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Behind the Scenes of an Intelligent Enterprise:

Moving Enterprise Applications to the Cloud

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Foreword

Dinesh Rao

Executive Vice President and
Global Head – Enterprise Application Services,
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In the past two decades, so many digitally driven companies have captured massive value at great cost to many established players. Despite a common belief that it is the digital natives that are the biggest threat to holders of existing market share, the time has come to take cognizance of the fact that a growing number of incumbents competing in new digital ways pose as great a threat to their erstwhile peers. What differentiates the best from the rest is their operating model that is geared to continually pivot in response to changing market needs, with both improved business processes on the inside and new end-to-end customer journeys on the outside. Their ability to move, adapt and scale quickly sets them apart.

Yet several others struggle. These companies have invested millions of dollars in several ERP products that they can't simply shrug off in their journey to digitize. But these legacy systems, surrounded by inflexible processes and complex services, can't talk to newer systems that leverage cutting edge technologies like artificial intelligence, machine learning, AR/VR, big data, real time analytics, IOT and blockchain. This makes agile innovation at speed and scale a huge challenge, until a systematic plan is orchestrated to solve the fundamental problems of their unique situation. This includes:

- Identifying the non-core aspects of the legacy landscape and transforming them for cloud-readiness and migration to the cloud
- Opening up the now simplified core with API-microservices to create secure pathways for newer digital platforms to access these systems; this means decoupling the evolution of frontends and backends allowing for a continuous renewal of the front, without disrupting the core
- Moving from a product-centric landscape (dominated by systems of record) to a platforms-led (systems of innovation) connected enterprise equipped with the building blocks to experiment, quickly iterate and evolve, by bringing in ecosystem participation
- Transforming to a software-driven enterprise where the ERP core runs with cloud-efficiencies and is augmented with next-gen digital capabilities to drive better business outcomes - whether it's spotting opportunities fast, re-engineering processes to spontaneously respond, reducing cycle times, or delivering new experiences on demand, often by creating new business models

The choices and decisions to be made, even when pursuing this path, are multifarious. To take the line-of-business cloud approach, enterprise cloud approach or a strategic combination of both? Which technology investments to repurpose and which ones to let go? How to establish stakeholder confidence around return on investment (ROI)? What would make for advanced data security? The questions are aplenty and we hope the findings from this research will help navigate your path with some guidance.

And, needless to say, you can count on us to help. At Infosys, we have proven expertise in helping enterprises with large ERP and legacy landscapes to strategize and execute on their path to becoming digital innovators, while repurposing the investments they have already made for the digital transformation ahead. We help them first simplify their core and run it with digital efficiencies, before opening it up to work seamlessly with newer technologies, applications and intelligent frontends. We help them find agile and efficient ways to create customer value with evolving technology at the core.

Enjoy the learning!

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Introduction

Digitization has significantly disrupted enterprise processes and even business models, changing the way both incumbents and digital natives think and act.

These enterprises should not assume that digital transformation is a one-time investment. Digital technologies evolve at a fast pace and will continue to do so. Companies expend considerable effort in keeping up with these changes, a trend that will only accelerate in years to come. The journey is not simple and involves revamping systems and processes to support the transformation. Cultural issues are no longer dormant problems, and resistance to change is something CXOs need to factor in to the transformation roadmap.

The digital superstars are those who think big, start small and focus on overarching strategic objectives with both business and IT stakeholders around the table. Short-term tactical wins no longer suffice to keep up with the competition across industry verticals.

Digital transformation is a broad umbrella encompassing many technologies, and the cloud is the primary member. Leading business and IT consultancies say that the cloud underpins the digital journey, and they may not be wrong. The cloud enables core modernization, enables better customer experiences at the periphery, and opens up new use cases for AI and data analytics (such as Oracle Analytics Cloud). It also helps reduce the hardware and software asset base within an enterprise so that they can scale quickly and keep up with changing demands on resources. A whiplash effect occurs wherein a move to the cloud impacts the bottom line and increases business agility in the process. The result is often a nimbler and more efficient organization. With this in mind, the absence of a solid cloud strategy, with approval from the top of the enterprise, spells disaster for any digital program.

With the cloud, building everything in house is often difficult: there is myriad complexity in choosing the right infrastructure and enterprise applications. Finding the right people is also a challenge – many do not have a holistic understanding of the vast cloud landscape, and it can take months to train them up. With that in mind, businesses are increasingly opting for everything-as-a-service (XaaS) models.

Enterprise applications form the backbone of any company. But what exactly are enterprise applications, and why are they a vital constituent in the enterprise?

Simply put, enterprise applications keep a business operating properly. They run the gamut of the business value chain, from enterprise resource planning (ERP), customer relationship management (CRM) and supply chain management (SCM) to human resources management (HRM).

Traditionally such applications were hosted on-premises; however, the advent of the cloud has had a significant impact. In keeping with the broader changes, enterprises are moving away from monolithic packages and massive implementation cycles toward shorter, agile implementations, now made possible by the cloud.

> *Enterprises become quicker, more open and more adaptive with cloud*

The cloud ensures reduced dependence on both software and hardware systems and allows enterprises to be quicker, more open and more adaptive.

Not surprisingly, enterprises are moving to the cloud to transform their applications, optimize their business processes and make themselves infrastructure-independent with a comprehensive suite of services. More importantly, applications in the cloud can accelerate digital transformation as they take advantage of scaling effects and cost efficiencies. Confidence deploying one enterprise application lights the touch paper for further use cases, even as the core of the business is amplified.

Enterprises have taken three different approaches to move applications to the cloud.

Line of business (LOB) cloud:

This approach allows LOBs to independently and instantly "turn on" a new cloud-based service with little assistance from enterprise IT. Consequently, a LOB cloud approach is faster to deploy and offers more flexibility, speedier delivery and enhanced customer experience.

Enterprise cloud:

This approach enables an integrated, enterprise-level cloud ecosystem by utilizing multiple cloud services such as IaaS, PaaS, and SaaS. It helps build a single homogeneous architecture that will serve as the roadmap for long-term cloud transformation. While it entails a sophisticated and transformation-led approach, it is designed to deliver seamless integration, synergies across applications and higher efficiencies enterprise-wide over the long term.

Combination approach:

Here, enterprises aim to maximize the best of both approaches. They prefer to use the LOB cloud for requirements that mandate flexibility and speed and choose the enterprise cloud when there is a need for a standardized approach.

Given that enterprise applications are now imperative to many business processes, it seemed timely to conduct research, gathering intelligence on the drivers and objectives of adopting cloud applications, along with implementation approaches and pain points. Expectations around cloud strategy were also on the agenda, and insights on the overall experience, methods adopted and the extent of adoption were gathered.

This research, conducted by Infosys in the first quarter of this calendar year, solicited views from 853 respondents across 12 industries, including retail, logistics and high tech. 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, and hailed from the United States (U.S.), Europe, Australia and New Zealand.

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Executive summary

Enterprise applications ensure smooth running of business operations. They have risen to the task by constantly evolving and adding business value. Shifting these applications to the cloud is a business strategy that often inspires improved business agility and long-term digital transformation.

But the migration is not a simple "lift-and-shift." Instead, it involves careful, comprehensive planning and implementation. Organizations wishing to traverse this path must have a clear understanding of the drivers, objectives and concerns before embarking on the journey. This understanding pays dividends further down the road, when questions arise as to what cloud model to adopt (LOB, enterprise or hybrid), and the actual extent of adoption.

According to our research, triggers or drivers for adopting cloud apps include a desire to keep pace with data security and emerging technology trends, meeting evolving customer demands and ensuring high levels of operational efficiency.

Enterprises expect this move to feed into their digital transformation efforts by standardizing and integrating the technology landscape, providing access to advanced computing capabilities and fostering innovation.

At the same time, apprehensions include stakeholder confidence around return on investment (ROI), an immature IT landscape and enterprise information security.

The drivers and objectives of transformation provide a window into the reason that firms transform in the first place. Are they merely looking to cut costs? Or are changing supplier or partner ecosystems playing their part? What about renewed agility through rapid development and deployment of applications? With that in mind, respondents were segmented into three clusters based on their major focus: business-focused (46%), IT-focused (24%) and agility-focused (14%). Those with no focus (16%) made up the total.

The business-focused cluster was the most mature and viewed cloud application transformation through a strategic lens. Being further along on the transformation roadmap, this cluster of firms had higher levels of satisfaction in cloud app implementation and used a combination of LOB and enterprise cloud applications. They also felt more confident about advanced data security and the ability to react to changing market conditions.

> *Cloud application transformation is more strategic at business-focused firms*

Another finding in this research is that firms are at various stages of cloud adoption. Only 16% have moved all major enterprise applications to the cloud, while 24% still have applications on premises. Additionally, only 46% of the respondents said that they had "clarity" on the firm's digital transformation program. Those firms where the business executive layer was more involved across the stages of cloud app transformation had higher levels of clarity.

Respondents across all four clusters preferred using an enterprise cloud approach to transformation (39%) compared with LOB (31%) or a hybrid (30%) approach.

The more mature a firm is on their digital transformation, the more confident they are of doing even better. For the laggards, or those that have only implemented proof-of-concepts, the path is far more rocky – yet for those that persist, greater efficiencies, organizational change and faster time-to-market await.

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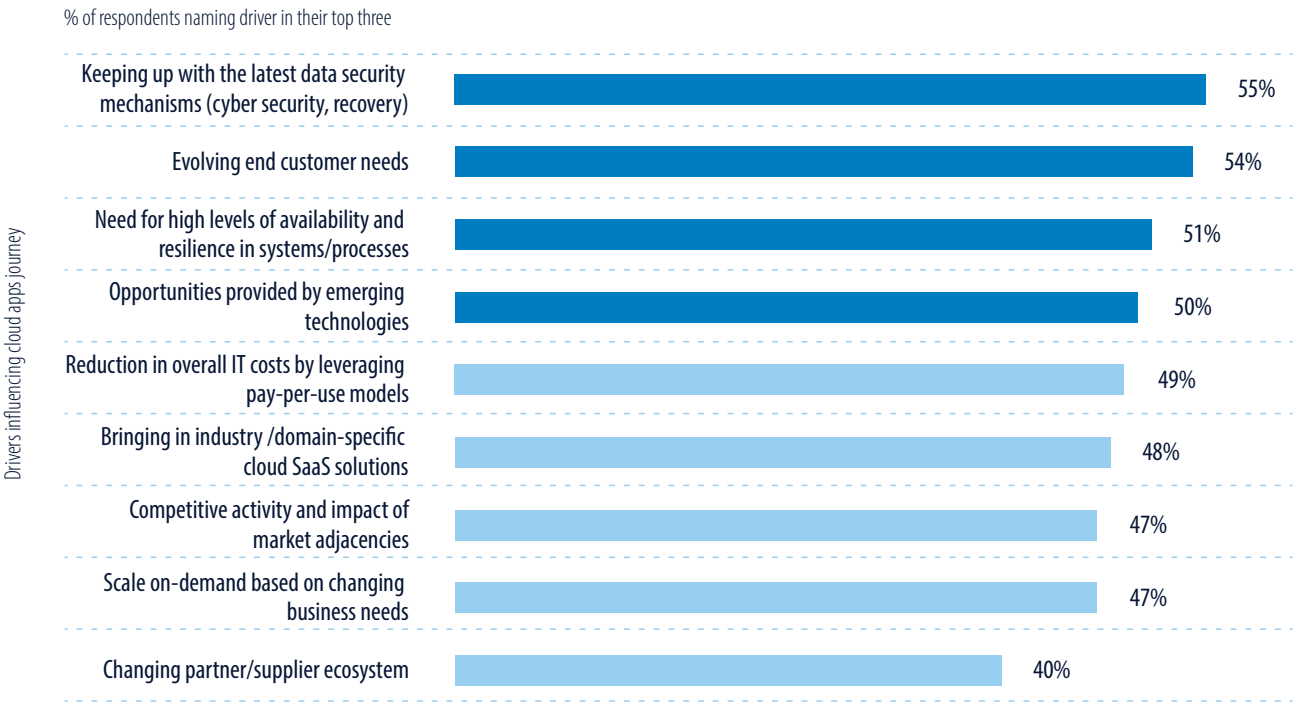
The cloud: a strategic move for enterprise applications

A variety of drivers, both strategic and more tactical, prompt the inevitable shift to the cloud. Our research validated the obvious ones such as the need for better data security (55%), increased resilience and availability (51%), reduced capital costs (49%) and the ability to scale resources on demand (47%) – aspects that improve the efficiency and agility of the enterprise (Figure 1).

Figure 1. Keeping up with data security, evolving end customer needs and resilience in systems and processes are the top drivers behind enterprise cloud app adoption



Source: Infosys Knowledge Incstitute, 2019

Today, the cloud ecosystem is more mature, with many big players such as Microsoft, Salesforce, SAP and Oracle dominating the scene. Cloud reliability has increased, while the risks have dropped considerably, incentivizing enterprises to accelerate cloud transformation. An investigation into recent security breaches at large enterprises shows that applications on the cloud were the least affected, a sign that even the public cloud might prove to be more secure than an on-premises environment.

This research also found that enterprises are moving to the cloud for business-centric reasons: keeping up with evolving customer needs (54%) scored highly, along with emerging technologies (50%) and the impact of competition (47%). Business functions typically initiate mainstay cloud programs in anticipation of the value they can add to current business models, overall organizational health and customer satisfaction. Of course, cloud initiatives must be balanced with many other digital initiatives such as DevOps and Agile, IoT, AI and digital product engineering for a firm to truly compete in this shape-shifting IT landscape. Instilling an appetite for continuous learning, along with effective employee location strategies (balancing cost with proximity to partners and customers) are also effective strategies to accelerate the journey toward digital status.

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Often, business initiatives that accelerate cloud adoption fall into two buckets.

- First, enterprises may implement cloud SaaS capabilities to satisfy specific functionalities that are lacking – such as customer management, sourcing, contracts and logistics – setting in motion the cloud journey. As a chief strategy officer of a consumer, retail and logistics firm in the US said: "We implemented cloud to give our global sales teams a complete view of each of our customers and help teams collaborate across disciplines and geographies."

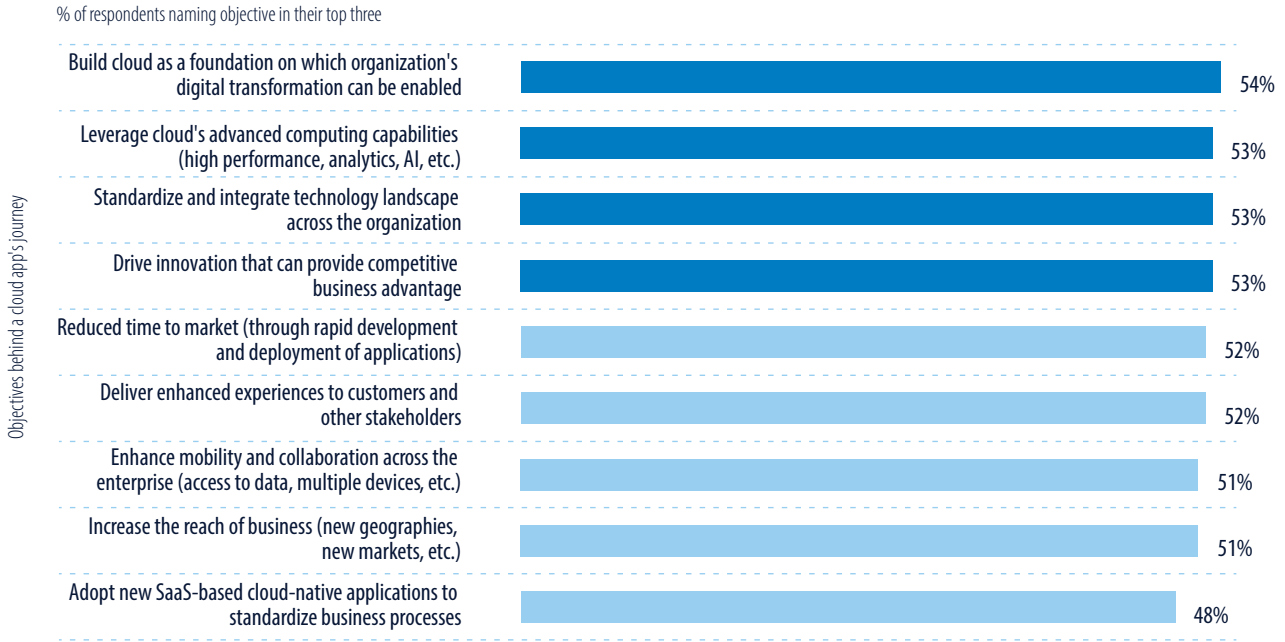
- Second, with mergers and acquisitions in play, a subsidiary may implement its own cloud solution.

This research also sought to understand the objectives– or pull-factors – that enterprises were expecting to achieve through cloud transformation. Leaders were keen on maximizing the power and capabilities of the cloud to further their digital transformation program (Figure 2). Respondents also cited innovation and the advanced computing capabilities that the cloud enables, including AI use cases and high-performance analytics. Enterprise applications like Force.com – Salesforce's digital development platform – and Einstein (its AI engine) consumerize the service experience and de-risk digital transformation, providing the scaffolding on which to build further digital capabilities.

Optimized processes, reduced time to market for product development and enhanced customer experiences were also ripe for amelioration. That applications on the cloud can deliver multiple benefits, strategic and operational, is evidenced by the high expectations riding on it. Indeed, enterprises have recognized the transformational gains possible through the cloud and are likely pushing through that advantage to maximize results.

> *We wanted to remove the clutter, optimize processes, emphasize the 'urgency' of the order in hand and, most importantly, simplify the process of gathering raw materials and arranging supplies.*
>
> – Supply chain lead of a European retailer

Figure 2. Building a foundation for digital transformation, along with the cloud's advanced computing capabilities, were the top objectives in a cloud apps journey



Source: Infosys Knowledge Institute, 2019

The four types of enterprises

Analyzing the research further uncovered more insights: it was evident that most enterprises have moved past the initial stages of the cloud journey.

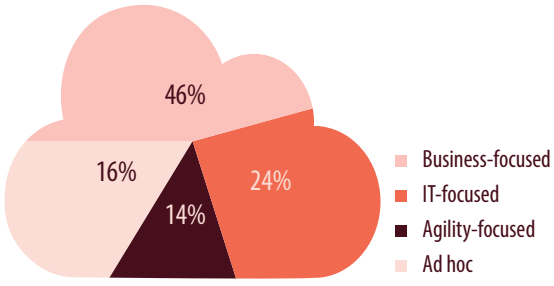
But just how mature are these enterprises and what is their main focus behind moving enterprise applications to the cloud?

The following questions were asked to determine the maturity and direction of cloud programs:

- What are the business objectives? Are they strategic or operational in nature?
- What drives enterprises to the cloud? Are they business or IT-led reasons?
- Are enterprises thinking and planning for the future, or are they occupied with quick wins today?
- Have enterprises expanded to include the external ecosystem, or are they internally focused?

This examination led to four distinct clusters:

Figure 3. Business-focused enterprises made up almost half of respondent firms, with agility-focused enterprises (14%) and IT-focused enterprises (24%) also figuring in the data



Source: Infosys Knowledge Institute, 2019

Business-focused:

This cluster (46%) comprises visionary enterprises with an eagle eye on long-term business impact. Almost half of the respondents fall under this category. These companies have trained their focus on business outcomes such as enhanced customer and employee experiences, increased innovation and market reach, better handling of competition, keeping up with the changing ecosystem, and standardized business processes. Business priorities drive these firms, and they ensure innovative technology is the fulcrum for any program.

This cluster had a high showing in the telecom (57%), manufacturing (49%), and retail (48%) industries. Telecom must innovate and disrupt its current business model if it is to survive in a world of tech giants and chip providers who are moving up the value chain. Manufacturing, with the advent of IoT and sensor-enabled programming, is a highly competitive industry, and retail is no stranger to skyrocketing customer demands. Retail is a dynamic ecosystem of players that is looking to augment the complete customer journey through enhanced experiences and innovative capabilities.

Agility-focused:

Progressive enterprises focused on organizational agility make up this cluster. This small set of firms (14%) looks to reduce time to market, standardize business processes and technology across the organization, enhance collaboration, meet evolving customer needs, and scale on demand.

The efforts of agility-focused firms are mostly trained "inward," relying heavily on operational transformation to deliver business outcomes. Business outcomes are not yet a significant priority.

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> *Agility-focused firms train their sights inwards on transforming operations, and have not made business outcomes a priority*

This cluster had more respondents from the high tech (21%) and financial services and insurance (16%) segments. The tremendous pressure to improve efficiencies has compelled both these industry sectors to bank on operational transformation. The emergence of disruptive technologies such as IoT and smart devices has also changed the way businesses engage with the customer, giving rise to the "prosumer" – acting as both consumer and microsupplier[1].

More European enterprises constitute this cluster (17%) compared to the other regions.

IT-focused:

24% of firms fall into this cluster, absorbed in technology-led operational outcomes. Typically, these firms look for short-term outcomes, including reduced costs, high availability, data security and advanced compute capabilities such as analytics and AI. Additionally, these enterprises are building the cloud as a foundation for digital transformation and looking for the uplift of emerging technologies. At the same time, these enterprises are yet to capitalize on the full potential of IT transformation and are not fundamentally changing their business model in response.

Healthcare and lifesciences (30%) figure highly in this cluster compared to other industries. Firms in this industry have traditionally adopted a cautious approach to the cloud, and this is perhaps why they are doubling down on operational improvements before taking a bigger leap into more risky territory.

Ad hoc:

Enterprises that have not yet devised a clear vision and plan for IT or business transformation form this cluster (16%). Such enterprises can be expected to react to every trigger, internal or external, and opt for temporary fixes rather than a holistic and integrated approach to addressing business demands. Surprisingly, the energy and utilities (22%) and consumer, retail and logistics (21%) industries figured comparatively highly in this cluster.

Expert corner: What makes a firm's enterprise application cloud program mature?

To stay relevant in today's market, organizations must continuously evolve and reinvent themselves. Undeniably, IT has played and is playing an active and pronounced role in accelerating business transformation.

Examining the organizations on their transformation journey through a maturity lens leads to the four clusters identified by this research. The business-focused cluster is the most mature, followed by agility-focused and IT-focused clusters, with the ad hoc organizations making up the rear.

What distinguishes mature firms from the rest?

Industries that frequently interact with the customer are likely to be more mature and exhibit the following characteristics:

1. *High volume of interaction with many consumers: while each interaction may be of short duration, however, the relationship once established continues over the long-term.*
2. *Frequent after-sale interactions owing to a more advanced customer journey and products/services that persist.*
3. *Periodic replacement of products and services as new product upgrades are made available.*
4. *Equal reliance on direct sales and the partner network.*
5. *High brand value and need for differentiation is pronounced.*
6. *Intense competition.*

In summary, the industry in question, a firm's business focus and customer behavioral patterns influence the triggers, objectives and overall direction that an enterprise heads in. These differences are linked to varying stages of the journey an organization undergoes resulting in the formation of clusters.

– Kannan Narayanan,
Principal Technology Architect, Infosys

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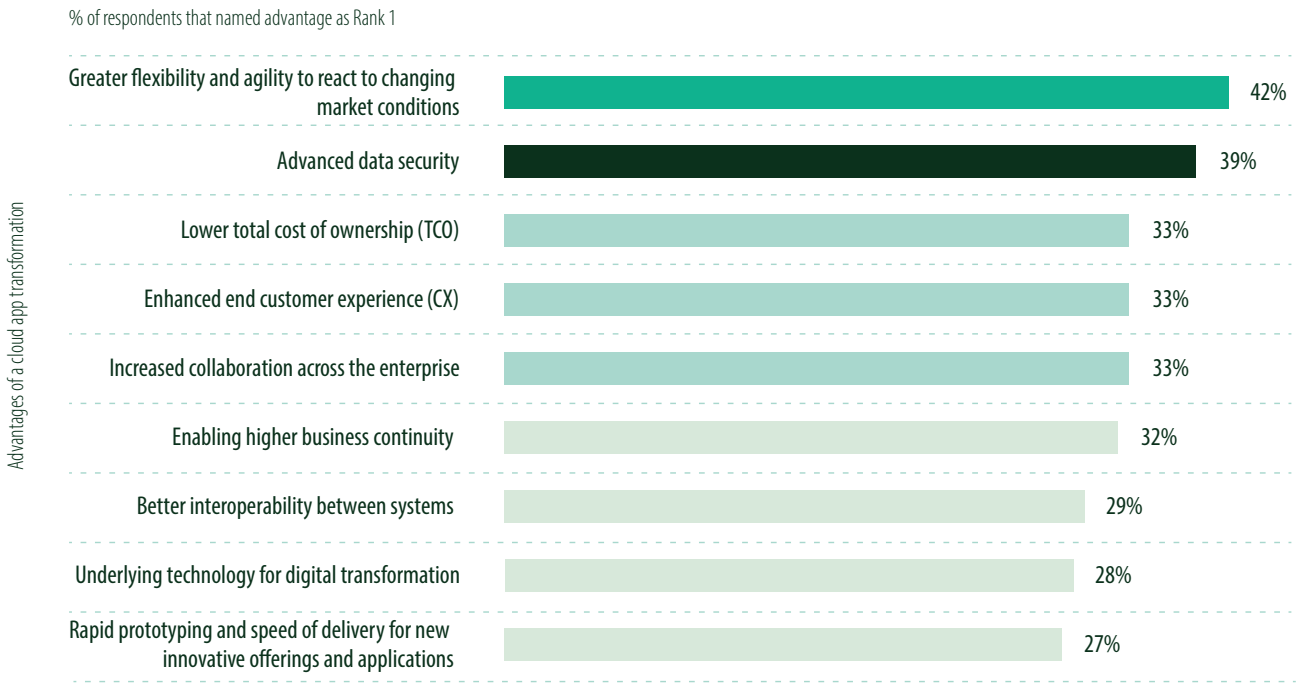
Enterprise clusters expect both strategic and operational benefits

Aspirations, along with drivers, give business analysts an understanding of what a firm hopes to accomplish in its digital transformation. The same goes for the cloud apps journey.

Figure 4. Greater market flexibility, advanced data security, lower TCO and enhanced customer experience are top cited advantages of cloud app transformation



Source: Infosys Knowledge Institute, 2019

The top perceived benefits of a cloud apps journey are greater flexibility to respond to market changes (42%) and better data security (39%).

Also, one-third of the respondents agreed that lower total cost of ownership (TCO), enhanced end customer experience and increased organizational collaboration were other important advantages.

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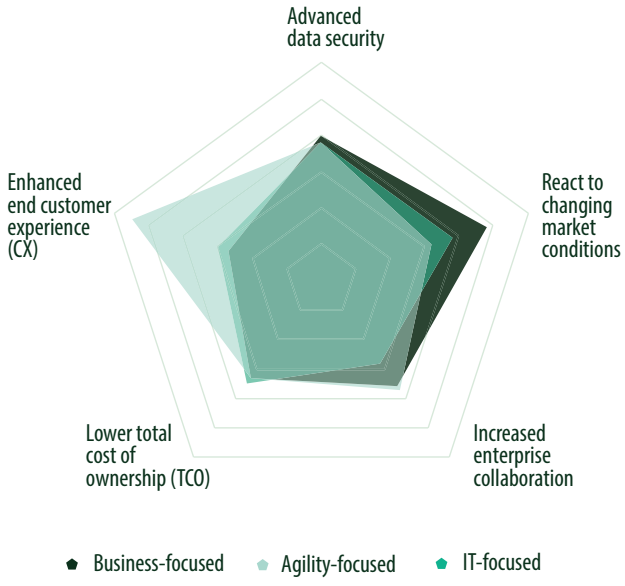
> *Greater flexibility to respond to market changes (42%) and improved data security (39%) are the top cited benefits of cloud apps journey*

As organizations strive to become digital businesses, they look to amplify customer experiences and business results, and even find completely new ways to make money. This data shows that the respondents view applications on the cloud as an enabler for digital transformation.

By understanding the top gains that firms expect in the near future, we can double down on the cluster methodology and see if any new insights arise. In Figure 5, each cluster (business-focused, agility-focused and IT-focused) is mapped against the top five advantages expected from a cloud apps transformation.

Figure 5. Business-focused firms are keen to remain flexible to market dynamics, whereas agility-focused firms want to drive an enhanced customer experience



Source: Infosys Knowledge Institute, 2019

Predictably, the business-focused cluster was keen to remain flexible in the face of changing market conditions while agility-focused enterprises aimed for increased enterprise collaboration and an enhanced customer experience. The incentive to lower capital expenditure and control operating costs has compelled IT-focused enterprises to seek lower TCO. All three clusters expect enhanced data security by shifting applications to the cloud.

Expert corner: Expected outcomes are tied to the maturity level of the organization

The expected outcomes from an application cloud journey are in accordance with the maturity level of each enterprise. Business-focused firms are market-facing, striving to keep pace with changing trends and stay ahead of the competition. IT-focused enterprises have their sights set on internal-facing pain points, whereas the agility-focused group acts like a bridge between both internal and external loci.

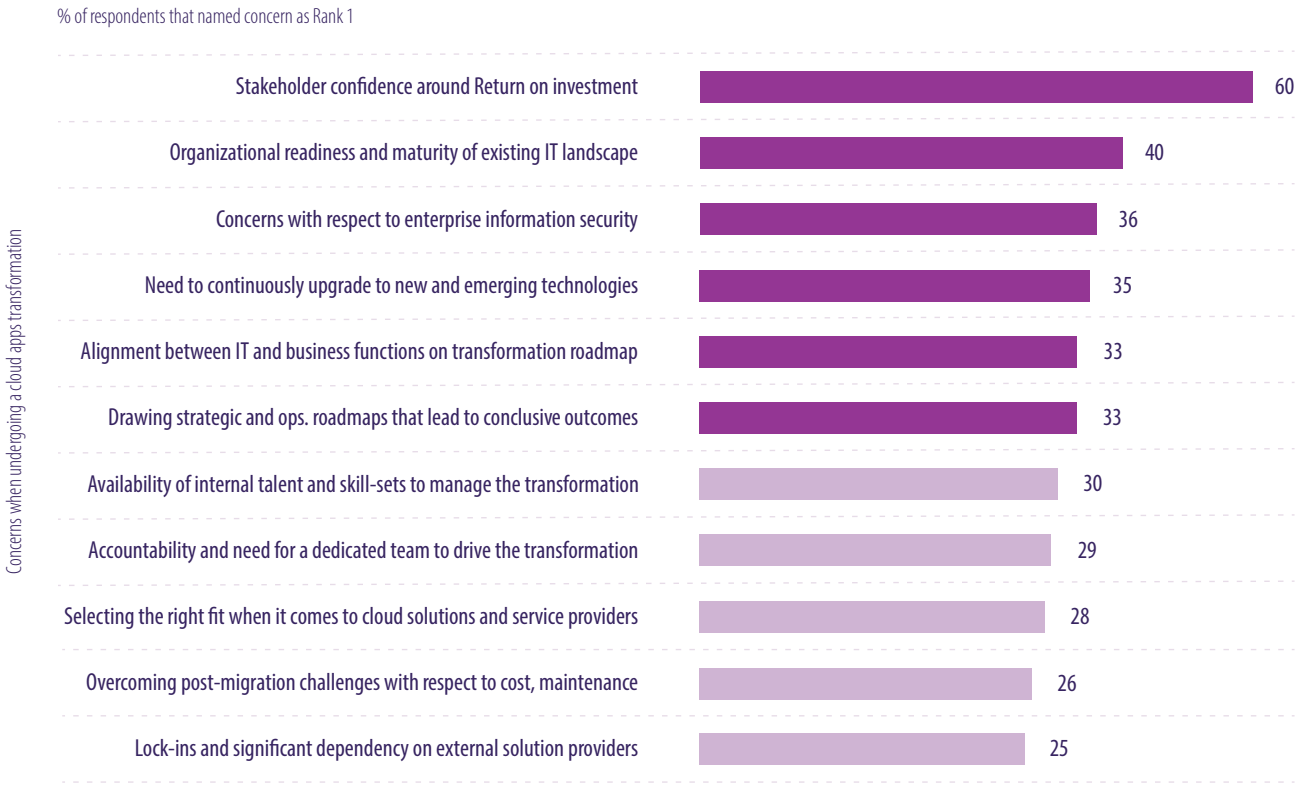
– Kannan Narayanan
Principal Technology Architect, Infosys

Cloud concerns persist, characterizing large-scale programs

Enterprises are significantly concerned about delivering return on investment to retain stakeholder confidence (60%) (Figure 6). 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 top concern across business and IT groups, and across industries and regions. Respondents from Australia and New Zealand (75%) and telecom (78%) and high-tech (68%) industries were most vocal about this concern.

The ability of systems, processes and people to cope with the transformation also figured highly (40%). Information security, an area of the cloud that is often the subject of many debates (are public or private cloud solutions more secure, etc.) was next on the list, with 36% of the vote.

Figure 6. Stakeholder confidence around ROI is a significant concern during a cloud apps transformation, while the maturity of IT assets also factored in leaders' minds



Source: Infosys Knowledge Institute, 2019

All four clusters were in agreement that building stakeholder confidence was the top concern around a cloud app transformation. The business-focused cluster, given it comprises a greater number of respondents, echoed the concerns of the group as a whole.

In addition, the business-focused cluster expressed concerns over information security the most. This group is further along on its transformation journey.

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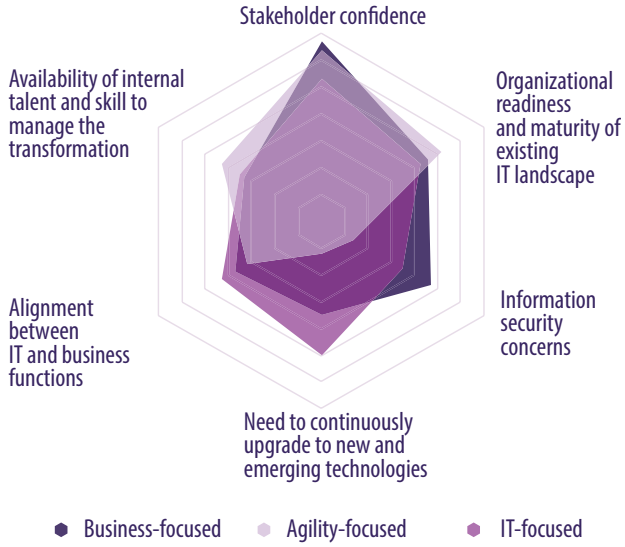
Figure 7. Stakeholder confidence around ROI was a top concern across all focus groups, while IT was focused on the need to continuously upgrade emerging technologies



Source: Infosys Knowledge Institute, 2019

As we wrote in the report – Infosys Digital Radar 2019: Enabling Transformation Through Salesforce – it is actually visionary organizations that often cite the most barriers to full-scale transformation, although they are also the ones that are most optimistic about surmounting these obstacles.

> *Visionary organizations often cite many barriers to full-scale transformation, though are also more optimistic about surmounting them. – Infosys Digital Radar 2019: Enabling Transformation Through Salesforce*

Organizational readiness (47%) and availability of internal talent (38%) were prominent worries for the agility-focused cluster as they geared up to scale and reduce time to market. Moreover, these firms, because of their inward-looking focus, face plenty of collaboration issues, and hence talent becomes a challenge.

On the other hand, the IT-focused cluster worried over the need to upgrade continuously to newer technologies (45%) and the alignment between IT and business functions (38%) as the transformation proceeded. As firms frequently update on the cloud and use software as a service, they end up losing control to third parties and vendors, causing concern for those in-house aficionados that have made IT their career. Additionally, these firms often have a roadmap that was created by business units, but may not have been aligned with the specific in-house IT capabilities.

Interestingly, firms in the financial services, along with insurance, consumer, retail and logistics companies, are most concerned about this IT/business divide. More frequent and more mature interactions with the customer – both internal and external – often result in various business and IT objectives that are not closely aligned.

> *Continuous upgrades to new and emerging technologies is more challenging for manufacturers than firms in the high-tech sector*

Manufacturers find continuous upgrades to new and emerging technologies a challenge – 50% ranked this as a number one challenge, significantly higher than other industries, where just 27% of high-tech respondents said the same.

This points toward the fact that digital native industries know how and when to use cloud and other digital technologies, and have trusted-use cases on which to grow their business. Manufacturing is also facing a renaissance with the advent of IoT and industry 4.0, and all the complexity that these technologies bring. It also has been affected by protectionist geo-political and macro-economic conditions, which have forced it to save costs and use digital to maximize revenue[2].

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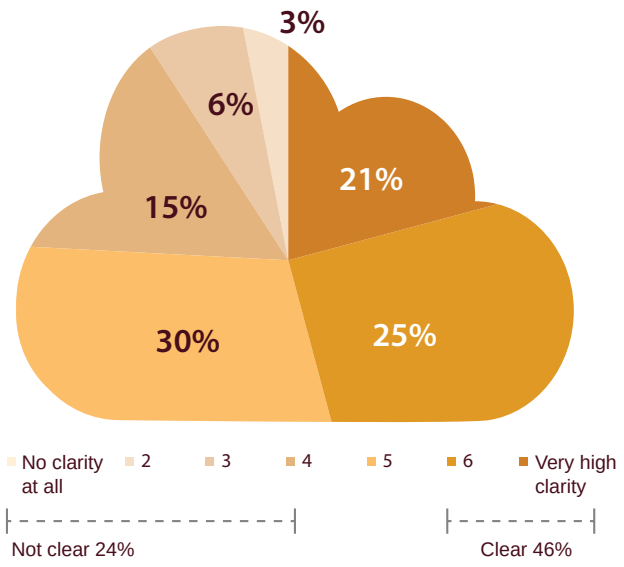
The importance of a clear strategy and roadmap

Digital transformation is a gamechanger necessitating massive changes that require the support of multiple stakeholders across the organization. The initiative is doomed to fail if there is a lack of clarity among the stakeholders. And the numbers are in. According to a recent digital transformation index by Dell Technologies, 78% of business leaders cite a lack of knowledge-sharing around digital initiatives implemented at their firms[3].

"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."

In this research, while almost 50% of the respondents said they had clarity on the digital path to take, a significant 24% said they were unclear (Figure 8).

Figure 8. Almost a quarter of firms lack clarity on digital initiatives, with those in IT departments more clear than business counterparts on digital transformation prospects



Source: Infosys Knowledge Institute, 2019

	Overall	CRL	FSI	H/LS	E&U	MFG	HiTech	Telecom
Base	619	142	109	95	92	51	81	49
Clear (%)	46	45	45	49	41	53	47	49
Not Clear (%)	24	22	26	28	29	20	19	20

	Overall	Business users	IT users	USA	EU	ANZ	Business	IT	Agility	Ad hoc
Base	619	361	258	311	214	94	290	135	85	109
Clear (%)	46	39	57	53	39	41	65	39	36	13
Not Clear (%)	24	31	14	20	27	30	11	19	26	63

Source: Infosys Knowledge Institute, 2019

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In Figure 8, some prescient insights emerge:

- A significant 57% of those in IT departments exhibited clarity, compared with just 39% of those in business streams. IT leaders have a sound understanding of the technologies as well as how to use them, while it might be the case that business leaders only possess a big-picture view and fail to grasp the underlying complexities of a digital journey.
- Using cross-tab analysis with drivers of cloud apps transformation, it was found that firms focusing on improving customer engagement and innovation have high levels of clarity.

> *CXOs that are involved in defining business outcomes and strategy lead to higher levels of clarity*

- High levels of clarity were found in firms where CXOs are more involved in defining business outcomes, conceiving design and strategy for adoption, and in the final decision regarding cloud solutions.
- From a cluster perspective, the more mature business-focused group had high levels of clarity. These firms have already been on the IT transformation path and consequently have more experience, confidence and lucidity in moving forward with strategic business transformations.
- Lastly, high clarity was exhibited by firms where cloud adoption is complete for some or all the key enterprise applications.

Among enterprises that don't have clarity, apprehensions about building stakeholder confidence (68%), handling post-migration (47%), and enterprise information security (46%) challenges rank high.

US respondents (53%) had the most clarity, whereas Australian and New Zealand respondents (30%) were most unclear about the digital path. Manufacturing (53%), telecom (49%), and health care and lifesciences (49%) respondents had a relatively high level of clarity across stakeholders.

Enabling innovation: a snapshot of what's possible when applications are on the cloud

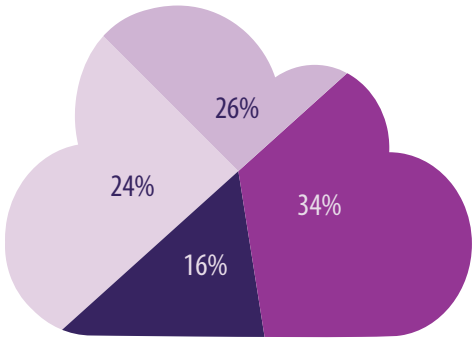
Extreme market focus – Thanks to digital technologies such as the cloud, enterprises can now have a near-ready product and await feedback from the market through digital signals to present a final version fine-tuned to customer expectations.

Borderless expertise – Digital sensors can map the shop floor of a factory with great accuracy, allowing experts situated in a remote location to guide activities in the factory as if they were physically in the same place.

Enterprise cloud applications adoption is well underway

This research revealed that a significant 50% of the respondents had shifted all or some key enterprise applications to the cloud (Figure 9). This migration implies that many have realized positive outcomes from enterprise cloud applications, motivating them to remain on the journey.

Figure 9. Half of firms have moved all or some of their enterprise applications to the cloud, with just 24% still entirely on-premises



Current state of cloud transformation (%)
Some pilots/POCs for cloud adoption are underway; but currently, all enterprise applications are still on premises
Cloud adoption is underway for some applications/functions, but none have been completed
Cloud adoption is already complete for some enterprise applications/functions
All major enterprise applications have moved to cloud

Source: Infosys Knowledge Institute, 2019

Breaking the stats down by cluster, the business-focused groups are most progressive, and have prioritized moving critical applications to the cloud. IT-focussed transformers have completed the journey for some applications, while the agility-focused group is working hard to catch up, with cloud adoption underway.

As one Infosys SME noted: "Enterprises that have embraced application cloud transformation and are working toward it ensure that they have a firm slot on the digital journey, a prerequisite to surviving and thriving in a tough market."

Within an enterprise, there are some functions that are more willing to shift the entirety of their applications to the cloud, such as the end-user productivity areas (37%) and business support units (37%) (Figure 10).

For applications belonging to end-user productivity functions, extensive collaboration is required, something that the cloud does very well. Applications used in business support tend to be from third-party vendors who have been proactive in moving to a SaaS model. It also appears that industries relying heavily on technology, such as telecom, manufacturing and high tech, have been more progressive in moving applications to the cloud.

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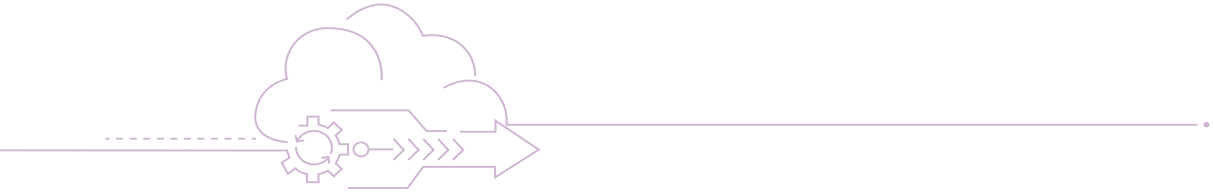
Figure 10. End-user productivity and business support functions within an enterprise are more likely to shift the entirety of their applications to the cloud

Functions	Overall (% High shown)	CRL	FSI	H/LS	E&U	MFG	Tele.	Hi-Tech	USA	EU	ANZ
Base	818	169	151	140	108	97	77	76	420	284	114
End user productivity areas (internal collaboration, support, mobility, apps, etc.)	37	36	34	38	33	35	48	43	40	33	35
Business support functions (finance, HR, operations, marketing, etc.)	37	33	36	36	31	43	49	34	40	32	35
Customer experience functions (CDM, self-service, multi-channels, etc.)	35	39	36	29	32	30	39	39	39	29	35
Core functions (manufacturing, logistics, product design, service and support, etc.)	34	30	36	29	36	36	35	38	39	27	32

Source: Infosys Knowledge Institute, 2019



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

Enterprises must weigh the objectives of cloud transformation programs with expected outcomes before deciding on a specific approach.

Enterprises have a choice of approaches to move applications to the cloud, either by adopting the LOB or enterprise approach, or a combination of both. We detailed earlier the characteristics of each.

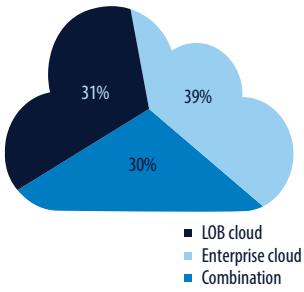
It is worthwhile to note that enterprise-level cloud approaches are complex, requiring massive efforts, and are best-suited for long-term projects that integrate applications on a single homogeneous platform to discover new synergies and deliver exponential business value.

However, such an approach may not be viable for all requirements, especially when there is a clear need to respond quickly to market changes. In such cases, an LOB approach is recommended as it causes minimal disruption to the existing system and processes and can quickly "turn on" a new service. Moreover, enterprises can select the best-in-class software such as SAP SuccessFactors or NetSuite by adopting an LOB approach, whereas with an enterprise approach, it will have to use a standard platform.

On the other hand, the enterprise can also elect for a combination approach, which provides the benefits of both methods. Care should be taken, though, as this can increase complexity in a cloud transformation, with business unit strategy conflicting with wider CXO initiatives.

While this research revealed that respondents preferred the LOB approach at an individual level, the data shows that across enterprises, enterprise cloud implementation is more favorable, getting almost four-tenths of the vote (39%) (Figure 11).

Figure 11. Enterprise cloud is the way forward for four-tenths of firms, with LOB and combination approaches having a similar adoption profile



Approach adopted	Overall	CRL	FSI	H/LS	E&U	MFG	HiTech	Telecom
Base	814	168	150	140	108	95	76	77
LOB Cloud	31	28	30	31	31	33	32	31
Enterprise Cloud	39	41	41	40	42	36	37	36
Combination	30	31	29	29	28	32	32	32

Source: Infosys Knowledge Institute, 2019

Firms are almost just as likely to opt for a combination of the two approaches as they are to opt for the LOB approach, highlighting that enterprise cloud apps are popular across the board.

The difference between enterprise and LOB adoption by consumer and retail industries was greatest (13 percentage points), pointing to the need for seamless integration of applications in customer-facing companies.

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> *Customer-facing industries are far more keen on enterprise solutions, underscoring their need for seamless integration of applications*

Breaking down this data by cluster raises some interesting insights. Business-focused enterprises tend to use all three approaches almost equally. It takes a high level of maturity and experience to be able to adopt any of the methods in differing use case scenarios, which is why this cluster is best placed to execute such decisions confidently.

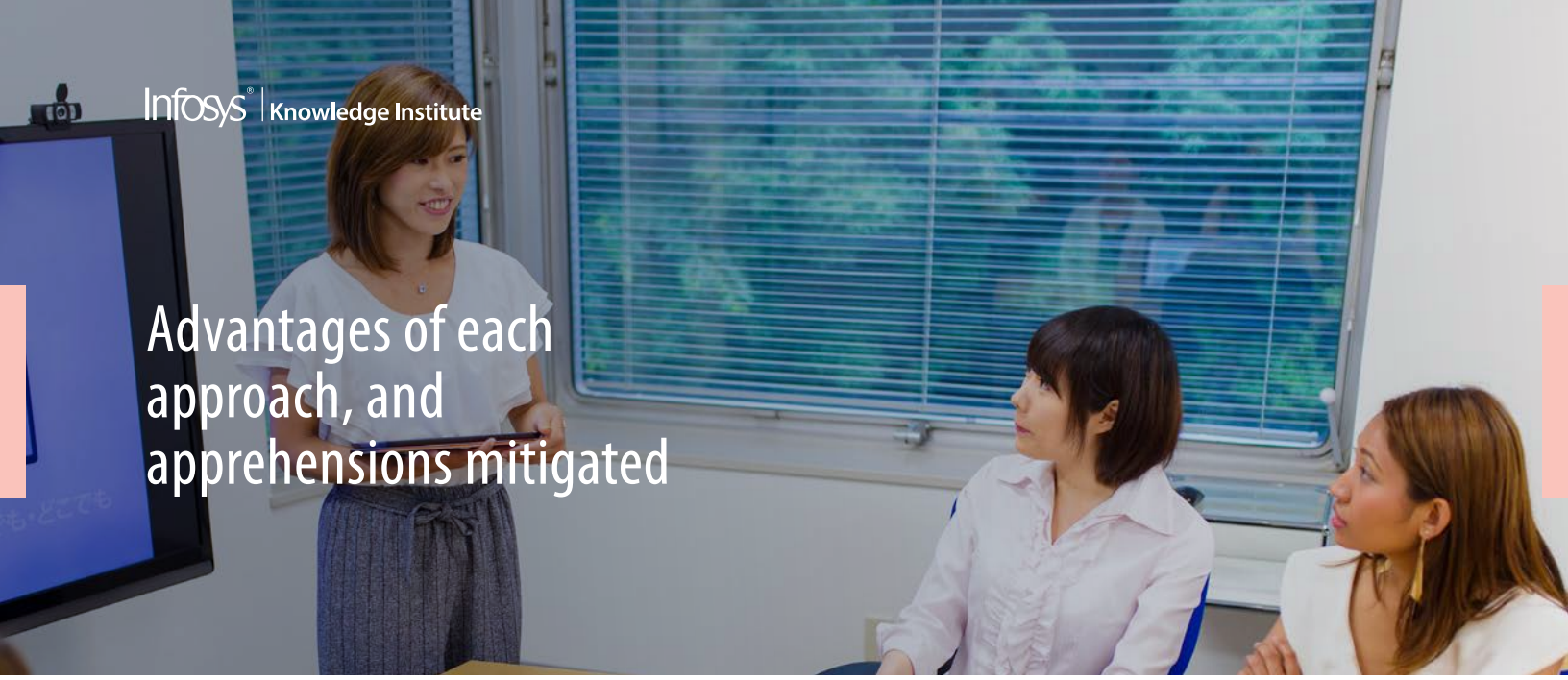
Enterprises focused on agility and IT transformation, however, were inclined to adopt an enterprise-wide cloud approach, as their programs often extend across the enterprise. Further analysis showed that IT-focused firms chose the enterprise approach for its advanced data security, enhanced end customer experience and increased collaboration across the enterprise. Agility-focused enterprises perceived the enterprise cloud to have a lower TCO and better interoperability between systems.

Expert corner: The enterprise cloud versus the LOB cloud approach

Why enterprise cloud? The IT-focused cluster elect for the enterprise cloud as they are cognizant of the complexity involved in managing these applications. 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.

Why LOB cloud? The fact is that there are only a few leaders at the enterprise level that can provide a superior overall product for every LOB. Those focusing on business-focused transformation are result-oriented and prefer the LOB approach as it allows them to pick and choose the best fit for the problem. They tend not to be unduly concerned about the under-the-hood aspects.

– Kannan Narayanan,
Principal Technology Architect, Infosys



Advantages of each approach, and apprehensions mitigated

> *"Going the LOB application route allowed us to focus on functionalities rather than compatibility with the organization"*
>
> – Senior executive at a US high-tech firm

Choosing either the LOB or enterprise cloud approach is heavily influenced by the benefits expected from the model and how best it can mitigate an enterprise's concerns.

The LOB model is expected to deliver greater agility to respond to changing market conditions (62%), provide enhanced end-customer experience (52%) and allow rapid prototyping to speed up delivery for new innovative offerings (52%). The relative freedom of operation that the LOB model enjoys enables more accessibility to readily available third-party solutions. Importantly, these cloud applications do not require any re-architecting or refactoring and hence, don't disrupt the existing setup, allowing faster deployment.

For the same reasons, respondents believe that the LOB model is better suited to tackle apprehensions revolving around building stakeholder confidence around RoI (51%), keeping pace with new technologies (49%), and scarcity of talent to manage transformations (49%).

In contrast, the enterprise cloud model heightens collaboration (61%), achieves better interoperability between systems (59%) and lowers TCO (58%). Those plagued by issues due to siloed systems that have difficulty communicating with each other often opt for this model as it offers standardization across the enterprise. As the vice president of a US financial services and insurance firm said: "Enterprise applications benefit from being a one-stop-shop – achieving easy integrations, and a clear flow of information across processes."

These firms also believe that the enterprise model will address their concerns on information security (60%) and drawing outcome-oriented strategic and operational roadmaps (56%). Fifty-five percent said that the enterprise route will also placate concerns around organizational readiness and maturity of the existing IT landscape.

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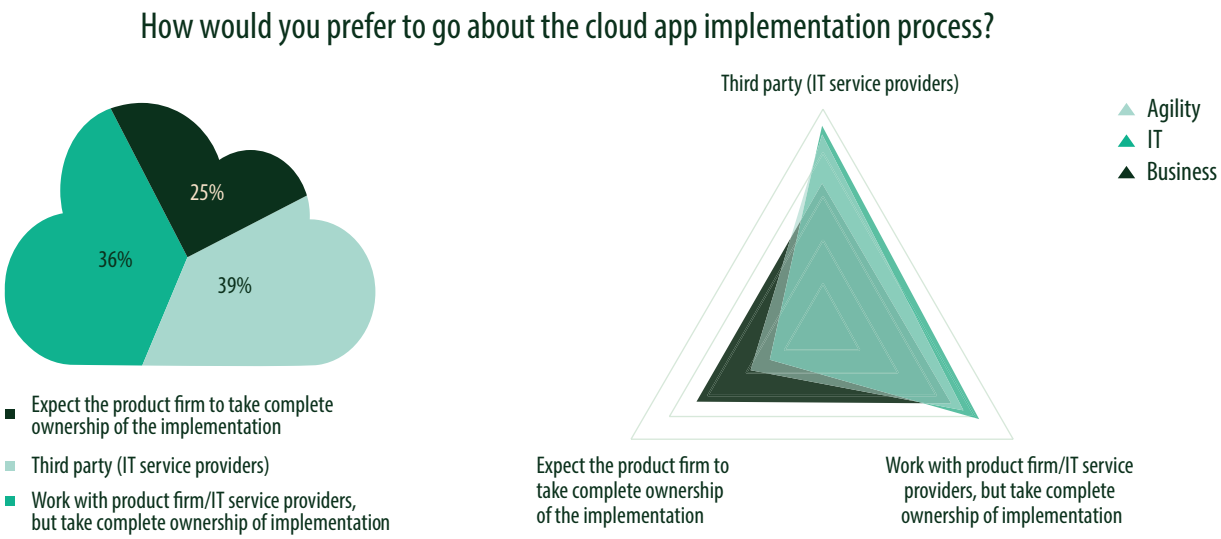
The implementation process

A choice of cloud-based applications is available for the entire business value chain – from enterprise resource planning to customer relationship management, supply chain management and marketing.

But once the cloud solution has been identified (SAP, Oracle, Salesforce, etc.), how do firms go about actually implementing these solutions? Is a third party a stronger choice, or should firms implement the solution in house?

Figure 12. Most firms use third-party service providers to implement the solution (39%), with agility-focused firms high on both third-party and in-house implementations



Source: Infosys Knowledge Institute, 2019

Third-party service providers (39%) are the most preferred option for implementing these applications, especially among agility-focused and IT-focused firms. Customization is a big factor in third-party implementations: with agility-focused groups desiring the ability to meet evolving customer needs and IT-focused groups keen on testing emerging new technologies, the ability to customize the solution is crucial.

On the other hand, the business-focused cluster expects the product firm to be responsible for the implementation. The domain expertise and the inherent product knowledge offered by product firms, and the relationships they have built with more mature firms, may be the underlying reasons here.

Breaking the numbers down further, the difference between LOB-leaning and enterprise-leaning firms is minimal when deciding on whether to own the implementation in-house, have the product firm take ownership, or utilize a third-party service provider.

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Preparing for the cloud challenge

Enterprises in this research cited operational and technology issues as the major challenges (Figure 13). Actually estimating the time and financial costs of the cloud app transformation was the top-cited pain point (51%), while monitoring systems (51%) and aligning legacy systems with new technologies (49%) also proved difficult. The COO of a US retailer said that "the challenge in our transformation journey was to map the customer journey and align customer touchpoints with our new system."

US firms seem to be grappling with many challenges, especially around monitoring systems and processes in the cloud (57%) and collaborating with external stakeholders such as third-party providers (54%). Manufacturing and telecom also cited many issues; more often than not, it is those firms that are further along on their cloud transformation journey that cite numerous challenges.

Figure 13. Operational issues such as estimation of time and costs, and technology challenges around monitoring processes on the cloud are major pain points

Challenges	Overall	CRL	FSI	H/LS	E&U	MFG	Hi-Tech	Telecom	USA	EU	ANZ
Base	840	176	152	139	115	97	81	80	434	291	115
Accurate estimation of time and financial costs involved	51	53	46	50	44	59	59	49	55	47	43
Tracking and monitoring systems/processes on cloud	51	53	45	50	50	54	49	54	57	44	42
Aligning existing legacy systems/ architectures and technology environments	49	47	47	51	50	48	43	54	54	41	47
Pace of execution/implementation of the initiative	48	49	47	47	44	53	44	58	54	43	41
Promoting a culture change within the organization	48	42	46	53	44	52	46	58	53	41	46
Deciding on choice of tools/technologies to pick from	48	50	42	51	43	54	46	49	53	41	43
Collaboration/integration with external service providers/stakeholders	47	42	43	47	49	55	48	56	54	39	43
Application refactoring/tweaking to suit cloud architectures	46	45	41	47	37	55	49	54	52	41	37
Absence of an internal dedicated cloud team to drive the initiative	45	41	34	51	49	46	50	56	49	41	41
Lack of high levels of clarity in the execution roadmap	45	40	41	49	44	47	44	54	49	40	42

Source: Infosys Knowledge Institute, 2019

Further cross-tab analysis found that the business-focused cluster ranked choosing the right tools and technologies as their biggest challenge (68%).

Agility-focused businesses considered the pace of execution (41%) and aligning legacy environments (39%) as the biggest hurdle to mount, while the IT-focused cluster said that collaboration with external stakeholders (41%) was most important. The nature of these obstacles indicates quite well the immaturity of the cloud journey thus far.

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Expert corner: Three ways to eliminate cloud app challenges

1. *Demonstrate quick successes by choosing those functionalities in the cloud that are not currently present in the on-premises application.*
2. *Adopt the lift-and-shift approach and free up valuable hardware and infrastructure by moving it to the cloud.*
3. *De-risk and take a phased approach, for example by functions, instead of a big bang implementation.*

– Srikanth Sripathi,
Senior Industry Principal, Infosys

Conclusion

Digital transformation is a big deal. And the cloud is a big part of whether a firm succeeds or fails. It provides the scaffolding around which to build other important digital capabilities. And the race is on; companies across industries are doomed to extinction if they don't transform. Nowadays, a company on the S&P 500 will only live for 12 years, according to a 2018 study by Innosight[4].

Enterprises now view the cloud as a strategic enabler for further digital initiatives, moving beyond mere scalability and cost benefits. Most respondents in this research have initiated the shifting of applications to the cloud, with 16% saying they have moved all critical enterprise applications.

This study found that there were three types of enterprises – business-focused, agility-focused and IT-focused – with a fourth, ad hoc – showing little signs of strategic acumen.

> *Business-focused firms rely on cloud to innovate the business model, with executive leaders involved in transformation activities*

Business-focused firms lead the field, with more mature programs triggered by sophisticated objectives with an external-facing mandate. They rely on the cloud's capabilities to innovate the business model, with executive leaders involved in transformation activities. They also demonstrate higher levels of clarity – which in turn leads to higher levels of productivity as more stakeholders get behind the project. These companies often have a stronger R&D function, are more innovative, have equal reliance on direct sales and the partner network and are better placed to fend off intense competition.

The agility and IT clusters were laden with a host of execution-related issues. Not surprisingly, these firms were also characterized by lower clarity and less top-down leadership in the cloud apps journey.

The LOB cloud apps approach is one way to go for businesses that don't want to look under the hood and understand the complexity of underlying cloud processes. They can pick and choose the best apps based on demand, and can pivot accordingly depending on market forces. Business-focused firms go for this approach, while those keen on building an agile and IT-centric enterprise prefer an enterprise-wide cloud approach. These firms are looking for enhanced collaboration and control of the IT environment, and opt for third-party firms to implement the solution.

Irrespective of the stage an enterprise is on its cloud transformation journey, it will face many challenges that impede progress. But as it proceeds, it will gain in confidence, giving it the know-how to remain at once business-focused, agile and technologically sophisticated. An able partner can go a long way in helping firms navigate these choppy waters, even as they emerge a winner in the cloud space.

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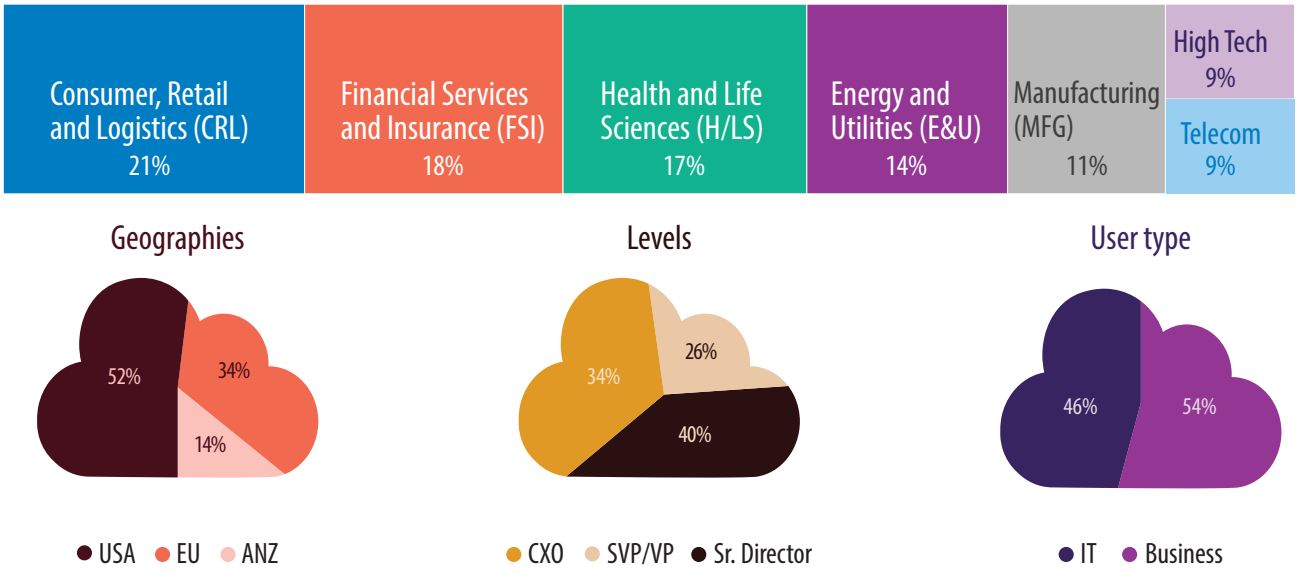
Survey methodology

A total of 853 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. Only companies with more than US $1 billion in revenues were chosen. To understand the pulse of the market moving forward, the survey was further validated by qualitative interviews with senior executives in September and October. Twelve industries were covered, and respondents hailed from the United States, Europe, Australia and New Zealand.

The breakdown is as follows:



Source: Infosys Knowledge Institute, 2019

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