

Infosys Modernization Radar 2022:

Race to modernize
healthcare and life
sciences

Infosys
cobalt



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Executive summary



We polled 213 senior technology leaders from the healthcare and life sciences (HLS) 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.

We found that the pool of legacy applications is disappearing quickly. Even though 90% 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 the 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 HLS 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 healthcare and life sciences: 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 HLS CIOs are concerned about having the right talent. Almost 51% of HLS respondents cited the lack of skills and talent as a bigger pain point than risks of disruption (26%) and costs (23%). Of course, 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.

Having niche skills is a big pain-point for HLS firms. Upskilling, partnering, and the gig economy should be utilized as much as possible.

Modernization investment should be more strategic than discretionary

A significant proportion of an organization's discretionary budget (66%) goes toward app modernization. Firms with lower discretionary budgets are larger HLS companies using strategic budgets for their modernization initiatives. Such companies assign only 43% of their discretionary budgets to app modernization. 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 – half of healthcare and life sciences 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. Reduced operational expenditure and the ability to utilize technologies, such as application programming interfaces (APIs), microservices, and even artificial intelligence (AI), are compelling HLS 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 healthcare and life sciences: 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. 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 Healthcare & Life Sciences 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 90% of current enterprise applications in healthcare and life sciences are still legacy, the spend on app modernization right now is substantial. Of this, around 46% is legacy mainframe systems. The respondents in our survey alone are spending \$3.6 billion.

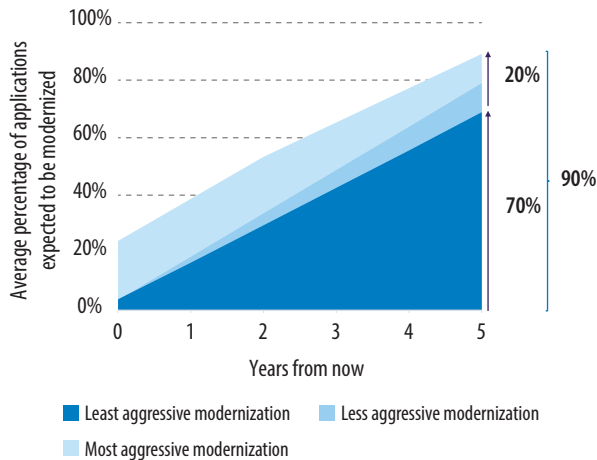
However, most of these legacy systems are critical to businesses. These are not just systems of differentiation or innovation, but they keep the businesses operating effectively.

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 a transformation is taking place.

"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

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



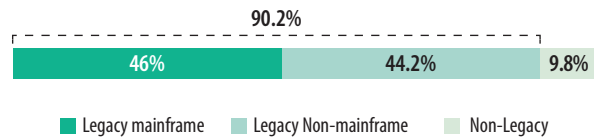
Source: Infosys Knowledge Institute

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, almost 50% would modernize in the next two years.

Many healthcare and life sciences firms face significant overlap in capabilities and rising technical debt, which can significantly increase the cost of care. Years of growth had left one large healthcare company with over 10,000 applications, of which it identified that around 80% could be consolidated or retired to lower the cost of healthcare in the United States. To achieve this, the company chose to pursue an application modernization and cloud migration strategy. It began with a private cloud, moving applications to virtual machines in its own data centre. To realize further value, it decided to embrace public cloud services and reimagine its applications in a microservices architecture. Doing so not only reduced costs and improved resilience but had the further impact of

Figure 2. There's a lot of legacy left — 90.2% of current enterprise systems are legacy



Source: Infosys Knowledge Institute

bringing IT and business closer together, enabling the firm to pivot to a product-centric operating model. The transformation was so successful that digital transformation became the company's buzzword for the next five years, with executive sponsorship and increasing CTO involvement in business strategy. Crucial was having business in the same room as IT when vendor negotiations and roadmaps were put in place.

A lot of legacy is critical to the business

Currently, 90% of current systems are legacy (see Figure 2). Of this, 46% is legacy mainframe.

More than half of this legacy is core to the business (51%), and the rest is supporting applications (see Figure 3).

Organizations, from local pharmaceuticals to global healthcare providers, have stacked up legacy debt by sticking with these legacy systems. These core systems, often housing important data and transaction processes, can be difficult and expensive to upgrade. They also lack software support, as the people who develop them are retiring (or have already retired). For companies in the legacy boat, these unsupported core

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

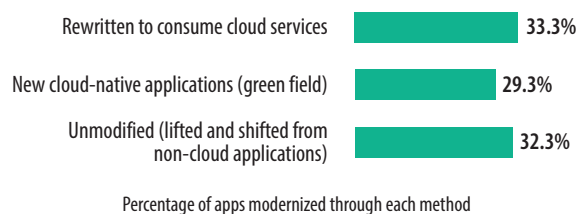
systems present security risks, often because there is no publisher-produced patch to repair vulnerabilities, offering a gold mine of information for knowing hackers to exploit. This all comes together to produce compliance, legal, and reputational risks.

All firms are suffering in this regard. Across industries, firms with more than \$5 billion in revenue have similar numbers of core assets as those with less revenue. Healthcare and life sciences firms that have set aside bigger budgets for app modernization have even more core legacy assets, with 51% core applications and 48% 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

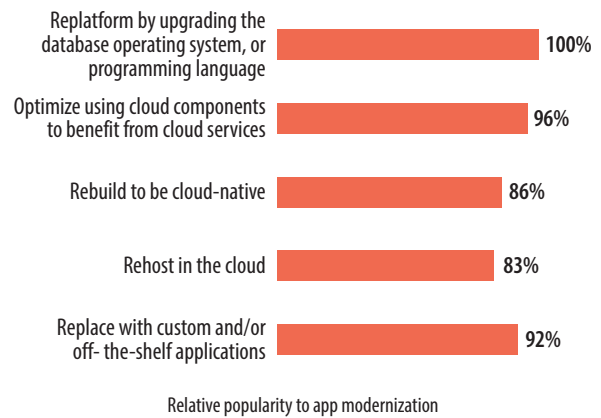
Many firms are choosing the cloud to modernize their legacy applications. Our Cloud Radar 2021 analysis showed that companies that move over 60% of their systems to the cloud achieve significantly higher performance, especially when core systems have been migrated.¹ But the options to get there are myriad and can be highly complex, including rewriting and greenfield deployments (see Figure 4). While a third (33%) of legacy applications are being rewritten for the cloud environment, another 32% consist of unmodified applications carried forward from legacy systems. Finally, a little under a third (29%)

Figure 4. Each modernization method is almost equally popular



Source: Infosys Knowledge Institute

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



Source: Infosys Knowledge Institute

are greenfield, native cloud applications, used for better scalability and extensibility.

Sometimes, a simple lift and shift is the best move to get things started. The large healthcare company mentioned earlier started its app modernization with a lift and shift to the public cloud. It then reimaged all applications in a microservices architecture. But this presented new challenges, with difficulty in maintaining end-to-end observability across the entire IT stack. With a solid roadmap in place, the company then used advanced observability tools, optimized customer journeys, and supported faster innovation through DevOps and CI/CD pipelines. This increased speed of product development and increased availability of mission critical back-end applications. By starting with a simple lift-and-shift, the firm was able to accelerate digital transformation and brought business closer to IT as a result of product-based teams organized around superior customer journeys.

However, for non-mainframe applications, executives we spoke to prefer to either optimize applications to benefit from cloud services or re-platform the

“Cloud can also help organizations engaging in mergers and acquisitions to expand into new geographies, quickly integrate new components and inject agility into their operations.”

Subhro Mallik

SVP and Global Head, Life Sciences, Infosys

application by upgrading the database, operating system, or programming language (see Figure 5).

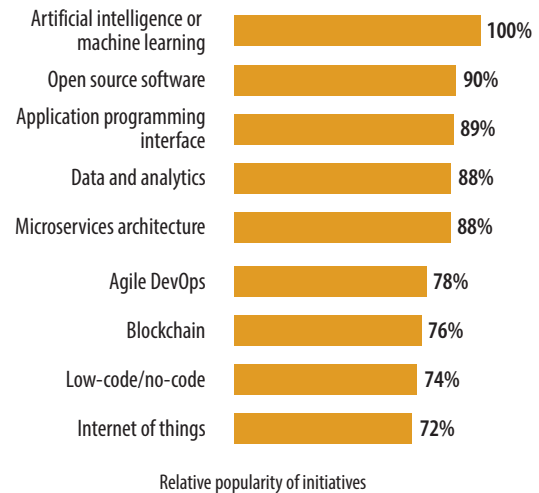
Exponential technologies dominate modernization drivers

Now that the cloud is ubiquitous, other technologies and ways of working are driving HLS firms to modernize. We found that artificial intelligence (AI) or machine learning (ML) ranked the highest, followed by open-source software, APIs, data and analytics, and microservices architecture (see Figure 6).

APIs have a high level of mindshare. Exposing programs as APIs can enable firms to plug-and-play different systems together, leading to what many have termed a “composable enterprise.” This increases agility, resilience, and customer-centricity in an enterprise. Firms that had a higher level of composability in business processes were able to weather the worst of the pandemic in a way superior to laggard firms in this respect. To do APIs well, firms will have to refactor their legacy applications. Refactoring is the process of discovery, isolation, extraction, and reuse of business rules as new API-level services. Automating that process is vital, as it can be akin to reading more than

a dozen copies of "War and Peace" — and that’s for a relatively modest application of only one million lines of code.²

Figure 6. Exponential technologies have a large influence on modernization



Source: Infosys Knowledge Institute



Multiple talent pools reduce risk

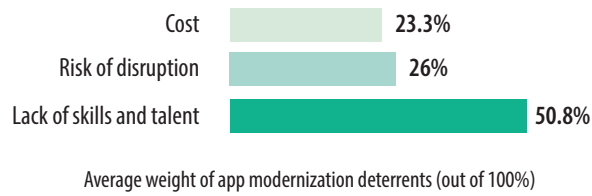


Talking to experts, it is easy to see why firms are modernizing now. Modern systems enable a better and richer customer experience, including an omnichannel presence for healthcare providers.

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 (26%), the lack of skills and talent appeared more threatening (51%) (see Figure 7). Healthcare and life sciences firms were more concerned about lack of skills (29%) than other verticals. The 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.

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



Source: Infosys Knowledge Institute

Firms need to invest in their workforces, build a community of practices for modernization, and even 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 underlying systems. Talent is also needed in more transformative efforts to expose business capabilities often locked within mainframe screens.



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 HLS 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 for the HLS industry was 66%, proving that modernization is a big deal for most enterprises.

We then split the respondents into low discretionary (less than 60% of their budgets going 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 HLS companies more likely to use strategic budget

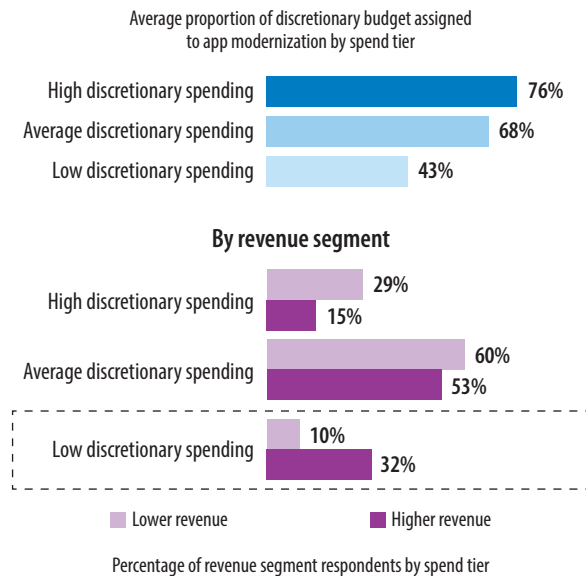
Low discretionary spenders are much more likely to be big HLS companies (revenues greater than \$10 billion) (see Figure 8) using strategic budgets for their modernization initiatives. We believe this is because they have a higher proportion of projects greater than \$10 million (see Table 1) and have 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.

High levels of discretionary spend across industries, with healthcare and life sciences showing less attention

Modernization is a key business initiative and should be sponsored from the top. Although the healthcare

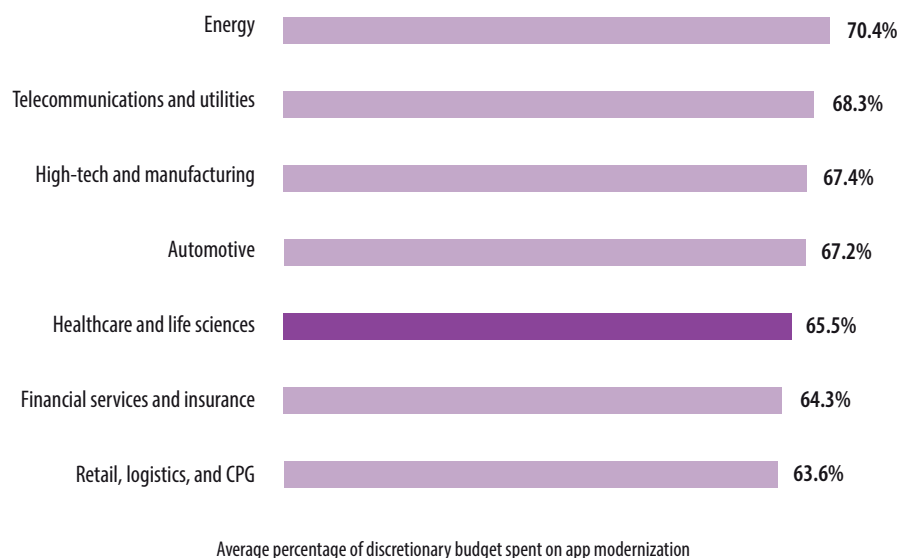
Figure 8. Larger HLS companies have lower discretionary spending for modernization



Source: Infosys Knowledge Institute

and life sciences segment spend a lower proportion of discretionary budget on app modernization, the proportions stands at 66% (see Figure 9). Energy, telecommunications, and utility firms spend on app modernization in the range of 68%-70%.

Figure 9. Most discretionary budget is used for modernization



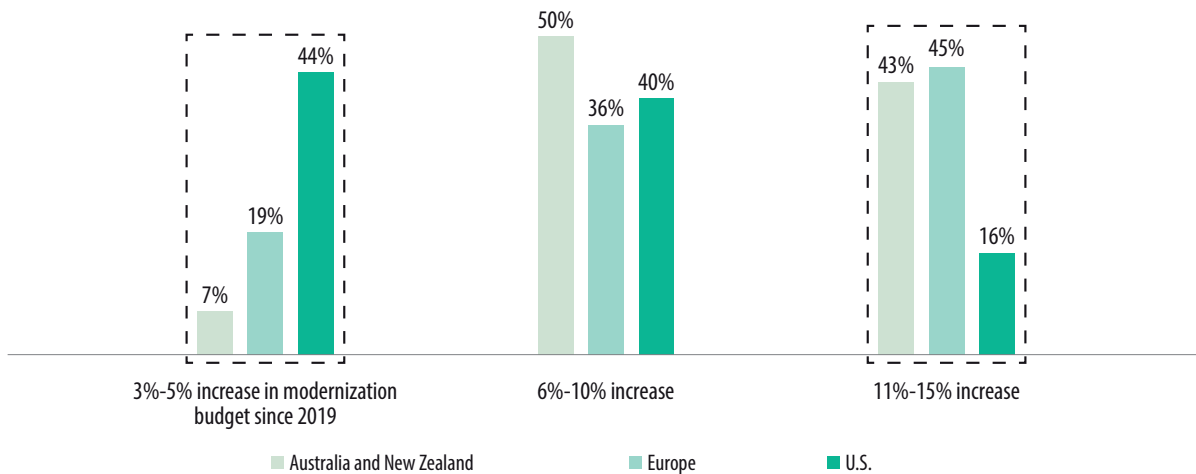
Source: Infosys Knowledge Institute

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, healthcare and life sciences firms are not plowing

into modernization initiatives as much as automotive and telco/utilities enterprises. However, they are investing more than enterprises in financial services and insurance, high tech, manufacturing, retail, logistics and consumer packaged goods industries. (see Figure 11).

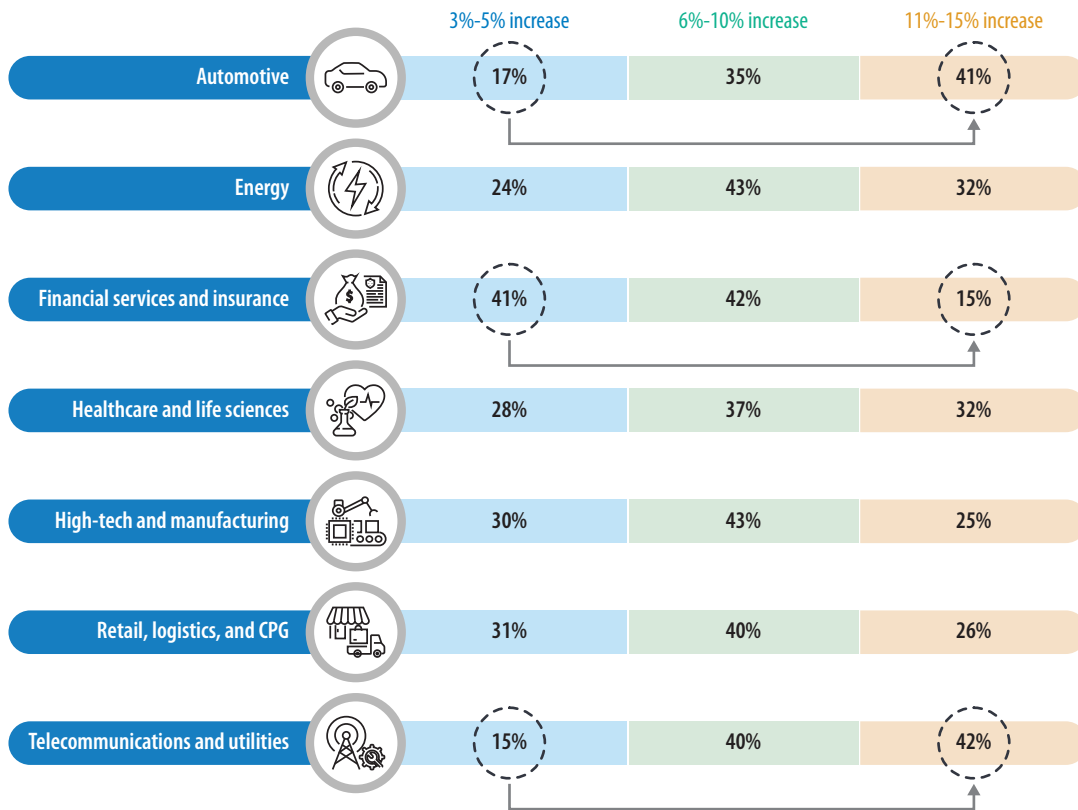
Figure 10. U.S. is behind in increasing modernization budgets



Source: Infosys Knowledge Institute



Figure 11. Healthcare and life sciences organizations are moderately increasing modernization budgets



Source: Infosys Knowledge Institute

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.

Strangler named after the fig tree (which coils and strangles other trees at the roots), 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 wholesale 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.

When modernizing an enterprise, its systems should see minimal changes to consume the services.

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

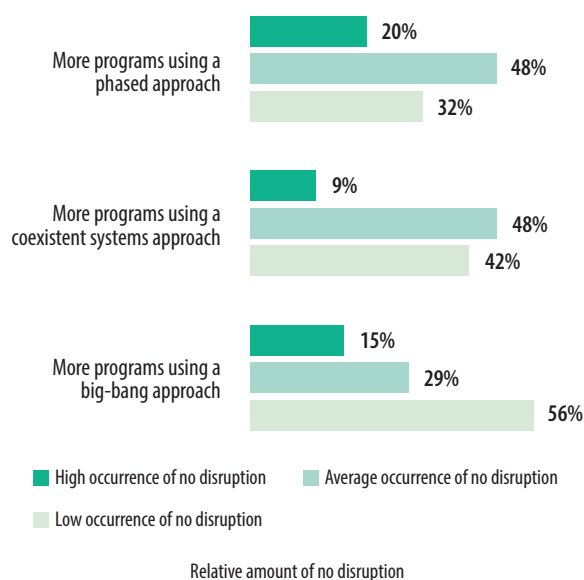
a sudden and abrupt disruption. When the end consumer is an enterprise, its systems should see minimal changes to consume the services. Business operations need to seamlessly transition from supporting the legacy applications to using the modernized model. The phased (or strangler) approach is best in this regard for most industries. However, for HLS respondents, the evidence is less clear (see Figure 12). Around 20% of HLS respondents using the phased method reported higher occurrence of 'no disruption' than average (see Figure 12). The percentage is as low as 9% for the coexistent method.

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 50% 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.

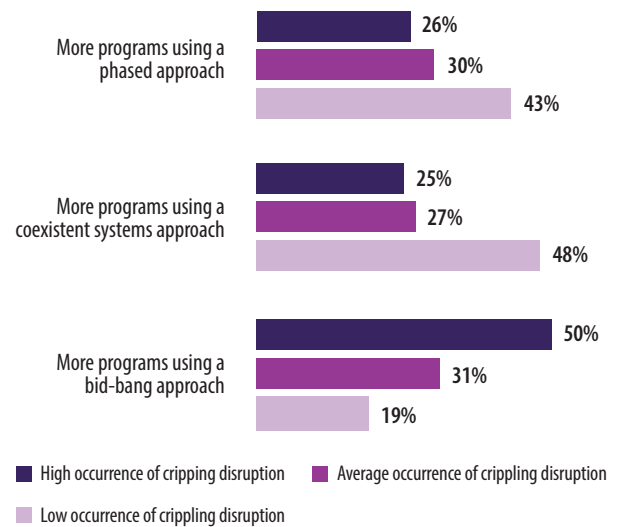
The whole point of a phased approach is to slowly replace existing functionalities with new applications and services in a phased manner. This is often done when replacing a complex system with microservices

Figure 12. Phased approach is the least disruptive



Source: Infosys Knowledge Institute

Figure 13. Coexistent and phased approaches cause less crippling disruption



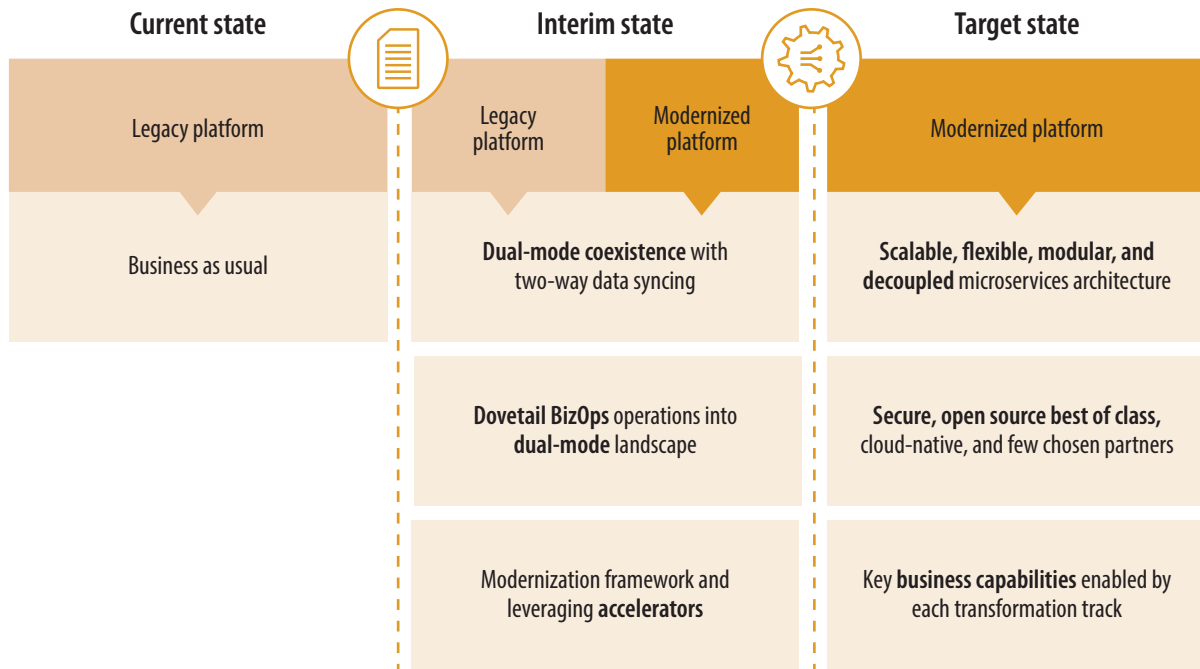
Source: Infosys Knowledge Institute

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 and security considerations (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 they often struggle with user experience. Healthcare firms, for instance, also face issue in this regard due to data locked in legacy vaults.

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.

“About 43% of all data breaches occur in the healthcare and life sciences industry, which highlights the vulnerability of legacy applications and on-premises infrastructure. Cloud-native security controls and standardized processes can address this challenge.”

Subhro Mallik

SVP and Global Head, Life Sciences, Infosys

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 result-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

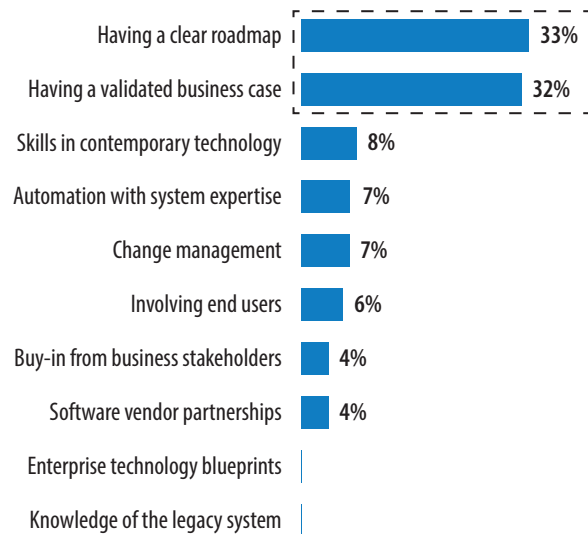
Modernization projects can cost over \$10 million. A clear modernization roadmap with defined commercial outcomes can unlock funding and sponsorship from senior executives. This was the topmost response highlighted by our HLS respondents when asked how they can achieve modernization success. In second 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 reimaged, 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.

A clear modernization roadmap with defined commercial outcomes can unlock funding and sponsorship from senior executives.

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



Percentage of respondents that ranked number 1 (most important) out of 5 in ensuring a modernization program achieves its objectives

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

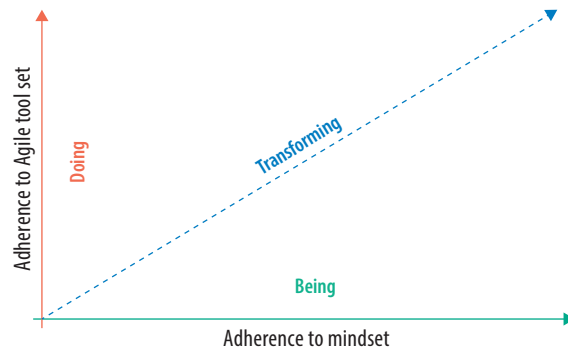
Our Agile Radar research found that product-centric value delivery, together with autonomous, cross-functional teams of technical practitioners, design thinkers, and business executives, can increase business growth by as much as 63%.⁷ The message is clear: Use Agile ways of working and cross-pollinate 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 an 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

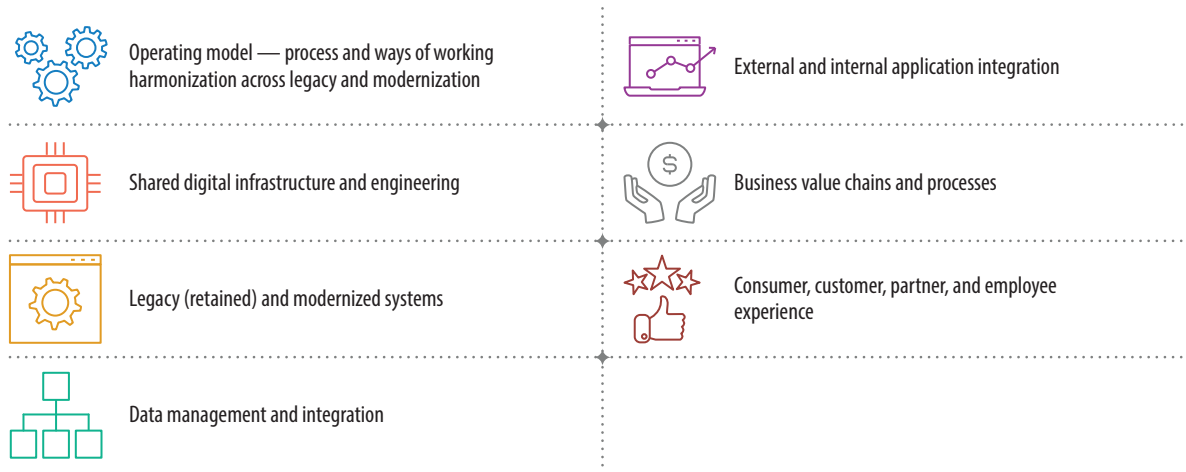
3. Use a zero-disruption modernization method

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 partner

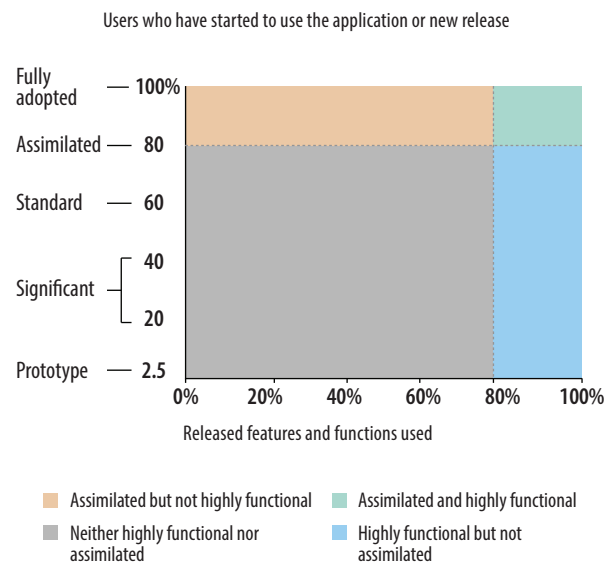
Clearly, modernization is imperative in today's customer-centric, turbulent climate. But it comes at a cost. Organizations are spending a significant amount on app modernization. Our research shows that organizations spend around 66% of their discretionary budget on modernization projects. Almost all 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).

Though legacy systems will either advance or disappear in the next five years, many executives we spoke to are stuck in analysis paralysis.

HLS organizations should use efficient tool sets to benefit the most from transformation. Many successful modernization initiatives used a partner that offered a framework of repeatable services, reducing development efforts by 40%, time to market by 20%-40%, and modernization costs by 15%-30%.⁹ The suite is an integrated solutions like this support a range of modernization services 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

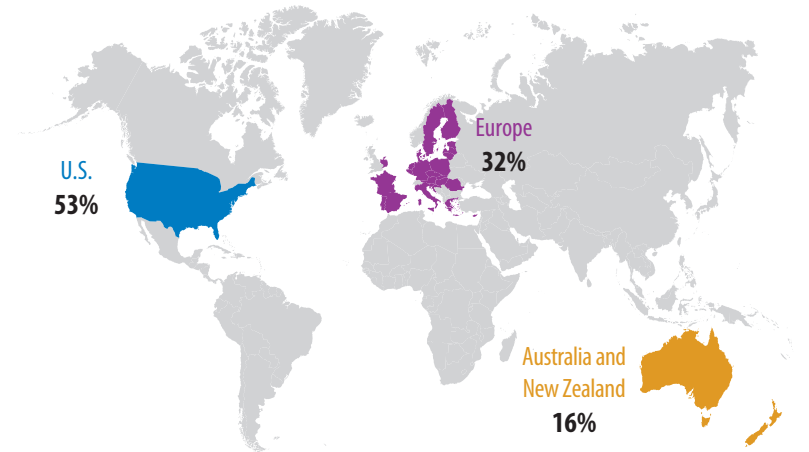


Source: Infosys

Appendix: Research approach

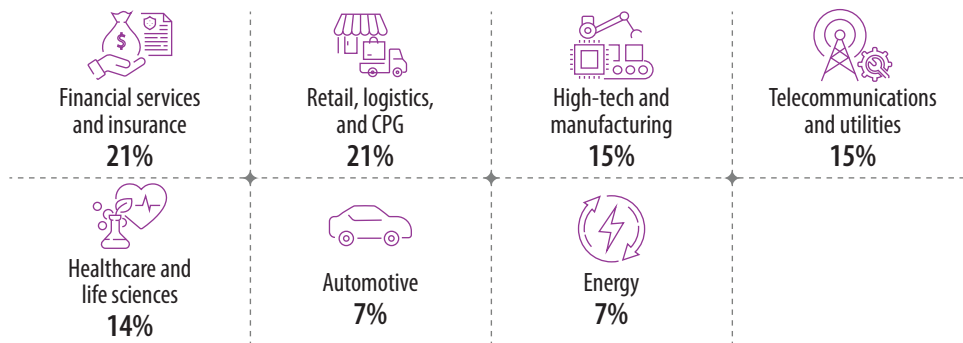
In addition to the survey of 1,500 executives and leaders for this research, we conducted interviews with industry practitioners, executives, and subject matter experts.

Respondents by region (for all industries)



Source: Infosys Knowledge Institute

Respondents by industry (for all industries)



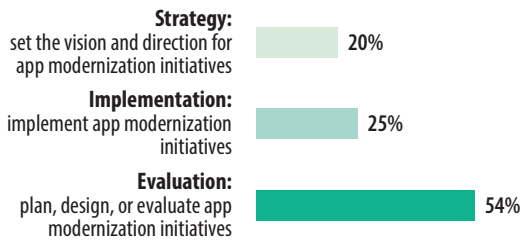
Source: Infosys Knowledge Institute

Respondents by seniority (for all industries)



Source: Infosys Knowledge Institute

Respondents by modernization role (for all industries)

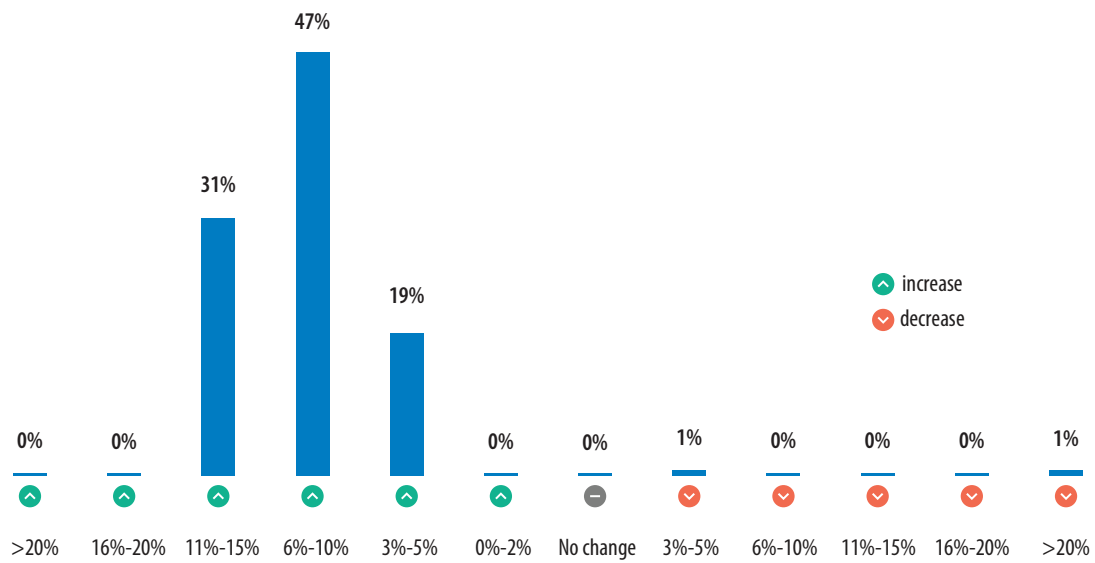


Respondents by discretionary spending level (for all industries)



Source: Infosys Knowledge Institute

Respondents by modernization budget change (for all industries)



Source: Infosys Knowledge Institute



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