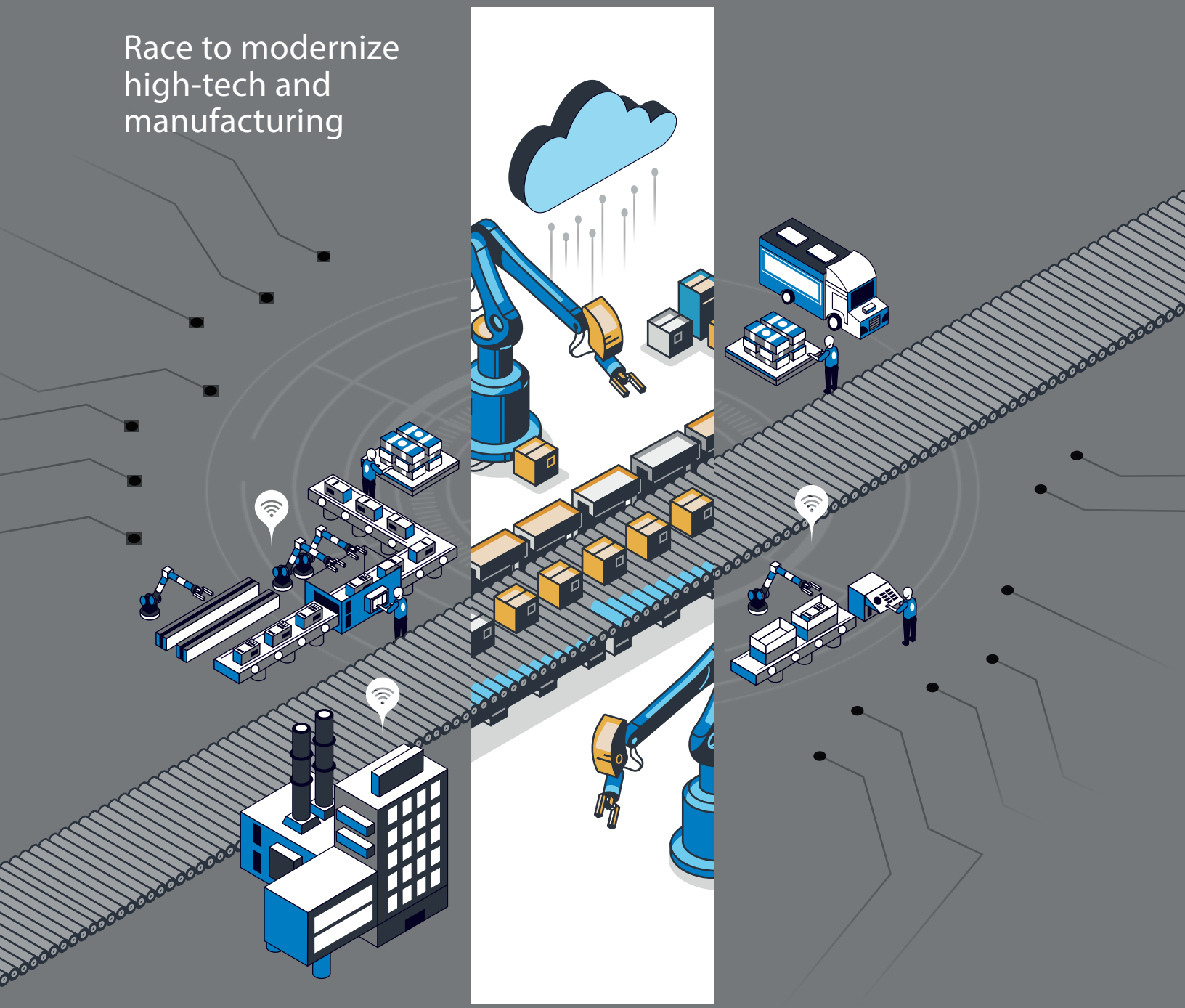
# Infosys Modernization Radar 2022:

## Race to modernize high-tech and manufacturing

Infosys cobalt



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# Contents

# Executive summary

We polled 227 senior technology leaders from the high-tech and manufacturing industries to understand their modernization journey. We found that organizations are spending a lot of money to modernize. The message is clear — firms that modernize quickly will make their way forward, while those that don't will be left behind.

Even though 88% of current technology assets are legacy, almost all will modernize in the next five years. What makes this matter even more urgent is that half of this legacy pool involves critical business systems. Chief information officers (CIOs) in our survey are worried that they don't have skills in-house to pivot successfully to this customer-centric modern era.

There are various approaches to modernization. But a phased ("strangler," named after the fig tree pattern where new trees grow over old) or coexistent method is less disruptive, ensuring business continuity during modernization of critical systems.

We found that unlocking modernization success relies on having a valid business case for modernization that starts from the top of the organization.

What is required here is a well-planned modernization roadmap with defined commercial outcomes. The speed of modernization will act as a differentiator.

Infosys Modernization Radar 2022 shows how firms should prepare for the new era. Those that don't modernize their legacy applications, particularly mission-critical applications, will be uncompetitive. Those that do will be future-ready to match the evolving customer demands. They will realize cloud benefits such as better enterprise data, value realization from exponential technologies, and a more scalable and operative digital backbone.

## The right modernization strategy for high-tech and manufacturing: Holistic, automated, and aligned

We found that 50% of the legacy applications are slated to modernize in the next two years and 70%-90% in five years. Mainframe, monolithic applications are being renewed to realize better cost efficiencies and faster development. This way, organizations will

benefit from order-of-magnitude improvement in ease of maintenance and extensibility.

## Multiple talent pools reduce risk

Firms must modernize now. But CIOs are concerned about having the right talent. Around half of high-tech and manufacturing respondents cited the lack of skills and talent as a bigger pain point than risks of disruption (27%) and costs (25%). Modernization is not a one-size-fits-all initiative. Different companies need different skill sets to realize true business benefits. That said, firms need to upskill, and take advantage of partnership opportunities to make modernization actually work.

## Modernization investment should be more strategic than discretionary

A significant proportion of an organization's discretionary budget (67%) goes toward app modernization. High-tech and manufacturing firms with lower discretionary budgets are larger companies using strategic budgets for their modernization initiatives. These low discretionary spenders have a clear modernization roadmap and are more likely to go all-in on big modernization projects costing over $10 million. Modernization is now on the executive agenda, and it should become a crucial part of organizations' strategic budgets.

## Phased and coexistent methodologies are less disruptive than big-bang

Phased modernization is less risky than doing everything at once (big-bang). The same analysis applies to a coexistent approach, in which the modernized system runs in parallel while legacy applications are transforming. The big-bang method is more likely to lead to crippling disruption – over two-thirds (68%) of high-tech and manufacturing respondents who used this method more often than other methods experienced more frequent crippling disruptions.

## The race to modernize

There are many reasons to modernize high-tech and manufacturing systems. Reduced operational expenditure and the ability to utilize technologies, such as application programming interfaces (APIs), microservices, and even artificial intelligence (AI), are compelling organizations to modernize. Many executives in our survey spoke about the increased reliability and resilience of modernized applications and modernization benefits, such as increased revenues and a better customer experience.

We followed a holistic approach to identify four ways to ensure swift and effective modernization.

1. Set a clear vision and roadmap for results-oriented business outcomes.
2. Cross-pollinate Agile teams with deep technical expertise.
3. Use a zero-disruption modernization method.
4. Start small but start now, and use a modernization expert.

This report explores these four actionable steps to guide companies to enhance modernization effectiveness, save money, and build tomorrow's technology infrastructure with today's resources.

# The right modernization strategy for high-tech and manufacturing: Holistic, automated, and aligned

Our Digital Radar 2022 research found that rates of digital adoption have risen steeply across all industries, and that companies that wait too long to modernize cannot survive.[1] The "digital floor" is a foundation of baseline technologies that all large enterprises must adopt to remain relevant. Cloud computing and legacy modernization are the basis of this floor.

But many high tech and manufacturing organizations are struggling. They just aren't prepared for this new age of customer power, hybrid workforces, and the need to ensure business resilience through agile ways. Most are held back by aging monolithic systems. This critical infrastructure, often running on millions of lines of COBOL code, was made for a 20th-century firm, built in times when things were relatively static and doing just enough to get by worked for the most part.

Given that 88% of current enterprise applications in high-tech and manufacturing are still legacy, the spend on app modernization right now is substantial. The respondents in our survey alone are spending $3.8 billion.

***"As everyone moves to cloud and new technologies demand significant mindshare, firms are now racing to modernize these legacy systems."***

**— Shaji Mathew, Executive Vice President**
Infosys

***"In the post-COVID world, business stakeholders across the spectrum are looking to increase investments toward digital transformation in their respective areas. The asks for investment dollars are creating a more acute need to justify where the dollars should go."***

**Rajiv Puri**
Vice President, Manufacturing Strategy and Partnerships, Infosys

However, most of these legacy systems are critical to businesses. These are not just systems of differentiation or innovation, but they keep the businesses operating effectively.

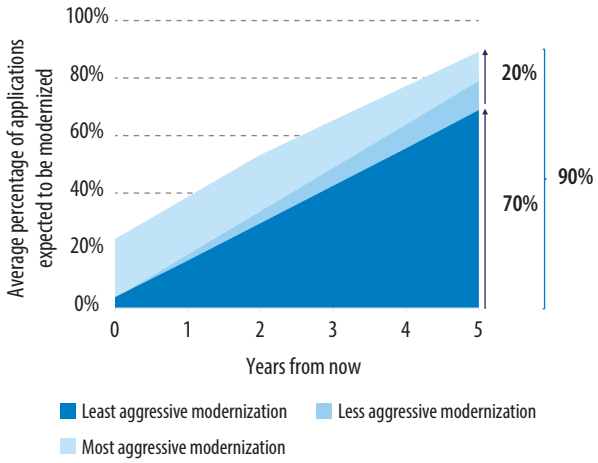
Firms need to run this race without disrupting core operations and without risking brand reputation. The key is to have a holistic view of the enterprise applications, use automation where possible, and ensure that business is in the same room as IT when transformation is taking place.

## Firms have five years to modernize their legacy applications

Firms are modernizing their application landscape very quickly (see Figure 1). In fact, aggressive timelines suggest that 90% of the legacy applications will be modernized five years from now, with 90% of the legacy applications will be modernized 50% modernized in the next two years. The message is clear — firms that modernize will make their way, and those that don't will be left behind.

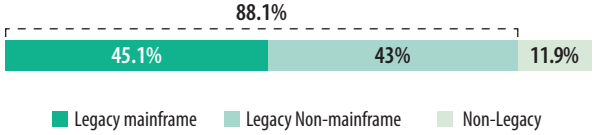
> High-tech and manufacturing firms are realigning their business models to remain relevant, increase digital footprint, and become more responsive and future-proof.

Figure 1. Companies expect to modernize 70% to 90% of applications in the next five years




Source: Infosys Knowledge Institute

Figure 2. There's a lot of legacy left — 88% of current enterprise systems




Source: Infosys Knowledge Institute

Today, high-tech and manufacturing enterprises need to transcend legacy systems to operate as digital-first and cloud-first businesses. They are realigning their business models to remain relevant, increase digital footprint, optimize costs, and become more responsive and future-proof. This transformation means that business and IT must be in the same room; doing so accelerates business outcomes and ensures modernization is a C-suite imperative.

## A lot of legacy is critical to the business

Currently, 88% of current high-tech and manufacturing systems are legacy (see Figure 2). Of this, 45% is legacy mainframe.

More than half of this legacy is core to the business (55%), and the rest is supporting applications (see Figure 3).

Organizations, from metal manufacturers to original equipment manufacturers and behemoth electronics firms, have stacked up legacy debt by sticking with these systems. These core systems, often housing important data and transaction processes, can be difficult and expensive to upgrade. They also lack

Figure 3. More than half of legacy is core to the business


Source: Infosys Knowledge Institute

***"Modernization is critical for enterprises to become Agile and responsive and match the competitiveness of digital native peers."***

**— Satish H.C.**
Executive Vice President and Co-Delivery Head, Infosys

software support, as the people who develop them are retiring (or have already retired). Further, these unsupported core systems present security risks, often because there are no publisher-produced patches to repair vulnerabilities, offering a gold mine of information for knowing hackers to exploit. This all comes together to produce compliance, legal, and reputational risks. All firms are suffering in this regard. High-tech and manufacturing firms with more than $5 billion in revenue have similar numbers of core assets as those with less revenue. Across industries, firms that have set aside bigger budgets for app modernization have even more core legacy assets, with 57% core applications and 43% supporting. Firms both big and small would be wise to set aside even more budget for core modernization, given the amount of legacy assets that are critical to the business.

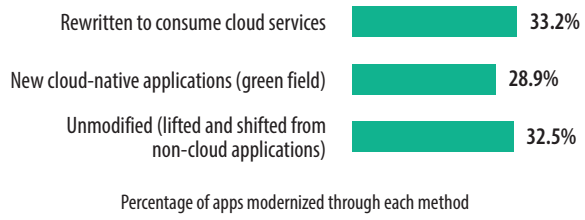
## No one method stands out for cloud migration

Many firms are choosing the cloud to modernize their legacy applications. Our Cloud Radar 2021 analysis showed that companies that move over 60% of their systems to the cloud achieve significantly higher performance, especially when core systems have been migrated.[1] But the options to get there are myriad and can be highly complex, including rewriting and greenfield deployments (see Figure 4). While a little over a third (33%) of legacy applications are being rewritten for the cloud environment, another full third (33%) consists of unmodified applications that have been carried forward from legacy systems. Finally, a little under a third (29%) are greenfield, native cloud applications, offering gains in extensibility, microservices, and other exponential technologies.

Whatever the approach, firms that moved forward on modernization plans have realized clear business benefits extending to B2B and B2C touchpoints. For example, a global automotive manufacturer that transformed its mainframe application to an open platform on AWS provided real-time data for dealers, while a global aircraft manufacturer that modernized mainframe systems to a web-based platform was able to enhance the end user experience.

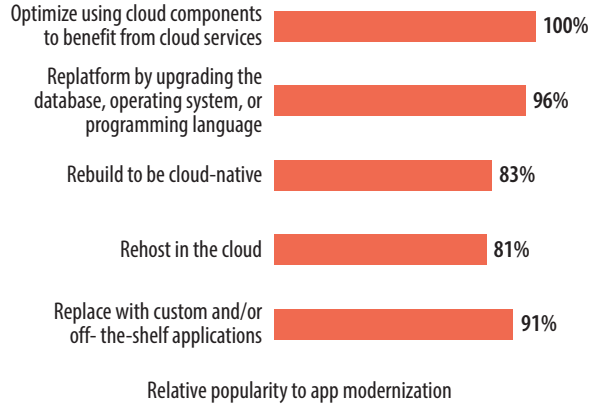
However, for non-mainframe applications, executives we spoke to prefer to either optimize applications to benefit from cloud services or re-platform the application by upgrading the database, operating system, or programming language (see Figure 5).

Figure 4. Each modernization method is almost equally popular




Source: Infosys Knowledge Institute

Figure 5. For non-mainframe applications, firms are optimizing as much as possible




Source: Infosys Knowledge Institute

> ***"Technology businesses really grasp the potential of utilizing cloud with AI to unlock greater value in the data they possess. Further, automation and automatic data collection will increase the volume of data coming into enterprises exponentially. Last century's technologies will not be able to keep pace, therefore it is imperative for savvy business leaders to expand their use of public cloud with AI and automation to manage and extract value from the growing petabytes of data that they observe."***
>
> **Komal Jain**
> Senior Vice President, Industry Head, Infosys

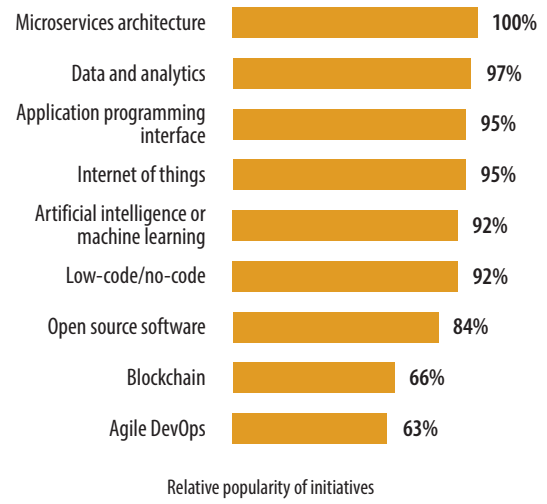
Of course, moving to the cloud doesn't have to be an either-or decision. Using the Infosys ART — accelerate, renewal, transform — framework, modernization can start with lift and shift.[2] But in the renewal phase, applications are modified to create new user experiences and applications. This phase also includes reducing development cycles through new tools that utilize APIs and modularization. Finally, the transform stage involves rewriting and redeploying workloads to take advantage of cloud computing.

## Exponential technologies dominate modernization drivers

Now that the cloud is ubiquitous, other technologies and ways of working are driving firms to modernize. We found that microservices architecture ranked the highest, followed closely by data analytics, APIs, and the internet of things (IoT) (see Figure 6).

Migrating legacy IT systems for manufacturing operations to a microservice architecture is an important step toward a platform-based ecosystem. Large, heavy, and inflexible systems can be decomposed into sets of independent services with specific business capabilities through a microservices architecture. Microservices offer enterprises a low latency, technology agnostic infrastructure that is interoperable and scalable. As a microservices architecture addresses most of the business issues posed by monolithic mainframe systems, it has emerged as the most popular approach toward modernization by manufacturing and high-tech companies.

Figure 6. Exponential technologies have a large influence on modernization




Source: Infosys Knowledge Institute

# Multiple talent pools reduce risk

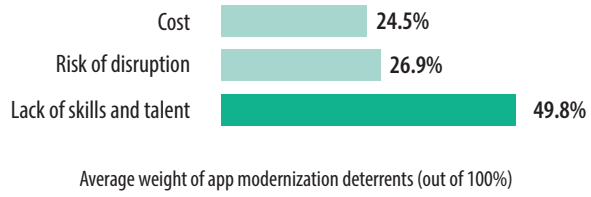
Talking to experts, it is easy to see why firms are modernizing now.

Ravi Kumar S, president of Infosys, notes that firms are looking for ways to monetize their data, often locked in the vaults of aging COBOL-programmed applications. These firms are held back for a variety of reasons. Many practitioners cite project-based methods of value delivery, reducing the ability to use DevOps for speedier software development and deployment. Also prevalent is the cost of modernizing legacy systems, with many projects taking over two years and millions of dollars to finalize. However, one of our original hypotheses in conducting this research was that both business and IT executives fear that modernization will disrupt the business and tarnish brand reputation.

We found this to be partly true. Though disruption loomed (27%), a lack of skills and talent (together) appeared to be more threatening (50%) (see Figure 7). Firms in this industry (28%) were more troubled by lack of skills than other industries (22%) but were less concerned over lack of talent (21%) compared to other industries (29%). Executives we spoke to verified this growing alarm in the upper ranks. Many core applications are supported by aging teams of developers with hard-to-find skills. To truly transform the business, niche skills such as rules externalization, database modernization, and the ability to reengineer apps to open source are necessary.

Firms need to invest in their workforces, build a community of practices for modernization, and even tap into the gig economy. Only then can they do the necessary due diligence and planning that successful modernization programs entail. Firms will need to get a handle on cloud-native processes, DevOps, and architectural feats such as decoupling data from

Figure 7. Lack of skills and talent is the biggest deterrent for modernization initiatives




Source: Infosys Knowledge Institute

underlying systems. Talent is also needed in more transformative efforts to expose business capabilities often locked within mainframe screens. A technically proficient and business-led workforce is also a must. A significant skilling effort should run in parallel with app modernization, with the IT team taking cloud training and certification along with reskilling in critical thinking, problem solving, and creativity.

# Modernization investment should be more strategic than discretionary

The money for reskilling, onboarding new personnel, and buying state-of-the-art modernization technology is crucial. More invasive modernization approaches can cost upward of $10 million per project. That is why the ownership cost is such a big problem for smaller firms.

To understand the financing source for these modernization projects, many of which last up to 35 months, we asked respondents about the amount of discretionary spend going to modernization. The average spend was between 60% and 70%, proving that modernization is a big deal for most enterprises.

We then split the respondents into low discretionary spenders (less than 60% of their budgets going on app modernization) and high discretionary spenders (more than 72% of their budget spent on app modernization) (see Table 1).

Table 1. Attributes of low and high discretionary spenders

| Low discretionary spenders | High discretionary spenders |
|---|---|
| More likely to have annual revenue >$10 billion | |
| More likely to have a small increase in modernization budget (3%-5%) | More likely to have a high revenue increase (≥11%) |
| Higher proportion of projects that are >$10 million | |
| Fewer core legacy applications, with more supporting | |
| More proactive modernization programs | Fewer proactive modernization programs |
| Think that a clear modernization roadmap is more important to the success of a project than high discretionary spenders | |
| Often use phased modernization methods | Use phased modernization methods less often than low discretionary spenders |

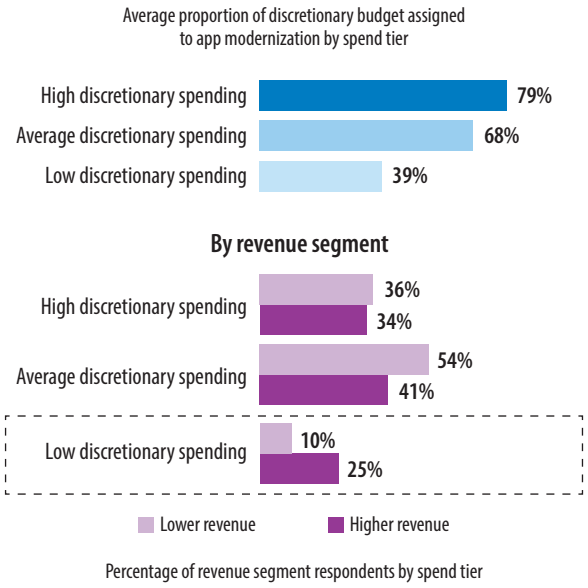
Source: Infosys Knowledge Institute

## Big companies more likely to use strategic budget

Low discretionary spenders are much more likely to be big manufacturing and high-tech companies (revenues greater than $10 billion) (see Figure 8) using strategic budgets for their modernization initiatives. We believe this is because they have a higher proportion of projects greater than $10 million (see Table 1) and have more "proactive" modernization programs in place than other groups. These larger firms also have more supporting legacy applications and often remark that a clear modernization roadmap is needed for a successful modernization program. They also use phased modernization methods more than other groups.

High discretionary spenders, often smaller firms that are growing fast, have fewer proactive engagements in place and typically go for big-bang or coexistent modernization approaches. They are more likely to be agile, innovative companies that do modernization in an ad hoc way, modernizing systems of innovation along with systems of differentiation and systems of record.

Figure 8. Larger companies have lower discretionary spending for modernization

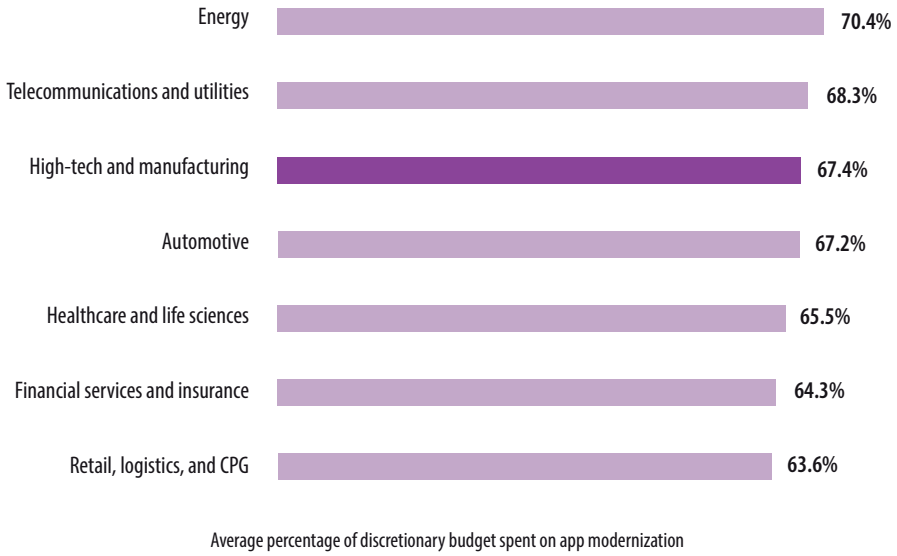



Source: Infosys Knowledge Institute

## High levels of discretionary spend across industries, including high-tech and manufacturing companies

Although retail, logistics and CPG spend less on modernization than other industries, they use 64% of their discretionary budget on modernization initiatives (see Figure 9). Energy firms are ahead with the ratio at 70%. High-tech and manufacturing companies follow this trend, with the ratio at 67%. Modernization is a key business initiative and should be sponsored from the top.

Figure 9. Most discretionary budget is used for modernization

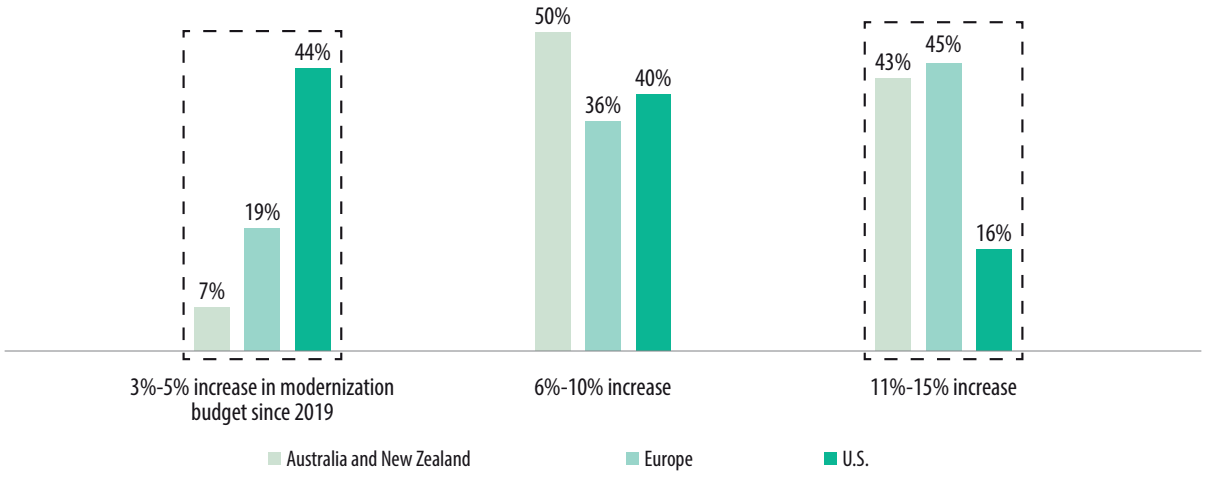



Source: Infosys Knowledge Institute

Given that most firms are planning to modernize their legacy applications in the next two to five years, firms across industries should use strategic budgets instead.

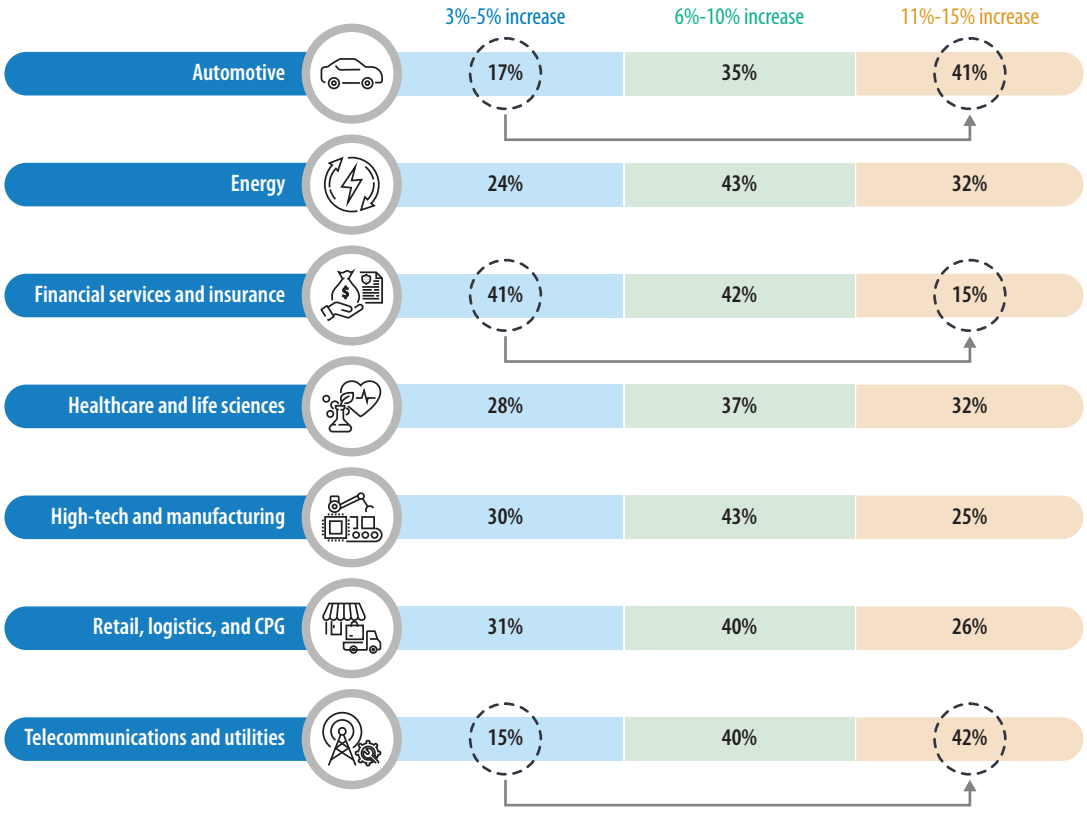
Another interesting finding is that firms in the US are not increasing their budgets as much as those in Europe, Australia, and New Zealand are (see Figure 10). Also, financial services and retail firms are not plowing into modernization initiatives as much as those enterprises in other industries (see Figure 11). Compared to telecommunications and automotive companies, high-tech and manufacturing companies have been slower to allocate more funds toward modernization.

Figure 10. U.S. is behind in increasing modernization budgets




Source: Infosys Knowledge Institute

Figure 11. High-tech and manufacturing companies are slightly behind in increasing modernization budgets




Source: Infosys Knowledge Institute

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# Phased and coexistent methodologies are less disruptive than big-bang

Modernization should have limited disruption to end users. This includes all partners in the enterprise ecosystem. Even a little downtime in mission-critical systems can be catastrophic. Gartner estimates that just one hour of downtime can cost a business $300,000.[3]

There are three patterns that firms can use to achieve a modernized architecture — strangler (or phased), coexistent, and big-bang.

Strangle is a phased approach toward a microservices architecture. Coexistent is the ability to run both modernized and legacy systems in parallel until the modernization of technology, processes, and people is complete. Coexistence can be costly, as new places in the cloud must be set up to transfer data between old and new systems. Big-bang entails an all-in rewrite of legacy systems, with more risk along the way. The approach taken depends on a clear-eyed risk-reward analysis.

Of course, the complexity of current systems will also be a key driver in choosing the options. A big-bang approach is viable if applications are small and can easily be replaced. If the IT landscape requires a wholescale change, phased and coexistent methods might be the better option. Our analysis found that levels of crippling disruption — in which the whole system goes offline for some time — significantly reduce with coexistent and phased approaches.

> Along with cloud-agnostic programming to reduce vendor lock-in, a successful modernization requires changes to people and processes too.

We recommend using an architecture-first approach when adopting these methods, with cloud-agnostic programming to reduce vendor lock-in. Of course, it's not just the technology that needs governance. A successful modernization requires changes to people and processes too. This means using Agile and DevOps methodologies and ensuring the operating model fits the purpose. Upskilling all employees to work with modernized software is also crucial.

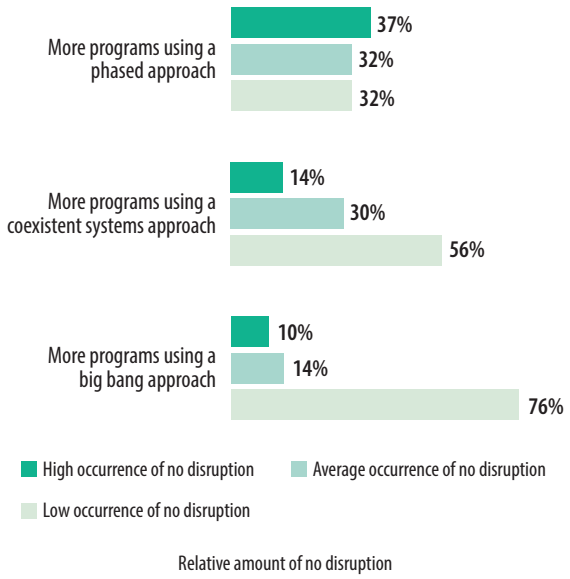
## Phased approach causes higher levels of no disruption

When designing a modernization project, it is important to put the customer first and ensure changes are introduced incrementally, without a sudden and abrupt disruption. When the end consumer is an enterprise, its systems should see minimal changes to consume the services. Business operations need to seamlessly transition from supporting the legacy applications to using the modernized model. The phased (or strangler) approach is best in this regard. Of respondents using this method more often than other methods, 37% said they experienced "no disruption" more frequently (see Figure 12).

## Big-bang approach causes more crippling disruption

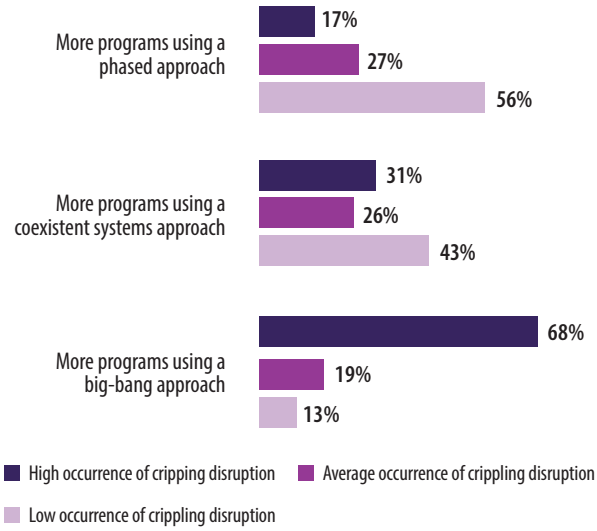
However, when we look at crippling disruption, the story is more nuanced. For this analysis, we split levels of disruption from modernization projects into four tiers — no, mild, significant, and crippling disruption. Our analysis found that 68% of respondents who had a higher-than-average number of big-bang projects (39% or more) experienced more frequent crippling disruption (see Figure 13). The frequency of crippling disruption for phased and coexistent methods was far lower.

Figure 12. Phased approach is the least disruptive




Source: Infosys Knowledge Institute

Figure 13. Coexistent and phased approaches cause less crippling disruption



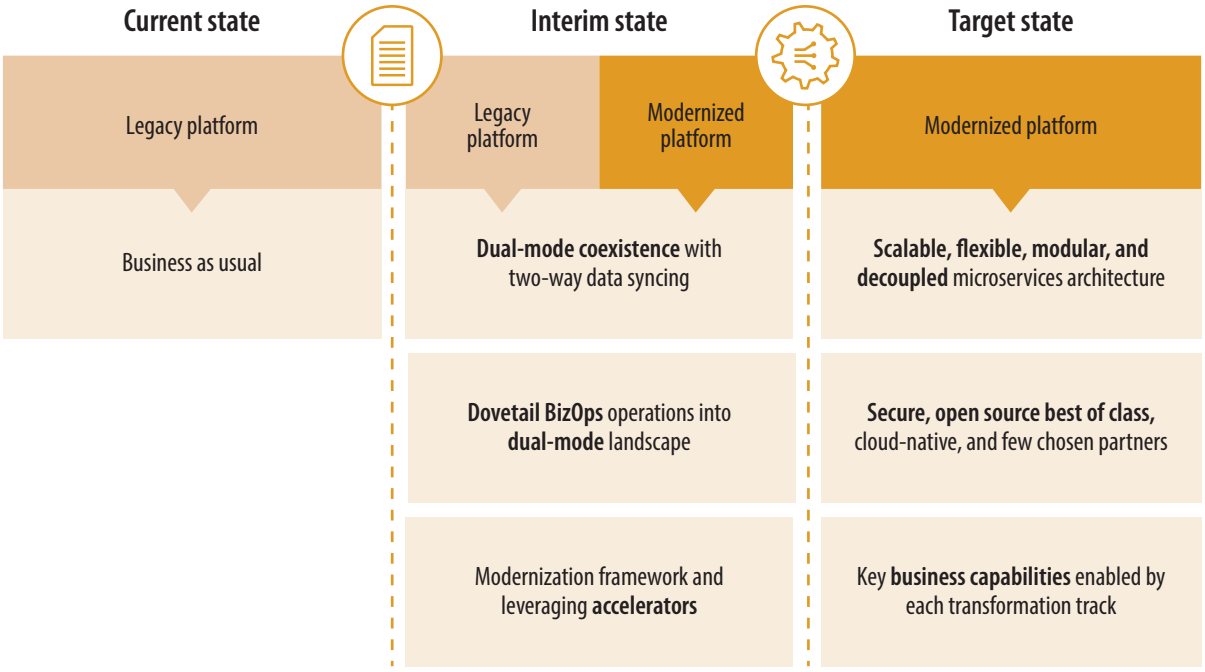

Source: Infosys Knowledge Institute

The whole point of a phased approach is to slowly replace existing functionalities with new applications and services in a phased manner. This is often done when replacing a complex system with microservices can be a huge risk. Adopting a phased or strangler approach to gradually migrate to the new system reduces the risk of complete failure. The strangler pattern updates the modernized stack to point to a new location by using what is known as a routing facade, an abstraction that talks to both modernized and legacy systems. To take this route, organizations should analyze applications in depth and perform security checks to ensure vulnerabilities don't surface in the new architecture.

The coexistent approach, often deployed in Infosys' zero-disruption method, is frequently used with more invasive strategies.[4] Here, planning is critical. Instead of a big-bang cutover, the modernized system runs in parallel with the legacy system until IT infrastructure and applications gradually transition. In the zero-disruption method, this transition runs over three phases (see Figure 14).

In this pattern, the modernized application is completely transformed to become scalable, flexible, modular, and decoupled, utilizing microservices architecture. It also uses the best of cloud offerings and opens a lively and innovative partner ecosystem for the organization.

Figure 14. The zero-disruption approach to app modernization




Source: Infosys Knowledge Institute

# Separating the winners from the also-rans

The reasons for, and goals of, modernization vary. Senior executives are interested in reducing the total cost of ownership (TCO) and improving application resilience. Firms with high discretionary spending are interested in increasing revenue, while goals across industries jump from reduced TCO (in, e.g., telecommunications) to speed of performance (in, e.g., life sciences). And with everything happening so fast and big budgets being put on the table for modernization initiatives, the actual effectiveness of modernization programs fluctuates across firms. Retail modernization programs (of the sort conducted by Kmart in Australia) effectively increase revenue and application quality, but often struggle with user experience. Healthcare firms, for instance, also face this issue, with data locked in legacy vaults that is difficult to release.

In this race to modernize, there will be winners and also-rans. Firms must act now to make the best of what they have. Upskilling will be critical, and a "micro is the new mega" approach to change, with deft planning and strategic budget, will win out over big-bang wholesale changes across people, processes, and technologies.[5]

Cloud, DevOps, and automation all play a role to ensure teams working on changing the legacy landscape hit the ground running — and keep on running. Thought must be given to quality assurance planning to ensure the modernized landscape is fully functional and operational. And importantly, even during modernization, the customer must remain center stage. This requires an operating model that brings IT together with the business to roll out new features and cross-functional teams of Agile practitioners continuously collaborating to meet user needs and provide exceptional experiences.

# Toward modernization success in high-tech and manufacturing

Firms can take four steps for more effective app modernization. These steps encompass people, processes, and technologies. Perhaps most important, they all depend on having business in the same room as IT when making big decisions. They also all require C-suite involvement, especially when complex, multiyear modernization projects loom large. And to overcome the fear of getting started on such a mammoth undertaking, they offer encouragement to do great things by stitching together a series of deft microchanges. The four recommendations are:

1. Set a clear vision and roadmap for results-oriented business outcomes.
2. Cross-pollinate Agile teams with deep technical expertise.
3. Use a zero-disruption modernization method.
4. Start small but start now, and use a modernization expert.

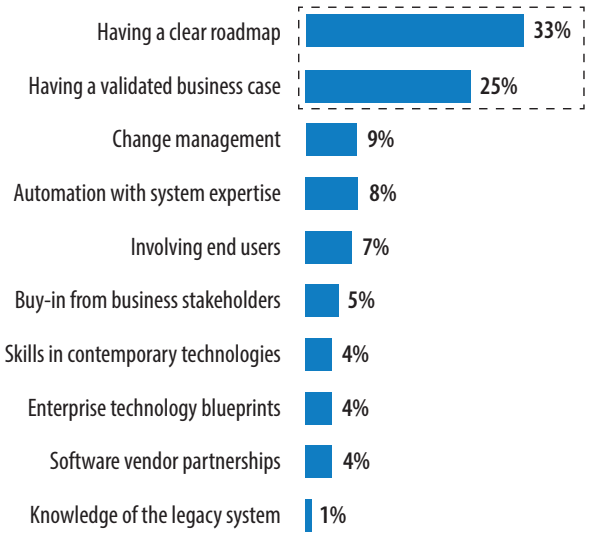
# 1. Set a clear vision and roadmap for results-oriented business outcomes

Modernization projects can cost over $10 million. A clear modernization roadmap with defined commercial outcomes can unlock funding and sponsorship from senior executives. This was the topmost response highlighted by our respondents when asked how they can achieve modernization success. In a close second place was a validated business case against the commercials of the solution (see Figure 15).

Clearly, concentrating on business outcomes is key. The vision should start at the top of the company and be cascaded down through well-defined objectives and key results.

With a defined roadmap in place, employee experience and business processes like new hire onboarding were reimagined, and a "digital runway" was established through small implementations rolled out every six weeks.[6] This enabled Infosys to be more resilient during the pandemic, when 99% of the workforce moved to remote work. Employee satisfaction increased dramatically, and client value scores were the highest they had ever been.

Figure 15. Focus on business outcomes is key to modernization success




Source: Infosys Knowledge Institute

***"Giving the whole firm a vision for transformation ensures that changes happen across people, process, and technology."***

**— Gautam Khanna**
Vice President and Global Head, Modernization Practice, Infosys

# 2. Cross-pollinate Agile teams with deep technical expertise

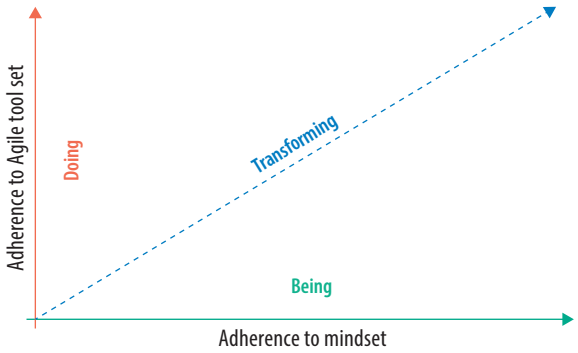
Our Agile Radar research found that product-centric value delivery, together with autonomous, cross-functional teams of technical practitioners, design thinkers, and business executives, can increase business growth by as much as 63%.[7] The message is clear: Use Agile ways of working and cross-pollinate teams with deep technical expertise so the whole firm becomes agile. This worked at Infosys during the pandemic, and scores of other companies that have successfully modernized their legacy landscape did the same.

Both legacy and modernized systems will work better through a focused initiative to identify, harmonize, and scale processes and ways of working. Here, adhering to the Agile tool set and mindset is important (see Figure 16).

Employees should be upskilled to work with exponential technologies such as AI, microservices, and containers. Security practitioners can become members of DevOps pods, forming DevSecOps for more automatable software provisioning and deployment.

Harmonizing the operating model in this way will lead to sustained agility across the entire organization; increased experimentation and innovation; and a transformation of the organization from "doing modernization" to becoming an agile, modernized organism that is relevant to clients, resilient to market shocks, and responsive to market forces — a live enterprise.

Figure 16. Successful teams adhere to Agile tool set and mindset




- Adhere closely to the recognized tools and practices associated with Agile.
- Follow methodologies rigorously, enabling consistent methods to be scaled across an organization.

- Cultural and organizational traits aligned with the agile manifesto.
- Flexible roles and flat hierarchies.
- Multidisciplinary teams organized around products.
- Speed, innovation, and empathy with the end user.

- Structural flexibility and the rigor of processes, practices, and tools with strong outcome orientation to achieve holistic agility at scale.

Source: Infosys Knowledge Institute

***"DevSecOps helps businesses shorten the modernization cycle time, from initiating a business idea to delivering to end customers. Organizations can now detect problems early in the modernization value stream to deliver quality outcomes and effortlessly collaborate through unified DevSecOps teams."***

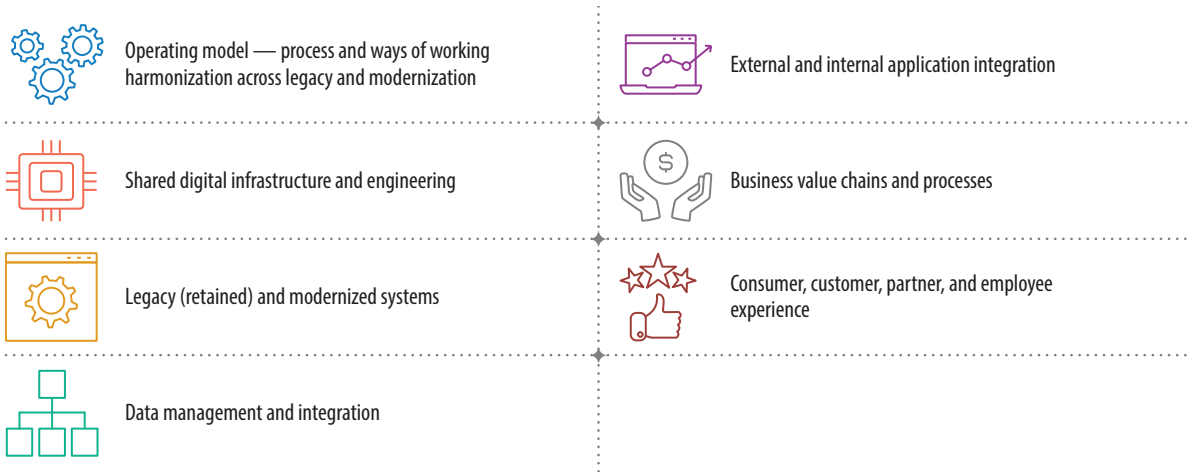
**— Anupama Rathi**
Associate Vice President, Head of DevOps Center of Excellence, Infosys

# 3. Use a zero-disruption modernization method

Our analysis found that coexistent and phased approaches to modernization result in the fewest crippling disruptions. But the story doesn't end here. Infosys takes a seven-layer zero-disruption approach (see Figure 17) to ensure minimal disruption and business resiliency during modernization.[8] Different modernization methodologies involve certain layers more than others, with big-bang (layers 1-4), and phased and/or coexistence (layers 1-6). With coexistent, layer 5 is more prominent. In layer 1, companies should take into consideration the experience of all relevant stakeholders at the early stage of modernization. Employees should be reskilled and upskilled as part of stakeholder considerations. Layer 2 is about focusing on business value chains and processes to derive maximum value while minimizing risks during the coexistence phase. These factors can be considered, along with the business case, to implement a pilot program using a few medium-risk, high-impact apps — ideally by leveraging a partner's expertise.

Layer 3 ensures an incremental change in the application interface to the external world through a carefully crafted migration from a monolith to a microservices-based organization. Layer 4 is also critical. For optimal coexistence, having the right data management and integration strategy is crucial. One way to manage this data is to create a repository of data on the cloud and ensure two-way syncing to modernized and legacy applications, preventing data loss. Finally, layers 6 and 7 include shared digital infrastructure (for efficiencies and process optimization) and an operating model that harmonizes ways of working across legacy and modernized systems and teams.

Figure 17. The seven layers of zero-disruption modernization




Source: Infosys Knowledge Institute

*"Modernization of core systems with zero disruption requires cross functional collaborative teams that take a holistic view across the seven dimensions and plan and execute micro changes in a concerted way. They continuously experiment and learn from these changes to refine the execution approach, thereby minimizing transition risks and delivering predictable outcomes."*

**— Rafee Tarafdar**
CTO, Infosys

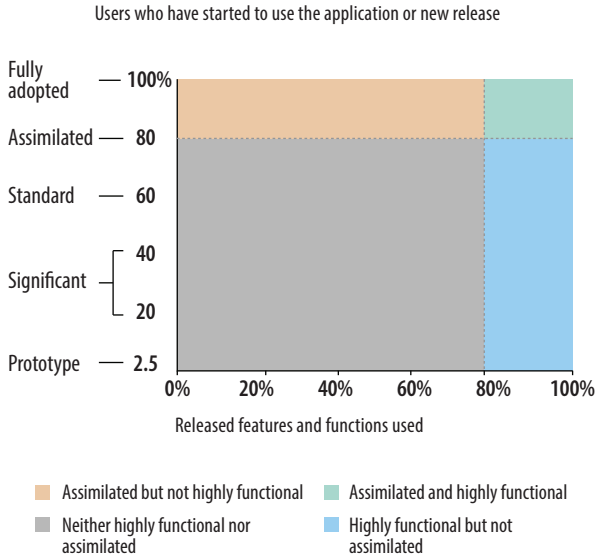
# 4. Start small but start now, and use a modernization expert

Clearly, modernization is imperative in today's customer-centric, turbulent climate. But it comes at a cost. Organizations are spending a significant amount on app modernization. Our research shows that high-tech and manufacturing organizations spend roughly 67% of their discretionary budget on modernization projects. Almost all legacy systems will either advance or disappear in the next five years. However, many executives fear failing. They want to change but are stuck in analysis paralysis.

Microchange management, as discussed in a recent Harvard Business Review article, provides some guidance. Instead of doing all changes at once, big modernization projects can be broken down into small components — such incremental work results in exponential change (and business benefit). Firms can also use this method to change employee behavior through slight modifications to habits and routines, which is important when organizational culture will also have to catch up with the modernized technological landscape. Modernized applications can be piloted on just a tiny fraction of the partner ecosystem; learnings from this pilot should then be used to refine and scale the rollout across the entire user base. Once modernization projects reach 80% adoption and 80% of the released features and functions are in use, they are considered assimilated into the organization and culture (see Figure 18).

Organizations can use efficient tool sets to benefit the most from transformation. Many successful modernization initiatives use the Infosys Modernization Suite to advance its legacy systems, effectiveness, and results.[9] The suite is part of Infosys Cobalt and a portfolio of modernization services that helps enterprises modernize their legacy systems. It is an Integrated solutions like this support a range of modernization scenarios through cloud-native development, cloud migration, mainframe modernization, and technology migration. The solution also includes a team of experienced consultants and an ecosystem of over 50 partners.

Figure 18. Measuring change at scale

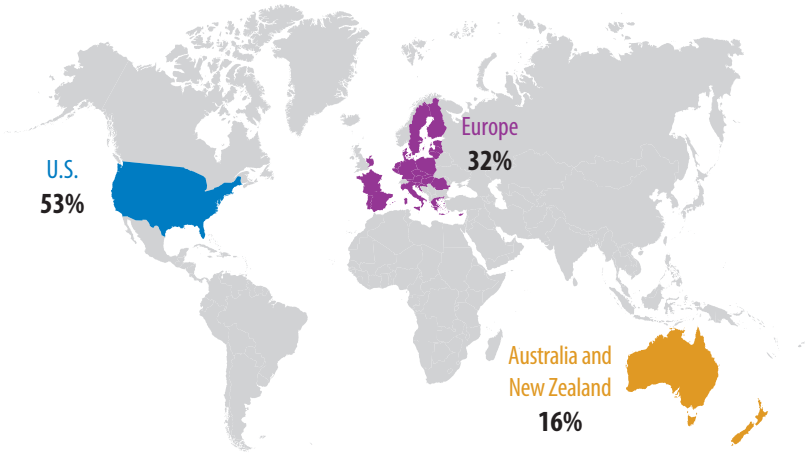



Source: Infosys

# Appendix: Research approach

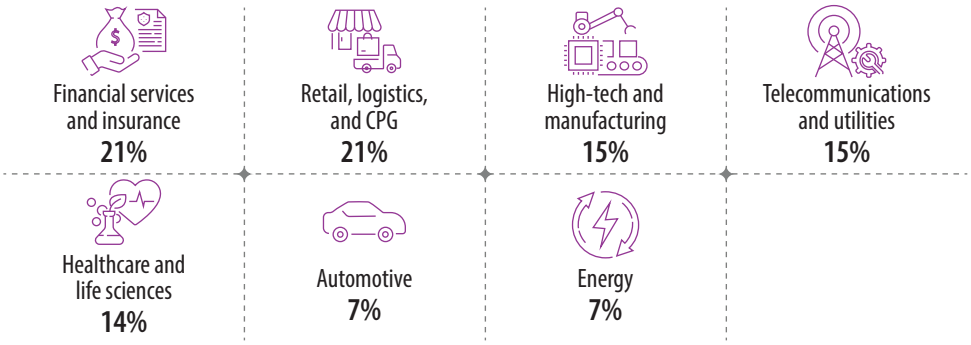
In addition to the survey of 1,500 executives and leaders, we conducted interviews with industry practitioners, executives, and subject matter experts.

## Respondents by region (for all industries)



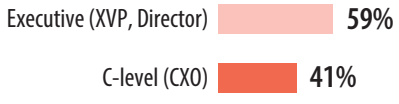

Source: Infosys Knowledge Institute

## Respondents by industry (for all industries)



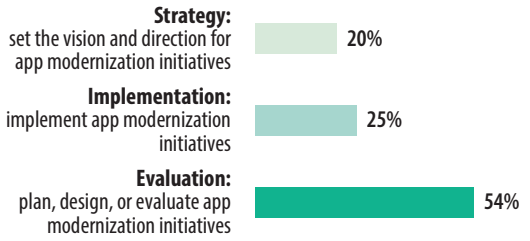

Source: Infosys Knowledge Institute

## Respondents by seniority (for all industries)

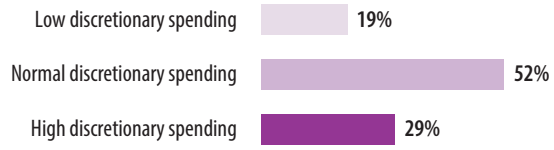



Source: Infosys Knowledge Institute

Respondents by modernization role (for all industries)

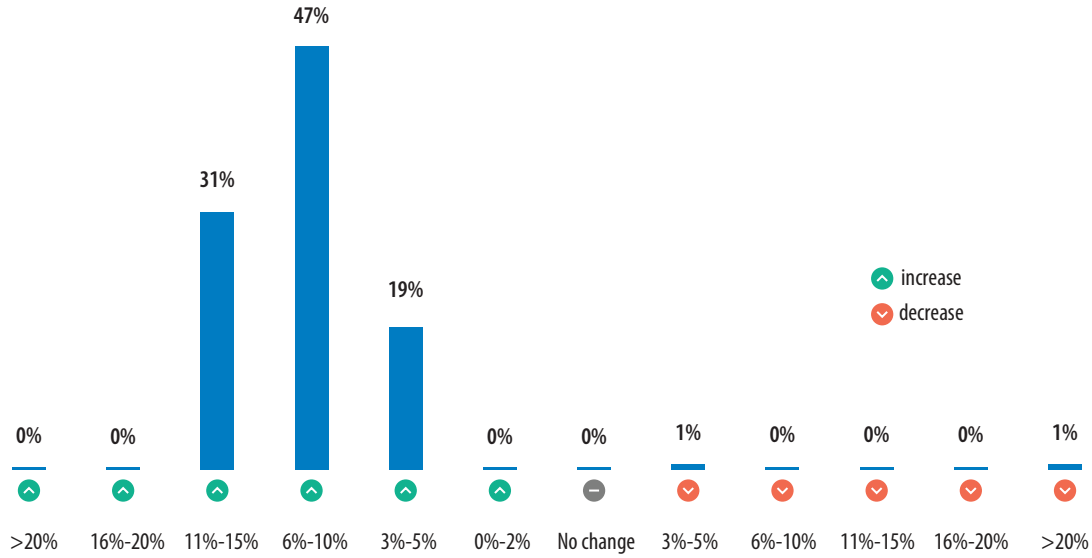



Respondents by discretionary spending level (for all industries)




Source: Infosys Knowledge Institute

Respondents by modernization budget change (for all industries)




Source: Infosys Knowledge Institute

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## Author

**Harry Keir Hughes** | Infosys Knowledge Institute, London

## Contributors

**Gautam Khanna** | Vice President and Global Head, Modernization Practice, Infosys, Bengaluru

**Jaydip Sanyal** | Associated Vice President, Infosys, Frankfurt

**Saroj Senapathy** | Senior Principal, Infosys, Bengaluru

## Analysis and Production

**Isaac LaBauve** | Infosys Knowledge Institute, Dallas

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The Infosys Knowledge Institute helps industry leaders develop a deeper understanding of business and technology trends through compelling thought leadership. Our researchers and subject matter experts provide a fact base that aids decision-making on critical business and technology issues.

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