IBM Institute for Business Value

Continuing the IT infrastructure conversation

Why building a strong foundation requires more than technology

Technology strategy

Infrastructure matters for optimizing business outcomes. Cloud, big data and analytics, mobile, social and security are changing the world. New trends and technologies are putting significant demands on the underlying IT infrastructure. This is causing IT leaders to revisit their IT choices and rethink how they manage infrastructure. Organizations need an open, agile and security-rich infrastructure that can deliver speed and scalability. They also need "anytime, anywhere" access to data and the ability to seamlessly allocate resources to accelerate innovation.

By Nate Dyer, Pamela Hurwitch, Eric Lesser and Jacqueline Woods

Amid a backdrop of rapid technological advances, the IT infrastructure conversation has matured, broadening from the solitary topic of technology to include the future of the business itself. As part of this, IT organizations must evolve and serve both as valued service providers and trusted advisors. Here in our second IT infrastructure report, we address their progress in this area, as well as the importance of collaboration among the IT function and other parts of an organization. Specifically, we examine how these groups can work together to capitalize on IT trends for competitive advantage and deliver the capabilities for business success today and well into the future.

22% of organizations have a **well-defined enterprise IT infrastructure strategy** and roadmap.

30% of organizations are successful at **collaborating with the business to provide IT infrastructure solutions** to support their business needs.

13% of IT executives say they are **successful at developing and maintaining the skills and capabilities** needed to meet changing IT infrastructure needs.

Today, the ongoing IT infrastructure dialogue between business and IT executives is about more than technology—it's about the future of the business. The modern IT infrastructure conversation is about identifying evolving technology developments and how to best harness IT trends for competitive advantage. It is about defining a business/IT relationship that is based on mutual gain, rather than control. And it is about delivering needed capabilities for the present, as well as preparing for future opportunities.

In our first research paper on the topic of IT infrastructure, "The IT infrastructure conversation," we reported that infrastructure continues to play an important role in an organization's ability to compete in the marketplace.[1] The significance of this role will only grow with continued advances in big data and analytics, cloud, social and mobile technologies. As part of the study, we identified a small number of leading IT organizations, which we dubbed "Strategic IT Connectors," that are working more closely with the business to understand their infrastructure needs and are more likely to realize better business outcomes.

We also see that a majority of senior IT executives surveyed believe they are challenged in their ability to support a strategic IT infrastructure agenda. Only a small number believe they have a well-defined enterprise IT infrastructure strategy and roadmap. Most don't see themselves as effective in collecting, analyzing and documenting their performance measures. Further, the lack of information on metrics also makes it difficult to translate and communicate IT's value to the organization.

A majority of IT executives also don't believe they are successful at capturing repeatable best practices for application and infrastructure patterns to drive optimal performance and service quality to support their business needs. And most aren't effective at enabling cross-functional teams of infrastructure domain experts from different infrastructure disciplines (such as hardware, software and networking) or sharing IT resources across multiple lines of business. In short, IT executives recognize that in an environment where IT infrastructure is becoming more critical, their ability to manage the business of IT infrastructure remains a work in progress.

Our research also revealed the need for a new level of interaction between IT and business leaders, who increasingly have a stake in the success of IT infrastructure. Never before has this conversation been as important as it is today. On one hand, as companies increasingly look to use their IT infrastructure as a competitive differentiator, technology executives need to understand how emerging analytics, social, mobile and cloud-based capabilities will affect their technology decisions and investment plans. On the other hand, line-of-business leaders are looking to make sense of the plethora of choices regarding the use of internal and external platforms to enable their most valuable applications.

From the vantage point of technology executives, the dialogue is still in its early stages. Only a small percentage of respondents see their IT organizations as effectively collaborating with the business around the development of IT infrastructure solutions. And relatively few IT executives believe that their business peers are looking to the IT function to provide guidance regarding technology solutions, such as the use of software-as-a-service and other cloud computing opportunities. This lack of connection between the business and the IT organization not only limits the opportunities for better coordination, it poses real risks associated with data governance, systems integration, security, resource allocation, business continuity and, ultimately, return on investment.

Skill development is another area in which IT organizations find themselves challenged. Despite the need for greater knowledge of the business and an ability to develop flexibility among the various IT infrastructure disciplines, a large majority of companies find themselves ill-prepared to develop the skills and capabilities needed to support today's infrastructure needs.

In an era where IT infrastructure plays an increasingly important role, we believe that organizations looking to increase the value they provide to the business should focus on three areas. First, we suggest repositioning the role of IT as both a trusted advisor and a valued service provider — one that not only delivers valued services, but leverages its expertise to help business leaders make more informed technology decisions that help achieve business goals. Second, IT organizations need to collaborate across the ecosystem — not only connecting the dots within the organization, but extending its reach to understand the emerging trends of strategic partners and vendors. Last, they should rise to the challenge of developing the next generation of IT professionals, establishing a new paradigm that includes skills beyond traditional technology competencies and addresses these changing demographics and new business requirements.

Methodology

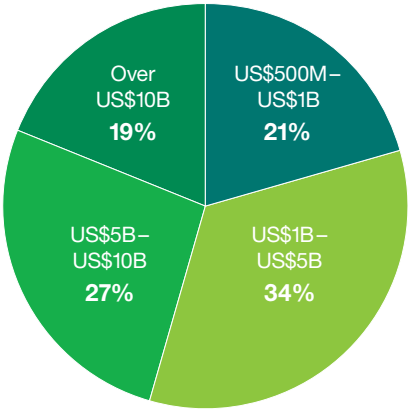
The data collected for this study is based on a survey of 750 senior IT executives hosted in conjunction with our research partner, Oxford Economics. Participants identified themselves as being involved in decisions regarding their organizations' IT infrastructure strategy and practices. Representing a wide variety of industries and company sizes, respondents were located in 18 countries, with 66 percent from mature markets and 34 percent from growth markets (see Figure 1).

As part of our analysis, we evaluated the extent to which companies identified themselves as applying certain leading practices, including:

- Establishing a well-defined enterprise IT infrastructure strategy and roadmap
- Collaborating effectively with the business to provide IT infrastructure solutions to support business needs (such as improving one-to-one customer engagement)
- Using the IT function as a broker of technology services for the organization (for example, providing expertise to the business in selecting software-as-a-service and other cloud computing opportunities)
- Supporting cross-functional teams of infrastructure domain experts to identify, source and implement IT infrastructure solutions
- Collecting, analyzing and documenting performance measures.

On a scale of 1 to 5, companies that selected a 4 or 5 in three or more of these practices were identified as "Strategic IT Connector" organizations. Those that did not select a 4 or 5 on any of these practices were identified as "Siloed IT Operator" organizations. In our sample, 17 percent of companies fell into the Strategic IT Connector category, while 20 percent were identified as Siloed IT Operator companies.

Survey respondents by global revenue



Survey respondents by industry (>50)*

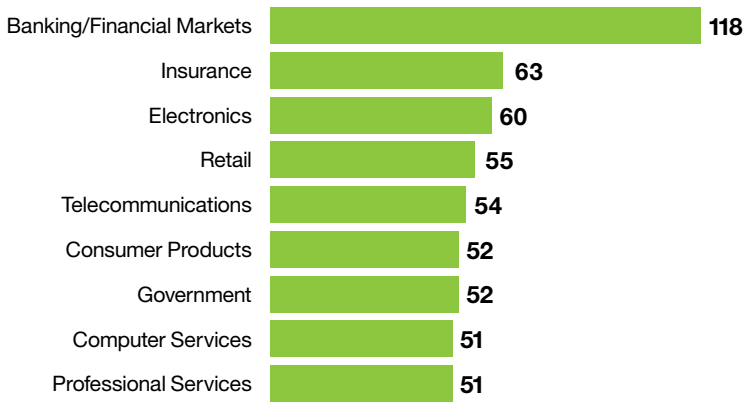


Figure 1: Industries and company sizes of study participants.

Source: IBM Institute for Business Value, IT Infrastructure Study. QS2. What is your organization's primary industry? (n=750); QS5. What was your organization's approximate global revenue last year in U.S. dollars? For public sector, what was your organization's approximate annual budget for the last fiscal year? (n=750). *Note: Other Respondents: 194 (Aerospace and Defense, Automotive, Chemicals and Petroleum, Education, Healthcare (Provider), Industrial Products, Life Sciences and Pharmaceuticals, Media and Entertainment, Travel and Transportation, Utilities). Totals do not add to 100 percent due to rounding.

Overall, Strategic IT Connector companies were significantly more likely to identify themselves as outperforming their industry peers in terms of revenue growth (30 percent versus 10 percent of Siloed IT Operators) and profitability (45 percent versus 25 percent of Siloed IT Operators). They also were more likely to have a higher than average industry net profit margin compared to their industry peers (62 versus 26 percent of Siloed IT Operators).

Toward a higher goal

The IT function continues to aspire to play a greater role in driving enterprise strategy. Over time, our face-to-face interviews with CIOs, conducted as part of our global C-suite series, reveal a distinct trend toward focusing on IT as a critical enabler of the business vision versus a provider of basic IT services and operations (see Figure 2).[2] Clearly, in the next three to five years, CIOs believe IT will be at the heart of competitive differentiation.

Our recent IT infrastructure study reinforces this fact; more than 70 percent of companies recognize that IT infrastructure plays an important role in enabling competitive advantage or optimizing revenue and profit. Further, Strategic IT Connectors are significantly more likely to make this connection (81 percent) than their Siloed IT Operator peers (see Figure 3).

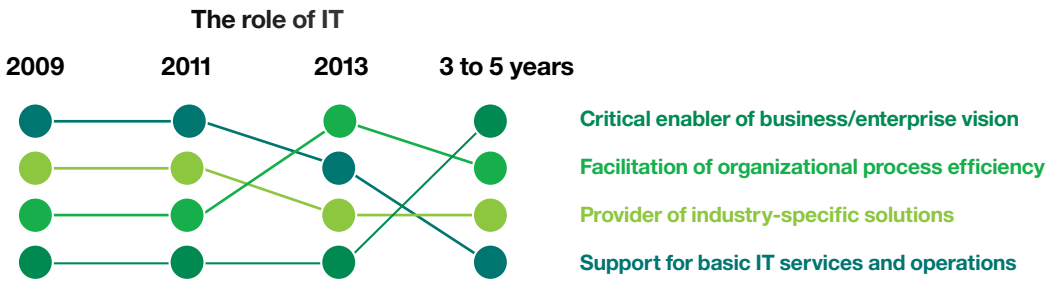


Figure 2: CIOs are focused on repositioning IT at a more strategic level within the enterprise.

Source: "Moving from the back office to the front lines, CIO Insights from the Global C-Suite Study." IBM Institute for Business Value. November 2013.

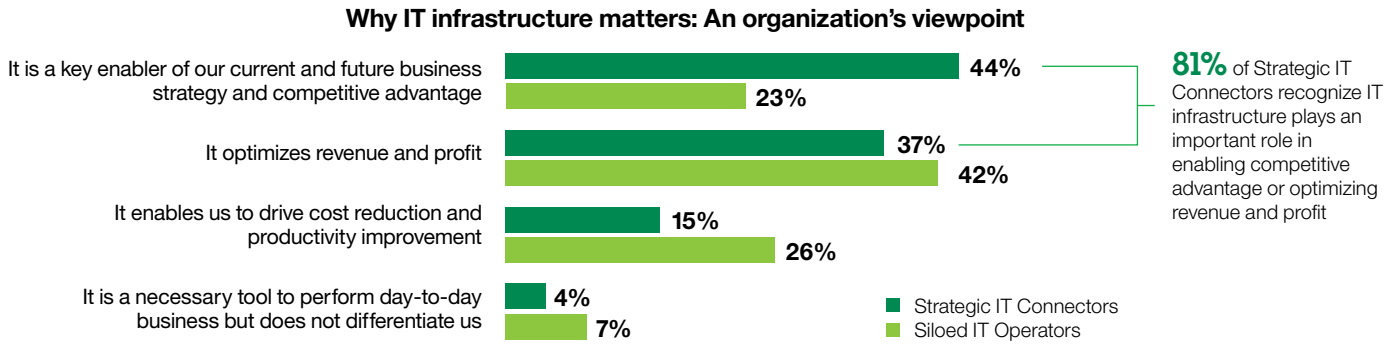


Figure 3: Twice as many Strategic IT Connectors view IT infrastructure as a key enabler of strategy compared to Siloed IT Operators.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q22. Please select the statement that best describes how your organization views IT infrastructure. Select one. (Strategic IT Connectors n=124, Siloed IT Operators n=148, 2% said they "Don't Know").

However, despite all the trends that indicate the IT function and the infrastructure it supports are becoming more important to business success, many of the underlying elements needed for perception to become reality are clearly missing. For instance, only 22 percent of organizations have a well-defined enterprise IT infrastructure strategy and roadmap (see Figure 4). Without a clear direction, IT organizations will likely find it difficult to prioritize investments, allocate resources and even identify areas where IT infrastructure can help differentiate the organization. Coupled with this lack of infrastructure strategy, only 41 percent of organizations are successful at capturing repeatable best practices for application and infrastructure patterns to drive optimal performance and service quality. Without this capability, it is unlikely that IT organizations can replicate what's working within their IT infrastructure or simplify routine management tasks, which makes them more likely to repeat prior mistakes and waste resources.

Finally, most senior IT executives in our sample are hampered in their ability to measure outcomes, with only 23 percent reporting success in collecting, analyzing and documenting performance measures. Without a strong measurement approach that links IT infrastructure effectiveness with business requirements, it is increasingly difficult to determine the root cause of problems and prevent issues from escalating. It's also difficult to spot trends, and missed trends can translate into missed opportunities to drive the business.

Making the most of limited resources is another area in which IT leaders struggle. When asked about the three most significant challenges in organizing their IT function, 43 percent cited infrastructure resource capability planning, while 40 percent identified workforce planning and scheduling. Clearly, the lack of strategy and performance measures has an impact in this area; without a clear direction and performance feedback, it is difficult to know where and how to allocate scarce capital and labor resources.

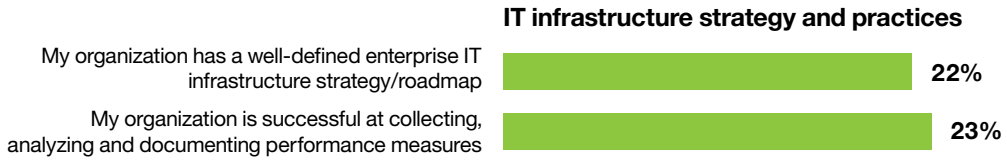


Figure 4: Less than a quarter of organizations have a clear enterprise IT infrastructure strategy, and few are successful at performance measures.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q8. To what extent do you agree or disagree with the following statement about your organization's IT infrastructure strategy and practices? (percent indicating agree or highly agree, well-defined infrastructure strategy n=750); Q9. To what extent has your organization been successful with the following activities related to its IT function? (percent indicating successful or highly successful, performance measures n=747).

Further, many IT departments do not have the flexibility to move resources to where they are needed: Only 39 percent believe they are effective in supporting cross-functional teams of infrastructure experts to identify, source and implement IT infrastructure solutions, and only 35 percent indicate they are effective in sharing IT resources across multiple lines of business.

In short, setting strategic direction, learning what works and what doesn't, sharing scarce resources and measuring results are all important management practices that remain elusive for the majority of IT organizations.

Under ongoing construction: The business/IT relationship

Much has been written over the years about the relationship between IT and the business—the value of a strategic partnership, the importance of involving end users in the design process and the need to manage delivery expectations are all topics that have graced the pages of business and IT publications. Today, the relationship continues to evolve in a paradoxical manner. As business leaders become less dependent on IT departments to address their critical business application needs, they simultaneously are in greater need of understanding the ramifications of their technology decisions.

Evidence of this developing relationship surfaced in our study. In fact, IT executives recognize a host of business support challenges associated with running IT infrastructure (see Figure 5). The first two are clearly related to the pace of change: Almost half in our survey cite keeping up with the increasing pace of business requirements as a significant issue, while 42 percent wrestle with the need to better manage upgrade cycles. Given the lack of strategy and resource challenges previously cited, it is not surprising that IT executives feel that the demand for output places them on a perpetual treadmill where the speed is continually being increased due to business expectations of "I need it now."

At the same time, business owners and functional leaders are now being offered alternatives to the traditional use of IT platforms. The advent of cloud computing has made it easier for these executives to go outside the traditional data center to obtain needed computer services from external providers. Forty percent of study participants believe that non-IT functions will be involved in cloud computing decisions in the next three years.

In addition to their recognition of the power of mobile devices and social platforms, IT leaders understand that business users will want to be actively involved in areas that were under the

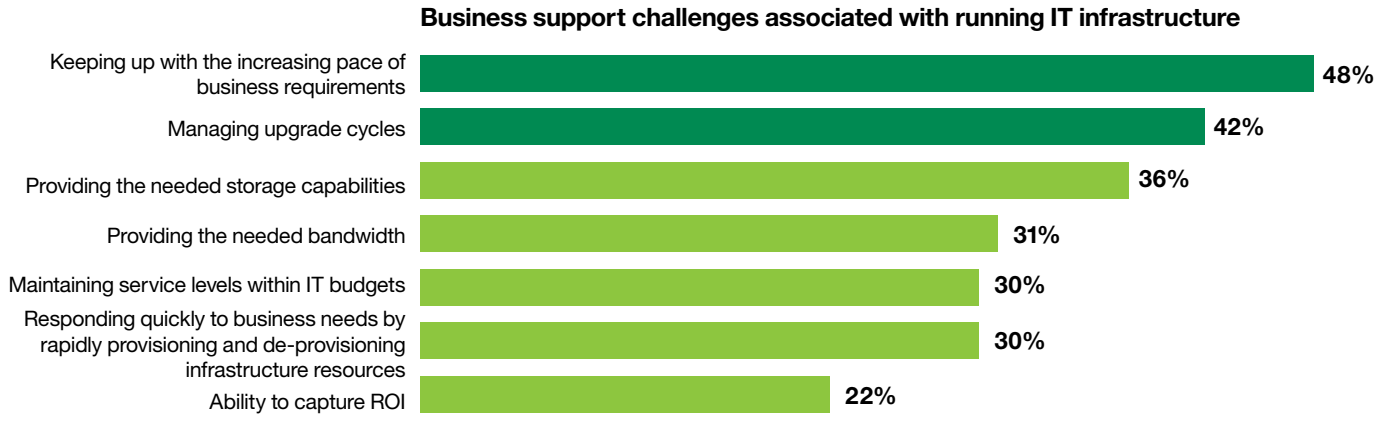


Figure 5: Managing business requirements is the top business support challenge associated with running IT infrastructure..

Source: IBM Institute for Business Value, IT Infrastructure Study. Q16. What are the three most significant business support challenges associated with running your IT infrastructure? Select up to 3. (n=750).

traditional purview of the IT function alone (see Figure 6). This includes areas such as end-user devices (43 percent), security (41 percent) and even IT architecture (39 percent). The plethora of choices available in the market can easily overwhelm even the most tech-savvy executive. Many business users fail to understand the full spectrum of issues related to data integration, security and compliance, and disaster recovery that come with use of software-as-a-service and mobile platforms.

Despite the need for business and IT executives to work more closely than ever before, it is clear that gaps remain. Only 30 percent of the IT executives in our sample believe they are successful at collaborating with the business to provide IT infrastructure solutions that support their business needs. Only slightly more (34 percent) believe that their organizations look to the IT function to provide expertise in selecting software-as-a-service and other cloud computing opportunities. While these numbers might not surprise individuals who have worked in this area for years, today's continually evolving IT environment makes it necessary for companies to build stronger bridges across this divide to achieve competitive advantage and effectively drive business strategy.

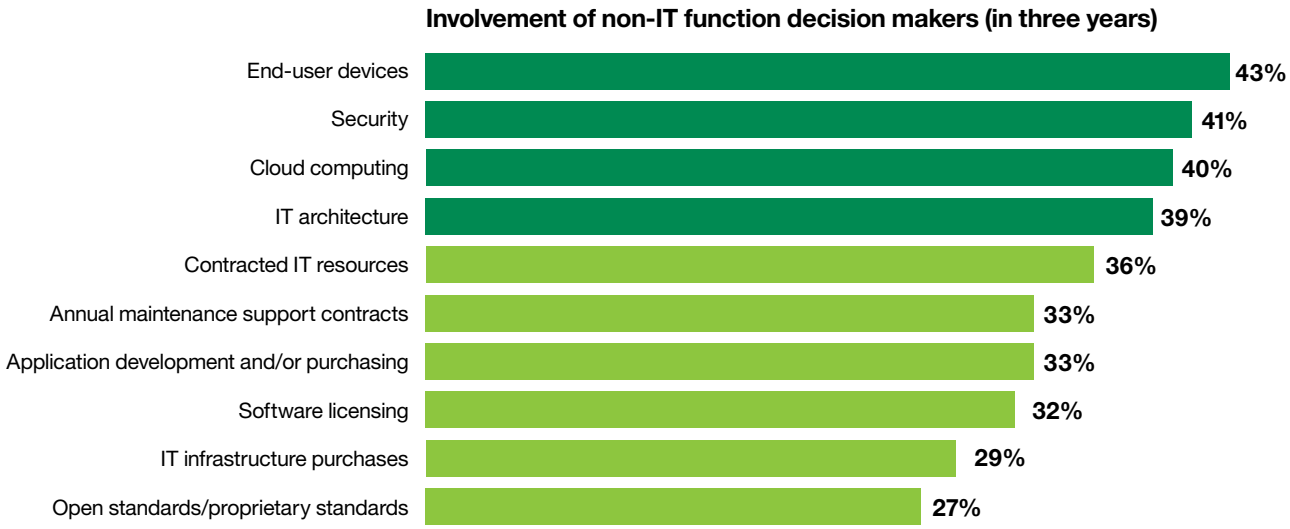


Figure 6: Many IT executives recognize that non-IT functions will play a bigger role in the IT infrastructure decision-making process.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q14. To what extent will non-IT functions be involved in the decision-making process for the following initiatives in three years? (percent indicating involved or highly involved) (n range=681-749).

Collaboration between IT and business drives vertical integration, client success[3]

London Stock Exchange Group (LSEG), a diversified international exchange group operating a broad range of international equity, bond and derivatives markets, recognizes the importance of tight collaboration and integration between the business and IT. With over 3,000 companies from 70 countries trading on its markets, LSEG is successful at integrating across verticals (e.g., exchange, post-trade business, data centers) to meet business requirements and performance and reliability demands of its 500 plus member firms. The exchange created the Advance Platforms Engineering team, which reports through the Chief Operating Officer and is responsible for the exchange platform and advance research for clearing and settlement. The team evaluates new technologies to ensure successful integration into operational platforms.

"In the past, there wasn't one team dedicated to integration across all verticals and advanced platforms. We are now responsible not only for delivery of a product, but also all the integration points with which the product comes into contact. Whereas in the past, separate LSEG companies should have worked even more closely together, today integration is always at the forefront of our thinking," explained Moiz Kohari, VP of Advance Platforms Engineering.

While LSEG runs multiple exchanges across the world, it is successful at integrating big data from each of its vertical businesses into all its business processes to enable better visibility and insight. In the past, the use of big data was siloed and only leveraged by certain components or organizations within the individual entity. This focus on infrastructure integration was driven in part by organizational performance measures tied to client experience.

"We want to remove some of the complexities for the client. This has to be done in a collaborative environment, not just within LSEG, but across other financial services firms. Since we operate in a global environment, cross-team integration and pollination of ideas can be time consuming. We take advantage of multiple collaboration software components within the organization, such as collaboration labs that can be accessed anywhere in the world," said Kohari.

The collaboration between the IT and business sides of the organization has been integral to the team's success. LSEG conducts ongoing staff training to ensure that the infrastructure team understands broader business challenges to complement their technical skills. And with continued growth and advancements in new technology, the organization recognizes the importance of maintaining the right balance to provide the performance, reliability and stability that clients demand.

Skills at the heart of the IT infrastructure

In an environment where technology continues to rapidly change, IT executives stressed the importance of cross-domain knowledge to support their IT infrastructure (see Figure 7). Understanding the interrelationship between server, storage and networking was seen as the most important area necessary to build and maintain a successful infrastructure.

However, there was a sharp division between Strategic IT Connector and Siloed IT Operator organizations. Strategic IT Connectors, which have been more active in developing strategies to address changing technological trends, identified themselves as significantly more prepared to address infrastructure requirements than did their Siloed IT Operator peers.

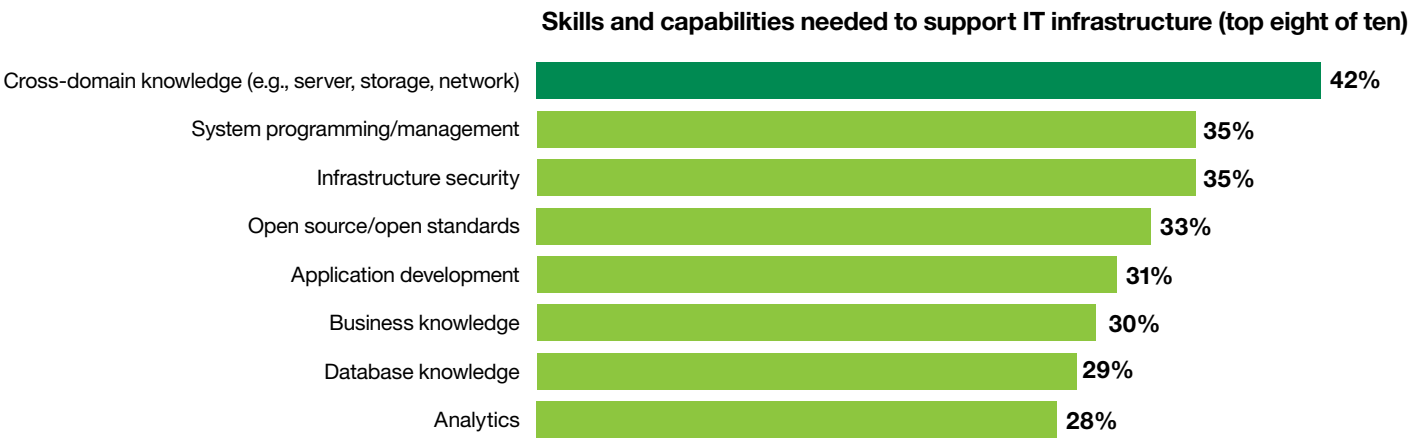


Figure 7: IT executives recognize the need for cross-domain knowledge to support their IT infrastructure.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q10. What are the three most important skills or capabilities necessary to support your IT infrastructure? Select up to 3. (n=750).

While cross-domain knowledge remains important for both groups (ranked number one for Siloed IT Operators and number two for Strategic IT Connectors), Strategic IT Connectors identified business knowledge as the most important skill needed to support their IT infrastructure (see Figure 8). Strategic IT Connectors ranked the need to understand analytics third.

In contrast, Siloed IT operators ranked analytics and business knowledge at the bottom of their important skills list. This highlights one of the great differentiators between the two groups: a recognition that a deep understanding of business issues is central to the development of both an overall IT infrastructure strategy and a strong collaborative relationship between IT and the business. After all, collaboration and cross-functional teaming are defining hallmarks of Strategic IT Connectors, enabling these organizations to be trusted advisors to the business.

Due to continued advances in technology, an IT organization's ability to match the right skills with new technologies is crucial. Unfortunately, the vast majority of IT executives do not believe they are prepared to address the changing learning requirements associated with today's technology shifts. Only 13 percent indicated they are successful at developing and maintaining the skills and capabilities needed to meet changing IT infrastructure needs. Given rapidly changing technologies, the need to better understand business requirements, and (in many industries) the aging population of individuals who have primary responsibility for IT infrastructure, this inability to stay on top of leading developments represents a real risk for many organizations looking to use their IT infrastructure as a competitive weapon.

Skills and capabilities needed to support IT infrastructure (top eight of ten)

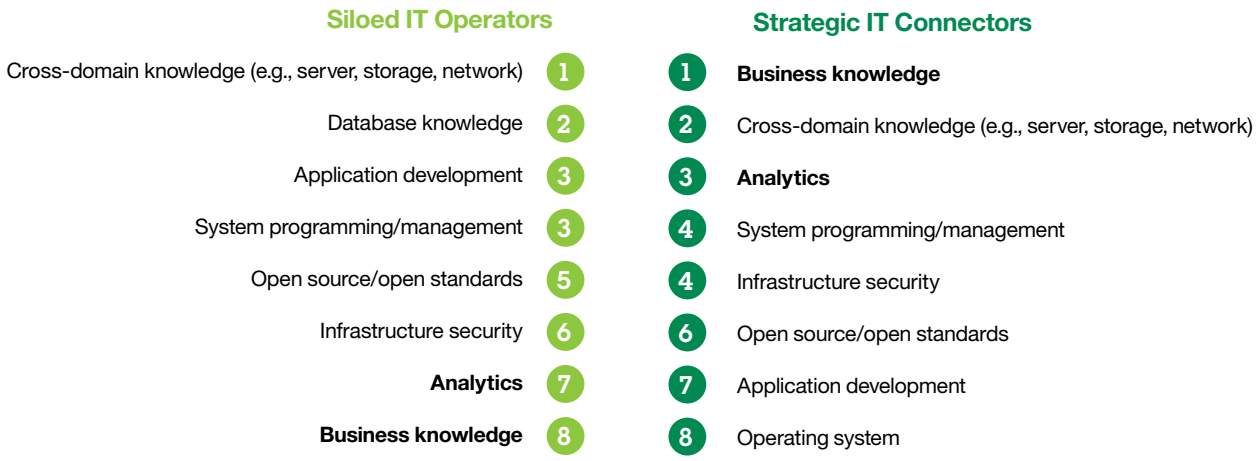


Figure 8: IT executives from Strategic IT Connector organizations place greater importance on business knowledge and analytics skills.

Source: IBM Institute for Business Value, IT Infrastructure Study. Q10. What are the 3 most important skills or capabilities necessary to support your IT infrastructure? Select up to 3. (Strategic IT Connectors n=124, Siloed IT Operators n=148).

RACV relies on business, technical skills for a seamless client experience[4]

The Royal Automobile Club of Victoria (RACV), a motoring club and mutual organization that provides services such as roadside assistance, insurance, loans, tourism services and home security products, recognizes the importance of both having the right technology skills and incorporating business knowledge into IT. Given the organization is involved in multiple lines of business, it is important that RACV respond to members in a way that reflects a single organization. Through the creation of the Strategy and Architecture Group under the CIO, the role of IT is gradually evolving to include the role of advisor to the business.

The group assists with framing business and technical requirements, understanding the feasibility of projects, running quality assurance over solutions proposed by vendors, and helping with technical solutions during implementation. RACV is also expanding its repository of enterprise services to increase its agility to operate in a multi-vendor environment.

According to Daniel Neal, CIO, "Since we outsourced most of our mid-range corporate applications, our IT staff spends time on vendor management and oversight. We have enough technical skill to understand what the vendor is doing on our behalf and provide quality assurance. At the same time, we recognize the value of broader cross-domain knowledge—someone who can look across networks and mid-range architecture solutions to provide business solutions."

The business of IT infrastructure: Looking inside and outside

As the conversation regarding IT infrastructure continues to change, it will produce new demands on the IT organization. The migration from maintaining a technology platform to building a strategic relationship with business executives for some companies will require a change in skills and corporate culture, as well as new tools and processes. For IT organizations looking to make this leap, we identify three potential areas of focus:

1. Reposition the role of IT as both a trusted advisor and valued service provider.

To collaborate more effectively with the business, the IT organization needs to consider both its ability to deliver existing services more efficiently, as well as provide new sources of value and insight. One way to start is by asking a basic question, "How easy it is it to do business with the IT organization?" If users find it difficult to gain basic information about how to obtain, contract, use and monitor IT services, they might be more likely to consider external alternatives for their application hosting and maintenance needs. Developing a clearly articulated services catalogue (including self-service options) can make it easier for business executives to understand their IT infrastructure options, tradeoffs and costs.

IT leaders should also be investing in analytic capabilities to improve delivery ability, including anticipating and correcting delivery problems, optimizing workloads and improving help desk responsiveness. Once these capabilities are in place, the IT organization will be in a better position to provide guidance on helping the business make "smarter" technology decisions (e.g., software selection, technical requirements, use of cloud-based services).

2. Collaborate across the ecosystem.

To be successful, IT executives need to collaborate across three main groups. First, given the challenges our study has identified relating to collaboration between IT and business executives, this must be a key priority. Developing a more formal collaboration approach that brings both sides together to discuss ongoing challenges and opportunities could help foster the common context needed to make more effective IT infrastructure decisions.

Second, IT executives should foster collaboration among individuals within the IT organization itself. Breaking down traditional silos among compute, networking, storage and various operating platforms is a key step to creating a more efficient and coherent service delivery mechanism to face the business.

Third, IT executives need to be comfortable in going beyond organizational boundaries to work with suppliers and vendors of existing and emerging technologies to better understand the landscape. Not only does this include traditional hardware and software providers, but also companies that are offering external cloud-based capabilities.

3. Reexamine IT's human capital supply chain.

A host of factors are forcing IT organizations to take a closer look at the talent behind the infrastructure. The potential loss of individuals with significant experience in mainframe technologies, coupled with the need for skills in areas such as mobile development, can place IT departments in a precarious position, especially when department budgets are tight.

To address this, organizations should start with an IT human capital strategy that identifies current and future capability gaps and develops buy/build/partner strategies to address areas of concern. By taking an analytic approach to this strategy, organizations can help reduce the guesswork associated with workforce planning and identify potential issues before they become operational problems.

As part of this strategy, companies should consider the need to include business knowledge in hiring and development plans of IT professionals and create job roles that work with business leaders to identify the implications for existing and future IT infrastructure. As we saw from our research, business knowledge is a key ingredient for many of the Strategic IT Connectors in our sample.

Finally, our study points to the value of cross-domain knowledge related to IT infrastructure. Creating rotational opportunities within the IT infrastructure domain (e.g., networking, storage, planning) to expose IT professionals to different technologies can enable them to see the larger picture and improve collaboration across specific disciplines.

Key questions to consider

For companies contemplating how to more effectively manage "the business" of IT infrastructure, the following questions can serve as an important guide:

- What actions can the IT organization take to develop a more collaborative and strategic relationship with the business?
- To what extent do business leaders have the information needed to make more informed decisions about the impact of IT infrastructure on their application choices?
- To what extent are analytics used to improve IT organizational effectiveness?
- To what extent does the IT organization have a human capital strategy in place that matches the anticipated business needs over the next three years?
- How are IT infrastructure decisions considered during the development of an organization's innovation pipeline?

Conclusion

From our research, one point stands clear: Developing a successful IT infrastructure requires more than leading technology. It requires an IT organization that is efficient in its service delivery, uses analytics to focus on continuous improvement, captures good practices and fosters connections between experts in multiple disciplines. It also requires a collaborative effort between IT and business leaders to prioritize emerging opportunities, address resource constraints and identify alternatives. IT organizations need to look both inward and outward to mesh existing IT infrastructure with external alternatives and enable the business to make effective decisions about current and future technology plans.

There is plenty of opportunity for a new IT conversation to evolve. However, it will require organizations to consider not only future technologies, but also the current corporate culture and management systems that influence organizational decisions.

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