects in an easy-to-understand form.

Ad hoc query is typically carried out in a 3-role model: Developers define the data accesses and the data model on which the semantic layer for the business users is based. Power users in business departments use ad hoc query tools to define reports based on this semantic layer. Report recipients then consume the reports created in this way. Reports can be made available to report recipients in the form of static or dynamic reports.

Important features for ad hoc query include data access, drag-and-drop functionality and suitability for business users. Buyers should evaluate a product's functionality and decide whether it matches their present requirements as well as those in the foreseeable future.

#### *How we measure*

We ask participants to rate the support of ad hoc queries (i.e., data access, drag-and-drop, suitability for business users). To arrive at the final KPI, we calculate an average weighted score per product.

### **Analyses**

#### *What we measure*

This KPI is based on how users rate their BI and analytics tool for performing analyses (KPI calculations, data navigation, predefined analyses)

#### *Why it is important*

The aim of analysis tools is to generate information. New insights are gained through new combinations of data and the application of analytical methods. Analysis tools offer users flexible navigation in the data space, predefined analytical procedures (e.g., ABC or deviation analyses) and even advanced statistical analysis functions as well as easily accessible advanced analytics procedures. The most common forms of analysis are dimensional analysis, set analysis and visual analysis. Important features for analyses include KPI calculations, data navigation functionality and predefined analyses. Buyers should evaluate a product's functionality and decide whether it matches their present requirements as well as those in the foreseeable future.

#### *How we measure*

We ask participants to rate the functionality for performing analyses (i.e., KPI calculations, data navigation and predefined analyses). To arrive at the final KPI, we calculate an average weighted score per product.

### **Distribution of reports**

#### *What we measure*

This KPI is based on how users rate their BI and analytics tool in terms of its support for the distribution of reports (dispatch/publication, scheduling, alerts, formats).

#### *Why it is important*

Functionality for report distribution (e.g., dispatch/publication of reports, scheduling, publication formats) is particularly important for standard reporting use cases. Standard reporting refers to the creation and distribution of predefined and precalculated reports. At recurring points in time, data is queried and prepared and made available in a predefined report layout for report recipients. Reports are typically distributed by e-mail or in a portal as HTML/PDF documents. Buyers should evaluate a product's

functionality and decide whether it matches their present requirements as well as those in the foreseeable future.

#### *How we measure*

We ask participants to rate their chosen product's functionality for the distribution of reports (dispatch/publication, scheduling, formats). To arrive at the final KPI, we calculate an average weighted score per product.

### **Advanced analytics**

#### *What we measure*

We measure how many survey respondents use advanced analytics (such as predictive analytics, data mining or machine learning) with their BI and analytics product.

#### *Why it is important*

Employing advanced analytics to find clusters, patterns and trends in data helps to identify relevant signals, especially in huge data sets, and can enable companies to gain a competitive edge. Powerful and robust algorithms can be used to make predictions in a broad range of use cases from customer behavior to product defects. By predicting future events, companies can make more suitable offers to customers and determine more cost-efficient maintenance schedules. For advanced users such as data scientists, BI and analytics platforms offer facilities to integrate advanced analytics models, such as notebook integrations, and to create and run scripts in the back end as well as the front end.

Advanced analytics functions are increasingly included in business-user-oriented analytics and BI too. As such, they power automated insights, data preparation and visualization recommendations or they are incorporated as prebuilt functions that can be used without coding.

#### *How we measure*

We ask participants whether the tool they are most familiar with is being used for advanced analytics by their company. The KPI is based on the frequency with which it is being used.

### **Planning and budgeting**

#### *What we measure*

This KPI is based on how users rate their BI and analytics tool in terms of its planning and budgeting capabilities (i.e., modeling, masks, workflows, plan data input).

#### *Why it is important*

Planning and budgeting capabilities encompass specialized functions (e.g., for forecasting or simulation scenarios) based on a consistent database. Depending on the planning scenario (top-down, bottom-up, centralized, decentralized, etc.) some functions may be more or less important. Important features for planning and budgeting include modeling capabilities, the creation of planning forms, workflows and

plan data input. Buyers should evaluate a product's functionality and decide whether it matches their present requirements as well as those in the foreseeable future.

#### *How we measure*

We ask participants to rate the planning and budgeting capabilities (modeling, masks, workflows, plan data) of their chosen product. To arrive at the final KPI, we calculate an average weighted score per product.

### **Customer experience**

Delivering a superior customer and user experience is more important than ever. BI and analytics professionals don't want to have to spend a lot of time figuring out how a BI and analytics product works, attempting to learn interfaces or waiting around for a query to finish. With the current vogue for agility and self-service capabilities and the increasing need for users to be able to access a variety of data sources, the user experience of a BI and analytics product is an important consideration for many organizations.

To calculate the quality of customer experience of a BI and analytics tool, we combine the 'Self-service', 'Ease of use', 'Flexibility', 'Query performance', 'Performance satisfaction' and 'Sales experience' KPIs.

### **Self-service**

#### *What we measure*

We measure how many sites are using self-service BI with their BI and analytics product.

#### *Why it is important*

Self-service BI speeds up processes and eliminates the middleman. Independence from IT processes is a commonly cited need in BI and analytics projects.

#### *How we measure*

We ask participants whether the tool they are most familiar with is being used for self-service by their company. The KPI is based on the probability that BI and analytics is being used in a self-service manner.

### **Flexibility**

#### *What we measure*

We measure the degree to which respondents consider their BI and analytics software to be flexible.

#### *Why it is important*

With the current vogue for agility and self-service capabilities and the increasing need for users to be able to access a variety of data sources, user flexibility is an important consideration for many organizations.

#### *How we measure*

This KPI is based on two factors: (1) the frequency with which flexibility was cited as a reason for purchasing a business intelligence product; and (2) the frequency of complaints about user flexibility post-implementation. Each of the above is given equal weighting in calculating a normalized KPI value.

### **Ease of use**

#### *What we measure*

We measure the degree to which respondents consider their BI and analytics software to be easy to use.

#### *Why it is important*

Ease of use is often considered the holy grail of software. It is an important consideration for any vendor seeking to expand its footprint within enterprise sites. Business decision-makers don't want to have to spend a lot of time in training or attempting to learn interfaces.

#### *How we measure*

This KPI is based on two factors: (1) the frequency with which 'ease of use' is cited as a reason for purchasing a business intelligence product; and (2) the frequency of complaints about ease of use post-implementation. Each of the above is given equal weighting in calculating a normalized KPI value.

### **Sales experience**

#### *What we measure*

We measure how companies describe their sales experience with the vendor.

#### *Why it is important*

In a competitive market like the BI and CPM software market, a highly professional sales organization is essential in order to become successful and continue to win new customers. In an increasingly complex, competitive and digitalized world, vendors that can quickly understand organizations' needs, provide industry-specific knowledge, and offer competitive pricing and contract flexibility are more likely to create a positive sales/purchasing experience for the customer. A positive experience in this regard can be as important to making the right software decision as functional and technical considerations.

#### *How we measure*

We ask users to rate their dealings with their BI and analytics vendor in the following six aspects of the sales/acquisition experience.

- General behavior
- Timely and thorough response to product-related and technical questions
- Overall rating of product evaluation and contract negotiation
- Ability to understand organization's needs
- Pricing and contract flexibility
- Industry-specific knowledge

Using this information, we weight the responses and calculate a sales experience index. The KPI is a normalized version of this index.

## Query performance

### *What we measure*

We measure the typical time it takes for queries to respond in the largest application using the tool, adjusted by the input data volume.

### *Why it is important*

Fast performance is more important than most people realize. You can work around missing features and even bugs, but nothing can disguise an application that is painfully slow. And few things can put users off from making the most of an application more than irritation at its response times. This is proven by the clear link between project success and query performance throughout the history of The BI & Analytics Survey.

There may well be other influencing factors, such as hardware capacity, but we do not have the data to account for such factors. However, it is unlikely that the majority of surveyed customers would under-specify their hardware. And if applications are hard to optimize for performance, then this is a fair reflection of user experiences with the product.

### *How we measure*

The KPI is a calculation based on the median response time per product. A weighting is then applied whereby products are divided into three groups depending on their average data volume (small, medium and large) in order to produce a fairer comparison of query performance.

## Performance satisfaction

### *What we measure*

We ask how common complaints about the system's performance are.

### *Why it is important*

Performance satisfaction is crucial in business intelligence projects, and often affects project outcomes.

In some ways, complaints about performance are more important than performance measured in seconds, because acceptable delays can vary depending upon how the system is used.

Performance is not only the most frequent product-related problem. Along with data quality it has been the most frequently reported problem overall in recent years. Beyond that, poor query performance leads to reduced business benefits and project success, so it is more than just a technical problem.

#### *How we measure*

We calculate the proportion of users indicating ‘query performance too slow’ as a problem. Complaints are a negative factor, so this KPI rises as query performance complaints fall.

### **Innovation**

New ideas and technologies are the lifeblood of the software industry. However, some vendors prefer to rest on their laurels, relying on existing technologies and lucrative maintenance contracts with loyal customers. If a BI and analytics tool cannot keep up with recent developments, it becomes outdated very quickly and cannot deliver the same level of benefits as rival tools.

The ‘Innovation’ KPI looks at eight technologies – cloud BI, data preparation, visual analysis, visual design standards, mobile BI, location intelligence, operational BI and embedded BI – to measure a product’s level of innovation.

Crucially, we do not investigate whether the vendor has promised the feature; we measure whether innovative features are in use by customers.

### **Cloud BI**

#### *What we measure*

We measure how many survey respondents are using their BI and analytics product in a cloud environment.

#### *Why it is important*

Many software categories have adopted cloud computing. However, there have been concerns regarding security. Business intelligence has been a late adopter of cloud technology, but this is now a growth area in the BI and analytics space.

#### *How we measure*

We ask participants whether the tool they are most familiar with is being used in a cloud environment by their company. The KPI is based on the proportion of sites using BI and analytics in the cloud.

## Data preparation

### *What we measure*

We measure how many survey respondents are performing data preparation with their BI and analytics product.

### *Why it is important*

Achieving efficient and agile data preparation is of utmost importance in today's economy. It is the key to increasing the ability to efficiently use enterprise and external data in a distributed manner to optimize business processes or to enabling new, innovative business models.

### *How we measure*

We ask participants whether the tool they are most familiar with is being used for data preparation by their company. The KPI is based on the frequency with which it is being used.

## Visual analysis

### *What we measure*

We measure how many survey respondents are using visual analysis with their BI and analytics product.

### *Why it is important*

Visual analysis enables decision-makers to quickly digest insights on trends through highly visual representations. As data grows increasingly complex, many decision-makers find they can more readily see insights and detect outliers if they are plotted in visual charts and graphs, versus being buried in data tables. This is an important feature that is increasingly being sought by enterprises seeking more effective ways for decision-makers to absorb and act on data.

### *How we measure*

We ask participants whether the tool they are most familiar with is being used for visual analysis by their organization. The KPI is based on the probability that products are being used in this way.

## Visual design standards

### *What we measure*

We measure how many respondents are using visual design standards with their BI and analytics product.

### *Why it is important*

Information design is the practice of presenting information in a way that fosters efficient and effective understanding of it. Reports, dashboards and presentations benefit largely from a common, standardized visual language. This KPI shows how much a product is used to employ information design standards.

#### *How we measure*

We ask participants whether the tool they are most familiar with is being used for visual design standards by their organization. The KPI is based on the frequency with which it is being used.

### **Location intelligence**

#### *What we measure*

We measure how many survey respondents are using location/spatial analysis with their BI and analytics product.

#### *Why it is important*

Geo/location information (at least an address or city) is available in most of the data an enterprise has. This data can be pre-processed in a standardized structure and then combined with other data sources. Through this combination, location intelligence provides new context and insights into existing data and offers additional analysis capabilities.

#### *How we measure*

We ask participants whether the tool they are most familiar with is being used for location/spatial analysis by their company. The KPI is based on the frequency with which it is being used.

### **Mobile BI**

Mobile BI has been available for years but has not yet gained much traction in the marketplace. New mobile hardware is making this software increasingly versatile.

#### *What we measure*

We measure how many survey respondents are using their BI and analytics tools on a mobile device.

#### *Why it is important*

Mobile BI is considered by many as a big trend in BI and analytics. It gives decision-makers access to critical enterprise data and insights from their devices, regardless of where they are working or traveling.

#### *How we measure*

We ask participants whether the tool they are most familiar with is being used for mobile BI by their company. The KPI is based on the probability that mobile BI is being used.

### **Operational BI**

#### *What we measure*

We measure how many survey respondents are using their BI and analytics tool with real-time data from transactional systems.

### *Why it is important*

Operationalization of BI is one of the most important trends in the BI and analytics area. In operational BI, insights are derived from data coming directly out of production systems. Analysis results are used directly in operational processes for ad hoc monitoring, the optimization of those processes and the removal of possible process failures. Furthermore, many enterprises are looking for ways to blend archived analytical data within operational data to be able to gain situational awareness of opportunities or issues impacting their businesses.

### *How we measure*

We asked participants whether the tool they are most familiar with is being used for BI with real-time data from transactional systems by their organization. The KPI is based on the probability that products are being used in this way.

## **Embedded BI**

### *What we measure*

We measure how many survey respondents use their BI and analytics product embedded within other applications.

### *Why it is important*

Integrating intelligence in operational applications is growing steadily in popularity. From dashboards and BI applications to prediction and optimization models, users can access complementary functions directly in their specific operational processes and act on the findings – closing the classic management loop from information to action.

### *How we measure*

We ask participants whether the tool they are most familiar with is being used in an embedded environment by their company. The KPI is based on the proportion of sites using embedded BI.

## **Competitiveness**

The aggregated ‘Competitiveness’ KPI combines the ‘Considered for purchase’ and ‘Competitive win rate’ KPIs.

## **Considered for purchase**

### *What we measure*

We measure how often products are *considered* for purchase, regardless of whether they are eventually purchased or not.

#### *Why it is important*

There are myriad reasons why a product might be considered for purchase by an organization. Factors such as vendor marketing, pre-existing relationships with the vendor or word-of-mouth can all have an influence. Taking all these factors into account, this KPI provides an interesting indicator as to the strength of a product's market presence.

#### *How we measure*

The KPI scores in this category are based on the relative frequency with which products are considered for purchase.

### **Competitive win rate**

#### *What we measure*

We measure how well products perform against other products in head-on competitions to win customers.

#### *Why it is important*

Recognizing which products to evaluate entails understanding those that have fared well in other organizations' product selections. Eliminating 'losers' at an early stage is important.

The BI & Analytics Survey has consistently found that products from some large vendors are often bought with little or no evaluation and therefore appear to have an artificially high win rate compared to products from smaller, independent vendors, who have to fight for every sale.

#### *How we measure*

We calculate the win rate for products chosen by organizations that have evaluated at least one other product. We divide the frequency with which the product was chosen by the frequency with which the product was evaluated.

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**Business Application Research Center – BARC GmbH**



**Germany**

BARC GmbH  
Berliner Platz 7  
D-97080 Würzburg  
+49 931 880651-0  
[www.barc.de](http://www.barc.de)

**Austria**

BARC GmbH  
Meldemannstraße 18 / 01.14  
A-1200 Wien  
+43 660 6366870

**Switzerland**

BARC Schweiz GmbH  
Täfernstr. 22a  
CH-5405 Baden-Dättwil  
+41 56 470 94 34

**Rest of the World**

+44 1536 772-451  
[www.barc-research.com](http://www.barc-research.com)