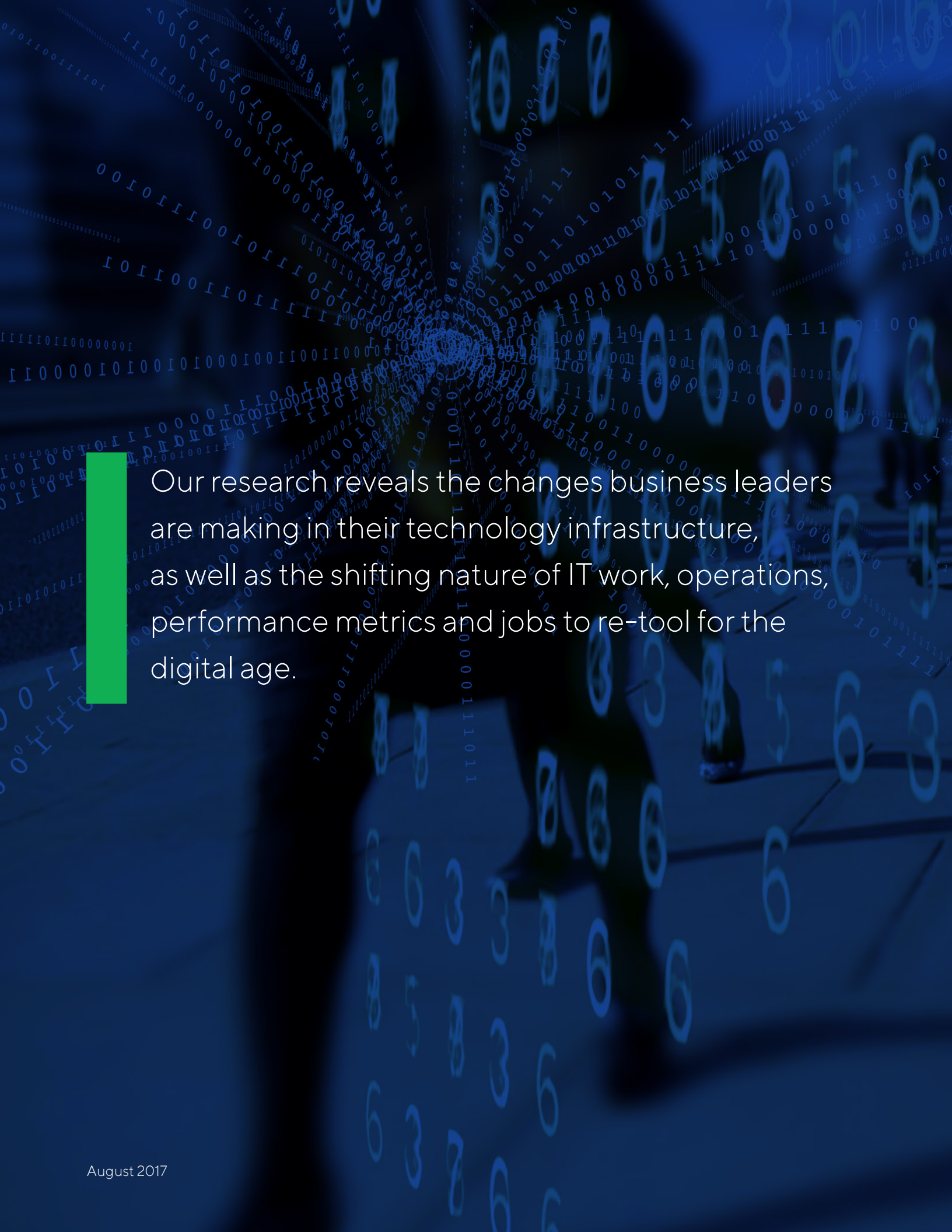
Cognizant

# The Future of IT Infrastructure

IT that matters in the new machine age prioritizes cybersecurity, innovation, time-to-market and customer experience over cost-cutting, according to our latest study. Here's what the future looks like for IT infrastructure, as traditional businesses make the digital shift, including our HEROES framework to guide you along the way.

By Manish Bahl

Center For
The Future of Work



Our research reveals the changes business leaders are making in their technology infrastructure, as well as the shifting nature of IT work, operations, performance metrics and jobs to re-tool for the digital age.

August 2017

# Executive Summary

As traditional businesses adapt to the realities of the new machine age – breathless time to market, intelligently enhanced everything, meaningful and personalized experiences – the implications for IT have been profound. It is no exaggeration to say that the core differentiator for a successful business today rests on the readiness of its IT infrastructure – and that an inflexible, sluggish, inefficient infrastructure poses a bigger competitive threat than any ingenious start-up or disruptive market force.

While the legacy IT industry of servers, databases and cables is still important, it has essentially become a utility, taking a backseat to the need for an agile, flexible and quickly scalable technology foundation to drive business. Companies with legacy technology architectures, therefore, face a dilemma: striking a balance between the present and future state of IT infrastructure. To achieve this equilibrium, the first ballast to discard is IT's traditional obsession with cost-cutting. The simple fact is, a lower cost but completely irrelevant backbone will condemn you to lose in whatever market you operate in.

To learn more about the future needs of IT infrastructure, Cognizant's Center for the Future of Work surveyed top IT executives at leading companies around the world, the majority of which have been in business for more than 15 years (see Appendix, page 24, for more details on the survey methodology). Our objective was to gain insights into the changes leaders are making in their organization's technology infrastructure, as well as the shifting nature of IT work, operations, performance metrics and jobs to re-tool for the digital age.

Based on our findings, we have developed a framework to help traditional businesses systematically move toward the new way of work for IT. The framework, dubbed "HEROES," involves change in five areas: hybrid cloud architectures, edge computing, robotic process automation (RPA), obsolescence of old IT and enterprise security. Cutting across all five categories is the infusion of artificial intelligence (AI).

Global business and technology decision makers can use our study findings, detailed in this report, as a practical guide to maximizing the strategic value of their IT investments. This report is intended as a call to action that will enhance partnerships between IT and business to better manage the transformative impact of the new machine age.

# THE NEXT FIVE YEARS WILL DRIVE MORE CHANGE THAN THE PREVIOUS 50

The amount of change expected in the next few years is daunting, relentless and coming fast. Nearly 70% of the executives we surveyed agreed that their industry will change more in the next five years than it did in the previous 50.

Little wonder, considering phenomena like the estimated three to five billion new consumers due to come online from developing economies, providing a mega-surge to the global economy;[1] the number of IoT devices outnumbering the world's population by the end of 2017;[2] and perhaps most important, the encroachment of AI into numerous entrenched societal challenges. In fact, 68% of study respondents agreed that AI will have a transformational impact on their business by 2020.

Respondents are already pushing ahead; we found that every business function, from sales and marketing, to finance, customer service and IT operations, is about to undergo a massive transformation. Amid this widespread flux, business priorities will also shift between now and 2020 (see Figure 1, next page), according to our research:

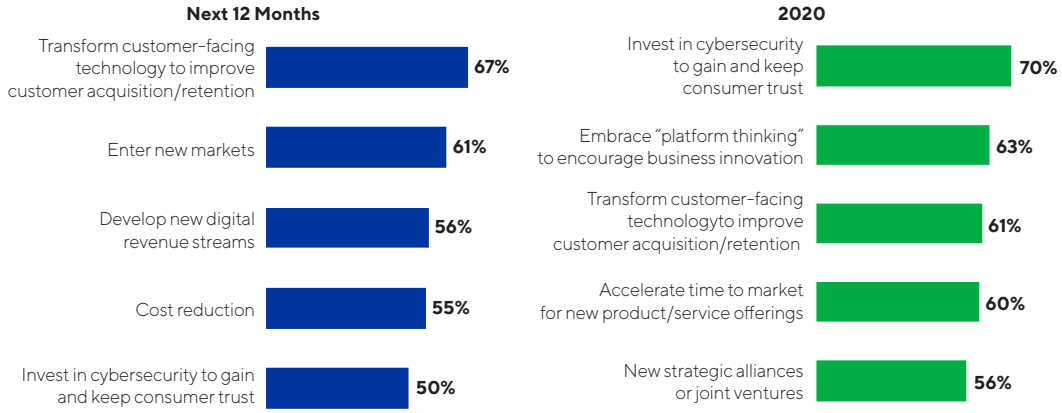
- **Cybersecurity will be key to building the brand.** Companies that think cybersecurity is an IT problem or priority have already been hacked by the future. By 2020, cybersecurity will top the list of business priorities, according to respondents. Online security threats are now a fact of life, moving organizations' ability to mitigate risk from an inconvenient need to a necessary competitive advantage. According to our study, companies endured an average of 40 security incidents in 2016 alone, costing each around $4.5 million. Sixty-eight percent of respondents suffered loss of reputation and brand value as a result of a breach. Numerous additional incidents likely escaped the business's notice. Respondents see the situation worsening, with 60% saying there are more emerging threats than they can currently control, illustrating that the underlying IT infrastructure is ill-equipped for the new machine age.
- **Customer-facing technology will remain supreme.** Although customer-facing technology transformation (websites, mobile apps, etc.) drops from first to third place between now and 2020 in our study, this priority is clearly here to stay. The winners in the digital economy will be those that own the customer relationship. In fact, 68% of respondents named improving data management capabilities to enhance the customer experience as a top priority. AI will emerge as a key factor, with 66% of respondents citing the use of AI to better target customer offers. More than half of respondents (60%) plan to invest in chatbots to offer new customer interaction experiences and improve customer engagement.
- **Innovation is no longer a luxury**. Time-to-market of new products, services and experiences is a must in the digital economy. On average today, respondents said their company launched two or three new products or services annually, each taking seven to eight months to get to market. That is simply no longer fast enough. Almost half of survey respondents acknowledged that five years from now, those launch times will need to be cut in half. This will only happen if companies look outside their own four walls and join outside ecosystems, via platforms and partnerships. Companies that exercise "innovation for a purpose" will succeed, as opposed to those building "just another" cool product or service.

- **Cost-cutting disappears as a top priority.** Leading businesses are already using automation today to relentlessly cut costs, and many will have already reaped the cost benefits by 2020. The future focus will be less about cost-cutting and more about investing in technologies and capabilities necessary for changing business requirements. For instance, Adidas Russia shifted its supply chain management focus from lowering costs to increasing sales. With better data insights, the company improved its delivery time to customers, which helped increase sales by up to 40%.[3]

## Changing times spur shift in business priorities

Which of the following will be your business priorities in the next 12 months? How will these change by 2020?

Top five categories




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 1

## From business-serving, to business-changing

As business priorities quickly shift, so must the priorities and role of IT. Over the next 24 to 36 months, we will see a new phase develop for IT organizations, in which they are measured on a very different set of metrics than ever before. The IT mandate will stretch beyond the familiar realm of satisfying customers and employees, collaborating with the business and reducing costs, to sealing the customer relationship, discovering new business value and enabling business agility and innovation while also ensuring security (see Figure 2, next page).

In response, IT leaders are renewing their focus on the following areas:

- **Strategically embedding themselves in the business to reclaim the mandate of "preferred partner."** Three-quarters of respondents are doing everything they can to break down remaining barriers between IT and their business peers. They are focused on spending more time with business leaders (76%), aligning their services portfolio with business functions (68%) and implanting IT staff in

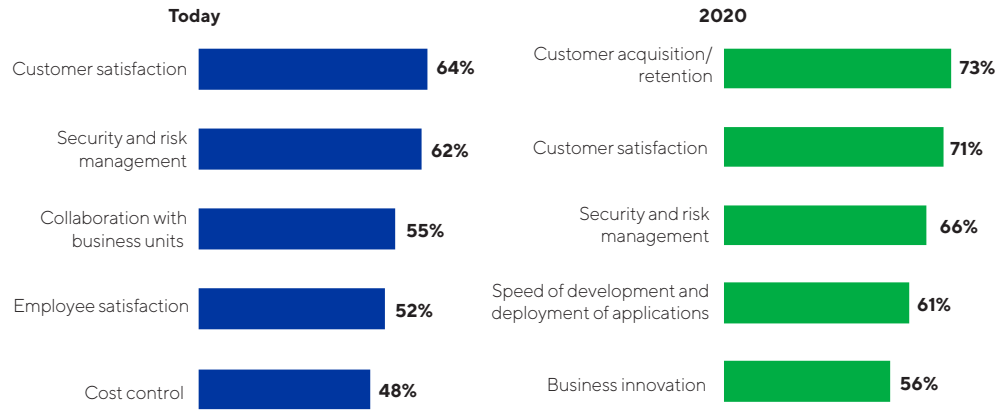
business units (56%) to encourage collaboration. The encroachment of AI into many business functions will require increased business-IT collaboration, particularly as the goals for AI initiatives are to gain new and profitable insights into customers. Sixty-five percent of respondents are creating, planning or commissioning AI solutions with both IT and business involved.

Increased collaboration is also helping IT address shadow-IT operations by providing flexibility to business users to source applications and technology that elevate enterprise work, while maintaining data control, security, governance and compliance. Our data shows that, on average, 35% of existing enterprise applications are developed and used without IT's direct involvement. With virtual assistants, self-service portals and service catalogs, IT can operate at the speed of business users' expectations. In fact, 74% of executives are piloting or planning to use intelligent assistants for decision support, for example, to guide staff to provide better advice, improve decision-making or make more relevant offers to customers. With increased collaboration, 55% of executives successfully moved shadow IT operations into the mainstream.

## As business priorities change, so does the role of IT

What are the key metrics on which IT performance is measured today, and how will that change by 2020?

Top five categories




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 2

- **Becoming a champion of fast innovation.** More than half (58%) of respondents see IT's role today as championing business innovation, working alongside product and business unit teams to rapidly test, deploy and scale new business innovations in their organizations. This trend is likely to continue, with respondents planning to increase the proportion of their IT budgets spent on business innovation from an average of 16% today to 28% by 2020.

  One example of this trend is a move made by the long-time CIO at Ford Motor Co., Marcy Klevorn, who is changing the way the automaker's IT organization works. Klevorn, who now heads up the automaker's smart mobility unit, spurred the adoption of Agile and DevOps programming and shifted to a bimodal IT approach to encourage experimentation with emerging technologies.[4]

- **Doubling-down on customer centricity by focusing on applications.** Applications are now central to improving the customer experience, developing new revenues and streamlining business processes. Speed of deployment has taken center stage, as new releases are expected weekly or daily. In fact, 73% of our respondents agreed that infrastructure and operations professionals would become more application-oriented in the future, and nearly 60% of respondents are planning to use machine algorithms to build new and better applications.

- **Making sense of data.** It's a mammoth task for IT to integrate data silos and help the business derive meaningful insights from data. According to respondents, only 44% of the data they collect is actually analyzed, and only 17% of companies have created new products and services purely built on data. A majority of respondents (68%) are either piloting or plan to use big data/business analytics solutions, whereas nearly one-third (27%) are already doing so to make sense of ever increasing data volumes. IT departments, however, need to be cautious of setting expectations from big data investments and consider blending machine learning with big data to power the modern enterprise.

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# ‘HEROES’: THE FUTURE OF IT INFRASTRUCTURE

Organizations must adapt their IT infrastructures to the changes in business and technological priorities. The IT infrastructure needs to become agile, responsive, flexible, secure, scalable and simple to manage. In an era when start-ups can disrupt entire industries in weeks or months, a company’s technological backbone should – indeed, must - give it the ability (and agility) to immediately adapt or, better yet, set the pace.

In our study findings, we see leaders developing the required IT infrastructure by focusing on what we call the HEROES framework, detailed in the sections below, which will reshape a new generation of IT.

All five areas of the framework – hybridization, edge computing, robotic process automation, obsolescence of old IT and enterprise security – will be impacted by the growing influence of AI technologies, which will both “upgrade” the existing IT infrastructure and lay the foundation for the future. In fact, 61% of executives agreed that AI will fundamentally change their IT infrastructure procurement and consumption model over the next five years. In short, AI will be at the heart of the new IT infrastructure.

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## Hybrid cloud: the genesis of Agile IT

From our survey, it is clear that cloud computing will simplify today's complex state of infrastructure management (see Figure 3, next page). In fact, 61% of organizations consider cloud to be a key enabler of driving business priorities. A hybrid cloud strategy – which incorporates a mix of on-site, public and private cloud – makes sense for most businesses today, as it enables IT teams to select the right virtual infrastructure for each use case. This introduces opportunities to improve agility, heterogeneity and scalability, while taking advantage of the existing management investment. Already, 32% of IT infrastructure and application workloads are hosted in a hybrid cloud setup, according to our study, and that will grow to 45% by 2020. Even more interesting, 55% of respondents mentioned that their new application investments will be in hybrid cloud.

Organizations also expressed interest in moving Internet of Things (IoT), application development/testing/deployment, big data/analytics and other related workloads to hybrid cloud by 2020. As a result, non-cloud workloads are shrinking at a rapid pace. With 70% of organizations claiming to have a clear understanding of the costs involved (migration, application development, administration, etc.), as well as the roles, policies, responsibility, governance and ownership for cloud, it is clear that cloud computing has moved from buzzword to mainstream business.

Hybrid cloud signals a shift away from massive hardware structures and toward more software-based infrastructures, changing the traditional IT approach in three distinct ways:

- **Increased application performance, agility and control.** Being competitive in most marketplaces today means turning around new features or services rapidly and with little overhead. To enable hybrid cloud management, more than half of respondents (52%) plan to deploy new applications in cloud containers, a form of server-less computing that isolates software processes for dynamic workflows. A container approach ensures the data management solution is always available, scalable and universally accessible.

  To meet speed, scale and agility goals with minimum risk, a microservices architecture will increasingly prevail. With a microservices approach to software development, a large application is built as a suite of small, independently versioned, scalable and customer-focused services with specific business goals. In fact, the top three reasons for embracing a microservices architecture as cited by respondents were improved elasticity (66%), modernization (55%) and better resilience (50%). Using containers and microservices together will enhance cloud capabilities, as a microservices architecture is scalable and reusable, while containers supply efficient resources. Together, they can improve runtime frequency, cloud-hosting policies and cloud tools.

With data volumes outpacing the capabilities of in-house systems and tools, according to 70% of respondents, it's no wonder so many (62%) are turning to the cloud for help.

- **Improved storage capability to address unmanageable data volumes.** Companies are awash in data. In our study, respondents manage 386 terabytes of data, which is approximately 5.5 times the size of the 4.62 billion web pages online today. Companies predict an average 44% annual growth in data volumes through 2020. With data volumes outpacing the capabilities of in-house systems and tools, according to 70% of respondents, it's no wonder so many (62%) are turning to the cloud for help.
- **Adoption of a start-up mentality.** Hybrid cloud environments, when paired with Agile development methods, can speed up application development, testing and deployment. DevOps will give rise to business innovation with rapid prototyping and testing of new ideas by leveraging the cloud, while ensuring that sensitive information remains on-site. We are also on the verge of a new generation of AI-powered cloud platforms, which will help IT organizations innovate much faster without having to invest in sophisticated AI infrastructures of their own. In fact, nearly 50% of respondents plan to leverage AI cloud services to augment their applications. There is already a broad range of cloud-based machine learning services on the market (from image recognition to language translation) that developers can use directly in their applications, including Google Machine Learning and Microsoft Cognitive Services.

## Hybrid cloud is the new IT

**76%**

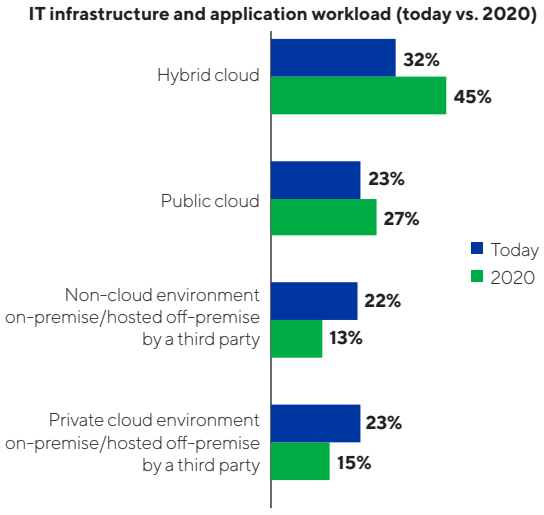
Cloud will change the role of IT to be an enabler of business transformation and revenue growth

**52%**

New applications will be deployed in containers

**50%**

Plan to use AI cloud services to augment existing applications




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 3

## Edge computing to create a competitive edge

IoT will add tremendous complexity (networking, integration, data analysis, etc.) to existing IT infrastructure, a sentiment expressed by 60% of respondents. IT teams need a platform that can help reduce the back-and-forth traffic between devices and the data center for faster decision-making. In centralized computing infrastructures, there's a high risk of data losing value in the few minutes it takes to be transmitted from hundreds or thousands of devices to the data center or cloud. Edge computing puts those computing resources closer to the data source, speeding up the analysis process and allowing businesses to act on insights more quickly.

The speed and agility benefits of edge computing are so great that 35% of respondents believe that by 2020, IoT-created data will be stored and acted upon close to the edge of the network rather than in their centralized data centers (see Figure 4). This represents a greater than 100% increase in interest in edge computing, from 17% today. This level of interest is not surprising, as well over half (63%) of organizations surveyed are either piloting or planning to deploy sensors and/or devices across their business operations, and a similar percentage (61%) agreed that collecting, storing, integrating and analyzing real-time data from various end-point devices is a key barrier to a successful IoT implementation. We would not be surprised if equipment manufacturers started building edge-computing capabilities into devices and sensors themselves over the next few years.

We expect the following factors to drive interest in edge computing:

- **Real-time or nothing.** Real-time response is increasingly a business must-have. The inability to respond to consumers in real time could mean loss of business, while the absence of real-time

### Living on the edge

**63%**

Piloting/plan to use IoT

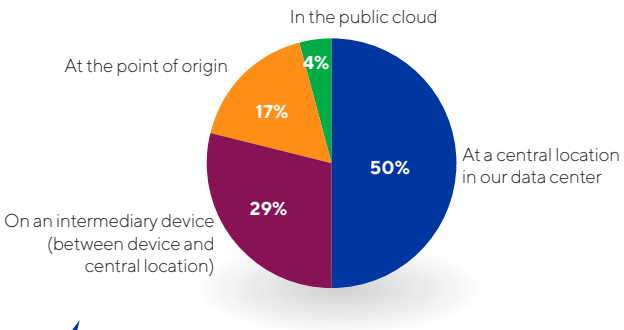
**61%**

Collecting, storing, integrating and analyzing real-time data from various end-point devices is a key barrier

**55%**

Plan to use machine learning algorithms to localize predictive or reactive analysis of IoT data within the instrumented device

**How do you analyze data from IoT devices?**




By 2020, 35% of executives expect to move computing from data centers to the edge of IoT devices.

Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 4

functionality in industrial contexts poses serious safety issues. The introduction of machine learning to IoT will vastly accelerate the speed of intelligence, with 55% of respondents planning to use machine learning to localize data analytics within an instrumented device. Companies like Imagimob, through its motion intelligence software that runs on IoT devices, enables companies to act immediately on the data generated by sensors and devices.[5]

- **The symbiotic relationship with cloud computing.** We foresee the emergence of a strong relationship between cloud and edge computing, in which each will handle data for different computing tasks and data types while complementing each other. Whereas edge computing will serve time-sensitive data for immediate intelligence within the device itself, the cloud will handle data intended for historical analysis. For instance, Coca-Cola's Freestyle machine relies on an edge server for fast performance in enabling customers to choose from over 100 beverage combinations. Additionally, the server gathers a wealth of information on consumer preferences to send to the data center via the cloud.[6]

We foresee the emergence of a strong relationship between cloud and edge computing, in which each will handle data for different computing tasks and data types while complementing each other.

## RPA: bots to augment IT's performance

Within the next five years, robotic process automation (RPA) will be essential for achieving the levels of performance required in the digital economy. In our survey, more than half (55%) of companies are either piloting or planning to adopt RPA, while 10% are already applying automation to their core processes.

RPA is "software robots" or "bots" often applied to repetitive, monotonous, high-volume tasks for faster turnaround and zero errors. The software mimics human behavior, particularly behavior that is "rule-based" and easily captured in procedures and work instructions.[7] Believe it or not, many companies still have highly skilled IT professionals copying and pasting responses to incoming support tickets. RPA will free precious IT resources to focus on activities that require higher-order thinking. In IT, such tasks could include system administration, help desk, project management, application support, and handling security patches.

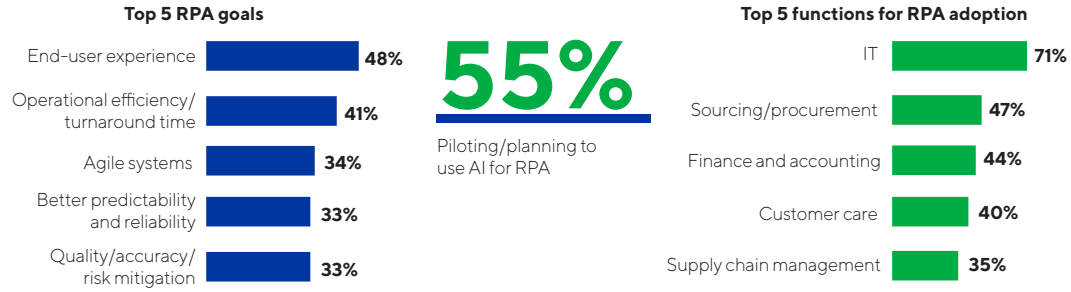
A well-known benefit of RPA is the massive cost savings organizations can realize. In our research, however, respondents were even more interested in RPA's positive impact on the end-user experience, as automated processes can ensure services are available to customers in a hassle-free, fast, secure way (see Figure 5). In fact, only 13% of executives cited cost savings as a key reason for RPA adoption.

Companies are already moving ahead along these lines. For instance, ANZ Bank is leveraging back-office automation to reduce time-to-market for the approval of unsecured and personal loans. According to the bank's CTO, 1,000 hours of back-office activity have been eliminated due to the increased automation.[8]

We see RPA radically changing IT infrastructure and IT's role in three distinct ways:

- **Simplifying IT complexities.** RPA will have a transformational impact on every business function, but it will be particularly game-changing for IT operations, with over 70% of respondents planning to apply RPA to IT. As the complexity of IT operations continues to grow, there will be an even greater need to automate the often laborious and manual tasks. Moreover, lack of visibility across multiple systems, platforms and processes due to systems silos and fragmented workflows can lead to costly errors. With RPA, systems, processes, applications and departments can be tightly synchronized.

## RPA: beyond cost-cutting




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 5

It will ultimately be humans who decide which tasks, processes and workflows can and should be automated; select the right tools; and develop, implement and manage the automation strategy.

- **Augmenting IT infrastructure with AI.** In our study, 55% of respondents are planning to apply AI-driven technologies and approaches to RPA. When a software robot is complemented with self-learning capabilities, it can have a multiplier impact on businesses and IT. In fact, 64% of executives plan to use machine learning algorithms to predict IT infrastructure requirements. Imagine if your automated IT infrastructure could predict slowdowns or errors and determine how to avoid or fix them. In an interesting example, American International Group recently deployed five "virtual engineers" inside its infrastructure to collect and analyze system performance data, working alongside human engineers to learn patterns and eventually act on their own to solve technical problems. These co-bots have resolved more than 145,000 incidents and returned 23,000 hours of productivity to human employees.[9]
- **Amplifying the human element of automation.** Each business must identify its specific pain points to determine where and how automation would best be applied. It will ultimately be humans who decide which tasks, processes and workflows can and should be automated; select the right tools; and develop, implement and manage the automation strategy. Survey respondents said they consider highly repetitive tasks as a top factor in deciding their process automation targets (65%), followed by the generation and handling of high data volumes (53%), tasks with low demand for human judgment (45%) and those needing little empathy (33%).

## bsolescence of old IT systems to boost customer experience

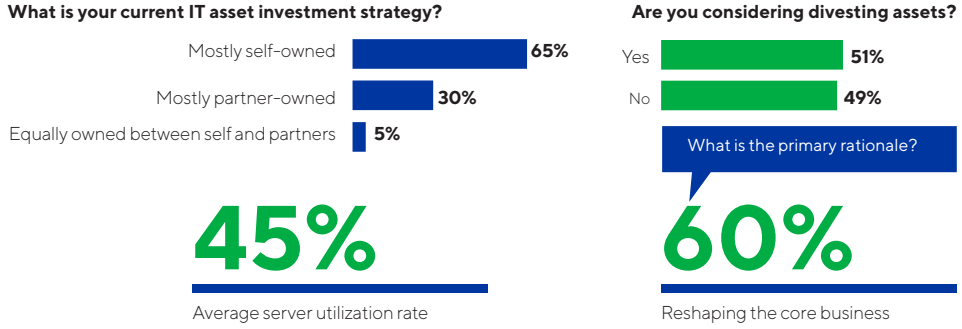
For decades, IT has followed the theory of "Why fix what's not broken?" This approach led to the massive accumulation of outdated legacy infrastructure, which is not only expensive to upgrade but also slow to meet the demands of becoming a digital business. In an era when the competitive advantages of technology have never been greater, the relentless focus on lowering costs of maintaining legacy systems is actually slowing down IT in its mission to revamp customer experience. In fact, 47% of IT executives we interviewed feel that their teams are spending too much time on maintaining legacy infrastructure. Moreover, the wasteful IT spending, which has long been endemic to corporations, has now reached plague-like proportions. Based on our data, the average server utilization rate in companies is 45% (see Figure 6). Of course, much of the superfluous hardware will never be used – it is already out-of-date.

If your ancient system is holding you back from creating a better offering, it's time to reboot your core IT. Elevating customer experience isn't just a good idea; it's a necessity for IT to thrive. For instance, Macquarie Bank in Australia built a customer experience layer on top of existing systems by leveraging big data, machine learning technologies and mobile applications to provide a real-time experience for its customers. The bank is using open source software and is moving data from many legacy systems to the new layer for real-time intelligence. The project will ultimately lead to legacy systems becoming obsolete.[10]

Without jettisoning systems and processes that are no longer (or soon won't be) fit for purpose, companies are undermining their ability to invest the budget, time, resources and energy in the future. Two questions can help guide businesses as they make the necessary move away from older IT assets:

- **Do you own the infrastructure, or does infrastructure own you?** IT departments need to be brutally honest in accepting which parts of the IT infrastructure are the major bottlenecks in becoming a digital business. In fact, 58% of respondents agreed that their core systems are difficult to update and are now seen as an obstacle. Over the next few years, companies will focus on reducing their legacy costs and expanding capacity through an asset-light business model. This means dropping the buy-and-hold mentality and replacing it with a pay-as-you-go model via cloud, mobile and as-a-service offerings,

## Asset-light = speed




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 6

and leveraging partners to offload the legacy systems. In our study, 51% of organizations said they are considering divesting self-owned assets as part of their digital strategy, with the goal of reshaping the core business. Moreover, as automation takes hold, asset optimization will increase significantly, resulting in the need to rethink the asset management strategy.

- **Which part of your business can be transformed from a "we own" to a "we control" mindset to achieve a nearly unbeatable level of agility and scalability?** In 2016, Apple had 200 suppliers with more than 800 locations to manufacture and assemble the iPhone, and none of them were owned by Apple.[11] The essence of Apple is its product-led customer experience and not its physical assets. In another example, Capital One, one of the top 10 largest banks in the U.S., has adopted a cloud-first strategy to transform itself from a bank into a technology company to deliver capabilities at a faster pace. Rather than investing in building its own infrastructure, it is focused on developing new apps for the cloud, while also steadily migrating its legacy applications.[12]

## Enterprise security in an insecure world

As the digital economy expands, cybersecurity threats will multiply. Leaders know they are not fully prepared, with 55% of respondents admitting their security strategy is more reactive than proactive. In our study, nearly 40% of organizations took 24 hours to identify a security breach, while 25% took a week to months. The speed of response to an attack determines the scope of damage to your critical assets.

Data is the biggest digital asset today, and protecting it (customer data, financial data, marketing data, IP data, etc.) means protecting your business. The good news is, 53% of respondents have already conducted a formal risk assessment to identify and protect digital assets, and 27% of organizations have initiated the process (see Figure 7, next page). As the General Data Protection Regulation (GDPR) of the European Union goes into effect, it will become much more critical for organizations to safeguard customer data or face a hefty financial penalty.[13]

The good news is, 53% of respondents have already conducted a formal risk assessment to identify and protect digital assets, and 27% of organizations have initiated the process.

As data and hybrid environments continue to grow at an exponential rate, creating more IT infrastructure complexity, it is increasingly challenging for IT to protect their companies' brand, while ensuring smooth operations. Two proactive approaches from IT will help businesses achieve their number one business priority:

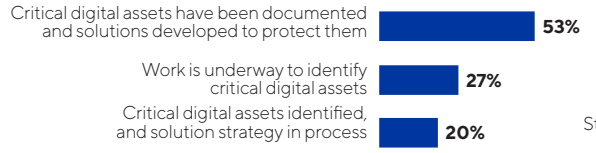
- **Make security automation a core element of enterprise IT defense mechanism**. Cybersecurity attacks can occur at any time of the day and any day of the year. Organizations cannot have security staff available 24/7, and even if they do, there is no guarantee that nothing bad will happen.

  This is precisely why security automation will be critical. Although software bots can't prevent cyberattacks from happening, they do enable a much faster response. In our study, 65% of executives are planning to automate security infrastructure to instantly assess, verify, prioritize and assign all incoming alerts. This will reduce the time to resolve the underlying security incident from days or weeks, to hours or even minutes. Moreover, automation can help break down data silos across the organization by providing a more uniform infrastructure that brings disparate systems together, thus reducing security complexities.

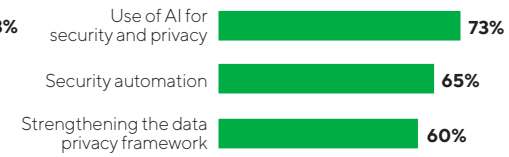
- **When a machine attacks, you need a machine to defend**. Tomorrow's attackers will be machines that think. The challenge is to build immunity against them. Fighting back requires an intelligent machine that can detect threats proactively, identify stealthy malware, reconfigure network traffic to avoid attacks, inform automated software to close vulnerabilities before they are exploited, and mitigate large-scale cyberattacks with great precision. No wonder 73% of respondents are planning to use cybersecurity applications with embedded intelligence. Darktrace, an AI security company, learns how each bit of a network operates, spots patterns and prevents cybercrimes before they can occur.[14]

## AI and automation: the new face of cybersecurity

**Which one of these choices best describes the degree to which your company has conducted a formal risk assessment to identify and protect its critical digital assets?**




**What are your top three security goals in the next 12-24 months?**




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 7

# DEMYSTIFYING THE FUTURE OF IT JOBS

The movement toward a HEROES framework will also drive a fundamental shift in IT performance metrics, roles and jobs. IT jobs of the future are likely to be those that involve understanding which systems will be required in the machine age, and how to create and operate within a HEROES framework. Individuals with an entrepreneurial mindset and who are comfortable switching between the confines of the IT department and a client meeting, customer service or even boardroom meetings will be in demand. In fact, 54% of respondents said robots will change their company's approach toward jobs (see Figure 8, next page). Workplace automation blended with human intelligence will be the future of work.

Based on our study, we believe the IT workforce will change in three interconnected ways:

- **Job automation: separating facts from hype**. On average, 17% of respondents expect IT jobs to be fully automated by bots and AI. We believe many of these workers will be absorbed into other functions or reskilled for new jobs that are yet to be created. This could be why only 10% of respondents believe workers' fear of job loss is a barrier to automation. Organizations that focus relentlessly on optimizing and applying human-centric skills (collaboration, analytical, communication, innovation to name few) will have a competitive advantage, particularly in terms of attracting and retaining top talent.
- **Enhanced workforce is the new workforce**: Rather than jobs being eliminated, it is more likely they will be altered or enhanced by bots, according to 50% of respondents. Moving to the cloud, automating back- and middle-office processes and workflows, and leveraging bots to address employee and customer support will not only eliminate mundane technical and maintenance tasks but also drive greater operational efficiency. For example, the team at Amazon Web Services uses AI to improve employee efficiency and decision-making by suggesting the best places to focus their attention each day.[15]
- **New jobs focused on IT mastery**. Nineteen percent of respondents believe IT roles will be newly created because of automation and AI, driving employment we can't currently envision. By one popular estimate, 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist.[16] Companies like Royole Corp. are developing flexible thin screens that will evolve the future of human-machine interaction.[17] This may lead to new job titles such as "human-machine interaction analyst" appearing in the future to manage this new engagement. A hybrid IT staff will act more as consulting partners, providing technical and integration services and rapid prototyping and testing ideas for the business.

Companies that believe there will be no change in IT's roles and responsibilities are making a fatal mistake. In this fast-paced world, companies need to retool and re-skill every person. No one can escape the gravitational pull of the new machine.

## What's in store for IT jobs?

**54%**

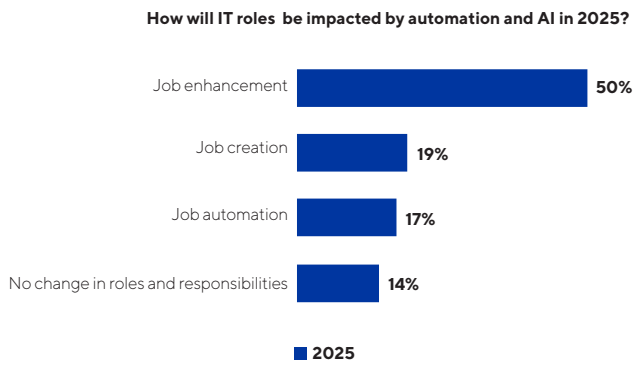
Robotic/virtual colleagues will change our enterprise's approach to jobs

**50%**

Maintaining the resources and skills to keep pace with market changes is a key challenge

**10%**

People's fear of job loss is a barrier to automation




Source: Cognizant Center for the Future of Work
Base: 1,018 senior IT executives
Figure 8

## Starting tomorrow: we can be 'HEROES'

Today's IT realm involves a myriad of platforms, systems, processes, applications and, of course, people. As the pace of change accelerates, the need to change the IT infrastructure will amplify. It can be overwhelming for businesses that are not well prepared. Below are five recommendations to help leaders get started on making the needed changes for the new IT infrastructure:

- **Merge your business, digital and security strategies into one**. In today's interconnected age, business is technology, and technology is business. The time has come for a single transformation strategy that cuts across business, IT and security the requirements of the digital enterprise. With this approach, the entire organization will engage in a single mission – growing a technology-led business. This doesn't mean that business leaders will become data center experts, but they will have a holistic view of how changes in IT infrastructure will change their business.
- **Inject cybersecurity deep into the company's culture** because humans will continue to be the weakest link to cybersecurity. In fact, social media (66%) and careless or unaware employees (64%) were cited as the top two threats increasing companies' risk exposure. Cybersecurity is everyone's responsibility, and the business's employee performance metrics should reflect that. Sixty percent of respondents said they are developing a corporate culture that makes everyone responsible for security.
- **Be fast, but not furious**. While it's true that companies need to match the speed of the change in the marketplace, mimicking the infrastructure of digital unicorns is a recipe for disaster. In our study, 35% of companies are endeavoring to become "the Amazon of their space," while 26% are unsure whether that's a realistic goal. With their roots in the industrial era, and very different end goals from digital natives, it's essential for traditional businesses to set their own pace for digital transformation. (For more on this topic, see our white paper "Fast But Not Furious: The Speed You Need to Win in the Fourth Industrial Revolution.")
- **Fix old-school HR practices with AI**. The rise of the new machine means that business transformation could occur more quickly than anticipated by organizations, often creating skill imbalances, and companies must be prepared. In fact, 50% of executive named maintaining resources and skills as a top challenge in meeting the pace of the digital economy. AI should drive the new rules of engagement for finding the best talent, along with building and managing "future of work"-type communities (GitHub among others) for the modern enterprise. Take a clue from consumer goods giant Unilever, which has been hiring employees using neuroscience-based brain games and AI. The average time for a candidate to be hired went from four months to four weeks, with a cumulative savings of 50,000 hours of candidates' time. Also, recruiters' time spent on applications decreased by 75%.[18]
- **Capture the next tech wave of data-driven decision making**. Companies that use advanced analytics and machine learning are twice as likely to be top financial performers, according to Bain, and three times more likely to execute effective decisions.[19] However, only 32% of respondents said their company has changed its approach to strategic decision making as a result of more data. In the age of the new machine, business decisions can no longer be hierarchically oriented or based on intuition. IT needs to foster collaboration and maintain a data-first culture to develop relevant products and services.

## IT matters more than ever

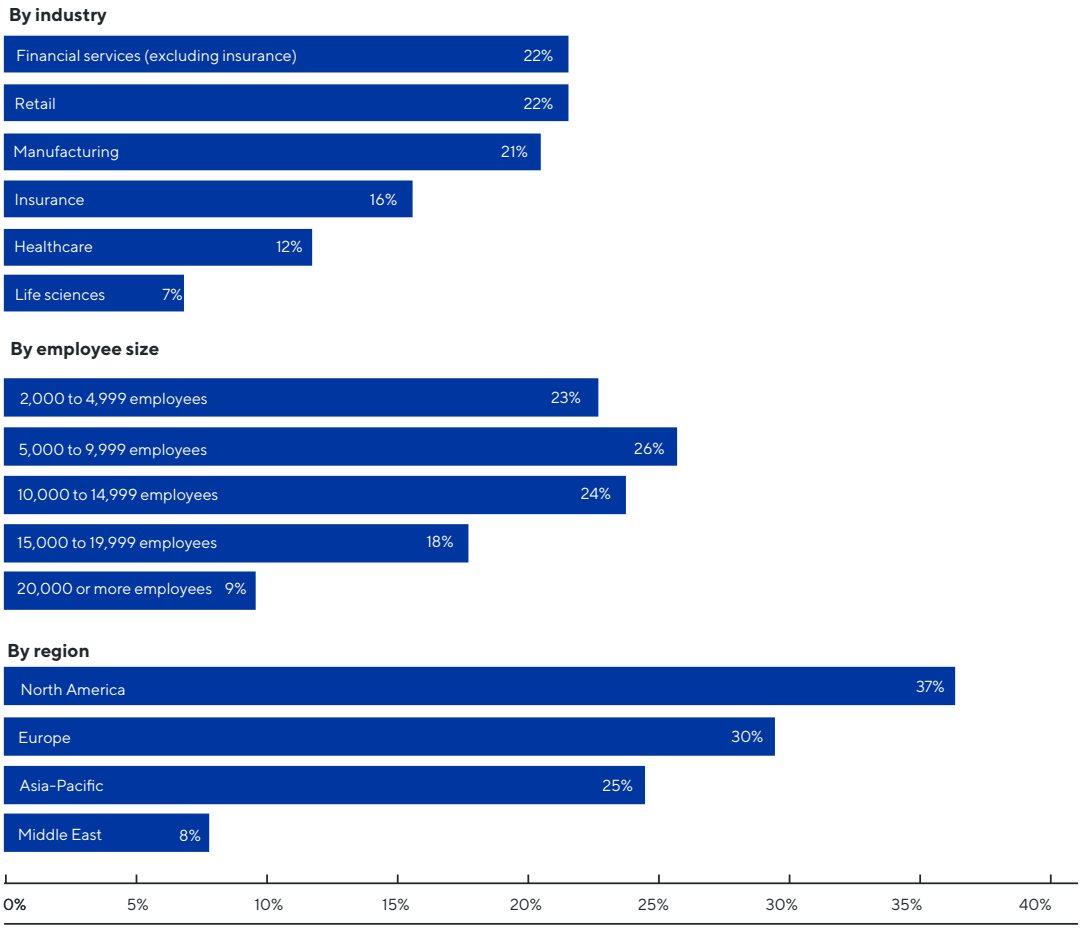
The days of the IT department being responsible for only infrastructure and operations, with a relentless focus on cost reduction, are gone. Enterprises that view IT as a costly overhead and not a competitive capability will struggle to succeed in the new machine age. Changing this mindset within IT, and then selling the idea to the rest of the company, will be both a challenge and an opportunity for CIOs.

Just as tablets, smartphones and app stores led the consumerization of IT, our HEROES framework, complemented with AI, can help businesses find their way into the future. Business and technology leaders that seize this moment of change will have a front-row seat to the shift in IT value far into the future.

# Methodology and demographics

We conducted a worldwide telephone-based survey in May and June 2017, with 1,018 senior IT executives across industries. The survey was run in 18 countries in English, Arabic, French, German, Japanese and Chinese. Survey respondents were distributed across financial services, healthcare, insurance, life sciences, manufacturing and retail industries. We interviewed companies with a minimum of 2,000 employees for this research.

## Demographics



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Manish Bahl is a Cognizant Associate Vice President who leads the company's Center for the Future of Work in Asia-Pacific. A respected futurist, speaker and thought leader, Manish has guided many Fortune 500 companies into the future of their business with his thought-provoking research and advisory skills. Within Cognizant's Center for the Future of Work, he helps ensure that the unit's original research and analysis jibes with emerging business-technology trends and dynamics in Asia-Pacific, and collaborates with a wide range of leading thinkers to understand how the future of work will take shape. He most recently served as Vice President, Country Manager with Forrester Research in India.


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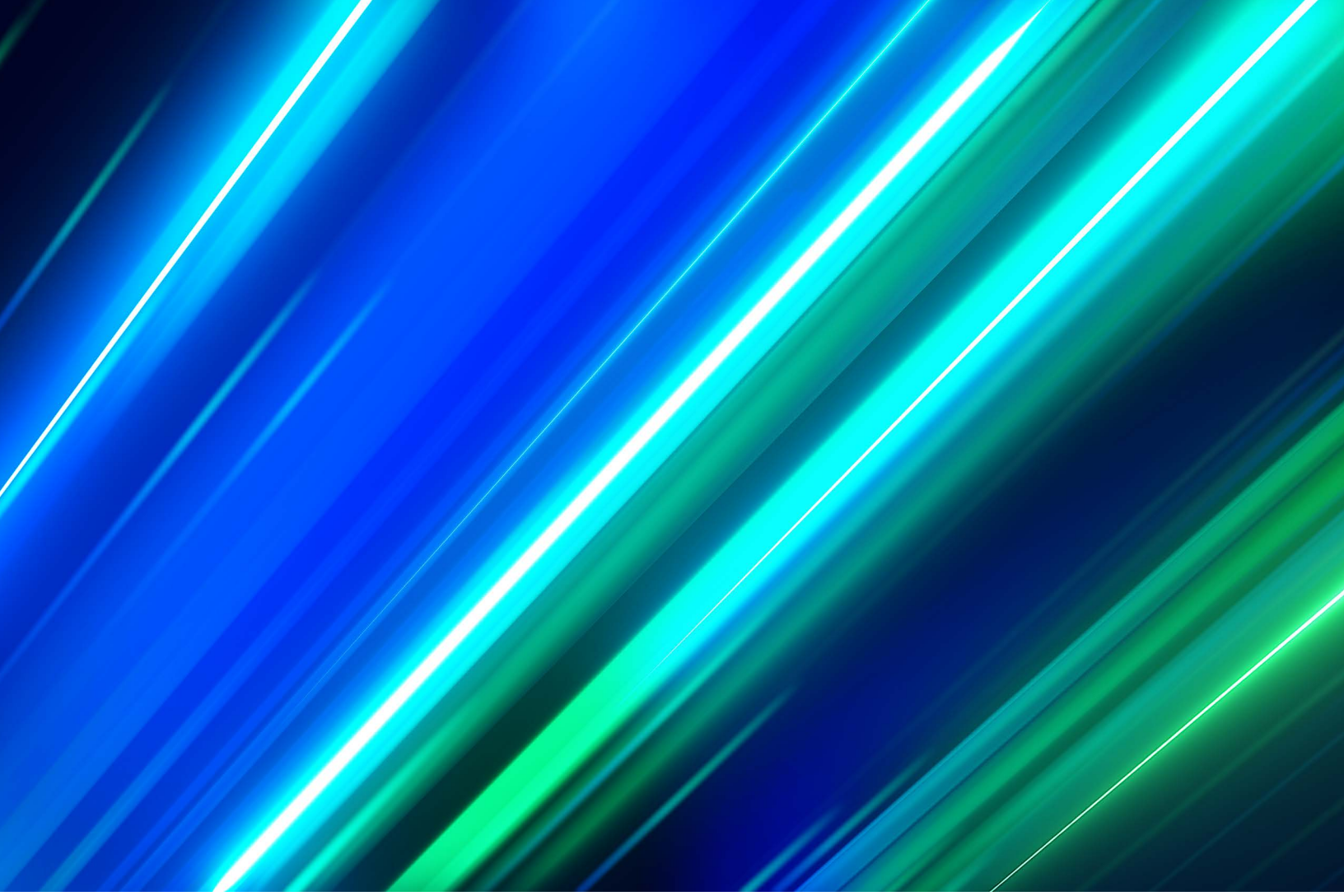

## About the Center for the Future of Work

Cognizant's Center for the Future of Work™ is chartered to examine how work is changing, and will change, in response to the emergence of new technologies, new business practices and new workers. The Center provides original research and analysis of work trends and dynamics, and collaborates with a wide range of business, technology and academic thinkers about what the future of work will look like as technology changes so many aspects of our working lives. For more information, visit Cognizant.com/futureofwork, or contact Ben Pring, Cognizant VP and Managing Director of the Center for the Future of Work, at Benjamin.Pring@cognizant.com.

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Cognizant (Nasdaq-100: CTSH) is one of the world's leading professional services companies, transforming clients' business, operating and technology models for the digital era. Our unique industry-based, consultative approach helps clients envision, build and run more innovative and efficient businesses. Headquartered in the U.S., Cognizant is ranked 193 on the Fortune 500 and is consistently listed among the most admired companies in the world. Learn how Cognizant helps clients lead with digital at www.cognizant.com or follow us @Cognizant.


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