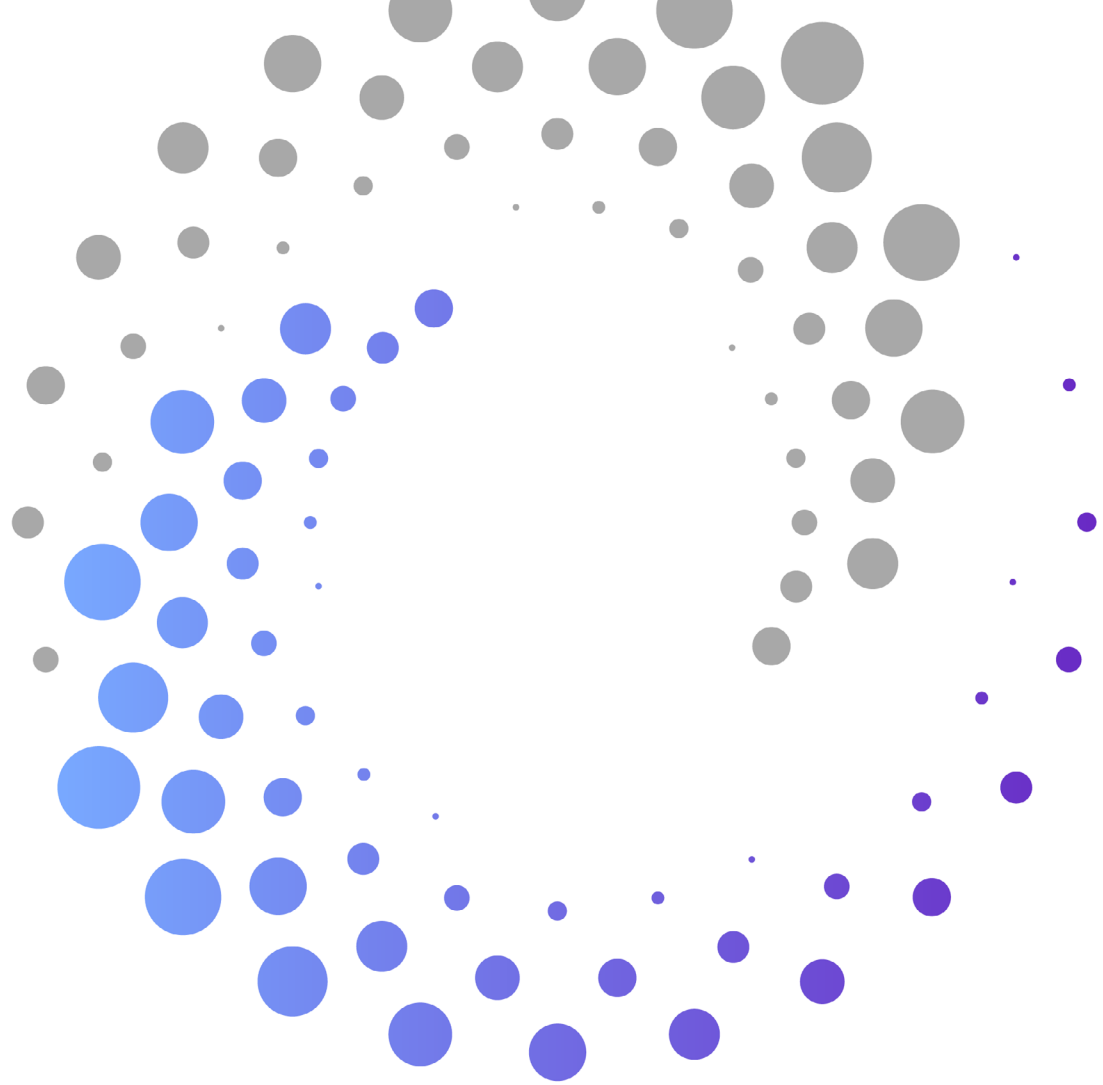


Global C-suite Series  
27th Edition  
The CDO Study



# Turning data into value

**How top Chief Data Officers deliver  
outsized results while spending less**

In cooperation with Oxford Economics, the IBM Institute for Business Value interviewed 3,000 CDOs. We supplemented data collection with in-depth conversations with approximately 20 CDOs globally. We designed data collection by country, industry, gender, and organizational size. We captured operational and financial data for the period 2019–2022.

To better understand what drives the data-driven organization, we assessed respondents on four aspects. Data Value Creators (8%) score high on all:

- A clear line of sight from data to value
- Data investments accelerate business growth
- Data at the center of business model innovation
- Engaged ecosystem partnerships.

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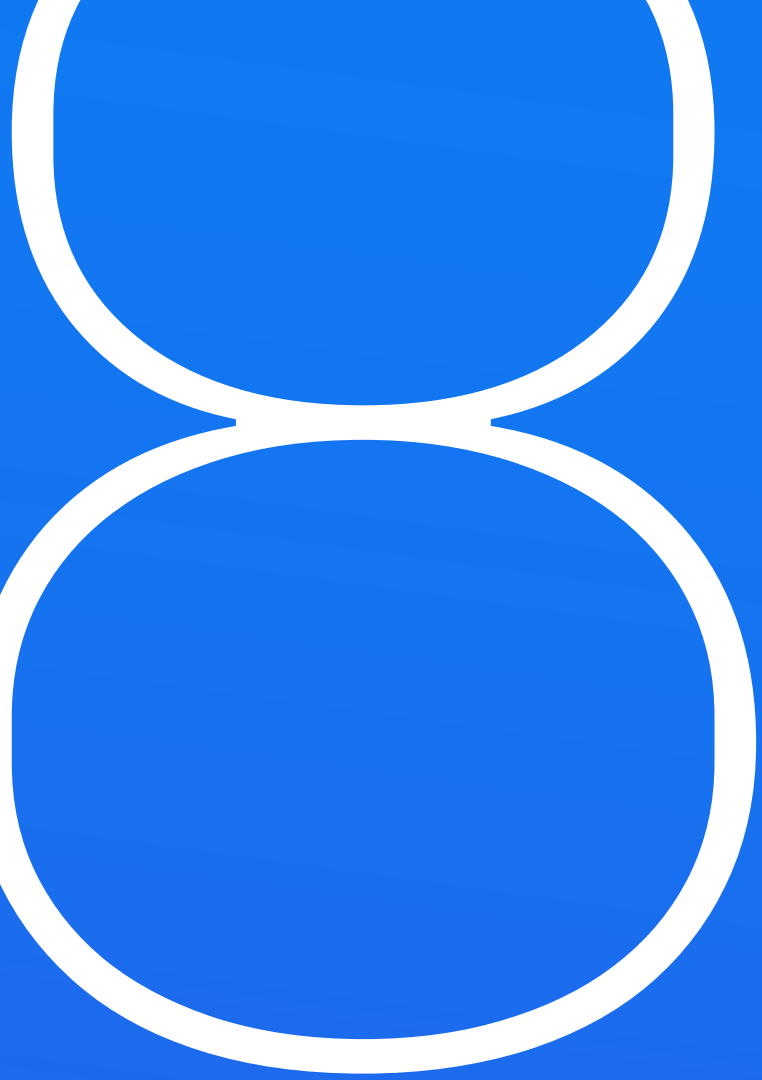
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3,000  
CDOs surveyed

30+  
countries

29  
industries

27<sup>th</sup>  
edition



8%

of Chief Data Officers  
achieve greater value  
while spending less.

How?

## Foreword

# Inderpal Bhandari

Chief Data Officer, IBM



Data, as the foundation for every business decision, strategy, and operating model, is no longer a mundane topic relegated to the furthest reaches of the IT department. It's a boardroom topic.

Circa 2002, when boards and C-suites first recognized data as a strategic asset that could fuel digital transformation, they awarded it a steward—the Chief Data Officer. I've been a CDO for about as long as the title has existed and can attest to how much the position has evolved since its inception. I'm delighted to share this report because it explores not just what the role is today, but what it can be when taken to its highest level of excellence.

Our research with 3,000 CDOs globally highlights an elite group of chief data officers—just 8%—whose performance is highly differentiated. They spend less on data strategy and management than peers, yet achieve equal or greater annual revenue growth. We call them “Value Creator CDOs,” and they share four things in common, which we detail in the pages that follow.

In this report, we also celebrate the increasing number of female CDOs. While gender parity is still down the road globally, almost half (46%) of our CDO respondents are female. You will hear them describe what they are doing to help their organizations transform. Throughout, you will hear CDOs describe their challenges, opportunities, tactics, and strategies in their own words. I'd be surprised if you don't see some similarities to your organization.

Strategic CDOs know it's never really been about the data. It's always been about the business transformation value of insights from integrated data.

I'm happy to recognize that my CDO colleagues are creating amazing positive change for their enterprises. Here's how they're doing it.

## A day in the life of a Chief Data Officer

Julien

03:00

Singapore  
[19:00 GMT]

Julian, Chief Data Officer (CDO) for a large telecom, is wide awake. Barely a year into his position, he was awakened moments ago by a call from his overnight team. “There’s been a breach.” Words no CDO wants to hear. While the scope and scale of the breach is under investigation, it looks like some of the company’s largest customers will be impacted. Palms clammy, with a raging headache coming on, he is stymied. He has been working closely with the company’s top cybersecurity executive on battening the virtual hatches to avoid just this situation. Early reports indicate the breach came via a cybersecurity gap within a small supply chain partner. Vetting the ecosystem was phase II of his plan—but cyber-criminals have their own timeline, and apparently were able to infiltrate before those doors were closed. Julian wonders if his CEO, not exactly the understanding type, will give him the chance to make things right. For now, he picks up the phone to call his Chief Supply Chain Officer to deliver the bad news.

Hayden

08:00

San Francisco  
[13:00 GMT]

Just six months into a role as CDO at a large financial services firm, Hayden has gathered the team to address what peers often overlook early in their tenure: defining the “why” behind each step of the strategic plan, to make sure they are prioritizing what matters most. At a recent conference roundtable Hayden attended, a significant number of fellow CDOs discussed their “big bang” approaches, designed to show the enterprise big change, fast. But Hayden feels the thinking the team is doing this morning and for the rest of the week is a crucial first step. Less “big bang”—instead, more planting seeds that will begin to change the way the organization works over the next year. Will the approach work? Will Hayden even be given the time to prove-out the approach? Hayden recognizes their job depends on it.

Ana

16:00

Recife  
[19:00 GMT]

Ana is on a video call with one of her chief product vendors, reviewing results from a six-week test of a data fabric product. “I’ve really appreciated the innovation you’ve helped us bring into a key area of our operations,” Ana says. “It would have taken us 12 months or more to test a new way of doing things last year. I mean it—your expertise in this area has been a rocket booster in terms of speed to value.” She is well aware that her emphasis on ecosystem partnerships and her strong relationships in the innovator space played a large role in her being hired 18 months ago. But now she needs to begin to scale proofs of concept and partnerships in a way her company has never done. She has her work cut out for her.

Wilma

09:00

Stockholm  
[08:00 GMT]

Wilma sips her coffee as she prepares for a meeting with board members and her CEO to review her 2023 plan for all things data within the consumer products company that employs her. Thirty-six months in, Wilma realizes she has reached a tenure many CDOs don’t. Her data strategy and implementation plan has real legs now, as evidenced by several successful cross-functional customer initiatives fueled by data insights. But she ponders what the board might want next, musing over ways to defuse potential “pet projects” or “I just read in Major Business Publication” input. She needs to maintain momentum behind the less glamorous—but ultimately more practical and effective—business data framework she’s been constructing, if she’s going to help unlock her organization’s potential.

Julien

Hayden

Ana

Wilma

# What does a Chief Data Officer do, anyway?

# 20

years after the role's creation, no one seems sure.

Every day, around the globe, Chief Data Officers (CDOs) find themselves in the spotlight—protecting customer and employee privacy, using data to create innovative new solutions, and streamlining large enterprises into sleek value producers fueled by data insights. From driving data fabric to AI insights to emerging data-driven cultures, the Chief Data Officer role is nearly unrecognizable from when the title first appeared circa 2002.<sup>1</sup> Yet, more than 20 years later, the CDO role is still being defined—as evidenced by an early 2022 cio.com article headline that began: “What is a chief data officer?”<sup>2</sup>

It's hard to achieve spectacularly when there is little agreement on what the job role entails. From a board of directors that expects “magic” early in a CDO's tenure (increasing revenue while decreasing costs), to CEOs that think a large enterprise can become completely data driven in six months or less (it can't), pressures on CDOs are as never before.

For example, just over half (52%) of CDO respondents say ensuring data security is the most critical responsibility of their role. But less than 2/3 (61%) agree their organizational data is secure and protected. With pressures like these mounting, CDOs are looking for ways not just to create value, but to protect it.

Savvy CDOs are forging their own paths. While no two are alike, the best paths share key similarities, as shown by our recent research with 3,000 Chief Data Officers around the globe. An elite group—some 8% of respondents—are reaping more value than their peers while spending less. Their tactics, approach, and mindset provide a model for any CDO and data organization to learn, improve, and unlock potential.

What follows unfolds in five parts: first, a description of these “hero” CDOs, who we call Value Creators; and then sections on each of four core lessons from this cohort. Along the way, we'll share guidelines on how to put key learnings into action.

It turns out that the CDO role has never really been about the data itself. It's about the business value that data insights can provide. Who are the CDOs nailing that connection and what approach are they taking?

Let's dive in.

**In their own words**

Shrinking tenure and blind spots



**Peter Jackson**

Chief Data and Product Officer, Outra (UK)  
Chief Data and Analytics Officer, Carruthers and Jackson

“I think the biggest blind spot and the biggest danger for the CDO is the organization doesn’t actually know what they want the CDO to do. And they don’t actually know what type of CDO that they want. Do they want a CDO who’s going to drive prediction and data analytics and data science or do they want a Chief Data Officer who’s going to make sure that their data is of a good quality and they can trust it?”



**Srinivasan Sankar**

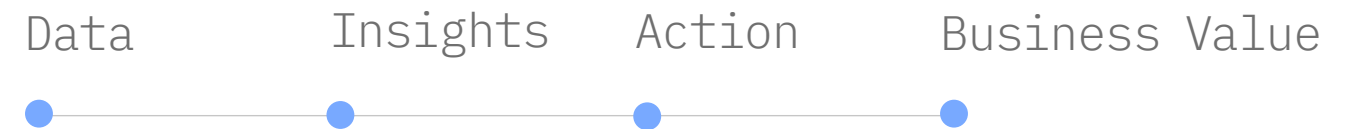
Enterprise Data and Analytics Leader  
in the insurance industry

“If you look at the last 18 to 24 months, the tenure of the CDO has been shrinking...when I’m talking to my peers, they agree that what used to be a 36-month tenure shrunk to 24 months, 18 months, 12 months... And the reason for that, in my opinion, is expectations. Expectations both ways.”

# What defines a “hero” Chief Data Officer?

Some enterprises take a “show me the money” approach to data, spending prodigious sums in a bid to generate outside value. While there is nothing wrong with that approach—you can make progress via blunt force—our research shows a better way.

In our study, we identified heroic Chief Data Officers, an elite 8%, whose organizations allocate proportionally less of their revenue to data, yet generate equal or greater business value. We call these CDOs Data Value Creators because they have created a clear line of sight from data to business value.



The specific figures may seem modest: To increase revenue growth by 1%, the average CDO in our study allocates 2.32% of annual revenue to data management and strategy; Value Creators achieve the same result by allocating 2.27%. Yet in aggregate, that difference means millions of dollars in savings, materially improved ROI, and better long-term outcomes.

## 4 things leading CDOs get right

The organizations we surveyed have an average annual revenue of roughly \$9 billion. Those with a clear line of sight from data to business value can spend nearly \$5 million less than peers to gain the same results in revenue growth. That's a savings greater than the average cost of a data breach (\$4.35 million).<sup>3</sup>

Not surprisingly, perhaps, Value Creators are 50% more likely to be responsible for increasing data ROI than other CDOs; the expectation of a tie to the bottom line is built into their job. They are also more likely to report directly to the CEO.

Interestingly, what defines these Value Creators is not a collection of flashy, "big bang" actions.

On the contrary, it's an emphasis on a carefully orchestrated low-key approach. These CDOs focus on planting seeds of change with new investments, carefully plotting out the "why" and "how" from those investments to value achieved. Most importantly, they move in lockstep with the business, in the process cultivating the right partnerships internally and externally.

Taking incremental steps does not preclude larger-scale impacts. In fact, it seems to enable them. Value Creators are outperforming peers by some 40% in innovation, according to our survey results, and by some 10% in data capitalization and in revenue growth.

1

Clear line of sight from data to value

2

Data investments accelerate business growth

3

Data is central element of business model innovation

4

Extremely engaged ecosystem partners

Figure 1

### What do leading CDOs do differently?

We are able to define a clear line of sight from data to value

56%

100%

Our data investments accelerate business growth

50%

100%

Data is a central element of our business model innovation

76%

100%

We have extremely engaged ecosystem partners

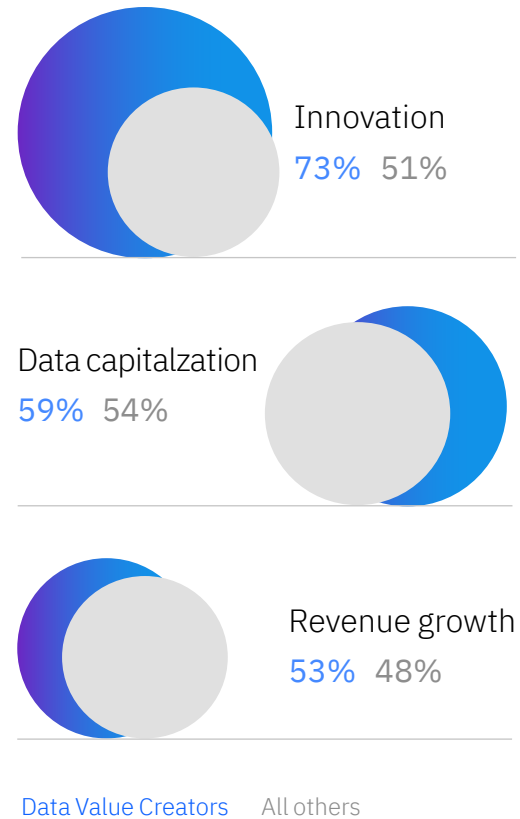
65%

100%

All others

Data Value Creators

Figure 2  
**Where Data Value Creator  
 CDOs outperform peers**



In examining what enables Value Creators’ heroic outcomes, our survey points to four key factors—what one respondent calls “double-vision”—that: link tech initiatives and business outcomes; align data investments to piggyback off of other digital investments; emphasize business-model innovation as much as business protection; and aggressively engage with ecosystem partners.

We’ll dig into each of these areas in more detail, highlighting on-the-ground experiences of CDOs and pulling out clear learnings to improve practices.

“I always ask my peers, before they even jump on any “big bang” approaches: Have you asked WHY you are doing that to the business?”

**Srinivasan Sankar**  
 Enterprise Data & Analytics Leader  
 in the insurance industry

## Profile of a Data Value Creator

More data Value Creators have a background in data and analytics, and more report directly to the CEO.

Data Value Creators combine a top down approach team empowerment

More organizations with Data Value Creators are publicly traded instead of privately held.

The most pressing data management challenges for Data Value Creators are data reliability and unclear data ROI.



# Cultivate “double vision” to drive ROI

“The great objective of a data area, of a CDO, is to add value to the business. So, it’s very important for a CDO to have ‘double vision’ that generates fruit for both sides—technology and the business.”

**Rafael Lychowski**  
Head of Data & Analytics  
TIM Brasil

Generating value for the enterprise as a chief data officer is not an independent task.

It requires keeping a close eye on revenue-generating priorities and activities. Yet CDOs’ primary focus is often the data function itself. Bridging the two requires what TIM Brazil’s Rafael Lychowski calls “double vision.”

Lychowski, who heads data and analytics for the Brazil-based telecommunications company, says this double-vision can be baked into an organization’s core operations and metrics. “TIM divides KPIs into two groups, technical and business,” Lychowski explains. “The technical KPIs focus on how many solutions are within the target architecture, if we’re on time and within budget. The business KPIs show how we are generating value for the business and depend on each use case.”

The result of this system, he says, is a constant and consistent re-prioritizing of choices, with an eye on ROI. “If I am talking about a product that aims at reducing cost, I must follow the cost reduction of that product on the business. If I’m talking about quality, I will track a net promoter score. For each analytical artifact—for each product that we deliver and monitor in production—we must have a business KPI that makes sense for that product and that we can follow up on.”

Lesson



## Data literacy helps connect the dots to business value

“In terms of data moving, I want that tooling to be as simple as possible. I want something off the shelf to do that, with the right audits and controls needed. I don’t think organizations can afford to have a \$200,000-per-year data engineer to move data from point A to point B. You want to invest in people who can then transform that data into value. Which is an analytics engineer.”

**CDO of a large consumer goods company**

You don’t need to follow exactly this formula to develop a “double-vision” approach. But you do need to be intentional about it. A large consumer goods CDO says that when it comes to ROI, “I’m trying to stay away from areas where the return on investment has a lot of ambiguity around it. So, where we’re focused is areas where we know that there is a major deficiency, either in our controls, common definitions of data, common processes that people are using and that it has a measurable impact on a business process or outcome. And then: [how can I show a real straight line between we fix this, we improve this, and here’s where it shows up in our P&L.](#)”

Double vision can often be challenging for CDOs who haven’t yet defined meaningful metrics for how data brings value to the enterprise. Wim Stolk, almost 18 months into his tenure as the Data & AI Lead at the CDO Office of the Dutch central government, describes his journey: “Part of my task is to define KPIs that are smart, cover stakeholder wishes and requirements, meet legal obligations, provide the data quality level and data management required. We are working hard on setting up this KPI system, not yet focusing on the content parts.” For now, Stolk says, the emphasis is on basics, “focusing heavily on data management functions, data quality, a data dictionary and data catalogue, a data framework perhaps, and data security and privacy. This will cascade into content priorities, to be realized in 2023 and 2024.”

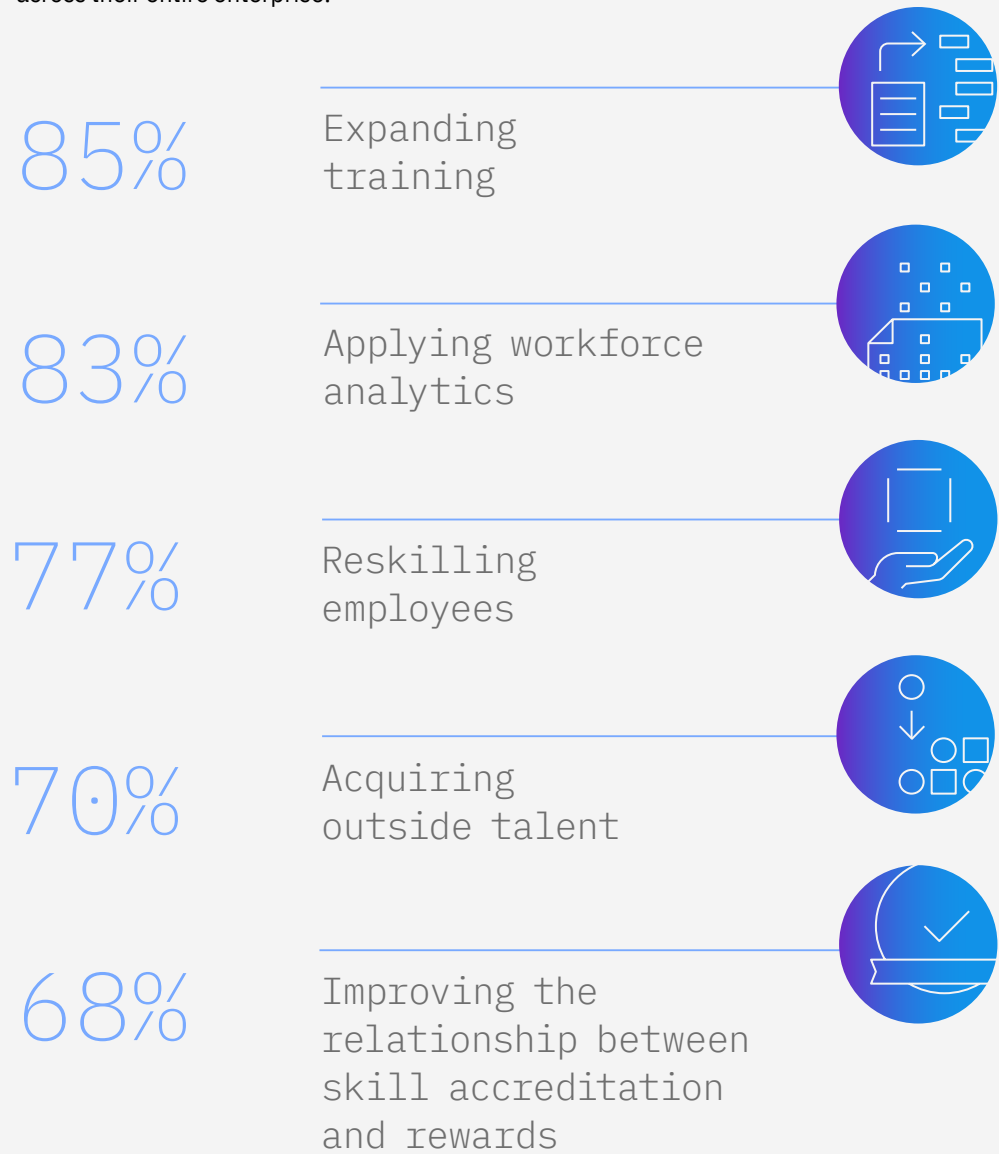
Put another way, double vision takes time to develop. A key step—and a tool for accelerating progress highlighted by the Data Value Creators—is improving the organization’s data literacy.

Achieving full value from data depends on data literacy within the organization. Value Creator CDOs recognize that data literacy must filter throughout not just leadership, but the entire workforce—and not just throughout technology divisions, but those on the business side as well. As a large consumer goods company CDO puts it: “You don’t become a data-driven organization if data access, understanding and insights are contained within one team or one part of organization.”

A key credibility component in the quest to build data literacy: providing top-notch data protection. Succeeding on this front helps the data organization foster necessary trust with business colleagues. In fact, in our study, Data Value Creators outperform their peers across the key areas of data protection, from data ethics to organizational transparency to cybersecurity.

TIM Brasil’s Lychowski describes how his organization is helping business-side colleagues become more data literate: “Those ‘big data’ problems that no one can solve, our team must be able to solve and address them—but this does not prevent us from also having business areas work with the data. [So we created a democratization strategy where the data and technology team is responsible for orchestrating our data lake but we provide sandboxes for the business areas. Here, they can work on their data, investigate their data, create their analysis visions, or even start working on AI machine learning models—all of this within a technology umbrella, respecting information security and best practices for cloud usage while using the right tools.](#)”

The Value Creator CDOs in our study cited **five key actions** they take to **increase and infuse data literacy** across their entire enterprise:



## Johnson & Johnson makes it personal

Organizations can build data literacy by connecting business priorities at the executive stakeholder level and mapping it across stakeholder domains. Jim Swanson, the Chief Information Officer at Johnson & Johnson, explains how his team is helping to educate colleagues on leveraging advanced and emerging technologies, including AI. “In partnership with IBM, we created an AI-driven skills inference model that married de-identified external data with skills data from our internal data sets,” says Swanson. “We were able to take the data on employee skills that resides in tools that my IT organization uses and feed it to the model. The AI was then able to determine everyone’s maturity level in each of the skills that we wanted to highlight, creating a comprehensive view of individual strengths and weaknesses.”<sup>4</sup>

Data talent isn’t yet as abundant as any CDO would hope; in many sectors, it’s scarce and the competition for it is fierce. The emphasis on expanding training and reskilling for all employees not only helps combat this shortage, it also deals with the massive workforce changes brought about by digital, AI, and other technologies, as repetitive tasks are taken over by intelligent machines.

Data literacy skills not only help create a self-service data culture, they help C-suites redeploy workers to more complex, valuable roles and responsibilities. In the process, data literacy helps connect business goals with tech and data initiatives. Value Creator CDOs recognize that seeding modern digital expertise throughout the enterprise enables a speedier, more transparent transition to value creation.

“Until now, systems, infrastructure, and networks have been perceived as support tools for efficiently running a business, but now we recognize that the data flowing through these systems has value. This is the change.”

**Munenobu Hashizume**  
Managing Executive Officer, Hitachi Zosen Corporation

# Protecting data value from major threats

What not only inhibits but actually threatens the possibility of achieving optimal data value? Data Value Creator CDOs provided an answer by their strong emphasis on three areas: data ethics, organizational transparency and accountability, and cybersecurity.

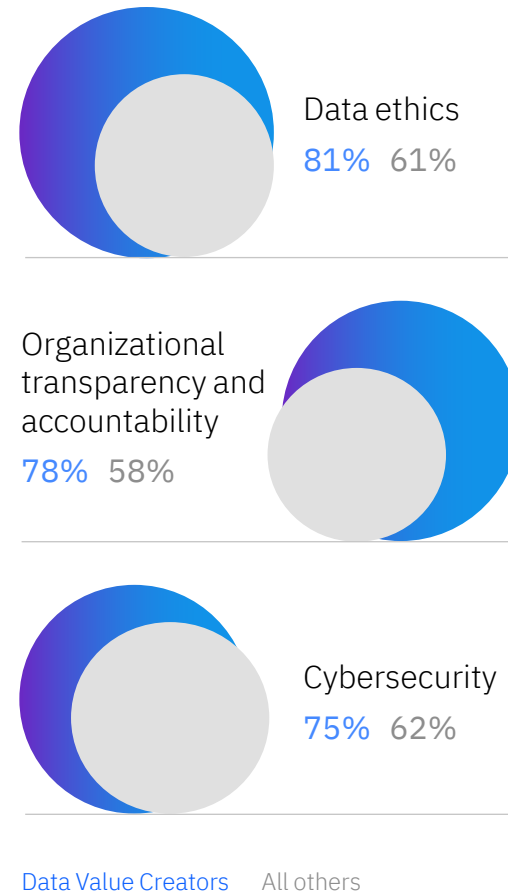
A major breach of data ethics or cybercrime can negate months or years of hard work to achieve data value.

The global average total cost of a data breach<sup>5</sup> is: **\$4.35 million**

In some industries, the average cost runs much higher; in healthcare<sup>6</sup>, it's: **\$10.10 million**

It's no surprise, then, that roughly 8 out of 10 Data Value Creator CDOs say their organization outperforms in data ethics, organizational transparency and accountability, or cybersecurity.

Figure 3  
Data Value Creator CDOs outperform in data protection



## In their own words

### Business value, data literacy, and storytelling



**Zhaolong Ma**

Chief Data Officer, SUNDA Group

“To a certain extent, pure technology is meaningless to enterprises. A company that uses technology for the sake of technology and data for the sake of data, which cannot be effectively transferred to business value, cannot survive.”



**Rodrigo Vasconcelos**

Head Data and Analytics (CDAO), Banco do Brasil

“Today, our efforts are 70% focused on development—data science, analytic modeling, data engineering, etc.—and we are 30% focused on governance, processes, and quality monitoring. Our ambition is that in three to five years, we can swap these conditions and be able to prioritize focus on governance, curation, and advisory. The goal is to increase our functional analytic maturity and the data literacy involved in the business.”



**Peter Jackson**

Chief Data and Product Officer, Outra (UK)

Chief Data and Analytics Officer, Carruthers and Jackson

“One of the greatest skills of people who are really good at data is their ability to tell stories.”

How to take a page out of the

## Data Value Creator playbook

### Calculate ROI early and often

**Data investments without a clear up-front ROI are not investments—they're guesses.**

- Whether ROI for data is expressed in time saved, self-service levels, lower costs to achieved goals, the number of problems tackled, or data issues evaded, ROI for data can be an enabler for 24% more revenue growth.\*
- Define KPIs that can demonstrate to the business the importance of data, as well as how you are driving results and generating business value.
- Prioritize areas with deficiencies, whether in controls, common definitions of data, or common processes used.
- Draw a straight line on how improvements will reflect in P&L.

### Create coherence

**Align data and analytics strategy with business strategy.**

- To get from data to value, you need to understand what drives the business, connecting your data and analytics strategy to business objectives.
- Create coherence by merging the various frameworks and guidelines that exist throughout departments.
- Get everyone involved and agreeing to the future data landscape.
- Create synergy by acting as an analytics mentor to the business, allocating the right sources, and investing in training.
- Deliver results side by side with business teams.
- Data Value Creators do this more often than peers; they are aligned with the business strategy in 63% of cases while all other CDOs are aligned in 48%.

## Cultivate double vision to drive ROI

### Use data to track and report performance in new ways

**Take advantage of data visualization and dashboards to help drive advanced insights.**

- Show how the organization aspires to increase data value. Data visualization and dashboards increase transparency showing progress toward goals.
- Ensure your reports come from a common repository, owned by the business. Chances are you have several data repositories in place with huge overlap. Reduce costs by consolidating your data.
- This is an area even Data Value Creator CDOs are still working on; 45% of them say their data investments enable them to track and report performance in new ways. But it's a worthwhile pursuit, as it is an enabler for 27% more expected revenue growth.\*

*\*Among Data Value Creators, we analyzed which enablers increased annual revenue growth or operating margin results for 2020-2022. For each enabler, we compared the group of Data Value Creators who indicated they applied an activity, versus the Data Value Creators who indicated they didn't, or had only somewhat implemented an enabler. We then calculated the relative differences in revenue growth or operating margin between both Data Value Creator groups.*

### Don't modernize on legacy business and data processes

**Align data use cases with specific business strategies and innovate together with the business.**

- Don't just focus on better tools, better cloud, better infrastructure, but also better processes.
- Existing legacy business and data processes are nothing but a representation of the business model that existed when you first built your data estate. It has changed.
- Modernize use cases to reflect today's real business needs and create true alignment to your business strategy. Doing so can enable 258% more revenue growth and 130% more operating margin.\*

### Empower teams with data literacy

**Foster data literacy, allowing teams to make informed decisions based on data.**

- At the same time, encourage business lines to take ownership of their data and let them lead the way on creation of data products.
- Emphasize that each individual in the organization has a data responsibility, but build a data infrastructure that allows its users to innovate without being inhibited by data compliance (because it's built into the infrastructure).
- Identify the segments of your data value chain where you need more progressive skill sets, invest in those, and plan for attrition and turnover in those areas.
- Data Value Creators with empowered teams drive 173% more revenue growth than those without empowered teams.\*

# Piggyback

Lesson

data investments  
off broader digital  
investments

“We are struggling to align our business and IT strategies.”

**Akiko Murakami**  
Chief Data Officer  
Sompo Japan Insurance Inc.

CDOs are generally given a wide berth within their budget in terms of where to invest and what to emphasize within those areas. However, the majority of Data Value Creator CDOs opt to align their data management strategy with their company’s larger digital transformation investments—and that choice enables enhanced impact.

Figure 4

**Data Value Creator CDOs align data strategy with enterprise digital transformation**

Data Value Creators

60%

Our data management strategy is explicitly aligned with our digital transformation

All others

52%

“If you talk to IT, they’ll say the business owns the data. We don’t do anything with it. And if you talk to the business, they’ll say IT controls the data because we can’t see it. We can’t access it. And so, data’s fallen into sort of this abyss where no one actually truly understands it. Because the business is restricted in what they see, and IT is restricted in what they understand of the business processes. There is a major gap in ownership and being able to truly leverage it to drive value.”

**CDO of a large consumer goods company**

**The clear lesson: Data strategy and digital strategy should be in lockstep.** That sort of alignment is easy to say and hard to do. Akiko Murakami, CDO at Sampo Japan Insurance Inc., is frank about the challenges: “We are struggling to align our business and IT strategies . . . The business strategy has a vision of business transformation, and while adhering to the agency-centered business model, it is necessary to transform the way of doing business into a data-driven one. However, some IT systems impose constraints. There are limitations in the amount of data that can be obtained from the legacy systems, as well as limitations of time.”

Friedman Wang, head of the Big Data R&D Center of CTBC Financial Holding Co., Ltd., agrees. Molding the data landscape through digital technologies that are transforming the entire enterprise is an essential step to get to value, says Wang:

“I think the field where the CDO can make a big difference in the future should be advanced data technology, such as through the combination of AI and data, to truly release the value of data.”

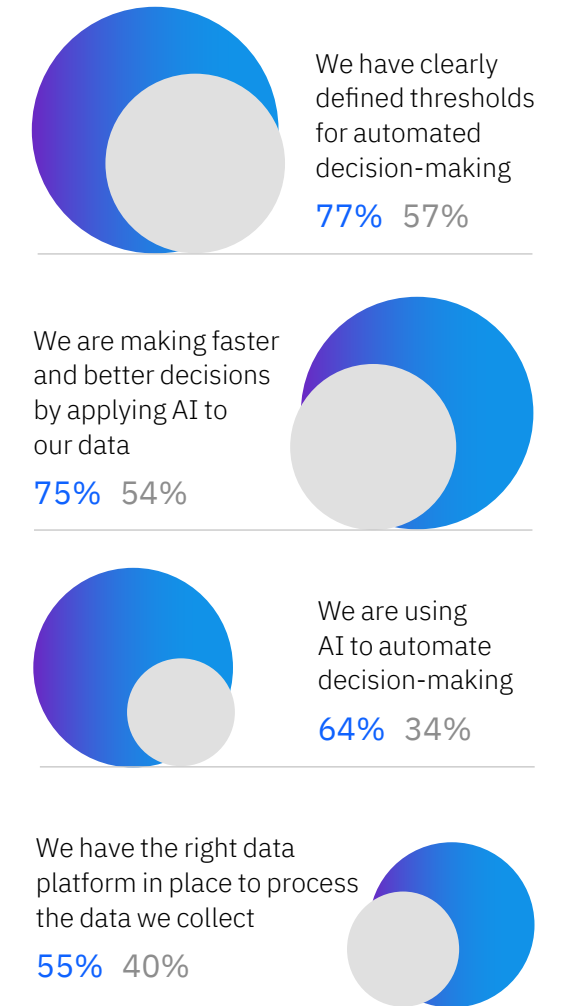
## AI is best equipped for today’s data deluge

CDOs we surveyed are particularly focused on investments in AI, with those in certain industries (government and education, communications, and banking and financial markets) particularly focused on automated decision-making.

Peter Jackson, Chief Data and Product Officer, Outra (UK), and Chief Data and Analytics Officer, Carruthers and Jackson, is nothing if not pragmatic on this topic: “If you’re receiving five feeds of ESG data, how do you compare one carbon score to another? And how do you actually come out with a median or an average or a range of that carbon score to use with confidence in some investment model? That doesn’t sit with a CTO, it doesn’t sit with a strategy officer, it doesn’t sit with an investment officer. It sits with somebody who’s really good at data modeling and statistics.”

AI-backed data insights can generate competitive advantage in many industries. The CDO of a large automotive distributor points to the relevance for the automotive industry: “I firmly believe that the next revolution is the data front.” The flood of data from increasingly intelligent vehicles, makes the job as a CDO even more critical to the business and its growth. “We really do collect so much data that it’s just a matter of prioritizing. Whoever is going to have the competitive advantage here in the automotive sector is who is going to get a better grip on the data sooner.”

**Figure 5**  
**Data Value Creators use AI to their advantage more than peers**



Data Value Creators All others

## Lufthansa

### Enhancing customer experience through data and AI

Germany's largest airline, Deutsche Lufthansa AG, knew that with the right data and AI strategy, it could enhance the customer experience and better empower its employees while achieving operational excellence.<sup>7</sup> The rules and regulations for an airline that operates all over the world are infinitely complex—from baggage allowances for specific routes and status levels to visa requirements for passport holders from one country traveling to any other. No agent can know all the answers.

“For Lufthansa, AI is so critical because it actually opens up the world of the data that we're sitting on,” explains Mirco Bharpalania, Senior Director of Cross Domain Solutions for the Lufthansa Group. “It actually helps us to unlock all the potential that we somehow or somewhere in our databases already have.”

Lufthansa worked with IBM to enable previously disparate data sources to become searchable in natural language and aviation terms, positioning agents to more easily address close to 100,000 customer queries annually. IBM Watson® technology manages, searches, analyzes, and interprets the various relevant and connected data sources, such as Microsoft SharePoint and internal ticket systems.

## In their own words

### Eliminating unrealistic AI expectations and understanding the business



#### Srinivasan Sankar

Enterprise Data and Analytics Leader  
in the insurance industry

“A CDO needs to be skilled in data management, business knowledge, and technical knowledge in order to set appropriate expectations. Otherwise, you can have a CEO who sets expectations like ‘everything on AI, machine learning, and automation within six months.’ If you know the technology and the business, you know that’s not possible from a data perspective or otherwise.”



#### Peter Jackson

Chief Data and Product Officer, Outra (UK)  
Chief Data and Analytics Officer, Carruthers and Jackson

“Do I want to understand every business process? No, because I don’t have the bandwidth to do it. What I would like to do is understand the business processes that are critical to the business.”



How to take a page out of the

## Data Value Creator playbook

### Piggyback data investments off broader digital investments

#### Establish clearly defined thresholds for automated decision-making

**Control the data and define the business policies that lie at the base of—and drive—(operational) decisions.**

- Provide insight and transparency into the algorithms that are used to process data.
- Define an ethics framework within which to apply AI and algorithms.
- Consider defining an algorithm policy framework, which defines when a calculation or set of rules is considered an algorithm, and how and when you are allowed to apply it.
- Significantly more Data Value Creator CDOs have established clearly defined thresholds for automated decision-making than other CDOs—77% versus 57%.

#### Pursue new sources of value through data

**Make data and analytics a central element of your innovation processes.**

- Establish data ownership: if you own the business process, then you own the data that comes out of that business process.
- Reengineer legacy data repositories to align with modern business processes, using prescriptive models. This helps not only to shrink costs, but also to deliver new data perspectives.

#### Apply AI for better, faster decision-making

**Use AI to augment human decisions and help to better understand the context and scenarios of business decisions.**

- Instead of relying on gut feeling to make decisions, use AI to infuse information-driven actions, based on data and prediction.
- Intelligent automation can help streamline decision-making processes that support business productivity, quality, and compliancy.
- At all times, ensure the human element by adding human control on top (“Does this prediction actually look right?”).
- Create diverse teams, with people from different backgrounds, to avoid unconscious bias in your solutions.
- Three-quarters of Data Value Creator CDOs (75%) are applying AI to decision-making versus 54% of other CDOs.

#### Use a seamless, customer-centric approach

**Work with partners to unlock and consolidate data and insights.**

- Provide consistent, available, and reliable data across customer channels to improve the customer relationship and experience.
- Consolidate data across the various customer touchpoints to serve up richer experiences and better insights.
- Ensure the strategic treatment and organization of your customer data is consistent across the organization.

# Emphasize

business-model  
innovation as much  
as business  
protection

Lesson

“We aren’t short on ideas. I go to workshops and I hear the business chatting about the various types of things we could do... as technologists, our job is to enable those dreams, to make those possible.”

CDO of a large automotive distributor

No chief data officer wants to receive that late-night call about a data leak or find that a critical information resource has been corrupted. Protecting data resources is a primary—and daunting—responsibility, and no CDO can afford to take it lightly.

But for the Data Value Creators in our study, pursuing data protection is on roughly equal footing with pursuing business-model innovation. In fact, nearly 90% of our CDO Value Creators report that they are using their data investments to pursue new sources of value, fueling innovation within their organizations.

This is a critical distinction, though not a simple one. Even these leaders can struggle to balance the openness inherent in innovation with the protection necessary to keep data safe. But that challenge is not allowed to be an impediment. As Suzuki Motor Corporation’s New Mobility Service Dept. Group Manager, Masayuki Yamamoto, puts it, “It is difficult to balance data protection while promoting innovation. I must build a data infra-structure that allows users to innovate without being bound by data compliance.”

Figure 6

## Investing in data yields new sources of business value

Data Value Creators

87%

Our data investments give the capabilities needed to pursue new sources of value

All others

63%

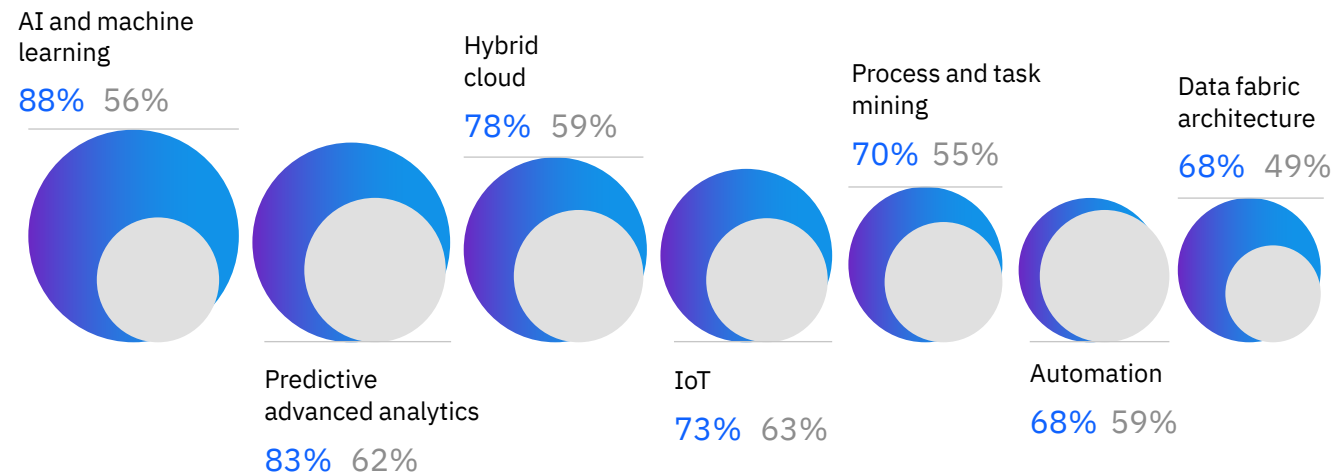
## “Silo-busting” and the technologies that multiply innovation

So how does a CDO thread this needle? The Data Value Creators in our study emphasize that they need their varied technologies to work together. From data fabric to centralized architecture to interoperable linked data, Value Creator CDOs are investing in the methods and approaches that foster innovation and break down the silos that hinder it.

But silo-busting often requires subtle engagement with business units. When data ownership sits with the business side, these CDOs say, it often adds layers of complexity to safe and open sharing practices and technologies. One critical enabler is allowing appropriate access to historical data that can be updated. Such virtual data archiving—which calls to mind the days when reams of paper data were stored somewhere physically—is something the Dutch central government’s Stolk calls “sustainable accessibility”: “By sustainable accessibility, we mean it’s findable, reusable, accessible, interpretable.”

Figure 7

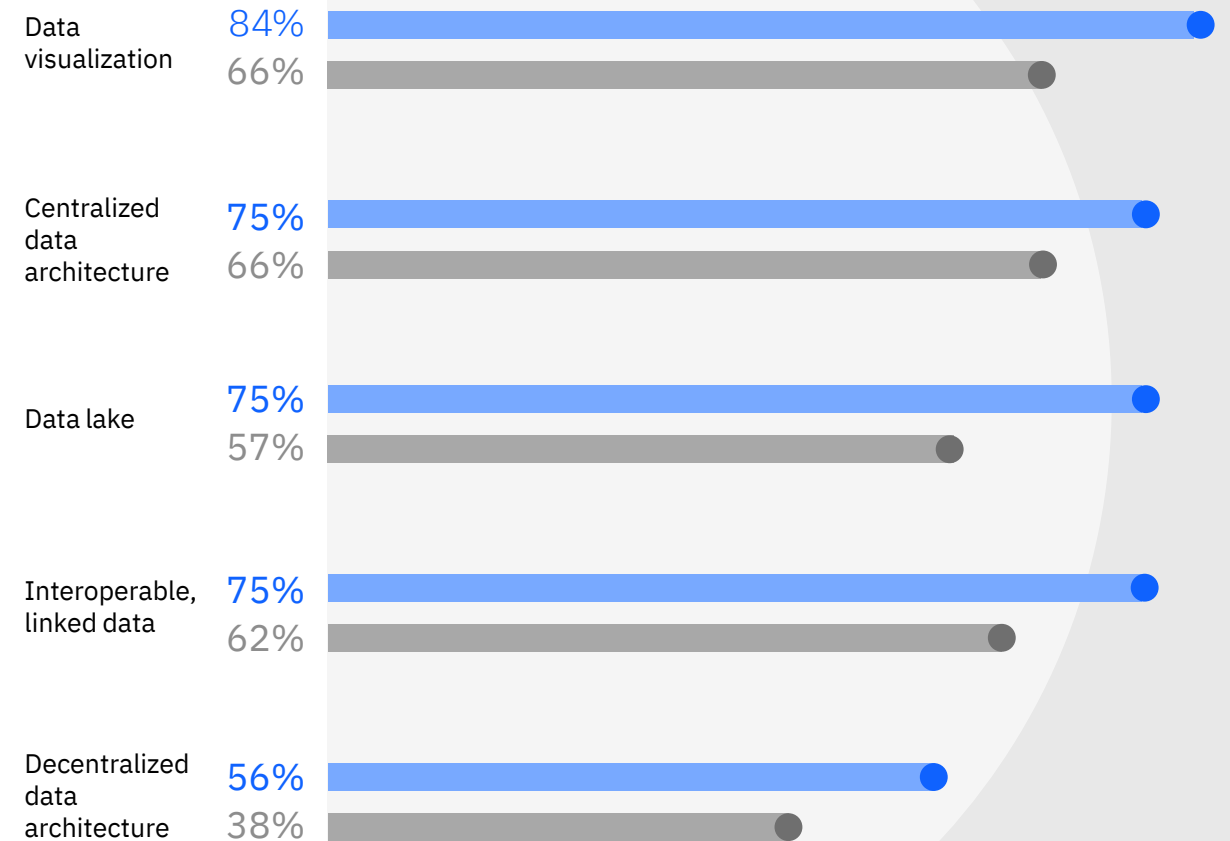
### Data Value Creator CDOs make full use of innovative technologies



Data Value Creators All others

Figure 8

### Breaking down data silos so innovation can grow



Data Value Creators

All others

## The many faces of data architecture

### Business-model innovation often starts with data architecture choices.

Organizations vary widely in their approach, and many CDOs have strong opinions. The Data Value Creators in our study, they have increasingly moved away from reliance on a central data lake, recognizing that it can become a dumping ground for data that doesn't have a defined purpose. Data lakes are at risk of becoming "data swamps" when they lack the appropriate data quality and governance needed to provide insightful learnings.

### But other data technologies can multiply innovation.

A data mesh—a decentralized data architecture that organizes data by a specific business domain—provides more ownership to the producers of a given data set, which enables a self-service data culture. Using a data mesh doesn't preclude traditional storage systems such as data lakes or data warehouses. It just means that their use has shifted from a single, centralized data platform to multiple decentralized data repositories. Some enterprises go a step further and add a data fabric to the mix because it can automate key parts of the data mesh. This helps organizations create data products faster, improve global governance, and orchestrate multiple data products.

### Here's how Outra's Peter Jackson approached it.

"I realized I had six divisions globally who were never going to let me move their data, let alone customer data, into one data warehouse. I didn't want to do it anyway. I didn't want to build a data warehouse. And I took this concept of polyglot persistence. In other words, data sets will persist in many different places at the same time. It doesn't mean you don't have one version of the truth. It means that through data governance, you need to understand why each is a version of truth at the point in time in that division. And if you can do that, they are equally valid. And then when you want to join the data sets, you know how, and you can join them together in a data mesh. So, I think you'll find modern infrastructures that are driven by CDOs will be mesh and fabric."

The innovation that data mesh and data fabric can enable—by breaking down silos and promoting insights across previously unconnected data sets—is something that sophisticated CDOs are increasingly pursuing, in partnership with the business.

## UK Ministry of Defence (MoD)

### Delivering the right data to the right people at the right time

UK's Ministry of Defence (MoD) employs more than 190,000 people in the British Army, Royal Navy, Royal Air Force and Strategic Command, with 58,000 civilian personnel. The MoD operates a central shared services model for its business services such as finance, procurement, and human resources, delivered by its Defence Business Services (DBS) division.

### The challenge

DBS is responsible for the end-to-end delivery of these services, including the underlying technology. Over the years, as DBS's remit expanded, it inherited many disparate IT systems and data sources from different agencies within the MoD. Managing this complexity was becoming a full-time job for the DBS team, and the maintenance burden made it difficult to deliver service improvements.

### The solution

DBS launched a major, multiyear initiative to rationalize its systems landscape and drive new efficiencies. With support from IBM® Consulting and Deloitte, DBS aimed to transform three main areas of its IT: the enterprise applications supporting its contracting, purchasing and finance (CP&F) processes; the financial systems supporting planning, budgeting and forecasting (PB&F); and the databases and analytics tools that provide management information (MI) to users across the MoD.

Data played a large role across these areas. For example, several years ago, DBS replaced a business planning system that had reached end-of-life with a new platform based on IBM software that now includes the latest version of IBM® Planning Analytics software. The PB&F solution now supports both in-year management of the budget and forecasts for the current financial year and an annual budgeting cycle with a ten-year horizon for longer-term planning.

DBS provides access to a wide range of tools to help users at different levels of the organization interact with this data — from workflows to help department managers with budget data to powerful spreadsheet-integrated analysis tools for power users on the finance team.

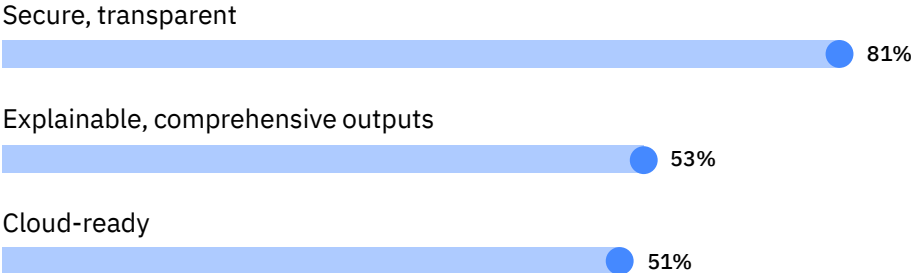
In parallel, DBS has also created a centralized data warehouse for management information. This reduces the need for departments to maintain their own figures and helps ensure that decisions are made based on consistent, accurate information. The MoD has saved on IT management and maintenance, as well as reduced unplanned downtime.

The increase in stability means that DBS staff can spend less time fixing IT issues and more time enhancing existing services and developing new features.

# Cloud-ready data architecture: More than checking the box

When asked for the most important characteristics of their data architecture, our hero group ranked security far above any other area. But, clocking in at second and third respectively were explainable comprehensive outputs and cloud readiness. Cloud plays a key role in enabling innovation—and although it gets less credit in this area than its “sexier” counterpart, AI, modern digital innovation can’t happen without it. Suzuki Motor Corporation’s Masayuki Yamamoto is keenly aware of the importance of cloud for data architecture: “Centralized and distributed data management and an optimal combination of on premises and cloud are important. Laws and regulations in each country are changing rapidly, so it is necessary to build a flexible infrastructure that can respond to these changes.”

Figure 9  
**What matters most to Data Value Creators for data architecture?**



# Protect data with quantum encryption

Quantum computing is evolving from the fantastical to the feasible. By decade’s end, practical quantum computing solutions could impact computing strategies across industries.

What does this mean for business leaders? The quantum era will unfold over time, but the need for quantum-safe solutions is immediate. Business, technology, and security leaders face an urgent need to develop a quantum-safe strategy and roadmap now. In fact, both the historic and current complexity of cryptography migrations—even pre-quantum computing—can require several years of strategic planning, remediation, and transformation.

Bad actors could be positioning themselves to take advantage of next-generation code-breaking tools now. Attackers could be stealing large tranches of encrypted data that would be unreadable using contemporary tools, hoarding data from these breaches with the intent to decode it once better technology becomes available. Organizations may have already experienced breaches that they will not know about for many years, creating an uncertain security and liability environment.

IBM has played a key role in developing new quantum-safe standards because of our expertise in both cryptography and quantum computing and has been working to prepare clients and partners for the transition to quantum-safe cryptography.

Chief Data Officers should be well-versed in the value and urgency of quantum encryption. Upgrading the world’s cybersecurity for the era of quantum computing is a new challenge that will take years, so it’s crucial that anyone with critical data to secure begins working on this now.<sup>8</sup>

How to take a page out of the

## Data Value Creator playbook

### Have the right data platform in place to process the data you collect

#### Implement a fit-for-purpose data architecture.

- Determine the specific needs the business has for data, and implement a fit-for-purpose data architecture that supports these business goals.
- Remove complexity from your data structure by introducing a data environment where the same data can be used for multiple use cases.

### Manage compliancy with data legislations and standards

#### Define a data governance policy that guides compliancy.

- Define a data governance policy that guides data quality, privacy, and security practices for the organization.
- Implement modern business applications to accommodate the ever-evolving landscape of regulatory reporting.
- Ensure compliancy and privacy are a shared responsibility between the CDO and the Chief Privacy Officer.

## Emphasize business-model innovation as much as business protection

### Protect and secure data to the max

#### Plan and prepare for quantum.

- Balance data-driven working and risks.
- Thread privacy and security through your entire data ecosystem.
- Prepare for quantum with quantum-safe encryption.

### Apply predictive advanced analytics

#### Implement an analytics model to predict outcomes.

- Implement a model to predict outcomes, using:
  - historical data and statistical modeling,
  - data mining techniques,
  - and machine learning.
- Doing so is an enabler for 45% more operating margin.\*

### Deploy hybrid cloud

#### Create a common platform across all cloud environments.

- Create a common platform that is consistent, scalable, and optimized for the organization and the partner ecosystem.
- Embed intelligence capabilities, deploying analytical services in the cloud.
- Use cloud to connect teams across functions, separate compute from storage, and bring flexibility and scalability into your enterprise information strategy.
- Discover insights in real time in a hybrid environment.

*\*Among Data Value Creators, we analyzed which enablers increased annual revenue growth or operating margin results for 2020-2022. For each enabler, we compared the group of Data Value Creators who indicated they applied an activity, versus the Data Value Creators who indicated they didn't, or had only somewhat implemented an enabler. We then calculated the relative differences in revenue growth or operating margin between both Data Value Creator groups.*

# Engage

wholly with ecosystem partners

Lesson

“I’ve found I need to embrace the chaos around me, rather than fight it. Technology is changing fast. I work with more and more external and internal partners each with their own standards; we acquire new companies. These are all external things I can’t control. But I need to use it. Therefore I try not to worry about all the differences, but I do protect my data standards as this is where I can make strong headway amongst the chaos.”

**An energy company CDO**

Sharing data, working with others—it can increase risks and make tasks harder.

But for the top-performing CDOs in our study, the effort is more than worth it. In fact, Data Value Creator CDOs have ecosystem partners that are 100% engaged in their data strategy, versus other CDOs, who report only about 65% engagement. Data Value Creators also engage customers in every aspect of their personal data.

Figure 10

**Data Value Creator CDOs have ecosystems that are 100% engaged**

Data Value Creators

All others

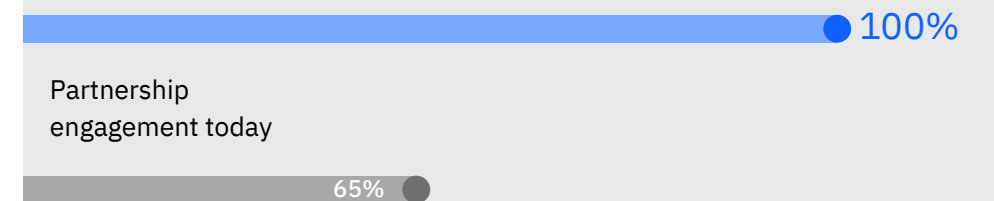
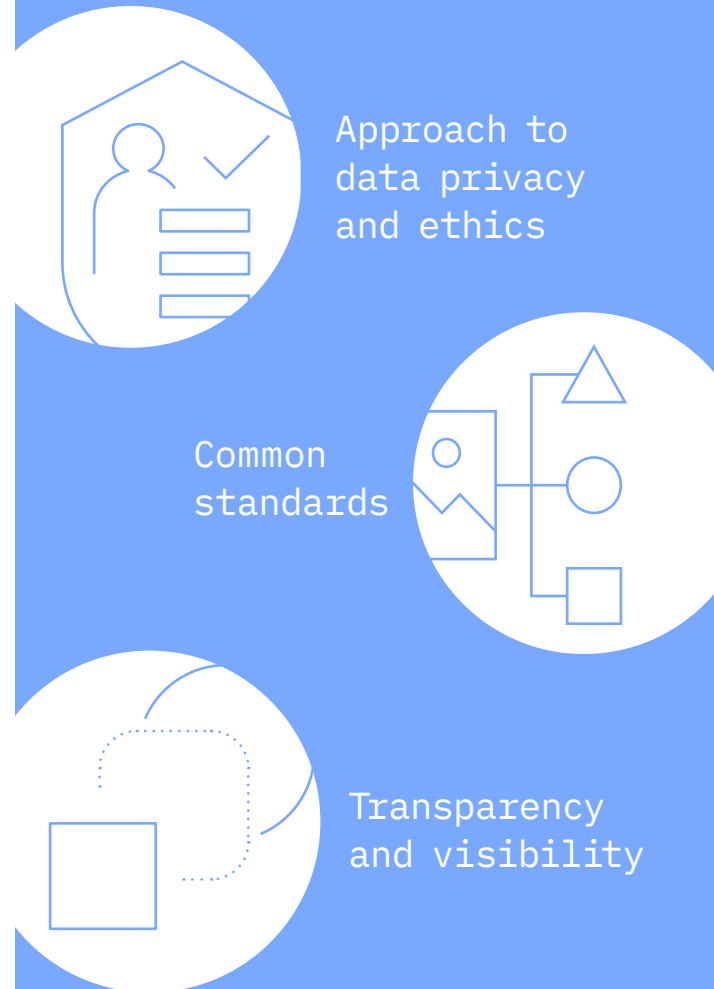


Figure 11

CDOs cite top 3 barriers to effective ecosystems



Engagement does come with challenges. Roughly one in three of Value Creator CDOs say they are challenged by an overly complex partner ecosystem. The three largest barriers to effective ecosystem partnerships that they cite: data privacy and ethics; common standards; and transparency and visibility. Nonetheless, these leaders are finding ways to power through these hurdles to gain the greater value they know will outweigh issues encountered along the way.

“As government, we have more regulatory pressure than regular organizations,” says Dutch central government’s Stolk. But that has not deterred his group from pressing ahead. “Government regulatory principles: data shall be shared, and you shall not ask for the same information twice. This demands a different approach to your data architecture and data interoperability.”

“As CDO, I do not own the content; I do not own the data. That ownership lies within the separate domains. But I have a role in the prioritization of tasks and activities, each adding to the strategic ambitions that have been defined.”

**Merle Zwiers**  
CDO, Dutch Ministry of Defense

## Ecosystems aren’t just external

It’s not just external ecosystems that can be complex. For the internal ecosystem, building collaboration is essential to yielding positive business results. Some 25% of Data Value Creators say they share strategic and operational data responsibilities with the Chief Customer Officer, for instance.

A global energy company CDO describes his situation: “If I want to go off and do something, I need the business to say ‘yes’—that this is something they want to do in an ideal world. I’ve got groups I can call upon, like IT specialists in the data space who can then deliver it, but I need to marry those two up. I don’t have my own IT delivery team nor my own budget to enable that to happen. So it’s very much working in partnership with the business to sponsor a particular use case and idea—and equally then making sure that they have dedicated the budget to enable the data team to deliver it.”

CDOs must act as one part businessperson, one part technologist, and one part diplomat as they strive to create business growth and innovation with data they don’t own in areas they don’t control. “Having more data doesn’t always lead to improved solutions; instead, it results in more difficulties regarding the quality of the data. There are various obstacles we face regarding data sharing and how we can responsibly share data.” says Lisel Engelbrecht, Data, Analytics & AI Officer, WomeninAI.

Given that Data Value Creators engage customers in every aspect of their personal data, internal partnerships with Chief Customer Officers and other leaders who “own” the customer must be navigated to be effective.



# Don't neglect internal partner networks

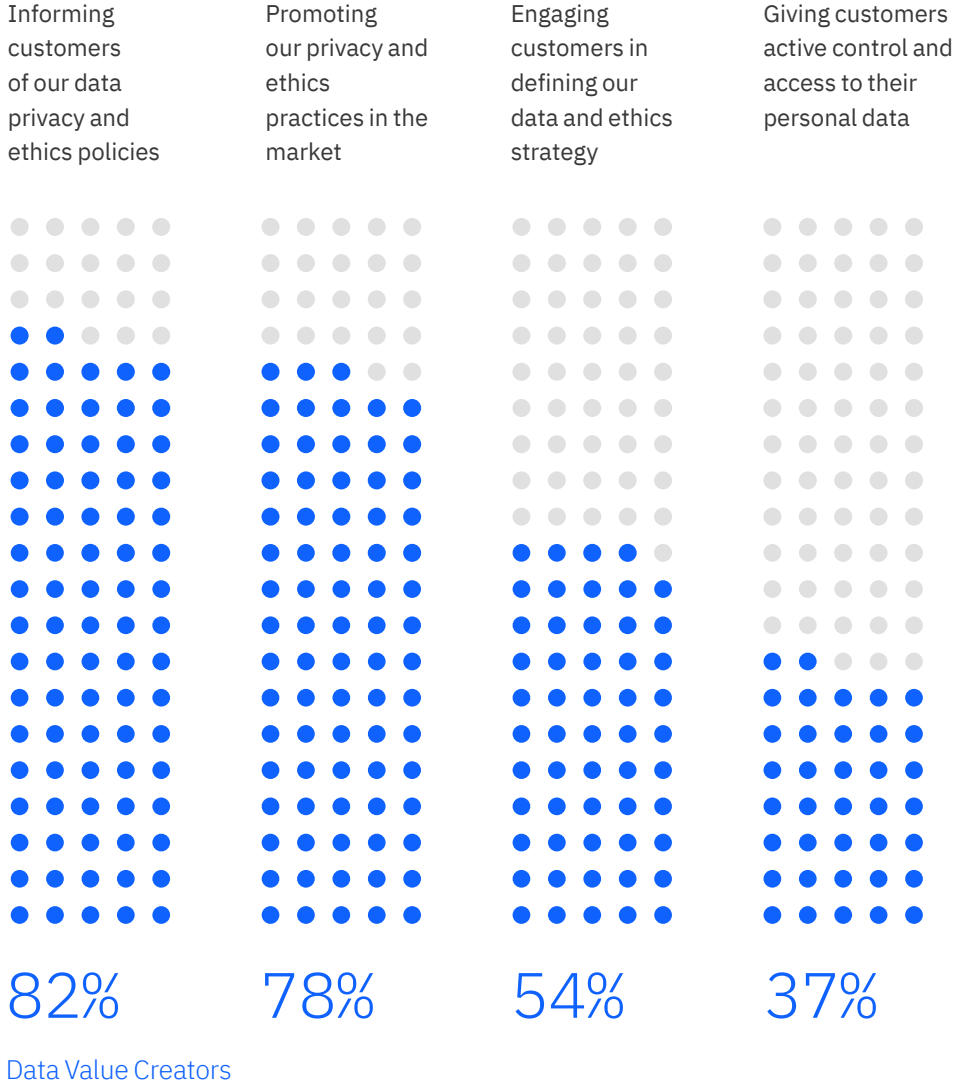
Internal partner networks must be navigated with precision. Patricia van Tienen, Acting CDO at a government agency, explains how she is proceeding: "We work for eight, sometimes as many as 10, government agencies—all with different data responsibilities. We cannot just throw all the data together to generate insights. We have to guarantee full data responsibility to prevent misuse. We could link all data on a certain topic and could provide solid policy advice, but there are risks involved once data is linked. And that is quite complex."

"We started with setting up a cross-organization data strategy, in which we defined the use of data for social benefit and impact, in a reliable way. The second step we've taken is setting up a data policy. What are our starting points in being a reliable partner? We have set up that entire framework within our organization, have coordinated it throughout, and we are still implementing that."

The challenges in partnering persist for CDOs, demanding their vigilance and discipline. But the rewards drive Value Creators to shoulder the burden, a tradeoff well worth making. As Van Tienen puts it, "And at the same time, there is also a very practical basis for me: making sure that we can do it, making sure that we collect the data in such a way that we can share it, recognize it. That wasn't the case when I came in. We're using an integrated data model and are in the middle of that implementation."

Figure 12  
**CDOs increasingly navigate customers and their data proactively**

## Activities related to customer and citizen data



How to take a page out of the

# Data Value Creator playbook

## Ensure interoperability with ecosystem partners

**Identify the right ecosystem partners to jointly achieve value from data.**

- Establish a long-term vision to establish the right connections with the right individuals, the right teams, the right partners.
- Interoperability refers to timely and secure access, compatibility, integration, and coexistence of data sources between business partners. Typically combine cloud data with open source acceleration.
- Together, create new business opportunities by connecting external and open data. Create a space for quick and scalable collaboration across the ecosystem, where different users with different objectives are using the same data repository.
- Separate internal data from external data, analyze fact-based information from your machines, facilities, and processes, and horizontally deploy that knowledge among industry partners.
- Interoperability is an enabler for 29% more revenue growth.\*

## Share cybersecurity threat intelligence

**Shared work environments require a shared approach to external threats.**

- This includes vulnerability assessments, phishing attempts, and even theft and malware practices.
- Thread security and privacy throughout your ecosystem.
- And make sure it's easily demonstrated.

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## Engage wholly with ecosystem partners

## Collaborate with transparency and visibility

**Enable trusted, transparent, and efficient supplier collaboration.**

- Enable supplier collaboration through digitizing and prioritizing data security and privacy.
- Connect with external partners to increase your knowledge base and use external experiences. You can learn a lot through conversations with other CDOs and translating it to your own organization. Embrace the opportunities to get more value and more data from other types of industries and environments, and from other types of data that can be explored.
- Always share data responsibly and handle data with trust. Proactively show the data lineage and how you control your security.
- Getting this area right is an enabler for 63% more revenue growth.\*

## Agree on common standards

**Agree on a common foundation and shared vision.**

- Coordinate your data privacy and ethics policies, and use your information partnerships to create scaling opportunities.
- Ensure that data points used in a mutual environment are interpreted correctly and add value to the ecosystem value chain.
- And more importantly, make sure you know what's out there, and then be able to bring it back to what's relevant and required for your organization.

## Make use of your mutual critical talent and skills

**Collaborate to improve data skills and close skills gaps.**

- Leverage best practices and skills networks, where employees can learn from peers in different work and company environments.
- Exchange knowledge and ideas and learn from each other's practices.
- Pledge commitment, quickly pilot, and together explore next steps.
- Look across to improve value beyond just your industry.

There is no one path from data to value.

But leading CDOs are leaving a trail of breadcrumbs.

No two CDO paths are alike. But the trailblazers who are forging a path from data to value provides valuable insights for all.

In this report, we've highlighted four key characteristics of Data Value Creators. Each comes with its own set of complexities but all appear to be paying off for these hero CDOs in terms of business value achieved. That business value is what gives them a continued remit, as well as a wide berth for innovation and achievement.

Despite the complexities inherent in the Chief Data Officer role, most of our respondents are energized and excited by the possibilities ahead.

“I think the opportunities with data are absolutely boundless. I don't think we've even really scratched the surface yet. I wake up every morning thinking I am the luckiest man in the world to actually be in this career at this point in time. It's just an absolute dream.”

**Peter Jackson**, Chief Data and Product Officer, Outra (UK), and Chief Data and Analytics Officer, Carruthers and Jackson

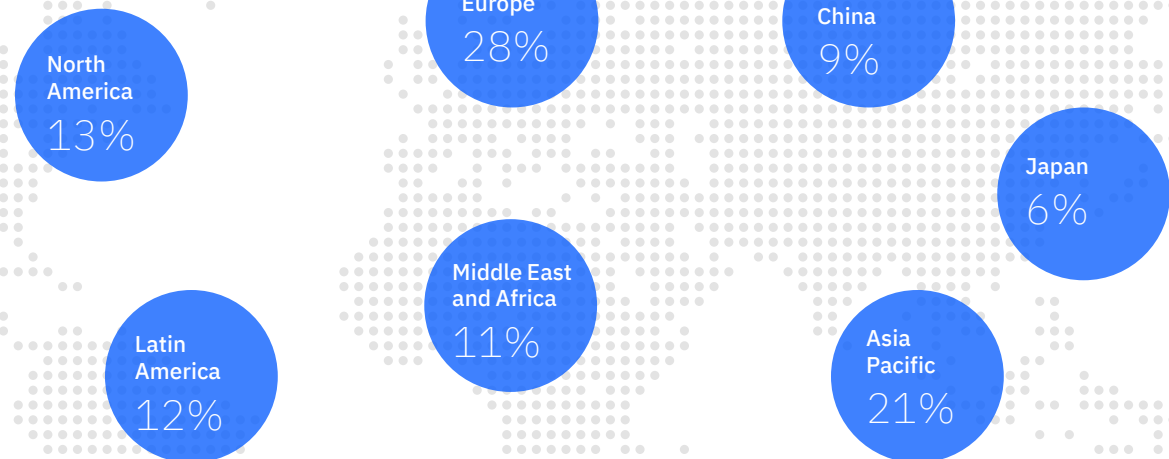
“Are you willing to try something different from what you've done for the last 20 or 30 years? This doesn't have to be a \$3 million or \$10 million massive project. Give me \$50K and I'll do something small. I'm going to prove it and I'm going to show you and we'll grow incrementally from there.”

**CDO of a large consumer goods company**

That excitement and ambition, blended with the phenomenal advances in exponential technologies such as cloud, AI, and quantum computing, should make the next chapter of CDO progress a compelling one. Twenty years from now, the CDO will likely still be evolving and growing, their contributions to business results richer than ever. With today's slow-and-steady-wins-the-race approach, CDOs are generating massive changes in the way businesses and governments run, enabling new waves of progress and achievement. CDO Value Creators are leading the way to this future, taking risks when necessary, standing firm when needed.

That's a breadcrumb trail worth following.

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