

From data science to data diplomacy

Chief Information Officer insights
from the Global C-suite Study



This report is based on input from the 2,924 Chief Information Officers (CIOs) who participated in IBM's fourth Global C-suite Study—the 20th edition in the ongoing IBM series of CxO studies conducted by the IBM Institute for Business Value (IBV). We have drawn on various statistical techniques, including exploratory factor analysis, regression analysis, and correlation analysis, to conduct our research. We also used IBM Watson AI technologies to perform sentiment analysis on thousands of qualitative responses and IBM Watson Project Debater to identify how prevalent themes were viewed from multiple perspectives.

A new world built on industrialized data

In 1913, Henry Ford famously created the first moving assembly line for the mass production of automobiles.¹ Today, we've reached a similar stage with data. Information is making the transition from the small to the large scale, from the cotton mill to the automated factory—with profound implications for CIOs.

Our latest Global C-suite Study explores what it takes to lead in a world of industrialized data. We asked more than 13,000 C-suite executives around the globe about the value they derive from data, how they intend to turn data into a differentiating advantage, and how far they've progressed with their plans.

We identified a small group of enterprises that stand above the rest. They use data to make smarter business decisions; build faster, more efficient operations; and forge closer links with their customers. The results say it all. These organizations are more flexible, innovative, and profitable than their peers. And their CIOs make a major contribution to that success.

A new operational paradigm and tempo

CIOs are acutely aware of the extent to which their industry is being disrupted—more so, indeed, than other CxOs. They have consistently stated, since 2013, that technological advances and market conditions are the two most powerful external influences affecting their organizations (see Figure 1).²

These two forces are entwined. Technological innovations and data-fueled insights are jointly creating new markets and transforming the operational landscape. The provision of services is displacing the selling of products, and buyers are becoming borrowers; witness the rise of music streaming, ride sharing, and rented *haute couture*. The digital economy is effectively becoming the *de facto* economy.

Thus technological trends and market factors are often one and the same, and the convergence of the two is a key source of competitive advantage. Combining innovation with intelligence enables organizations

to invent new market segments, redefine entire industries, and rewrite the dynamics of supply and demand.

To put it another way, industrialized information is driving the development of a new operational paradigm oriented around a continuous and changing stream of evidence and events. As one executive remarked, “Every business is now a data business, and every company is now a tech company, irrespective of the sector in which it operates.”

So how are some CIOs able to make data more actionable, more rapidly and on a greater scale? What makes them better at building robust production lines for converting raw data into useful intelligence?

Torchbearers light the way

During our research, we identified four distinct kinds of enterprises, each at a different stage on the journey to data leadership (see Figure 2).

Figure 1

Tech-tonics

CIOs consistently report that technology and market factors are the two biggest outside influences on their organizations

Most important external forces that will impact the enterprise in the next two to three years

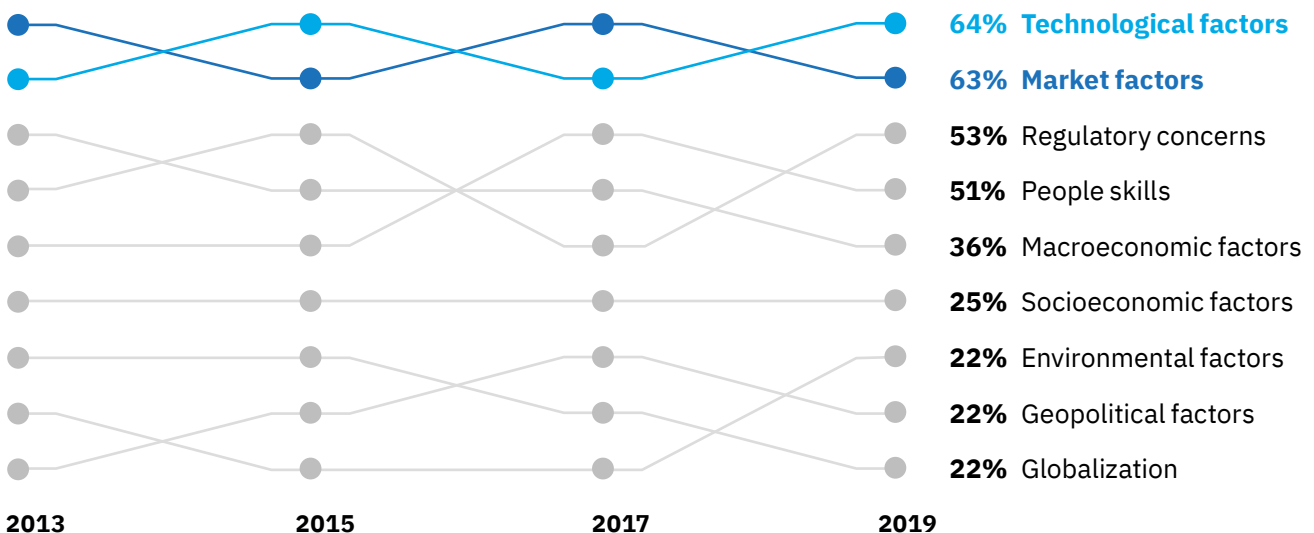
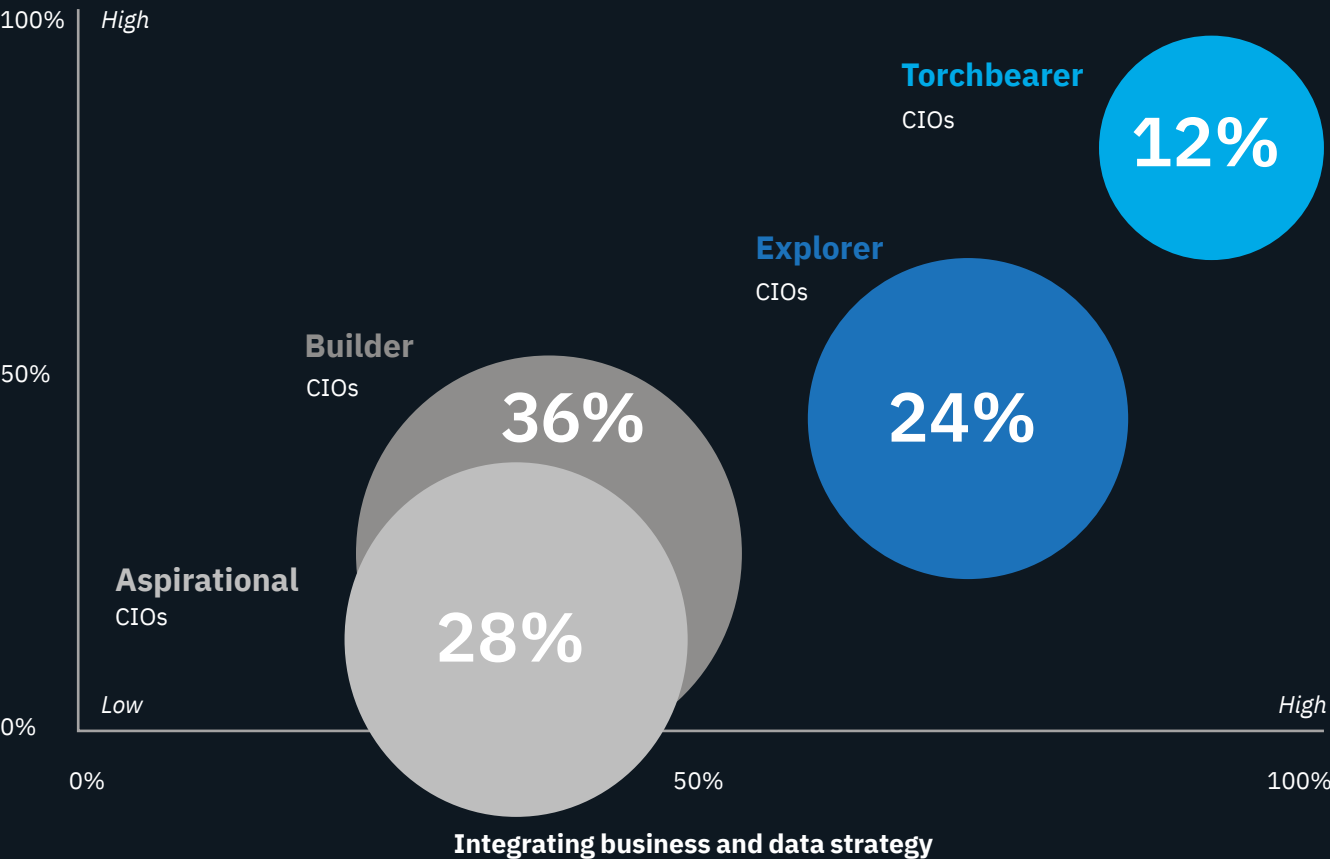


Figure 2

The data dividend

Torchbearer CIOs have charted a new path to value by incorporating data in their strategies, operations, and culture

Creating value from data



“Our executive team is good at using data to drive decisions, but we need this to spread throughout the entire enterprise.”

CIO, Healthcare,
United States

Aspirational organizations are just setting off. They’re beginning to integrate their business and data strategies. But they don’t have a data culture in place, and they’re not very good at extracting value from data. *Builders* have made greater progress in aligning their business and data strategies and creating a data culture. Nevertheless, they’re also struggling to capitalize on their data.

Explorers, by contrast, are halfway there. They’ve either aligned their data strategy with their business strategy or managed to create considerable value from the data they collect. However, they haven’t yet succeeded in doing both. *Torchbearers*, alone, have attained this ideal. They’ve fused their data strategy with their business strategy, operate in a data-rich culture, have high expectations of the value data can deliver, and typically exceed their targets.

Comparing Torchbearer CIOs to Aspirational CIOs—as we’ll refer to them here for ease of reading—reveals marked variations in the performance of the enterprises they help run. A full 82 percent of Torchbearer CIOs work in organizations with an excellent record of innovation, for example, versus just 34 percent of Aspirational CIOs. There’s an equivalent gap between the two groups when it comes to managing change effectively.

These strengths have paid off handsomely. More than seven in ten Torchbearer CIOs represent enterprises that have generated superior revenue growth. More than seven in ten have also seen their organizations earn outsized profits, whereas barely four in ten Aspirational CIOs have enjoyed the same level of success on either count.

So what are Torchbearer CIOs doing to reap the benefits of data? Our analysis shows three key ways in which they diverge from other CIOs. Torchbearer CIOs:

- Foster a culture of data fluency
- Focus on building the infrastructure required to operationalize data
- Balance transparency with trust, discriminating between data that can be shared and data that should be kept confidential at all costs.

We’ll address each of these themes in more detail in the following three chapters.

Chapter 1

Create a culture founded on data fluency

Torchbearer CIOs work in enterprises that are skilled at using data to determine the best course of action: 84 percent say they and their C-suite colleagues are predisposed to draw on data when they have to make significant decisions, compared to just 35 percent of Aspirational CIOs. Similarly, 87 percent—more than double the percentage of Aspirational CIOs—place great weight on collecting data to inform the decision-making process.

Torchbearer CIOs don't dismiss the value of experience, but they insist that the facts should come first (see sidebar "All Nippon Airways: Uncovering intuitive insights"). The truth may be painful, as the CIO of an electronics company in Japan notes. "The data-driven world can be unforgiving. Data can lay bare plans that are clearly unfeasible and expose businesses that once seemed promising as dead ends," he states. But this rigor serves as a guiding principle: Torchbearer CIOs favor hard evidence over false hope.

Indeed, Torchbearer CIOs not only place more reliance on data to guide their decisions, they use data to make different sorts of decisions from Aspirational CIOs.

They claim data is especially useful in unearthing and assessing new market prospects. Aspirational CIOs, by contrast, see data primarily as a means of pinpointing where costs can be cut (see Figure 3).

Most Torchbearer CIOs also state that data is critical in enhancing their organization's productivity, agility, and ability to innovate, whereas Aspirational CIOs say its chief value lies in identifying opportunities for improving efficiency. In short, Torchbearer CIOs and their fellow CxOs look to data to help them decide how best to expand, while Aspirational CIOs and their colleagues look to data to help them decide how best to save money.

Figure 3

Double vision

Torchbearer CIOs primarily use data to drive growth, while Aspirational CIOs use data to cut costs

Top activities where data drives the most value

Identifying and evaluating revenue growth opportunities

19% more



Defining enterprise strategy and vision

27% more



Reducing costs

18% less



Torchbearer CIOs
Aspirational CIOs

Custodians of quality

This gulf in perspectives helps explain why Torchbearer CIOs go to great lengths to maintain the data their enterprises hold and enhance its value: 83 percent work hard to curate the data, and 85 percent focus on integrating different data sets. Yet only 61 percent and 66 percent of Aspirational CIOs, respectively, put in the same amount of effort.

Torchbearer CIOs understand that building an effective data supply chain involves adopting a lifecycle approach to data management, with the emphasis on quality, integrity, and continuous stewardship. “We plan to cleanse, standardize, centralize, and integrate our data in a seamless manner to get the best value out of it in terms of real-time analysis and decision making,” the CIO of an industrial products company in India explains.

But for many CIOs, that’s still a distant goal. “We’re playing catch-up. Our data is spread across random systems in different departments. It’s been stored without being validated. And we’re struggling to find people with the right skills, both people who are data-literate and people who can do the heavy lifting,” says the CIO of a transportation company in New Zealand. Other respondents share his frustration.

The right tools for the task

Data is of negligible value in isolation, though; hence the fact that Torchbearer CIOs have invested in the analytical infrastructure required to mine the data. Eight in ten sit in C-suites that actively endeavor to provide employees with the relevant tools and training, whereas fewer than three in ten Aspirational CIOs and their fellow CxOs show an equal degree of commitment. These exertions are already bearing fruit; the organizations Torchbearer CIOs represent are four times more likely to have a workforce that is skilled in data science and analytics.

All Nippon Airways: Uncovering counterintuitive insights

When All Nippon Airways (ANA), Japan’s largest airline, wanted to create a data science team, it decided to take what Taiichi Nomura, Vice President of Innovation, calls the “self-manufacturing” route. “Our initial plan was to retrain some of our systems engineers. We soon discovered that not all systems engineers are natural data scientists, but there were a few people who stood out—people who had a real affinity for data. Once we gave them the opportunity to step into a new role that suited their personalities and areas of interest, they excelled,” Taiichi Nomura explains.

It was a revelation, he adds. Systems engineers use standardized design-and-build processes and allocate a fixed period of time for each activity. The employees who successfully made the switch to data science behaved quite differently. They were eager to explore new ideas, open to learning, and comfortable working outside traditional constraints. They were also highly driven, pushing their own boundaries in the search for innovation, rather than sticking to a project-oriented approach and time-boxed work patterns.

ANA’s efforts to build a homegrown team of data scientists have paid off amply. The airline now relies heavily on data to make key decisions—and some of that data has yielded completely unexpected insights.

When certain aircraft parts started failing for no obvious reason, for example, everyone assumed that the problem was linked to the length of time spent in the air. But ANA’s data scientists analyzed the records, only to find that there was no correlation between flight duration and breakability. The real determinant was the aircraft’s flight path, which affected the flow rate of air to the engine and thus the impact on the individual components. “Changing the measure we used has enabled us to predict the mean time between failures much more accurately,” Taiichi Nomura notes.

“One of our biggest challenges is democratizing data and enabling all our employees to be analytical citizens.”

CIO, Consumer Products,
Switzerland

However, equipping employees to delve into data does *not* mean providing them with numerous best-of-breed point solutions. This simply results in “tool sprawl,” where an enterprise gradually adopts so many programs and platforms that they hinder productivity rather than improving it. Faced with a plethora of options, employees don’t know which tool to choose for which task, or whether the tool they’re using offers a definitive view of the data.

There are other problems, too. The more tools an enterprise deploys, the more opportunities for misconfiguration, data leaks, and data breaches arise. These challenges are made worse by limited visibility into third-party applications and datastores. Moreover, some tools may come at a cost that doesn’t make sense over time. Long-term software-as-a-service (SaaS) contracts represent recurring expenses—i.e., fixed costs that never turn into sunk costs. An overabundance of SaaS contracts can impair an organization’s flexibility and erode its margins.

“Our challenge is to reduce the slope of the cost curve,” the CIO of a government agency in Canada ruefully remarks. “We have far too many platforms and technologies, all of which require support. We need to skinny down.”

Diplomats as well as data scientists

Torchbearer CIOs manage tool sprawl by liaising closely with their peers in the rest of the business: 89 percent regard collaborating with other functions to manage, govern, and secure data as a top priority. These CIOs realize their role has evolved, as a growing number of enterprises turn to clouds and outsource responsibility for their technological infrastructure.

Where CIOs were once expected to deliver the plumbing and wiring, their job is now to provide a service. They have to mediate the relationship between people, technology, and data; make data readily available to diverse constituencies; and help colleagues build a business case for digital transformation.

Torchbearer CIOs have already made the jump. They combine hard technical expertise with an expansive understanding of their organization’s business imperatives and the soft skills required to cooperate effectively across different domains. They’ve learned to be diplomats as well as data scientists.

At the center point

The respect Torchbearer CIOs have earned probably accounts for another distinguishing feature: they play the lead role in crafting their organization’s data strategy, as other C-suite executives acknowledge (see Figure 4). In Aspirational enterprises, by contrast, CxOs say it’s the CEO who exerts the greatest influence.

Yet relatively few CEOs possess the necessary technical proficiency for federating internal and external data. Research by executive search firm Heidrick & Struggles shows that half of the CEOs who run the world’s largest businesses have backgrounds in finance or general management.³ Moreover, few CEOs can devote the time and attention required to develop and maintain a comprehensive data strategy. So, arguably, the CIO *should* take pole position.

“Today’s CIOs have to be leaders, communicate well, and partner with others.”

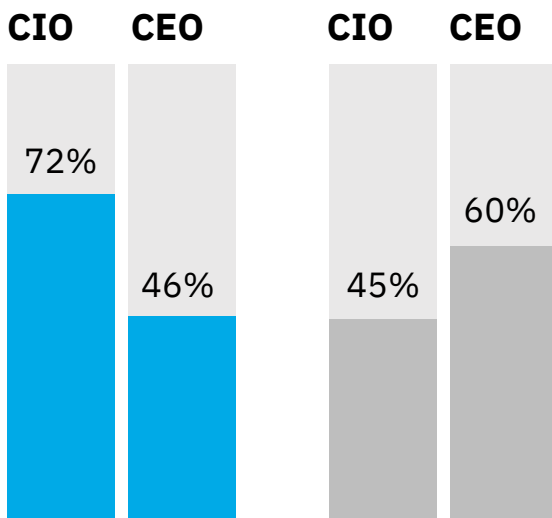
CIO, Life Sciences, China

Figure 4

Prime movers

Torchbearer CIOs take the lead in devising their organization’s data strategy

*CxO with the most influence on the development of data strategy**



Torchbearer enterprises
Aspirational enterprises

**Based on the views of all CxOs except CIOs.*

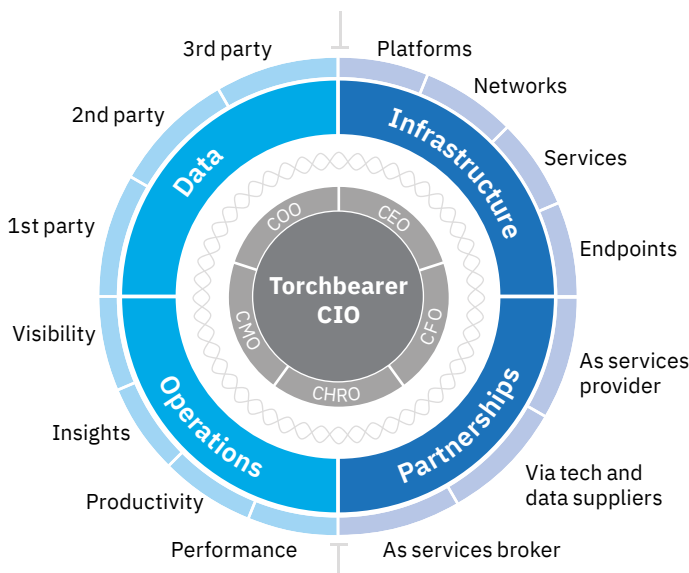
Torchbearer CIOs do precisely that. They stand at the center of the data ecosystem, with an all-embracing view of their organization’s technological infrastructure, operations, and data, irrespective of the form the data takes, where it originates or resides, and who’s accountable for it (see Figure 5). Thus Torchbearer CIOs are uniquely placed to deliver “insights as a service.” They can help their fellow CxOs gather intelligence, drive innovation, and create new value propositions that span functional boundaries.

To sum up, the enterprises Torchbearer CIOs represent have frictionless data value chains in which data is widely disseminated to support better decision making at every level. These are the hallmarks of a data-fluent culture.

Figure 5

Panoramic perspective

Torchbearer CIOs can see across technological, functional, and organizational boundaries



Action guide

How to create a culture founded on data fluency

1. Seed insights by combining hard and soft skills

Embrace expertise and establish the credibility of your IT team through technical acumen. Design for experiences by making new technologies more accessible and understandable. Encourage—and reward—collaboration by positioning your organization as both a data business (for insights) and a tech company (for innovation).

2. Cultivate insights through continuous innovation and adaptation

Re-frame discussions about disruption as opportunities to generate insights. Capitalize on the power of insights-as-a-service. Elevate the conversation about governance into a conversation about business outcomes; link these to specific practices for data lineage, data quality, data integration, and lifecycle management.

3. Refine insights to deliver value for your peers and partners

Transform your data supply chain into a value chain that delivers dividends quickly, incrementally, and cumulatively. Leverage your visibility across assets and providers to assist peers in building compelling business cases. Act as both a services provider and broker by helping colleagues understand the tradeoffs between investing in “best-of-breed” platforms and impairing productivity (and insights) through isolated point solutions.

Chapter 2

A new operating model based on insights

Many companies collect reams of data, but they fall short when it comes to harvesting the data and converting it into relevant, actionable information. Torchbearer CIOs focus heavily on *operationalizing* data by developing a robust technological base to integrate, access, and analyze it (see Figure 6).

“We’re transforming our data from an operational by-product into a corporate asset.”

CIO, Transportation, Belgium

Creating the right foundation entails making various strategic decisions that depend on the size and maturity of the enterprise concerned. Smaller, younger businesses typically require an infrastructure that supports innovation and speed-to-market, while larger, more established, and more heavily regulated businesses require an infrastructure that supports diverse operations and regulatory compliance.

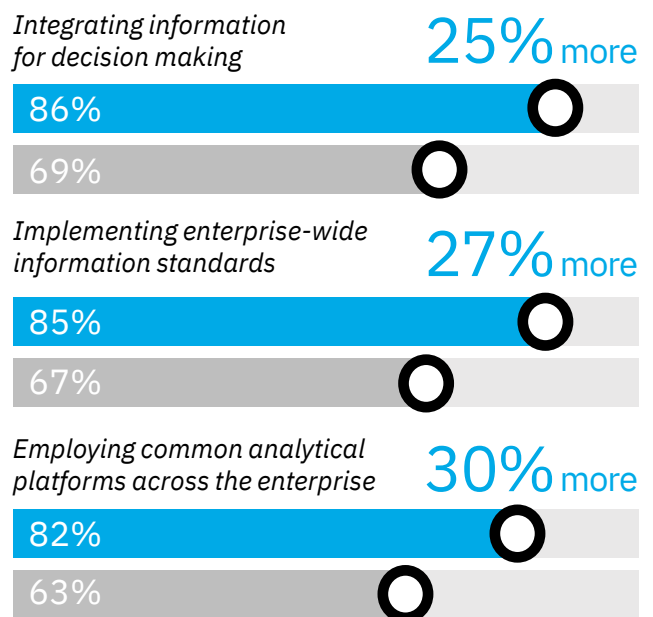
One key decision is whether to buy or build. Smaller organizations can often use off-the-shelf systems without worrying about data integration, while larger organizations have far more complex needs that may require heavily configured solutions. It may also make

Figure 6

Putting data to work

Torchbearer CIOs concentrate on making data actionable

Importance of data initiatives to the IT organization



Torchbearer CIOs
Aspirational CIOs

sense to build a new system if that provides a differentiating advantage or, conversely, to adapt an existing system if it has already been fully depreciated and there's little to gain from transforming current business processes.

Analytics and clouds

Torchbearer CIOs have also invested heavily in the technologies required to analyze data and access new sources of information over the past few years. And many intend to make further investments in these same technologies in the near future (see Figure 7).

“Advanced analytics will allow us to make better and faster decisions and thus deliver a better performance.”

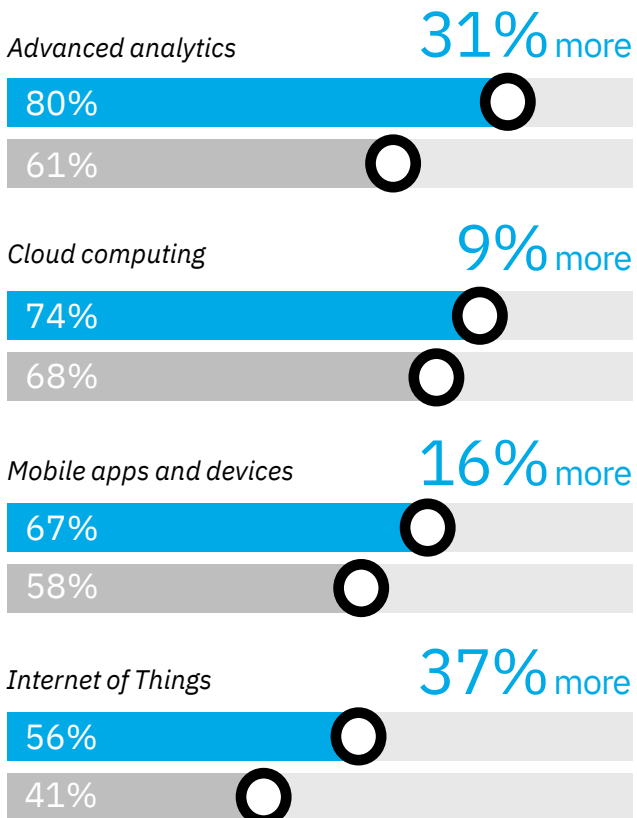
CIO, Consumer Products, UK

Figure 7

Smart spenders

Torchbearer CIOs plan to make substantial investments in advanced analytics and cloud computing

Key investment areas in the next two to three years



Torchbearer CIOs
Aspirational CIOs

KBC: Making the most of machine learning

Dr. Barak Chizi, General Manager of Big Data, Data Analytics, and AI at Belgian bancassurer KBC, heads one of the largest AI operations in Europe's financial sector, with more than 80 data scientists – and he's putting that team to very good use. KBC's roots reach back to 1998, but it's now a multinational business in the vanguard of the digital banking revolution.

KBC has a clutch of “firsts” under its belt, including a mobile app that enables new customers to open and activate an account in just five minutes and a “multi-banking” app that lets customers manage any accounts they hold with other banks. It's also testing contactless payments with wearables, and it recently launched an online facility in Belgium where homeowners, tenants, and landlords can buy property insurance as soon as they've answered three simple questions.

Seen from the customer's perspective, KBC provides a fast, user-friendly, and highly personalized service. But this smooth exterior hides a sophisticated analytical set-up. KBC's big data infrastructure has several distinctive features.

“We don't have a data warehouse; we have a data lake,” Barak Chizi explains. And there's a major difference between the two. “A data warehouse is a repository for data that's already been filtered and structured, using predefined theses, whereas a data lake is a vast pool of raw data that's free of in-built assumptions or biases.” KBC also uses machine learning to identify triggers, rather than developing predictive models, which start from the premise that the future will behave like the past. “We focus on data, not mindsets,” Barak Chizi states.

Aspirational CIOs, by contrast, have more modest ambitions—or possibly just smaller budgets, since they generally work for less profitable enterprises. However, both Torchbearer and Aspirational CIOs' investment priorities are shifting. Where mobile apps and devices previously topped their shopping lists, they are now more interested in advanced analytics and cloud computing.

Hybrid clouds feature particularly prominently in Torchbearer CIOs' plans for managing data on an industrialized scale. Four in ten have already invested in hybrid clouds, while seven in ten intend to put a toe in the water or double down on their existing expenditure. Aspirational CIOs have been slower to take the plunge. Only 24 percent have invested in hybrid clouds, and only 49 percent plan to do so in the foreseeable future. This could prove a costly delay in some cases, since the primary benefit of hybrid clouds is the agility they offer. The ability to change direction quickly is vital in a fast-moving digital environment, and organizations that are already struggling could end up falling even further behind.

But CIOs as a whole are fairly skeptical about the value of novel technologies. Only 17 percent expect a high return on investment in such technologies, compared to 27 percent of their C-suite peers. That's partly, perhaps, because they're better equipped to see through the “oversold promises,” as the CIO of an insurance company in Finland puts it. They're also, of course, the executives charged with delivering the payoff, so they have good reason to be cautious.

The one notable exception is artificial intelligence (AI)—including machine learning—where two-thirds of Torchbearer CIOs and half of Aspirational CIOs are placing big bets. “AI and advanced analytics will be the two most important trends of the next five years,” says a banking CIO in Canada. “Whoever gets this right will have a huge advantage over everyone else.” Other CIOs are equally enthusiastic (see sidebar “KBC: Making the most of machine learning”).

Streamlined data supply chains

Torchbearer CIOs are in a strong position to reap the benefits of these investments, since they've already adopted the data practices required to make the most of AI. Seven in ten say their enterprise has clearly defined rules for collecting, using, and sharing data, whereas only two in ten Aspirational CIOs can make the same claim. What qualifies Torchbearer CIOs to lead the dialogue on industrialized data is their understanding of the importance of data stewardship.

Furthermore, 84 percent of Torchbearer CIOs plan to work harder on cleansing their organization's data, compared to just 61 percent of Aspirational CIOs. "Data hygiene is absolutely imperative for proper analysis," the CIO of a media and entertainment company in the United States points out. And 56 percent of Torchbearer CIOs—more than twice the percentage of Aspirational CIOs—place equal weight on purging data.

These CIOs understand that more data doesn't necessarily translate into more or better insights. On the contrary, too much data can bog a business down, inhibiting management's ability to make speedy, well-informed judgments. It's therefore essential to articulate a strategy for deprecating data when it becomes obsolete. "We currently keep everything," the CIO of a utility provider in the UK remarks. "We need to de-clutter all our databases so that we can 'see the forest for the trees.'"

"We're establishing a robust data governance framework, encompassing everything from data management to data quality."

CIO, Insurance, Philippines

Torchbearer CIOs are also set apart by their ability to combine unstructured data with structured data to generate insights that neither would yield in isolation. Parsing social media posts, aggregating data from smart sensors, and capturing contextual metadata can produce a much more comprehensive view of customers. Most importantly, this combination of data provides a moving picture of how customer behaviors and preferences evolve over time.

Lastly, much of the data Torchbearer CIOs manage is available instantly: 69 percent have put systems in place to deliver data in real time, compared to just 28 percent of Aspirational CIOs. When employees have immediate access to customer data, they can respond more rapidly and capably to customers' needs. Real-time data, likewise, enables an organization to improve its operational efficiency and helps management see what's going on at a glance.

In other words, Torchbearer CIOs have constructed solid supply chains for producing accurate data at scale and speed and turning that data into insights as efficiently as possible. They realize that data has little intrinsic worth; it's intelligence, agility, and competitive differentiation that add value. So they focus on those areas where more data, superior data, or faster access to data will make the biggest difference in improving the decision-making process and delivering a competitive advantage.

Action guide

How to build an operating model based on insights

1. Improve your data signal-to-noise ratio

Capture metadata, context, and behaviors. Make traceability, accountability, and explainability integral to the utilization of data. Enforce risk evaluation and trust scoring as standard practice, so your enterprise can qualify sources of data and interact seamlessly across high- and low-trust environments.

2. Optimize design patterns for efficiency and differentiation

Battle complexity to achieve economies of scale; draw on standardization, consolidation, and decentralization to secure a competitive edge. Go modular by using composable, re-usable services and containers. Build an infrastructure that supports multi-party collaboration and data orchestration across platforms and services that are increasingly diverse and decentralized.

3. Augment human minds with machine intelligence

Invest in AI to leverage insights more proactively. Use algorithms and machine learning to automate workflows. Eliminate bias from your data and AI models, and create clear ground rules for applying automation in ways that respect boundaries. Evangelize the importance of human factors in a machine-moderated world.

Chapter 3

A new ecosystem built on transparency and trust

The vast majority of CIOs foresee two changes that will generate even more data over the next few years. They predict that most enterprises will form more partnerships, as ecosystems offer new ways of creating value. And they anticipate more emphasis on the customer experience, as distinct from standalone products.

Collaborating with a network of partners involves sharing considerable amounts of information. Similarly, optimizing the customer experience entails capturing huge swathes of customer intelligence at every point of contact, be it digital or physical. Both trends will mean dealing with a rising tide of information and adopting new operating structures, where necessary.

Torchbearer CIOs are intent on mining this seam of gold: 78 percent work in enterprises that use data to define and test new business models, compared to just 38 percent of Aspirational CIOs. Some of the CIOs we interviewed are investigating subscription models—following in the steps of companies like Restoration Hardware. Customers who pay an annual USD 100 fee

get access to the US furniture retailer’s interior design service and discounts on its goods.⁴ Other respondents are exploring how to deliver mobility-as-a-service, for example, to fill gaps in the sharing economy.

Open—up to a point

Torchbearer CIOs also devote far more effort to ensuring that data can circulate easily, both inside and across corporate walls (see Figure 8). When data is freed from organizational siloes, it germinates to create richer insights (see sidebar “State of Illinois: Sharing for caring”).

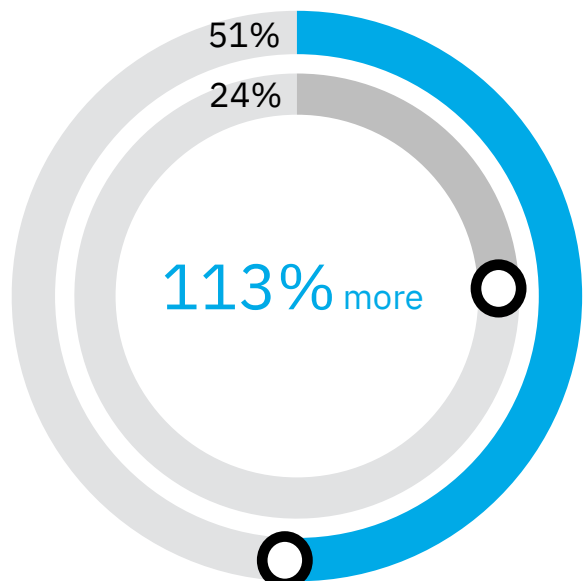
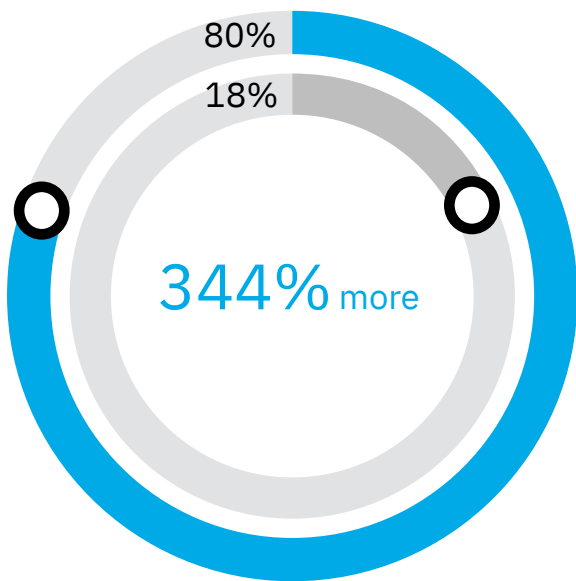
Figure 8

Free to fly

The enterprises Torchbearer CIOs represent make a greater effort to share data internally and externally

Data is freely shared across other functional business areas

Enterprise focuses extensively on acquiring and sharing data with its network partners



Torchbearer CIOs
Aspirational CIOs

But the vast majority of Aspirational CIOs are still struggling to liberate their data. “We need to foster a culture of open data sharing within our organization,” the CIO of an industrial products company in Spain notes. Similarly, the CIO of an electronics firm in the United States talks of “unleashing the data on the masses to maximize its value.”

That said, Torchbearer CIOs recognize the inherent tension between sharing data freely and keeping it close for proprietary gain. Although 69 percent tell us their organization excels at collecting, using, and sharing data, only 47 percent claim that it shares data completely openly with its business partners.

Know your customer

Judicious transparency, combined with a robust technological infrastructure for processing data on an industrial scale, has already served some organizations well. Nearly seven in ten Torchbearer CIOs sit in C-suites that have an accurate, actionable, 360-degree view of the customer, whereas only two in ten Aspirational CIOs and their fellow CxOs can see their customers so clearly.

Torchbearer CIOs and their colleagues are drawing on this deep grasp of their customers’ individual habits and inclinations to refine the customer experience: 71 percent use data to identify unmet customer needs, while 70 percent use it to build the processes required to deliver value at every touchpoint. Just 25 percent and 27 percent of Aspirational CIOs, respectively, are focusing on the same goals.

State of Illinois: Sharing for caring

In May 2016, 13 Illinois state agencies providing health and human services entered into a data-sharing agreement in a bid to become more customer-centric. Different agencies had been using different data systems, which prevented them from sharing data. Since many residents required services from more than one agency, they had to contact multiple agencies to get information and sign up for the services they needed. In some cases, residents also had to visit the offices of one agency, fill in a paper form, and then travel to another agency’s offices to complete yet another paper form with identical information.⁵

The system was frustrating for Illinois’s citizens, but it also impeded the state government’s ability to aggregate and analyze the data. Each agency could only see how customers used its own services, so it was very difficult to assess the long-term impact of specific programs on the total wellbeing of the individuals and families concerned. And that precluded the Department of Human Services from directing its collective resources as effectively as possible.⁶

Today, information that was previously confined in departmental siloes flows freely. It took seven months for the Illinois State CIO to hammer out a data-sharing pact. A lot of work also went on behind the scenes to ensure that every piece of personally identifiable information was heavily encrypted. But all the agencies participating in the arrangement can now share data. They have ten days in which to provide the information that’s been requested, ask for more time, or deny the request, although they are required to supply a valid reason for getting an extension or withholding the data.⁷

“Customer expectations, ethical dilemmas, and regulatory requirements pose challenges for utilizing data to its full potential.”

CIO, Banking, Norway

New risks and restraints

But both Torchbearer CIOs and Aspirational CIOs worry that the regulatory, risk, and compliance environment is becoming more complex—a trend that could eventually impede their efforts to operationalize the data their organizations collect. Other C-suite executives are more relaxed on this score. Yet CIOs are right to be concerned.

For a start, the regulations concerning the collection, use, storage, and dissemination of personal data have already become much stricter in many parts of the world. Research by legal firm Baker McKenzie shows that at least 50 countries now have omnibus data privacy and security laws in place, and 41 expect to make material changes to their existing data protection regimes quite shortly.⁸

Moreover, there are greater security and compliance risks when data lives in many places and the people who access it work remotely (as is increasingly the case). Different organizations have different data governance policies. And strong corporate firewalls are no longer enough. In a post-perimeter world of cloud providers and federated data, CIOs must accommodate a changing mix of first-, second-, and third-party services and be capable of delivering value in “zero-trust” environments.

Adding to these challenges, CIOs often have primary responsibility for the administration and governance of emerging data privacy and security guidelines. These reflect cultural variations in the concept of personal privacy, many of which are evolving as regulators try to reconcile technological innovation with economic disruption. The sensitivity of data, combined with the availability of data, means risks are evolving along new vectors. Cybersecurity threats are growing ever more sophisticated and numerous. Adversarial actors are looking to leverage the same market forces and technologies that power industrialized data—only for nefarious ends.

Profiting from probity

Again, however, there's a marked gap between Torchbearer and Aspirational CIOs. Torchbearer CIOs realize it's crucial to treat the personal data their organizations collect in a principled fashion—and they're confident that data can solve the very problem it poses. A full 87 percent say data helps their enterprise strengthen the trust that customers place in it, compared to just 52 percent of Aspirational CIOs.

Used irresponsibly, data fuels people's fears about pervasive surveillance, social bias, and economic exploitation. Used responsibly, though, data enables organizations to forge bonds with customers that reflect not only nuance and depth but also commitment. These relationships represent an entirely new source of value: trust.

Developing a strategy and operating model around trust requires a change in thinking: one based on cultivating insightful, long-term relationships for mutually beneficial outcomes. What distinguishes Torchbearer CIOs is that they appreciate the importance of prospering in conjunction with—not at the expense of—their customers.

The acid test is, of course, what customers—not executives—think. Still, it's clear that some C-suites regard behaving well as a precondition for doing well and take their duty as data stewards very seriously. “We want to get a personalized 360-degree view of the customer without endangering our integrity or jeopardizing the trust the market has placed in us by sharing that data,” a banking CIO in Australia explains.

Torchbearer CIOs also point to data privacy as a key source of competitive advantage in the future (see Figure 9). “Extracting value from data while preserving customers' privacy is a very difficult balancing act,” according to the CIO of a telecommunications company in Brazil.

“We need to ensure that our customers feel we treat their data in a trustworthy fashion.”

CIO, Automotive, Germany

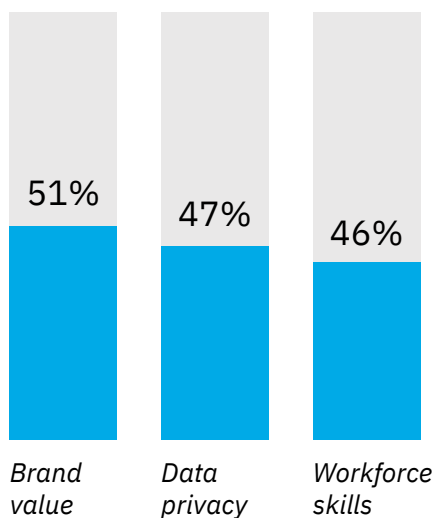
Nevertheless, there’s widespread recognition of just how important it is to get the balance right. The CIO of a professional services firm in Singapore weighs the benefits of insight with the need for moderation: “We need to use customer data to obtain insights and then create personalized experiences. But we *also* need to comply with the data privacy laws.”

Thus CIOs in the very best enterprises share data widely—and wisely. They embed risk management in their organization’s infrastructure and operations. They respect privacy and distinguish between high- and low-trust interactions. They use data to curate insights and calibrate experiences as a means of building better relationships at a personal level and better communities at a social level. These CIOs see trust as more than a mode of interaction; they see it as an integral design pattern powering the systems, software, services, and social capital their enterprises rely upon.

Figure 9

Off the record

Torchbearer CIOs say data privacy will come second only to brand value as a driver of competitive advantage in the future



Torchbearer CIOs

Action guide

How to establish an ecosystem built on transparency and trust

1. Articulate a compelling vision for tomorrow

Demonstrate in the language of your business how new technologies such as blockchain and edge computing are transforming existing business models. Champion a workplace where humans and machines can discover and create at scales and speeds never possible before. Promote a culture in which data drives insights and insights drive outcomes.

2. Pull together with your partners

Leverage hybrid clouds to partner with other enterprises and develop entirely new value propositions. Prioritize visibility and transparency across the ecosystem to promote mutually beneficial outcomes (e.g., data integrity, provenance, assurance, and security). Establish common governance guidelines to mitigate n-party risk and promote the scaling of operations.

3. Transform trust into an operational input and output

Recognize that trust plays a key role in creating value from data. Learn to operate across the diffuse boundaries of an IT portfolio that is more diverse, more federated, and more service-oriented. Sponsor the discussion on data privacy, and leverage the CIO’s visibility across the data ecosystem to build shared outcomes benefiting consumer and first-, second-, and third-party interests.

Conclusion

The currency of exchange

Data is making the leap from bespoke artifact to mass-produced commodity—and CIOs everywhere are grappling with the transition. Some CIOs talk of the managerial challenges. “Too many people are doing their own thing, so I don’t have full visibility of all the data,” the CIO of an educational institute in Australia complains. Other CIOs stress technical issues like data hygiene and governance or the fact that, with more data, “it’s much harder to separate the signal from the noise.”

Skills shortages are also a recurring motif. “Cutting-edge innovation calls for cutting-edge skills, and hiring the right talent is neither easy nor economical,” notes the CIO of a transportation business in the United States. “It’s tough to find people with the right mix of technical and problem-solving skills at a tactical level, and leadership skills at management level,” the CIO of an insurance firm in South Africa elaborates.

Nevertheless, our respondents are convinced that using mass manufacturing techniques to convert data into actionable intelligence on an industrial scale will yield huge returns. They enthuse about “improving innovation,” “disrupting other sectors,” “delivering awesome customer experiences,” and “driving up customer stickiness.”

The Torchbearer CIOs in our study show what it takes to become a leader. These CIOs are data diplomats who use data to serve different constituencies, cultivate deeper connections, and promote a culture of data fluency. They build robust supply chains for turning bytes into insights. They share data judiciously to secure the benefits of working in ecosystems without giving away their competitive edge. And they place the utmost emphasis on treating customer data ethically. Torchbearer CIOs realize that, if data is a raw resource, trust is the currency of exchange.

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