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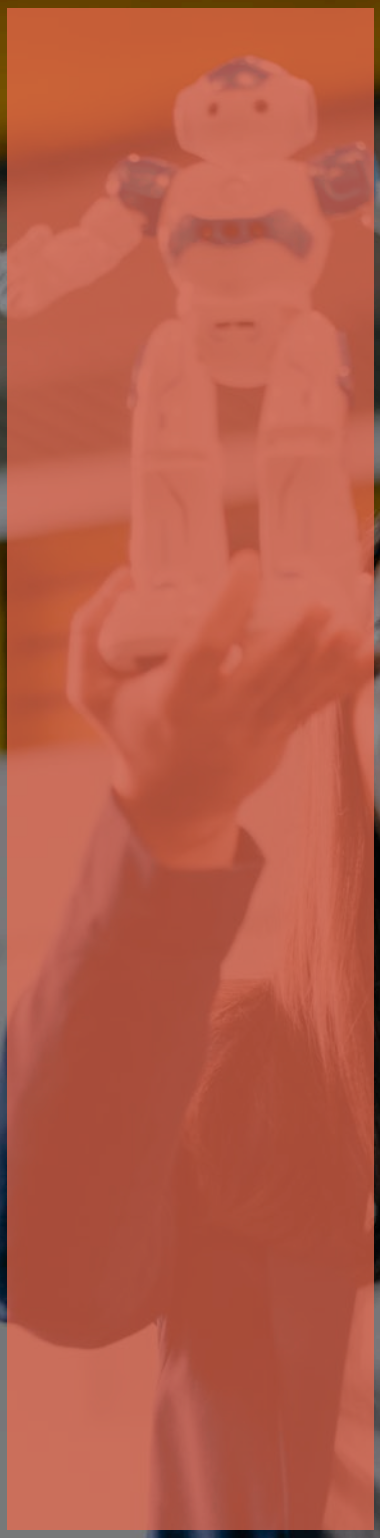
Intelligent High Tech:

The Movement Of Enterprise Applications To The Cloud



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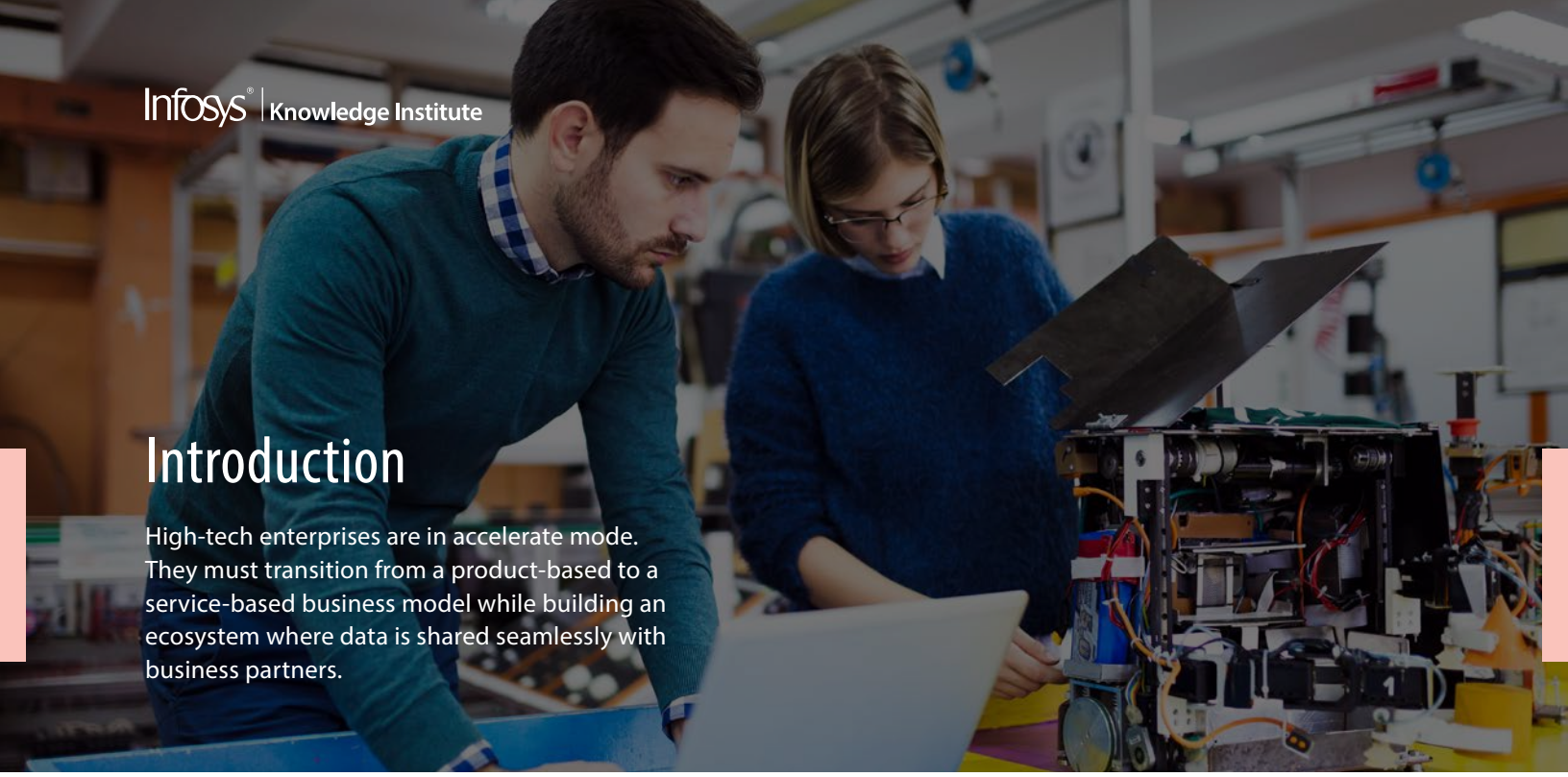
Contents



Introduction

High-tech enterprises are in accelerate mode. They must transition from a product-based to a service-based business model while building an ecosystem where data is shared seamlessly with business partners.

This breakneck speed and continual state of high alert is driven by digital disruptors that are forming new partnerships while mastering the art of rapid experimentation, development, prototyping and validation.

Visionary high-tech firms are those that ensure business and IT collaboration from the start to end of a project, with new ways of working and DevOps practices adopted as the status quo. But though the high-tech industry is by far the most mature in terms of digital transformation,[1] some high-tech firms are still lagging and not adopting capabilities that will ensure they survive in this new era.

By harnessing the power of cloud computing, both laggards and those that are looking to optimize their business can find new forms of growth, increase efficiencies and instill a culture change to fend off the likes of Netflix or Airbnb.

"With many global customers, and the accelerated growth our industry is witnessing, our firm needs to remove friction in business processes," says one CMO of a high-tech firm in the U.S. "Cloud is the answer to this concern, providing transparency while keeping measures in place so that all bottlenecks are removed to ensure the business runs smoothly."

Cloud computing is cheaper, more efficient, more agile and more resilient than legacy IT, and platforms that use the cloud can act as the scaffolding on which to implement further forefront initiatives such as artificial intelligence, design thinking and digital product engineering, among others. With the cloud, data can be accessed on-demand, offering customer-centric use cases that set the pace of change across the global marketplace.

Once on-premises legacy architecture moves to the cloud, high-tech firms can find new ways of making money. Adobe Systems used cloud technology to transition from a seller of boxed software to a subscription-based money machine. High levels of business performance enticed customers to sign up, with software upgrades keeping up with consumer demand. Personalized and speedier services, along with omnichannel customer interactions, made Adobe a truly disruptive player in the market.

As part of the transition to the cloud, enterprise applications come under the spotlight as firms move away from monolithic software packages and massive implementation cycles toward shorter agile implementations. Given the critical role played by these enterprise applications in a business, it seemed timely to get a comprehensive idea of their movement to the cloud.

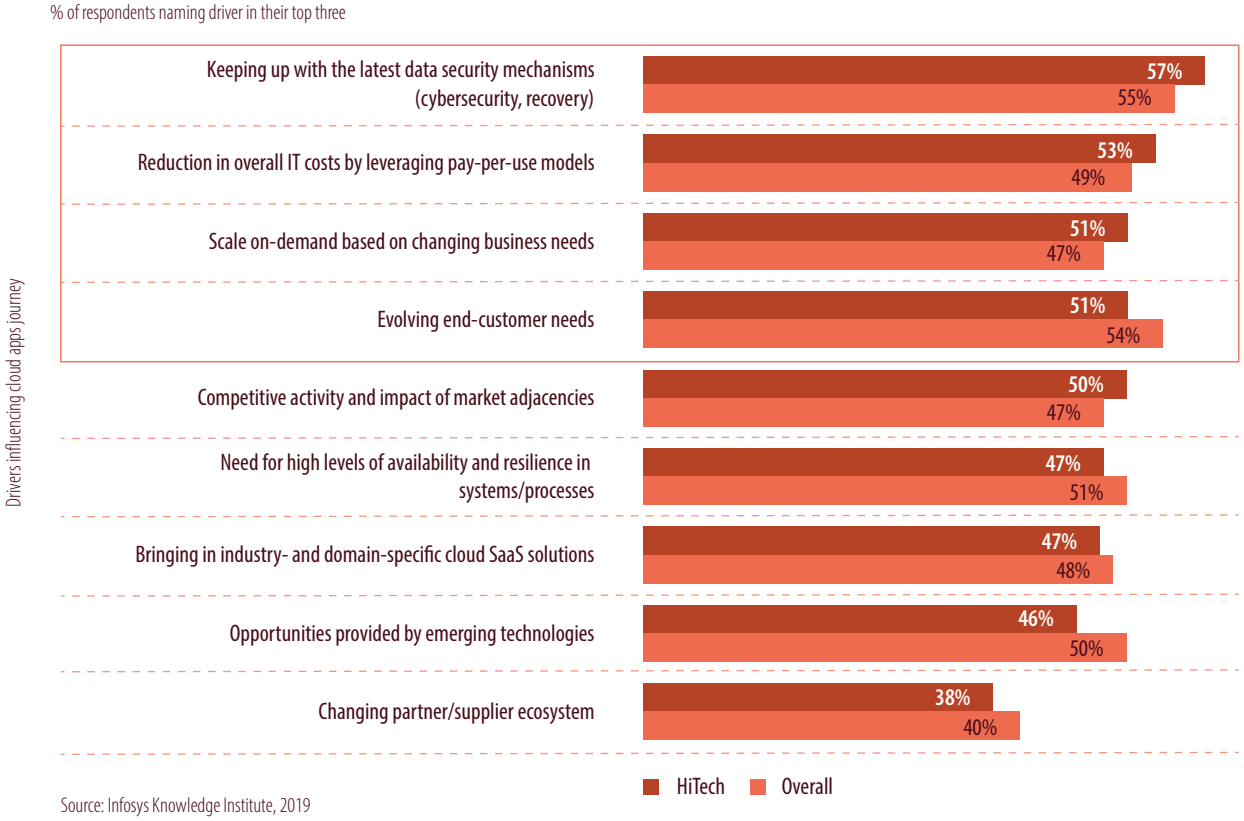
Enterprise applications include those that run the business, such as enterprise resource planning, customer relationship management, supply chain management and human resources management.

Infosys launched a study in the first quarter of this calendar year to understand the experience of application cloud transformation across 81 high-tech firms from the United States, Europe, Australia and New Zealand. To understand the pulse of the market moving forward, the survey was further validated by qualitative interviews with senior executives in September and October. Respondents were senior executives involved in digital and cloud initiatives at firms with revenues exceeding $1 billion.

The cloud: a strategic move for enterprise applications

What is driving high-tech firms to the cloud? In this research, we found that operational factors were most prevalent: Keeping pace with data security trends (57%), reducing overall IT costs by using pay-per-use models of engagement (53%), scaling on-demand in response to business needs (51%) and fulfilling evolving customer needs (51%) featured highly (Figure 1).

Figure 1. Data security and operational efficiencies are the driving force behind cloud apps transformation



Source: Infosys Knowledge Institute, 2019

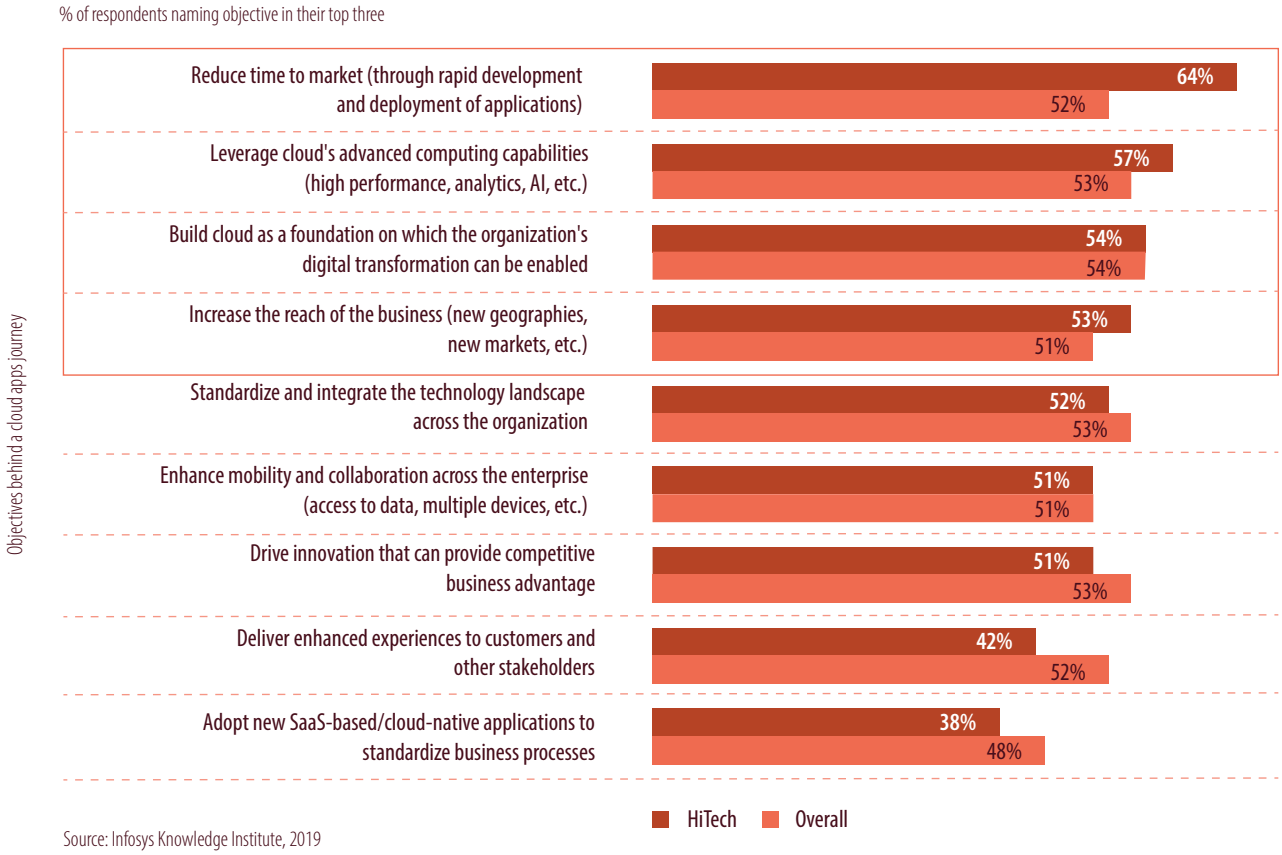
High-tech firms are continuously innovating to arrive at the next business or consumer disruption. Consequently, they are home to a significant amount of sensitive and valuable intellectual property. Moreover, high-tech firms and their employees tend to be early adopters of still-evolving and not completely foolproof technologies, making them vulnerable to cyberattacks. By moving applications to the cloud, high-tech firms can benefit from a more secure cyber perimeter. The cloud, because of more effective security policies and disaster recovery mechanisms, experiences cyberattacks half as frequent as in on-premises environments.[2]

> *It's time for high-tech firms to transform into lean, agile and nimble enterprises in order to meet the growing market pressures*

To handle customer demands and the constant pressures for market-relevant innovations, high-tech firms must metamorphose into lean, agile and nimble enterprises. In this context, reducing overall IT costs to divert valuable funds to activities that can enhance business results is an attractive proposition.

The key objectives that high-tech firms expect to achieve through the cloud apps transformation include faster time to market (64%), the ability to exploit cloud's advanced computing capabilities (57%) and use of the cloud as a foundation for digital transformation (54%) (Figure 2).

Figure 2. Key objectives include reduced time to market and leveraging the cloud's advanced computing capabilities



Source: Infosys Knowledge Institute, 2019

Cloud technology allows DevOps to take root in an enterprise, leading to products and services being delivered faster, better and cheaper. No wonder then that cloud is touted widely as the preeminent technology to drive digital transformation.

Vendors such as Salesforce, Oracle and SAP offer cloud solutions as a service, acting as scaffolding on which to build other digital technologies. By exposing APIs to a wider ecosystem and utilizing open source code, the cloud enables agile teams to produce high-quality software faster and less expensively.

The cloud also allows high-tech firms to quickly open up in new markets with minimal cost. Digital natives have long used cloud development platforms such as GitHub to collaborate around data, sensing market opportunities in real time. Cloud computing also offers high-tech incumbents a way to form new partnerships and develop new digital offerings. For instance, VMware started working with Amazon Web Services as well as other cloud providers. In one interview, a VMware vice president said the company wanted to be "Cloud Switzerland" (provider neutral).

The four types of enterprises

The study evaluated the maturity and direction of the application cloud program across the high-tech companies surveyed. Maturity was determined by asking the following questions:

- Are the business objectives of high-tech firms strategic or operational in nature?
- Do business or IT-led reasons drive high-tech enterprises to the cloud?
- Are enterprises occupied with quick wins today, or are they thinking and planning ahead?
- Have high-tech enterprises expanded to include the external ecosystem, or are they internally focused?

This examination led to four distinct clusters in the high-tech industry (Figure 3):

Business-focused (38%):

Visionary enterprises looking at long-term business impact. Competition, enhanced stakeholder experiences, increased innovation and market reach, and keeping up with the changing ecosystem drive these firms.

IT-focused (24%):

Enterprises absorbed in technology-led operational outcomes that are not fundamentally changing their business model in response. Typically, these firms look for short-term outcomes, including reduced costs, high availability, data security, and advanced compute capabilities such as analytics and artificial intelligence.

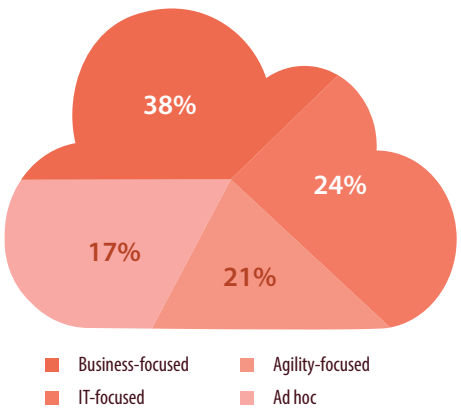
Agility-focused (21%):

Progressive enterprises focused on improving organizational agility. These firms rely heavily on operational transformation to deliver business outcomes.

Ad hoc (17%):

Enterprises lacking a clear vision and plan for IT or business transformation. They respond to triggers in an ad hoc fashion.

Figure 3. Business-focused enterprises (38%), IT-focused enterprises (24%) and agility-focused enterprises (21%) comprise the key clusters



Source: Infosys Knowledge Institute, 2019

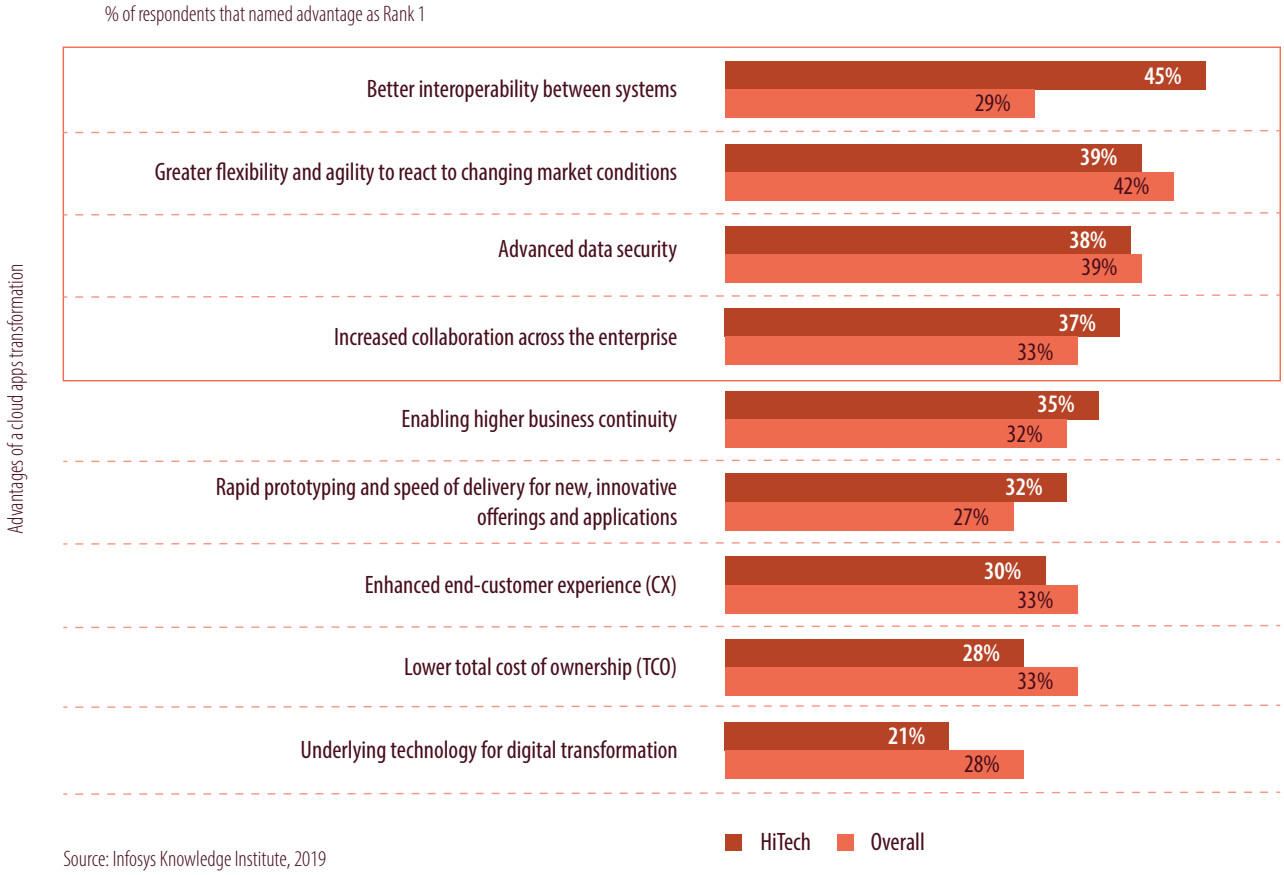
Though the share of business-focused firms trailed the industry average by eight percentage points, there was a significantly higher number of agility-focused firms in the high-tech data. Clearly there is an emphasis on a leaner, nimbler dynamic in high tech, bridging customer-facing initiatives on the one hand with operational efficiency on the other. With cloud technology applications, these firms are looking for rapid provisioning of infrastructure, with the ability to turn off cloud instances that are not in use. Timing the hardware refresh cycle to coincide with application migration is necessary for further efficiencies.

Read our master report — Behind the Scenes of an Intelligent Enterprise: Moving Enterprise Applications to the Cloud — for more insight into each cluster.

Enterprise clusters expect both strategic and operational benefits

Advanced data security is not only a dominant driver for cloud apps transformation, but is seen as a top expected advantage (38%) (Figure 4). However, better interoperability between systems was even more present in leaders' minds (45%), along with the cloud's flexibility to respond to changing market conditions (39%).

Figure 4. Better interoperability, greater market flexibility and advanced data security are the top cited advantages for cloud apps transformation



Source: Infosys Knowledge Institute, 2019

Advantages of cloud transformation (%)	Overall High Tech	GEO		
		U.S.	EU	ANZ
Base	81	22	49	10
Better interoperability between systems	45	67	38	100
Greater flexibility/agility to react to changing market conditions	39	14	47	40
Advanced data security	38	46	26	60
Increased collaboration acros the enterprise	37	56	32	–
Enabling higher business continuity	35	25	45	–
Rapid prototyping and speed of delivery for new, innovative offerings/applications	32	33	45	–
Enhanced end customer experience (CX)	30	50	17	67
Lower total cost of ownership (TCO)	28	29	27	33
Underlying technology for digital transformation	21	–	32	20

Source: Infosys Knowledge Institute, 2019

Cloud technology is touted by experts as a "future proof solution." This means that the technical blueprint meets both short- and long-term needs, something that high-tech CXOs are acutely aware of with so much market turbulence. The cloud is also portable and interoperable, meaning that systems can be built from reusable components that will work together "out of the box," significantly reducing costs and increasing transparency in business processes. With increased transparency in IT architecture comes increased bargaining power with cloud service providers and reduced business risk.

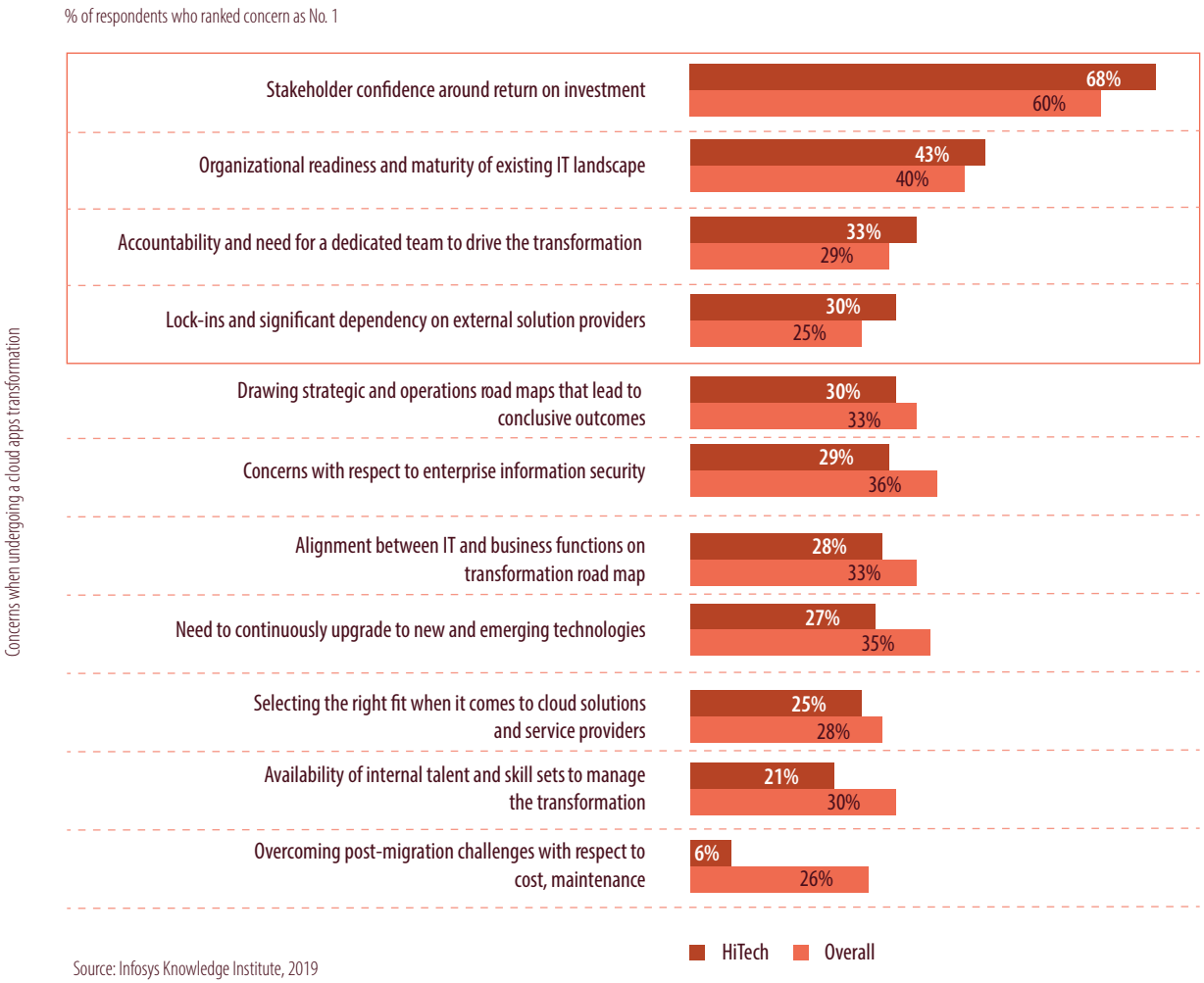
As many CXOs will profess, cloud computing is touted as a savior to many business problems, and could in fact satisfy its own hype. The CFO of a renowned European high-tech player that we interviewed cited manifold boons to organizational performance and health, including 100% regulatory compliance, on-time payments due to frictionless business processes, reduced error and "smoother relationships with existing customers."

A regional view of the responses gave interesting insights. Respondents from Australia and New Zealand and the U.S. agreed that more interoperable systems and advanced data security were the top expected advantages. For Europe, greater flexibility to react to market conditions (47%) outweighed the rest.

Cloud concerns persist, characterizing large-scale programs

High-tech respondents viewed building stakeholder confidence by delivering a return on investment (68%) as a top concern (Figure 5). Cloud transformation programs mandate high investments and consequently garner significant visibility, especially among senior leaders. Large-scale programs of this nature require ownership and direction from top management to succeed, and so delivering significant ROI deservedly becomes a key concern across business and IT groups, and across industries and regions.

Figure 5. High-tech firms are apprehensive about building stakeholder confidence, organizational readiness and the need for a dedicated transformation team



Source: Infosys Knowledge Institute, 2019

Apprehensions during a cloud transformation journey (%)	Overall High Tech	GEO		
		U.S.	EU	ANZ
Base	81	22	49	10
Stakeholder confidence around return on investment	68	64	67	80
Organization readiness/maturity of existing IT landscape	43	40	41	67
Accountability/need for a dedicated team to drive the transformation	33	50	22	50
Lock-ins/significant dependency on external solution providers	30	–	50	–
Drawing strategic and operations road maps that lead to conclusive outcomes	30	17	35	25
Concerns with respect to enterprise information security	29	20	29	50
Alignment between IT and business functions on transformation road map	28	43	30	–
Need to continuously upgrade to new/emerging technologies	27	–	43	-
Selecting the right fit when it comes to cloud solutions and service providers	25	33	22	33
Availability of internal talent/skill sets to manage the transformation	21	29	21	–
Overcoming post-migration challenges with respect to cost, maintenance	6	–	9	–

Source: Infosys Knowledge Institute, 2019

The fact that executives were least concerned with post-migration challenges with respect to cost and maintenance is worth delving into (no respondents in the U.S. were concerned here). High-tech firms, as we will see in following sections, are more mature and more advanced in their cloud journey than other industries. We would then expect post-migration apprehensions, along with readiness of talent (also low on the list) to be top of mind.

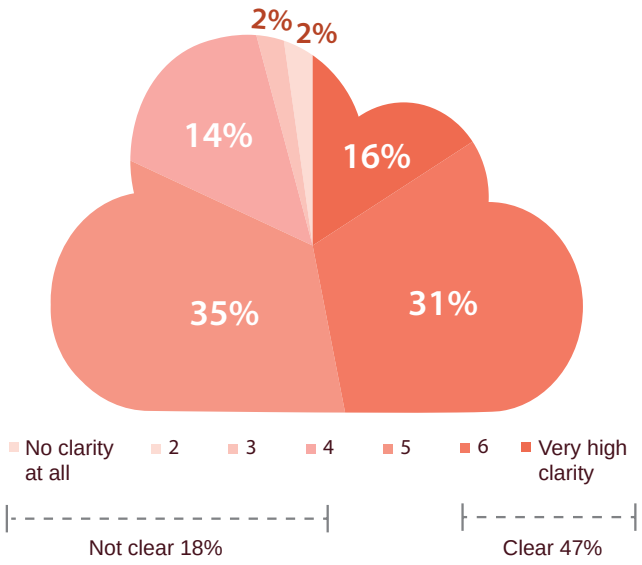
However, as we found in the report titled Infosys Digital Radar 2019: Barriers and Accelerators for Digital Transformation in the High-Tech Industry, high-tech organizations tend to underestimate some of the challenges they will face on the cloud journey. Companies need to implement major cultural changes to take on post-migration challenges, along with the ability to rapidly experiment with other technologies that cloud enables. One way to do this is to open a center of excellence where employees are upskilled and prototypes of applications are tried and tested before scaling out. Reskilling of employees is vital to ensure that there are boots on the ground to provision cloud environments, while monitoring idle cloud instances and ensuring money isn't wasted needlessly. With experience across the full stack of cloud technology, employees can then assure stakeholders that new projects will run on time, taking us full circle to the pet grievance – the ability to build stakeholder confidence.

Australia and New Zealand (80%) expressed most concern over building stakeholder confidence. The business-focused cluster (79%) also ranked retaining stakeholder confidence as the topmost concern.

The importance of a clear strategy and road map

Game-changing initiatives such as cloud transformation cannot succeed without the support of multiple stakeholders across the organization. To buy in, stakeholders must have clarity on the initiatives and what to expect from them. While 47% of the respondents said they had clarity on the digital path, almost one-fifth of executives said their firms were unclear (Figure 6). This was six percentage points lower than the median number across industries, though significant enough to cause some alarm.

Figure 6. Almost half the high-tech firms had clarity on digital initiatives, though almost one-fifth were unclear



Source: Infosys Knowledge Institute, 2019

"While collaboration within companies has increased dramatically thanks to the introduction of new collaboration tools, productivity has only increased modestly because teams lack true clarity," says Robbie O'Connor, head of EMEA sales for work management platform Asana. "The more complex the project and the more parties involved, the harder it is to keep everyone focused on the work that matters."

Those firms with clarity sought to reduce time to market (64%), capitalize on the cloud's advanced capabilities (57%) and use the cloud as a foundation for digital transformation (54%).

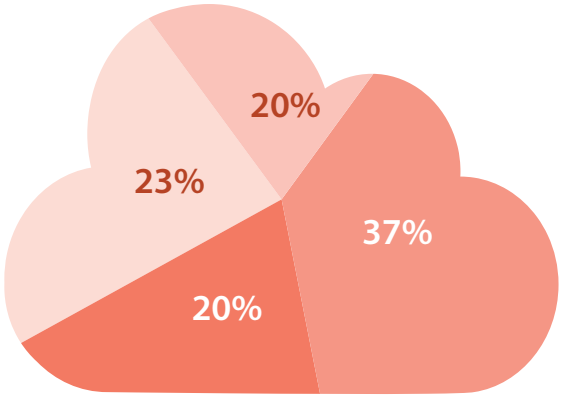
A clusterwise analysis showed that the business-focused group (68%) had the most clarity, followed by the agility-focused group (47%). Experience breeds clarity; the more mature a firm is on its digital transformation journey, the more challenges arise to impede progress. However, as firms garner more experience in one digital technology, the more confident they are of succeeding on other initiatives. They can think about standardizing software as processes become more transparent and create new efficiencies with automation.

> *The business-focused group (68%) and agility-focused group (47%) have the highest clarity on digital initiatives*

Enterprise cloud applications adoption is well underway

While high-tech firms recognize that cloud apps transformation is essential for their survival, this research looked to uncover whether adoption outpaced that in other industries. In fact, like manufacturing, where 58% of firms had moved all or some major applications to the cloud, high tech was seven percentage points above the median, with 57% having moved all or some applications (Figure 7).

Figure 7. 57% of high-tech firms have moved all or some of their enterprise applications to the cloud, with 23% still entirely on-premises



	Current state of cloud transformation (%)	Overall	HiTech	U.S.	EU	Australia and New Zealand
	Base	853	81	22	49	10
1	Some pilots and proofs-of-concepts for cloud adoption are underway, but currently, all enterprise applications are still on premises	24	23	14	31	10
2	Cloud adoption is underway for some applications/functions, but none have been completed	26	20	14	22	20
3	Cloud adoption is already complete for some enterprise applications/functions	34	37	36	37	40
4	All major enterprise applications have moved to cloud	16	20	36	10	30

Source: Infosys Knowledge Institute, 2019

However, a significant 23% of firms still have the entirety of their applications on-premises. As we will see later, insufficient budget often derails cloud projects. Forrester is projecting that tech spending growth will slow from 5% in 2018 to 3.8% in 2020, as firms battle their way to the bottom on prices.

> *Instead of jumping into a Big Bang cloud implementation approach, firms should follow a phased structure*

Also, while agile and DevOps practices are often baked into the DNA of high-tech staff and engineers, the business side of most high-tech firms is still dealing with inefficient supply chains. To ensure laggards adopt the cloud quickly, firms must take a case-by-case look at their application portfolios and then prioritize

those applications that can be lifted and shifted easily. According to Srikanth Sripathi, a cloud expert at Infosys, firms should also take a phased approach to implementation, starting with business functions that will return the most value to stakeholders, and resist a Big Bang implementation.

Many organizations in the U.S. (72%) and Australia and New Zealand (70%) had moved all or some of their major applications to the cloud, while Europe (31%) had all applications on-premises. Analyzing these findings along with the responses on clarity validated that those with higher clarity on digital transformation were ahead on the cloud path. European respondents (39%) had the lowest level of clarity, while U.S. respondents (64%) had the highest.

Three choices for migration to the cloud: LOB, enterprise or both

High-tech enterprises must carefully examine the objectives and expected outcomes of a cloud apps journey before deciding on the cloud approach.

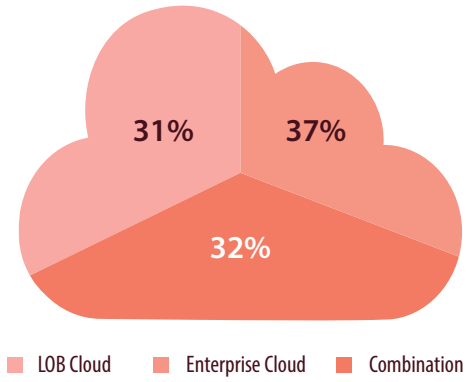
The line-of-business (LOB) approach allows a business unit to independently activate a new cloud service with less involvement from the enterprise IT team. Such an approach is best suited for situations that require quick deployment and minimal disruption. Moreover, high-tech enterprises can select best-in-class software such as SAP SuccessFactors or NetSuite by adopting an LOB approach.

In contrast, enterprise-level cloud approaches are complex, requiring immense efforts, and are ideal for long-term projects that integrate applications on a single homogeneous platform. Such efforts cause significant disruption and take a long time to complete.

The combination option presents a best-of-both-worlds approach.

High-tech firms preferred to use the enterprise cloud approach (37%), although the LOB (31%) and combination (30%) approaches were not far behind (Figure 8). These trends echo the overall trends across industries.

Figure 8. Enterprise cloud is the way forward for 37% of high-tech firms, and even more popular in Europe (40%)



	Approach adopted	Overall	HiTech	U.S.	EU	ANZ
	Base	814	76	20	47	9
1	LOB Cloud	31	32	30	30	44
2	Enterprise Cloud	39	37	35	40	22
3	Combination	30	32	35	30	33

Source: Infosys Knowledge Institute, 2019

European firms are more likely to go the enterprise cloud route (40%), while Australian and New Zealand firms opted for the LOB cloud approach (44%). U.S. firms were more willing to try the combination approach (35%) than the others.

The cluster view of the data revealed that business-focused firms strongly preferred the LOB cloud approach (45%). Those targeting business-focused transformation are results-oriented and prefer the LOB approach as it allows them to pick and choose the best fit for the

problem. As Kannan Narayanan, a cloud expert at Infosys, remarks, "These business-focused enterprises tend not to be unduly concerned about the under-the-hood aspects, making LOB the preferred option."

The IT-focused group opted for the enterprise cloud approach (53%). This cluster, primarily led by the IT department, is likely to be entrusted with keeping all stacks running seamlessly and performing optimally. In this context, working with different cloud providers or solutions can lead to coordination and other compatibility issues, explaining why they decided to go the enterprise-cloud way.

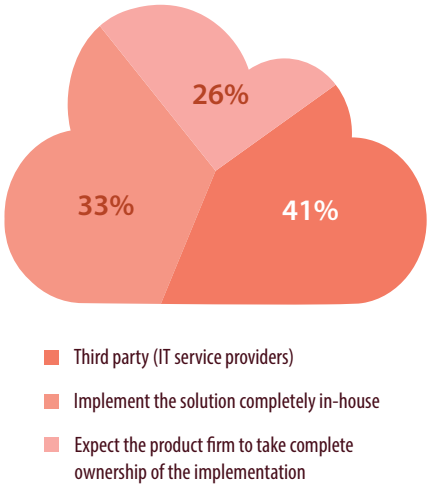
Interestingly, the agility-focused firms chose the combination approach (60%). The high-tech industry has a higher proportion of agility-focused firms (21%) that seek to make the enterprise leaner and quicker to respond to a changing market dynamic. However, only a LOB cloud approach can achieve this without spending inordinate time on implementation.

The implementation process

Once the right cloud approach has been identified, and the cloud solution identified (SAP, Oracle, Salesforce and so on), how do high-tech firms go about actually implementing these solutions?

Third-party firms enable a high degree of customization, giving high-tech firms the ability to meet evolving customer needs and greater flexibility to respond to market changes. It's no surprise then that third-party implementations rated highly across the board (41%), with high-tech firms in the U.S. (55%) expressing a strong preference for partnering (Figure 9). It should also be noted that a trusted partner can help bring about culture change and infuses an organization with thought leadership and skill in emerging technologies. Infosys analysis also shows that partnering leads to higher chances of success, quicker implementation and a greater transfer of skills.[3]

Figure 9. 41% of high-tech firms expressed a desire to implement the cloud solution through a third-party provider, while a third implement in-house



Source: Infosys Knowledge Institute, 2019

	Product implementation (%)	Overall	HiTech	U.S.	EU	Australia and New Zealand
	Base	844	81	22	49	10
1	Third party (IT service providers)	39	41	55	37	30
2	Implement the solution completely in-house	36	33	23	37	40
3	Expect the product firm to take complete ownership of the implementation	25	26	23	27	30

Preparing for the cloud challenge

The primary challenges faced during the cloud apps program are accurate estimation of time and costs (59%), absence of a dedicated team to anchor the program (50%), tracking and monitoring of systems on the cloud (49%), and application refactoring to align with cloud architectures (49%) (Figure 10).

Figure 10. Diverse issues such as accurate cost estimation, absence of a dedicated team and application refactoring were the top cited pain points

Challenges (% Top 2 box)	Overall	HiTech	U.S.	EU	Australia and New Zealand
Base	840	81	22	49	10
Accurate estimation of time and financial costs involved	51	59	64	53	80
Absence of an internal dedicated cloud team to drive the initiative	45	50	55	48	50
Tracking and monitoring systems and processes on the cloud	51	49	64	41	60
Application refactoring and tweaking to suit cloud architectures	46	49	67	42	50
Collaboration and integration with external service providers and stakeholders	47	48	68	40	40
Promoting a culture change within the organization	48	46	41	44	70
Deciding on choice of tools and technologies	48	46	64	33	70
Pace of execution and implementation of the initiative	48	44	55	41	40
Lack of high levels of clarity in the execution road map	45	44	59	39	40
Aligning existing legacy systems and architectures and technology environments	49	43	45	39	60

Source: Infosys Knowledge Institute, 2019

More advanced high-tech firms have a keen eye on how the cloud enables cost reduction, improved efficiency and business agility. They also understand the long-term potential of cloud solutions and are usually the most vocal about barriers that impede their progress on the cloud journey. They are more willing to move into new markets, and fundamentally change the cloud operating model, while upskilling employees to work in a more automated environment. They also think clearly about partnering with public cloud providers to build and manage the cloud stack, understand the challenges of legacy-application remediation (applications need to be refactored at the infrastructure and application layers to align with capacity and security requirements), and have leadership involved in early stages of cloud adoption.

The business-focused cluster was almost equally challenged by cost estimation (77%), absence of an internal dedicated team to drive the initiative (71%) and application refactoring to suit cloud architectures (70%). This mature cluster, having moved all or some of its major applications to the cloud (61%), has the most experience dealing with such a large-scale program and is likely to have encountered more challenges. Agility-focused firms also ran into these challenges but to a lesser degree than the business-focused cluster.

Conclusion

The high-tech industry is undergoing tectonic changes. As it contends with new business models, shrinking product cycles, the accelerating pace of technological changes and an expanding ecosystem, it must ensure customers don't defect and go elsewhere. Indeed, today, customer loyalty is at an all-time low, with new products and services offered at the touch of a button. To come out on top, high-tech firms must retool their internal operations. Only those that embrace digital transformation and, by extension, cloud transformation can capitalize on the opportunities that these technologies purvey and ultimately succeed in the long term.

Almost half of the respondent firms said they had clarity on the digital path, though almost one-fifth were unclear about digital initiatives, a remarkable number given how much competition high-tech firms face in this new era. That said, 57% of the respondent firms had moved all or some of their major applications to the cloud, showing signs of maturity.

We also found a higher number of agility-focused firms than the average across industries, highlighting the fact that this industry is looking to instill agile and DevOps and benefit from a "live enterprise" — a continuously learning organization that adapts and evolves at speed in response to market and customer data. As we have written in a complementary report — The Three Pillars of Cloud Transformation — in this paradigm, the cloud is the foundation on which firms build sentient routines into processes.

Respondent firms were almost equally divided between the three cloud approaches, although enterprise cloud (37%) was the most preferred. The findings suggest that the high-tech industry is more mature than the others as organizations are comfortable with any of the three approaches and have the flexibility to choose the best-fit approach for their requirements.

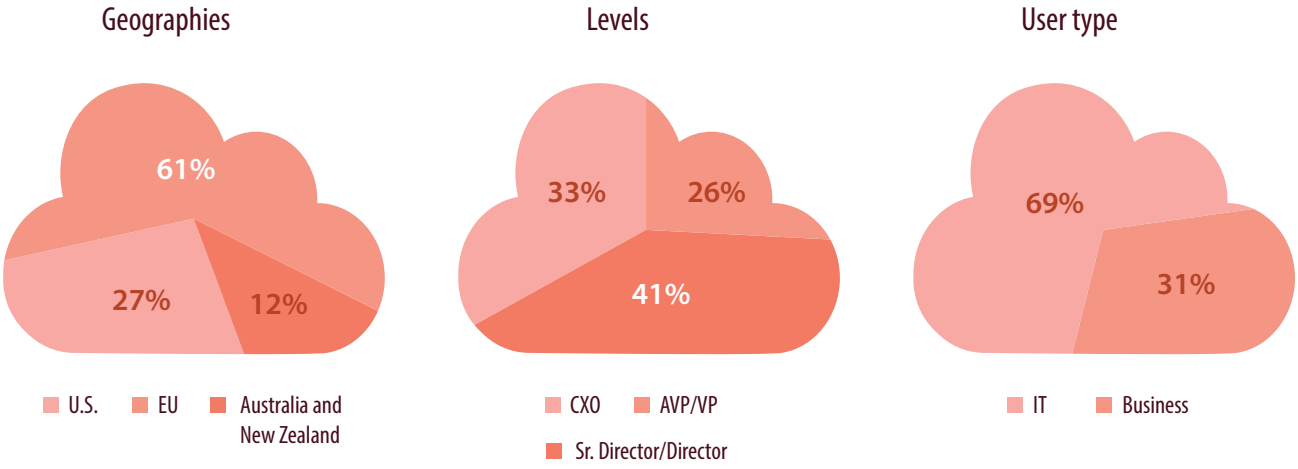
Making good on the cloud transformation promise mandates close collaboration between business and IT to overcome multiple operational and technology challenges. Operational challenges, such as cost estimation, absence of a dedicated internal team to own the initiative, and tracking and monitoring, were deemed significant. It's noteworthy that 41% of high-tech firms use third-party providers to deploy the cloud solution, possibly to take advantage of the providers' technical expertise and faster implementation cycle.

However daunting these challenges appear to be, high-tech firms must arrive at ways to tackle them and continue on the cloud apps journey. Keeping track of customer needs, analyzing the maturity of digital programs and taking corrective action — while involving senior stakeholders in the cloud program and demonstrating good ROI through quick wins — will ensure digital transformation continues in the right direction.

Only those companies with the requisite business agility and acumen to grasp the complexities of the evolving market demands and the ability to respond appropriately will survive.

Survey methodology

A total of 81 high-tech senior executives and leaders involved in digital and cloud initiatives responded to this research, which took place in the first quarter of this calendar year. To understand the pulse of the market moving forward, the survey was further validated by qualitative interviews with senior executives in September and October. Only companies with revenues exceeding $1 billion were invited to participate. Respondents hailed from the United States, Europe, Australia and New Zealand.



Source: Infosys Knowledge Institute, 2019

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