DNV·GL

BUSINESS ASSURANCE

VIEWPOINT REPORT

Are you able to leverage big data to boost
your productivity and value creation?

APRIL 2016

CONTENTS

FOREWORD

Big data are all those data sets whose sizes go well beyond the ability to capture, manage and process with commonly used software tools.

Increased connectivity, new capabilities for capturing, storing, processing, presenting data, and transmission of large volumes of varied data at high velocity have developed significantly in the past few years, resulting in the potential availability of extensive data sets to most companies.

This new reality has changed the playing field of many traditional industries and has revealed new opportunities. There is a strong trend across all industries and sectors to use data analytics for managing performance and risk. This is the core of the big data shift; the ability to use data to obtain actionable knowledge, insights and predictions.

The global certification leader DNV GL – Business Assurance has tried to investigate the maturity of this situation.

INTRODUCTION

DNV GL - Business Assurance, supported by the international research institute GFK Eurisko, has investigated how companies in different sectors in Europe, North America, South America and Asia deal with big data.

The survey was conducted in February 2016 and investigated how DNV GL - Business Assurance customers approach big data, the initiatives they implement and the opportunities they are seizing.

The survey of 1,189 professionals from the primary, secondary and tertiary sectors[1] highlights that big data is seen as a reason for optimism from a business point of view. It represents an opportunity for a large part of the sample.

However, world companies have just embarked on the journey to really exploiting big data. Although the awareness of its importance is noteworthy and widespread, the ability to leverage big data to boost productivity and value creation is still rare. Most companies are still dealing with preliminary, enabling initiatives, delayed by the lack of comprehensive strategies and technical skills.

The certainty is that big data offers a world of opportunities no one wants to miss out on. There is a lot of fermentation going on and – with most companies believing that big data will be playing a key role in the mid-term and preparing for this – we are sure that data science will be one of the key occupational fields in the future. Better data management will create a myriad of efficiency improvements and market opportunities. They are there for the taking.

In this context, a group of companies (hereinafter "leaders") is one step ahead in managing big data; they are incorporating their use into its organizations and reaping significant benefits.[2]

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[1] Primary: i.e. agriculture; secondary: i.e. manufacturing; tertiary: i.e. services, transportation.
[2] The leaders' characteristics are reported in the text boxes throughout the report and summarized in the final section *Profiling the leaders*.

METHODOLOGY AND SURVEY SAMPLE

- The survey was conducted in February 2016. It involved 1,189 professionals who work at companies in the primary, secondary and tertiary sectors across different industries in Europe, North America, Central and South America and Asia.

- The sample consists of DNV GL's customers and is not statistically representative of companies worldwide.

- The sample includes 82 companies defined as *leaders*. The classification of a company in the leaders category is based on it meeting a set of pre-requisites specifically defined by DNV GL.

- The questionnaire was administered using the CAWI (Computer Assisted Web Interviewing) methodology.

→ **BIG DATA ATTRIBUTES OF COMPANIES IN THE LEADERS GROUP**

- Is able to evaluate big data as opportunity or threat.
- Leverages on big data to boost productivity.
- Has a clear strategy on big data.
- Has taken action to deal with big data.[3]
- Is able to evaluate benefits achieved from leveraging big data.
- Is preparing for a big data future.
- Is going to invest the same or more than today in big data in the next 2-3 years.

●	Europe	32%
●	Asia	53%
●	North America	7%
●	Central and South America	6%
●	Others	2%

Figure 1: Companies in the sample. Geographic breakdown

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[3] At least one of the following initiatives: to implement/integrate new technologies and methods; to build or train new competencies; it make changes to culture and organization; to offer new delivery models; to create new business models and go-to market strategies; to enhance information management; to take on new roles in the digital space; other.

INDUSTRY

PRIMARY	2,7%
SECONDARY	55,0%
food	5,0%
chemicals	4,3%
plastic	3,5%
metals	13,0%
machinery	7,8%
electrical	5,2%
other secondary	16,2%
TERTIARY	34,9%
electricity, gas and water...	2,6%
construction	6,6%
wholesale and retail trade	3,2%
transport	11,3%
health	3,3%
other tertiary	7,9%
Missing	7,4%

COMPANY SIZE

<50	24,7%
50-99	13,5%
100-249	20,0%
250-999	18,3%
1000 +	17,4%
Missing	6,1%
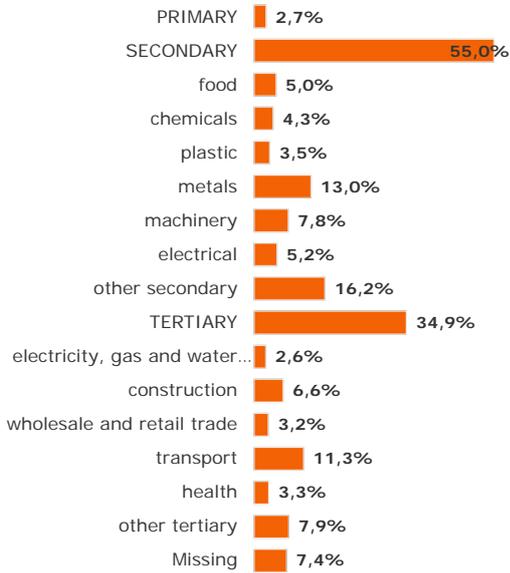
Figure 2: Companies in the sample. Sectors and size (number of employees)

NOTES TO THE READER

- In the graphs contained herein, red circles highlight data significantly below average. Green circles highlight data significantly above average.

- In the graphs, the symbol * indicates that the sample size is small.

- Graphics in figures 7, 8, 9, 18 and 19 refer to questions with multiple answers.

All other graphs refer to single answer questions, with answers adding up to 100%.

- The graphs report the scores obtained by the total of respondents, by respondents in different regions, by large companies employing more than 1,000 people and by leaders.

- For the reader's convenience, the word *average* has been used throughout the text to indicate the scores obtained by all respondents.

CURRENT SCENARIO

BIG DATA, OPTIMISM ALL AROUND

Everybody is talking about big data and analytics these days. They are seen as a reason for optimism from a business point of view. For sure, companies around the world do not consider this as a threat (5%); on the contrary, it represents an opportunity for more than half of those surveyed (52%). The percentage increases to 70% when it comes to companies employing more than 1,000 people.

Enthusiasm abounds about big data in every region of the world, likely because it is expected to contribute significantly to improving performance. A total of 45% recognize the direct importance of big data capabilities for their companies. Proportions are more than 10 percentage points higher for companies located in North America (56%) and for large companies (60%).

Big data clearly represents an opportunity for LEADERS (96%).

EVERYBODY'S TALKING ABOUT BIG DATA AND ANALYTICS THESE DAYS: IS YOUR COMPANY CONSIDERING IT MORE AS AN OPPORTUNITY FOR OR A THREAT TO YOUR BUSINESS?

Figure 3: Big data, opportunity or threat?
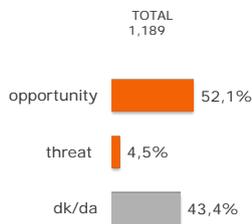
TOTAL
1,189

		Europe	Asia	North America	Central South America	Large Companies >1000 employees	Leaders
		n=368	n=615	n=82	n=65	n=207	n=82
opportunity	52,1%	55,4%	49,3%	52,4%	53,8%	70,0%	96,3%
threat	4,5%	4,3%	4,9%	2,4%	3,1%	1,4%	3,7%
dk/da	43,4%	40,3%	45,8%	45,2%	43,1%	28,6%	0,0%

HOW IMPORTANT ARE BIG DATA CAPABILITIES (COMPETENCES, TECHNOLOGY, METHODS, ETC.) TO YOUR COMPANY TODAY?

Figure 4: Importance of big data capabilities from a business perspective
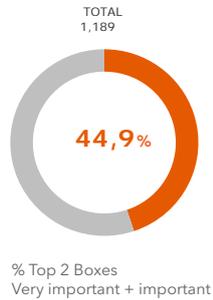
TOTAL
1,189

44,9%

% Top 2 Boxes
Very important + important

Europe	Asia	North America	Central South America	Large Companies >1000 employees	Leaders
n=368	n=615	n=82	n=65	n=207	n=82
50,5%	40,7%	56,1%	32,3%	60,4%	98,8%

APPROACH AND USAGE

Although the awareness of the importance of big data is noteworthy and widespread, only 1 company in 4 is able to leverage big data to boost productivity and value creation.

Large companies (44%) stand out with proportions above average. So do, but at lower rates, North Americans (32%) who have been working on big data for a longer time and whose universities have been leading the way.

LEADERS unanimously think that big data capabilities are important to their companies.

LEADERS leverage on big data to boost their productivity.

TO WHAT EXTENT DOES YOUR COMPANY LEVERAGE BIG DATA TO BOOST YOUR PRODUCTIVITY AND VALUE CREATION?

Figure 5: World companies leveraging on big data to boost productivity
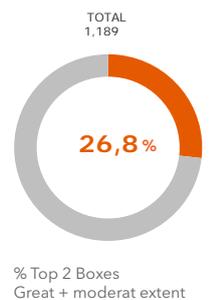
TOTAL
1,189

26,8%

% Top 2 Boxes
Great + moderat extent

Europe	Asia	North America	Central South America	Large Companies >1000 employees	Leaders
n=368	n=615	n=82	n=65	n=207	n=82
27,2%	26,5%	31,7%	20,0%	43,5%	100,0%

A clear strategy on big data is a reality for 1 in 4. Large companies' rates are understandably higher (40%), as they might have put big data on the agenda before others.

Though being the most advanced in terms of usage, North Americans record below average percentages for strategies (20%). That's not surprising: the more you know, the more complex the issue becomes. North American companies are more aware of what having a strategy implies.

LEADERS have a big data strategy.

TO WHAT EXTENT DOES YOUR COMPANY HAVE A CLEAR STRATEGY ON BIG DATA?

Figure 6: World companies adopting a strategy on big data
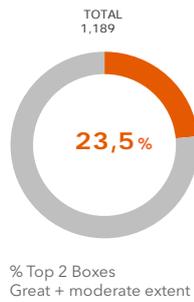
TOTAL
1,189

23,5 %

% Top 2 Boxes
Great + moderate extent

Europe	Asia	North America	Central South America		Large Companies >1000 employees		Leaders
n=368	n=615	n=82	n=65		n=207		n=82
23,9%	24,9%	19,5%	16,9%		39,6%		100,0%
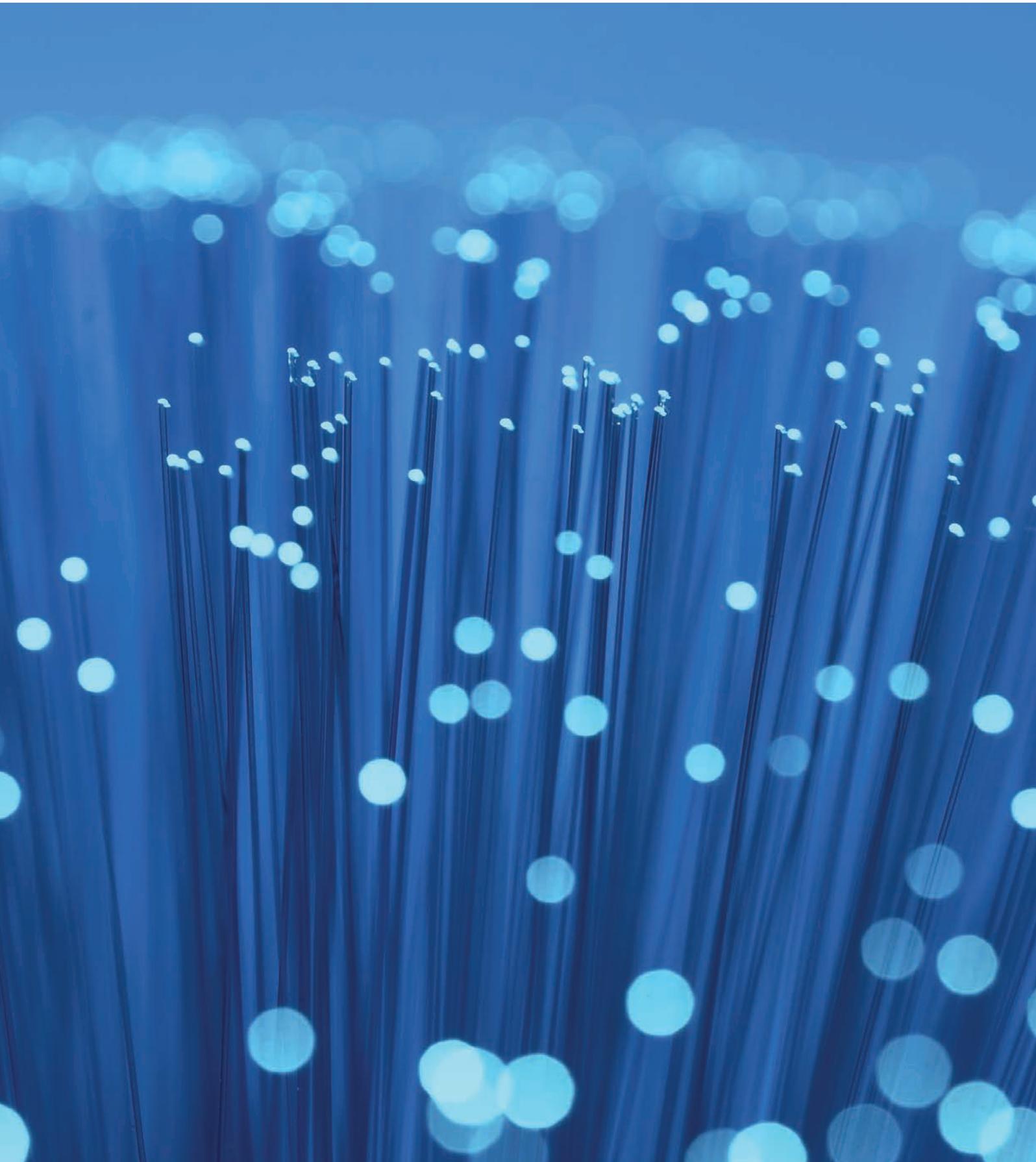
WHAT IS BIG DATA?

Big data is one of the main protagonists of today's digitized global economy and its definition is one of the most discussed topics floating around in the business community.

IBM, the leading organization on big data and analytics, defines big data as follows: "every day, we create 2.5 quintillion bytes of data (…). This data comes from everywhere: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records and cell phone GPS signals, just to name a few. This information is big data."* The leading North American software and analytics company SAS well explains another key element: "the importance of big data doesn't revolve around how much data you have, but what you do with it."**

The term big data is nowadays increasingly used in all business sectors to describe several operations, all of which are characterized by the availability of an amount of data – too large to be processed via conventional software systems and databases – and whose analysis (through technologically advanced tools and techniques) allows complex comparisons and leads to insightful results. The value of these analytics is anything but theoretical; it opens the way to concrete innovations, sometimes revolutions. Big data promises business benefits in terms of timely insights from data, real-time monitoring and forecasting of events, more fact-based decisions and improved management of performance.

The ability to store, aggregate, and combine data and then use the results to perform in-depth analyses is now widespread. Big data has made possible various applications across several industries, such as machine learning, network optimization, semantic search and many more. For example, one of the major data-driven changes is the emergence of real-time location data, which has created an entirely new set of location-based services, from navigation to pricing property and casualty insurance based on where and how people drive their cars.

Big data has already had a considerable impact and changed the competitive landscape in many industries. Visionary leaders are working to build their organizations' big data capabilities*** in the certainty that big data is sweeping away consolidated, conventional practices and replacing them with something new.

*http://www-01.ibm.com/software/data/bigdata/what-is-big-data.html
**http://www.sas.com/en_us/insights/big-data/what-is-big-data.html
***Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Byers, A. H. (2011). Big data: The next frontier for innovation, competition, and productivity.

APPROACHING A BIG DATA STRATEGY

Big data could be just another item on your strategic agenda, but probably it is bigger. When we see big data as one of the key elements in the larger context of digitalization, the transformative powers of these topics can be so fundamental that they most likely deserve and will demand a very special focus in most companies.

For most, there is a high degree of uncertainty as to how big data and digitalization will impact their companies and industries, their own modes of operation and business models. In such situations it is often difficult to craft and apply a traditional strategy with a 3-5 year horizon. The best advice may be to see it as a learning journey, even if the return on investment is more uncertain.

One approach, which may also satisfy the conservative forces in the company, is to work along three paths: this could be done simultaneously, in parts or independently:

1. Leverage opportunities offered by big data and digitalization to optimize the current delivery mode and business model.

2. Leverage opportunities offered by big data and digitalization to establish new delivery modes and business models.

3. Identify how opportunities offered by big data and digitalization may disrupt your production/services and industry and set out to actively take part in the disruption. This journey can give you the freedom to try things that are out of the box, while keeping at heads with your competition.

All three paths may hold significant efficiency and productivity gains that could help you establish key differentiators against the competition and totally new digital services.

You may set out to use your existing data in a better way: to optimize production/service delivery, share insights into the customer interface and perhaps even introduce benchmarking as a new service.

Or you may set out to transform your production/service through a whole new way of delivery (e.g. from analogue to digital) and use big data analytics to give a whole new level of user experience combining data from all your process, from your customers and any other open or commercially available sources.

You may see some disruptive scenarios in your industry that you want to get ahead of and grasp the opportunity before anybody else does. To do this, you may even need to set up a whole new company outside of your own organization to get the agility and freedom to build a new culture and new production/service to succeed.

All three paths require you to build certain big data capabilities internally or access them through sub-contractors, partners or investments/acquisitions.

To analyze and act on the impacts of big data and digitalization on your industries, you need a strong element of domain knowledge which you should have or build inside your own organization, but you will also need a strong element of digital and business model innovation competence that you may not have readily available inside your organization.

If you see that you will need to change your current operation mode (e.g. from analogue to digital), you will need to build or buy services to embed your domain and process knowledge into data streams. For this you will need technical capabilities to handle data governance, data processing and storage, data science/modelling, etc.

Finally, you may expect any significant change to be limited by internal and external barriers which consequently have to be addressed in your strategy. Internal barriers will to a large part be cultural and typically be resistance to: automation of knowledge work, use data as a basis for decisions, learning to treat data as an asset, use analytics to create new value propositions, etc. External obstacles may be found in existing customers resisting change in various ways or barriers to reach new customers or customer networks, legislative or stakeholder limitations, etc.

KEY INITIATIVES UNDERTAKEN

Half of the companies interviewed implemented at least one initiative related to big data, with rates slightly higher in North America and Europe (both 55%). Size is also a factor: large companies record well above average rates (63%).

Exploiting big data is a journey upon which most companies have embarked: it begins with governance and technology and moves on to more sophisticated actions. You first have to be able to act on management and governance to use data in an effective way. The curve of initiatives implemented mirrors this journey.

Most of the initiatives undertaken are enabling actions and relate to aspects such as the improvement of information management (28%) and the implementation of new technologies and methods (25%).

The proportion implementing actions with more significant impact on everyday activity is smaller. 16% made changes to culture and their organizations, and 15% even assumed a different business model or developed new competencies.

10% offered new delivery models and 8% took on new roles in the digital space.

Both Europeans (31%) and North Americans (33%) focussed on new technologies, but the latter invested in people too, especially on changes to culture and organization (24%) and on training and building new competencies (21%).

Large companies are the most active, with above average rates for all categories of initiatives. The bigger they are, the more focused they are on this topic.

New technologies and methods play a key role for LEADERS; they implement related initiatives at 3 times the average rate (81%) but they do not limit themselves to enabling actions.

They resort to changes to culture and organization (56%), training (50%) and offer new delivery models (43%) in proportions well above average.

WHICH OF THE FOLLOWING ACTIONS REGARDING BIG DATA HAS YOUR COMPANY TAKEN?
(multiple responses)

Figure 7: Initiatives undertaken

	TOTAL 1,189	Europe	Asia	North America	Central South America	Large Companies >1000 employees	Leaders
		n=368	n=615	n=82	n=65	n=207	n=82
AT LEAST ONE	49,1%	55,2%	47,3%	54,8%	53,9%	63,3%	100,0%
enhance information management	27,6%	28,5%	25,4%	29,3%	32,3%	38,2%	62,2%
implement/integrate new technologies and methods	24,8%	30,7%	20,2%	32,9%	21,5%	37,2%	80,5%
make changes to culture and organization	16,0%	19,8%	11,2%	24,4%	27,7%	21,7%	56,1%
create new business models and go-to market strategies	15,4%	12,2%	17,7%	14,6%	13,8%	21,7%	45,1%
build or train new competencies	14,6%	13,3%	14,0%	20,7%	15,4%	22,7%	50,0%
offer new delivery models	9,8%	9,5%	9,3%	11,0%	12,3%	15,0%	42,7%
to take on new roles in the digital space	7,6%	6,8%	7,0%	7,3%	10,8%	13,0%	26,8%
other	3,1%	2,4%	3,3%	3,7%	6,2%	4,3%	6,1%
no actions undertaken so far	34,5%	34,2%	37,9%	22,0%	29,2%	16,4%	0,0%

MAIN BENEFITS

There is no doubt that all businesses that leveraged big data concretely benefited. Only 2% did not profit.

Companies reaped benefits especially in terms of improvement of their operations. A total of 23% increased efficiency, 16% improved business decision making and 11% achieved financial savings. For 7% big data even transformed their business model.

Benefits were not limited to internal aspects: 16% also improved customer experience and 9% improved relations with other stakeholders.

The trend is similar in all geographical regions and for large companies; benefits are just more intense for the latter group.

LEADERS benefit more than others. Rates are higher for all advantages, but they profit more than average especially in terms of efficiency (60%) and of transformation of their business model (32%; more than 4 times the average). They also obtained significant market related benefits: improved customer experience (57%) and their innovation process/time to market (49%, more than 4 times the average).

WHAT BENEFITS DID YOUR COMPANY ACHIEVE FROM LEVERAGING BIG DATA?
(multiple responses)

Figure 8: Benefits obtained from big data related initiatives

	TOTAL 1,189	Europe n=368	Asia n=615	North America n=82	Central South America n=65	Large Companies >1000 employees n=207	Leaders n=82
AT LEAST ONE	43,0%	45,4%	42,0%	36,6%	41,5%	54,1%	98,8%
Increased efficiency	22,6%	21,5%	23,4%	18,3%	23,1%	27,5%	59,8%
Improved business decision making	16,3%	17,9%	14,5%	17,1%	16,9%	26,6%	54,9%
Improved customer experience and engagement	15,6%	14,9%	15,9%	18,3%	10,8%	19,8%	57,3%
Achieved financial savings	11,4%	10,3%	13,5%	8,5%	7,7%	17,9%	32,9%
Improved innovation process/time to market	11,3%	11,1%	12,4%	8,5%	7,7%	17,9%	48,8%
Improved compliance with laws and regulations	11,0%	10,3%	10,7%	12,2%	15,4%	15,0%	30,5%
Improved relations with other stakeholders	9,3%	8,7%	8,9%	8,5%	10,8%	13,5%	34,1%
Improved supply chain security	9,0%	9,0%	9,4%	3,7%	10,8%	14,5%	30,5%
Achieved a transformation of the business model	6,9%	4,9%	8,9%	3,7%	6,2%	9,7%	31,7%
Other benefits	3,2%	4,9%	2,4%	1,2%	4,6%	3,9%	4,9%
undertake action but NO BENEFITS ACHIEVED	2,2%	2,4%	1,3%	7,3%	0,0%	2,4%	1,2%

MAIN OBSTACLES

Factors preventing companies from taking more advantage of big data mainly relate either to the lack of an overall strategy or of technical skills (both accounting for 24%). Acquiring a specific vision and specific skills are emerging needs; competing priorities are a close second (20%).

North Americans report above average difficulties with resources distracted by other issues (40%) and again highlight difficulties with a comprehensive big data strategy (31%), while technical skills are less of a problem to them (18%). Security concerns - average score of 17% - represent a barrier mainly in Asia (23%), while the lack of strong business cases is particularly felt in Europe (12%).

More than 1 in 10, irrespectively of geography, is aware of the importance of organizational agility to profit from big data.

The ranking of barriers change slightly for large companies; they also feel hindered especially by the lack of a strategy (29%) but also by competing priorities (28%) and by security concerns (21%). As it is still early, it is common practice for companies to devote resources to clearer business cases and to feel slowed down by tangible issues such as security.

Strategy (20%) and management understanding (13%) are not a problem for LEADERS. Similarly to large companies, they are prevented in taking advantage of big data by competing priorities (40%) and security concerns (35%).

WHAT BARRIERS ARE IMPEDING YOUR COMPANY IN TAKING ADVANTAGE OF BIG DATA?
(multiple responses)

Figure 9: Barriers to progress in big data management
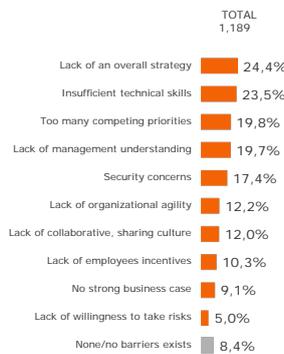
	TOTAL 1,189	Europe n=368	Asia n=615	North America n=82	Central South America n=65	Large Companies >1000 employees n=207	Leaders n=82
Lack of an overall strategy	24,4%	24,7%	22,3%	30,5%	30,8%	29,0%	19,5%
Insufficient technical skills	23,5%	21,7%	25,9%	18,3%	24,6%	23,2%	22,0%
Too many competing priorities	19,8%	30,2%	11,5%	40,2%	12,3%	28,5%	40,2%
Lack of management understanding	19,7%	21,2%	17,4%	23,2%	21,5%	18,4%	13,4%
Security concerns	17,4%	13,0%	22,6%	11,0%	7,7%	21,7%	35,4%
Lack of organizational agility	12,2%	11,7%	12,5%	11,0%	12,3%	14,5%	15,9%
Lack of collaborative, sharing culture	12,0%	12,2%	11,9%	9,8%	18,5%	14,0%	13,4%
Lack of employees incentives	10,3%	9,2%	11,7%	6,1%	9,2%	8,2%	11,0%
No strong business case	9,1%	12,0%	7,2%	9,8%	3,1%	9,2%	1,2%
Lack of willingness to take risks	5,0%	4,3%	5,9%	3,7%	3,1%	4,8%	7,3%
None/no barriers exists	8,4%	8,4%	9,1%	6,1%	6,2%	6,8%	12,2%

DATA GOVERNANCE, CONFIDENCE IS KEY

The survey has also investigated how businesses deal with governance now that data complexity is increasing day by day.

In considering how they handle and use data today, companies recognize that the major challenges to better data management are represented by data quality (48%), retrieval (46%) and security (44%), while access to data is slightly less problematic (39%).

Rates are even higher for leaders and this is not a contradiction. As they are the ones adopting the most advanced approach, they are most aware

of the difficulties you may encounter in collecting quality data.

However, leaders or not, most people think that existing governance tools are limited; but in fact, innovation in this area is taking place mostly via open source forms. Here most companies are lagging behind in big data competences and technologies.

Data governance limits are mirrored by a lack of confidence in the data companies depend upon for their business. Less than half of the companies are confident about the information they manage. That's not surprising: when quality is a major challenge to be careful is healthy. Only leaders trust the data they are using (85%).

LOOKING AT HOW DATA IS HANDLED AND USED IN YOUR COMPANY TODAY, WHAT DO YOU CONSIDER TO BE THE MAJOR CHALLENGES TO BETTER DATA MANAGEMENT?

Figure 10: Major challenges to data management
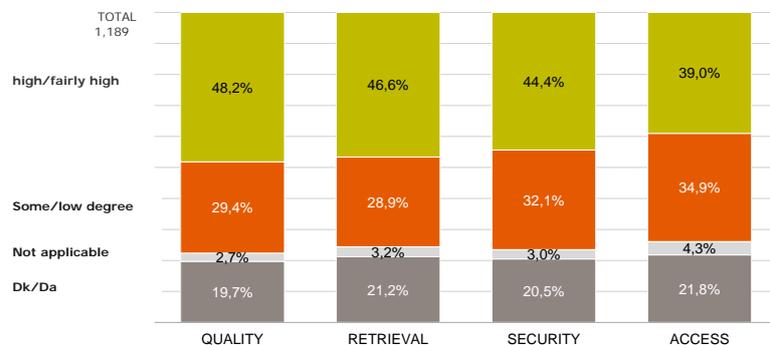
DO YOU TRUST THE DATA YOU ARE DEPENDENT UPON TODAY FOR YOUR BUSINESS?

Figure 11: Trust in data
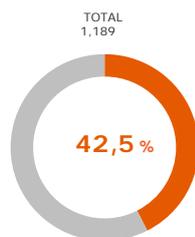
So, what could increase the level of confidence? Data validation (71%) and security (71%) are key drivers for quality. Also important are standardization (68%), as you need a benchmark for your validation, and the definition of specific processes and infrastructures (67%) to allow advanced reporting modalities.

To overcome this obstacle, companies seemingly will not be searching for a solution in futuristic inventions, but by investing in human skills. Questioned on how they intend to manage the increasing data complexity, most of them answer they are planning significant changes to their workforce in the mid-term.

As big data is a relatively new topic, the percentage of companies that haven't made up their mind yet as to how to approach this is around 30%, but the others are ready to take action.

About 1 in 2 will develop in-house competence, while 20% will outsource or work through partnerships. The first reaction will understandably be to be in control but, the more the companies mature, the more external partnerships they will seek to pursue progress, alliances with competitors included.

Leaders confirm this trend, with 73% developing in-house competences (being able to deal autonomously with basic data management needs is becoming more and more essential) and 22% working with external partners.

However, whether located inside or outside the company, the occupation as a data scientist will definitely be one of the key positions in the future.

HOW IMPORTANT ARE THE FOLLOWING IN INCREASING YOUR CONFIDENCE IN THE DATA YOU USE TODAY?

Figure 12: Drivers for quality
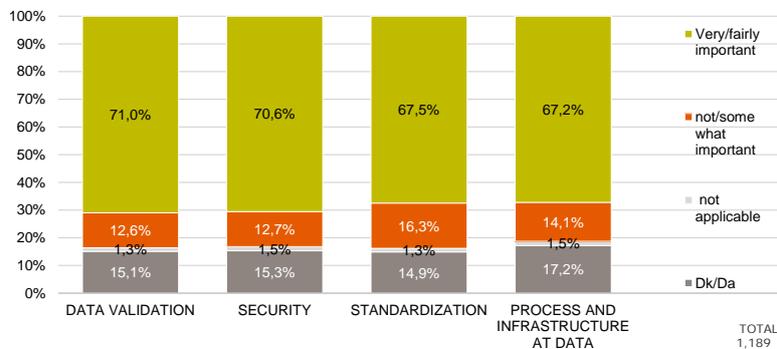
HOW DO YOU PLAN ON MANAGING THE INCREASED COMPLEXITY OF DATA, I.E CHALLENGES RELATED TO VOLUME, VELOCITY, VERACITY AND VARIETY? (2-3 years from now)

Figure 13: Future set-ups to manage increasing data complexity

FUTURE OUTLOOK

BIG DATA IMPACTS MID-TERM

Questioned on the mid-term outlook, roughly 38% think that big data will directly affect their business; awareness is particularly high for North Americans (57%) and for large companies (53%).

They consistently agree on the key role big data capabilities will be playing for their companies 2 or 3 years from now (57%: +12% vs present). North Americans (67%: +11%) and Europeans (64%: +14%) are among the strongest supporters. The same goes for large companies (72%: +12%).

9 in 10 LEADERS think that big data will directly affect their business in the future.

All LEADERS (99%) agree on the important role big data will be playing for their companies in the near future.

HOW DO YOU FORESEE THAT BIG DATA WILL AFFECT YOUR BUSINESS IN THE NEXT 2-3 YEARS?

Figure 14: Impact of big data on business in the mid-term future
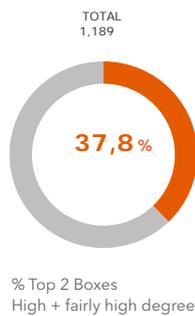
TOTAL
1,189

37,8 %

% Top 2 Boxes
High + fairly high degree

Europe	Asia	North America	Central South America	Large Companies >1000 employees	Leaders
n=368	n=615	n=82	n=65	n=207	n=82
41,9%	30,1%	57,3%	49,2%	52,6%	90,2%

HOW IMPORTANT WILL BE BIG DATA CAPABILITIES (COMPETENCES, TECHNOLOGY, METHODS, ETC.) TO YOUR COMPANY IN 2-3 YEAR TIME?

Figure 15: Importance of big data capabilities from a business perspective in the mid-term
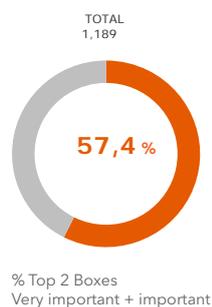
TOTAL
1,189

57,4 %

% Top 2 Boxes
Very important + important

Europe	Asia	North America	Central South America	Large Companies >1000 employees	Leaders
n=368	n=615	n=82	n=65	n=207	n=82
64,4%	50,6%	67,1%	56,9%	72,0%	98,8%

PREPARING FOR THE FUTURE

A total of 65% are preparing for the new reality, with large companies (76%) and North Americans (74%) among most active pioneers.

Omitting those who don't know what to answer, although the topic is still somewhat new and hasn't yet revealed the full potential of its revolutionary impact, 75% of the companies worldwide plan to maintain or even increase investments in big data. Once again North Americans confirm their pronounced interest, with 52% stating they will invest more than today. With rates around 26%, large companies also confirm their position.

All LEADERS are preparing for the future.

All LEADERS will invest. 1 in 2 will increase funds.

ARE YOU AND YOUR MANAGEMENT TEAM PREPARING FOR THIS NEW REALITY?

Figure 16: Preparing for the future
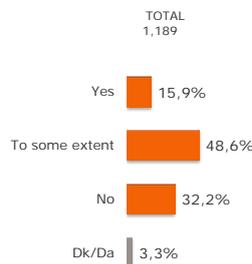
TOTAL 1,189		Europe n=368	Asia n=615	North America n=82	Central South America n=65	Large Companies >1000 employees n=207	Leaders n=82
Yes	15,9%	16,3%	15,6%	20,7%	9,2%	25,1%	100,0%
To some extent	48,6%	51,1%	46,7%	53,7%	52,3%	51,2%	0,0%
No	32,2%	29,6%	34,1%	23,2%	33,8%	22,2%	0,0%
Dk/Da	3,3%	3,0%	3,6%	2,4%	4,7%	1,5%	0,0%

IS YOUR COMPANY GOING TO INVEST IN BIG DATA IN THE NEXT 2-3 YEARS?

Figure 17: Intention of investment

Attention: low basis
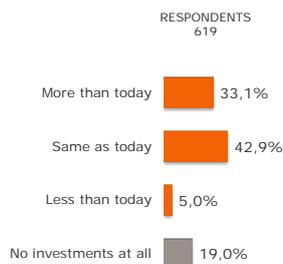
RESPONDENTS 619		Europe n=218	Asia n=290	North America n=42*	Central South America n=32*	Large Companies >1000 employees n=106	Leaders n=82
More than today	33,1%	37,1%	25,4%	52,4%	28,0%	51%	51,2%
Same as today	42,9%	42,2%	45,6%	40,5%	46,9%	36,7%	48,8%
Less than today	5,0%	3,7%	5,9%	2,3%	12,6%	4,7%	0,0%
No investments at all	19,0%	17,0%	23,1%	4,7%	12,6%	7,6%	0,0%

OPPORTUNITIES FROM BIG DATA MANAGEMENT

Companies see the biggest potential for value creation through better data management and automation mainly bound to efficiency aspects: improvement in day-to-day operations (52%), cost reduction (48%), safety and security (27%) and compliance (19%).

We are still in an "awakening" phase; companies are just starting to deal with big data, which may explain why opportunities related to the market record smaller rates. The improvement of customer experience (30%), the innovation of the business model and go to market strategies (24%) or the uncovering of new business opportunities (24%) rank below efficiency aspects in the list of opportunities.

Percentages may vary, but the tendency is similar in every region and for large companies too.

When considering the specific impact of better data management and automation on management systems, the areas of major potential are related to daily work: operational processes (60%), process planning (44%) and process improvement (42%).

In addition to the impact on operations (61%), large companies see opportunities related mainly to the improvement of their processes (53%), likely because they are more mature.

LEADERS' rankings do not vary but they have a more intense perception of opportunities, including those related to the market. This is clear sign that they are moving beyond the awakening phase.

All, including LEADERS, see the biggest impact of big data on their operational processes.

IN WHAT AREAS DO YOU SEE THE BIGGEST POTENTIAL FOR VALUE CREATION THROUGH BETTER DATA MANAGEMENT AND AUTOMATION?
(select up to 4)

Figure 18: Opportunities for value creation

	TOTAL 1,189	Europe n=368	Asia n=615	North America n=82	Central South America n=65	Large Companies >1000 employees n=207	Leaders n=82
Day-to day operations and work processes	51,6%	58,7%	45,4%	54,9%	60,0%	57,0%	58,5%
Reducing costs	48,4%	52,4%	44,7%	62,2%	52,3%	53,6%	53,7%
Improve customer experience and engagement	30,4%	32,3%	26,2%	42,7%	33,8%	37,2%	39,0%
Safety and security	26,6%	23,6%	28,9%	19,5%	29,2%	25,1%	25,6%
Innovation of the business model and go to market strategies	24,4%	21,2%	25,0%	20,7%	36,9%	31,4%	39,0%
Uncover new business opportunities	23,7%	24,7%	22,3%	23,2%	32,3%	27,1%	29,3%
Investments in technology	22,1%	24,2%	22,8%	14,6%	18,5%	24,2%	39,0%
Compliance	19,3%	19,6%	18,9%	28,0%	6,2%	18,8%	19,5%
Supply chain set-up	16,9%	17,7%	16,6%	9,8%	20,0%	15,5%	22,0%
Relationships to 3rd parties and regulatory authorities	9,8%	14,7%	5,5%	11,0%	12,3%	7,7%	9,8%
Environmental footprint	7,7%	9,8%	7,3%	4,9%	6,2%	10,6%	14,6%
Plants and physical assets	7,4%	5,7%	8,6%	6,1%	6,2%	11,1%	8,5%
Other	2,1%	1,6%	1,8%	6,1%	3,1%	1,9%	0,0%

Certification might help companies successfully exploit data to improve their operations.

Measurement difficulties are often reported during audits; this means that companies are not able to collect the right data that might help them improve their processes. A management system in line with the prerequisites of international standards will help in gathering the correct data.

A total of 47% actually think that third party validation might help them to exploit data and consequently to present them to suppliers and stakeholders as validated by a reliable source.

60% of LEADERS believe in third party involvement in validating and distributing data to stakeholders.

IN WHAT AREAS OF YOUR MANAGEMENT SYSTEM (E.G. QUALITY, ENVIRONMENTAL, SAFETY, ETC.) DO YOU SEE THE BIGGEST IMPACT THROUGH BETTER DATA MANAGEMENT AND AUTOMATION?
(select up to 3)

Figure 19: Impact of better data management on management systems

TOTAL 1,189	Europe n=368	Asia n=615	North America n=82	Central South America n=65	Large Companies >1000 employees n=207	Leaders n=82
Operation processes (manufacture of products, delivery of services, etc.) — 59,5%	56,5%	60,0%	65,9%	67,7%	61,4%	68,3%
Planning processes — 43,9%	48,9%	37,2%	52,4%	58,5%	38,2%	50,0%
Improvement processes — 42,6%	47,8%	37,4%	50,0%	46,2%	52,7%	36,6%
Performance evaluation processes — 38,6%	43,5%	36,1%	31,7%	40,0%	41,1%	36,6%
Context (e.g. understanding needs/expectations from stakeholders, etc.) — 21,7%	19,3%	23,6%	20,7%	23,1%	24,2%	31,7%
Support processes (hr, admin, etc.) — 21,3%	20,9%	22,0%	12,2%	24,6%	22,2%	11,0%
Leadership processes — 18,1%	17,4%	18,0%	26,8%	15,4%	20,8%	28,0%

IN ORDER TO SHARE YOUR DATA WITH YOUR SUPPLIERS AND STAKEHOLDERS, WOULD YOU APPRECIATE HAVING AN INDEPENDENT THIRD PARTY (A KIND OF DATA CUSTODIAN) SERVING AS YOUR TRUSTED SOURCE OF DATA?

Figure 20: Importance of third party data validation
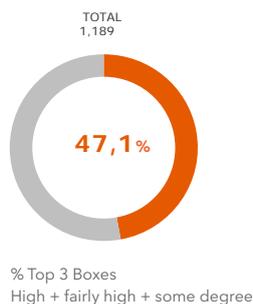
TOTAL 1,189

47,1%

% Top 3 Boxes
High + fairly high + some degree

Europe n=368	Asia n=615	North America n=82	Central South America n=65	Large Companies >1000 employees n=207	Leaders n=82
40,5%	52,3%	34,1%	53,8%	48,3%	59,7%

MANAGEMENT SYSTEMS IN A WORLD FULL OF DATA

For decades, analyzing data and applying statistical techniques have been tools to support process improvement after going through the Plan, Do, Check and Act in a Management System. With the advent of big data there is more opportunity to turn the wheel of continual improvement.

How are management systems coping with this today? To answer that question we analysed the found whilst auditing our customers' management systems. It appears that there are relatively more findings against the requirements (clauses) related to measurement processes and products compared to other requirements (clauses). This theme is visible across all the industries. This is interesting: as the world becomes more digital and generates more data, management systems are expected to excel in using data to fuel the improvement cycle. It appears that it is still a challenge for many organizations to do this.

This puts us on to some interesting observations around big data and management systems.
• Organizations should control their processes to create and collect only high quality data. Without data quality, it's problematic to draw any valid conclusions.

• At the same time, the data pool is expanding rapidly beyond the normal transactional & structured data set. For example, the data generated by the internet of things, website visits & clicks or pictures & videos. This presents new challenges in managing and analyzing available data.

• With cloud technology, it's easy to share data, the boundaries of the management systems are blurring and value chains are more integrated.

• At the very least, analyses should be performed in relation to customers, product conformity, processes and supplier performance.

This provides an opportunity to improve management systems' ability to take care of data quality and the ability to extract value from the data. Quality Managers will need to develop more analytical skill sets to exploit the potential of data in their management systems.

HOW IMPORTANT WILL BIG DATA CAPABILITIES BE TO YOUR COMPANY IN 2-3 YEARS? *Very important + important*

● Total **(1,189)**
● Food & beverage **(77)**

57,4%

62,3%

HOW DO YOU FORESEE THAT BIG DATA WILL AFFECT YOUR BUSINESS IN THE NEXT 2-3 YEARS? *Very important + important*

● Total **(1,189)**
● Food & beverage **(77)**

37,8%

49,4%

Big data is getting big buzz among food industry leaders as a potential game changer in the critical arenas of food safety, product development and supply chain management. Responses from the food and beverage companies in the survey indicate a forward-leaning approach. They are eying opportunities to tackle complex challenges and many are already moving to take advantage.

When looking at the food and beverage companies responding to the survey, 47% see big data analytics as an opportunity. Very few see it as a threat and 51% indicated that they did not know.

However, over a quarter of the companies have already seen productivity boosts from using big data concepts (28%) and 25% have a clear strategy on big data. This picture mirrors that of the total sample, indicating that the food and beverage industry by no means is lagging behind the others.

→

WHAT BARRIERS ARE PREVENTING YOUR COMPANY FROM TAKING ADVANTAGE OF BIG DATA? *(Select up to 3)*

● Total **(1,189)**
● Food & beverage **(77)**

Barrier	Total	Food & beverage
Lack of an overall strategy	24,4%	18,2%
Insufficient technical skills	23,5%	22,1%
Too many competing priorities	19,8%	16,9%
Lack of management understanding	19,7%	15,6%
Security concerns	17,4%	19,5%
Lack of organizational agility	12,2%	7,8%
Lack of collaborative, sharing culture	12,0%	15,6%
Lack of employees incentives	10,3%	14,3%
No strong business case	9,1%	2,6%
None/no barriers exists	8,4%	6,5%
Lack of willingness to take risks	5,0%	5,2%

30%   20%   10%   0%   10%   20%   30%

FOOD INDUSTRY EYES BIG DATA

TAKING ACTION

Almost half also indicated that they had already undertaken specific actions. This is not very different than for the overall sample, but the preferred actions for the food and beverage companies are slightly different and seem to center around efficiency and financial savings, brand reputation and supply chain management.

This could indicate that the companies surveyed consider big data concepts to have the potential to help them address needs for efficiency in an industry where pressure on margins is extremely high. Moreover, the food and beverage industry is forced to manage an increasingly complex risk picture of extensive supply chains, often crossing borders, linked to the threat of costly recalls due to food safety failures. In this industry, most incidents directly impact the consumers, and thus threaten the bottom line, reputation and brand.

What may be particular to this industry is that food safety failures can impact not only the responsible company, but entire supply chains and ultimately the whole industry. This has driven cross-industry collaborations like GFSI (Global Food Safety Initiative), developed in the light of the fact that food safety is seen as a non-competitive issue.

FUTURE COLLABORATIONS

It will be interesting to see how the industry approaches big data in the near future. Big data concepts could be applied to address individual company challenges, but also as a foundation for industry collaborations to tackle common issues related to food safety. The potential in data sharing to address supply chain vulnerabilities, food fraud or traceability, for example, is an intriguing thought.

In the survey, a higher number of food and beverage companies indicate that they trust the data they depend upon today (55% vs 43%). This seems to relate to confidence in their own data validation, the quality of data and infrastructure, which are of high importance to companies in this industry. Sharing data among industry players, may pose some questions around trust. Individual players must ask themselves how willing they are to base important decisions that impact their operations and/or reputation upon someone else's data. Over half the companies (52%) indicate that they see the need for a data custodian role, i.e. an independent verifier that could assure the data quality and instill trust in shared data sets.

THE INDUSTRY WILL GO BIG

All in all the ViewPoint survey gives reason for optimism. The food and beverage companies seem to be more certain than the total sample of the importance of having big data capabilities in the future (62% vs 57%). Moreover, a higher number of food and beverage companies indicate that big data will have a high or fairly high impact on their business in the next 2-3 years (49% vs 38% for the total sample). The companies in this industry indicate fewer barriers, even today, in taking advantage of big data concepts. Already, 21% say that their management team is preparing for the new reality and seemingly more food and beverage companies plan to invest in big data. A total of, 41% indicate a higher investment than today. Almost half indicate at the same level today. Combined, this provides a willingness to invest that is slightly higer than the total survey sample.

OUR FINAL THOUGHTS

It is still early, for most companies, but big data is clearly a topic that is finding space on everybody's agenda. From the leaders, we see that big data does have a positive impact on their operations and that with more experience, it will become even more important. Half of them are even planning to increase investments in the years to come.

It is a complex topic requiring a good deal of attention and maturity to really see how it may impact one's own operation in terms of opportunities and threats. Hence, we see that many implement standalone initiatives, but few have established a big data strategy.

We see clear signs of the transformative power of big data from the way that the leaders go beyond just enhancing information management and implementing new technologies and methods to also implementing changes to culture, competence and organization as well as transforming their business models and go-to-market strategies.

Competing priorities seems to be one of the key challenges to accelerate the process of leverag-

ing big data to address new opportunities and threats. This is even more predominant for the leaders. The natural response to change in the marketplace is often to just optimise further on the existing product/service and business model, and this requires more effective management prioritisations. If you want to transform your business model, you consider the new capabilities and insights big data brings and you may re-design how you can create value to your customers, leading to new services and value propositions.

As we see from this survey and what is happening in the market, when more critical decisions are based on data, the reliability of the data becomes a much more important factor in managing risks and outcomes. Anything from unintentional skewing of data quality, through malicious cyber-attacks to conscious tampering (of which we have seen some major industrial examples recently), the need to guarantee the quality of the data and algorithms used is increasing. This will be one of the core focuses for DNV GL going forward in this space, to play a role that enables companies to leverage on this new technology and methods to increase their value creation in a safe and sustainable way. This we will do through improving methodologies for following up management systems, contributing to the development of standards and the development of new services and assurance roles that will aid data validation and sharing.

PROFILING THE LEADERS

- LEADERS are strong big data supporters. They clearly see it as an opportunity, both in general and for their own company.

- They set an ad-hoc strategy and implement dedicated initiatives. LEADERS do not limit their investments to new technologies and new methods but invest in people, arranging for training or similar activities, and changing their organizations, for instance, with new delivery models.

- LEADERS' approach to big data is well rounded and they are incorporating its use into their organizations. They are a step ahead and understandably profit more than others do, both in terms of efficiency and market advantages.

- They recognize the impact that big data will have on business in the mid-term future and are preparing for it, and are ready to increase their investments, too.

LEADERS' APPROACH TO BIG DATA

01   LEADERS see big data as an opportunity.

02   LEADERS have a clear strategy on big data.

03   LEADERS invest considerably in big data related initiatives.

04   In addition to initiatives focusing on new technology and methods, LEADERS also carry out people related actions, such as training, and changes to their organizations, such as introducing new delivery models.

05   Strategy and management understanding are not preventing LEADERS from leveraging on big data.

06   LEADERS profit much more than others do from big data initiatives.

07   LEADERS recognize the impact that big data will have on business in the mid-term future and are preparing for it.

08   Big data will implicate efficiency and market related opportunities for LEADERS.

09   LEADERS will maintain or increase their investments in big data.

10   For LEADERS, certification will help them build trust in big data.