BRIEFING PAPER

Reassessing Data-Driven Business Transformation Through a New Lens

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Data is undoubtedly the most important asset of our generation. The cloud has certainly made it easier to store, process, and analyze data at scale. Analyzing business data to learn from the past and predict the future is one of the key business imperatives for many organizations. However, many still struggle to realize the vision of becoming a truly data-driven organization. Why is that? There are some common pitfalls to watch out for when embarking on a data-driven journey.

In my experience working with leaders across enterprises, I find that some of the biggest challenges are cultural. NewVantage Partners conducts a survey of big data and artificial intelligence company executives. Every year, it asks executives what the biggest impediment to becoming a data-driven company is. What has been consistent throughout the years is that the number one impediment reported by executives is culture. In fact, in 2021, 92% of respondents said that the biggest reason was culture, while only 8% said it was technology. There's a significant amount of work ahead of us as leaders to drive this change, but it's also a fantastic opportunity to benefit from investment in data and to use the growing data volume for the good of your business.

Amazon Web Services, in association with Harvard Business Review Analytic Services, has identified common pitfalls companies should avoid when it comes to embedding data in their culture and best practices for becoming a data-driven enterprise. Sincere thanks to many contributors who shared their experiences and expertise to shape this study. I hope that the information covered in this paper helps organizations on their data-driven reinvention journeys and helps them avoid common pitfalls strategically.

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Zettabyte—the unit of measure that is the equivalent of 1 billion terabytes of data—may not be a word that C-suite executives use very often these days. But that might change soon as the data revolution rages on. Data is already pumping through organizations like never before, arriving from a plethora of sources— from smartphones to smart cities—and proliferating so rapidly that experts believe the term zettabyte will soon be found in the corporate technology lexicon. By 2025, businesses, along with the economies and societies in which they operate, will collectively be handling an estimated 175 zettabytes of data, according to the Internet and Jurisdiction Policy Network, citing market intelligence firm IDC.[1]

That prospect is both exciting and daunting for C-suite executives, leading to a growing sense of urgency to nail down strategies to share, embed, manage, innovate, and compete using enterprise-wide data. For some companies, doing so is a matter of staying competitive and relevant in their industries; for others, it is a matter of survival. "There are absolute consequences of faulty data strategies, but they play out over time. If you don't become data-driven in one form or another, eventually it will catch up with you," says Randy Bean, consultant and author of *Fail Fast, Learn Faster: Lessons in Data-Driven Leadership in an Age of Disruption, Big Data, and AI*, which relates insights and observations he has gleaned as CEO of NewVantage Partners. After all, he says, "Disruption tends to happen gradually, then suddenly."

HIGHLIGHTS

There is a growing sense of urgency to **nail down strategies** to share, embed, manage, innovate, and compete using enterprise-wide data.

Becoming a truly data-driven enterprise—with all parts of the business making real-time decisions based on high-quality data that drive actionable insights—**has proven elusive for a variety of reasons**.

Three broad areas of focus can facilitate a data-driven cultural shift: **a clear, inclusive strategy; tailored learning and development; and trustworthy and ethical use of data** through watertight governance.

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The value that data can bring to organizations has become increasingly clear, even more so since the Covid-19 pandemic began. Companies of all sizes in all industries are ramping up investments and human capabilities on their journeys to data-driven business transformation. Rapid technological advances are front and center in enabling this journey, particularly in the form of artificial intelligence (AI). With AI, machines can now perform many cognitive tasks that once only humans could do. For businesses that can mean more support in automating processes and engaging with customers and employees, along with gaining insight through data, wrote Thomas H. Davenport and Rajeev Ronanki in an HBR.org article titled "Artificial Intelligence for the Real World."

The return on this investment: new competitive advantages, faster and better strategic decision making, and turbocharged collaboration and innovation. It's not surprising, then, that data is seen as a strategic business asset at many organizations.

However, few companies have yet to fully harness data in ways that create sustained efficiency, insight, and innovation as our world has become more digital. Being a truly data-driven enterprise—with all parts of the business making real-time decisions based on high-quality data that drive actionable insights—has proven elusive for a variety of reasons.

Yet the ambitions are clear among companies seeking competitive advantages using data. Consider Cathay Pacific, a global player in an industry characterized by intense competition, low margins, and—particularly during the Covid-19 pandemic—high volatility. Though the airline has been a technology innovator for decades, Cathay says new AI tools are now enabling it to use data in a more strategic, targeted way as it evolves into a premium travel lifestyle brand and aims to become a corporate leader renowned for its strong digital culture and capabilities. "As an organization, we understand, possess, and use leading-edge digital data and technologies to power our business success," says Lawrence Fong, the company's director of digital and IT. "We believe that having a digital culture and capabilities is a core competitive edge alongside our traditional strengths in terms of brand, customer experience, and people."

Armed with lessons from enterprise-data pioneers, C-suite executives have an opportunity to leverage advances in AI, analytics, automation, and other breakthrough technologies while also addressing one of the thorniest reasons why becoming a data-driven enterprise is so tough—culture.

Climbing Up the Data Value Chain

To be sure, companies are not embracing data-driven transformation at equal speeds. Global research from consulting firm Deloitte identifies five levels of maturity in becoming an "insight-driven organization."[2] **FIGURE 1**

While a "Level 1" organization is aware of data analytics (that is, systematically analyzing raw data to create value), it has little or no relevant infrastructure or strategy to harness vast amounts of real-time data, which is today referred to as big data. At the other end of the spectrum, "Level 5" companies empower employees—regardless of job function or business unit—to analyze and actually use the data to make decisions, among other key characteristics. With steady and strategic adoption of emerging enterprise technologies, these companies use data and analytics as competitive tools. Only around 10% of respondents to Deloitte's survey of 1,048

FIGURE 1

Data Maturity: Are We There Yet?

Five stages of becoming an insights-driven organization

1	Analytics awareness	Aware of analytics but little or no infrastructure in place and undefined analytics strategy
2	Localized analytics	Aware of the need for data management performed on a limited basis on a departmental or an application level on an as-needed basis
3	Analytical aspirations	Expanding ad hoc analytical capabilities beyond silos and into mainstream business functions
4	Analytical companies	Industrializing to combine data from broad sources into meaningful content and new ideas
5	Analytical competitors	Depend on analytics, including artificial intelligence-related tools such as machine learning to manage performance, preserve value, and create new products and sources of value, while keeping pace with rapid technology change

Companies with the highest level of data maturity empower employees—regardless of job function or business unit—to analyze and actually use the data to make decisions, among other key characteristics.

executives at U.S. companies believe they are at the highest level of maturity. The majority—approximately 62%—place their companies in Levels 1, 2, or 3.

Beena Ammanath, executive director of the Deloitte AI Institute, cites the proliferation and improvement in platforms, solutions, and vendors as one reason why many companies are now able to move into higher maturity levels. In global research she coauthored on AI adoption in 2019, she found that companies are, in fact, reaping the benefits of using AI tools such as machine learning, which teaches computers to analyze data and predict future outcomes, among other uses; 42% of respondents say they are using AI to make processes more efficient, and 37% are using it to enhance existing products and services.[3]

The results from this survey show a promising sense of what is possible. "Companies should look to push the boundaries of what they can do," says Ammanath. "There is an opportunity for these companies to pursue creative approaches that unlock the value of data insights beyond efficiency with AI applications that are truly transformative."

The journey to unlocking the value in data has been neither short nor pain-free, says Bean. "The questions I hear when I go into an organization today are the same that people were asking 25 years ago," he explains, such as what data can teach them about their company and customers or how data can make them more competitive. "Now there are tools and technology capabilities that have made it possible or easier to answer some of those questions, but there's a lot more data, and there's a lot more complexity," due to the sheer volume of data and the exponential growth of computing power so that data can be analyzed far faster than before. In short, the challenge remains to glean actionable insights from all the reports, spreadsheets, and dashboards that businesses can now generate.
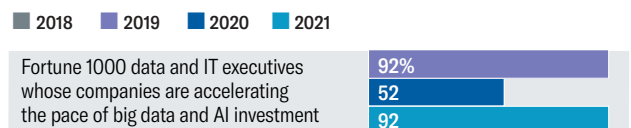
NewVantage Partners has been running an annual survey since 2012 of chief data officers and other C-suite business and technology executives to learn more about big data and AI strategies at Fortune 1000 companies, primarily in financial services, life sciences, health care, and retailing. While their companies investments in these technologies have been rising, respondents' confidence in their companies' data-transformation progress has been declining. The 2021 survey shows investment plans in big data and AI are robust, returning to pre-pandemic levels, with nearly 92% of respondents from

85 companies citing an acceleration in these investments in the latest survey, compared with 52% in 2020.[4] **FIGURE 2** However, only around 41% believe their companies are using
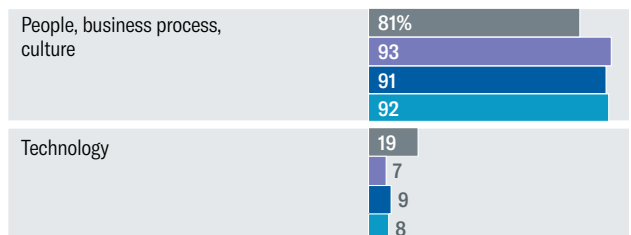
FIGURE 2

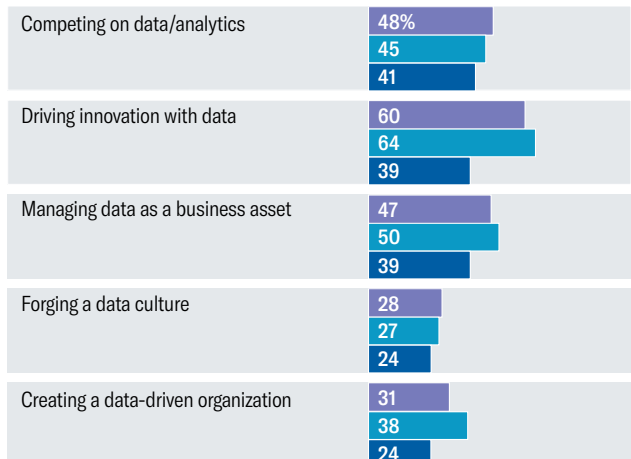## Data-Driven Opportunities and Challenges

An annual assessment of big data and AI investments

■ 2018 ■ 2019 ■ 2020 ■ 2021

Fortune 1000 data and IT executives whose companies are accelerating the pace of big data and AI investment
- 92%
- 52
- 92

What is the main barrier to your organization becoming data driven?

People, business process, culture
- 81%
- 93
- 91
- 92

Technology
- 19
- 7
- 9
- 8

My organization is:

Competing on data/analytics
- 48%
- 45
- 41

Driving innovation with data
- 60
- 64
- 39

Managing data as a business asset
- 47
- 50
- 39

Forging a data culture
- 28
- 27
- 24

Creating a data-driven organization
- 31
- 38
- 24

Source: NewVantage Partners survey, January 2021

For CEOs with a new vision of leadership, a data-driven culture can spread strategic information and knowledge deep into their organizations, ultimately enabling sharper decision making and even market differentiation.

big data and AI to compete on data and analytics, down from around 48% in 2019, while approximately 49% are driving innovation with data, compared with 60% two years earlier.

Notably, Bean says that the growing maturity of data initiatives in industries captured in NewVantage Partners' surveys means that executives have a more "self-critical," realistic understanding than they once had of what becoming a truly data-enabled enterprise requires. "As they mature, they start to realize that they are far less perfect than they thought they were in earlier surveys in terms of, for example, embedding a data-driven culture," he says.

What the C-Suite Needs

For many C-suite executives, the opportunity data presents coincides with their companies radically and rapidly changing their approach to leadership, according to Deborah Ancona, professor of management and organization studies at MIT Sloan School of Management and founder of the MIT Leadership Center. In what she calls "a digital world of exponential change," C-suite executives are looking toward more distributed management strategies in order for their companies to remain competitive. "We are seeing the evolution of leadership so that the hero leader—such as GE's Jack Welsh—has given way to what we call nimble leadership. It means you need great leadership at all levels of your organization. You need great leadership at the top, but you need innovation leaders from below; you need people reaching out to the larger ecosystem to explore, experiment, and learn."

Against this backdrop, data is a powerful enabler. For CEOs with a new vision of leadership, a data-driven culture can spread strategic information and knowledge deep into their organizations, ultimately enabling sharper decision making and even market differentiation. Three broad areas of focus can facilitate a data-driven cultural shift at organizations: a clear, inclusive strategy; tailored learning and development; and trustworthy and ethical use of data through watertight governance.

Create an inclusive strategy.

Ammanath of the Deloitte AI Institute says companies often fall into the trap of simply wanting to be "data driven" without a clear business goal. "This leads me to wonder if

the technology is being forced into the business rather than starting with a business problem and using the technology as part of the solution." A lack of focus on the business problem increases the likelihood that technology isn't being fully leveraged. "To me, that's a failed project."

As she puts it, just because an enterprise data strategy is successful at one company doesn't mean it will be successful at another. "No companies face the exact same challenges or have the exact same cultures, so CEOs can't take a one-size-fits-all approach," she says. "The best way to think about data enablement is not by saying, 'We have all this data, what can we do with it?' Rather, start by asking the C-suite, 'What's keeping you awake at night and what are the four or five priorities you want to help your company succeed?' It actually might not be solvable with data," she explains. For companies in traditional industries that are not "naturally data native," this step alone will demand a lot of different thinking in the C-suite, she says.

Yet even a strong, business-focused data strategy will falter without buy-in across the organization, according to Ancona. "You need to have an enterprise strategy driven from the top, but one that then allows people at different levels to decide what might work for them. Senior leaders need to be saying, 'this is what we're doing' but then pulling on local innovation."

Framing is important, Ancona adds. "CEOs should be saying, 'Let's go on this journey and explore together what is going to help us do better—what is going to take our business in a new direction.'" What's more, these strategies are more likely to deliver value if the message from the top demonstrates that not only does the company embrace a growth and experimentation mindset, but also "doesn't punish failure," she adds.

She advises CEOs to really understand the mindset of their organizations. "If there is a mindset of, 'We can do everything ourselves,' that's not good. You need to learn from outside, learn from people who are trying out things themselves."

At Cathay, a "collective mindset that makes us curious about digital innovation" is definitely critical for embracing data-driven change, says Derek Chau, operations analytics manager with the company's digital unit. But there are other elements that ensure both buy-in and high adoption rates of the new tools and technologies, as a recent machine-learning project with Cathay's revenue department shows.

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The department is responsible for optimizing passenger revenue per ASK—available seat kilometers, an airline industry metric referring to passenger-carrying capacity. To do this, its analysts must focus on three processes—pricing, demand forecasting, and managing seat availability—while using technologies that provide high-quality data for gleaning insights and making decisions that support these processes. "More often than not, a huge effort was being made on the ground, such as collecting and organizing the data inputs, which drives little commercial value," Larry Tsung, systems and analytics manager in Cathay's revenue department, he explains. This situation presents a "huge opportunity" to introduce automation through machine learning. "We want the machine learning model to turn the data directly into actionable insights. The analysts can execute the model's recommendations, enabling them to focus on other revenue-generating activities," Tsung says.

Chau explains that there are two key factors his team considers before launching such projects. The first is understanding "the appetite" for change among employees whose work will be impacted by the new tools and processes. The second is the "technological maturity" of the employees. Both of these factors influence how his team prioritizes, designs, and implements projects—low levels of either might require small, iterative projects initially to build knowledge and confidence, while high levels mean employees are likely to accommodate more ambitious change. With the latter, Chau's team will include these employees in the brainstorming, designing, and testing stages.

In the case of the revenue department, both the appetite for change and the technological capabilities were high. "With this in mind, we started to involve the analysts as early as possible and took their recommendations very seriously," he recalls. "Collaboration has been key."

The analysts have been working alongside the digital, data science, and IT teams to develop a number of features for the preliminary mode, including identifying a set of risk factors with regard to capacity and pricing over a fixed period of time. "We then published the results on an interactive dashboard for business and the central digital team to review and enhance," Chau explains, adding that this "one-stop-shop" overview for all stakeholders creates an inclusive approach to communicating progress and taking in feedback.

Though still in its infancy, the revenue project is already delivering positive results. The combination of machine learning to extract critical data from customer travel records and human expertise means that the revenue department now has a forecasting model that is approximately 25% more accurate than the off-the-shelf products they had been using. "This demonstrated that we knew our customers and our data," Tsung says.

Prioritize learning and exploring.

Getting to grips with data literacy—defined as the ability of all levels of employees to understand, analyze, and question data and the use of machines to make decisions—is pivotal to the cultural change that data-driven business transformation requires.

Creating a data-literate culture needs to start within the senior ranks, even in the boardroom, says Bean. An "enlightening" way that he uses to help embed a greater understanding of data at senior levels within organizations is by having executives participate in a "data lineage" workshop. "This helps executives understand where data is derived, produced, resides, and used at every step of the way," he explains. "The aim is to give a concrete rather than abstract appreciation for the value and impact of good or bad data."

Executives also should step back and ask whether a program to reskill employees to introduce new ways of working is needed. Is it a matter of upskilling? Hiring external talent? Or is it a combination of all of the above? A good way for the C-suite to find the answer is to undertake a rolling inventory of current skills to be assured that teams know how to fully leverage data tools, bolstered by concerted, tailored training. Not everyone needs the same level of data literacy; introducing new or deeper skills needs to make sense for individual employees.

Even regular inventories might not tell the full story. A January 2020 survey from Harvard Business Review Analytic Services found that there is a disconnect between the desire for organizations to empower employees to make insightful, on-the-spot decisions and the skills their employees have

to do so. Of 464 executives responding to a survey, 87% say their organization will be more successful when frontline workers—for example, employees who are the first or main point of contact with customers—are able to make important decisions in the moment. However, while 68% say they have the tools for data-based decision making, only 46% believe they can apply insights with those tools.

Data initiatives with such a disconnect, or those that stall for some other reason, need swift and clear attention, says MIT Sloan School of Management's Ancona. An effective approach she has found is to ask each team member to go "explore" and conduct one interview a week with a partner or an expert—or with another team—who has already gone down the same path to see whether there are any learnings that can be imported into other initiatives.

"Or if the CEO is getting feedback that employees are feeling overworked beyond what is acceptable, it probably means they are being asked to do too much or do things they don't know how to do," Ancona notes. "Partnerships and collaborations might be one of the solutions for dealing with this overload." In other words, if the organization doesn't have the right or enough talent, "go get what you need, even if it is part time or part cycle." These steps can help break down silos and reintroduce momentum to a change project, she adds.

Build trust in data.

Trust has long been a weighty word in data governance circles, with good reason. It can make or break an organization's data-driven business transformation. Chief data officers know all too well the maxim that trust is easy to lose and hard to regain when it comes to data that erodes the confidence of company stakeholders. In essence, organizations need data that is reliable, timely, relevant, unbiased, and ethically sourced, among other quality metrics.

Critically, the focus of data governance discussions in the C-suite is shifting. For starters, the rising power of social media is creating a new variable for data governance policies and processes, according to Ammanath. "The internet and social media are making companies very aware of the risks of data abuse or mismanagement, to their own reputations as well as to society at large," she says while describing how news of any sort of data governance breach can spread far and wide over the internet.

It's not just social media and the internet forcing changes to how and why data governance warrants greater C-suite attention. Governments and regulators, too, are front and center in data governance discussions today. The debate is intensifying over "whether the collective quest for data-driven economic growth is putting privacy, taxation, competition, security, and even the democratic process at risk," according to Internet and Jurisdiction Policy Network Executive Director Bertrand de La Chapelle and Director Lorrayne Porciuncula,

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coauthors of a report from the organization titled, "We Need to Talk About Data: Framing the Debate Around Free Flow of Data and Data Sovereignty." The report's authors predict an increasingly complex network of rules and regulations for data, to the extent that "globally active businesses may be caught in conflicts where abiding by the laws of one country makes them in breach of that of another."

For executives in traditionally regulated industries, this is not new, says Ammanath, but for others "it's a struggle" getting to grips with a "nuanced" regulatory environment to uphold trust across all their stakeholders.

Bean says the best approach to governance—as with any other aspect of a data-driven business strategy—is to view it as an ongoing process. "Policies and procedures, I support that. But organizations sometimes establish governance policies and procedures and think their job is done," he notes. "That shouldn't be the case. Just like with data strategies themselves, you have to reexamine your data governance continually."

The Long Haul

The truth is data-driven business transformation is never done, say veterans in the field. "It's not a destination but an ongoing process," Bean asserts. "From this perspective, organizations must continue to improve or run the risk of slipping as data proliferates and as business demands increase. What was good or good enough last year may very well not be good enough this year."

Therein lies a frequent conflict between the chief data officers driving the transformation and other C-suite executives who may expect start and finish lines. In

> Data-driven business transformation is never done, say veterans in the field. "It's not a destination but an ongoing process," NewVantage Partners CEO Randy Bean asserts.

conversations with highly successful chief data officers of data-driven market leaders, Bean says he never senses complacency or overconfidence, even if they appear to be at the top of their game. "They believe in continuous improvement. They are driven to raise the bar even higher," he says. For those who are not so fortunate, "the bad news is that there is a long way to go."

In today's hypercompetitive, volatile operating environment, it's easy to understand why achieving digital-driven growth is attractive yet challenging for business leaders. Yet at its core, powerful and lasting cultural change is needed. "It starts with building strong relationships with the business," understanding where the needs are and where they are coming from but also where they want to go to and then delivering results, explains Cathay's Chau. But none of that can happen, he says, without a digital innovation culture from the top to the bottom of an organization. For Cathay, "it's embedded in the way we think, behave, and communicate."

Endnotes

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3   Beena Ammanath, Susanne Hupfer, and David Jarvis, "Thriving in the Era of Pervasive AI," Deloitte, July 14, 2020. https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/state-of-ai-and-intelligent-automation-in-business-survey.html.

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