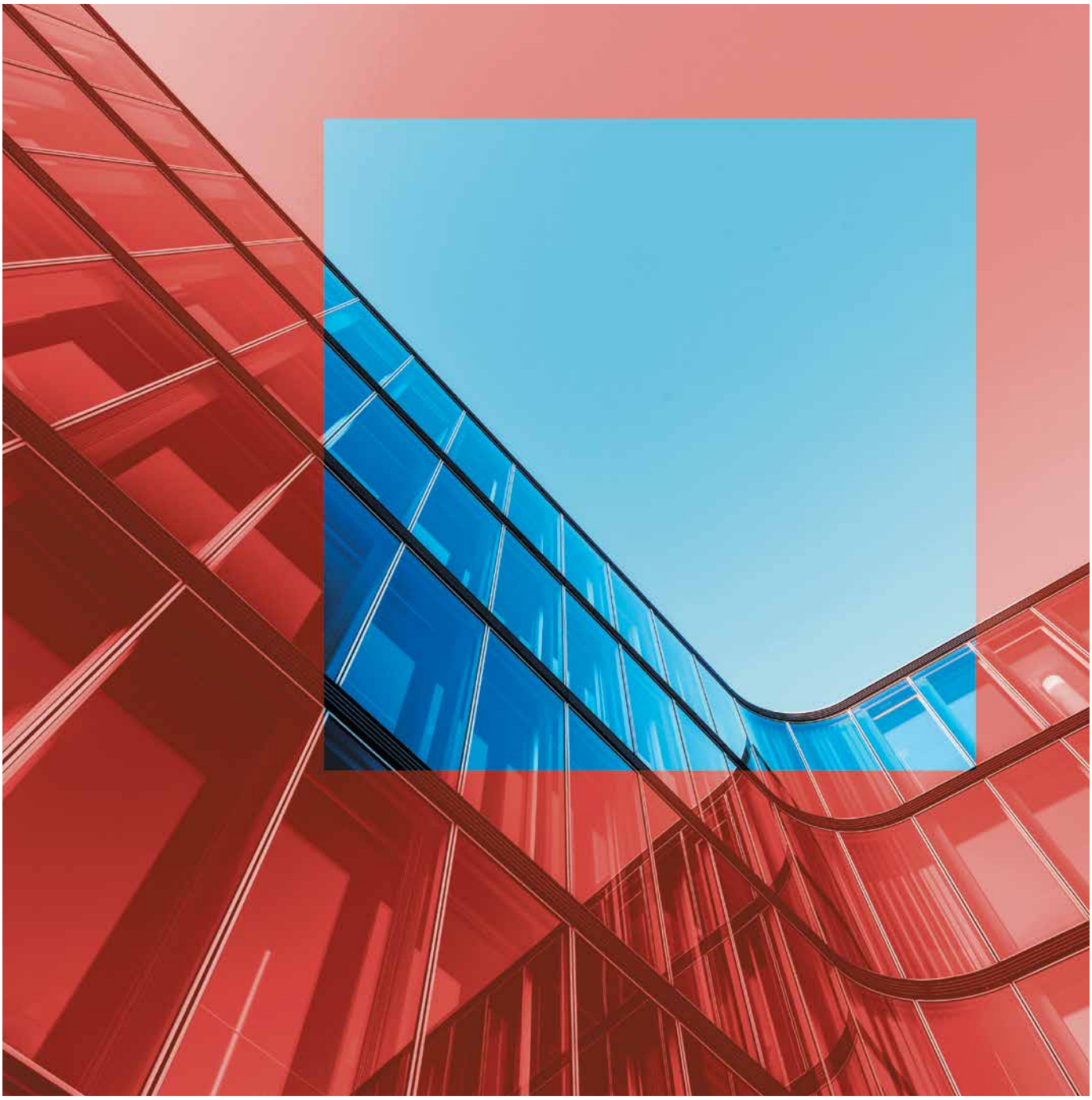
IT Investment Priorities and Realities

Insights Report
Volume 05

CDW



IT Investment Priorities and Realities Insights Report
Volume 05

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WE GET STRATEGIES TO MAXIMIZE YOUR IT SPEND.

Technology investment strategies are shifting and evolving at record speed as business priorities realign across the global economy. For many, the future is more uncertain than ever. What's more, for the past few years, digital transformation had challenged companies to gain operational efficiencies and cut costs — all while harnessing new technologies and navigating uncharted waters.

Fulfilling a vision for the next one to three years now requires even more carefully evaluating business goals and priorities, and strategically allocating IT spend accordingly. It is no longer business as usual. In fact, the world is facing a new definition of "business as usual." The technologies organizations invest in, and how they derive value from those investments, will likely determine their success — or failure.

To better understand the vision of IT decision-makers and the future of their IT investments, CDW partnered with IDG in January 2020 to conduct a survey of 600 senior-level IT and non-IT professionals.

In addition to the quantitative survey, IDG conducted in-depth interviews with CIOs, IT decision-makers (ITDMs), and other subject matter experts (SMEs) to further probe the details of the survey findings and compile best practice insights and advice. This report summarizes the findings, in addition to highlighting variances based on title, company size, and the following verticals: Federal Government, State and Local Government, Healthcare, and Education (Higher-Ed and K-12).*

* For details on the study, see pp. 72-73

Key Investment Priorities

The survey findings revealed five key investment priorities among both IT and line-of-business (LOB) leaders. Although the changing global economy may impact the potential timeline for these investments, the underlying challenges that many enterprises face are unlikely to change over the coming one to three years.

1. Using cloud to accelerate IT infrastructure modernization for supporting remote workers

It's very clear that in most cases, legacy systems can no longer deliver on IT's needs. Organizations must modernize their IT infrastructure, including tapping into public and private cloud resources, to better support remote workers, gain more efficiency, unlock greater network availability, and improve compliance and security.

2. Acquiring tools to lower IT operating costs for greater business value

A volatile, shifting global economy is challenging organizations to trim costs without sacrificing security or compromising IT capabilities. Most organizations need tools that enable them to reduce budgets, improve efficiencies, and stretch precious resources.

3. Broad commitment to staff education in enterprise security

Security is an ongoing concern for all IT leaders, and the challenges increase every day as cyberthreats grow in volume, variety, and prevalence. Sophisticated cyberthieves are using artificial intelligence (AI) and machine learning to identify potential targets. The impact is very real in terms of compliance, brand reputation, and lost business, among other concerns. To minimize threats, organizations must invest in powerful security tools and educate all employees on cybersecurity best practices.

4. Developing a data-driven, 360-degree view of the customer

Delivering compelling customer experiences in order to maintain a competitive advantage has never been more important. Data analytics can help pinpoint customer needs and highlight emerging trends. But for the best chance of success, organizations must extract data from multiple sources, and carefully integrate that data on a single platform.

5. Improving employee engagement, productivity, and flexibility

Today's talent shortages in IT, emerging technology, and security promise a potentially crippling effect on productivity — and profitability. Forward-looking organizations recognize that the right workplace tools and environment can help protect precious talent — but only if employees can make the most of them.

Key Research Findings

The study explored essential technology investment priorities — as well as key business issues, investment drivers, areas of technology investment, and action plans — in IT infrastructure modernization, IT operating costs, risk mitigation, customer experience, and workplace productivity. What follows are the key findings.

29%

1. Building a Flexible IT Infrastructure

29% of IT budgets will be spent on "modernizing your technology backbone in order to expand capabilities while keeping operations running smoothly and costs down (e.g., cloud, storage, servers, networking, etc.)."

42%

2. Cloud as Digital Transformation Catalyst

Cloud monitoring and management (42%) will be a key area of focus for organizations across vertical segments over the next two years.

43%

3. An Economy for Cost Cutting

Cost control (43%) is a top driver of planned investments in technology to transform the customer experience.

56%

4. Making Customers Count

Data analytics (56%) is the top technology investment under consideration to improve customer experience.

46%

6. A Workplace for the Future

IT executives overall cite planned investments in analytics software (46%) and storage (43%) to help employees better use and manage data, as well as investments in collaboration (43%) and productivity software (41%). Collaboration software, in particular, will help support the new remote workforce.

50%

5. Security for Survival

Improving security (50%) frequently drives planned investments in workplace solutions, software, and services, edging out increasing productivity (47%) as the top investment trigger.

1. Building a Flexible IT Infrastructure

- Respondents cite competing business goals over the next two years, assigning (on average) nearly equal priority to modernizing the technology backbone (26 points out of a possible 100) and improving employee experience (28 points).
- Challenges of modernizing technology infrastructure include: supporting remote workers, budget/cost, upgrading legacy systems, system integration, keeping up with technology changes, and hiring and retaining staff.
- Just over one-third (36%) of respondents overall feel their current technology infrastructure is very well aligned with the organization's vision.
- Respondents who feel there is strong alignment cite reasons such as "we made the right investments," "we have a well-established infrastructure," "we planned ahead," "we have a robust technology budget," and "our technology investments reflect user feedback."

2. Cloud as Digital Transformation Catalyst

- An average of 76% of organizations will leverage cloud delivery models, with Software as a Service (SaaS) expected to be the most prevalent delivery model (30% of the total IT environment) followed by Infrastructure as a Service (IaaS) at 24% and Platform as a Service (PaaS) at 22%.

3. An Economy for Cost Cutting

- IT cost management (44%) is the biggest priority over the next two years as organizations modernize their technology infrastructure to meet business objectives.
- Identifying areas for improvement and/or cost savings (39%) tops the list of action items respondents are considering to improve risk posture.
- Identifying areas for performance improvement and cost savings is a top action item across vertical segments, including healthcare, small business, and education.

4. Making Customers Count

- Improving the customer experience includes improving the online experience (40%), capturing real-time customer feedback (39%), and enabling secure information access from anywhere (39%).
- Top strategies for transforming the customer experience include process redesign (37%), strategy development (36%), staff training (36%), and hiring the right skill sets (36%).
- The most pressing customer experience challenges include catering to various end users, communicating with customers and gaining feedback, leveraging data analytics, keeping up with customer expectations, and cost/budget.

5. Security for Survival

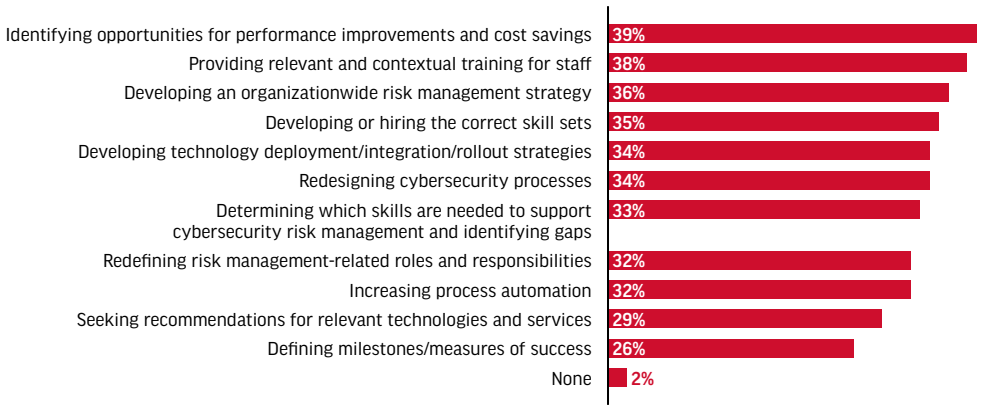
- IT decision-makers cite web security (39%), Network Access Control (38%), DLP (36%), cloud-based identity management (34%), and email security (33%) as their top risk management–related investment considerations over the next two years.
- Respondents overall cite increasing security awareness (45%) as a top business goal, as well as improving understanding of external threats (40%).
- Compliance (51%) is a top driver of planned investments in risk identification and mitigation solutions. Respondents also report that hearing about potential cyber risk from industry-related sources can spur investment (45%).
- The most pressing challenges related to risk management include: cybersecurity, budget/cost, employee education, skills gaps, and staying up-to-date with security technologies.

6. A Workplace for the Future

- Top uses of technology to improve workplace productivity, flexibility, and engagement include: better use of data analytics (42%), enabling collaboration (40%), and providing real-time access to information (38%).
- Although edged out by security as the No. 1 reason for tech investment, 47% of respondents say increasing productivity is the top investment trigger.
- Respondents cite identifying areas for improvement and/or cost savings (42%) and developing an organizationwide strategy (38%) as the top action items planned to improve workplace productivity, flexibility, and engagement.
- Top hurdles related to improving workplace productivity include change management, keeping up with technology advancements, supporting remote workers, finding qualified staff, cost/budget, and lack of collaboration between roles/teams.

Identifying areas for improvement and/or cost savings (39%) tops the list of action items planned to improve risk posture, followed by providing staff training (38%).

Actions Prioritized Over the Next Two Years to Gain Visibility and Mitigate Risk



Cloud monitoring and management is a key area of focus for organizations across vertical segments over the next two years. IT cost management is likewise almost universally important.

Top Three Actions Prioritized Over the Next Two Years to Modernize Technology Infrastructure and Meet Business Objectives (by Segment)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
IT cost management		47%	46%	43%	53%	37%
Cloud monitoring/management	36%	42%	45%	43%	49%	39%
Developing a long-term IT roadmap	46%	46%	41%			
Integrating legacy systems with new applications				32%		38%
Gaining better visibility into application performance	36%					33%
Optimizing processes to enable quicker cycles, i.e., agile approaches						
Improving vendor management						
Data migration initiatives						
Determining application development/re-platform needs					39%	
Change management						
Protecting assets that are running across virtual boundaries						
Understanding/mapping application dependencies						

WE GET LETTING GO OF THE PAST TO PREPARE FOR THE FUTURE.

IT teams can no longer rely on legacy systems to achieve their vision for the future. It's easy to understand why.

1

IT leaders must "learn, experiment, and be comfortable" with new technologies while "making sure [our] investments are on the right assets."

– Survey respondent

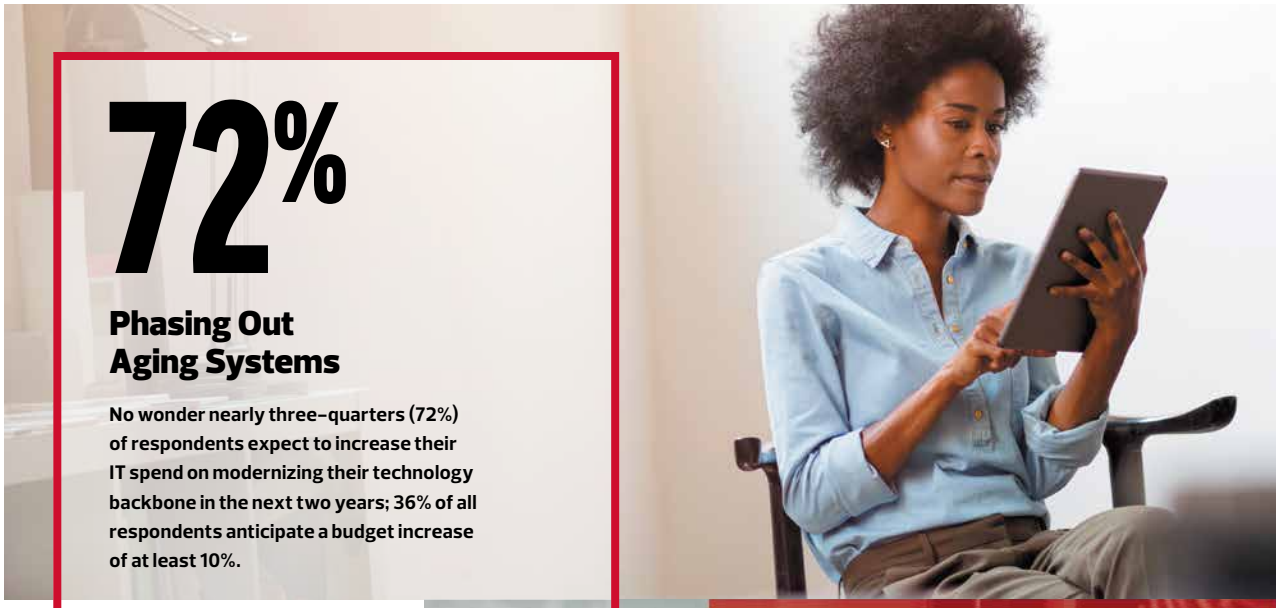
From a workforce perspective, the dangers of legacy systems are multifold.

For one, training new hires how to use legacy systems can drain precious IT resources. Legacy systems can rarely accommodate the workflows of more modern applications and often fail to reflect current user behavior. In fact, simply enabling a legacy system to communicate with a modern app requires creating middleware, such as a .NET/Java/PHP–based backend, to act as an intermediary between legacy systems and apps — a time-consuming endeavor for busy IT teams.

Worse yet, organizations with age-old legacy infrastructure are often hard-pressed to recruit and retain younger workers. That's because today's millennials demand working with the latest and most cutting-edge technologies. Take, for example, app developers. Thanks to the DevOps movement, developers now expect to make code changes on the fly and deploy apps quickly. But while DevOps establishes a consistent, repeatable way for IT to manage its production environment to quickly release new apps, legacy systems discourage agile development processes and can slow time to market.

What's more, many of today's older, transaction-based legacy systems still serve mission-critical business processes and store critical data. Unfortunately, integrating these systems with new software takes time, and can significantly add to IT workloads. Some IT teams build wrappers around age-old systems using APIs to ensure data migration, for example. Others choose to eliminate or replace them entirely. Either way, these approaches take time and divert IT resources from more mission-critical tasks.

Then there are the security concerns associated with legacy systems. No longer supported by vendors, many systems lack the necessary security updates and patches, rendering them ideal targets for ill-intentioned hackers.



72%

Phasing Out Aging Systems

No wonder nearly three-quarters (72%) of respondents expect to increase their IT spend on modernizing their technology backbone in the next two years; 36% of all respondents anticipate a budget increase of at least 10%.

And finally, legacy solutions aren't designed to help companies digitally transform. Legacy systems are poorly equipped to ingest the vast (and growing) volume of data that organizations need to better understand customer behavior, predict market trends, and retain top talent, among other things. Additionally, migrating data from legacy systems requires data preparation, such as cleaning data to ensure pristine quality, eliminating duplicate records, and painstakingly consolidating unstructured data. In either case, the result is a missed opportunity to glean critical insights and gain a competitive advantage in an increasingly data-driven universe.

36%

Getting in Alignment

Only about one-third (36%) of respondents overall feel their current technology infrastructure is very well aligned with the organization's future vision and goals.

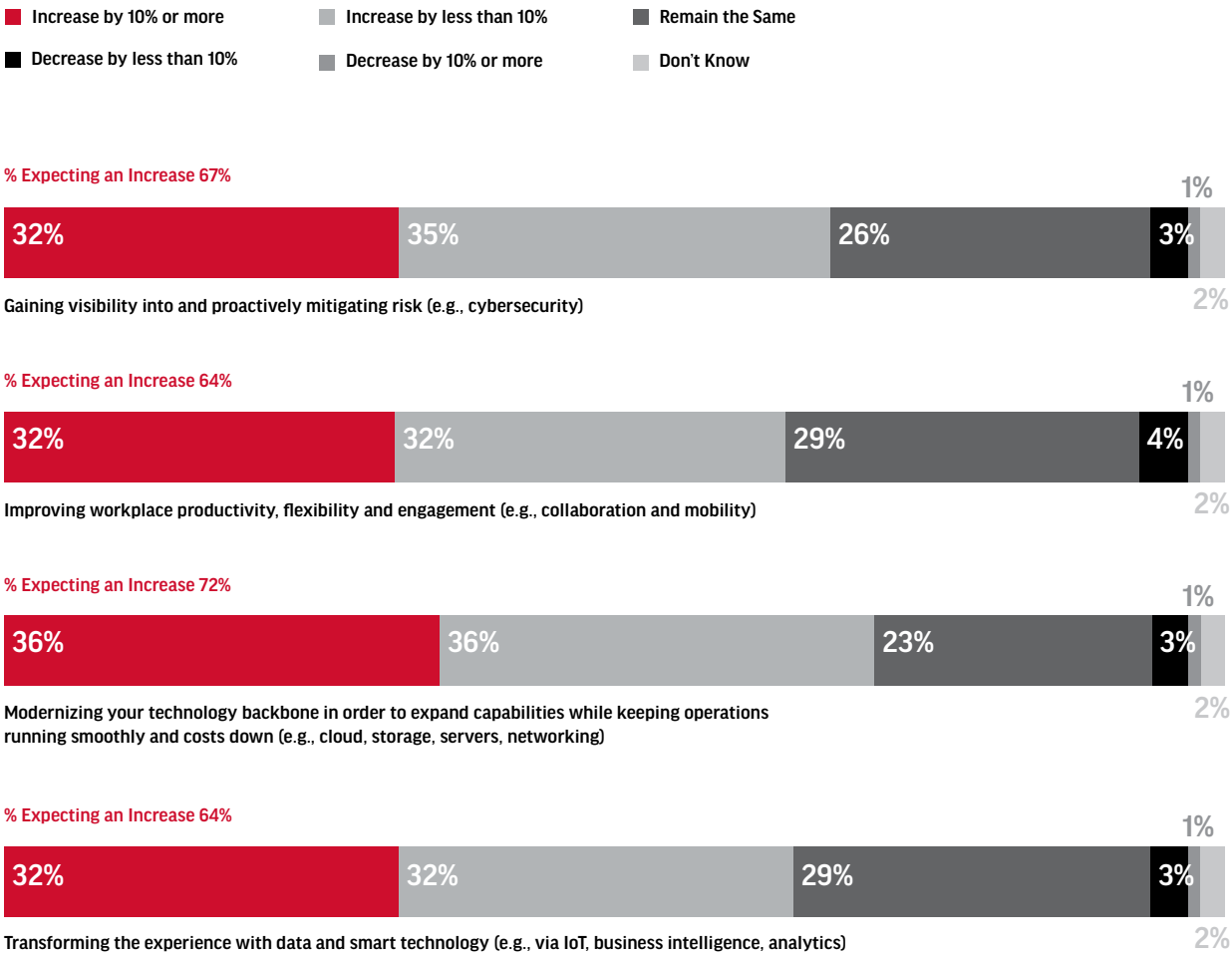
Out with Aging Systems – In with Innovation

In fact, modernization is so important that it ranks as one of respondents' top competing business priorities and is expected to account for 29% of overall IT spend, surpassing allocations for other critical initiatives like reducing cybersecurity risks (23%), improving workplace productivity (26%), and transforming the customer experience (24%).

Consensus on legacy IT's increasing obsolescence is understandable. Today's organizations, regardless of industry, must operate at breakneck speed to capitalize on emerging market trends, keep pace with evolving customer needs, cater to employee expectations, and rapidly respond to global events, from pandemics to technological advancements. Aging infrastructure cannot support the fast and agile workflows of innovative applications.

More than 60% of respondents overall expect the percentage of their organization's budget dedicated to each IT priority to increase over the next two years.

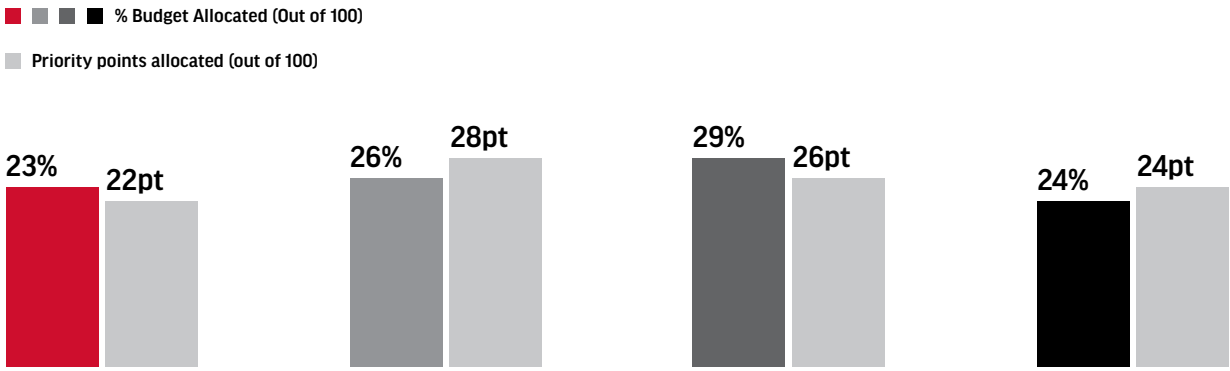
Expected Change in the Percentage of Organization's Budget Allocated to IT Priorities – Next Two Years



"All of the applications being designed today, including operating systems, depend on a technological landscape where CPUs are always getting faster, memory is always getting cheaper, and there's always the availability of compute resources, such as network bandwidth," says Chris Gibes, a technology practice manager at CDW.

The average percent of technology budget allocated to each area matches or nearly matches the level of priority placed on each. Respondents' organizations allocate the largest average portion of the budget toward modernizing the technology backbone.

Average Proportion of Technology Budget Allocated to Each Area: Next Two Years



Consider, for example, the federal government, which ranks IT modernization as a top priority. Indeed, both federal and State and Local government agencies have allocated the largest portion of their IT budgets to investing in more innovative cloud, storage, and networking solutions over the next two years (30% and 33%, respectively).

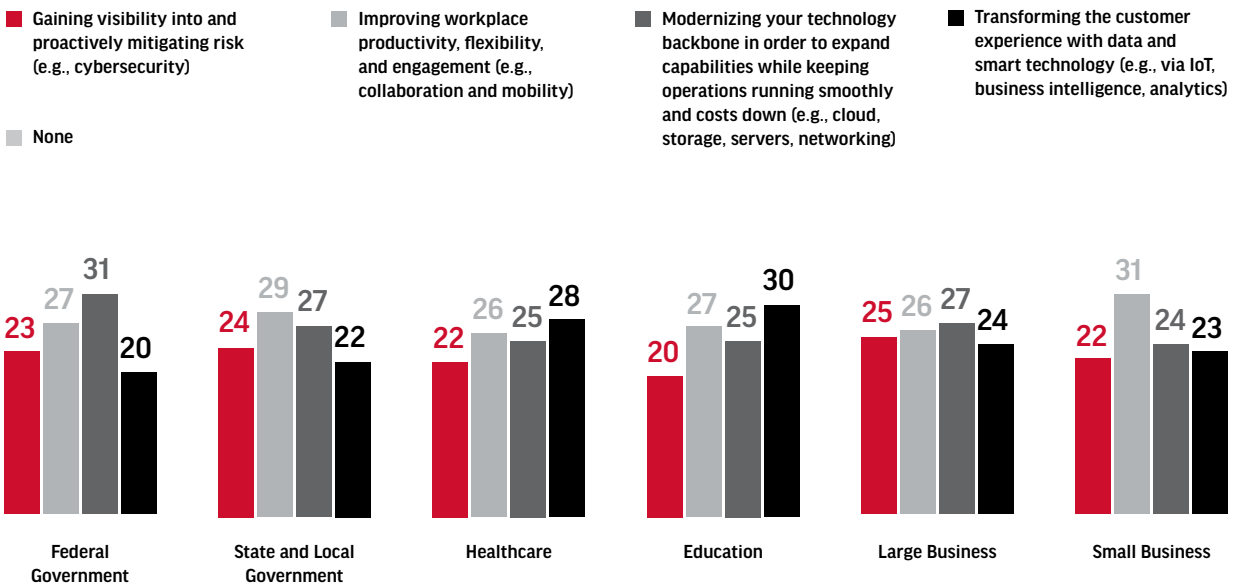
That's good news: Government agencies have long spent significant IT funds on the operation and maintenance of sprawling legacy systems, often at the expense of innovation and operational efficiencies. But increasing demands from citizens and heightened security concerns require government entities to pursue IT modernization strategies.

By investing in technologies such as data center optimization, data analytics, and high-performance mobile devices, government agencies can make substantial gains in improving security, enhancing employee productivity, and bettering service delivery.

As it stands, nearly half of government entities are highly confident in their ability to upgrade aging infrastructure. In fact, 40% of federal agencies and 37% of state and local government entities believe they are best positioned for IT modernization in the coming years. And nearly one third — 31% — of respondents across sectors believe they are well-positioned for modernizing technology infrastructure.

Future business goals differ slightly across respondent segments, though risk mitigation is assigned lower average priority across the board.

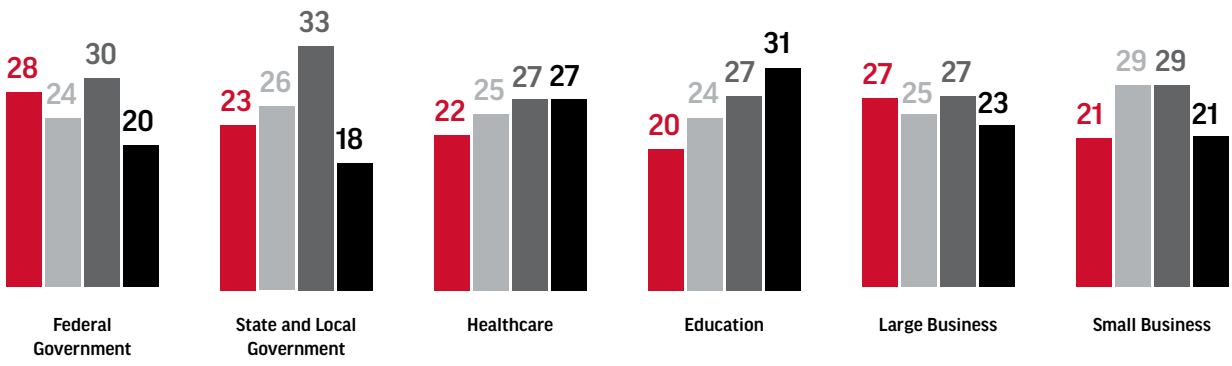
Business Goals Over the Next Two Years: Average Points Allocated Out of 100 (by Segment)



Q: Imagine you have 100 points to allocate across the following priorities, based on their relevance to your organization's business goals over the next two years. You may allocate anywhere from 100 to zero points or anywhere in between, but please sum to exactly 100 points. If you feel two or more priorities are equal in their relative importance for your organization, you can give them the same number of points, but the total should equal 100.

Respondents in the federal government and large business segments report a significantly larger average budget allocation dedicated to risk mitigation compared to those in other segments.

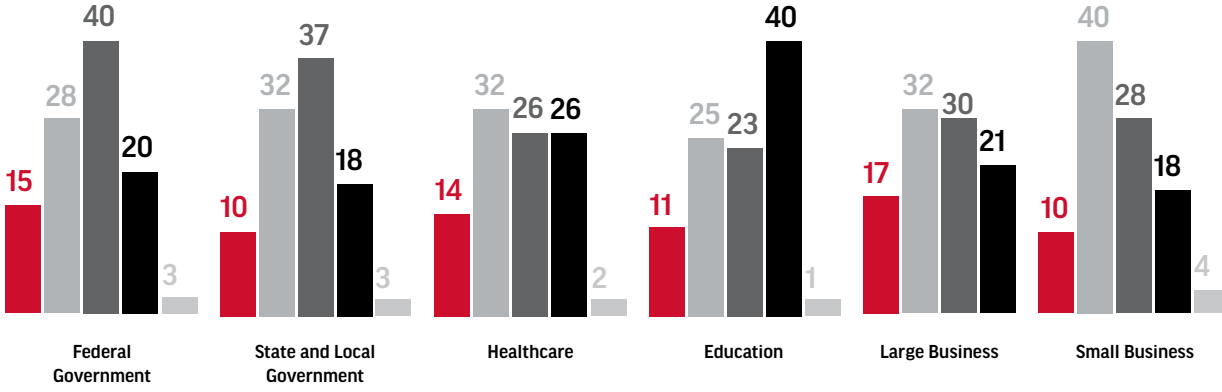
Average Proportion of Technology Budget Allocated to Each Area: Next Two Years (by Segment)



Q: With the total equal to 100%, how do you expect your organization's technology budget to be allocated across the following areas over the next two years?

Those in federal government note IT modernization as a strength, while those in education feel confident in their ability to transform customer experiences and those in the small business segment cite improving employee experience as their strongest area.

Areas Where Organization Is Best Positioned to Meet Business Goals: Next Two Years (by Segment)



Q: In which of the following areas do you feel your organization is BEST POSITIONED to meet your business goals over the next two years?

The Challenge of Infrastructure Change

For all its advantages, embracing modern digital services and technology requires overcoming considerable obstacles, from reskilling talent to redesigning organizational structures.

One manufacturer interviewed for this report is a perfect example. The company recently began replacing its legacy systems with cloud-based Microsoft solutions. The problem, recalls an IT executive, is that the company "had hundreds of employees with no Microsoft skills – no experience with Dynamics, 365 tools, Power apps, or Active Directory." Bridging this skills gap, he says, required "retraining workers at the same time we were rolling out these software tools. That was a huge challenge."

Modernizing IT infrastructure can also present sweeping changes to a company's organizational structure. One solution is to create an ad hoc team dedicated to evangelizing the advantages of modernizing legacy systems. For example, another organization interviewed for this report recently added an Organization Change Management team to its organizational structure. Composed of 10 executives, this group is responsible for reinforcing the value proposition of modernizing IT infrastructure and helping business partners understand the advantages of embracing new workflows.

Another challenge is striking a balance between upgrading aging infrastructure and testing new but less-proven tools. Racing to migrate to new technology can become all-consuming. But organizations must not lose sight of their priorities. "We have to modernize our systems on a continual basis," says Anupam Khare, CIO at Oshkosh Corporation. "However, at the same time, we have to experiment and deploy technologies that are emerging and can have a potential impact on our business." The result, says Khare, is a balancing act in which IT leaders must "learn, experiment, and be comfortable" with new technologies while "making sure our investments are on the right assets."

Getting in Alignment

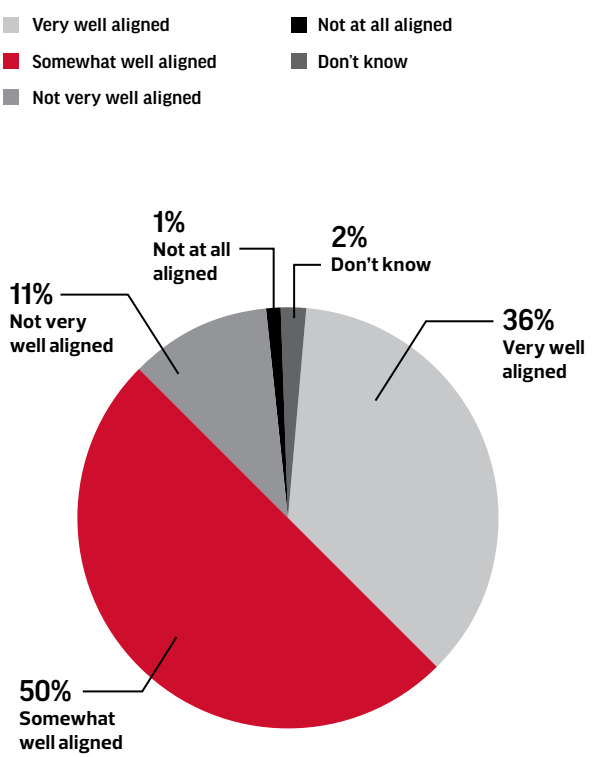
To that point, only about one-third (36%) of respondents overall feel their current technology infrastructure is very well aligned with the organization's future vision and goals. The majority of others (62%) say their current infrastructure poorly reflects where they're heading, or would like to head, with their IT initiatives. Nearly 20% of state and local government respondents, and 13% of those in the education sector, cite poorly aligned infrastructures.

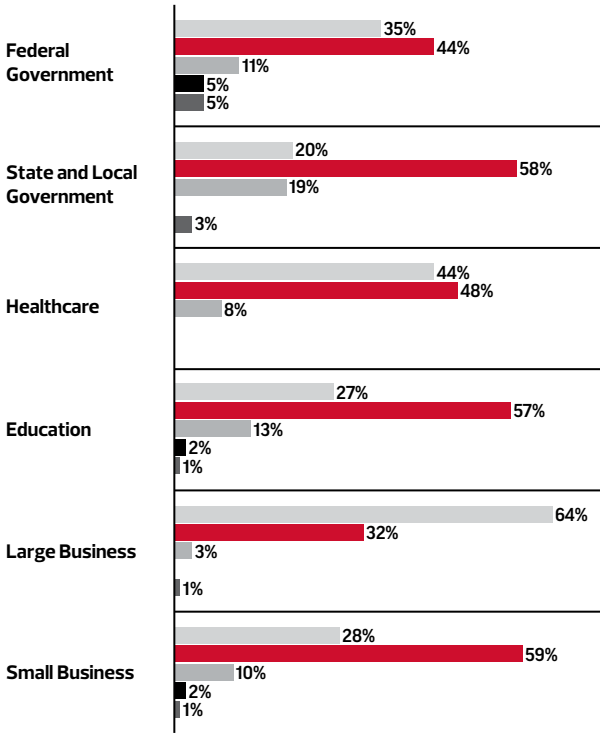
But there is good news. Large businesses demonstrate the highest levels of confidence (64% believe they are very well aligned). Organizations with a more positive outlook on their IT preparedness cite reasons such as:

- We made the right investments
- We have a well-established infrastructure
- We planned ahead
- We have a robust technology budget
- Our technology investments reflect user feedback

Just over one-third (36%) of respondents overall feel their current technology infrastructure is very well aligned with the organization's vision. Those in the large business segment are the most confident in technology and business alignment.

Alignment of Organization's Current Technology Infrastructure with Future Vision and Goals





Oshkosh Corporation credits a carefully crafted list of top investment priorities for enabling it to stay on track and remain in close alignment with its long-term goals. According to Khare, these priorities include:

1. **Business growth:**
   Streamlining processes and implementing workforce solutions that improve the company's capability to attract, retain, and manage talent

2. **Digital transformation:**
   Using advanced analytics to predict margins while also deploying technologies that will directly impact the company's top and bottom lines

3. **Operational efficiencies:**
   Managing the operational costs of moving away from legacy systems

By setting these priorities, Oshkosh Corporation has managed to both modernize legacy systems, such as enterprise resource planning, while still venturing into more innovative fields, like data analytics and robotic process automation.

A Simple Roadmap to Modernization

If not executed carefully, modernization efforts can add layers of complexity to existing IT infrastructure. Fortunately, there are steps organizations can take to meet current IT demands without sacrificing simplicity or adding to IT workloads. Chris Gibes, a technology practice manager at CDW, explains how.

1. **Standardize your IT environment**
   For years, organizations believed that the best way to modernize infrastructure was to purchase best-in-class products from a wide array of vendors. As a result, it was quite common for a single organization to run multiple types of servers, operating systems, and storage solutions. The problem with this approach, says Gibes, is that it can "increase complexity in an unnecessary fashion." Instead, he recommends that organizations work with a small number of vendors for greater standardization.

2. **Get hyper**
   The days of expensive, purpose-built hardware are fast disappearing. According to Gibes, hyperconverged infrastructure (HCI) solutions, which combine storage, computing, and networking into a single system, can make it easier for IT managers to perform everyday tasks, such as provisioning virtual machines, allocating resources, and setting up intelligent alerts.

3. **Move to an all-flash storage array**
   A growing number of modern data centers are looking to all-flash arrays to improve performance and increase capacity — without incurring additional costs. "All-flash storage can be just as economical to implement as spinning disks because of the data reduction capabilities built into them," says Gibes. Better yet, he adds, "a single solid-state drive today has all the performance of an entire array that we would have sold five or six years ago."

4. **Consider containerization**
   A popular path to modernization, containerization uses containers to "wrap" existing legacy applications. This approach, says Gibes, "allows IT leaders to have loosely coupled application processes that can then be turned on or turned off or moved very easily with less of an impact to the business."

WE GET THE BEST CLOUD SOLUTIONS ARE CUSTOM.

Cloud-based platforms such as SaaS, IaaS, and PaaS have become go-to solutions as organizations look for fast and cost-effective ways to modernize IT infrastructure.

2

“Enabling the cloud is probably the best thing we’ve ever done.”

– Survey respondent


76%
According to IDG findings, an average of 76% of total IT environments will leverage cloud delivery models in the next two years. SaaS tops the list (30%), closely followed by IaaS (24%) and PaaS (22%).

IDC research reports that public cloud spending will grow from $229 billion in 2019 to nearly $500 billion in 2023.

By tapping into public and provider cloud resources, organizations stand to gain enormous benefits, including improved efficiency, greater network availability, and better compliance and security. But approaches to cloud deployment can vary.

For example, federal government agencies expect SaaS to comprise 30% of their IT infrastructure two years from now. And for good reason: federal agencies are known for tight budgetary constraints and complex procurement processes. By migrating to the cloud, these agencies can take advantage of the cloud's subscription-style pricing model, as well as scale up resources, or pull back again, in accordance with evolving needs. Nevertheless, more than one-quarter (28%) of the federal government's IT environments will continue as non-cloud–based infrastructure.

Small businesses also rely heavily on non-cloud-based infrastructure (28%). One possible explanation is that these companies lack the IT staff and expertise required to migrate resource-heavy backend systems and convert to cloud-based applications. But there are signs of progress: 29% of small business respondents plan to leverage SaaS in the next two years, and another 23% are focused on incorporating IaaS in the face of competition from new, more agile competitors.

Across all verticals, large businesses are least likely to rely on non-cloud infrastructure (20%). Rather, as pressure mounts to pivot quickly and constantly innovate, enterprise IT leaders expect to leverage more agile technologies, such as SaaS (30%), IaaS (24%), and PaaS (22%).

That's not to suggest, however, that cloud is a panacea for aging infrastructure. Organizations, particularly government agencies, must put measures in place to ensure constant network availability for the delivery of critical services. And in today's security landscape, all sectors, from healthcare to finance, must protect proprietary applications and the data they house.

No wonder then that 42% of respondents across all vertical segments cite cloud monitoring and management as key areas of focus. When supported by the right tools, these activities not only ensure the constant availability of critical cloud infrastructure, such as websites, servers, and applications, but also allow IT leaders to track important performance metrics, from server response times to resource levels.

The Many Incarnations of the Cloud

Although most organizations agree on the importance of modernizing IT infrastructure, approaches vary, and not all cloud computing strategies are created equal.

"We are undertaking a number of strategic initiatives to leverage best-of-breed cloud offerings and services, while maintaining hybrid-cloud and on-premises systems when necessary, based on the risk profile of a given service," says Josh Davis, vice president and chief cybersecurity officer for Toyota.

Another executive interviewed for this report explained how his large business is moving from a hybrid-cloud environment to "a pureplay cloud where nearly everything is SaaS." Through this modernization effort, he says the company not only hopes to "simplify our business," but "support growth in a perfectly scalable manner."

As noted by another IT executive: "Enabling the cloud is probably the best thing we've ever done." Doing so, he says, has helped the company shift focus from "application performance issues" to more business-critical tasks.

Aid in the Decision-Making Process around Modernization

Not all modernization efforts call for the cloud, though. In some instances, a strict regulatory climate or security concerns may prevent organizations from placing data in the public cloud, in which case private clouds may be a better fit.

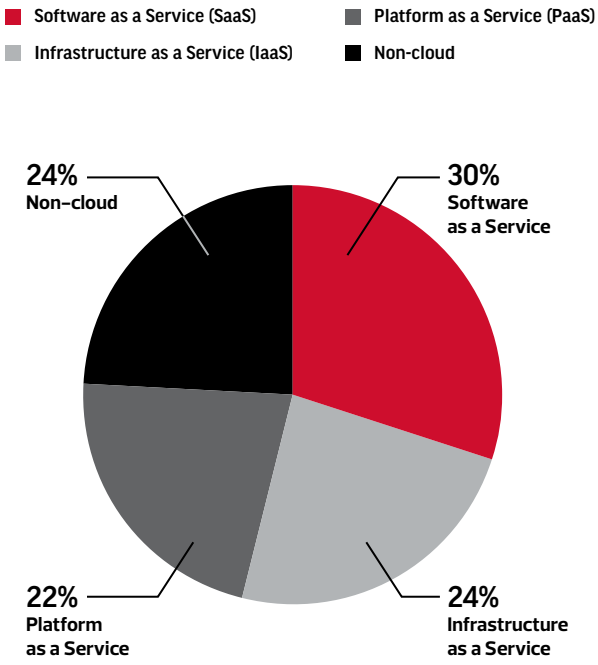
"The workloads that are best suited for the cloud are those that you need to spin up quickly but don't need to have running all the time," says Gibes. A perfect example is an e-commerce web server that needs to ramp up quickly for a new product release or busy holiday shopping day.

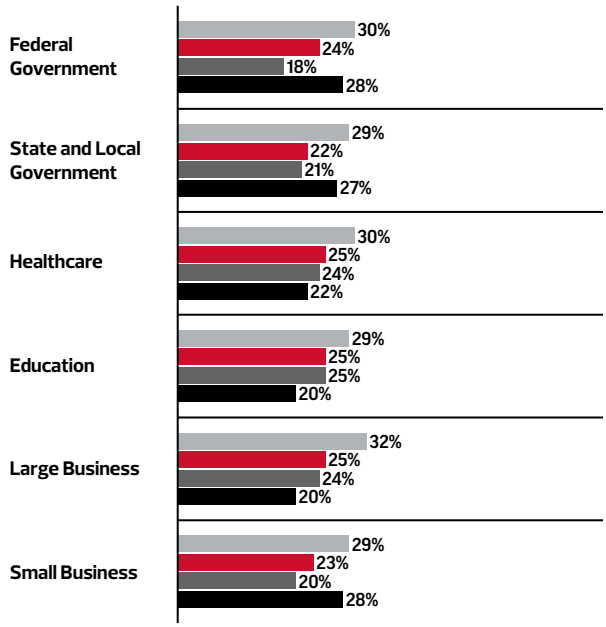
Organizations with distributed workforces, highly customized systems, and strict data security protocols, however, should carefully consider whether migrating to a pure cloud environment makes sense. "If you have a repeatable workload and your IT organization is well-run, it's always going to be more economical to run it on premises," advises Gibes.

Given these decision-making challenges, many organizations turn to external partners, such as public cloud and managed services providers, to help them identify opportunities for modernization. Based on an organization's specific goals, a third party can help plan, deliver, and manage a cloud environment tailored to specific needs, along with risk mitigation strategies and security measures.

Respondents in IT roles expect that two years from now, an average of 76% of their total IT environments will leverage cloud delivery models.

Percent of Total IT Environment Expected to Leverage Each IT Service Delivery Model — Two Years from Now (Asked of IT Titles Only)





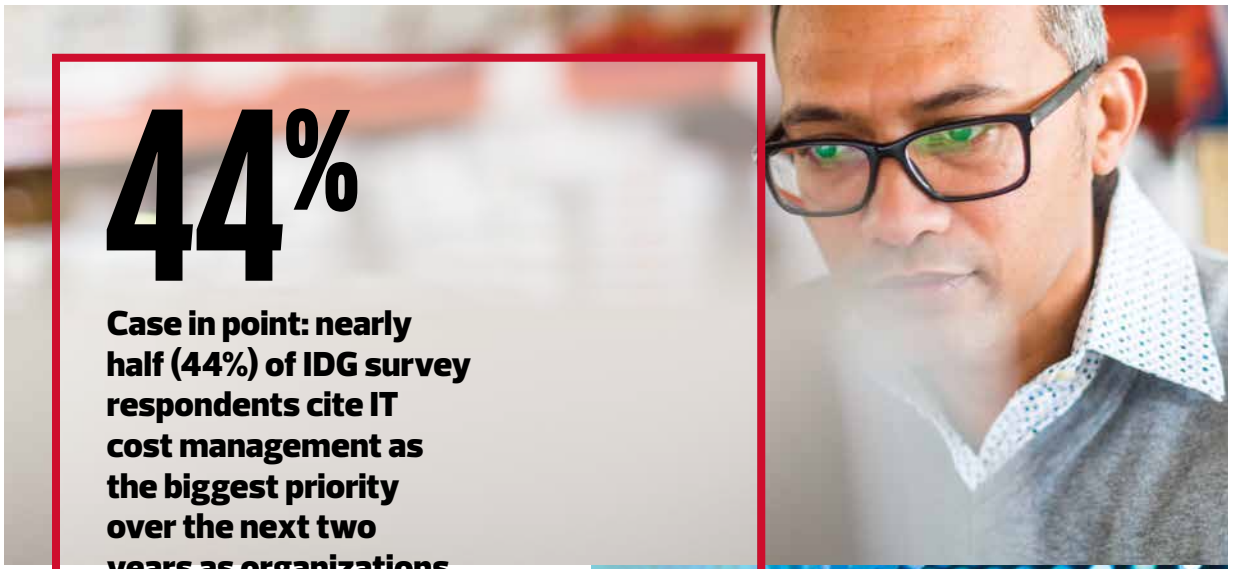
WE GET MODERNIZATION AT ALL COSTS.

Organizations are eager to enhance customer experiences to drive sales, improve employee engagement to retain talent, and replace aging infrastructure with cutting-edge apps. But even the loftiest goals are governed – and sometimes curtailed – by cost considerations.

3

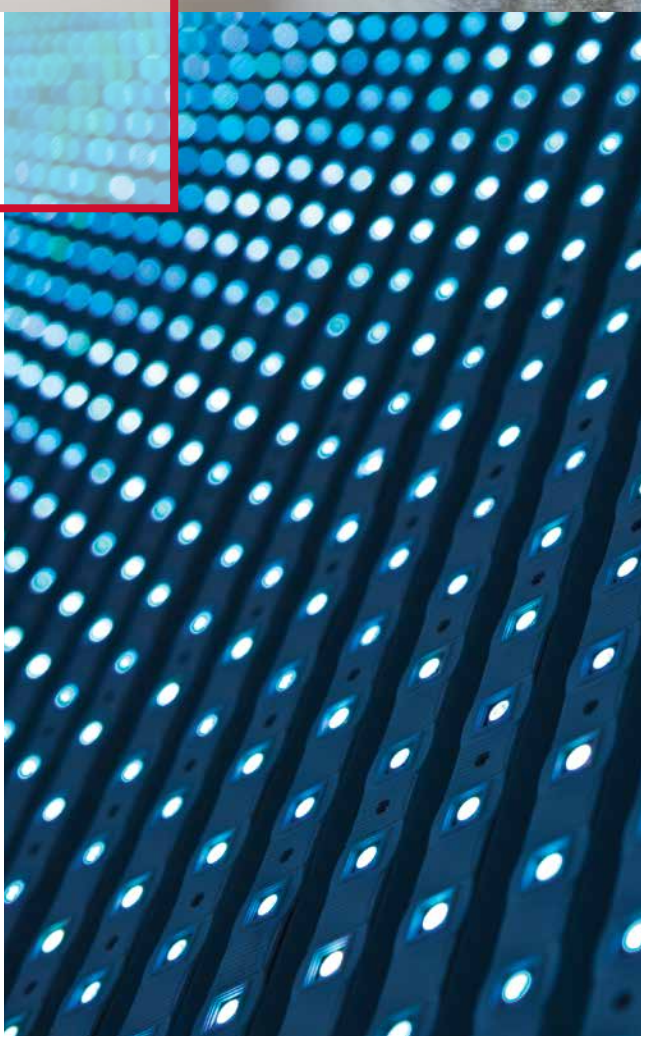
"How do I modernize and innovate in a way that improves customer experience but, at the same time, reduces costs?"

– Survey respondent



44%

Case in point: nearly half (44%) of IDG survey respondents cite IT cost management as the biggest priority over the next two years as organizations work to modernize their technology infrastructure.



There's plenty of consensus across industries: cost control ranks as one of the top three priorities for modernizing infrastructure among state and local government (47%), healthcare (46%), education (43%), large business (53%), and small business (37%) sectors.

For many organizations, cloud promises to deliver on IT modernization while still minimizing operating expenses. A predictable cost structure, a lack of hardware requirements, low upfront capital expenditures — these factors render cloud an attractive alternative to legacy on-premises systems.

But maintaining cloud's cost advantages calls for due diligence on the part of IT leaders. Many organizations rely on the cloud to quickly add computing resources to existing systems. Consider, for example, an accounting firm during tax season, or an e-commerce outfit in the days leading up to Christmas. If not tracked carefully, however, organizations risk adding more services, and more compute power, than needed.

For this reason, one CIO interviewed for this report says, after a significant uptick in IT spend in 2019, he now keeps careful track of cloud utilization and its associated costs. "In this world of SaaS, we have the ability to buy services very quickly," he says. To justify these costs, organizations must keep close tabs on cloud spending, he notes.

Other cost-reduction strategies include optimizing data center space, tightening governance around cloud services, establishing spending limits for IT leaders, and providing greater visibility into data center usage and capacity.

"We're making sure that we maximize the use of our infrastructure by providing tools that enable IT leaders to look and see what compute resources they're consuming," he says. This strategy not only cuts consumption costs, but "makes workers more accountable. If someone goes over budget, they'll need to explain why."

Protecting the Bottom Line

The need for greater cost control is also a top technology investment driver for transforming customer experience and improving organizations' security risk posture.

Fortunately, there is no shortage of IT tools that organizations can rely on to trim costs and stretch precious resources. One organization launched a global optimization initiative to migrate 13 of its legacy best-of-breed applications onto Microsoft and Azure platforms. "We moved every single application, including all of our productivity tools, to our digital workplace," recalls one of the company's executives.

Since then, the company has cut overall IT costs by 30% in areas including infrastructure investments, licensing fees, and operating expenses. Thanks to sophisticated collaboration tools, employees now participate in more than 55,000 events per month without having to pay for travel expenses. And investments in help desk technologies have helped decrease user-reported incidents from 116,000 in 2017 to just 32,000 last year.

"That's 84,000 interruptions at work that have been eliminated from the environment," he says. The result is a more palatable experience for end users, and a productivity boon for time-strapped IT teams, who are now free to focus on core competencies rather than resetting passwords.

Investments in remote work technologies are also paying off, notes one executive: "We're really well-positioned to run our business in 170 countries around the world and feel comfortable that anyone in the organization can get on a call with another individual, share documents, and conduct business, even if they're working from home."

Popular IT practices are even helping organizations achieve long-term cost reductions. Toyota is a perfect example. "Toyota's Agile methodology has identified areas where our IT spend can best align with the business," says Davis. "Continued deployment of Agile and DevSecOps methodologies for projects continues to strengthen quality, schedule, and cost management."

Reducing Costs without Compromise

But cost-cutting measures, no matter how innovative, should not come at the expense of achieving important business outcomes. At Oshkosh Corporation, for example, the primary drivers for modernizing IT infrastructure form a perfect trifecta: improving customer experience, managing the risks posed by legacy systems, and achieving cost reductions.

In fact, Khare says the company's IT leaders are constantly asking themselves, "How do I modernize and innovate in a way that improves customer experience but, at the same time, reduces costs?" Once these cost reductions are realized, he says the next step is to "reinvest savings in business growth and transformation initiatives so that we can create more top-line and bottom-line impact."

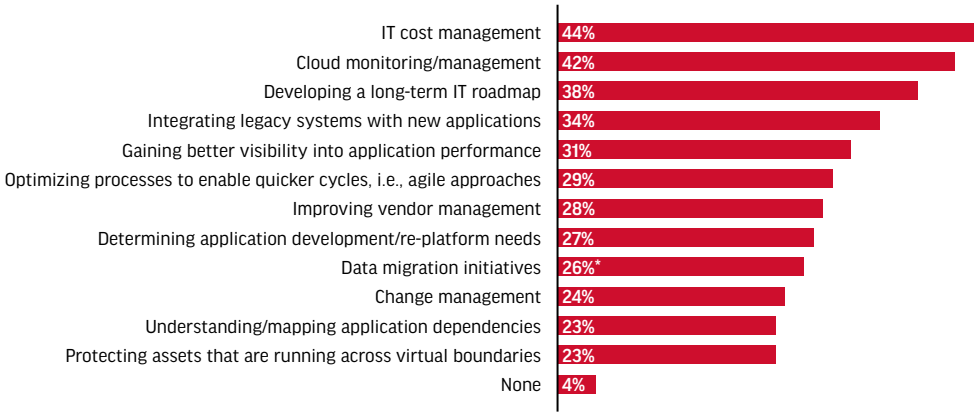
One manufacturer has gone so far as to establish a 1% expense-to-revenue ratio that determines how much money the company will spend on an IT project to generate each dollar of revenue. "We cut out every IT project that doesn't deliver a return on investment or a full return for the business," says the IT leader. "So instead of always talking about how much budget we have, we evaluate everything based on that 1%."

Even in times of volatility, he adds, this "filter" ensures that the company continues to focus on "improving the bottom line while transforming our sales organization, service, accounting, and financing."

Organizations are doing a good job of making sure they maintain their priorities when investing in IT. In fact, the average percent of technology budget allocated to each area matches or nearly matches the level of priority placed on each, proof that even in a volatile economy, organizations can both control IT costs and meet corporate goals. (See chart on Page 15.)

IT cost management (44%) is the biggest priority over the next two years as organizations modernize their technology infrastructure to meet business objectives.

Actions Prioritized Over the Next Two Years to Modernize Technology Infrastructure and Meet Business Objectives



* More often cited by IT management (30%) vs. business management (22%)

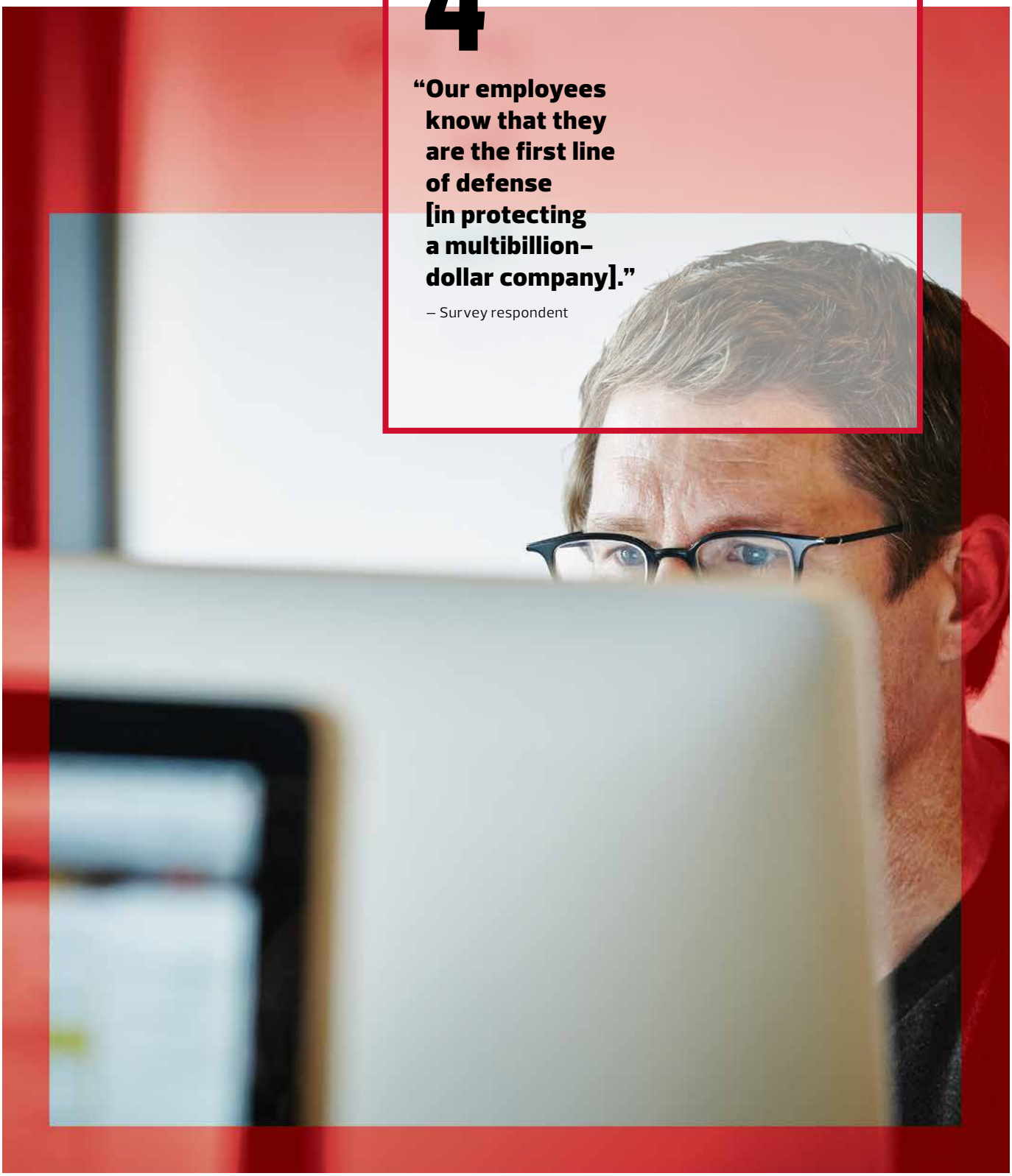
WE GET YOUR PEOPLE MAKE A POWERFUL FRONT LINE.

Today's security threats are more sophisticated than ever. Cyberattacks, phishing attempts, network eavesdropping, malware, and many other hostile actions not only jeopardize the integrity and availability of IT resources, but threaten to impact consumer trust, brand reputation, and business continuity.

4

"Our employees know that they are the first line of defense [in protecting a multibillion-dollar company]."

– Survey respondent



Emerging technologies such as AI and machine learning are upping the ante, providing cyberthieves with new and innovative tools to identify potential targets.

And then there's today's data deluge. This year, the digital universe — the data created and copied annually — is expected to reach 44 zettabytes, or 44 trillion gigabytes, according to market research firm IDC. With each new handheld device and Internet of Things (IoT) sensor, and every new database created, the table stakes for protecting these vast volumes of information grow exponentially.

Consider the statistics: A 2019 IBM/Ponemon study reveals that the global average cost of a data breach is $3.62 million. Unanticipated downtime, precipitated by a breach, can have a calamitous impact on an organization's critical operations, especially in today's volatile and challenging economy. Worse yet, it can take weeks, if not months, to remediate a breach or near-breach.

Although harder to qualify than downtime, a loss of consumer trust in the wake of a cyberattack can significantly compromise a brand's reputation. Among the damages of some of the most widely known cyberattacks: months of bad press, compromised customer trust, and brand dilution – losses that are hard to recoup. In fact, the safeguarding of personal and sensitive data, such as credit card numbers, is increasingly becoming a deal breaker for many security-conscious consumers.


$3.62M
Global average cost of a data breach
Based on a 2019 IBM/Ponemon study

Government Gets in the Act

Consumers aren't the only ones raising the bar on data security. In early 2020, one of the toughest data privacy laws in the U.S. went into effect: the California Consumer Privacy Act (CCPA), which gives Californians greater privacy rights over the personal information that businesses collect about them.

The California law builds on the General Data Protection Regulation (GDPR), which requires companies that handle the data of EU citizens to comply with some of the strictest data privacy regulations in the world, or else face significant financial penalties. For instance, when collecting personal data, companies have to specify what it will be used for, and not use it for anything else.

Failure to meet such regulatory mandates and their security requirements can result in the loss of the ability to accept credit cards, sweeping legal liabilities, and hefty government fines, among other things.

Fortunately, IDG survey findings indicate that organizations are proactively investing in security solutions and strategies to mitigate risk.

"We can no longer just brush cybersecurity and the technical components that underpin those requirements under the rug," says Jeff Falcon, a cybersecurity practice lead at CDW.

The good news is a full half (50%) of IDG survey respondents cite improved security as a primary driver of planned investments in workplace solutions, software, and services, edging out increasing productivity (47%) and better customer experiences (37%) as the top investment triggers.

Given today's strict regulatory environment, spending to meet government compliance/regulation mandates is driving investment in risk identification and mitigation solutions, according to 51% of survey respondents. Respondents also report that hearing about potential cyber risk from industry-related sources can spur investment (45%).

Executive mandates are more likely to drive investments in risk mitigation among federal government agencies (46%), education (39%), and large businesses (56%).

Improving security (50%) is frequently a driver of planned investments in workplace solutions, software and services, edging out increasing productivity (47%) as the top investment trigger.

Primary Drivers of Planned Investments: Workplace Solutions, Software, and Services

The Truth about Insider Threats

Clearly, organizations recognize the importance of investing in powerful solutions in order to circumvent threats and protect confidential data. But while many are already allocating budget to cybercrime-fighting tools, and implementing savvy strategies, such as monitoring and endpoint security, others are not as equipped as they think to reduce their exposure to risk.

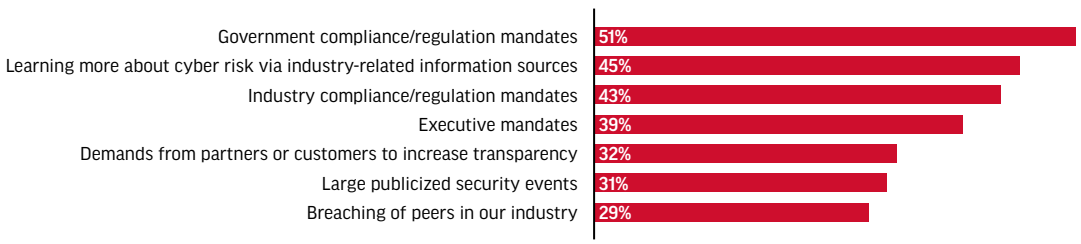
Part of the problem is that many organizations view cyberattacks as the handiwork of foreign operatives, not the missteps of well-meaning employees. Yet employees are one of the leading causes of data breaches today. Workers that unwittingly click on a malicious link or download can instantly unleash malware throughout an entire organization via a phishing or engineering attack.

Complicating matters are Bring Your Own Device (BYOD) policies, which can create a host of security problems, including shadow IT, software vulnerabilities, and legal issues. And finally, many apps, such as collaboration tools, are designed to be used by any device, from smartphones and tablets to a desktop computer. As a result, it can be challenging for IT teams to ensure that security techniques, such as identity management, are consistent across applications – or to integrate security measures across a wide variety of siloed applications with varying degrees of user provisioning and privacy rules.

A lack of authentication, disparate platforms and operating systems, poor compliance with regulations among remote workers – they all make protecting corporate systems challenging for IT teams. Nor is there any sign of abatement as organizations look to remote work as a permanent solution for cutting real estate costs in today's volatile economy. For instance, a Gartner survey reveals that 74% of CFOs say they expect to move at least 5% of their previously onsite workforce to permanently remote positions post-COVID-19 .

Compliance (51%) is a top driver of planned investments in risk identification and mitigation solutions. Respondents also report that hearing about potential cyber risk from industry-related sources can spur investment (45%).

Primary Drivers of Planned Investments: Risk Identification and Mitigation



Creating a Frontline Defense

Although external-facing threats continue to remain a top priority, many organizations are looking inward, recognizing the criticality of educating staff on cybersecurity best practices. In fact, with respect to risk identification and mitigation, IDG survey respondents overall cite increasing security awareness (45%) as a top business goal, as well as improving the understanding of external threats (40%).

To curb employee negligence, many IT leaders are implementing end-user security policies and training programs. One manufacturer offers employees anti-phishing and other types of security training to "create continual awareness" of the security threat landscape, according to one executive.

"We know we will always have one to two percent of employees that will click on some link because cyberthreats continually evolve," said the executive.

Similarly, at Oshkosh Corporation, employees participate in mandatory security training courses as part of "a massive education campaign," according to Khare. "Phishing continues to remain the No. 1 risk area. Cybersecurity training is how we engage team members and make them the first line of defense."

However, not all organizations agree on how to enforce the lessons learned from cybersecurity training. Some subscribe to small incentives, such as providing bonuses, gift cards, or a celebratory dinner to employees that regularly adhere to strict cybersecurity practices.

Publicly championing security advocates can also help to raise awareness in the workplace. A wall-of-fame board in the lobby, a mention in the corporate newsletter, a shout-out at a conference – they're all ways to reward employees for playing a key role in mitigating security risks.

Other organizations prefer to use straight talk to drive security awareness and greater accountability among workers. Says Khare: "We let our employees know that they are the first line of defense in protecting a multibillion-dollar company – that's positive and empowering messaging."

With respect to risk identification and mitigation, respondents overall cite increasing security awareness (45%) as a top business goal, as well as improving understanding of external threats (40%).

Business Problems Trying to Solve: Risk Identification and Mitigation

* More often cited by IT management (35%) vs. business management (26%)

New Ways of Measuring Risk

But corporations are more than the sum of their employees. Today's organizations consist of customers, subcontractors, partners, and parent companies. Together, these vast networks of people connect and collaborate using a wide array of tools and technologies. As a result, a single security misstep — a lost device, an overlooked security update, a nefarious link, a stolen laptop — can easily lead to sweeping security risks for all parties involved.

"Organizations have to recognize the interconnected nature of business and of the world," warns one executive. As a result, he says, "Our biggest risks are advanced persistent threats where a state actor could get access to us, or one of our customers."

An organization's understanding of external and internal threats is a prime indicator of their preparedness to prevent them. In fact, 40% of IDG survey respondents cite improving understanding of external threats as a top-three risk mitigation objective. And 33% are focused on identifying acceptable levels of risk.

Fortunately, some large enterprises are discovering new and innovative ways to increase their security understanding and better evaluate risks. "Security is really about blocking an attack," says one executive. "To assess in a rapid way if there are threats in our supply chain created by a partner, we've migrated to using a security score." The system works like a credit rating score to gauge the security risks a partner or supplier might pose to the company. This approach, he says, "has revolutionized how we think about our ability to manage the risks across our supply base."

Davis of Toyota agrees. "All global organizations face cybersecurity threats," he says. As a result, "Toyota continuously works to address the threats it faces, and also actively works with suppliers and other stakeholders to increase awareness and adoption of leading cybersecurity practices."

Onboarding Business Leaders in the Fight Against Cybercrime

Business leaders must also increase their understanding of the security landscape. "They need to understand that cybersecurity risks are just as important as any other type of risk — financial risk, merger and acquisition risk, research and development risk," says Falcon of CDW. "Then and only then will CIOs and nontechnical business leaders begin to understand and build those bridges to operate in a secure manner."

That's because, typically, LOB leaders express far greater confidence in an organization's ability to thwart an attack — a cognitive dissonance that highlights the varying degrees of awareness and understanding of today's heightened security risks and what's required to stay protected. To avoid frustration — or worse, negligent user behavior — organizations must foster greater communication, collaboration, and knowledge transfer between IT and LOB teams.

One way for IT and LOB leaders to achieve cyberthreat preparedness together is for business leaders to participate in the company's security assessment. Participants highlight where critical business activity resides, what security concerns they have in these areas, and where things might go wrong.

"The leaders of these organizations have to be thinking about cyber risk as not just a technology issue but as a significant business problem that needs to be solved," says CDW's Falcon. "At the end of the day, it comes down to people working together to solve security problems. Everybody has a role to play in the overall risk management of their organization."

Survival Strategies

A strong security posture requires more than employee training exercises and awareness-raising. While "education is a recipe for success," Falcon says organizations must also "embody, live, and breathe a culture of risk awareness."

Embedding this in a company's DNA, he says, involves creating a roadmap so organizations know how "to operate, and continue operating, even in moments of crisis." In fact, when it comes to risk identification and mitigation, 35% of IT managers cite implementing disaster recovery and business continuity strategies as a critical business problem.

Indeed, even the most carefully crafted education campaigns and business continuity plans can miss the mark, especially if a company is relatively new to the cybersecurity arena.

"Our organization is fairly young," notes one executive. "We progressed in leaps and bounds to make sure our infrastructure is secure, but I don't think we've done a good enough job making sure that all of our employees are fully educated."

That's a common refrain. According to IDG survey findings, only 13% of respondents feel they are positioned to gain visibility into and proactively mitigate cybersecurity risks. Comparatively, confidence levels are considerably higher when it comes to improving workplace productivity (32%), modernizing infrastructure (31%), and transforming customer experience (23%).

A Security Toolkit for the Future

The good news is there's no shortage of technology tools promising to safeguard systems against a widening array of threats, including data tampering, advanced persistent threat, Network Denial of Service (DoS) attacks, unauthorized access to corporate financials, compromised customer-facing systems, and ransomware.

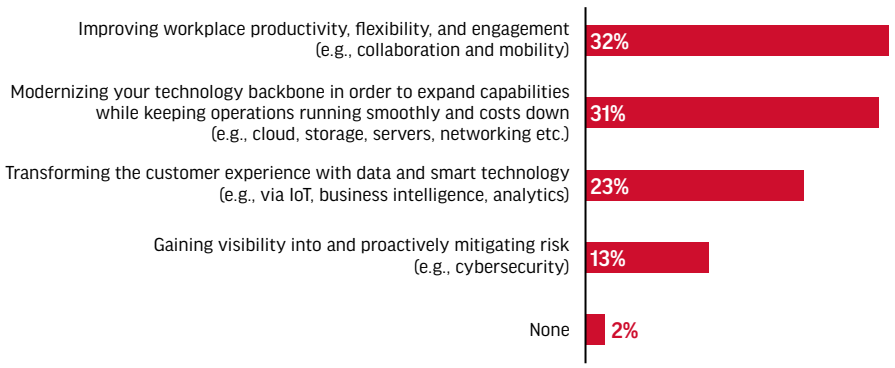
Risk-mitigation solutions under consideration by IDG respondents include web security (39%), network access control (38%), data loss prevention (36%), cloud-based identity management (34%), and email security (33%).

However, preferences vary by industry — some respondents are more likely to cite better use of certain measures than others. For example, 40% of healthcare organizations indicate they're considering security incident and event management (SIEM) technologies to improve their risk posture. Respondents in the education sector point to security assessments using external consultants (37%) and web security (35%) as preferred technologies, while small businesses cite data loss prevention tools (39%) as their solution of choice.

One explanation for these variances is that different types of industries face different types of threats. For example, healthcare organizations are particularly troubled by ransomware, in which an attacker uses malware to encrypt a victim's files and then demands a ransom for their safe return. Hacked medical records can fetch a premium on the black market: In a targeted attack against MongoDB

Overall, respondents feel their organizations are best positioned to meet business goals related to improving the employee experience and modernizing technology infrastructure.

Areas Where Organization Is Best Positioned to Meet Business Goals: Next Two Years



databases, hackers hijacked 26,000 open servers, many of which were used by healthcare organizations to store research data on leukemia patients. The hackers demanded a ransom to restore data on more than 200,000 patients.

The reality is that new and sophisticated cyberthreats are constantly emerging. One of the latest types of malware to surface is cryptojacking. Cryptojacking involves the unauthorized use of a computer or handheld device; the cybercriminal uses malicious code, hidden on a website or embedded in a link, to take control of a victim's computing resources for the purpose of mining cryptocurrencies — a form of digital currency.

However, as new and sophisticated cyberthreats multiply, so too do the solutions that promise to thwart them. As a result, IT leaders must constantly look to add to their security toolkits. "Toyota actively tracks the market for cybersecurity solutions," says Davis.

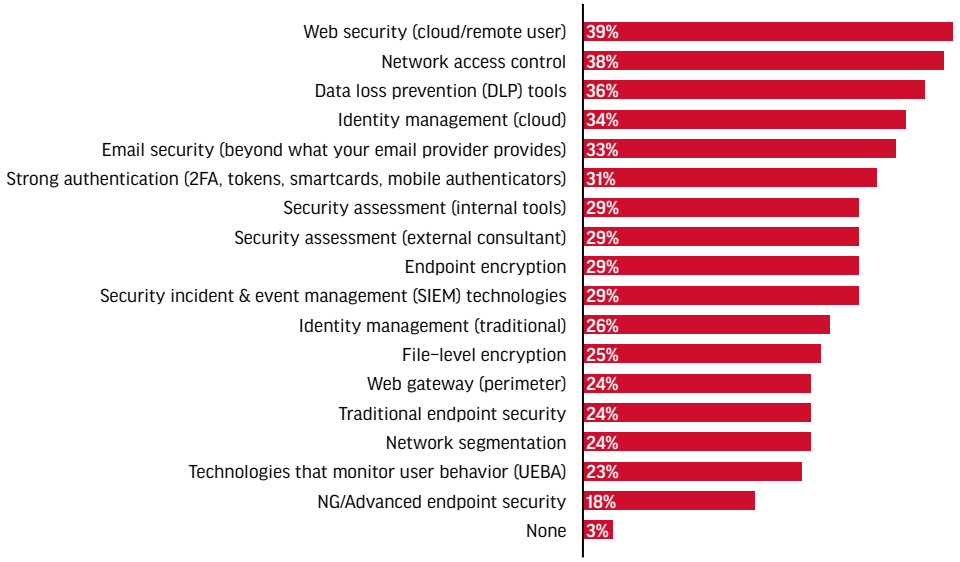
In fact, cybersecurity has emerged as an ideal use case for innovative technologies including AI and machine learning. By sifting through vast volumes of security data and automating security monitoring tasks, AI-equipped security solutions promise to reduce time to discover threats while freeing time-strapped IT teams from routine tasks.

For example, at Oshkosh Corporation, Khare says the IT team is exploring "how we can use advanced AI-based technologies to proactively understand security risks and improve profitability."

Although best known for improving customer experiences and predicting market trends, data analytics is gaining traction as a powerful weapon in the fight against cyberattacks. Forty percent of those in federal government, and 43% of healthcare respondents, cited better use of data and analytics as a top risk mitigation goal. By parsing vast volumes of data, these analytics tools can quickly identify anomalies in networks and device behavior. So too can IT leaders use data and analytics to build predictive models that can identify areas of vulnerability and issue alerts before an attack occurs.

ITDMs cite web security (39%), Network Access Control (38%), DLP (36%), cloud-based identity management (34%) and email security (33%) as their top risk management–related investment considerations over the next two years.

Technologies Under Consideration to Improve Organization's Risk Posture (Asked of IT Titles Only)



Technology As a Helper, Not Hindrance

Despite its potential to fight cybercrime, technology can also act as a roadblock, preventing IT leaders from safeguarding their systems. Bolting new security solutions onto legacy systems, for example, "can be costly," exacerbate IT headaches, and widen an organization's risk exposure, warns CDW's Falcon.

Another technology misstep: investing in "specific technology tools" without first "prioritizing the whole process of risk mitigation," says Falcon. First, he says, IT leaders must assess how a cyberattack might impact various segments of the business, and the types of solutions best suited to mitigate these risks and limit damages.

Next, organizations should take an inventory of the devices, applications, data, and infrastructure that make up IT's expanding footprint in the company and consider their risk posture. Questions to ask include: How might a hybrid environment contribute to data leakage or inadequate compliance? How can vendor-specific dashboards, consoles, and logs get in the way of a risk mitigation plan?

Following this technology risk assessment, Falcon says organizations must evaluate whether they have employees with the skill sets needed to prevent cyberattacks. In the past, companies relied on single-purpose solutions, such as web application firewalls and perimeter protection tools, to safeguard systems against relatively known cyberattacks.

But that's no longer enough. Unlike yesteryear's rudimentary solutions, Falcon says today's security tools are "a conglomeration of technologies that address multiple areas of an organization's interconnected systems and networks."

Respondents in all vertical segments cite web security among the top five technologies under consideration to mitigate risk.

Top Five Technologies Under Consideration to Improve Organization's Risk Posture (by Segment, asked of IT Titles Only)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
Web security (cloud/remote user)	39%	44%	37% (tie)	35%	44%	37%
Network access control	46%	40%		33%	48%	
Data loss prevention (DLP) tools		44%	39%		40%	39%
Identity management (cloud)	39%	37%	37% (tie)	35%		
Email security (beyond what your email provider provides)		35%				39%
Strong authentication (2FA, tokens, smartcards, mobile authenticators)	46%					29% (tie)
Security incident and event management (SIEM) technologies			40%	31% (tie)		
Security assessment (internal tools)				31% (tie)		
Security assessment (external consultant)				37%		
Endpoint encryption	41%					
Traditional endpoint security						
Identity management (traditional)						
File level encryption					38%	29% (tie)
Technologies that monitor user behavior (UEBA)			37% (tie)			29% (tie)
Network segmentation						
Web gateway (perimeter)			37% (tie)		44%	
NG/Advanced endpoint security						

Respondents in large and small private-sector businesses are more likely than others to seek recommendations for relevant technologies and services to improve visibility into and mitigate risk.

Top Three Actions Prioritized Over the Next Two Years to Gain Visibility and Mitigate Risk (by Segment)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
Identifying opportunities for performance improvements and cost savings		37%	50%	35% (tie)		39%
Providing relevant and contextual training for staff	48%		42%	36%		35%
Developing an organizationwide risk management strategy	46%	41%		35% (tie)	40%	
Developing or hiring the correct skill sets	40%		39%			
Redesigning cybersecurity processes		39%				
Developing technology deployment/integration/rollout strategies					43%	
Determining which skills are needed to support cybersecurity risk management and identifying gaps						
Redefining risk management-related roles and responsibilities				36%*		
Increasing process automation				35% (tie)		
Seeking recommendations for relevant technologies and services					39%	38%
Defining milestones/measures of success						

* Respondents employed in K-12 Education are significantly more likely than those in Higher Ed to cite "redefining risk management-related roles and responsibilities" (46% vs. 26%)

As a result, the skills required to manage these environments have also evolved to include "the discipline to sustain the proper business processes around cyber risks," says Falcon. "Cybersecurity is about more than just investing in a product that protects email by setting it, forgetting it, and walking away."

Rather, he says, IT leaders must have the skills necessary to continuously monitor systems for anomalies and perform frequent internal cybersecurity audits. Policy management software, for example, can generate reports that provide an audit trail highlighting a company's security compliance posture and vulnerabilities.

IT leaders can't act alone in risk mitigation. Developing a strong security posture also requires C-suite support, which is best earned through the establishment of a dedicated security function.

Greater external support can also provide organizations with the objective perspective and expertise needed for today's new state of security. For example, a third party can conduct a security checkup or assessment to help an organization understand their security posture, and patch gaps that they didn't even know existed. After all, a proactive stance against imminent threats can shield an organization from the legal liabilities, productivity losses, and reputational impact of a highly publicized breach.

Interestingly, respondents in large and small private-sector businesses are more likely than others to seek recommendations for relevant technologies and services to improve visibility into and mitigate risk. Large businesses, with their treasure troves of data, are prime targets for ill-intentioned hackers. Fortunately, third-party provider services, such as vulnerability assessments, penetration testing, configuration reviews, application assessments, and compliance assessments, can provide a comprehensive understanding of security shortfalls. Alternatively, small businesses are more likely to turn to a third-party provider for security expertise and assessment tools due to a lack of internal resources.

With technology stacks growing and compliance regulations tightening, IT leaders must move beyond simple preventative measures. Certainly, new tools exist to mitigate security risks. But the urgency of the matter also calls for new strategies — reskilling workers, leveraging AI, conducting third-party vulnerability assessments — to stay one step ahead of cyberthreats.

WE GET MEETING CUSTOMER EXPECTATIONS. AND THEN SOME.

Today, customer expectations are at an all-time high. Thanks to smartphones and 24/7 connectivity, consumers can price-check products on the spot, receive real-time responses to pressing questions, and engage with brands that cater to their unique buying patterns and delivery preferences.

5

“Individuals want to feel heard … they want products that will help them with their own personal goals and lifestyles.”

– Survey respondent

No sector is exempt. Many citizens expect to pay taxes, renew parking permits, and apply for benefits on municipal websites.

Grocery store shoppers rely on their smartphones to instantly check and reload their loyalty card balances. And more and more patients are using online portals to book appointments and access lab results.

Meeting these high demands is now table stakes for most organizations. No longer can retailers, government agencies, and healthcare organizations rely on outdated profiles and static documents to win over today's super-connected, hyper-informed consumer.

Rather, organizations are increasingly turning to innovative technologies to construct a 360-degree view of their customers. Chief among these solutions is data analytics: more than half (56%) of IDG survey respondents cite data analytics as the top technology investment under consideration to improve customer experience.

By sifting through vast volumes of data, from demographic details to social media activity, analytics can uncover customer needs and emerging trends — information that can be leveraged to create tailored experiences and personalized services. Benefits vary from increased conversion rates for e-commerce companies and stronger enrollment figures for universities to enhanced customer loyalty for small businesses.

Oshkosh Corporation is a prime example. The company deployed an advanced data analytics system last year. By parsing customer order, supply chain, and manufacturing data, it can predict margins and modify the production mix. Analyzing supply chain and sales data also helps Oshkosh Corporation "optimize production lines," says Khare. And future plans include using data analytics to predict customers' buying behavior to improve delivery accuracy and timeliness.

Toyota is also using data analytics to better serve its customers. "We employ various data and analytic tools to improve our products, services, customer experiences, and customer loyalty," says Davis. "This includes the analysis of data to understand preferences, expectations, and behavior as market and competitive landscape changes."

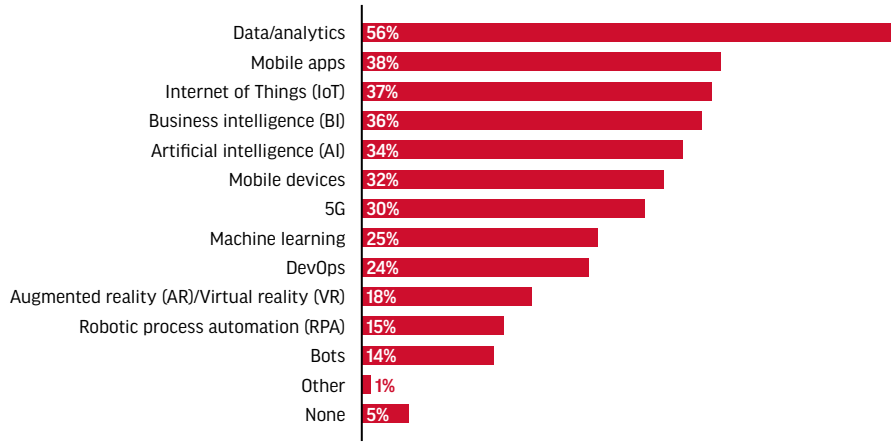
56%

Data Analytics

More than half (56%) of IDG survey respondents cite data analytics as the top technology investment under consideration to improve customer experience.

Data analytics (56%) is by far the top technology investment under consideration to improve customer experience.

Primary Drivers of Planned Investments: Technology to Transform the [Customer/Patient/Constituent/Student] Experience



Big Data and Beyond

Data analytics solutions aren't the only conduits to happier or more loyal customers. Although there is a lot of consistency across industries when it comes to planned technology investments, emerging technologies are fast gaining traction in certain sectors.

Case in point: one-third of IDG respondents in the education sector plan to invest in 5G over the next two years. And for good reason: 5G promises to revolutionize networking by delivering greater bandwidth, lower latency, and speeds of up to 100 times faster than current LTE networks for users (in this case, students). This next generation of mobile networks also allows for the connection density to support 1 million devices per square kilometer – ideal for universities that must deliver reliable wireless networking to thousands of remote and geographically scattered students.

And more than half – 52% – of large businesses plan to make investments in IoT over the next two years. Logistics companies are ideal candidates. Shipping giants such as UPS, FedEx, the U.S. Post Office, and DHL are facing mounting pressure to meet rising consumer service expectations while also increasing efficiencies and cutting costs. For many, the answer is to readily embrace emerging technologies in new and innovative ways. UPS trucks, for example, have more than 200 sensors to collect data points on vehicle operations. This data is fed into a UPS analytics system, which analyzes overnight whether new truck parts are needed. By proactively predicting equipment failures, the IoT-enabled system helps prevent delays, improve productivity, and better serve customers with up-to-date delivery information.

There is a lot of consistency across vertical segments when it comes to planned technology investments to improve customer experience. Planned investment in 5G is most likely to be cited by those in the education vertical.

Top Five Technologies under Consideration to Improve the [Customer/Patient/Constituent/Student] Experience (by Segment, asked of IT Titles Only)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
Data/analytics	49%	63%	61%	47%	56%	60%
Mobile apps	32%	35%	48%	31%	46%	33%
Business intelligence (BI)	37%	37%	37%		44%	33%
Internet of Things (IoT)	29% (tie)	27% (tie)	37%	37%	52%	40%
Artificial intelligence (AI)	34%		40%	37%	42%	29%
Mobile devices		38%				
5G	29% (tie)	27% (tie)		33%		
Machine learning						
DevOps		27% (tie)				
Augmented reality (AR)/Virtual reality (VR)						
Robotic process automation (RPA)						
Bots						

Cornering the Online Market

Although use cases for customer experience–enhancing technologies, such as data analytics and IoT, run the gamut, the IDG research indicates that the majority of survey respondents (40%) plan to use them to improve online customer experiences.

It's not surprising given that, by 2021, the global e-commerce market will approach a whopping $5 trillion, according to eMarketer. A well-designed website that's easy to use, helps consumers achieve their goals, and delivers custom content is more than simply a calling card; it's a precious piece of real estate that can drive sales and foster brand loyalty.

Another way to parlay technology into a compelling customer experience: capture real-time customer feedback, say 39% of IDG survey respondents. One example: online surveys that gather responses from targeted audiences in a relatively fast and cost-effective way.

Similarly, social media channels allow organizations to directly interact with their customers. "Social media is a way for consumers to let their friends and followers know why they had a certain experience," says Joe Starofsky, an analytics senior field solution architect at CDW.

But unlike online surveys, social media channels allow for a two-way dialogue. These real-time exchanges can be revelatory, allowing an organization to gather firsthand insights into a product's strengths, a staff member's knowledge gaps, even a competitor's pricing. The result is a powerful feedback loop that not only delivers critical insights but keeps customers engaged.

Social media channels also allow organizations to provide customers with fast and accurate answers to a wide range of questions. According to research from Convince & Convert, 42% of consumers expect a response from a company within 60 minutes and 32% expect a response within 30 minutes. Real-time communication via social media channels significantly increases the likelihood of a compelling customer experience, and it can be strategically supplemented with phone-based customer support agents and online FAQs.

When it comes to customer experience, 35% of IDG survey respondents cite improving mobile interactions as a top use for technology. With 260 million smartphone users in the U.S. alone, BI Intelligence predicts that mobile commerce will reach $284 billion, or 45% of the total U.S. e-commerce market, in 2020.

Engaging these mobile consumers requires understanding how they're using an app, which features of the app they interact with, and what actions they take within the app. A data analytics solution can gather these details, and from there, offer insights about how new features or capabilities can increase engagement. Better yet, by combining app usage data with customer behavior and buying habits, the result is a truly 360-degree view of the customer.

"Analytics helps organizations stay on the cutting edge by hearing what their customers want," says CDW's Starofsky. "Individuals want to feel heard and they want products that will help them with their own personal goals and lifestyles. Being able to understand whether someone is married or not or if they have children, as well as what their views and interests are, ultimately helps organizations cater to individuals, not just the masses."

Take McDonald's, for example, which faces mounting mobile competition. According to the NPD Group, restaurant digital orders have increased at an average annual rate of 23% since 2013 and will triple in volume by the end of 2020. Sixty percent of these orders are placed via mobile apps — a figure that's only likely to grow as the number of smartphone users across the world tops 3.8 billion by 2021.

To differentiate itself, McDonald's delivers customers personalized experiences with unique features such as discounts on frequently ordered items, and customization options such as substituting a folded egg for the scrambled variety on any breakfast sandwich.

In the new age of food pickup and takeout, Domino's Pizza was one of the first to start capitalizing on the idea of a digital customer experience. In 2017 Domino's Chief Digital Officer Dennis Maloney reported in Think with Google that 60% of all Domino's orders were done online, and half of those came through mobile devices. As described by Maloney in a 2018 interview with *Forbes*, driving this mobile engagement are key features, including Zero-Click, which allows consumers to receive their go-to pizza order simply by downloading the app, connecting it to their Domino's profile, and selecting the "Easy Order" option. Customers can also request zero-contact delivery — a delivery person places the pizza in a bag, sets it on the doorstep, moves back a safe distance, and then waits for the customer to open the door and receive the order.

Competing Priorities across Titles, Industries

Despite mobile mania, IDG survey findings indicate that business leaders are more likely to cite improving the online experience as an investment priority than are IT leaders (44% vs. 36%). One possible explanation is increasing digital awareness among business teams, as well as the online world's rising reputation as the first point of contact between customers and organizations.

IT executives, on the other hand, are more likely to use a dedicated customer community or portal to improve customer experience than are those in business management (37% vs. 27%). This discrepancy may best be explained by the collaborative nature of IT and its history of reliance on community portals, such as GitHub, to share source code and app development strategies.

State and local government organizations indicate they are likely to include self-service enablement on their list of improvements over the next two years. It's easy to understand why: Many government agencies face staffing shortages and are bogged down by bureaucracy. By enabling citizens to access health records, download education materials, and identify government services on their own, for example, public agencies can significantly enhance service delivery, improve operational efficiencies, and respond faster to more urgent, potentially lifesaving constituent requests.

This is critical as citizens increasingly expect consumer-grade accessibility and modern functionality from government apps and websites.

Alternatively, 50% of IDG survey respondents in the healthcare industry plan to rely on real-time capture of feedback for improving customer experience, while 46% of those from large businesses anticipate leveraging new engagement channels, such as social media, to reach their customers.

Drivers for Customer Experience

Despite the widening array of technologies used to create a 360-degree view of a customer, there is a common set of drivers for increased investment.

Nearly half (43%) of IDG survey respondents view cost control as a primary reason for investing in customer experience–enhancing tools. Given today's volatile economy, organizations need to carefully select the technologies and touchpoints they believe will produce the most value. For some, community portals will deliver the greatest return on investment. For others, social media

Use of technology to improve the customer experience includes improving the online experience (40%), capturing real-time customer feedback (40%) and enabling secure information access from anywhere (39%).

Planned Use of Technology to Improve the [Customer/Patient/Constituent/Student] Experience — Next Two Years

* More often cited by business management (44%) vs. IT management (36%)
† More often cited by IT management (37%) vs. business management (27%)

State and local government organizations are likely to include self-service enablement on their list of improvements over the next two years, while those in federal government are prioritizing a 360-degree constituent view.

Top Three Planned Uses of Technology to Improve the [Customer/Patient/Constituent/Student] Experience (by Segment)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
Creating or improving online experiences for [customers]	35% (tie)	43%	48%	40%		
Real-time capture of [customer] feedback			50%	46%	41% (tie)	42%
Providing ways to access information securely from anywhere (e.g., secure networks, mobile apps)	40%		47%		41% (tie)	42%
Providing employees with real-time, contextual [customer] information	38%					
Adding or improving mobile experiences for [customers]		36%				39%
Establishing a dedicated [customer] community or portal					42%	
Enabling a consistent user experience across location, time and channel						
Enabling self-service for [customers] (e.g., fulfilling orders, accessing health records, accessing educational materials and/or grades, finding government statistics)		37%				
Leveraging new engagement channels (e.g., social media)				36% (tie)	46%	
Personalization/contextualization of [customer] interactions				36% (tie)		
Combining internal and external data to build a 360-degree [customer] view	35% (tie)					

channels are a smart and cost-effective means to reach consumers and partners in real time. Either way, careful vendor selection and upfront planning are critical to achieving favorable results.

Another factor incentivizing organizations to invest: a growing need to protect customer privacy, according to 42% of respondents. Toyota is one such company. "We are committed to the privacy and security of the customer personal information we collect and process," says Davis.

Case in point: nearly 4,000 customer breaches occurred in the first half of 2019 alone, exposing 4.1 billion records, according to Norton, a software security firm. These breaches, with root causes ranging from human error to vulnerable point-of-sale payment systems, can take a significant toll on consumer loyalty.

Complicating matters is the fact that today's IoT systems require vast volumes of data to produce actionable insights. These systems not only create new endpoints — and new vulnerabilities — but they also rely on complex algorithms, making it difficult for organizations to be transparent about the processing of personal data.

Respondents in sectors including federal and state government (43%), as well as large business (56%), cite a changing and stringent regulatory environment as heavily influencing their investment decision-making when it comes to customer experience. Companies that fail to comply with data privacy and protection regulations such as California's CCPA law, the GDPR, the U.S. Health Insurance Portability and Accountability Act (HIPAA), and Payment Card Industry (PCI) standards face potentially crippling financial penalties and resulting revenue loss.

However, one-third of respondents in small businesses view today's "always-on economy" as a key customer experience technology-investment driver. These days, consumers expect instant access to information on everything from product availability to return policies. By equipping warehouses with sensors, retailers can determine the exact location of a product and track how many are on the shelf. The result is more accurate inventory, faster fulfillment of orders — and happier customers. Similarly, chatbots enable small businesses to compete with their deep-pocketed competitors by offering customers 24/7 support — without the overhead of a sprawling call center.

Beyond the Technology

But it takes more than technology to transform customer experience. More than one-third (37%) of survey respondents intend to redesign processes so that they align with their technology investments. Consider, for example, data analytics technology.

"Being able to collect all these different data points, aggregate them in one place, analyze them, and make decisions based upon them, is the future of most organizations," says Starofsky of CDW.

However, factors such as unstructured data, data silos, data duplication, and incomplete data can prevent organizations from gleaning accurate insights. Building a strong data science foundation involves data cleansing and validation — processes that are often overseen by third-party providers.

"Analytics vendors can help organizations collect the data, validate the data, and make sure that it's in the correct format," says Starofsky. Another upside to working with a third party: knowledge of best practices. For example, many organizations make the mistake of loading a data analytics solution's front-end visualization and backend workloads onto core systems, such as a customer relationship management (CRM) or enterprise resource planning (ERP) solution. A third-party provider, however, can shift these workloads to a data warehouse for better quality control, data governance, and faster system performance.

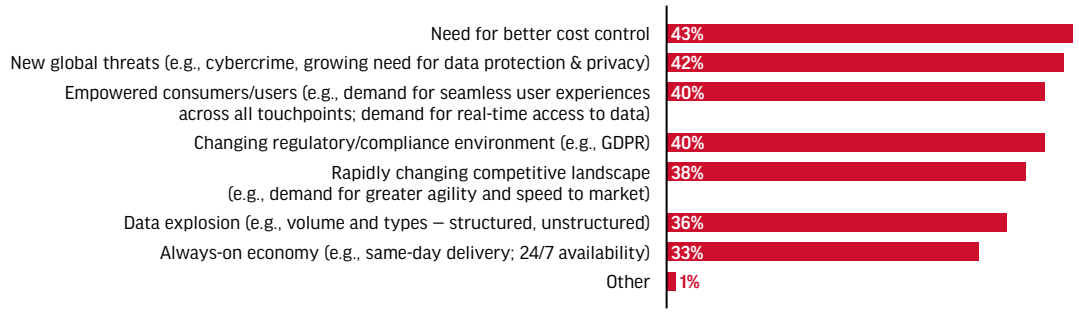
Another critical component in transforming customer experience: the right people. Thirty-six percent of IDG survey respondents place a premium on staff training, while the same percentage cite providing relevant training for staff as necessary to meeting their customer experience objectives over the next two years.

That's not easy given today's IT talent shortage. By 2030, the global talent shortage could reach 85.2 million people, according to a Korn Ferry Institute report. Technology, media, and telecommunications industries will be particularly hard hit. Korn Ferry's research predicts a deficit in digital talent of 4.3 million people by 2030, or 59 times the entire workforce of Alphabet, Google's parent company, at a cost of $449.7 billion in unrealized revenue.

The most sought-after skills include Big Data and analytics, according to a KPMG CIO survey. And more than one-third (38%) of KPMG respondents report suffering from a shortage in AI skills, specifically.

Cost control (43%) is a top driver of planned investments in technology to transform the customer experience, as well as a growing need to protect customer privacy (42%).

Primary Drivers of Planned Investments: Technology to Transform the [Customer/Patient/Constituent/Student] Experience



Luckily, many organizations are discovering new and innovative ways to train their talent on tools that promise to deliver a 360-degree view of customers. Case in point: Professional services firm PricewaterhouseCoopers created a Digital Fitness app that allows employees to conduct a personalized assessment of their technology skills. If any knowledge gaps are identified, the app guides them to customized educational content across a wide variety of domains, from AI to blockchain.

In addition to hiring and upskilling IT talent, many organizations are teaching business leaders about how the right technology tools can shape a 360-degree view of the customer.

"We are educating the value of analytics to almost every part of the business," says Khare of Oshkosh Corporation. "We are working with our business teams to identify the particular problem where they think analytics can add value."

Raising awareness not only drives adoption of data analytics tools among business units but enables IT teams to ask better questions of the data they're collecting for more meaningful and relevant results.

Widening the Lens

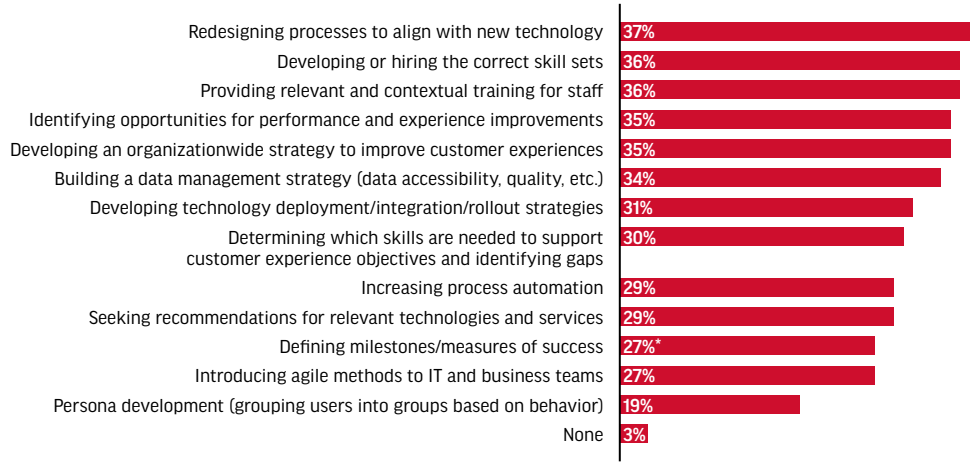
Some IT teams are even expanding their definition of what it means to create a 360-degree view.

"I've moved beyond the 360-degree view of the customer," says one executive. "It's really about the 360-degree view of the entire digital enterprise." Whereas organizations have long relied on CRM systems to provide insights into customer behavior, he says, this "expanding" view entails regarding every function of the business as a valuable source of information — tidbits with the potential to shape better customer experiences.

However, organizations that wish to widen the aperture of customer experience should start early by investing heavily in data architecture. Indeed, an executive at a cloud data management company said his company's data infrastructure is specifically designed to pull data from a wide variety of sources, from telemetry to accounts payable, "so that we can paint this 360-degree view of what's going on in the organization, across the board, for any component, whether it's a customer or an employee."

Top priorities with respect to transforming the customer experience over the next two years include process redesign (37%), hiring people with the right skill sets (36%), and staff training (36%).

Actions Prioritized over the Next Two Years to Transform the [Customer/Patient/Constituent/Student] Experience



* More often cited by IT management (31%) vs. business management (23%)

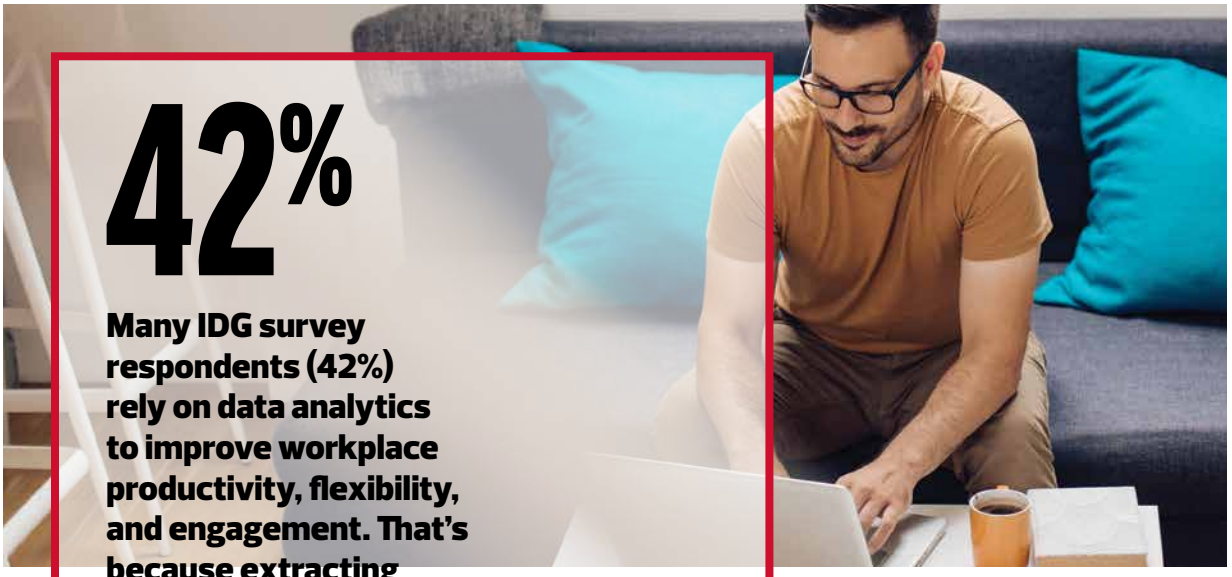
WE GET YOUR DIGITAL WORKSPACE NEEDS TO WORK SMOOTHLY IN ORDER FOR YOUR PEOPLE TO.

Thanks to consumer-grade expectations, organizations are under unprecedented pressure to provide secure and easy access to everything from enterprise apps and collaboration platforms to secure documents, where and when users want, using whatever device they choose, from any global location.

6

“Employee experience boils down to the ability to access applications safely, securely, and without hassle.”

– Survey respondent

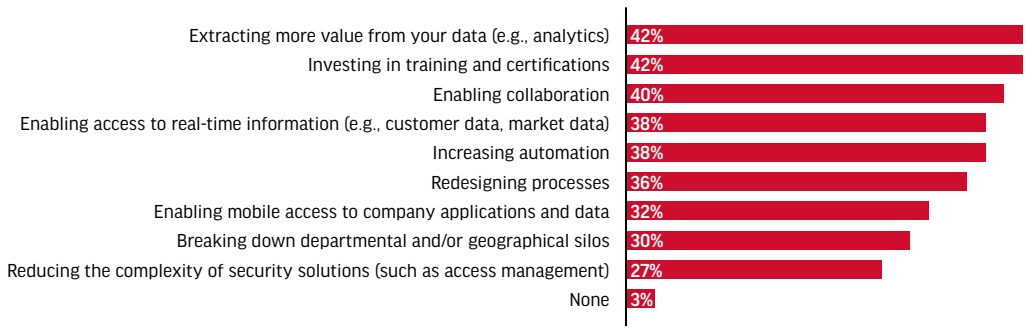


42%

Many IDG survey respondents (42%) rely on data analytics to improve workplace productivity, flexibility, and engagement. That's because extracting more value from data can unleash enormous workplace benefits.

Top uses of technology to improve workplace productivity, flexibility and engagement include better use of data analytics (42%), investing in training (42%), and enabling collaboration (40%).

Planned Use of Technology to Improve Workplace Productivity, Flexibility and Engagement — Next Two Years



The good news is that the average number of workplace solutions in use is on the rise, as is IT budget allocation for these tools, according to the IDG survey. Together, these tools promise to boost innovation, improve productivity, and deliver greater efficiencies for a more engaged and better-balanced workforce.

Many IDG survey respondents (42%) rely on data analytics to improve workplace productivity, flexibility, and engagement. That's because extracting more value from data can unleash enormous workplace benefits.

Consider, for example, workforce analytics. According to the Center for American Progress (CAP), it can cost anywhere from 50% to 150% of a worker's annual salary to replace them. Fortunately, data analytics can reduce employee attrition by identifying high-performing workers at risk of leaving the company. The data could show, for example, that these employees do not feel sufficiently challenged, or that they're frustrated with new management.

Regardless of the reasons behind them, these data-driven insights provide employers the opportunity to take preemptive action, such as offering a promotion or raising a salary. A workforce analytics tool can also better forecast staffing needs to maintain a robust talent pipeline, monitor employee performance in real time, calculate compensation strategies, and even conduct cost-benefit analyses of employee training programs. The result: highly productive teams as well as higher employee morale and lower workforce management costs.

Reaping the benefits of data analytics takes more than seamlessly deploying a technology solution, however. Just ask Khare at Oshkosh Corporation. To make the most of its data analytics investment, he says, the company is taking steps that include, "hiring a team of data scientists, building the infrastructure, focusing on use cases, and educating our workforce on how to exploit the data."

In addition to data analytics, 40% of IDG survey respondents cite enabling collaboration as key to improving workplace productivity, flexibility, and engagement. Group chat apps, for example, let workers share documents, deliver private messages, and search conversation threads without interrupting workflows.

Web conferencing and telepresence solutions also facilitate collaboration by connecting geographically disparate teams virtually. For example, doctors can use telehealth apps to speak directly with remote patients, then send file attachments such as X-rays, share screens to explain test results, and even bring in a third party, such as a medical specialist, for expert input, all in real time.

And then there are time-strapped IT teams. In today's fast-paced work environment, IT staff can't afford to spend lengthy periods of time resetting employee passwords and troubleshooting Wi-Fi connectivity. Collaboration tools, such as instant messaging and social enterprise applications, can help by accelerating information sharing and providing fast answers, in real time, for speedy problem resolution.

Although use cases for collaboration tools vary, the goals are fundamentally the same across industries: faster, real-time access to accurate information and insights. "Employee experience boils down to the ability to access applications safety, securely, and without hassle," explains one executive. This requires, he says, not only ensuring that network bandwidth is sufficient but deploying tools, such as instant messaging platforms, that allow employees to participate in "day-to-day conversations" and better collaborate on projects.

Various Approaches to Productivity

How organizations use technology to boost employee productivity differs by industry. For example, nearly half (49%) of IDG respondents in the federal government sector cite increasing automation as a top priority. By automating time-consuming, repetitive processes, such as filing tax returns and passport renewals, agencies can ease employee workloads while boosting productivity, reducing operating costs, and improving service offerings.

Automation also ranks as a high priority among 45% of large businesses. Oshkosh Corporation is a perfect example. The company recently deployed chatbots to reduce workloads for its IT help desk workers. The result of chatbots and consolidation of three help desks into one single entity produced a 30% reduction in help desk calls. "We are creating a more frictionless environment for our team members to connect to the help desk," says Khare.

Automation can also help reduce time-consuming, mundane IT infrastructure activities. Consider, for example, the IT department of a multinational manufacturer. Overseeing the ongoing performance and security of its infrastructure entails time-consuming manual tasks, such as configuring systems and software. By automating server provisioning, configuration management, and system monitoring, however, IT teams can improve process efficiencies for greater productivity and lighter workloads.

Reasons to Invest in Workplace Solutions

Nearly half (47%) of IDG survey respondents cite improved productivity as the top trigger for investing in workplace solutions, only surpassed by security (50%). And for good reason: setting employees up for success can mean the difference between retaining productive workers and constantly recruiting and training new hires.

Consider, for example, the widespread popularity of virtual desktop technology. Virtual desktops allow for greater productivity and collaboration, as all network devices with the same security settings have access to the same data and software.

But while virtual desktops let employees access their own personal workspaces anywhere, CDW's Gibes warns that if they are not well architected and supported, it can take as long as 15 minutes to log in, resulting in "wasted time" and daily "frustration."

Worse yet, Gibes says, today's employees expect instant-on experiences from their mobile devices. As a result, he says, even occasional delays using virtual machines can prompt high-value workers "to leave and join other organizations, just because it took too long for them to access the resources they needed to do their job, even though everything else about the company was great."

From an industry perspective, large businesses (49%) are most likely to cite driving revenue as a key incentive for workplace solution investments. However, 53% of respondents from both the healthcare and education sectors are focused on increasing security. After all, both sectors are particularly vulnerable to

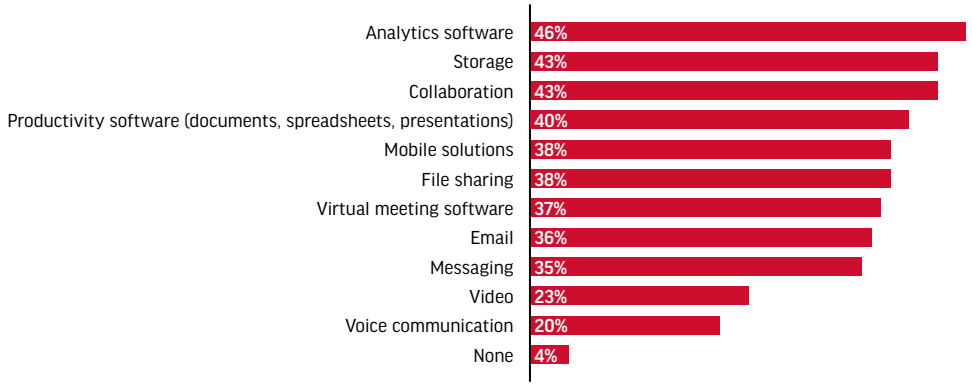
Respondents in the large business segment are the most likely to cite driving revenue as a top driver for workplace solution investments.

Top Three Drivers of Planned Investments: Workplace Solutions, Software and Services (by Segment)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
Improved security	51%	49%	53%	53%	47%	47%
Improved employee productivity		47%	51%	40%	54%	49%
Improved process efficiency through automation	46%					
Cut costs						
Create better end-user experiences			48%	44%		
Improved responsiveness to internal organizational needs	43%	39%				
Improved responsiveness to external customer needs						
Staying ahead/on pace with competition						39%
Improved staff retention rates and team morale						
Drive revenue					49%	

IT executives overall cite planned investments in analytics software (46%) and storage (43%) to help employees better use and manage data, as well as investments in collaboration technology (43%).

Technologies under Consideration to Improve Workplace Productivity, Flexibility, and Engagement (Asked of IT Titles Only)



ransomware attacks, in which malware encrypts a victim's files, or worse, entire fleets of computers, effectively shutting them down.

As the workplace technology solution landscape evolves, IT executives are also considering investments in analytics software (46%) and storage solutions (43%) to help employees better use and manage data, as well as investments in collaboration (43%) and productivity software (40%).

As is often the case, future investment goals vary among sectors. Analytics software factors high among those in state and local government (62%), healthcare (48%), and large (44%) and small (54%) businesses.

However, federal government and healthcare respondents cite mobile solutions among their top planned investments (44% and 45%, respectively). The reasons are clear: unable to compete with the private sector on pay, government agencies must provide young hires and current field-workers with mobile devices and remote access to critical systems. Time is of the essence given the federal government's aging workforce: the median age of U.S. public servants is 45.6, according to the U.S. Bureau of Labor Statistics.

At the same time, healthcare professionals now rely heavily on mobile tablets and smartphones to track and store patient information. IT teams within both these sectors also require mobile connectivity to maintain high levels of productivity. Handling system upgrades and maintenance activities from remote desktops during off-hours can lead to greater business continuity and less user downtime while providing employees more flexibility.

Overcoming Integration and Security Hurdles

According to some IDG survey respondents, one of the most pressing challenges of improving workplace productivity is "integrating new technologies with existing equipment." Finding the right combination of solutions isn't easy. Many of today's workplace solutions are designed for use with any device, from smartphones and tablets to desktop computers. Yet an organization's reliance on legacy systems can make it difficult to achieve seamless integration.

Another challenge facing IT teams is security. Federal government (51%), state and local government (49%), healthcare (53%), education (53%), large business (47%), and small business (47%) respondents all cite improving security as the primary goal for planned investments in workplace technology solutions.

To achieve this objective, IT teams must ensure that security measures, such as identity management, are consistent across mobile and collaboration tools, and that the same provisioning and privacy rules apply to all applications.

The Ins and Outs of Investing in Employees

Strategies for meeting today's workplace productivity objectives over the next two years include identifying areas for performance improvements and cost savings (42%) and developing an organizationwide vision or strategy (38%).

Despite these action plans, plenty of work needs to be done to successfully boost workplace productivity. Providing relevant and contextual training for staff ranks as one of the top-three action items required to boost employee productivity, as indicated by respondents in federal government (39%), state and local government (35%), healthcare (38%), and small business (33%).

However, even large businesses can benefit from qualified staff. At Oshkosh Corporation, Khare says "investing enough in our IT employees so that they can upgrade their skills and be ready for the future" is one of the company's three guiding IT investment principles, along with enhancing customer experience and creating business value.

To stay productive, a workforce must continuously adapt to new market trends and technology advancements. This requires a commitment to constant learning and a willingness to embrace new tools and technologies.

One IT leader emphasized the ongoing challenge of keeping employees' skill sets up to speed up on the latest technology advancements. "In the last three years, I've reorganized my company about four times to reflect the services we need to deliver," he says. As a result of the modernization of the company's infrastructure, its staffing requirements have changed dramatically.

"I no longer need system administrators or data administrators," says the executive. Instead, skills in high demand include individuals that "can explain how AI works," "drive digital transformation," and translate complex machine learning and AI activities into business-relevant insights, he explains.

Complicating matters is how quickly employees must adapt to new technologies and business processes in order to stay productive. Adds the executive: "I've moved away from two-week sprints because the business area can't retrain their people in enough time. There's a learning curve."

Respondents cite identifying areas for improvement and/or cost savings (42%) and developing an organizationwide strategy (38%) as the top action items planned to improve workplace productivity, flexibility and engagement.

Actions Prioritized over the Next Two Years to Improve Workplace Productivity, Flexibility and Engagement

Identifying areas for performance improvement and cost savings is a top action item across vertical segments.

Top Three Actions Prioritized over the Next Two Years to Improve Workplace Productivity, Flexibility and Engagement (by Segment)

	Federal Government	State and Local Government	Healthcare	Education	Large Business	Small Business
Identifying opportunities for performance improvements and cost savings	42%	37%	42%	38%	49%	43%
Developing an organizationwide vision or strategy	42%		43%	38%	43%	
Providing relevant and contextual training for staff	39%	35% (tie)	38% (tie)			33%
Developing or hiring the correct skill sets		35% (tie)				
Redefining employee roles and responsibilities to align with the organization's vision		35% (tie)				33%
Making business process changes to align with new technology						
Developing technology/deployment/integration/rollout strategies				35%		
Sharing/reporting on successes across the entire organization			38% (tie)			
Seeking recommendations for relevant technologies and services					42%	
Defining milestones/measures of success						
Finding change leaders/project champions						
Reducing battles for control or ownership over processes or data						
Reducing the number of "Shadow IT" projects						

The Adoption Equation

Adoption is another hurdle organizations must overcome in order to optimize their technology investments. Analytics software, mobile solutions, and messaging apps can drive productivity and increase collaboration, but they're of little value if employees don't use them.

"Many organizations put in fancy widgets, and then don't follow it up with any kind of adoption services," says CDW's Gibes. "Adoption is about teaching users how to make the most out of the new widget they've implemented."

One way to drive greater adoption is with employee training and education. Consider, for example, a marketing agency that deploys an online collaboration hub where team members can work together on upcoming campaigns. Users can discuss conversion rate projections and share design ideas, all in one place. However, if these employees aren't taught how to properly use collaboration technology, they're likely to become frustrated and continue relying on email to communicate with colleagues. The result: fragmented communication, reduced productivity, siloed data, and low employee morale.

Fortunately, there's no shortage of online courses, seminars, and mentoring programs that can teach employees how to take advantage of a solution's key features and functionalities. Some vendors provide in-depth training on products and services. And the right third-party provider can help organizations find the tools and training needed to meet their specific requirements. In fact, 42% of large businesses surveyed by IDG plan to seek recommendations from third parties for relevant technologies and services over the next two years.

Management must also play a role in ensuring organizations derive greater value from their IT investments in workplace technology solutions. Today, blockchain-powered smart contracts are enabling disparate parties to trade and transact without the input of lawyers while, at the same time, robot reporters are transforming newsrooms with data-generated stories.

To assuage fears of job loss, senior-level managers must evangelize new workplace technology solutions. One way to accomplish this: emphasize what employees will gain by using a solution with their day-to-day activities. Consider, for example, a state agency bogged down by paper-based processes. In this case, automating workflows is clearly not about eliminating head count but rather freeing workers to focus on more important tasks, such as improving constituent services. In fact, an IDC study reveals that 58% of constituent-facing processes and 46% of back-office processes rely on paper, not data, and only 36% of respondents described those processes as efficient and effective, compared to 52% in the private sector.

Similarly, a messaging app is likely to increase the speed and frequency of employee communication while reducing reliance on productivity killers such as email. By emphasizing how employees stand to gain from innovative tools, IT leaders can ensure employees get on board quickly.

Quick Tips to Drive User Adoption

Unfounded fears, incomplete training, poor deployments — they can all prevent employees from adopting powerful workplace solutions. But with the right strategies, IT leaders can convince employees to incorporate these tools into their daily workflows — and make their IT investments pay off. Mike Murphy, solution architect team lead at CDW, explains how.

1. **Think outside the box**
   Murphy recalls one client that planned on deploying a web conferencing solution. To foster employee enthusiasm, he says, the company created an entire event around launch day that included a cake, flyers, and casualwear. By allowing employees to wear "shirts and ties with shorts and sandals," Murphy says the company gained "buy-in and instantly connected with users." After all, he says, "if someone is having fun with technology, they're going to be more productive."

2. **Consider your audience**
   Online training modules might get millennials up to speed on new workplace management tools, but more seasoned staff, or those with limited access to online resources, might prefer face-to-face interactions or paper-based manuals. For this reason, Murphy says, "You have to tailor training for different technologies but also for different audiences. How you train your accounting department on Microsoft Teams might be completely different from how you train your sales department or mobile workforce."

3. **Create the right environment**
   Today's more sophisticated telepresence systems provide near lifelike audio and video quality for geographically dispersed teams to collaborate. But that doesn't require converting a conference room into a sci-fi space. "Keep it simple," advises Murphy. "Otherwise you'll have this wonderful, powerful technology that no one will want to use because the room is too intimidating."

4. **Plan ahead**
   "Don't just turn a technology loose and publish the user guide on the company's intranet," says Murphy. Instead, he recommends asking questions such as, "Will the launch be a big splash? What will our bottlenecks be? What kind of burden will this be on help desk? And who will champion the technology internally?" By planning ahead, organizations can prevent delays and better drive adoption.

Overcoming Integration and Security Hurdles

According to some IDG survey respondents, one of the most pressing challenges of improving workplace productivity is "integrating new technologies with existing equipment." Finding the right combination of solutions isn't easy. Many of today's workplace solutions are designed for use with any device, from smartphones and tablets to desktop computers. Yet an organization's reliance on legacy systems can make it difficult to achieve seamless integration.

Another challenge facing IT teams is security. Federal government (51%), state and local government (49%), healthcare (53%), education (53%), large business (47%), and small business (47%) respondents all cite improving security as the primary goal for planned investments in workplace technology solutions.

To achieve this objective, IT teams must ensure that security measures, such as identity management, are consistent across mobile and collaboration tools, and that the same provisioning and privacy rules apply to all applications.

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The COVID-19 crisis is reshaping the way people work. Citywide closures, stay-at-home mandates, and social distancing measures have forced many people to work from home to help flatten the curve of a global pandemic.

7

"A global pandemic, volatile economy, and uncertain job market are reshaping entire industries ... and technology continues to move [them] forward."

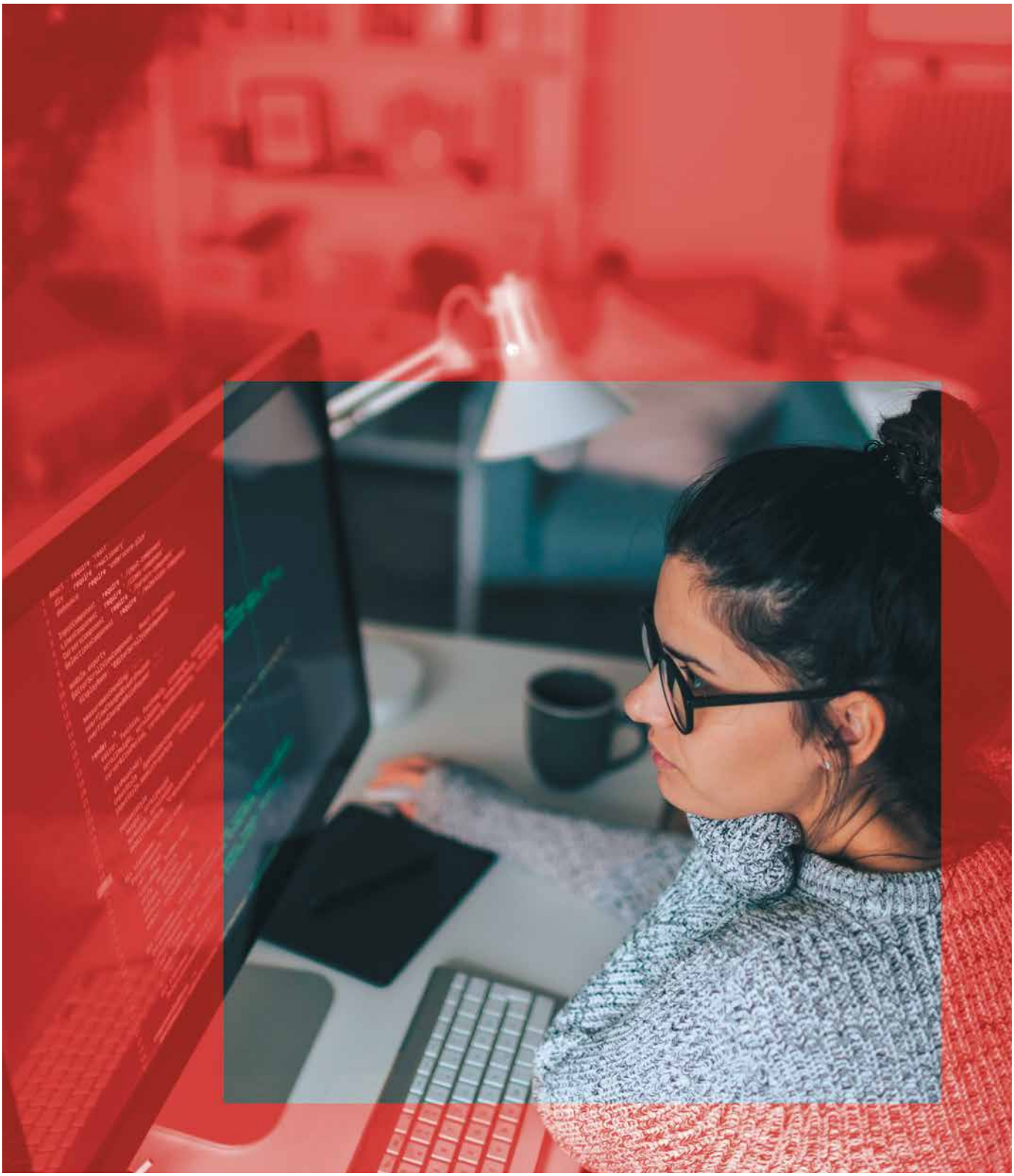
– Survey respondent

2.7B

Workers are taking heed: On April 9, 2020, Microsoft reported a new daily record of 2.7 billion online meeting minutes in one day — a 200% increase from 900 million on March 16.

Among those joining today's remote work movement: an increasing number of healthcare workers who must rely on videoconferencing and other collaboration tools to conduct virtual consultations (aka telehealth sessions) with their patients.

Today's remote workforce is only likely to grow as organizations look to remote work as a permanent solution for cutting real estate costs, maintaining operations, and meeting customer demands. Case in point: a Gartner survey reveals that nearly three in four CFOs plan to move at least 5% of their previously onsite workforce to permanently remote positions post–COVID-19.



From Tech Trials to Cultural Shifts

But supporting a remote workforce isn't easy. In one recent webinar snap poll, 91% of HR leaders reported implementing "work from home" arrangements since early 2020. Among the respondents' biggest challenges: a "lack of technology infrastructure and lack of comfort with new ways of working."

These twin pain points — technology and culture — present enormous challenges to IT teams. From a technology standpoint, IT objectives must dramatically shift to accommodate greater investment in security, collaboration, and network bandwidth solutions. At the same time, driving adoption of these tools requires extensive employee training and education. No wonder IDG survey respondents cited "supporting remote employees/teams" as one of the most pressing challenges organizations face related to improvement of workplace productivity, flexibility, and engagement.

Fortunately, there are ways to invest in remote work that promise to pay off.

1. **Buy wisely**

   Today, there's no shortage of technology tools promising to secure systems and protect confidential data. According to IDG survey respondents, the top risk-management investments to consider include web security (39%), network access control (38%), and data leak prevention (36%).

   However, as remote workforces multiply, IT decision-makers should consider new and more innovative technologies. For example, blockchain promises to serve as a more secure and more reliable alternative to oft-forgotten passwords. A large business or government agency could authenticate a remote worker by having them register their identity on the blockchain using a combination of identity-related attributes, such as name, fingerprint, or Social Security number.

   In addition to using emerging technologies, some vendors are rapidly adding new and innovative features to their remote work solutions. For example, real-time noise suppression, pop-out chats, and a booking app are among the new capabilities recently added to Microsoft Teams' meeting platform.

2. **Encourage collaboration**

   Even remote workers can fall into a productivity slump. To keep teams on task, organizations must invest in tools that encourage collaboration, communication, and knowledge sharing.

   In fact, 40% of IDG survey respondents cite enabling collaboration as a top use of technology to improve workplace productivity, flexibility, and engagement. And IT executives overall (43%) cite planned investments in collaboration technology over the next two years. Options range from online meeting solutions and instant messaging platforms to project management programs.

3. **Teach proper cyberhygiene practices**

   Oftentimes, remote workers rely on the same smartphone, laptop, or tablet for both business and personal tasks. Unfortunately, transmitting sensitive data over unsecured networks, or worse yet, losing a device with vast volumes of confidential data, can result in serious security breaches, often unbeknownst to busy IT teams.

   Certainly, endpoint management security solutions can help mitigate some of these risks. But the best line of defense against an attack is employee awareness. Online cybersecurity training can educate remote workers on everything from password management and software updates to how to recognize a phishing scam. In fact, nearly half (45%) of IDG survey respondents cite security awareness programs and staff training as a top business goal with respect to risk identification and mitigation.

4. Consider corporate culture

For many employees, remote work represents a significant cultural adjustment. Former office workers are likely to feel disconnected from their colleagues. Others, unaccustomed to participating in online meetings and messaging apps, may feel overwhelmed by the sudden upsurge in the use of technology tools.

Remote work can also blur the line between work and personal life: it's not easy to effortlessly toggle between work-related tasks and childcare, household upkeep, aging parents, and financial dealings, among other things.

In some cases, issues over privacy rights can arise between employees and IT as network and systems administrators, in order to safeguard enterprise data, increasingly demand access to, and control over, the devices remote workers use.

Fortunately, incentive programs can serve as powerful catalysts, driving greater adoption of online meeting solutions and next-generation messaging tools. Strong communication between IT and remote work teams can also ensure employees' privacy rights are respected while safeguarding enterprise systems.

There's no turning back time. Remote work is now the new normal. But while working from home presents considerable challenges to IT teams and employees alike, smart strategies and potent solutions can foster an environment conducive to long-term success in uncertain times.

What would you say is the most pressing challenge your organization faces related to improving workplace productivity, flexibility, and engagement over the next two years?

Top themes:

- Change management/employee education and training
- Keeping up with technology advancement
- Finding qualified staff
- Cost/budget
- Lack of trust/lack of collaboration between roles/teams
- Supporting remote employees/teams
- Using and managing data wisely to make better decisions
- Employee retention
- Learning about/awareness of new technologies
- Implementing AI
- Integrating new software/technologies with our existing equipment
- Redefining employee roles and responsibilities to align with the organization's vision

How Technology Is Shaping the Future of Three Key Industries

A global pandemic, a volatile economy, and an uncertain job market are reshaping entire industries, and only time will determine the staying power of some of these initiatives. But one thing is certain: technology continues to move many industries forward.

To better understand how tech is recasting key industries, we examined three key verticals and the changes that could be in store for them. Some of these seismic shifts are already underway; others require a wait-and-see approach as the technology landscape evolves.

1. **The Future of Government**
   The number to know: 40% of IDG survey respondents in federal government say they are best positioned to modernize their technology backbone.

   - **Predictive parole violations**
     Officials are using predictive modeling and other data analytics solutions to alert parole officers about individuals most likely to violate parole conditions. These data-driven risk assessments supplement human decision-making in the criminal justice system to prevent systemic gridlock and reduce the likelihood of rearrest.

   - **Sensor-rich cities**
     Sensors will help provide city officials with real-time infrastructure and asset management data. Lighting-management systems can provide up-to-the-minute updates on outages, preventing dangerous accidents. GPS-enabled sensors help track the timing and location of garbage truck fleets to ensure effective trash collection. And smart roads can change speed limits based on real-time traffic flows, in turn preventing accidents and saving lives.

2. **The Future of Education**
   The number to know: 40% of IDG survey respondents in the education sector say they are best positioned to transform the "customer" (aka student) experience with data and smart technology.

   - **Customized college learning**
     Universities provide students with personalized learning portfolios for a custom education experience. The portfolios are based on the data collected on a student's campus activities, personal interests, and academic achievements. By crunching these numbers, and presenting students with data visualizations, universities can help students better mix and match courses to build their own degrees. This custom approach not only enhances the student experience but increases enrollment and completion rates.

   - **Self-driving cars**
     Autonomous vehicles are making their way from the research lab to campus roads. As part of a research project, between June 2018 and December 2019, students at the University of Michigan could ride in one of two self-driving, all-electric shuttles with 11 seats each. By equipping the Mcity Driverless Shuttles with onboard cameras and Wi-Fi communications, researchers gathered data to help understand how passengers, pedestrians, bicyclists, and other drivers interact with the shuttle.

3. **The Future of Healthcare**
   The number to know: 32% of IDG survey respondents say they are best positioned to improve workplace productivity, flexibility, and engagement.

   - **Remote patient care**
     Allied Market Research predicts that the Internet of Things (IoT) healthcare market will reach $136.8 billion worldwide by 2021. That's no surprise given today's aging population, high-speed internet access, and exorbitant healthcare costs, among other things. As a result, remote patient monitoring (RPM) systems will become commonplace. Worn by patients, these IoT-enabled devices collect and report real-time health data about the user, from blood glucose levels to weight gain. This information is then relayed to healthcare practitioners for quick preventative action. Better yet, with access to their own health data, patients can play a more active part in managing their own care.

   - **Improved patient safety**
     Hospitals are starting to improve patient and visitor safety with real-time video analytics. These solutions work much like the human eye — they identify patterns, flag anomalies, and trigger responses, all in real time. The key difference: video analytics solutions are powered by a combination of IoT sensors and machine learning functionality. Together, these technologies prevent intruders from gaining access to restricted areas, in turn significantly increasing staff, patient, and visitor safety. Other use cases include deterring vandalism, and enforcing staff health and safety standards, such as hand-washing.

What's in Store

In some ways, the world remains the same. Legacy infrastructure continues to age, exposing organizations to greater IT integration headaches and security risks. IT teams must carry on with cost-cutting measures for greater business value. Customer expectations persist, pressuring organizations to build more personalized experiences, while employees keep pace with the latest productivity and collaboration tools.

But in a global economy, there is no such thing as status quo. IT objectives are shifting as remote workforces multiply, requiring greater technology investment in the areas of security, collaboration, and network bandwidth. A chill in consumer spending is raising the stakes, challenging organizations to shift from simply collecting consumer data to leveraging it for truly customized interactions.

At the same time, the second wave of digital transformation is cresting, requiring organizations to move from experimentation mode to business strategy. And the cloud continues to disrupt operating expense and IT consumption models in new and unpredictable ways.

In response, technology investment strategies are evolving at breakneck speed. Some organizations will be challenged to keep up, especially those beset by legacy systems and change-averse employees. But IT leaders who embrace today's rapidly changing environment, and remain steadfast in their technology priorities, are more likely to weather the current global business disruption and potentially drive more value from their investments.

About the IDG Research Study

To qualify for the January 2020 IDG/Research CDW survey, respondents had to work in an IT-related function at the Manager level or above or a non-IT role at the Director level or above.

Methodology and Objectives

Sample

Field Work This survey was fielded in the U.S. from January 3, 2020 through January 21, 2020. Additional responses in the large business segment were gathered between February 6, 2020, and February 12, 2020.

Total Respondents 600 qualified completes

Survey Goals

The objective of this survey is to understand the vision of IT decision-makers for the future of their IT investments. We explore the priorities of technology decision-makers employed in IT as well as those in business executive roles. We uncover key business problems, investment drivers, technology investment areas and action plans within these four areas: (1) Risk identification and mitigation, (2) Improving workplace productivity, flexibility and engagement, (3) Transforming customer/patient/student/constituent experiences and (4) Modernizing technology infrastructure to meet business objectives.

Method

Data Collection Online Questionnaire

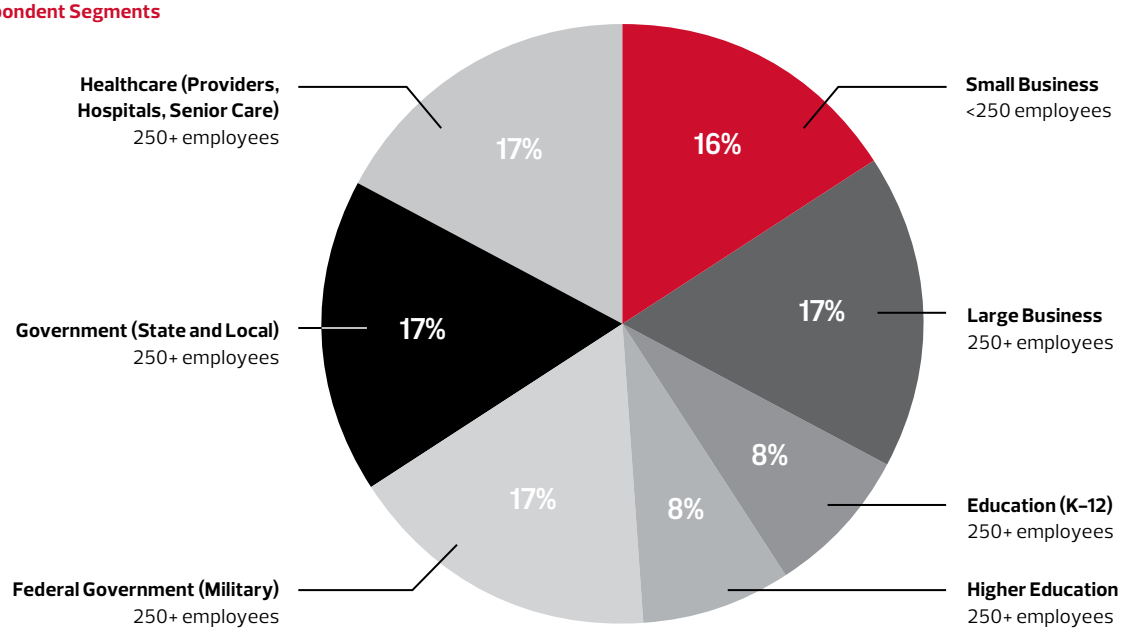
Audience To qualify for this survey, respondents were required to work in an IT-related function at the Manager level or above or a non-IT role at the Director level or above.

The following vertical segments included:

- Education (Higher Ed/K-12), 250 employees or more
- Federal Government, 250 employees or more
- State and Local Government, 250 employees or more
- Healthcare, 250 employees or more
- Large Business: 250 employees or more, EXCLUDING education, government and healthcare verticals
- Small Businesses, less than 250 employees, EXCLUDING education, government and healthcare verticals

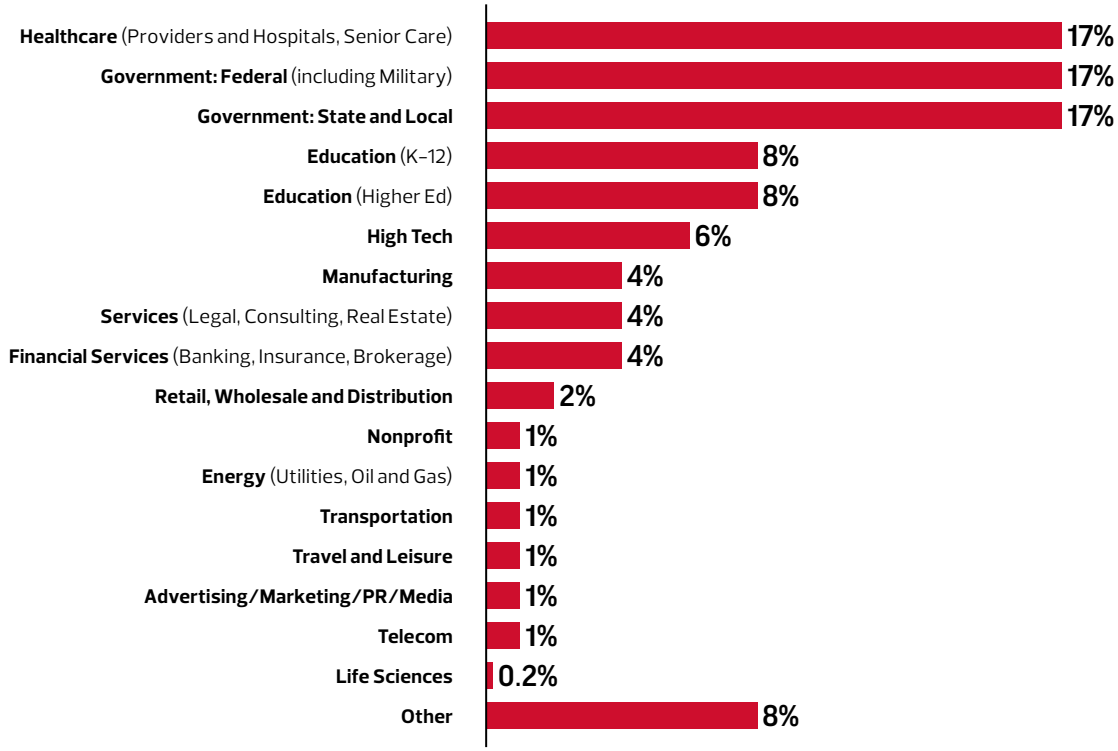
Respondent Profile

Respondent Segments



Respondent Profile (Cont.)

Primary Industry (All Segments, N=600)



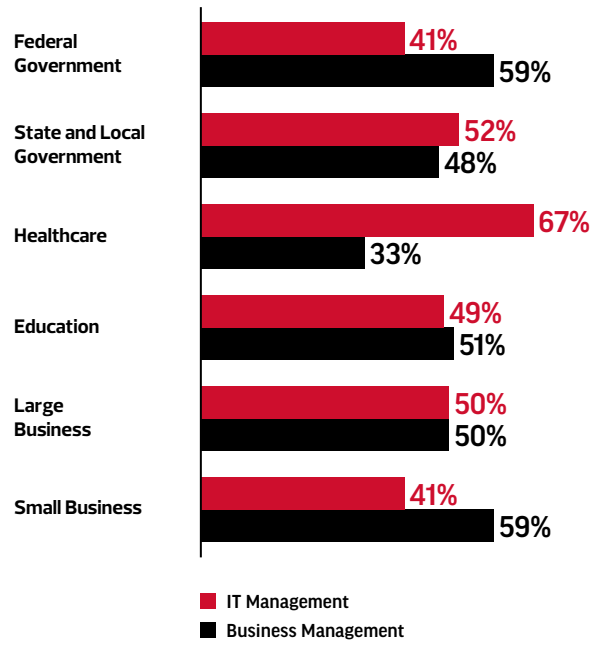
Job Titles

IT Management (50%):	
CIO	2%
CMIO (Chief Medical Info Officer)	1%
CTO	1%
Executive VP/Senior VP/VP	4%
Executive Director/Managing Director	4%
Director	15%
Manager	20%
Business Management (50%):	
CEO, COO, Chairman, President	12%
CFO, Treasurer, Controller	4%
Executive VP, Senior VP, VP, GM	9%
Director	26%

Number of Employees

15,000 or more	13%
10,000–14,999	4%
5,000–9,999	11%
2,500–4,999	13%
1,000–2,499	14%
500–999	18%
250–499	12%
Less than 250	17%

Roles by Segment



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