The strategic CIO

Risks, opportunities and outcomes

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About the report

Information technology is playing an increasingly significant role in determining how companies interact with customers, prospects, partners and suppliers—and how firms function internally. This trend will only accelerate as new tools become crucial in binding a company's products, services and operations together into a functional whole. This makes the role of the chief information officer (CIO) more strategic than ever.

The strategic CIO: risks, opportunities and outcomes, an Economist Intelligence Unit report sponsored by EMC, explores what it means to operate, innovate and introduce emerging technologies as a strategic CIO and offers advice to CIOs still making the transition to a more strategic role.

As the basis for this research, The Economist Intelligence Unit surveyed 156 CIOs in May and June 2013 and conducted in-depth interviews with CIOs from a cross-section of major corporations. Those polled are based in North America (31%), Europe (30%) and the Asia-Pacific region (29%), with the remainder from the Middle East, Africa and Latin America. The respondents work at companies with more than US$500m in annual global revenue and represent 19 different industries.

Executive summary

As enterprise and consumer technologies become more interoperable, scalable and pervasive, the line between strategic and operational applications continues to blur. Technologies like mobile computing are both customer-facing and operational in that they can lead to more efficient business processes and less employee downtime.

The increased business value of technology gives CIOs more opportunity than ever to work as equal partners alongside other members of the executive team. And, while many are taking advantage of this opening, others still report that they are filling roles that are more operational than strategic within their firms. To explore how CIOs can best step into and fulfill a strategic role in their organisations, The Economist Intelligence Unit conducted a global survey of 156 CIOs in May and June 2013, sponsored by EMC.

Overall, the findings indicate that CIOs today are far more integral to setting strategy and maintaining operational effectiveness of their organisations than in days past. As technology continues to pervade the enterprise and the daily lives of customers, employees, partners and suppliers, CIOs will be called upon again and again to ensure that emerging technologies are adopted to meet business goals and effectively address operational challenges.

Technology decisions are increasingly collaborative

Survey responses show that many CIOs (40%) have final decision-making authority regarding their companies' spending on emerging technology. Few CEOs (19%)—and even fewer CFOs (7%)—have retained this authority for themselves. Many CIOs interviewed for this paper indicated that they consider this to be a positive development: as pervasive as technology is today, individuals with limited technological expertise should not hold all of the power when it comes to technology spending.

Still, most CIOs are consulted before a final decision on technology spending is reached. They are being called upon to ensure that monies spent result in good returns on capital compared with other investments that could be made with the same funds. In general, technology decisions are now being made in a more collaborative fashion. CIOs report their C-suite counterparts and line-of-business executives are more technology-literate than ever before. Thus, they can contribute materially to the discussions of what will best meet their needs. CIOs can effectively align with other senior executives on both technology strategy and investment, with the CEO being cited most often as their strongest ally.

Caveat emptor: the cautious embrace of emerging technology

CIOs also report a high degree of interest in and knowledge of emerging technologies (92%). A surprisingly high number say their organisations are "excellent" or "very good" at understanding shifts in emerging technology (75%) and then developing strategies to align their use with business goals (66%). Most CIOs also report a positive impact on their businesses from investments in emerging technology.

However, CIOs are not spending wildly. Most adopt new technologies only when they become cost-effective, with a proof-of-concept pilot project usually required. Incorporating new technologies into their businesses is a "high priority" for 31% of surveyed CIOs and a "moderate priority" for 54%. This speaks to their expanding roles as innovators and change agents within their firms. Indeed, 49% of CIOs today say they are "well positioned to promote 'game-changing' innovations." Only 26% indicate that they were so positioned three years ago.

CIOs must speak the language of the business

To accomplish this often daunting task, 60% of CIOs report that communicating the benefits of technology to the business requires them to speak first in terms of solving customer or partner problems. The next-ranked approach is presenting a business case based on cost-benefit analysis (37%). In short, they must be able to help the business understand the value that any new technology will bring to their organisations.

Effective communication requires CIOs to possess a solid understanding of their businesses' overall goals and to present the "art of the possible" when explaining how new technology may benefit the business.

Still, challenges remain. Fifty-one percent of survey respondents report that the ability to handle constant change is a must-have competency. They also face a skills shortage—38% report lack of skilled personnel holds them back from aligning new technology with their organisations' business goals. The inability to predict the costs and returns keeps 37% of CIOs from effectively adopting new technologies. ■

Introduction

As the members of the C-suite with the broadest understanding of technology and its implications, CIOs increasingly serve as equal partners alongside their executive peers. About half of CIOs surveyed for this report indicate that their role in their company is strategic as well as operational. CIOs who want to move into even more strategic roles must adopt a "business first" mindset and evaluate all technology in that light.

Data are the new currency of business. The hardware and software that support and generate them are merely the common components of the modern enterprise and deliver little value on their own. Connectivity, pervasiveness and ubiquity are the order of the day. Thus, the days of the CIO being solely responsible for deploying technology to improve processes or streamline operations are also coming to an end.

Today's CIOs must do more

CIOs need to communicate strategy and business benefits as thoroughly and compellingly as any of their peers. They not only have to understand the technologies that are reshaping the corporate landscape—mobile, cloud, big data—but recognise how these technologies will fit into and affect their business architectures and infrastructures. If they cannot, they will not thrive. "The top CIOs are seen as process change leaders within their companies," says Rudy Wedenoja, senior vice-president of Reed Elsevier Technology Services, parent company of LexisNexis.

The technologies they view as strategic vary by industry, but CIOs consider cloud, business intelligence and analytics, and mobile as key enabling technologies for today and for the future.

For American Electric Power (AEP), a US power company serving 11 states, enabling its thousands of field personnel to work through mobile devices provided major operational advantages, streamlined business processes and improved productivity. The same technology yields a strategic advantage that allows AEP to build electric towers faster than its competitors. Extending mobile capabilities for use in communicating directly with customers gives AEP a second wave of benefits from the same technology. "[It] really improves our relationship and our connection with our customers," observes Alberto Ruocco, CIO of AEP.

Being able to demonstrate the multiple roles that new technology can play in an organisation helps CIOs elevate their discussions with other C-suite executives from hardware, software and costs to how technology can help achieve business goals. Indeed, when assessing and deploying emerging technologies, most CIOs report playing an integral role in setting their companies' strategies. They do so in a more collaborative fashion that spreads technology decision-making across the organisation, especially in the early evaluation stages.

But the operational aspects of their jobs have not declined in importance. When disruptions

occur to key services, the CIO has the ultimate responsibility for fixing them. Without a consistent delivery of services, none of these same CIOs would be able to stand beside their C-suite counterparts as recognised and equal members of the team that leads their organisations. To be strategic requires a fully functioning infrastructure that supports the business without fail. Technology delivered as a utility, previously the goal, is now the expected norm. Pressure is unrelenting to deliver on execution above all else, according to Yuri Aguiar, CIO and senior partner at Ogilvy & Mather Worldwide. Says Mr Aguiar: "My favorite line is that 'good execution eats strategy for lunch!'" ■

1 The strategic CIO: stepping into an expanding role

What does it mean to be a "strategic CIO"? For the last decade, CIOs at leading firms have played essential roles in setting and executing business strategies, having evolved in their roles from merely "keeping the lights on" to becoming equal members of the senior executive team. Most CIOs interviewed for this report see themselves as business enablers who share the same responsibilities for success as any other member of the executive team, be it the CFO, COO or CEO.

"What does it mean to be a strategic CEO?" asks Patty Morrison, CIO of healthcare services company Cardinal Health. "I don't think it is different because it is the CIO. All the senior executives of a company have to play a role in driving strategy based on where they are adding value in the market."

As survey results indicate, however, this is still not the case with all—or even most—companies. Depending on the application of technology— products and services, motivating employees or engaging customers—only about half of survey respondents indicate that they are an early-stage stakeholder in—and adviser to—all mission-critical projects with a technology component.

The majority of CIOs are consulted prior to project execution, but primarily in support roles. Also, 62% of CIOs polled say their companies view the role of technology within the business as "tactical, primarily to drive efficiencies and increase productivity." Indeed, many companies still seem to struggle with the idea of technology doing more than increasing efficiencies or automating business processes.

"There are a lot of companies that highly value the CIO as a strategist and innovator, but it hasn't become universal yet,"observes Robert Carter, co-CEO and CIO of global courier and delivery services company FedEx.

These survey findings can be explained in part by company size, says AEP's Mr Ruocco. "In the middle market, IT tends to be less strategic and more tactical." But even mid-size companies find themselves at a disadvantage against competitors that embrace technology as more than just a way to cut costs or improve operations, maintains Tim Theriault, CIO of drug retailing chain Walgreens. "There is a new way of doing things in which you achieve higher revenue or lower cost or better loyalty or all of them at the same time. The good CIOs I talk to can speak directly to their strategy, what they are doing in business terms."

Another reason for this discrepancy is the collaborative decision-making process CIOs engage in with their counterparts. CIOs are certainly not the sole repository of technical know-how within their organisations, nor can they make most technology decisions in isolation. They must secure the agreement of and feedback from individuals within IT and the rest of the business to ensure that their technology solutions address and resolve the problems they were intended to. Accordingly,

Q **How would you rate the overall technological literacy of other senior executives at your organisation?**
Please select one in each row.
(% respondents)

■ High ■ Moderate ■ Low ■ Don't know

Knowledge of technology trends

| 35 | 55 | 10 | 1 |

Level of technological literacy

| 40 | 50 | 8 | 2 |

Source: Economist Intelligence Unit survey, June 2013.

> **If the CIO isn't the principal strategist, then who?**
>
> Yuri Aguiar
> CIO, Ogilvy & Mather

decision-making is spread across the organisation, especially in the early evaluation stages, and may be why many CIOs report that they are late-stage advisers.

For example, collaboration is how Tenet Healthcare CIO Paul Browne expects to achieve return on investment from its efforts to digitise patient health records. This company-wide project, which encompasses 49 hospitals in 11 states, requires Mr Browne to work closely with Tenet's chief medical and operations officers to ensure its long-term success. "It is an example of how the IT leader is the overall leader, bringing together all the different silos," says Mr Browne. "And, frankly, the board and the CEO look to me as accountable for executing success on the entire project, including getting the financial returns we expect."

CIOs also report that their C-suite colleagues are more tech-literate, rendering collaboration across business lines simpler than it previously was: 80% of CIOs say their business counterparts have "high" or "moderate" knowledge of technology trends; 90% say they themselves have a "high" or "moderate" level of technological literacy. And, because technology today is easier to use and is often delivered directly from the cloud as a service to line-of-business managers and users, these business counterparts and division heads are taking over early-stage evaluation of the possible means of achieving their objectives.

"It is actually a great time to be a CIO or CTO because [the business is] very fluent, they get it," Mr Aguiar says.

This is especially true when IT supports global operations. At Ogilvy, Mr Aguiar has full control over the capital budget, but operational spending

is controlled by a formula—either as a cost-per-seat or as a percentage of revenue—because local offices have their own P&L responsibilities. This formula allows them to make decisions based on regional issues and conditions such as slower broadband speed in parts of Asia or high import tariffs in Brazil, which could make it difficult or expensive to use the resources of Ogilvy's private cloud.

Cardinal's Ms Morrison sees a variety of IT/business arrangements today that could help explain the expanding nature of the CIO role. In some cases, the chief marketing officer and the CIO are one and the same. She is also seeing CIOs responsible for human resources or customer service functions within the same organisation. Mr Theriault, for example, holds many titles: CIO, chief innovation officer and chief continuous improvement officer. The CIO's role is expanding to encompass a number of new business responsiblities.

Regardless of the number of roles he or she plays, the CIO's responsibility is still to show other senior decision-makers the "art of the possible" when determining how emerging technology can affect their businesses. And CIOs report favourable returns from their technology investments across a spectrum of measures from productivity to business agility.

Perhaps this is the reason why, when asked to compare their current roles with the past, 49% of CIOs report that today they are "well positioned to promote game-changing innovations" within their companies while only 26% would have said the same three years ago. Says Mr Theriault of Walgreens: "I will comment on how tech can be

What does an innovator look like?

The survey reveals a strong link between the role of the CIO and a company's success at innovation. Survey participants who assess their firm as "well above average" in innovation share a number of distinguishing characteristics:

- CIOs of strong innovators are more likely to say they participate in virtually every business decision (50% vs. 43%) and are also more likely to say they are well positioned to promote game-changing innovations (32% vs. 26%).

- CIOs of strong innovators are more likely to be the principal strategist for key strategic technologies, especially consumer-facing mobile applications (28% vs. 20%), as well as online learning, enterprise social networks, big data analytics and social media.

- CIOs of strong innovators are more likely to say their firm has achieved "excellent" performance in understanding technology shifts (27% vs. 18%) and developing technology strategies to align with business goals (46% vs. 30%).

- CIOs of strong innovators are much more likely to rate other senior executives in their firm as "high" both in terms of knowledge of technology trends (52% vs. 35%) and level of technological literacy (57% vs. 40%).

- CIOs of strong innovators are much more likely to rate other executives in their organisation as "supportive" of new initiatives to align technology with business goals. This broad support is notable: whereas only 57% of respondents rate functional specialists as supportive, 73% of strong innovators consider them to be supportive. ■

helpful and I will also provoke by bringing in new ideas and ways [my company] can think about doing things differently."

Indeed, though most CIO survey respondents consider developing a strategy to integrate emerging technologies into the enterprise either a

"high priority" (31%) or a "moderate priority" (54%), CIOs interviewed for this report consider this an essential part of their responsibilities. Mr Aguiar of Ogilvy & Mather wonders, "If the CIO isn't the principal strategist, then who?" ■

2 Moving from operational to strategic

> The CIO can't just say, 'Oh, please can I have a seat at the table?' It really has to be something that is part of the DNA of the company.

Robert Carter
co-CEO and CIO, FedEx

As many CIOs still find themselves in supporting roles, becoming strategic will require that, like their C-suite counterparts, CIOs prove themselves through performance and business results. Simply managing infrastructure has not been good enough for many years. New technology investments must "meet the business case for value," as AEP's Mr Ruocco maintains.

"Organisations want an overall accountable executive for these massive inventments they're making in tech," agrees Tenet's Mr Browne. "So more and more CIOs are being looked to not just as the technology leader but the person who is experienced in leading big change efforts."

It is the end customer that matters most to the CIOs interviewed for this paper. The focus is on how to use technology to create new value, which is seen as strategic in a way that bottom-line cost savings are not. Fortunately, many of today's must-have and emerging technologies—virtualisation, cloud, predictive analytics and big data—enable CIOs to do both.

Walgreens' new point-of-sale (POS) system is a compelling example. In the past, a POS system would have been a tactical IT-led project that enabled the company's 8,000 retail pharmacies to operate more efficiently. Today, the same technology is simultaneously moving people through the checkout process faster and updating loyalty points as they go, saving energy and employee time as well as improving security.

The system can interface with Google Wallet at some locations today, and the company will be able to deploy near-field communications, so customers will be able to check out using their smartphones. Because the service is delivered via the company's private cloud, Walgreens can even set up operations in a parking lot in the case of a natural disaster.

"It is strategic in every sense of the word," says Mr Theriault. "What is different [from older POS systems] is when you start to recognise the digital engagement of a customer like that, it creates a holistic experience."

To position themselves as strategic leaders within their firms, CIOs need to take charge of their destinies, confirms FedEx's Mr Carter. "It is kind of a leader-led phenomenon," he explains. "The CIO can't just say, 'Oh, please can I have a seat at the table?' It really has to be something that is part of the DNA of the company."

If that seat at the table is not already provided, the CIO has to work to change his or her company's perception of technology and the value he or she provides. To do so, maintains Reed Elsevier's Mr Wedenoja, CIOs must be able to clearly articulate the goals of their initiatives as well as their successes to other organisational leaders.

This requires business and technical know-how. Fifty-four percent of CIOs say that one of the most important lessons they have learned from promoting the adoption of new technologies is that they must understand business goals to recommend initiatives that business managers understand.

Q **What are the most important lessons you have learned from your experience promoting the adoption of new technologies to improve business performance?**
Please select up to three.
(% respondents)

It is critical that the CIO understands the business's goals to effectively recommend new initiatives that operational managers understand
54

CIOs must take the initiative to ensure that new technologies that could improve business performance are integrated across the enterprise
40

Educating other senior executives about the benefits of emerging technologies is a pre-requisite for successful innovation
39

CIOs must know how to present complex topics simply and as seen through a non-technical lens
38

The CIO must continually promote the adoption of technology at every level of the organisation
28

The CIO must understand the corporate culture to minimise resistance to innovation
21

The CIO must understand their company's place in the larger market to effectively introduce new technologies
21

Source: Economist Intelligence Unit survey, June 2013.

For Mr Wedenoja, this was a matter of survival. Few industries have been affected as severely by the Web as publishing. The repository of 26% of the world's scientific knowledge and literature, Reed Elsevier was no exception. In 2000, 64% of the company's revenue came from print publishing and 22% was from the Web. Today, those percentages are reversed: 65% from digital and just 18% from print.

This massive shift required Reed Elsevier to reinvent itself and rethink its business model, ultimately deciding to spend a much larger percentage of revenue on IT. However, it is critical that spending lead to solid financial returns and operational performance gains. "What that means is our business leaders have become technologically aware and technologically competent, and IT has taken on a major role in keeping us competitive in delivering our products and services," Mr Wedenoja declares. "And the product we are increasingly delivering is IT."

As the executive overseeing a team of five divisional CIOs, Mr Wedenoja finds that his role is now more business-focused than ever. "Being strategic in our world means 'How can we take what is going on in tech and what our end customers' expectations are and drive that back into our technology product,'" he says. ■

3 New challenges for a changing role

Some issues and challenges are outside a CIO's direct control. Thirty-eight percent of CIOs surveyed cite a lack of available talent as a roadblock to bringing technology in line with business goals. That problem is followed closely by the inability to predict the costs of and the returns on technology investments (37%).

The speed of technological change may also be causing CIOs to hold off on deploying new technologies in their organisations. Ninety-two percent of survey respondents indicate that they have a "good knowledge" of emerging technologies, but just 50% know how they are going to integrate them into their organisations. The other 42% say they don't know how they will

use new technologies in their companies.

Some CIOs also struggle with managing inflated expectations of what advantages new technology will provide, having to push back against assumptions driven by media coverage and vendor "hype cycles." Twenty-six percent of respondents cite the difficulty of making decisions without succumbing to technological trends as one of the biggest challenges in integrating new technologies—making it the top response. Difficulty in crafting a convincing business case was cited by 23%, followed by the challenge of breaking down silos to produce organisation-wide change, at 21%.

These are very encouraging results for CIOs

Q In your opinion, what are the biggest challenges for CIOs trying to align technology use with business goals?
Please select up to three.
(% respondents)

Challenge	%
Inadequate technical skill sets	38
Inability to predict costs of and returns on technology investments	37
Rapidly changing business models	36
Lack of senior management vision	33
Rapidly changing technologies	28
Silos within the organisation	24
Lack of financial commitment to support innovation	23
Inadequate management skills	21

Source: Economist Intelligence Unit survey, June 2013.

> " IT exists to enable the business and to create value for the business. "

Albert Ruocco,
CIO, American Electric Power

looking to move into a more strategic role. In the past, these problems would have scored much higher. Today, most senior executives have experienced a major technology implementation and understand the challenges and potential pitfalls inherent in such endeavours. More important, they have witnessed the business benefits that successful technology deployments can provide. This makes them more open to IT's needs, perhaps making at least some aspects of the CIO's job easier.

Easier or not, CIOs looking to advance in their careers must wear several hats and be able to speak intelligently with their business counterparts about the functions they oversee. They need to understand each part of the business and how to deploy technology effectively to support it. Mr Ruocco, for example, may be talking about better monitoring tools at a power plant for predictive maintenance on Monday, while on Tuesday he might be discussing how to apply analytics to smart meter data to understand market segments better.

These transitions can be difficult. However, as Mr Ruocco notes, "IT exists to enable the business and to create value for the business." CIOs will have to successfully address these challenges if they are to become effective business leaders. ∎

4 Learning to thrive

To be strategic, CIOs have to do more than simply understand and manage the technology platforms and architecture of their organisations. Ninety-two percent of surveyed CIOs say that they stay current with emerging technology to improve products and services. Eighty-four percent use technological change as an opportunity to make their workforce more effective and engaged; 77% of CIOs use technology to gain deeper insights into their customers. Although most CIOs report good returns on their technology investments, companies are not adopting new technologies indiscriminately. Most CIOs only purchase these technologies as they become cost-effective (77%), and only implement new tools after first running pilot projects (85%).

CIOs should choose key allies within their leadership teams. In particular, it is critical that they collaborate closely with their CEOs, whose broad responsibilities make them better able to cut across business silos and communicate the benefits of technology to all working within the company.

Unlike in days past, when the CEO was often the last to sign off on technology spending because it was viewed as a cost rather than an investment, 78% of CIOs say the CEO is now their biggest supporter. States Ogilvy & Mather's Mr Aguiar: "When a CIO successfully adjusts his strategy to help attain a CEO's goals, there is much better momentum and support not only from the CEO but from other business leaders in the organisation."

Q **What are the most effective approaches for CIOs to articulate the business benefits of new technology?**
Please select up to three.
(% respondents)

Explaining how new technology can solve customer or partner problems
60

Presenting business cases based on cost-benefit analysis
37

Selling new ideas one-on-one to key senior executives
36

Presenting case studies of successful technological transformation in other or competing organisations
31

Educating the executive committee about technology issues
31

Showing how technology improves stakeholder value
25

Demonstrating the negative consequences of failure to innovate
12

Tracking and presenting information about technology trends
12

Source: Economist Intelligence Unit survey, June 2013.

Emerging technologies to watch

The dual nature of many of today's latest technologies allows CIOs more ways than ever to improve efficiencies and increase top-line opportunities. Over the next three years, CIOs expect to serve as the principal strategist in four key areas:

- Big data analysis and advanced analytics
- Consumer-facing mobile applications
- Cloud and virtualisation
- Enterprise social networks

Gaining ground is the "Internet of things"—a term used to refer to individually identifiable objects that can now be represented, tracked and communicated through digital networks. FedEx

has always viewed technology and information as strategic differentiators. That is why co-CEO and CIO Robert Carter is so keen on the next wave of sensors and the data it will create. It will be revolutionary for the company when every box, package, parcel, jet and truck in the fleet relays continuous information for analysis.

"We are innovating today in sensor-based shipments that have the ability to be online and provide continuous information about their state and status and whereabouts and temperature and velocity—all kinds of things" says Mr Carter.

Big data analytics, mobile and social all play a role in transforming this information into knowledge—and knowledge, not technology, will differentiate winners from losers in the future. ■

> " We really try to create a collaborative environment where the business and IT can get excited together about goal-congruency and joint accomplishments. "
>
> Robert Carter
> Co-CEO and CIO, FedEx

According to survey respondents, the top three skills CIOs need to be effective are not technology-related. They are:

- An understanding of the business in order to align technical advice with key business goals (53%);
- Ability to deal with constant change (51%); and
- Communication skills to promote new ideas effectively (40%).

CIOs interviewed for this report would rate this last finding higher. As Cardinal Healthcare's Ms Morrison observes, "One of the most important skills that a CIO has to have is the ability to translate the technology to what is real to the business."

Technology decisions are increasingly made in a collaborative fashion. This requires CIOs to have communication skills on par with any executive in the organisation: 60% of surveyed CIOs say that the most effective approach to articulating the benefits of new technologies is explaining how they can solve customer or partner problems, compared with 37% for the next-ranked approach—presenting business cases based on cost-benefit analysis.

CIOs also find themselves presenting to their boards of directors more frequently, with some organisations convening annual technology-focused board meetings as well as establishing board-level technology sub-committees. "We really try to create a collaborative environment where the business and IT can get excited together about goal congruency and joint accomplishments," says FedEx's Mr Carter. "That is the real secret sauce."

Part of this collaboration requires understanding what goes into a compelling business case for change. In many cases, the first call to implement new technologies should come from the business leaders who need the new tools. CIOs are brought in later to add their insights and experience to the process, says Mr Theriault.

In addition, since the same technologies—for example, cloud, mobile and social—are now used to support once-siloed business processes, IT leaders must be able to work with all levels of their organisations to understand where technology and business needs meet. At these intersections they will find the rationale they need to move their companies towards a given solution.

But this is also where some of the greatest

challenges lie. Ask any CIO about user adoption of new technology and you may hear a different story. Much of the friction between IT and the business can be found at the point of adoption—where lack of communcation or ill-defined projects can lead to users who do not understand the value of new technologies and thus resist a new solution or, worse, actively find ways to work around it.

One of the biggest challenges, reflects Mr Aguiar, is figuring out when a technology becomes "strategic." This is why he created Client Engagement Teams, comprising technologists with deep business knowledge who travel the globe to help regional CEOs find the best way to achieve their business goals—even if the solution is a pen and a piece of paper.

"CIOs have strived to be strategic; however, the tactical aspects always drag you down because they are so all-consuming," says Mr Aguiar. By focusing on the value technology can create—the ability to share information seamlessly across the globe regardless of device—Mr Aguiar was able to move IT into the role of business enabler instead of technology supplier. This is the type of thinking that moves a CIO from one role into the next, says Reed Elsevier's Rudy Wedenoja. "If you don't have business acumen, you are not going to be a CIO of a major company." ∎

5 Conclusion

While many CIOs still face challenges as they attempt to take a seat at the executive table, the role of chief information officer is increasingly strategic. The manner in which technology is used today has blurred the lines between what was once a job focused solely on "making things work" to one that is focused on enabling businesses to flourish.

The CIOs interviewed for this paper expressed great excitement about the growing importance of their positions and the role that technology will play in the future of their firms. Looking back just a decade, one can see how rapidly technologies such as social and mobile have changed how people live, work and play. CIOs who take advantage of these shifts will propel their companies to new levels of profitability and innovation. And, for most CIOs, the biggest challenge will not be convincing other executives of the value of technology; it will be deciding how and when to deploy which

technologies to achieve the greatest impact.

Fifty years have passed since the first digital computers were introduced into enterprises, says FedEx's Mr Carter. In that time, digital technology has spawned entire industries and made others disappear. Most companies have benefited greatly from technology's advance, and this is just the start of what is to come. "If I told you that the Internet was strategic, you might glaze over on me," says Mr Carter. "But it is just in its infancy."

The next wave has yet to be imagined, he says, but societies and businesses are beginning to understand what extreme connectivity will mean for value creation.

"There are a lot of quills in the quiver," says Mr Theriault. "The art of it is to know which technologies to use, how to use them, how to align them for the business and to execute. All of those things have to be true to be successful, but that makes this an exciting time." ■

Appendix: survey results

Percentages may not add to 100% owing to rounding or the ability of respondents to choose multiple responses.

In your opinion, how effective is your organisation in each of the following performance indicators compared with its peers?
Please rate on a scale from 'Well above average' to 'Well below average'.
(% respondents)

Well above average | Somewhat above average | Average/ on par with peers | Somewhat below average | Well below average

Profitability
30 | 41 | 22 | 4 | 3

Revenue growth
35 | 29 | 32 | 3 | 1

Market share
31 | 34 | 26 | 6 | 3

Customer loyalty
44 | 34 | 19 | 2 | 1

Innovation
38 | 38 | 17 | 5 | 1
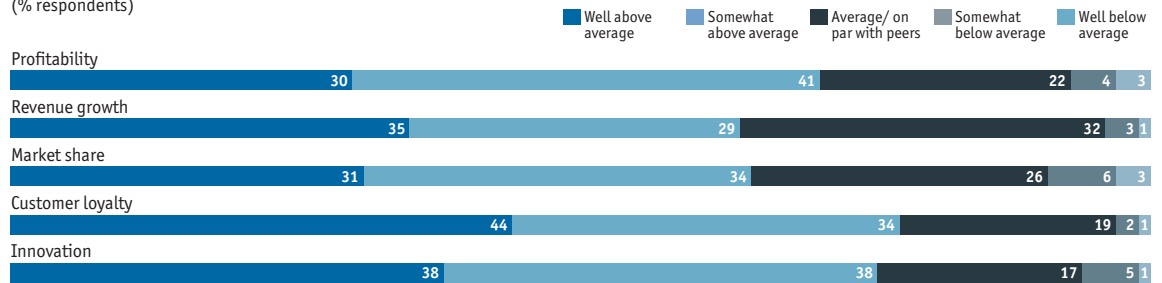
How does your organisation view the role of technology within the business?
Select all that apply.
(% respondents)
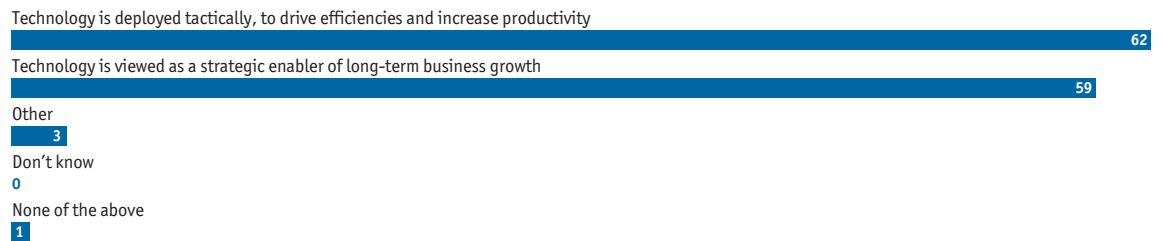
Technology is deployed tactically, to drive efficiencies and increase productivity
62

Technology is viewed as a strategic enabler of long-term business growth
59

Other
3

Don't know
0

None of the above
1

Which role in your organisation has final decision making authority for allocating resources to integrate new technologies into the enterprise? Internal business infrastructure technologies
(% respondents)
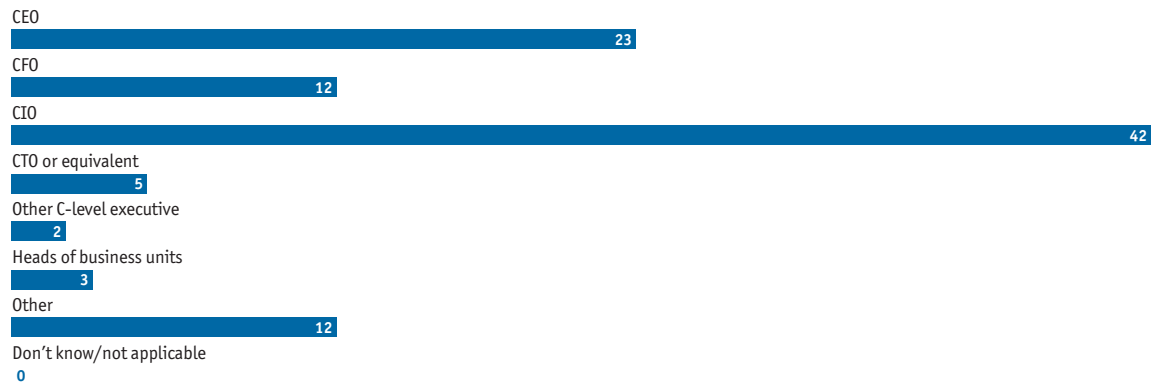
CEO
23

CFO
12

CIO
42

CTO or equivalent
5

Other C-level executive
2

Heads of business units
3

Other
12

Don't know/not applicable
0

Which role in your organisation has final decision making authority for allocating resources to integrate new technologies into the enterprise? Technologies that focus on customer-facing functions
(% respondents)
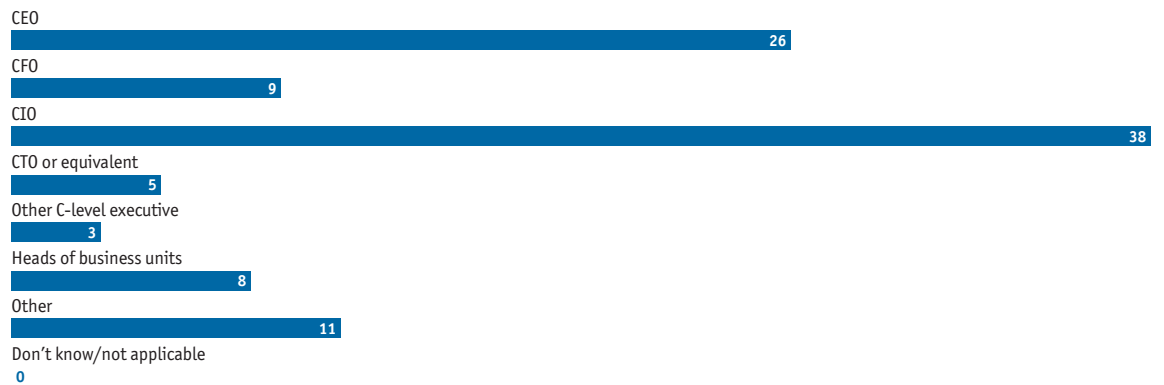
CEO
26

CFO
9

CIO
38

CTO or equivalent
5

Other C-level executive
3

Heads of business units
8

Other
11

Don't know/not applicable
0

Which role in your organisation has final decision making authority for allocating resources to integrate new technologies into the enterprise? Technologies related to product/service functionality
(% respondents)

CEO
19

CFO
7

CIO
40

CTO or equivalent
10

Other C-level executive
6

Heads of business units
8

Other
9

Don't know/not applicable
1
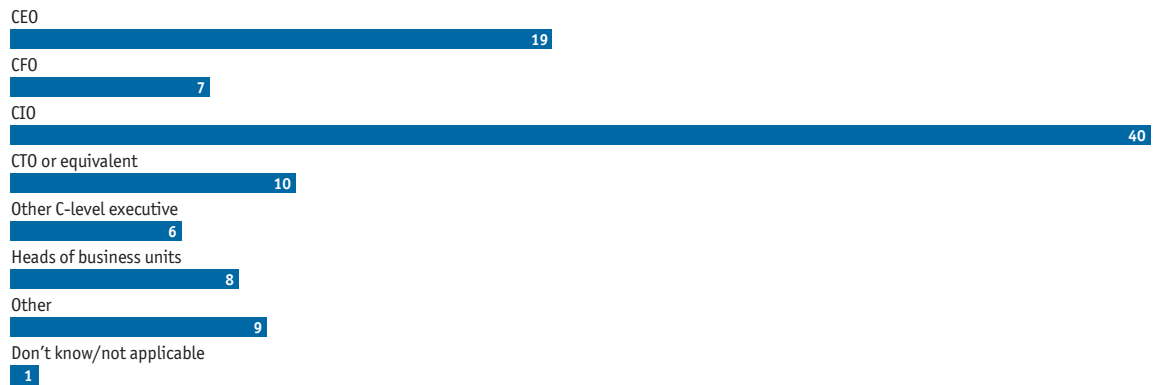
What overall impact have new technologies had on the following aspects of your business over the past three years?
Please select your response on a scale from 'Strongly positive' to 'Strongly negative'.
(% respondents)

Legend: Strong positive | Somewhat positive | Neutral | Somewhat negative | Strongly negative | Don't know/ Not applicable

Operational efficiency/productivity
38 | 49 | 12 | 1 | 1

Customer relationships
44 | 33 | 21 | 2 | 1

Product/service innovation
40 | 40 | 17 | 1 | 1

Employee productivity
35 | 41 | 20 | 3 | 1

Risk management and compliance
33 | 34 | 29 | 2 | 3

Profitability and revenue generation
28 | 40 | 25 | 2 | 1 | 4

Business agility
35 | 37 | 23 | 3 | 2
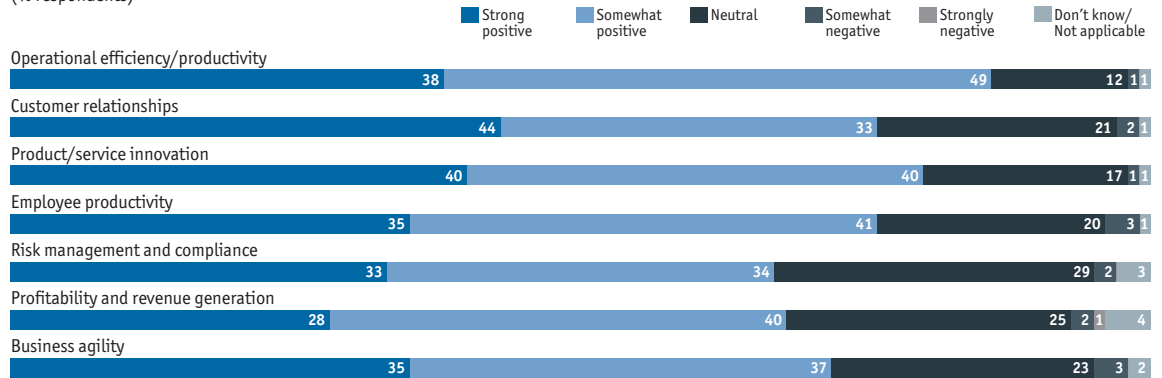
Do you agree or disagree with the following statements about your organisation's strategic approach to technology?
Please select one in each row.
(% respondents)

Legend: Agree | Disagree | Don't Know

We see technological change as an opportunity to improve products and services
92 | 4 | 4

We are investing in emerging technologies to make our workforce more effective and engaged
84 | 13 | 3

We are exploiting emerging technologies to achieve deeper customer insights
77 | 19 | 4

We see new technologies substantially improving our ability to collaborate with partners
76 | 21 | 3

We are integrating emerging technologies to enhance senior management control
73 | 21 | 6

Our goal is to reduce our technology/data centre spend
61 | 32 | 6

Do you agree or disagree with the following statements about your organisation's tactical approach to technology?
Please select one in each row.
(% respondents)
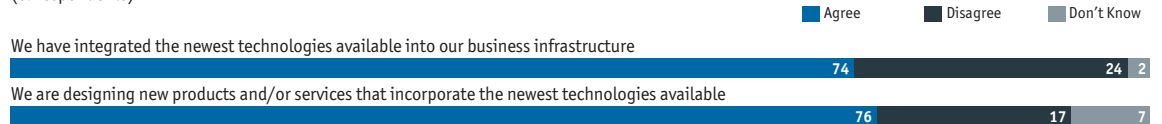
Legend: Agree | Disagree | Don't Know

We have integrated the newest technologies available into our business infrastructure
74 | 24 | 2

We are designing new products and/or services that incorporate the newest technologies available
76 | 17 | 7

Do you agree or disagree with the following statements about your organisation's approach to integrating new technologies?
Please select one in each row.
(% respondents)

Legend: Agree | Disagree | Don't Know

We integrate new technologies into our business infrastructure only as they become cost-effective
77 | 17 | 6

We run small pilot programmes for emerging technologies, and expand adoption only if we achieve some level of success
85 | 8 | 7
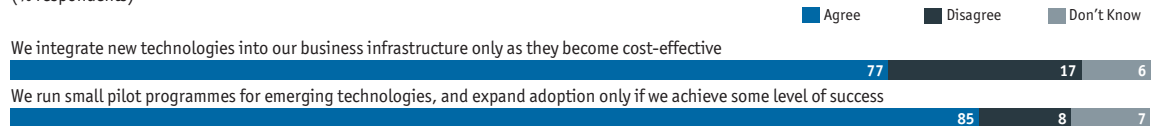
As CIO of your organisation, which of the following technologies have become major priorities when considering business strategy?
Please select up to three.
(% respondents)

Cloud computing
44

Business intelligence
38

Mobile technologies
29

Enterprise applications
27

Collaboration technologies
26

Infrastructure
23

Security
20

IT management systems
19

Big data
19

Virtualisation
18

Online communities
12

Other
1

Don't know/not applicable
1

None of the above
1
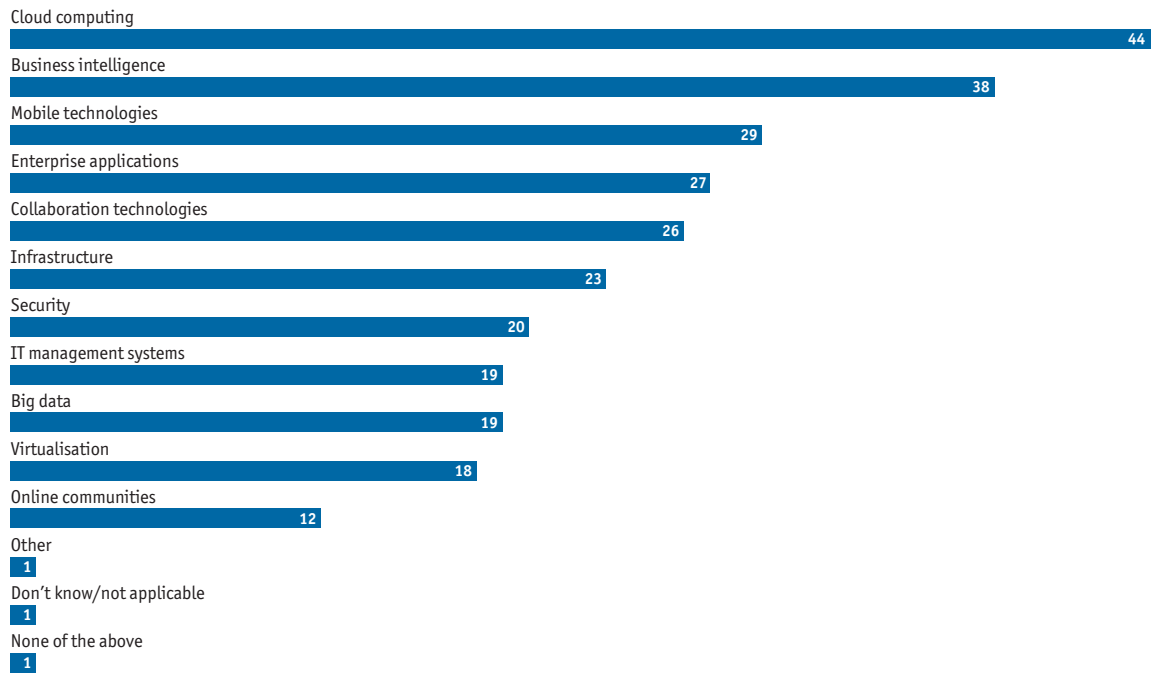
In which top areas are you the principal strategist today?
Please select the top three.
(% respondents)

Cloud computing/virtualisation
42

Business process infrastructure/management
41

Security
31

Big data analysis/advanced analytics
24

Mobile workforce enablement
23

Company websites/branded social media
23

Consumer-facing mobile applications
20

Enterprise social networks/collaboration
19

Supply chain and manufacturing
15

Online learning and development
15

Don't know
3

None of the above
2

In which top areas are you expected to be the principal strategist three years from now?
Please select the top three.
(% respondents)

Big data analysis/advanced analytics
31

Consumer-facing mobile applications
26

Cloud computing/virtualisation
25

Enterprise social networks/collaboration
23

Online learning and development
20

Security
19

Company websites/branded social media
17

Mobile workforce enablement
16

Business process infrastructure/management
12

Supply chain and manufacturing
12

Don't know
3

None of the above
1

Which aspect of integrating emerging technologies is the most challenging for you?
(% respondents)

Difficulty making decisions without succumbing to technological trends created by popular coverage and/or inflated expectations
26

Difficulty creating a convincing business case for new technologies
23

Breaking down silos to produce organisation-wide change
21

Inability to find employees with the right skills to integrate and use these technologies
13

Difficulty convincing management of the importance of technological change
7

Encouraging tech-savvy employees to work through proper channels to bring new technologies into the company without compromising data security
6

Other
1

Don't know/not applicable
3

Which of the following statements best describes your organisation's approach to funding technological innovation?
Please select the one response that is most appropriate.
(% respondents)

The CIO has a fixed budget and allocates funds at their own discretion
23

The CIO controls a budget, part of which is specifically allocated to integrating emerging technologies that could improve business performance
37

The CIO has a limited budget for basic IT operations. Funds for assessing emerging technologies are approved on a case-by-case basis by other members of the C-suite/executive board
35

Don't know/not applicable
3

None of the above
3

Which of the following statements describes your principal role in engaging customers through technology?
(% respondents)

I am an early-stage stakeholder in and advisor to all mission critical projects that contain a technology component
49

I am a late-stage advisor whose role is primarily decision support and advice around deploying project-enabling technologies
27

I establish security and interoperability requirements for sales and marketing support tools, but do not make procurement decisions
18

Don't know/not applicable
5

None of the above
1
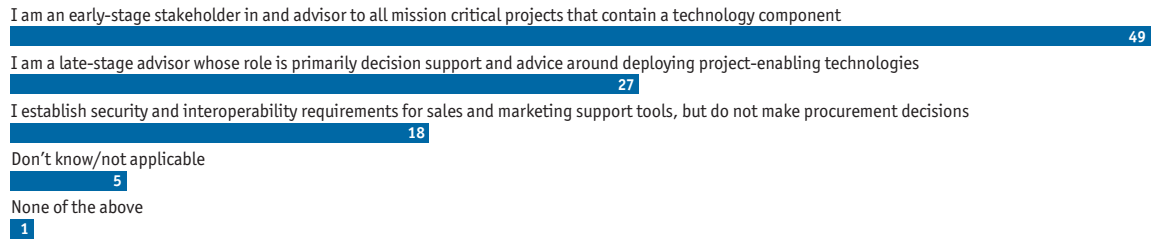
Which of the following statements describes your principal role in engaging employees through technology?
(% respondents)

I am an early-stage stakeholder in and advisor to all mission critical projects that contain a technology component
51

I am a late-stage advisor whose role is primarily decision support and advice around deploying project-enabling technologies
24

I establish security and interoperability requirements for sales and marketing support tools, but do not make procurement decisions
19

Don't know/not applicable
2

None of the above
3

Which of the following statements describes your principal involvement in technology strategies related to product or service functionality?
(% respondents)

I am considered an early-stage stakeholder in and advisor to all mission critical projects that contain a technology component
56

I am a late-stage advisor who's role is primarily decision support and advice around deploying project-enabling technologies
22

I establish security and interoperability requirements for new technologies, but do not make procurement decisions
17

Don't know/not applicable
4
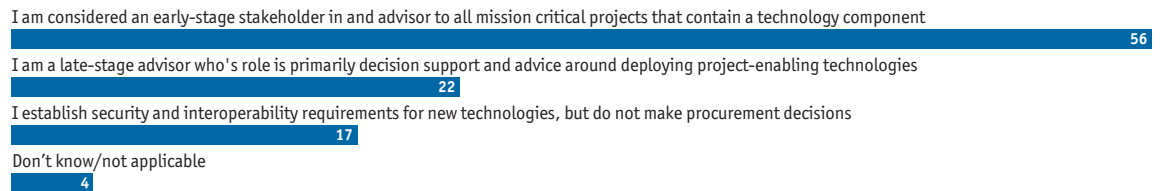
Which of the following statements best describes your own knowledge of emerging technologies and their consequences for your organisation?
(% respondents)

I have good knowledge of the range of emerging technologies and how they are likely to affect our organisation, and I know how we can strategically integrate them across the enterprise
50

I have good knowledge of the range of emerging technologies and how they are likely to affect our organisation, but I don't yet know how to strategically integrate them into the enterprise
42

I have a minimal understanding of emerging technologies beyond those required to support existing business processes
8

To what extent is developing a strategy to integrate emerging technologies into the enterprise one of your professional priorities?
(% respondents)

High priority
31

Moderate priority
54

Minimal priority
14

Not a priority at all
2
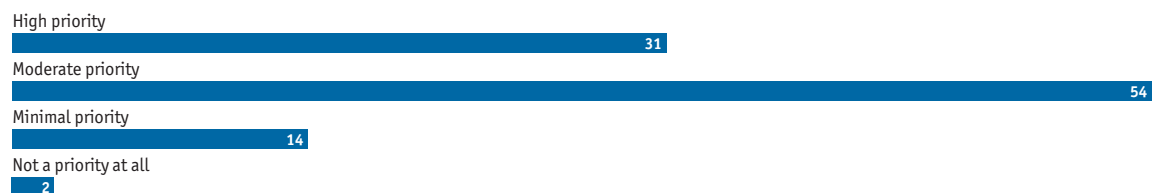
To what extent is gaining more knowledge of emerging technologies one of your professional priorities?
(% respondents)

High priority
8

Moderate priority
23

Minimal priority
62

Not a priority at all
8

How successful is your organisation in understanding emerging technology shifts and developing strategies to align their use with business goals?
Please select one in each row.
(% respondents)

Legend: Excellent | Very good | Fair | Somewhat poor | Very poor | Don't know/ Not applicable

Understanding technology shifts
18 | 57 | 20 | 3 | 1

Developing technology strategies to align with goals
30 | 36 | 26 | 7 | 1

How would you rate the overall technological literacy of other senior executives at your organisation?
Please select one in each row.
(% respondents)

Legend: High | Moderate | Low | Don't know

Knowledge of technology trends
35 | 55 | 10 | 1

Level of technological literacy
40 | 50 | 8 | 2

How would you rate other senior executives at your organisation on their understanding of the following technologies?
Please select one in each row.
(% respondents)

Legend: High level of familiarity | Moderate level of familiarity | Low level of familiarity | No familiarity | Don't know

Cloud
26 | 45 | 23 | 4 | 2

Social media
35 | 48 | 14 | 1 | 1

Connected devices/mobile
40 | 51 | 8 | 1 | 1

Big data/advanced analytics
21 | 44 | 27 | 8 | 1

Data/network Security
33 | 42 | 23 | 2 | 1
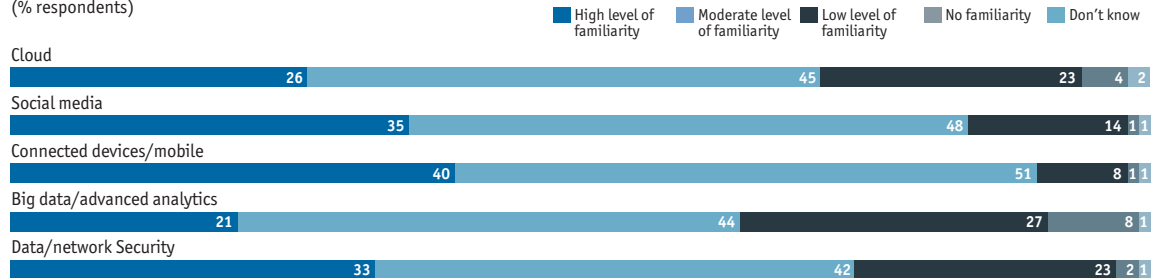
How easy is it for you to align with other senior executives on technology strategy and investment decisions?
Please select one in each row.
(% respondents)

Legend: Very easy | Somewhat easy | Somewhat difficult | Very difficult | Don't know/ Not applicable

Strategy
23 | 45 | 30 | 2 | 1

Investment
23 | 42 | 31 | 3 | 1

Which management levels are most supportive of new initiatives to align technology with business goals?
Please select one in each row.
(% respondents)

Supportive ■ Neutral ■ Resistant ■ Don't know/ ■ Not applicable

CEO
78 | 20 | 1

Other C-level executives
56 | 39 | 3 | 2

Vice presidents and directors
57 | 32 | 5 | 5

Heads of business units
55 | 39 | 5 | 2

Functional specialists (marketing, HR, etc)
57 | 35 | 8 | 1

Front-line managers
55 | 40 | 2 | 3

In your opinion, what are the biggest challenges for CIOs trying to align technology use with business goals?
Please select up to three.
(% respondents)

Inadequate technical skill sets
38

Inability to predict costs of and returns on technology investments
37

Rapidly changing business models
36

Lack of senior management vision
33

Rapidly changing technologies
28

Silos within the organisation
24

Lack of financial commitment to support innovation
23

Inadequate management skills
21

Other
1

Don't know/not applicable
3

How has the role of the CIO as a strategic leader changed over...
Please select all that apply.
(% respondents)

... three years ago ■
and now ■

Participates in virtually every business decision because technology is essential throughout the enterprise
43
37

Is expected to identify gaps in the organisation's use of technology and to develop new strategies
40
42

Serves as the organisation's most senior technology strategist
37
40

Is responsible only for delivering IT services
33
26

Is expected to intelligently discuss the company's strategic direction
29
31

Is well positioned to promote game-changing innovations
26
49

What are the most effective approaches for CIOs to articulate the business benefits of new technology?
Please select up to three.
(% respondents)

Explaining how new technology can solve customer or partner problems
60

Presenting business cases based on cost-benefit analysis
37

Selling new ideas one-on-one to key senior executives
36

Presenting case studies of successful technological transformation in other or competing organisations
31

Educating the executive committee about technology issues
31

Showing how technology improves stakeholder value
25

Demonstrating the negative consequences of failure to innovate
12

Tracking and presenting information about technology trends
12

Other
0

Don't know/not applicable
2

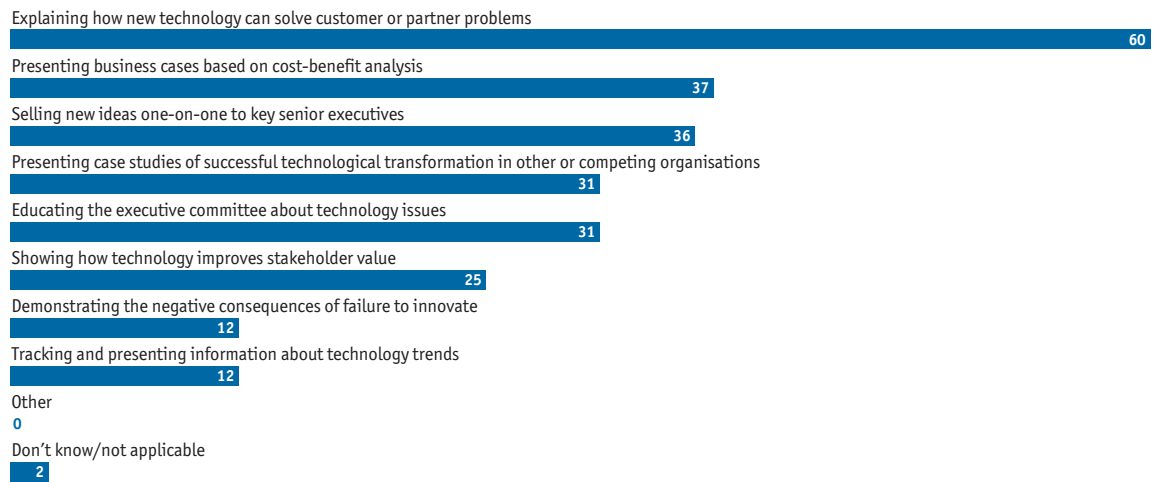**What are the most important lessons you have learned from your experience promoting the adoption of new technologies to improve business performance?**
Please select up to three.
(% respondents)

It is critical that the CIO understands the business's goals to effectively recommend new initiatives that operational managers understand
54

CIOs must take the initiative to ensure that new technologies that could improve business performance are integrated across the enterprise
40

Educating other senior executives about the benefits of emerging technologies is a pre-requisite for successful innovation
39

CIOs must know how to present complex topics simply and as seen through a non-technical lens
38

The CIO must continually promote the adoption of technology at every level of the organisation
28

The CIO must understand the corporate culture to minimise resistance to innovation
21

The CIO must understand their company's place in the larger market to effectively introduce new technologies
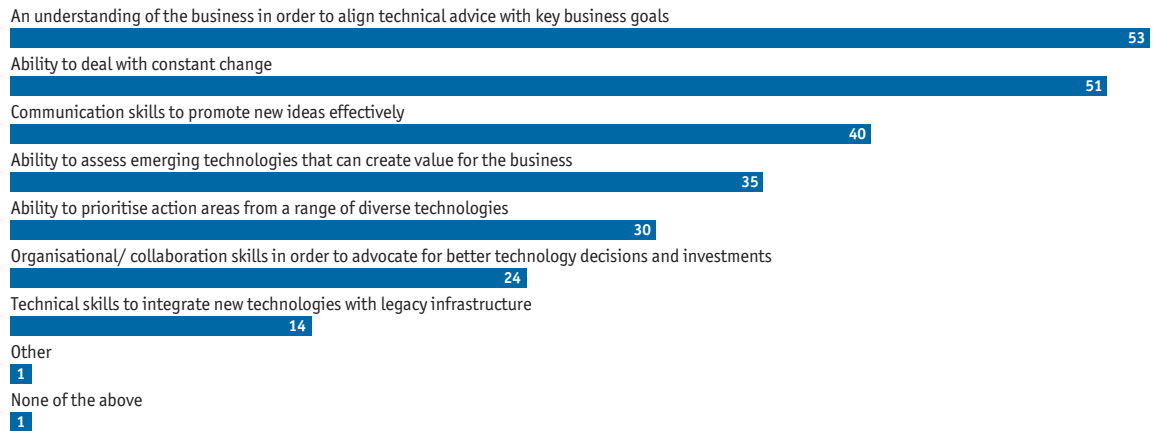21

Other
0

None of the above
2

Which skills or competencies are most needed for CIOs to achieve high levels of performance in today's business environment?
Please select up to three.
(% respondents)

An understanding of the business in order to align technical advice with key business goals
53

Ability to deal with constant change
51

Communication skills to promote new ideas effectively
40

Ability to assess emerging technologies that can create value for the business
35

Ability to prioritise action areas from a range of diverse technologies
30

Organisational/ collaboration skills in order to advocate for better technology decisions and investments
24

Technical skills to integrate new technologies with legacy infrastructure
14

Other
1

None of the above
1

Which of the following best describes your job title?
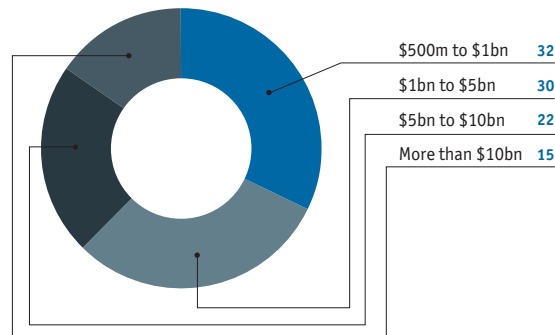(% respondents)

CIO
100

Which is your main functional role?
(% respondents)

IT
100

What are your organisation's global annual revenues in US dollars?
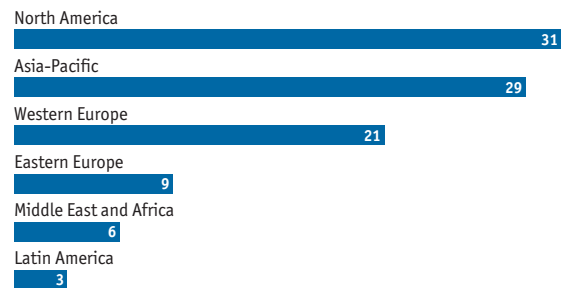(% respondents)

$500m to $1bn **32**
$1bn to $5bn **30**
$5bn to $10bn **22**
More than $10bn **15**

In which country are you personally located?
(% respondents)

United States of America
30

Singapore
12

India, Norway, Czech Republic, Malaysia, United Kingdom
(% per each country)
4

South Africa, Germany, Slovenia, Switzerland, Thailand
(% per each country)
3

Brazil, Ukraine, United Arab Emirates (% per each country)
2

Australia, Denmark, Mexico, Netherlands, Philippines, Sweden, Vietnam, Bahrain, Canada, China, Greece, Hong Kong, Hungary, Iceland, New Zealand, Nigeria, Poland, Portugal, Romania, Spain, Taiwan
(% per each country)
1

In which region are you personally located?
(% respondents)

North America
31

Asia-Pacific
29

Western Europe
21

Eastern Europe
9

Middle East and Africa
6

Latin America
3

What is your primary industry?
(% respondents)

Financial services
15

IT and technology
12

Manufacturing
10

Energy and natural resources
9

Professional services
7

Consumer goods
6

Healthcare, pharmaceuticals and biotechnology
5

Telecoms
5

Automotive
4

Logistics and distribution
4

Transportation, travel and tourism
4

Construction and real estate
4

Retailing
4

Chemicals
3

Entertainment, media and publishing
3

Aerospace and defence
2

Education
1

Government/Public sector
1

Agriculture and agribusiness
1

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