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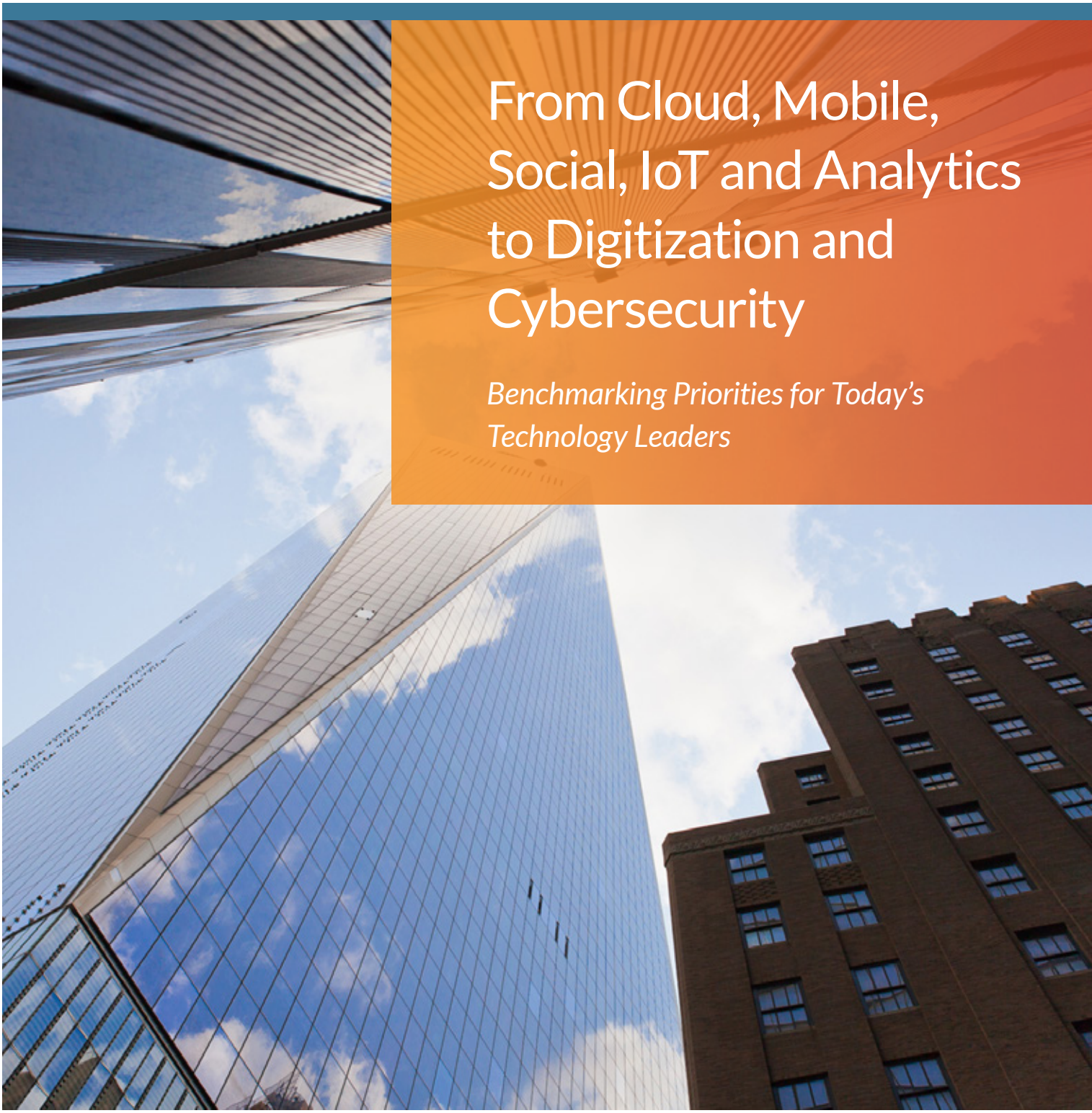

From Cloud, Mobile, Social, IoT and Analytics to Digitization and Cybersecurity

Benchmarking Priorities for Today's Technology Leaders

Internal Audit, Risk, Business & Technology Consulting

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Executive Summary

A decade ago, a leading analyst firm chided chief information officers for spending 80 percent of their budgets on running and maintaining the business, noting that such an allocation was "dead money." More needed to be invested in growing the business.[1] Since then, IT functions have made stunning progress, bringing lights-on investments down to 55 percent of their current budgets, according to Protiviti's annual survey of technology leaders. Yet organizations still may not be investing enough in innovation at the expense of compliance, security and maintenance. At the same time, considering the greater impact of technology disruptors in the form of digitization to harvest new sources of value through business model innovation and improve collaboration between IT and the core business, more progress is needed to mature the performance of security and privacy capabilities across the enterprise.

The results of our survey (see Methodology section on page 4 for details) magnify the current state of operations, challenges and competing priorities in IT functions throughout all industries. When mismanaged or underfunded, some activities (IT security, for example) can potentially dim the lights on the entire organization. Technology leaders also want their investments to deliver the greatest impact, in terms of both enhancing and protecting enterprise value. In addition, they are trying to adopt agile processes in order to deliver solutions more effectively. Among the questions they continually consider: *Will this software as a service opportunity reduce operations and maintenance costs that can be reallocated into security and innovation investments that protect and transform the business? Will this digitization project improve measurably the delivery of our products and services to our customers?*

[1] "Gartner Says Eight of Ten Dollars Enterprises Spend on IT is 'Dead Money,'" October 9, 2006: www.gartner.com/newsroom/id/497088.

Our notable findings:

01 **Cloud computing adoption is accelerating rapidly –** Nearly two out of three companies are focusing on and investing in cloud adoption. Close to one in four applications, infrastructure and platforms are cloud-based today, and within three years this ratio is expected to increase to one in three.

02 **Digitization investments are on the rise –** Not surprisingly, a majority of companies are focusing on and investing in digitization, with higher numbers of financial services, healthcare, and consumer products and retail organizations pursuing digitization initiatives. Of note, cost represents a major barrier to digitization efforts.

03 **IT transformation projects abound, but there are hurdles –** A majority of organizations are undergoing a major IT transformation. However, there are significant roadblocks, both technological (legacy systems and processes) and cultural (change management problems and skills gaps) in nature.

04 **Data and analytics are advancing –** Many organizations are investing in data projects and their analytics capabilities and have made significant progress, though they face barriers that include cost, time-to-value, security, and finding qualified talent to reduce the risks associated with implementation.

05 **While technology budgets are increasing, investments in innovation may not be sufficient –** IT leaders continue to struggle to fund all of their ever-increasing activities sufficiently. Despite IT budgets that continue to increase, cost still figures as a widespread barrier for companies to execute cloud adoption and digitization in an agile manner. Overall, organizations allocate a majority of their technology budgets to IT operations and maintenance combined, with far fewer dollars devoted to business model innovation and leveraging technology disruptors to drive digitization.

06 **Cybersecurity issues remain top-of-mind for executives, though investments may not be measured properly in terms of performance** – IT security and incident response capabilities dominate the priority lists for CISOs and CIOs (see table on following page), but whether current IT budgets and investments are measured properly is another question.

Note: Throughout our report, we cite selected findings from different industries. More detailed data on these groups and other segments is available upon request.

• • • *Today's Top 10 IT Priorities (including ties)**

Rank	IT Area	Priority Index
1	Managing and administering backup and recovery	6.63
2	Virus/malware advanced threat detection/eradication	6.58
3	Incident response success (containment, recovery)	6.52
4	Incident response policy and preparedness	6.45
5	Implementing security/privacy solutions and strategies	6.44
6	Monitoring security events	6.43
7	Incident response reaction time	6.38
8	Managing project quality	6.33
9	Data breach and privacy laws (various U.S. states)	6.32
10 (tie)	Vulnerability scanning	6.29
	Cloud storage of data	6.29
	IT project management	6.29

* *Based on a 10-point scale. See Methodology section for details.*

Methodology

Close to 400 C-suite executives (n = 396), including business-minded technology leaders throughout the enterprise, participated in our study, which was conducted in Q2 and Q3 2016 (see Demographics section on page 34 for a detailed breakdown of the respondents). In a change from prior years of our annual technology survey, we limited our response group to leaders at the C-suite or director level in order to obtain their strategic insights on emerging IT trends and views on areas including IT investments and budget allocation. We are grateful for the time invested in our study by these executives and technology leaders.

Our participants answered a series of questions in the following categories:

Current Benchmarks and Emerging Trends

- IT Transformation
- Budgets and Organizational Structure
- Outsourcing and Offshoring
- Cloud Computing and Adoption
- Digitization
- Big Data
- Agile Processes

IT Priorities for the Coming Year*

- Managing Security and Privacy
- General IT Technical Standards and Knowledge
- Defining IT Governance and Strategy
- Management and Use of Data Assets
- Managing Application Development and ERP Systems
- Managing IT Infrastructure
- Ensuring Continuity

* For each of these categories, respondents were asked to rate, on a scale of 1 to 10, the level of priority for them and their organizations to improve in different issues and capabilities. A "10" rating indicates the issue is a high priority while a "1" indicates the issue is a low priority. We have classified each issue and capability with an index of 6.0 or higher as a **"Significant Priority"** for IT functions. Those with an index of 4.5 through 5.9 are classified as a **"Moderate Priority,"** and those with an index of 4.4 or lower are classified as a **"Low Priority."** (Of note, none of the more than 100 IT issues and capabilities addressed in our survey is rated as "Low Priority.")

Current Benchmarks and Emerging Trends

1. IT Transformation

More than half of all companies are currently pursuing some form of major IT transformation. The most common drivers of transformational initiatives include new functionality, cost optimization, operational improvement, adoption of emerging technology, and alignment between the IT organization and the business. Legacy infrastructure, change- and agility-challenged IT cultures, and IT skills gaps are common obstacles organizations encounter on their transformational journeys. Interestingly, the inherently disruptive nature of IT transformation does not figure as a major barrier.

KEY FACTS

Organizations undergoing a major IT transformation

Organizations that report a high level of disruption being experienced as a result of their IT transformation

- *Which of the following would you consider to be a driver of your organization's IT transformation efforts? (Multiple responses permitted.)*

New functionality	**53%**
Cost optimization	**43%**
Operational improvement	**41%**
Adoption of emerging technology	**40%**
Business/IT alignment	**38%**
Innovation enablement	**32%**
Time to market/IT agility	**32%**
Regulatory/compliance	**30%**
Business transformation	**30%**
Service assurance	**24%**
Merger & acquisition activity	**17%**
Outsourcing/third-party hosting	**15%**

- *Which of the following would you consider to be a barrier to your organization's IT transformation efforts? (Multiple responses permitted.)*

Legacy infrastructure	**43%**
IT culture not agile to change	**39%**
IT skills gap with desired state	**37%**
Legacy processes	**36%**
Cost/budget limitations	**36%**
IT collaboration with the business	**30%**
Vendor capabilities	**20%**

Insights

- Fifty-four percent of all companies are currently undergoing a major IT transformation. While that figure represents a slight decline from the past two years of our survey (when 60 and 63 percent of companies, respectively, reported that major IT transformations were underway), certain industries are more active. Specifically, 70 percent of financial services companies and 67 percent of consumer products and retail companies are conducting substantial IT transformation efforts.
- Overall, the quest for new functionality, cost-reduction benefits and operational improvements are the top overall drivers of IT transformation. However, the top drivers vary by industry. The adoption of emerging technology is the leading driver in the technology and manufacturing industries, while for financial services organizations it is operational improvement. For healthcare providers, innovation enablement is the top driver of IT transformation, along with new functionality.
- Legacy infrastructure and processes hinder IT transformation across all industries. Organizational culture and skills gaps within the IT function also represent formidable obstacles. Healthcare provider respondents identified IT's collaboration with the rest of the business as the most significant barrier to transformation, while consumer products and retail companies point to the IT function's inability to manage change in an agile manner.
- Despite these obstacles, the overall level of disruption caused by these change efforts (6.6 on a 10-point scale) appears manageable – as does the average duration of current IT transformation initiatives (approximately one year).

Our Perspective

- While there is a common set of barriers to IT transformation, it is important to understand and address the impact of these obstacles in the context of your industry's and organization's unique challenges.
- Additionally, so-called softer impediments to IT transformation, including change-management issues and skills gaps, often require as much attention as technical hurdles, thus should not be neglected.
- Organizations must consider the implications of the changing IT landscape carefully and how IT must be managed and governed. Managing infrastructure is changing as operations and services shift to the cloud. Vendor management is even more important, and service assurance in a hybrid environment requires new tools/skills. Technology-savvy users have access to many more – and more powerful – tools empowering "shadow IT" in new ways. Agile and DevOps are changing how companies think about testing, integration, deployment and release management. Microservices and open APIs are changing integration patterns and architecture strategies. Bottom line: The traditional IT skills and management paradigm and governance structures are no longer sufficient. IT must evolve across people, process and technology in order to enable IT and business transformation.

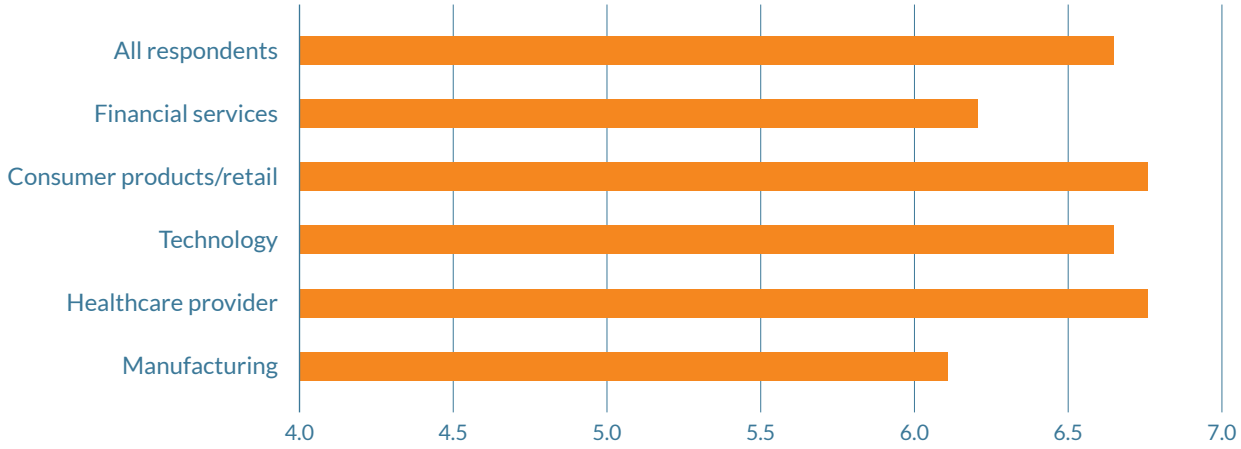
KEY FACTS

Financial services organizations undergoing a major IT transformation

Consumer products and retail organizations undergoing a major IT transformation

Average duration (in months) of IT transformation

*How disruptive are IT transformation efforts?**



* On a scale of 1 to 10, with "10" representing a high level of disruption.

2. The IT Budget Conundrum: How Much to Spend, and Where?

IT budgets are rising. In a strong majority of organizations, our respondents report that their company's IT budget increased this year compared to the previous year, with many reporting an increase of 10 percent or higher.

How these budgets break down among major IT categories remains consistent across industries, with some minor deviations. Investments in running IT operations and maintaining technology throughout the business consume the largest portions of IT budgets (more than half), followed by investments in improvements and innovation (e.g., transformation), security, and compliance, respectively.

While companies continue to make significant investments in offshore IT resources, these and other strategies to drive greater efficiencies may need to increase, thereby reducing the amount of IT spend allocated to keeping the lights on.

- *By approximately what percentage has your overall IT spend/budget changed this year compared to last year?*

Increased more than 30%	**8%**
Increased 20-30%	**8%**
Increased 10-20%	**24%**
Increased 1-10%	**31%**
No change	**18%**
Decreased 1-10%	**5%**
Decreased 10-20%	**2%**
Decreased 20-30%	**1%**
Decreased more than 30%	**1%**
Don't know	**2%**

KEY FACTS

Organizations in which the overall IT budget increased 10 percent or more compared to last year

Organizations that utilize offshore resources to support or augment the IT function

• • • *What estimated percentage of your current IT budget is allocated to each of the following areas?**

	All respondents	Financial services	Technology	Healthcare provider	Manufacturing	Consumer products/retail
IT operations (Run the business)	33%	28%	32%	34%	34%	32%
Maintenance (Maintain the business)	22%	21%	21%	24%	22%	21%
Security (Protect the business)	16%	23%	17%	13%	12%	16%
Discretionary enhancements (Improve the business)	14%	12%	13%	14%	13%	14%
Innovation (Transform the business)	13%	12%	12%	12%	15%	15%
Compliance	10%	12%	9%	13%	10%	8%

* Percentages reflect the average response for each area, thus the columns do not sum to 100%.

Insights

- This year, IT budgets increased by 10 percent or more at 40 percent of companies, and 16 percent of companies boosted IT spending by 20 percent or more. These figures are generally consistent across all industries.
- Overall, companies spend an average of 55 percent of IT budgets on technology operations and maintenance (i.e., running and maintaining the business), 27 percent on discretionary enhancement and innovation (i.e., improving and transforming the business), 16 percent on IT security, and 10 percent on compliance.*
- Financial services companies spend significantly more on security, allocating an average of 23 percent of their budgets to this area. Healthcare providers devote a higher portion of their IT budgets (58 percent) to IT operations and maintenance.
- Spending on innovation, which averages 13 percent of IT budgets across all industries, represents a comparatively small investment area. Among industry segments, healthcare providers allocate more IT spending to compliance (13 percent) than they do to innovation (12 percent), while consumer products and retail companies devote nearly twice as much IT spending to innovation (15 percent) as they do to compliance (8 percent).
- Thirty-nine percent of companies use offshore resources to support their IT function. Among these organizations, 55 percent have done so for three years or more. On average, these companies allocate an average of 20 percent of their IT budgets for offshoring.
- Overall, investments in offshore resources for development, hosting, services and platforms are broken down fairly evenly.

• • • *Average percentage of different IT functions that are outsourced to offshore resources*

	All respondents	Financial services	Technology	Healthcare provider	Manufacturing	Consumer products/retail
Development	29%	20%	35%	27%	41%	28%
Hosting	27%	26%	27%	30%	16%	34%
Services	26%	27%	29%	25%	40%	23%
Platforms	20%	22%	20%	23%	11%	20%

* Percentages reflect the average response for each area, thus the areas do not sum to 100%.

Our Perspective

- While it is clear that IT functions face major challenges in juggling a growing number of competing priorities, these results raise questions about whether current levels of investment in innovation and security are sufficient.
- The results suggest there may be opportunities to improve the efficiency of "lights-on" IT investments in running and maintaining the business.
- In our survey, security issues dominate the list of priorities for CIOs and IT leaders (see page 3) – it is fair to consider whether the level of investment in security and privacy is sufficient to address these priorities and concerns.
- It is a bit surprising to find relatively high percentages of hosting services that are outsourced to offshore resources. Many times, regulatory and privacy issues, along with data latency concerns, dissuade organizations from offshoring these services.
- Security is critical and organizations should not reduce their focus on it. However, as business models change, so must IT. With the increase in business transformation and digitization, CIOs must focus on how to deliver technology services in a way that enables change while also managing key security, compliance and cost areas.

3. Adopting and Using the Cloud

Nearly two out of three companies are focusing on and investing in cloud adoption. Additionally, the percentage of IT applications, infrastructure and platforms in the cloud is increasing at a rapid rate.

Although companies have made significant progress in their cloud adoption efforts, the results suggest that much more cloud adoption and integration will take place over the next three years. The widespread adoption of infrastructure as a service, software as a service and platform as a service will require significant planning and changes. Security and privacy risks figure as a pervasive hurdle for companies to clear if they are to harness the benefits of cloud computing.

• • • *Which of the following cloud computing services does your organization currently utilize?*

Software as a service (SaaS)	**70%**
Infrastructure as a service (IaaS)	**48%**
Platform as a service (PaaS)	**26%**

• • • *Percentage of applications, infrastructure and/or platforms in the cloud*

	Today	Three years from now (estimated)
1-5%	15%	8%
5-10%	15%	11%
10-20%	23%	18%
20-30%	19%	17%
30-40%	9%	12%
40-50%	8%	14%
More than 50%	10%	20%
Average	23%	31%

KEY FACTS

Organizations that are focusing on and investing in cloud adoption

Consumer products and retail companies and technology organizations, respectively, that are focusing on and investing in cloud adoption

Consumer products and retail organizations that utilize IaaS

Financial services organizations in which 20 percent or more of all applications, infrastructure and platforms are currently based in the cloud

Technology companies in which half of all applications, infrastructure and platforms are expected to be cloud-based in three years

Estimated revenue from worldwide public IT cloud services by 2018*

Estimated spending on cloud computing by 2019**

* Source: Microsoft Cloud Landscape Update, 2015

** Sources: Talkin' Cloud; IDC

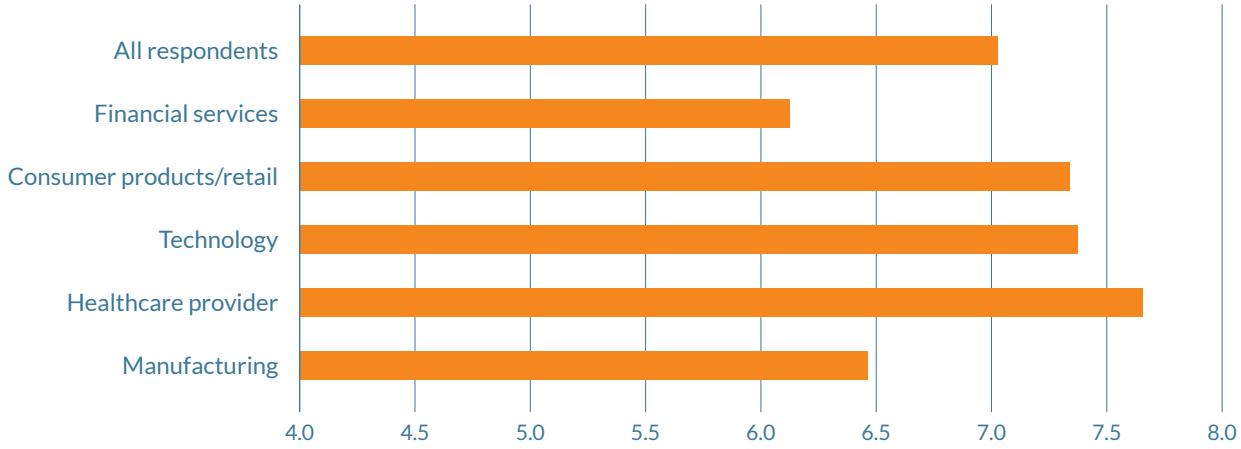
Insights

- Overall, 64 percent of companies are focusing on and investing in cloud adoption. Not surprisingly, the numbers are higher among consumer products and retail companies (80 percent) and technology companies (75 percent).
- Among all organizations, 23 percent of IT applications, infrastructure and platforms are cloud-based. Technology companies and healthcare providers currently operate 26 percent of their applications, infrastructure and platforms in a cloud environment.
- Cloud adoption progress is substantial: Respondents rate their progress at an average of 7 on a scale of 1 to 10.
- The movement to the cloud will intensify. Within three years, the ratio of cloud-based IT applications, infrastructure and platforms is expected to rise to 31 percent, which equates to a 33 percent increase. This increase in cloud-based IT is projected to be even more dramatic for manufacturers and consumer products and retail companies.
- Despite this progress and projected growth, there are formidable barriers. Security and privacy risks and cost rate as the top two impediments to cloud adoption across all industries. The time required to implement cloud technology, and the impact to other IT priorities, also qualify as significant adoption hurdles.
- Among all companies, software as a service remains the most common cloud computing service currently in use, followed by infrastructure as a service and platform as a service, respectively.

Our Perspective

- As the adoption of cloud computing intensifies, IT leaders should chart a course for the function and the organization as a whole to prepare for and execute this ongoing transition.
- The movement to the cloud underscores the confidence users are placing in cloud providers for essential functions like security. These providers have the opportunity to differentiate themselves in what they deliver. At the same time, it is essential for users to identify what their cloud providers do deliver so that expectations are properly established.
- As core applications, infrastructure and services migrate to the cloud, the requirement for CIOs to focus on maintaining security and privacy as well as adequate controls will intensify.
- Consumers and providers of cloud services should assume that a security event will occur at some point. It is essential to have incident management roles and responsibilities clearly articulated among all the participants, and response plans should be tested at least annually.
- The cost of change is high as organizations struggle to transform culture and address the skills gaps of existing resources. CIOs need to focus on managing the cost of change as well as ways to support the requirements for speed of change. To this end, improvements in IT processes are critical.

• • • *Progress to date toward cloud adoption**



* On a scale of 1 to 10, with 10 representing substantial progress.

• • • *Which of the following have been barriers to your organization's efforts with regard to cloud adoption? (Multiple responses permitted.)*

	All respondents	Financial services	Technology	Healthcare provider	Manufacturing	Consumer products/retail
Security and privacy risks	48%	64%	52%	53%	71%	54%
Cost	48%	52%	48%	60%	41%	54%
Time – disruption to other priorities	38%	32%	44%	33%	41%	46%
Regulation/compliance	25%	44%	22%	20%	18%	25%
Implementation risk	24%	28%	26%	7%	41%	42%
Lack of executive buy-in	20%	8%	11%	13%	12%	21%
Vendor product/service challenges	18%	16%	26%	13%	24%	13%

4. The Digitization Journey

An early majority of companies are now focusing on some form of innovation enabled by digitization, with higher numbers of consumer products and retail companies and financial services organizations pursuing digital initiatives. These efforts leverage one or more technology disruptors to drive value through innovation. While cost is a prominent barrier to digitization across industries, the measured results of some leaders suggest companies are achieving positive returns on their digitization investments.

Insights

- Fifty-seven percent of all companies are focusing on, and investing in, digitization. That figure rises to 73 percent for consumer products and retail companies and 63 percent for financial services companies.
- Cost, time/disruption to other priorities, and security and privacy risks represent the top barriers to digitization across most industries. Within the financial services industry, lack of executive buy-in also ranks as a notable obstacle.
- Overall, progress toward digitization goals is good, though there are significant variances by industry. Technology, healthcare, and consumer products and retail organizations report more progress than do manufacturing companies.

KEY FACTS

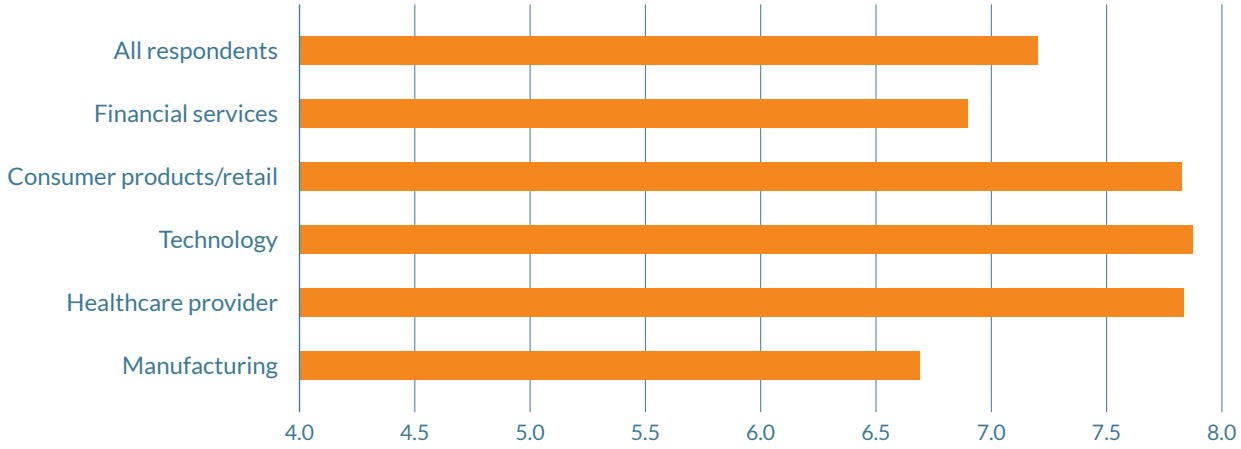
Who is focusing on and investing in digitization?

All organizations

Consumer products and retail organizations

Financial services organizations

• • • *Progress to date toward digitization**



* On a scale of 1 to 10, with 10 representing substantial progress.

• • • *Which of the following have been barriers to your organization's efforts with regard to digitization? (Multiple responses permitted.)*

	All respondents	Financial services	Technology	Healthcare provider	Manufacturing	Consumer products/retail
Cost	52%	44%	59%	53%	62%	64%
Time – disruption to other priorities	43%	44%	45%	47%	46%	50%
Security and privacy risks	33%	40%	41%	35%	62%	50%
Lack of executive buy-in	24%	32%	9%	6%	23%	27%
Regulation/compliance	23%	28%	18%	35%	15%	23%
Implementation risk	23%	16%	32%	24%	15%	23%
Vendor product/service challenges	18%	20%	18%	35%	0%	23%

Our Perspective

- Digitization, often referred to as "digital transformation" or, more simply, "digital," has now transitioned from early adopters to early majorities across most industry sectors. By leveraging technology disruptors (e.g., cloud, mobile, social, IoT, analytics, blockchain, fintech, narrative science, machine learning), companies have been able to conceptualize, design and implement innovations to their business models for delivering products and services.
- In advanced cases of digitization, companies have been successful in redefining their position in the marketplace with unique competitive advantages. While these advancements in digitization begin to accelerate, digitally stored content doubles every two years, including sensitive data and security vulnerabilities. The growth of sensitive data and sources of security vulnerabilities make protecting this data a major concern, particularly as legacy processes and technologies in organizations reach their limits. Such legacy systems likely represent additional barriers to digitization efforts. Furthermore, the changing landscape of data privacy laws and regulations adds to the complexity and cost of digitization initiatives, as well as the need for experienced implementers to reduce program risks.

5. Advancing Analytics

A majority of companies are focusing on and investing in data projects, though the numbers are slightly lower than the results for cloud adoption and digitization (cited earlier). Higher percentages of consumer products and retail organizations and healthcare provider companies invest in data projects compared to companies in other industries. As is the case with other major IT initiatives examined in our report, organizations have made significant progress with data analytics for predictive models. The primary barriers companies are contending with include cost, time-to-value, security, and finding qualified talent to reduce the risk of implementation.

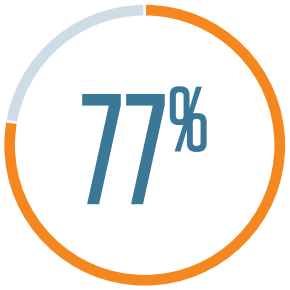
Insights

- Fifty-seven percent of all companies are focusing on and investing in data-related projects (including but not limited to big data initiatives), with higher numbers of consumer products and retail companies and healthcare provider organizations focusing on these areas. The results reflect an emphasis on data-driven customer experience management capabilities that have emerged in these industries in the past decade.
- Overall, companies rate their progress in this area relatively high. Of note, manufacturers and financial services organizations rate their company's progress lower than respondents in other industries.
- The primary barriers that interfere with data-related IT projects across all industries include cost, time/disruption to other priorities, and security and privacy risks. While these three obstacles are universal, they do not affect all industries equally. Cost is a more significant barrier to data projects within the manufacturing and consumer products and retail industries. Financial services companies, technology companies and healthcare providers rate time/disruption to other priorities as a greater impediment compared to companies in other industries. And healthcare providers and manufacturing companies tend to rate security and privacy risks as a more formidable barrier to data projects. For many organizations, other notable barriers include aging data infrastructure, poor data governance and distributed data ownership across an organization.

KEY FACTS

Who is focusing on and investing in data-related initiatives?

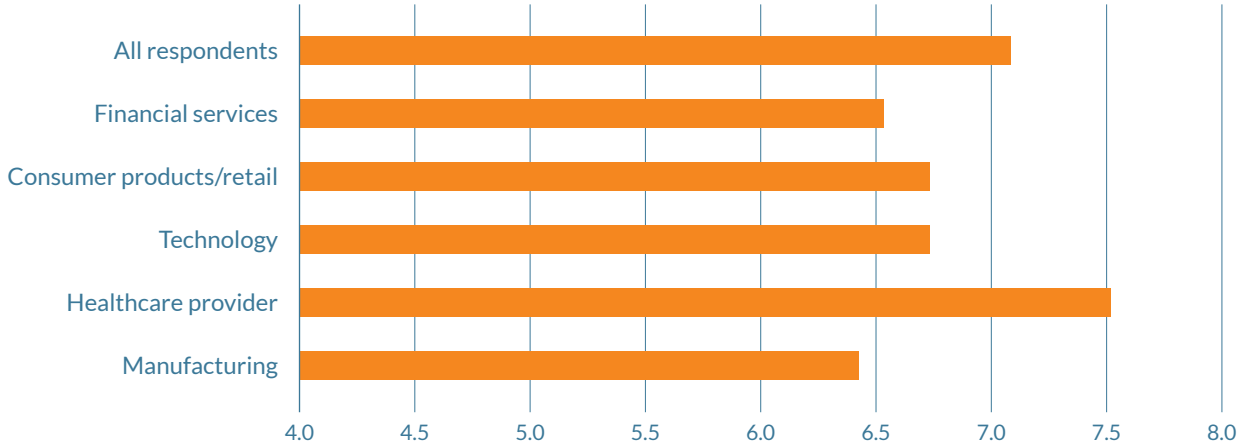
All organizations



Consumer products and retail organizations

Healthcare provider organizations

• • • *Progress to date with data-related initiatives**



* On a scale of 1 to 10, with 10 representing substantial progress.

• • • *Which of the following have been barriers to your organization's efforts with regard to data-related initiatives? (Multiple responses permitted.)*

	All respondents	Financial services	Technology	Healthcare provider	Manufacturing	Consumer products/retail
Cost	48%	50%	55%	37%	67%	61%
Time – disruption to other priorities	45%	54%	55%	53%	39%	43%
Security and privacy risks	32%	25%	20%	42%	44%	30%
Implementation risk	27%	17%	25%	26%	33%	30%
Regulation/compliance	23%	25%	25%	26%	11%	30%
Lack of executive buy-in	21%	8%	20%	16%	17%	17%
Vendor product/service challenges	16%	17%	25%	5%	17%	9%

Our Perspective

- As companies become increasingly information-driven, IT plays a pivotal role in this big data transformation. It is crucial for time- and cost-challenged IT departments to identify new ways to conceive and conduct data projects that deliver insights and value to executive management and business leaders.
- Today's market allows end users to acquire, prepare and visualize data on their own without IT involvement. However, those departmental actions lead to siloed data marts lacking in security and with questionable data quality. It is up to IT to prevent data silos by providing timely and trusted data environments that business users can access with their preferred visualization tools.
- Expectations for big data environments now and in the future will be for end users to have access to billions of records from potentially multiple sources that are fast, accurate and often in real-time. Companies should leverage technologies utilizing capabilities such as in-memory storage, columnar indexing, scale-out architecture and data federation to speed analysis of data from their data lakes and data warehouses.

6. Becoming More Agile

Compared to other major IT initiatives such as digitization and data projects, agile processes and initiatives are still emerging and not yet fully established. Overall, well under half of companies are investing in agile practices designed to help the organization accelerate the implementation of new IT projects and initiatives. Consumer products and retail companies as well as technology organizations are an exception: A majority of organizations in these industries are focusing on and investing in agile processes.

Insights

- Forty-four percent of companies overall are currently focused on and investing in the adoption of agile IT processes.
- Two industries are more committed to agile process investments: 58 percent of technology companies and 53 percent of consumer products and retail companies are currently adopting agile processes.
- Those IT organizations that are currently investing in agile processes report substantial progress.
- Time and disruption to other IT priorities is a notable barrier to the adoption of agile processes, and for the moment, agile process adoption takes a backseat to digitization and data projects.
- For highly regulated industries such as healthcare, regulatory and compliance concerns represent a major barrier to agile process adoption. However, this may be more perception than reality. For example, many leading financial services organizations have adopted or are in the process of implementing agile processes.

KEY FACTS

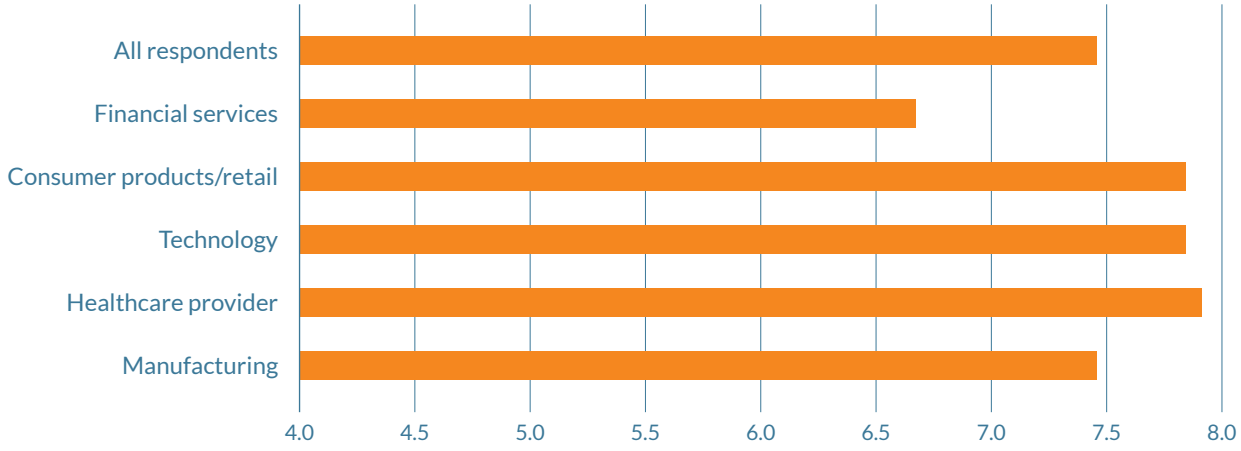
Who is focusing on and investing in agile processes?

All organizations

Technology organizations

Consumer products and retail organizations

*Progress to date with implementing agile processes**



* On a scale of 1 to 10, with 10 representing substantial progress.

• • • *Which of the following have been barriers to your organization's efforts with regard to agile processes? (Multiple responses permitted.)*

	All respondents	Financial services	Technology	Healthcare provider	Manufacturing	Consumer products/retail
Time – disruption to other priorities	40%	19%	57%	30%	44%	50%
Cost	33%	44%	24%	40%	33%	44%
Regulation/compliance	30%	38%	24%	60%	11%	38%
Lack of executive buy-in	30%	19%	14%	20%	22%	25%
Implementation risk	27%	31%	24%	30%	22%	31%
Security and privacy risks	26%	19%	10%	30%	44%	44%
Vendor product/service challenges	13%	13%	14%	10%	11%	13%

Our Perspective

- Organizations continue to seek new ways to grow revenue. An agile approach may allow companies to test ideas more efficiently and ultimately scale those ideas more effectively. IT and business leaders may want to look more closely into ways that agile processes can benefit the organization.
- Leaders should also hone in on the barriers impeding the adoption of agile processes.
- IT leaders should assess which frameworks – Scaled Agile Framework (SAFe), ISO 27001/27002, NIST, etc. – are the best for the IT organization.
- Speed to market and flexibility of development cannot jeopardize the security requirements companies have and that their customers and employees expect. A difference in development methodology is not an excuse to alter a security-based systems development lifecycle (SDLC).
- The sensitivity of data – from both a privacy and security (confidentiality, integrity and availability) perspective – must also be a major focus when designing systems. Organizations must ensure they are aware of this sensitivity, reigning regulations, internal privacy principles and cultural mores when concluding what information to process and promote.

Managing Security and Privacy

Key Findings and Observations

- Incident response activities, along with virus/malware advanced threat detection and eradication, dominate the list of security and privacy priorities for CIOs and technology leaders. As business processes and supporting technology progress, companies know that they must continue to invest in refined defenses for common and advanced threats. Adding a thoughtful and mature incident response program (and testing it frequently) is a responsible activity reflecting the reality that a security incident could still occur. Global data breach regulations are also affecting the focus on both protection and response.

- Interestingly, many index scores dropped across the board compared to last year's results, though most areas are still viewed to be significant priorities. Companies investing in employee awareness and training as well as improved access management technologies and processes are expecting that, in the process, they will address high-priority application user, contractor and third-party issues. Although we agree with the linkage, we urge organizations to ensure there are metrics for process execution and goal achievement to gauge "trickle down" performance.

- Of note, managing third-party vendors is no longer viewed to be a significant priority, though many organizations continue to struggle with implementing and executing programs for managing third-party risk. Based on our experience along with our significant research, we view this result as a reflection that organizations are still prioritizing "getting their own house in order" over setting incongruent expectations for their business partners. However, the alignment of internal security and privacy requirements with others in an organization's ecosystem remains a significant focus for companies worldwide.

Managing Security and Privacy	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Virus/malware advanced threat detection/eradication	●	●	⇔
Incident response success (containment, recovery)	●	●	⇔
Incident response policy and preparedness	●	●	⇔
Implementing security/privacy solutions and strategies	●	●	⇔
Monitoring security events	●	●	⇔
Incident response reaction time	●	●	⇔
Data breach and privacy laws (various U.S. states)	●	●	⇔
Vulnerability scanning	●	●	⇔
Penetration testing (internal/external)	●	●	⇔
End-user security awareness and training	●	●	⇔
Developing and maintaining security and privacy standards	●	●	⇔
Patch management	●	●	⇔
Managing user identities and access	●	●	⇔
Managing IT users	●	●	⇔
Managing technical infrastructure configuration	●	●	⇔
Managing and classifying enterprise data	●	●	↓
Managing application users	●	●	↓
Managing contractors	●	●	↓
Managing third-party vendors	●	●	↓

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

General IT Technical Standards and Knowledge

Key Findings and Observations

- Not surprisingly, one of the top priorities for IT leaders is cloud storage of data. Another, IT project management, likely reflects the growing number of critical initiatives underway in organizations as they undergo the types of IT transformation, cloud, digitization and big data projects detailed earlier in our report.

- A number of areas are viewed to be of lower priority compared to our prior year results.

General IT Technical Standards and Knowledge	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Cloud storage of data	●	●	⇔
IT project management	●	●	⇔
Business process automation	●	●	⇔
Cloud computing	●	●	⇔
IT program management	●	●	⇔
Virtualization	●	●	⇔
Enterprise architecture	●	●	↓
Data architecture	●	●	↓
Smart device integration	●	●	↓
Data discovery/e-discovery	●	●	↓
Mobile commerce security	●	●	↓
Open Web Application Security Project (OWASP)	●	●	↓
Mobile development	●	●	↓
DevOps	●	NA	NA
Mobile commerce integration	●	●	↓

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

Defining IT Governance and Strategy

Key Findings and Observations

- Similar to prior years, CIOs and technology leaders remain focused on managing project quality along with the costs and benefits of new programs. This has never been more critical in light of numerous IT transformation activities underway, including but not limited to cloud computing and digitization.

- Risk and compliance reporting continues to be a driver of IT governance. In the face of change, CIOs are focused on maintaining compliance and assessing risk.

Defining IT Governance and Strategy	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Managing project quality	●	●	⇔
Monitoring IT costs and benefits	●	●	⇔
IT risk analysis and reporting	●	●	⇔
Integration/alignment of IT planning and business strategy	●	●	⇔
Monitoring and achieving legal/regulatory compliance	●	●	⇔
Key performance indicators (KPIs)	●	●	⇔
Reporting IT activities and performance	●	●	↓
Maintaining IT controls design and operating effectiveness	●	●	↓
Developing and maintaining operations management policies and standards	●	●	↓
Developing and maintaining end-user support policies and standards	●	●	↓
Negotiating, managing and monitoring customer service-level agreements (SLAs)	●	●	↓
Managing and monitoring policy exceptions	●	●	↓
Defining metrics and measurements for monitoring IT performance	●	●	↓

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

Management and Use of Data Assets

Key Findings and Observations

- Organizations have an increased appetite for more data and business intelligence to aid them in driving growth, product and service strategies. They are seeking BI and data analytics support that can deliver insightful information to help drive key decision-making.

Management and Use of Data Assets	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Business intelligence and reporting tools	●	●	⇔
Data analytics platforms and support	●	●	⇔
End user adoption of data tools	●	●	⇔
Short- and long-term enterprise information management strategy	●	●	⇔
Master data management	●	●	⇔
Data lifecycle management	●	●	↓
Data and information governance program	●	●	↓

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

Our Perspective

- Business intelligence has been a major priority for more than a decade. But in recent years, end users have become more advanced users of data. They are prioritizing data analysis into their daily job functions in an effort to make more informed decisions. And they are mining data to find the sources of issues that are affecting the bottom line.
- It is fair to say that in many organizations, lines of business (LOBs) become frustrated because IT is unable to supply them with the data they need in the time frame they want it. Oftentimes, these LOBs proceed to procure third-party technology tools and begin importing data on their own. The result is short-term satisfaction among LOBs, but there are significant longer-term issues, including but not limited to lack of data quality, data validation and data security. For this reason, it is important for IT to take a more proactive role in leading BI efforts in the organization.

Managing Application Development and ERP Systems

Key Findings and Observations

- Most areas in this category have dropped in priority compared to our prior year results. This may reflect a focus on technologies such as cloud computing and digitization as more organizations move aggressively into these areas.

- An emerging trend that appears to be accelerating is the heavy push by establishment vendors to promote their relatively new cloud-based offerings, such as SAP S/4 and Oracle ERP Cloud. Customers currently relying on aging on-premise versions increasingly are considering cloud versions as a viable next stage in the application roadmap. In addition, native cloud vendors such as Workday and NetSuite are gaining ground for customers seeking their first ERP solution.

- There is also a dual (and sometimes contradictory) trend of (1) application rationalization, wherein customers are collapsing redundant systems and point solutions into more comprehensive end-to-end ERP footprints, the goal being to create greater synergies and consistency across business units; and (2) disaggregation of some key functions to best-of-breed cloud solutions, particularly in the areas of human resources (e.g., Workday), CRM (e.g., Salesforce.com) and collaboration/ content management (e.g., SharePoint), the goal of which is to provide simpler, more intuitive user experiences for less transactional but critical functions.

- Deploying mobility use cases of certain functions is also high on the list of focal points for application developers and owners.

Managing Application Development and ERP Systems	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Software selection	●	●	↓
Project monitoring and control	●	●	↓
Requirements management	●	●	↓
Secure development/code review	●	●	↔
ERP application security	●	●	↓
Collaboration platforms (for example, SharePoint)	●	●	↓
Mobile application development	●	●	↓
Organizational process performance	●	●	↓
Organizational performance management	●	●	↓
ERP system "bolt-on" applications	●	●	↓
ERP system implementation	●	●	↓
ERP system selection	●	●	↔
Scaled Agile Framework (SAFe)	●	NA	NA
Configuration management	●	●	↓
Spreadsheet risk management	●	●	↔
Kanban development methodology	●	NA	NA

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

Managing IT Infrastructure

Key Findings and Observations

- Not surprisingly, backup and recovery systems, storage management and planning, and managing application service providers have consistently ranked among the top IT priorities in our annual survey.

- Of note, managing and administering backup and recovery represents the highest-ranked priority in this year's survey.

Managing IT Infrastructure	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Managing and administering backup and recovery	●	●	⇔
Storage management and planning	●	●	⇔
Managing application service providers	●	●	⇔
Network performance planning	●	●	⇔
Managing and maintaining real-time operations	●	●	⇔
Managing and maintaining hybrid operations	●	●	⇔
Managing and maintaining batch processing	●	●	⇔
Operating system change management	●	●	⇔
Database change management	●	●	⇔
IT infrastructure change management	●	●	↓
Platform performance planning	●	●	↓

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

Our Perspective

- As the results of our survey indicate, IT infrastructure management has become a major challenge for organizations, particularly those that have aging cores of outdated information systems. CIOs and technology leaders are faced with having to invest more and more time and resources into managing these systems, while at the same time seeking cost reductions from them without impacting service levels. In many organizations, layer upon layer of technology systems dating back decades further exacerbates the issue. A growing number of these organizations are electing to modernize their aging cores to achieve both increased agility and significant long-term savings in costs and resources.

Ensuring Continuity

Key Findings and Observations

- Amid numerous priorities and concerns for IT leaders, they clearly are not forgetting that the organization's ability to recover from an unexpected or unplanned business interruption is of paramount importance.

Ensuring Continuity	Current Priority Index	Prior Year Priority Index	YOY Trend (Change in Priority Level)
Developing and maintaining IT disaster recovery plans	●	●	⇔
Ensuring business alignment	●	●	⇔
Ensuring executive management support and sponsorship	●	●	⇔
Business continuity management and disaster recovery program testing	●	●	⇔
Designing and maintaining business continuity strategies	●	●	⇔
Developing and maintaining crisis management plans	●	●	⇔
Developing and maintaining risk assessment/business impact analysis	●	●	↓
Developing and maintaining business resumption plans	●	●	↓

● Significant Priority – Index of 6.0 or higher

● Moderate Priority – Index of 4.5 to 5.9

Our Perspective

- In the face of ongoing IT transformation, CIOs are focused on designing strategies to maintain service availability. As noted earlier, managing and administering backup and recovery (see "Managing IT Infrastructure" section) is the highest-ranked priority in the survey. For the technology environment, this underscores the importance of recovery and continuity.
- Above all, leading technology functions want to help their organizations face their future confidently by enabling resiliency to respond to major external events as well as more specific technology and cybersecurity incidents. Further, they are striving to implement business continuity measures and responses not only for large-scale events, but also for more targeted incidents that carry the potential to create significant disruption to the business. Most cybersecurity events fall into the latter category – organizations want the ability to ensure continuity in the wake of these incidents, as well, which arguably is even more challenging given the quantity, frequency and speed to impact of cyber threats they face on a daily basis.

Demographics

Position

IT VP/Director	40%
Chief Information Officer	19%
Chief Financial Officer	14%
Other C-suite executive	14%
Chief Technology Officer	6%
Chief Information Security Officer	4%
Chief Security Officer	2%
Chief Privacy Officer	1%

Size of Organization (by gross annual revenue)

$20 billion+	6%
$10 billion - $19.99 billion	7%
$5 billion - $9.99 billion	8%
$1 billion - $4.99 billion	20%
$500 million - $999.99 million	12%
$100 million - $499.99 million	12%
Less than $100 million	35%

Type of Organization

Private	54%
Public	32%
Not-for-profit	7%
Government	6%
Other	1%

Industry

Financial Services	12%
Technology	11%
Government/Education/Not-for-profit	10%
Professional Services	9%
Healthcare Provider	9%
Manufacturing	8%
Communications	6%
Retail	6%
Services	4%
Energy	4%
Insurance	4%
Consumer Products	3%
Distribution	2%
Hospitality	2%
Real Estate	2%
Telecommunications	1%
Healthcare Payer	1%
Life Sciences/Biotechnology	1%
Media	1%
Other	4%

ABOUT PROTIVITI

Protiviti is a global consulting firm that delivers deep expertise, objective insights, a tailored approach and unparalleled collaboration to help leaders confidently face the future. Protiviti and our independently owned Member Firms provide consulting solutions in finance, technology, operations, data, analytics, governance, risk and internal audit to our clients through our network of more than 70 offices in over 20 countries.

We have served more than 60 percent of *Fortune* 1000® and 35 percent of *Fortune* Global 500® companies. We also work with smaller, growing companies, including those looking to go public, as well as with government agencies. Protiviti is a wholly owned subsidiary of Robert Half (NYSE: RHI). Founded in 1948, Robert Half is a member of the S&P 500 index.

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Emerging technologies and changing business models are driving a shift in the role of IT – from leveraging technology in support of the business to the higher, more strategic goal of protecting and enhancing business value. Today, it is critical that you have strong IT processes and practices to ensure the alignment of IT and business strategy and to drive excellence through the IT infrastructure and the operations it supports.

Protiviti's global Technology Consulting practice helps CIOs and IT leaders design and implement advanced solutions in IT governance, security, data management, applications and compliance. Protiviti works to address IT security and privacy issues and deploy advanced and customized application and data management structures that not only solve problems, but also add value to organizations. Technology will drive your future, and with Protiviti you can be confident it takes you where you want to go.

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