THE DATA-DRIVEN ENTERPRISE:

New strategies for better decision-making

About this report

The volume, variety and usability of data have expanded at an unprecedented rate over the past decade. At the same time, the ability to quickly generate decisions based on data alone, sometimes through automation, is increasing. Industries have been made and remade thanks to a rigorous emphasis on acquiring and exploiting data—or a failure to do so.

In January-March 2020 The Economist Intelligence Unit interviewed 24 top executives with direct responsibility for data strategy at enterprises in a range of industries across four major regions of the world. This white paper presents the many insights we gleaned from their expertise.

The Economist Intelligence Unit would like to thank the following individuals who participated in the interview programme:

North America

- **Alvaro del Pozo**,
  VP international marketing, Adobe

- **Colin Parris**,
  SVP and CTO, GE Digital

- **Kylan Lundeen**,
  global head of marketing, Qualtrics

- **Karen Jones**, EVP and CMO, and
  Rajeev Ravindran, SVP and CIO, Ryder System

- **Stan Pavlovsky**, CEO, Shutterstock

- **Mike Taylor**, CTO, World Wide Technology

Europe

- **Morag Watson**, CDIO, BP

- **Lisa Fiondella**, CDO, Finastra

- **Jason Goodall**, CEO, NTT Ltd

- **Mohammed Sijelmassi**, CTO, Sopra Steria

- **Iris Meijer**, CMO, and **David Gonzalez**,
  head of big data and advanced analytics,
  Vodafone Business

- **Rodrigue Schaefer**,
  Director Digital Foundation, Zalando

Asia-Pacific

- **Clemens Philippi**,
  CEO ASEAN, Euler Hermes

- **Unique Kumar**, head digital innovation
  and cybersecurity, Max Healthcare

- **Parthasarathy Mandayam**,
  CEO, Mindshare South Asia

- **Donald MacDonald**, head of group
  customer analytics and decisioning, and
  Ken Wong, head of AI Lab, OCBC Bank

- **C. R. Srinivasan**, EVP & CDO,
  Tata Communications

Brazil

- **Tatiana Mazza**, CDO, Carrefour Brazil

- **Ricardo Guerra**, CIO, Itaú Unibanco

- **Felipe Tadeu de Souza Lima**,
  head of business analytics, and
  Guilherme Stefanini,
  director new business, Stefanini

Eric Laursen is the author of the report and Gilda Stahl is the editor.

Introduction

The volume and variety of data have expanded at an unprecedented rate in recent years. Such expansion leaves companies struggling to understand the value of all the additional information they possess and how it can help them to make key strategic decisions for their business. Data-driven analytics are critical to meeting this challenge; they enable companies to integrate the growing volume of data in their decision-making and validate a course of action before committing to it. Cloud-based analytic tools, PC-based spreadsheets, artificial intelligence (AI), machine learning (ML) and other technologies allow businesses to extract competitive insights from the mammoth amount of data companies collect and acquire.

At Vodafone Business, the company's investment in data-driven analytics has enabled it to practise "more informed decision-making", says Iris Meijer, chief marketing officer. "Moving away from opinions and gut feeling helps our daily operations better understand customer opportunities, along with market risks and opportunities. We're able to act proactively and from a marketing point of view, we've become more agile, flexible and able to course-correct quicker."
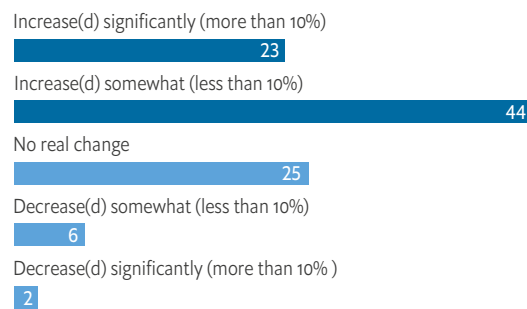
In a 2018 survey conducted by The Economist Intelligence Unit, more than two-thirds of respondents said their organisation's profitability had increased over the past three years thanks to its digital strategy and nearly

three-quarters said they expect it to rise in the next three years.[1] A 2019 survey by KPMG found that 78% of senior finance and management executives believe AI will enable finance staff to take on more value-added and strategic roles.[2]
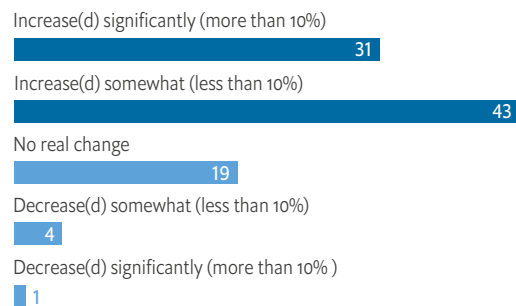
How has your organisation's digital strategy affected annual profitability over the past three years? How do you anticipate it will affect it over the next three years?

Select one for each row (% respondents)

Effect of digital strategy on annual profitability over the past three years

Increase(d) significantly (more than 10%)
23

Increase(d) somewhat (less than 10%)
44

No real change
25

Decrease(d) somewhat (less than 10%)
6

Decrease(d) significantly (more than 10%)
2

Effect of digital strategy on annual profitability over the next three years

Increase(d) significantly (more than 10%)
31

Increase(d) somewhat (less than 10%)
43

No real change
19

Decrease(d) somewhat (less than 10%)
4

Decrease(d) significantly (more than 10%)
1

Source: The Economist Intelligence Unit survey, 2018.

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[1] https://assets1.dxc.technology/digital_transformation/downloads/Digital_Decisions_Survey_Report.pdf
[2] https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/09/kpmg-future-ready-finance-global-survey-2019.pdf

"The ability to acquire, process, store, discard or retain these blocks of data in a local form in storage gives us the ability to get a 360° view of our customers for our employees who serve them," says C R Srinivasan, chief digital officer (CDO) of Tata Communications. "It also provides the customer with a 360° view of the relationship that it has with us."

By leveraging data analytics, companies also put themselves in a better position to quantify, measure and predict risk, for instance by exploiting transactional and behavioural consumer data. As demand for these analytics expands, making them available becomes a form of risk management for providers as well.

To better understand how enterprises are using data-driven decision-making to reap these advantages, The Economist Intelligence Unit interviewed 24 top executives with direct responsibility for data strategy at their businesses. A range of industries across four major regions of the world were covered by the research. This white paper presents the many insights we gleaned from their experiences.

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[2] https://assets.kpmg/content/dam/kpmg/xx/pdf/2019/09/kpmg-future-ready-finance-global-survey-2019.pdf

Forging a data-driven organisation

"I believe data is the game changer in any industry," says Unique Kumar, digital technology leader at Max Healthcare, a hospital chain in India. "If you have the right data and you blend it properly, the sky is the limit."

But to reap the advantages of actionable, data-driven insights, companies are finding it's not enough to simply amass data for analysis. They must create better data management platforms that can reliably collect and clean data, find patterns between data points, and provide profiles and analyses that inform better strategic decisions. Finally, companies must remake themselves as organisations: retraining employees, revising processes and moving direct responsibility for data and analytics further up the chain of command.

"Data scientists had been part of our marketing organisation for some time," says Alvaro del Pozo, vice-president of international marketing at Adobe. "But implementing our data-driven operating model changed their role from being a support function to giving them a seat at the decision-making table. They are now involved in all meetings and decisions."

A recent survey by McKinsey & Company found that almost nine out of ten companies that have succeeded in building a more data-driven organisation spent more than half of their analytics budgets on activities such as workflow redesign, communication and training.

For most companies, forging a data-driven culture is not easy. A 2019 NewVantage Partners (NVP) survey of 65 *Fortune 1000* companies found that only 28% claimed to have done so. A large proportion (40%) said the biggest challenge to business adoption was lack of organisational alignment or agility while 63% said people were the principal challenge to becoming data-driven.[3]

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>
> *Unique Kumar, digital technology leader, Max Healthcare*

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[3] https://hbr.org/2017/04/how-companies-say-theyre-using-big-data

Even some functions of organisations that gave data high priority are making slow progress. KPMG found that less than a third (28%) of senior finance and management executives view their initiatives to enable data-driven decision-making as a "great success".

Karen Jones, executive vice-president and chief marketing officer (CMO) at transportation and logistics provider Ryder System, cites "collaboration and support from the top down" as an advantage as her company shifts to more data-driven decision-making. "Our executive team reporting to the CEO all have very similar goals. We all understand the importance of data and everyone jumps in to help. That is really what's driving the speed at which we do these things. It's not perfect, but it's gone a long way because of that."

To fall on the right side of a data analytics proficiency divide, companies need to look carefully at the lessons that data-centred organisations have learned about how processes and priorities.

Our interviewees told us that companies must concentrate not just on accumulating and analysing data to solve specific problems, but also on tying it directly to their long-term strategic goals: to inform those goals as well as achieve them.

The objective should be to build a more efficient, more productive and more customer-responsive business. But to do so, companies must meet the following key challenges:

- Linking data strategy to business strategy;

- Improving and maintaining the quality of data;

- Making full use of their data;

- Getting data governance right;

- Solving the data talent gap; and

- Harnessing data to anticipate customer needs.

Linking data strategy to business strategy

Companies are responding to the explosion of data by expanding their collection and analysis of information about their internal operations and personnel, their customers, potential customers and competitors. They are also tapping into new data streams to better understand internal performance. These might include records of the company's employees and job descriptions, employee performance goals with measurable outcomes, company goals and quarterly results.

The types of data that companies collect to better understand their customers are also changing. In the past, consumer data largely meant personal information like names, physical and email addresses, and land-line and mobile phone numbers. Now, these have been augmented with cookie IDs, mobile IDs and other digital markers that trace user behaviour across multiple websites and mobile apps.

At the online stock-photo, video and music supplier Shutterstock, CEO Stan Pavlovsky says, "On any given day we collect millions of data points related to search and download behaviour of our customers as well as content-specific data connected to the 1m contributors who are uploading images, video and music for license. Much of that data shows how they are interacting with our product. Also, by looking at conversions, we can see how people are using collections to collaborate with their teams."

To make use of the data, Mr Pavlovsky adds, "We have an infrastructure team in place, including data engineers, scientists and analysts who create intelligence dashboards that are tailored towards informing us about the health and performance of the business and our products."

For example, Shutterstock creates a daily revenue report that looks at site conversions, site engagement and revenue by business segment. Pairing the data with scientists and analysts, "we have a set of insights informing us on what is happening on any given day and how we might need to focus on particular regions, audience segments or business areas," says Mr Pavlovsky.

> ## On any given day we collect millions of data points related to search and download behaviour of our customers."
>
> *Stan Pavlovsky, CEO, Shutterstock*

New data sources like mobile IDs will assume greater importance as their use becomes habitual and companies figure out more ways to derive analytic insights from them. And companies will be finding more ways to use data to communicate with a critical data source: their customers. In 2018 there were more than 300,000 chatbots on Facebook alone.[4] In a 2016 survey by Business Insider Intelligence, 80% of companies said they already used or planned to use chatbots by 2020.[5]

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[4] https://www.smallbizgenius.net/by-the-numbers/chatbot-statistics/#gref
[5] https://www.businessinsider.com/80-of-businesses-want-chatbots-by-2020-2016-12

Harnessing new data sources and functions is complicated, however, in part because some data (eg healthcare-related) requires customer permission before the company can use it for marketing purposes.

Companies have been using focus groups and surveys for many years to gain insight into their target audiences, but now they can use social media as well.

Online resources also make it easier for companies to collect information on their competitors. Businesses are becoming more adept at amassing data to gain greater understanding of other players in their market.

The more your company can base its decisions on concrete data—from consumer patterns to internal productivity and performance—the more confident it can be that those decisions are both logical and profitable.

However, before they can implement a strategy for generating actionable, data-driven insights, companies need to link their data strategy to their overall business goals, says Jason Goodall, CEO of global tech services firm NTT Ltd. That requires answering four questions:

"One, how do they improve their sales and, therefore, profitability with their customers? Two, how do they improve the delivery or their cost structure and, therefore, profits? Number three, how do they improve the experience of their customers? And number four, how do they improve their employee experience internal to the organisation?"

Improving delivery of products and services

In an increasingly interconnected world, where goods are often the end-result of production in multiple parts of the globe, efficient supply chain logistics are critical.

Ms Jones explains how Ryder has risen to these challenges: "We developed a visibility and collaboration tool for our supply chain customers that helps them see the movements of all shipments and goods across their suppliers. So you can imagine the massive amount of data that's produced from seeing millions of shipments a day go across and through that digital platform.

"What if a truck breaks down on the side of the road? How do I get the quickest identification of where that truck is through GPS telematics so that I can deploy someone to pick up that stranded driver on the side of the road? Those are all things we're able to do now that, a couple of years ago, we couldn't do. And now we're pulling all that data to analyse and let our customer know, say, 'your fleet in this area seems to have more breakdowns than your fleet in this particular area. Let's dive in under the hood and find out what's going on so we can fix your operations there.' That's making them more efficient, more productive, and saving money."

Last September energy giant BP had concerns about methane emissions in its operations.

"We made an announcement around how we were lumping various technologies together to get a better view—and more in real time—of

methane emissions, such that you could actually make a timely response," says Morag Watson, BP's chief digital innovation officer (CDIO). "At the end of the day, the algorithms and the data-crunching that we were able to do allowed us to take action and get a better outcome."

Over the past six years, GE has created a digital twin, a digital simulation model connected with its physical operation by the Internet of Things (IoT), AI and ML, and analytic software. This helps the company to map processes from manufacturing to supply chain to pricing and determine how to optimise each one. The result, says Colin Parris, senior vice-president and chief technology officer at GE, has been a thorough business process transformation that can save time and extend the life of machinery.

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Morag Watson, chief digital innovation officer (CDIO), BP

Eventually, this could transform the entire process of building, repairing and replacing equipment. Currently, says Mr Parris, who heads the digital twin initiative at GE, "when a part is damaged, I replace the part. But how about if the digital twin could tell me the type of damage that's happening? How about if I take all of that data about the part and design a replacement using an additive or 3D printing manufacturing process?"

With this capability, "I constantly look at ways we could change the performance or the longevity of the machine," says Mr Parris, "and I use that to make the machine work as best as possible for as long as possible for our customer. It becomes an immortal machine."

Mr Parris likens the digital twin to "a brain that's constantly learning, and that replaces any organ that's deformed. I can use it to service the current assets, and then I can use it to design new assets that live for a longer time. So this is the dream we've been going after."

Improving sales, retention and profitability

Fintech provider Finastra launched FusionFabric.cloud, its open innovation platform, "to open up and encourage development of other types of applications that financial institutions want and need", says Lisa Fiondella, CDO. "If there's an external fraud solution they want to take advantage of, or an application that helps a consumer more effectively save money, those types of applications can be built in easily. Does it reduce risk for Finastra? Yes: the risk of client attrition. One could say that we're de-risking our business because we're facilitating access."

Improving the customer experience

Customer interaction--and how it affects customer acquisition, retention and commitment--has become a near-obsession for companies in a wide variety of industries. Businesses are increasingly turning to AI to personalise digital interactions and even make them a source of new business—all the while generating more data to harvest and analyse.

AI is helping companies to tailor their outreach to customers more precisely. "We aim to personalise the customer experience as much as possible," says Rodrigue Schaefer, director of the digital foundation at German fashion e-tailer Zalando. "We use algorithms to create a personal shopping experience and recommendations for each of our 29m customers every time they visit the store."

Marketing and forecasting are two areas that benefit noticeably. Mr Schaefer says, "In marketing, we have developed sophisticated approaches to re-engaging customers across channels—email, notifications, ads, etc —with the right, personalised product recommendation or special offer. We also use data to help our buying teams forecast demand, ensuring sufficient stock for our customers."

Kylan Lundeen, global head of marketing at Qualtrics, distinguishes between two kinds of data that companies can collect: operational data and experience-based data.

"Operational data includes metrics like: when someone visits a website, where do they click? How much time do they spend on a given page? Which items do they add to their cart?"

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Now for the first time, we live in a world where you can get feedback and data from almost every single passenger—using the channels they prefer to provide that data."

Kylan Lundeen, global head of marketing, Qualtrics

Experience data is fundamentally different, according to Mr Lundeen. "it's the human sentiment, the beliefs and emotions that tell you how people felt about their experience. Companies can get these inputs on whatever channel their customers—or employees—are already using, such as social media, chatbots, call transcripts and review sites. Businesses can even pick up signals like rage-clicking—measuring how quickly and heavily someone is clicking on a webpage—to know exactly where there is an experience gap and how to fix it."

Rather than an airline asking a small sample of passengers how their flight went, Mr Lundeen says, "now for the first time, we live in a world where you can get feedback and data from almost every single passenger—using the channels they prefer to provide that data. These data can then be logged—or transcribed, in the case of voice messages—analysed and used to immediately correct any issues reported. The best brands do this in real time, before the next passenger experiences the same problem."

Improving the employee experience

"Our employees gain confidence and efficiency from using our more advanced analytics," says Mike Taylor, chief technology officer (CTO) and senior vice-president of services at World Wide Technology (WWT). "Good employees, motivated people, just do not want to do mundane, low-value work. We view it as our responsibility for both our employees and our customers to strive to provide something that's better."

Improving and maintaining the quality of data

The most time-consuming aspect of any action-oriented analytics exercise is data prep, says Ms Fiondella at Finastra. "If you want to use data in decision-making, you better make sure you've got good data to work with." This is more difficult for some processes than for others.

"A loan application has some pretty set fields of data, and as it goes into the system, it's going to be relatively clean," Ms Fiondella says. "Whereas a CRM [customer relationship management] system is populated by salespeople who are putting in data associated with their selling activities with a particular prospect. They may put some things in notes. They may not be using the fields correctly. There may be drop-downs, and maybe they picked the wrong drop-down. So that data is more subject to human error and is inherently going to be 'dirtier' than loan data."

The problem is compounded at companies with a global reach. "We have 50,000 people speaking numerous different languages around the world, and if you don't get the accuracy and timeliness of the data right, it's garbage in, garbage out," says Mr Goodall at NTT Ltd. "The amount and the rigour of the process that you need around ensuring the quality and the integrity of the data is massive."

At WWT, Mr Taylor notes that data insights are built on complex data webs that extend from the end-customer through a company's entire supply chain—and this affects data quality as well.

"Partnership is so essential to providing unique solutions and capabilities to the customers that

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>
> *Lisa Fiondella, CDO, Finastra*

we serve," he says. "We sit squarely between a group of innovative technology providers and customers that want to use and consume that technology to better their businesses. Our strength in that is we're really good at partnering with companies. So designing systems, processes and data architectures that understand from the get-go that we're going to have data sources coming in from other partners—that have to be augmented and rationalised to our own data—is critically important for us."

Data consolidation is one way to push back. At Tata, master data is sourced from a single master data-management tool. "Every system we have in the company looks to this source for all information," says Mr Srinivasan. "That means the customer master, the HR master, the location master—any master database being accessed by different systems. And these can only be modified through a controlled process. So we can do analytics on top of that without having to worry about one line of data not being of the quality that we need."

Making full use of your data

Another significant challenge is one that many companies may not even be aware of: making full use of their data. More than half (55%) of respondents to the EIU's 2018 global survey worried that they were not making optimal use of digital technologies within their organisation.

We are not making optimal use of digital technologies within our organisation

(% respondents)

Strongly agree
23

Somewhat agree
33

Neutral
17

Somewhat disagree
16

Strongly disagree
11
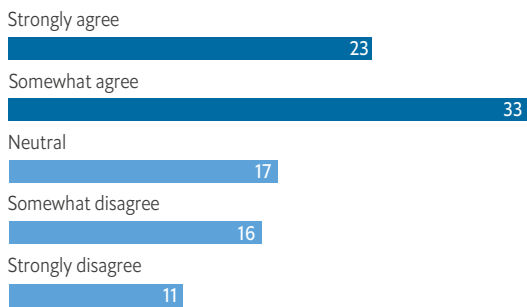
Source: The Economist Intelligence Unit survey, 2018.

"I think the biggest problem, which all companies face, is you don't know what data you have," says Parthasarathy Mandayam, CEO of Mindshare South Asia. "The second is you don't know how data set A talks to or impacts data set B. So the very first step is to actually audit the available data, to tag it correctly, and to try to establish some kind of relationship between the various data sets that you have."

"Data is so important to us because it helps us to be more efficient, more productive, more accurate in our positions," says Mr Srinivasan at Tata. "We are a global network company. Those networks spit out a lot of data. Earlier, we used to discard quite a bit of those bits and bytes, which means we processed only the critical alerts and didn't process the rest. Today, we are able

Today, we are able to process 100% of that data, look at real-time network statistics and analytics and are able to predict certain patterns even before they happen. That helps us to be a more knowledgeable, more proactive, more technology-driven company."

C. R. Srinivasan, EVP and CDO, Tata Communications

to process 100% of that data, look at real-time network statistics and analytics and are able to predict certain patterns even before they happen. That helps us to be a more knowledgeable, more proactive, more technology-driven company."

"Expertise data" is one valuable but often-overlooked category, says Mr Parris at GE: "You may have data in documents that the designers have created that says, 'When we did this design, we ran these simulations, we ran these tests, and we see this in these extreme cases'. There may be logs written by people who have done different tests for different parts of the fleet. You want to incorporate that information in your analytics as well. There are design notes. There are other notes—and we want to pull this in as well on the data side."

But to make use of all available data, the holders of that data must be motivated to share it. "I know that I have to get data that's across multiple silos," says Mr Parris, "so now I have to convince people across silos that I need to access their data and I need it cleaned in this way."

"I have to tap into the metrics they're looking at and the value that they seek. I have to convince you I need access to data in your silo, and if you do give me access, you will get benefits too. So we start off by studying what's the value of the data, knowing the profit, the revenue growth we can achieve. Because if you begin by saying, 'I can make more money and this is the value,' you have everyone's attention."

Getting access to data within your own organisation, or from a customer or supplier, can be daunting when it exists in multiple markets, Mr Parris adds, given increasingly stringent regulatory webs surrounding data and limitations on sharing it across borders.

Establishing the correct relationship between all the data at your disposal can be an exercise in hitting a moving target. "If there's a point at which you think you are using 70% or 80% of your data, one month later that could be wrong, because you've suddenly got a whole host of new data that has come your way which you're not using," says Mr Parthasarathy. "The point is, 'are we adaptable enough to keep using all that data effectively as it comes in?'"

Rich data sets are of limited use if they aren't incorporated into an analytical platform. Moreover, this can create gaps and lead to wrong insights and misleading messages. For most companies that participated in our study, one of the first steps is to consolidate all data in a single source, such as a data lake.

A data lake or warehouse is a system for storing unstructured data, including everything from systems source files to documents, emails and images. Flexibility and low storage costs mean that organisations can keep a much larger volume of data in a data lake than in a traditional relational database.

At Ryder "the strategy is to provide data to the business real-time so that every time they need a component they shouldn't have to keep coming back to us for it," says Ms Jones. "We have a team dedicated to ensuring that data is consolidated into a data lake that the business can dive into, pull out whatever they need and manage it."

That requires what Ricardo Guerra, executive vice-president and CIO of Brazil's Itaú Unibanco, calls "the democratisation of the data lake". This means that "all employees have access to data, depending on what they do. We have an internal process where we discover the needs of each employee of the bank, and we give them access according to those needs. Once we bring one specific data item to the lake, we make sure the right access is given to the right people and the right business—because that is most likely to generate value as soon as possible."

To produce usable data insights, however, the company must also make sure everyone is speaking a common language through the data. "We have to look across business lines, business units, at how we ratify a common vernacular and set of terms for our data so that

it can be consistently applied across groups and teams," says Mr Taylor at WWT. "For us, the beginning of this is not a technology problem at all. It's really a business process."

Being open to working with disparate partners and technologies "is also critical to keep up with the rapidly evolving data landscape", says Mr Parthasarathy. "If you are stuck with a certain set of processes or a certain set of tools and technologies to work with, you'll constantly be falling behind the eight ball, because the volume and variety of data available just keeps increasing every day."

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Mike Taylor, CTO, World Wide Technology

Getting data governance right

Consolidating data and integrating analytics facilitate better data governance—along with proper training of staff with access to sensitive information.

At Ryder, "we've begun the process of creating an enterprise information governance group with people from all the business units," says Ms Jones.

"Each of our businesses now has a chief data officer," says Ms Watson at BP. "It's a new role and it really underpins the fact that we see data as a valuable asset in a way that hadn't really been understood before. The CDO's role is to work out the type of data governance and to move our data out of silos. So there has been a much higher level of conversation around what the data strategy for BP is and how we execute upon that."

That strategy must include data privacy, an increasingly urgent issue for regulators and lawmakers, as evidenced by the EU's General Data Protection Regulation (GDPR) and the California Consumer Privacy Law. Whether they regard themselves as data-centric or not, companies need to be aware of data that originated from customers and third parties to make sure it is carefully controlled and governed.

"Since the introduction of GDPR in Europe we have created and invested in a central data governance team that has introduced and is enforcing principles, processes and policies that govern data collection, management, access and retention," says Mr Schaefer of Zalando. "We are also investing heavily in software tools and platforms that make strong customer data security and privacy default across the company. Customer trust and privacy is our main priority."

The challenge is only going to grow, says Mr Goodall at NTT. "We have to figure out how we get the balance between using the data and the privacy of data," he says. "I'm not sure we have figured out exactly how we draw the boundaries. And once we have all of this data, we're going to start to enable things like AI and robotics. Where do we draw the lines and guidance around those technologies? As an industry we have to figure these things out."

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> *Morag Watson, CDIO, BP*

Solving the data talent gap

In a 2017 survey of European C-suite executives conducted by The Economist Intelligence Unit, 43% of respondents cited "poor understanding of how to use data analysis" as one of the greatest challenges they face in pursuing data-driven decision-making.[6] In the EIU's 2018 global survey, nearly 30% of global executives placed recruiting more digital-savvy employees and consultants among their most critical initiatives for the coming year.

"The real challenge is to have the right people that can ask the right questions, to build the right algorithms and to start to use the data in a way that really creates business value," says Mr Goodall at NTT. "We find that it's quite tricky and quite difficult to find those types of resources on the scale that we need. It's incredibly competitive to try to identify and find them."

The talent gap extends deeper into the workforce as well. While every employee doesn't need to be a data scientist, at many companies workers with critical roles in information gathering and data flow are not sufficiently knowledgeable to ensure that data is collected and used effectively.

Sparse data, which is data transmitted by sensors that may contain significant gaps, provides an illustration. "How do I get top data scientists who can help me think about how I deal with sparse data?" says Mr Parris at GE. "How do I get data scientists who can then train the physical folks so that they become better and better at working with sparse data?"

That means attracting and retaining analytic talent will become a competitive requirement. "Our solution is to try to build expertise within our organisation through things like graduate programmes and recruitment programmes," says Mr Goodall, "and by bringing in younger people who have the mathematical and data science qualifications that allow them to come into an organisation and add value".

For many companies, however, generating and retaining expertise is likely to remain an uphill battle. "This talent challenge is an issue for any industrial company like GE," says Mr Parris, given the constant possibility that as it trains a new generation of data scientists, they will be poached by either a high-tech superpower or an ambitious start-up. "So you're constantly trying to figure out ways to retain this talent and manage around what's unique."

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6   https://eiuperspectives.economist.com/technology-innovation/data-overload-effective-decision-making

Harnessing AI to anticipate customer needs

Companies looking for tools and systems to help them make better, data-informed decisions face an embarrassment of riches. "It's almost like a perfect storm," says Ms Watson at BP. "The tech industry is focusing on algorithmic developments and AI. The hardware companies are competing on computer power. It's moving to the cloud, it's cheap, it's accessible. At the same time, there's an explosion in the number of sensors deployed around your operations. And so the tech industry is just bursting with new products every day. You have more people playing, so it drives the cost down. And if it drives the cost down, more people can take advantage of it."

AI and ML, although relatively new and still-evolving technologies, are rapidly attracting attention based on their potential to anticipate and facilitate faster response to changing customer needs. Last year, more than 60% of executive management, marketing and sales and research and development teams said that data science encompassing AI and ML was either critical or very important to their success, according to a study by Dresner Advisory Services.[7]

Two years ago, OCBC created an AI Lab, housed in a separate building from its analytics team and with considerable autonomy, that focuses on strategic projects and creating capabilities that the analytics team can then leverage. "We run hundreds of credit card campaigns every year focused on recommending relevant merchant offers to individual customers," notes Mr MacDonald.

"The AI Lab built an engine that effectively allows us to automate that and use AI to determine the optimal match of offer and customer."

Companies that are pursuing a more data-driven approach to insight-building and decision-making say these new tools give them a greater depth of understanding of their customers. This enables them to make decisions that place them on top of problems, or even a step or two ahead.

Last year, Tatiana Mazza, CDO at Carrefour Brasil, a subsidiary of the big French grocery chain, says, "we invested in the application of AI to recommend the best offers to our customers at the best time and through the right contact channel. With this, our sales through directed communication were three times higher than the previous year."

OCBC Group was an early adopter of digital banking and customer data analysis, beginning its journey more than 20 years ago. Initially, the focus was on sales and marketing use cases, but increasingly its efforts have extended to such areas as risk management and financial crime. "Data-driven leads are a key output from that process, and today 35% of all sales on the wealth management business are related to data," says Mr MacDonald. "We have a programme called Next Best Conversation where we use machine learning and real-time event triggers to make recommendations to our customers on what's the next 'best conversation' we want to have with them. This might be a sales conversation or potentially even a data collection conversation."

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7   https://www.forbes.com/sites/louiscolumbus/2019/09/08/state-of-ai-and-machine-learning-in-2019/#2487fc801a8d

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Donald MacDonald, head of group customer analytics and decisioning, OCBC Bank

Ryder has applications running at all times to detect systems failures and truck breakdowns. "We use predictive analytics across the enterprise to know if there are devices that are going to fail," says Ms Jones. "We also have a process in place that enables us to recover very quickly so the business can keep running."

Zalando recently changed the way it recommends products to its customers, moving from a complex set of rules driven by business teams to a data-driven, customer-centric approach. "Each product shown on our site is selected by a machine-learning algorithm which adapts to meet the individual customer demand in real time, using signals from millions of customers as they engage with

fashion in every market," says Mr Schaefer. "This way, our system can quickly adapt to changing customer demands—like a cold snap in Italy or a music festival in Germany. This personalisation, down to the level of the individual customer, is key for Zalando."

Vodafone Business has initiated an intelligent pricing programme which gears pricing of some services to recent market activity, market conditions and seasonality, and customer priorities and expectations. "We are evolving from manual pricing to completely data-driven fees and pricing," says David Gonzalez, head of big data and advanced analytics. "We make simulations about fixed quotes, all of which are built on the big data that is in our systems."

Ultimately, Vodafone Business aims to drive predictive intelligence such that it understands "what our customers need and what is happening with our customers, even before they know about it," Mr Gonzalez says. "We are starting to look at predictive intelligence, in this case working with marketing, working with our customer value management teams and starting to define how we can embed all this intelligence and all these predictions in the daily interactions that we have with our customers."

"Not a science experiment anymore"

Companies have already invested a great deal in data, data analytics and employee expertise that enable them to surface actionable insights—and will continue to do so. "It's one of our strategic imperatives that more and more of our talent pool should be data analysts and data scientists," says Mr Parthasarathy at Mindshare. "Quality talent in these areas is hard to recruit and retain, and we are making good progress."

As companies run out of low-hanging fruit in their quest to realise efficiency gains and lower costs from data transformation, however, they will also need to integrate data-driven decision-making more closely into their strategic process.

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Parthasarathy Mandayam, CEO, Mindshare South Asia

"We have learned that every effort should be driven by a business objective and with the active participation of business owners," says Ms Mazza at Carrefour. At the outset, "it is important to understand the purpose of your analytics and the exact goals you want to achieve," says Mr Kumar at Max Healthcare. "The decision about data must be based on expected outcome or results."

Data-driven insights must, however, help companies to answer larger questions that inform strategy and goal-setting, says Mr Taylor at WWT, such as "how our teams are performing and how

effective and high-performing is our culture. This can't be kind of a science experiment anymore. It needs to be connected to a corporate strategy and a set of goals and outcomes that ultimately can be invested in and measured over time."

To make data inform and serve corporate strategy, it also has to be rendered in usable form for the company's business units. OCBC's analytics team includes "analytics translators", Mr MacDonald explains. Their job is to embed in the business, understand the business objectives and pain points, and bring them back to the analytics team to solve. "We use 'translators' at the end to go back to the business and do the data storytelling: 'this was your problem statement, here's how we tackled it, here's what we found and the action you should take as a result. We use data visualisation heavily as part of this process to explain the sometimes complex outcomes."

Itaú Unibanco has established what it calls the Analytics Center of Excellence, a bi-weekly workshop that brings together data scientists, technology engineers and business people to meet and discuss opportunities to use data to deliver better results. "We believe that it's one of our core competencies and something that any serious analytics company should have," says Mr Guerra.

Executives we interviewed return often to Mr Parthasarathy's point that expertise—people—is the investment that will take them furthest along this path. "There are no barriers anymore to getting access to data and data analytics," says Ms Meijer at Vodafone Business. "Where I feel some of the barriers are is upskilling our people and empowering them to build on their digital IQ."

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Iris Meijer, CMO, Vodafone Business

Education is a critical part of the journey, most interviewees agreed, but some want to take data-analytic thinking further. This will only become more critical as data science plays a greater role in more aspects of a business. This might range from tailoring marketing strategies and analysing social media penetration to predicting airline flight delays and patient admission rates at hospitals to managing serious illnesses.[8]

"A lot of people talk about data scientists as a special, separate discipline, and while I think that's true with most skill sets, we desire to enable data science capability across a broad section of our employees," says Ms Watson at BP. "If you go back 15 or 20 years, when Excel came out, it was probably the purview of your IT department, and you probably went there to get your macros built. Today, everybody— whatever function they're in— knows how to use Excel and has some capability with macros.

"That's how we see data science. Our focus is on enabling the skill set across the board, through what we call 'citizen data scientist capabilities'. While there will always be a core capability, we want to open it up into the hands of the users, such that they can integrate that into their day-to-day, doing the models."

As data-driven insights become a more integral part of strategic decision-making, they must also be made more available to the workforce. If one way is to create "citizen data scientists", another is to simplify delivery.

"Each tool has its own role to play and should be used to transform data into analytical output that supports business decisions and deliveries," says Ms Mazza at Carrefour. "The important thing is to establish a consistent strategic vision and mobilise the entire company in data orientation."

That doesn't mean companies won't continue to vie for expertise that can take data decision-making into new places. "Steering your business using data-driven insights is now a fairly well-established practice and well supported by software vendors," says Mr Schaefer at Zalando. "What is significantly harder is developing data-driven algorithms that power innovative new products that can serve customers at scale." Mr Schaefer points to Zalando's success with its Algorithm Fashion Companion which uses ML to suggest outfits for its customers— and point out to the company itself where it should take its product line next—as an example of this more ambitious approach.

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[8]   https://knowledge.wharton.upenn.edu/article/whats-driving-demand-data-scientist/

Conclusion:
The journey to a data-driven culture

In a knowledge-based economy, the ability to generate data-driven insights will align more and more with companies' overall competitiveness. More than two-thirds of companies the EIU surveyed in 2018 said their profitability had increased over the past three years thanks to their digital strategy and nearly three-quarters expect it to rise in the next three years.

"The role of data in everyday decision-making is becoming more and more normal, reinforcing the use of data and the use of very strong analytical tools in the process," says Guilherme Stefanini, director of new business at Stefanini, a Brazilian software and service provider.

The volume and cost of data will grow too, of course, especially as AI and ML assume a more prominent role. Companies in data-heavy businesses like healthcare provision are already coming to grips with this problem.

Repeatedly, however, our interviewees referred to their quest to build more of their decision-making at all levels on data-driven insights as a "journey". Some companies we spoke to are still focused on product-level predictivity—such as which audience its market ought to pursue based on geography, income level or other indicators—while others are looking to apply data analytics to more strategic matters. Curiously, however, as the importance of data and analytics grows it is broadly agreed that the critical factor will be people rather than numbers.

"You have to almost do a change management process within the organisation," says Mr Goodall at NTT, "and create awareness about the value of the data, the importance of putting it in accurately and keeping it up-to-date, supported by process and orders and the right toolset. But a large part of it is, once again, human behaviour, where the salesperson realises it's important to change the email address of the contact at the company because that data is going to be used for different things across the organisation."

Garbage in, garbage out, in other words.

The results will never be perfect, or perfectly up to date. "There are sets of data that we don't have fully integrated," says Mr Srinivasan at Tata. "Organisations that go through this journey will always have some sets of data that are not fully analysed and fully used. Some of this is because technologies get obsolete and you need to move on."

The way to consistently overcome these hurdles is to develop a data-driven culture at all levels of the organisation. "The best takeaway here", says Mr Gonzalez at Vodafone Business, "is that having all your teams working together under the same data strategy—finance, marketing, strategy—and celebrating the technology, is the only way forward."

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