Infosys Modernization Radar 2022:

Race to modernize financial institutions

Infosys cobalt

Contents

Executive summary

We polled 319 senior technology leaders and executives of financial institutions 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 84% of current technology assets are legacy, almost all will modernize in the next five years. This matter is even more urgent because half of the legacy pool involves critical business systems, including claims systems with in-depth customer data. Our surveyed chief information officers (CIOs) are worried that they don't have skills in-house to successfully pivot 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 also 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: How financial institutions are racing to modernize' 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 evolving customer demands. They will realize cloud benefits such as better enterprise data, value realization from exponential technologies, more resilience and compliance with what are sometimes onerous regulations, and a more scalable and operative digital backbone.

The right modernization strategy for financial institutions: Holistic, automated, and aligned

We found that 50% of 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 can maintain and extend their applications for full business benefit.

Multiple talent pools reduce risks

Firms must modernize now. But banking and insurance CIOs are concerned about having the right talent. Almost 49% of respondents cited the lack of skills and talent as a bigger pain point than risks of disruption (27%) and costs (26%). Of course, modernization is not a one-size-fits-all initiative. Different banks and insurance firms need diverse 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 financial organization's discretionary budget (64%) goes toward app modernization. Firms with lower discretionary budgets are larger financial institutions using strategic budgets for their modernization initiatives. For such companies, only 45% of their discretionary budgets are assigned 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 with legacy applications that are transforming. The big-bang method is more likely to lead to crippling disruption – almost half (45%) of the financial services and insurance respondents who used this method more often than other methods experienced more frequent crippling disruptions.

The race to modernize

There are many reasons financial institutions are racing 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 this transformation. Many banking and insurance executives in our survey spoke about increased reliability and resilience of modernized applications and modernization benefits, such as increased revenues, omnichannel delivery, 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 financial institutions to enhance modernization effectiveness, save money, and build tomorrow's technology infrastructure with today's resources.

The right modernization strategy for finanical institutions: 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 financial services 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 84% of current enterprise applications in financial services are still legacy, the spend on app modernization right now is substantial. Of this, around 43% are mainframe systems. The respondents in our industry survey alone are spending $5.4 billion. The actual number might be as much as $40 billion when extrapolated globally.

However, most of these legacy systems are critical to businesses. These are not just systems of differentiation or innovation, but they also keep 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 and AI where possible, and ensure that the business is in the same room as IT when transformation is taking place.

> Financial institutions have just five years left to modernize their legacy applications to stay ahead of nimble upstarts.

"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
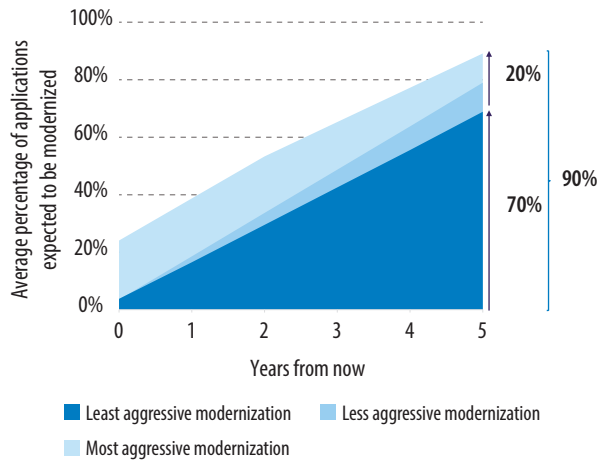
Source: Infosys Knowledge Institute

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 for financial institutions will remain after five years, with almost 50% modernized in the next two years. The message is clear — from big banks to smaller InsureTechs and middling mortgage providers — the firms that modernize will make their way, and those that don't will be left behind.

Most CIOs and CEOs realize that modernization provides both immediate and long-term benefits, changing the emphasis of the organization from "doing digital" to "being digital."

An example provides illumination. A multinational investment bank in New York City, offering core banking, investment banking, brokerage, and wealth management services, had to accelerate its modernization timeframes urgently. The bank had a December 2021 end-of-life support deadline from Google that could expose its systems to security

Figure 2. There's a lot of legacy left — 83.5% of current enterprise systems
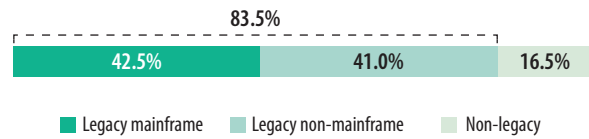
Source: Infosys Knowledge Institute

vulnerabilities. On the journey, the bank streamlined its processes (with the help of Infosys) and realized cost savings of $650,000, reduced cycle time by 83%, and increased team productivity by 25%. While the impetus to implement the modernization came from a hard deadline, the bank received immediate payback in monetary and efficiency terms for its agility. The case demonstrates the importance of a business-led impetus and commitment to modernization.

A lot of legacy is critical to the business

Currently, 84% of current Financial institutions are legacy. Of which, 43% is legacy mainframe (see Figure 2).

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

Financial institutions, from banks to residential mortgage servicers and even standard lines carriers, have stacked up legacy debt by sticking with these legacy systems. These core systems, often housing

Figure 3. More than half of the 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.
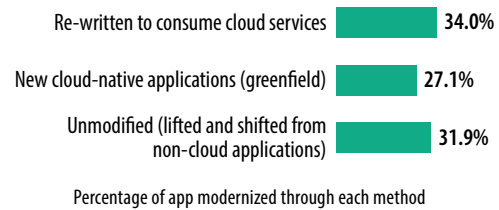Executive Vice President and Co-Delivery Head, Infosys

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 instance, the multinational New York bank discussed earlier had no documentation on system functionalities for its legacy applications. For this bank, and other companies in the legacy boat, 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. Across the five industries included in our main report Modernization Radar 2022, firms with more than $5 billion in revenue have similar numbers of core assets as those with less revenue. And firms that have set aside bigger budgets for app modernization have even more core legacy assets, with 54% core and 46% supporting applications. 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 financial institutions are modernizing legacy applications through the cloud. 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. 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 (34%) of legacy applications are being rewritten for the cloud environment, another full third consists of unmodified applications that have been carried forward from legacy systems. Finally, a little under a third (27.1%) of the applications are

Figure 4. Each modernization method is almost equally popular

Method	Percentage
Re-written to consume cloud services	34.0%
New cloud-native applications (greenfield)	27.1%
Unmodified (lifted and shifted from non-cloud applications)	31.9%

Percentage of app modernized through each method

Source: Infosys Knowledge Institute

greenfield, native cloud applications that offer gains in extensibility, microservices, and other exponential technologies.

Sometimes, a simple lift and shift is the best move to get things started. For example, a wealth management client partnered with Infosys to digitize its legacy platform managed to reuse 100% of its mainframe resources through an API-based approach. The modernized platform delivered 90% automation, improving time-to-market by 66%. Citizens Financial Group, a U.S. mid-tier organization headquartered in Providence, R.I., with 1,000 branches across 11 states (and another Infosys partner), became a cloud-native organization in three years.[2] The company was able to develop more than 100 APIs, set up a landing zone in the cloud, and build new cloud-first applications while leveraging deep automation for applications and infrastructure. This tiered cloud migration brought speed, capability, and resilience to digital transformation. During the pandemic, the bank was able to bring its customers the benefits of the Paycheck Protection Program in the U.S. It developed apps on the cloud, submitted loan applications to the small business administration (SBA), and emerged as one of the top 15 lenders globally, processing 48,000 loan applications and disbursing roughly $5 billion in timely loans.

"Financial services institutions are leveraging cloud for digital transformation, creating new customer journeys, and driving business agility. They are accelerating cloud adoption with a factory model and increasingly moving to hybrid multi-cloud states in a secure way. Some of them are also focusing on cloud neutral and multi-cloud portability. The focus is also shifting to modernizing applications, building new cloud-native platforms and unlocking the power of their data on cloud with analytics and AI/ML use cases."

Dennis Gada
SVP and Head, Financial Services, North America, Infosys

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).
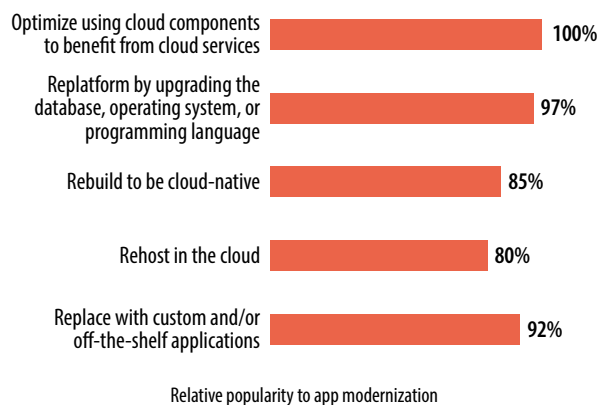
Of course, moving to the cloud doesn't have to be an either-or decision, as demonstrated by the wealth management client. By building fresh user interfaces and creating dashboards that enabled users to view up to 200 key performance indicators in graphical representations, the company could mine more useful data from older systems while delivering automation and business agility.

Exponential technologies dominate modernization drivers

Now that the cloud is ubiquitous, what other technologies and ways of working are driving firms to modernize.
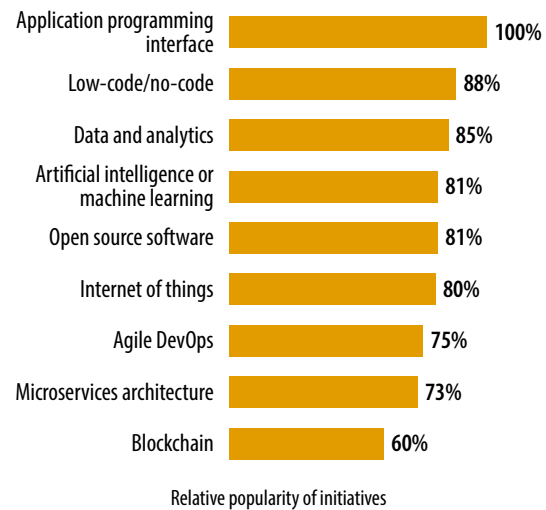
We found that APIs ranked the highest, followed by low code/no code (LC/NC), data and analytics, and AI or machine learning (ML) (see Figure 6).

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

Optimize using cloud components to benefit from cloud services	100%
Replatform by upgrading the database, operating system, or programming language	97%
Rebuild to be cloud-native	85%
Rehost in the cloud	80%
Replace with custom and/or off-the-shelf applications	92%

Relative popularity to app modernization

Source: Infosys Knowledge Institute

Figure 6. Exponential technologies have a large influence on modernization

Application programming interface	100%
Low-code/no-code	88%
Data and analytics	85%
Artificial intelligence or machine learning	81%
Open source software	81%
Internet of things	80%
Agile DevOps	75%
Microservices architecture	73%
Blockchain	60%

Relative popularity of initiatives

Source: Infosys Knowledge Institute

APIs have a high level of mindshare. Technologies such as APIs can enable financial institutions to plug-and-play different systems together and become a "composable" enterprise. This increases agility, resilience, and customer centricity in an enterprise. Firms that had a higher level of composability in business processes could weather the worst of the pandemic in a way superior to laggard firms. For APIs to do 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.[3]

"Utilizing AI, ML, and natural language processing (NLP) on the petabytes of data created with each customer touchpoint through various channels, be it the mobile application, written correspondence, website, phone calls, and then collating and correlating those data points is improving the customer experience." [2]

— Randhir Gandhi
CEO, Select Portfolio Servicing

Data and analytics is also a great driver. Our work with Vanguard is a testament to this. Vanguard is a strategic recordkeeping partner to nearly 1,500 plan sponsors, helping almost five million people to plan for retirement. The firm used cloud, data analytics, and AI to reshape the corporate retirement plan experience for its customers. It was able to grab more attention and personalize brand engagement, according to Amber Czonstka, head of institutional investor advice and client experience at Vanguard.[4] The key here was modernized data facilities for a predictive customer experience. These real-time data solutions enable participants to quickly plan design changes and help plan sponsors to track participant sentiment.

The residential mortgage servicing industry is an example for the power of data and AI in financial institutions. SPS, a wholly owned subsidiary of the Credit Suisse Group AG, worked with Infosys to improve its customer experience by translating documents into data points and "data points into usable information". Technology modernization was given a shot in the arm by leveraging Infosys Mortgage Solutions, part of Infosys Cobalt. This suite encompasses business process automation solutions for the mortgage industry, with a primary-focus on manual and effort-intensive document-centric processes. Built on open-source, the technologies and tools employ state-of-art computer vision, NLP, and include data correlation, predictive analytics, and classification.

Multiple talent pools reduce risks

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

On the one hand, modernization lets organizations of all sizes tackle nimble fintech firms looking to lure customers away with a better experience, lower fees, and greater experience. On the other, it gives them advantage over incumbent players who take longer to transform their vast legacy landscapes.

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.

> Niche skills such as rules externalization, database modernization, and reengineering of apps to open source are highly prized.

We found this to be partly true. Though disruption loomed (27%), a lack of skills and talent appeared more threatening (49%) (See Figure 7). Financial institutions feel these pain points more than others. They were found to be slightly more concerned about cost (26%) than other verticals. However, they were not as challenged by the lack of talent (23%) compared to the rest (29%).

"Modern systems enable a better and richer customer experience, including an omnichannel presence for banking and retailer firms, among others."

— **Ravi Kumar S**
President, Infosys

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

Cost	25.6%
Risk of disruption	27.2%
Lack of skills and talent	48.7%

Average weight of app modernization deterrents (out of 100%)
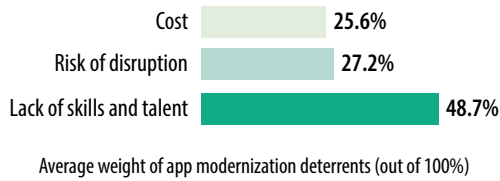
Source: Infosys Knowledge Institute

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 database modernization, and the ability to reengineer apps to open source are necessary.

At Citizens Bank, upskilling in APIs and modern microservices-based cloud-native architecture is part of what CIO Michael Ruttledge calls the multi-year next-generation technology (NGT) strategy.[6] Ruttledge is aggressively investing in in-house talent, and upskilling and reskilling using hands-on engineering academies, technology immersion sessions, badging and certification programs, and like Infosys, online web-based learning solutions.

The message is clear. Firms need to invest in their workforces, build a community of practices for modernization, and even tap the gig economy. Only then can they do the necessary due diligence and planning that successful modernization programs entail. Firms will need to handle 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.

"Coupled with an external talent hiring plan, upskilling and reskilling initiatives enhance the overall engineering caliber of the whole team."

— Michael Ruttledge
CIO and Head of Technology Services, Citizens Bank

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 financial institutions.

To understand the financing source for these modernization projects, many of which last up to 35 months, we asked respondents about the

discretionary spend on modernization. The average spend was 64%, 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

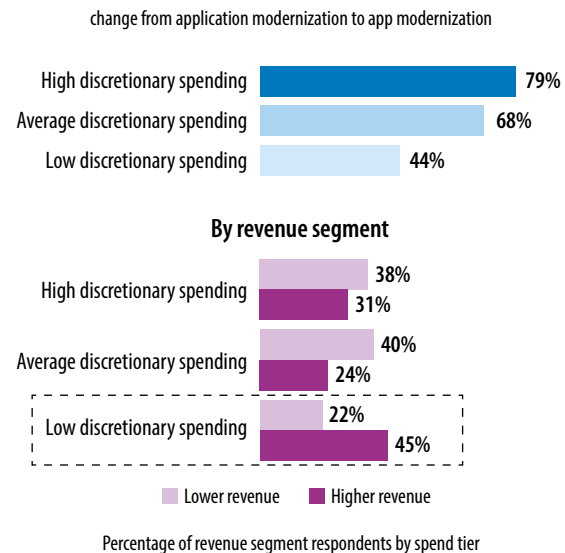| Low discretionary spenders	High discretionary spenders
More likely to have annual revenue >$10 billion	
More likely to have a small increase in modernization budget (3%-5%)	More likely to have a high revenue increase (≥11%)
Higher proportion of projects that are >$10 million	
Fewer core legacy applications, 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

Larger financial institutions more likely to use strategic budget

Low discretionary spenders are much more likely to be large financial institutions (revenues greater than $10 billion), using strategic budgets for their modernization initiatives (see Figure 8). 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 effectively.

Of course, some big firms are more pro-active than others, and have the full weight of the C-suite to utilize strategic budget, especially when business strategy entails close involvement with the chief technology officer (CTO). This was the case with Citizens Bank, and also with Old National Bank (ONB), another Infosys strategic partner. This U.S.-based community bank had a mission to invest heavily in digital solutions and bring existing infrastructure close to the cutting-edge. Automation was used heavily in the modernization approach, according to Jim Ryan, the CEO. Crucial to the success of ONB's transformation into "The World's Ethical Company"[7] were the twin pillars of expert niche engineering talent, and utilization of the Infosys Modernization Suite, which includes cloud migration, cloud-native development, and mainframe modernization through a co-existent approach.

Though these sorts of big modernization initiatives are seen in large firms like ONB, they have not yet trickled down as much to smaller upstarts (Table 1). These smaller firms, though high discretionary spenders that are growing fast, have fewer proactive engagements in place and typically go for big-bang modernization approaches that require less partner involvement. They are more likely to be agile, innovative companies

Figure 8. Larger financial institutions have lower discretionary spending for modernization

change from application modernization to app modernization

High discretionary spending	79%
Average discretionary spending	68%
Low discretionary spending	44%

By revenue segment

High discretionary spending	38% / 31%
Average discretionary spending	40% / 24%
Low discretionary spending	22% / 45%

■ Lower revenue   ■ Higher revenue

Percentage of revenue segment respondents by spend tier

Source: Infosys Knowledge Institute

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 financial institutions and retail showing less attention

Discretionary spend shows the importance business lines place on modernization. And the numbers are high across industries (up to 70%), though lower for financial institutions. That said, even retail, logistics and CPG, which use the smallest amount of its discretionary budget on modernization, spend 64% on modernization programs (see Figure 9). Energy, telecommunications, and utility firms are further ahead, with the ratio at 68%-70%. Modernization is a key business initiative and should be sponsored from the C-suite, as our examples underscore.

Figure 9. Most discretionary budget is used for modernization

Industry	Percentage
Energy	70.4%
Telecommunications and utilities	68.3%
High-tech and manufacturing	67.4%
Automotive	67.2%
Healthcare and life sciences	65.5%
Financial services and insurance	64.3%
Retail, logistics, and CPG	63.6%

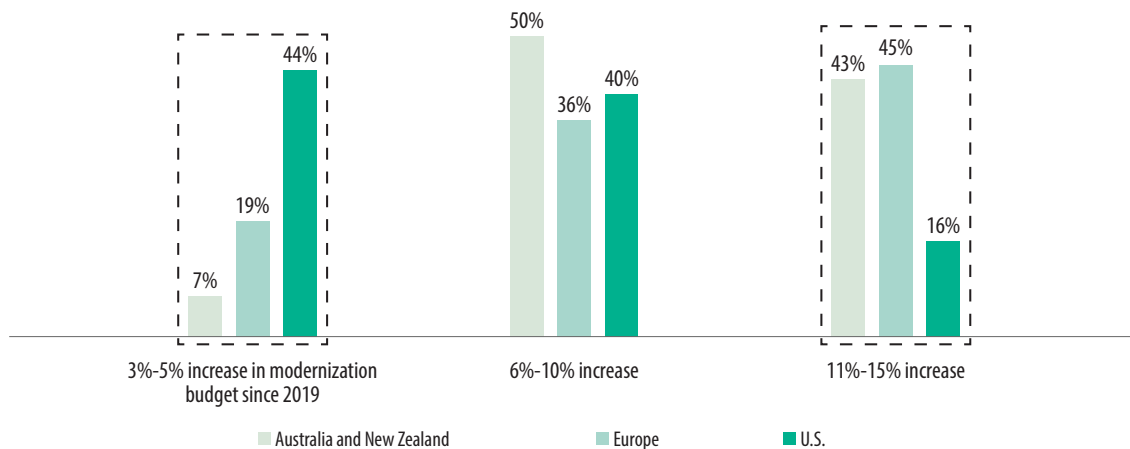Average percentage of discretionary budget spent on app modernization
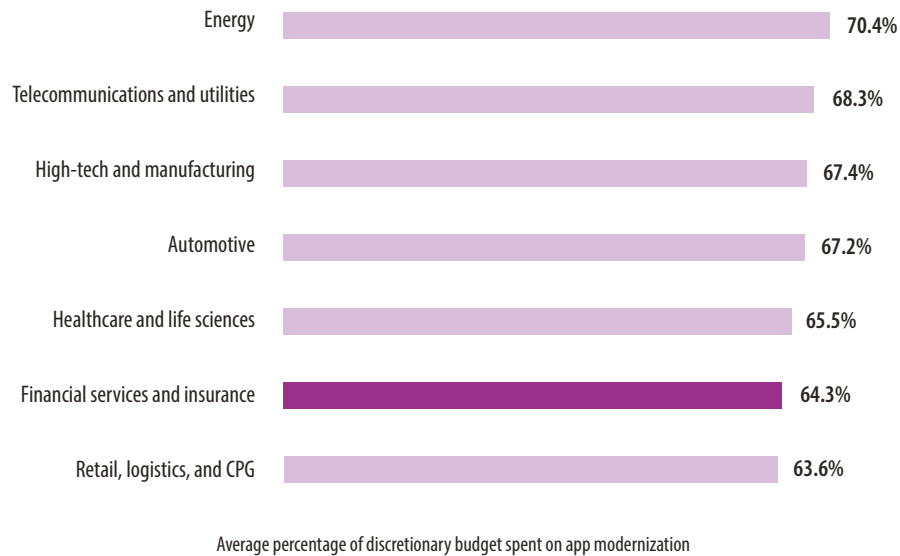
Source: Infosys Knowledge Institute

Modernization is urgent. 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 and partner with a respected technology services provider.

Another interesting finding is that firms in the U.S. are not increasing their budgets as much as those in

Europe, Australia, and New Zealand (see Figure 10). Also, financial institutions are not plowing as much into new wholesale modernization initiatives, while automotive and telco/utilities enterprises are investing the most (see Figure 11).

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

	Australia and New Zealand	Europe	U.S.
3%-5% increase in modernization budget since 2019	7%	19%	44%
6%-10% increase	50%	36%	40%
11%-15% increase	43%	45%	16%

Source: Infosys Knowledge Institute

Figure 11. Financial institutions are behind in increasing modernization budgets

		3%-5% increase	6%-10% increase	11%-15% increase
Automotive		17%	35%	41%
Energy		24%	43%	32%
Financial services and insurance		41%	42%	15%
Healthcare and life sciences		28%	37%	32%
High-tech and manufacturing		30%	43%	25%
Retail, logistics, and CPG		31%	40%	26%
Telecommunications and utilities		15%	40%	42%
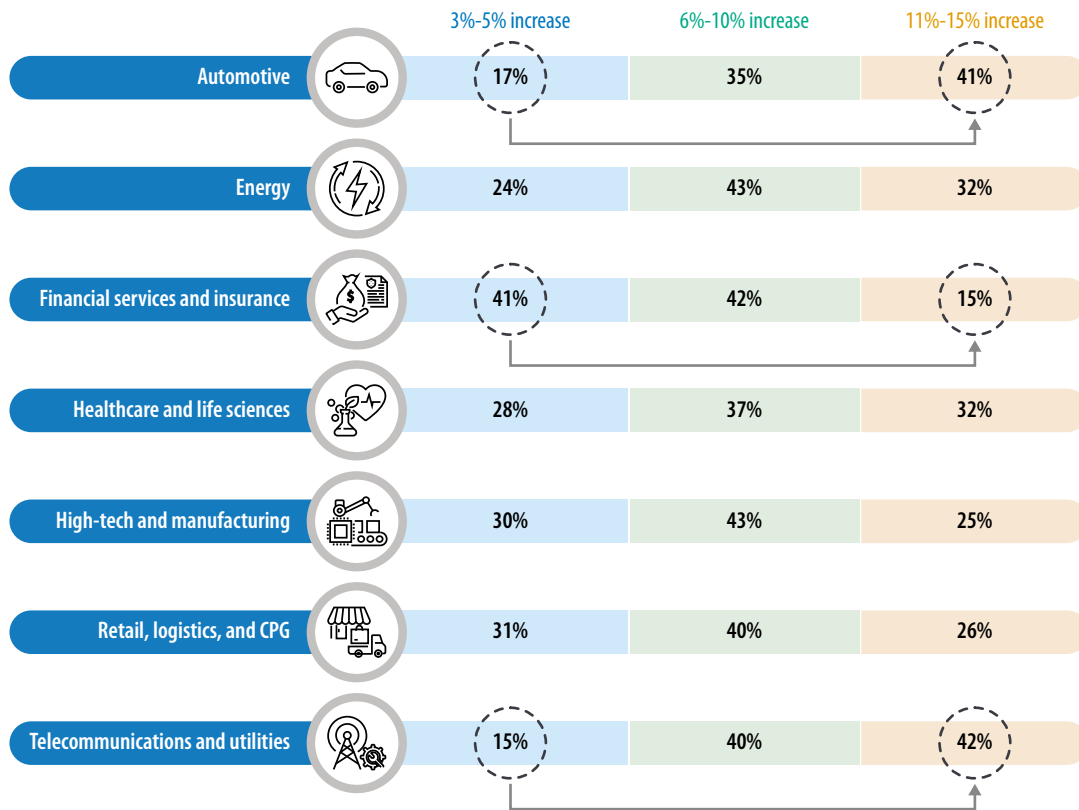
Source: Infosys Knowledge Institute

According to some research, a startling number of application landscapes across the insurance industry continues to rely on age-old technologies. This inattention has left most large insurers with parallel or redundant systems that drive up both the cost of maintenance and new feature development.[8] In addition, the research states that quite a few insurers are selecting front-end tools with immediate visible impact, and not investing in updating mainframe systems that are behind the times. This needs to change. But the road can be treacherous. Not only will FS&I firms need to substantially overhaul core systems, they will need to transform their overall business model (such as increased gross written premiums, or reduced IT cost), utilizing either standard software packages, building new proprietary platforms, or modernizing legacy IT applications.

<Infosys | Knowledge Institute>

Phased and coexistent methodologies are less disruptive than big-bang

So, how should true financial services modernization really be conducted, and what's at stake?

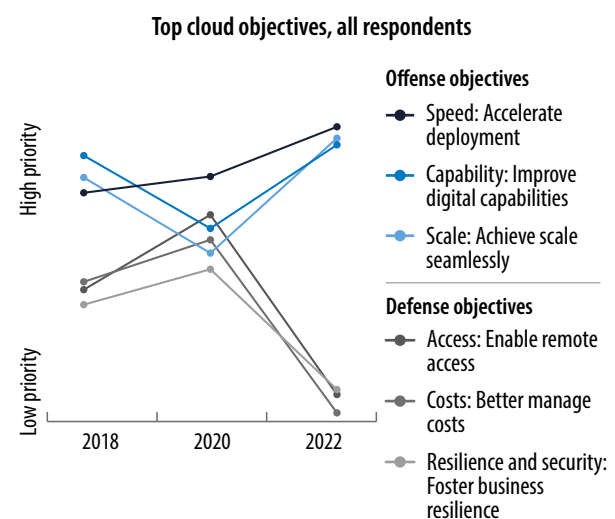> Just one hour of downtime can cost a business $300,000, according to Gartner

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.[9]

The new IT applications should be cloud-enabled as much as possible, be built on an agile operating model, with an architecture that brings together the best of speed, capability, and scale. In fact, our Cloud Radar 2021 research found that these more offensive cloud objectives are table-stakes as we move into the middle of this decade (see Figure 12).

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

Strangler refers to a phased approach toward modernizing the 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 for financial institutions, as new places in the cloud

Figure 12. Firms are using the cloud to go on the offensive in 2022

Top cloud objectives, all respondents

Offense objectives
- Speed: Accelerate deployment
- Capability: Improve digital capabilities
- Scale: Achieve scale seamlessly

Defense objectives
- Access: Enable remote access
- Costs: Better manage costs
- Resilience and security: Foster business resilience

Source: Infosys Cloud Radar 2021

must be set up to transfer data between old and new systems. Big-bang entails an all-in rewrite of legacy systems, with more risks 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.

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.
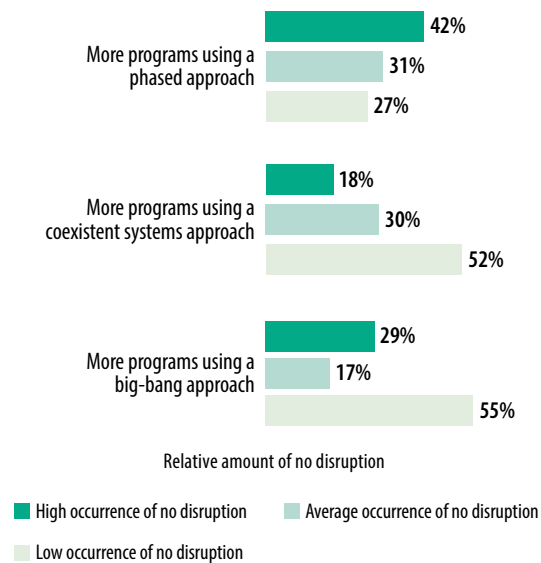
Phased approach causes higher levels of no disruption

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 approach is best in this regard. Of respondents using this method more often than other methods, 42% said they experienced "no disruption" more frequently (see Figure 13). This falls to 18% for the coexistent method.

Big-bang approach causes more crippling disruption

However, the story is more nuanced when we look at crippling disruption. For this analysis, we split levels of disruption from modernization projects into four

Figure 13. Phased approach is the least disruptive

Relative amount of no disruption

■ High occurrence of no disruption　■ Average occurrence of no disruption
■ Low occurrence of no disruption

Source: Infosys Knowledge Institute

tiers — no, mild, significant, and crippling disruption. Our analysis found that 45% of respondents who had a higher-than-average number of big-bang projects (39% or more) experienced more frequent crippling disruption (see Figure 14). 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 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.

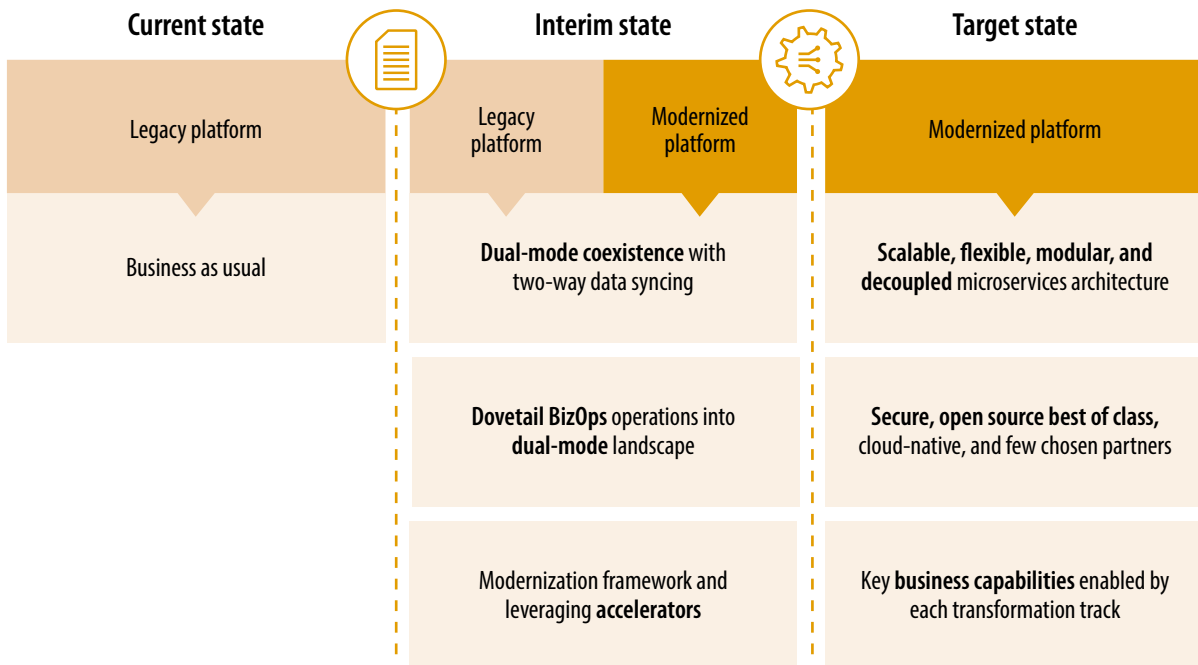## Figure 14. Coexistent and phased approaches cause less crippling disruption
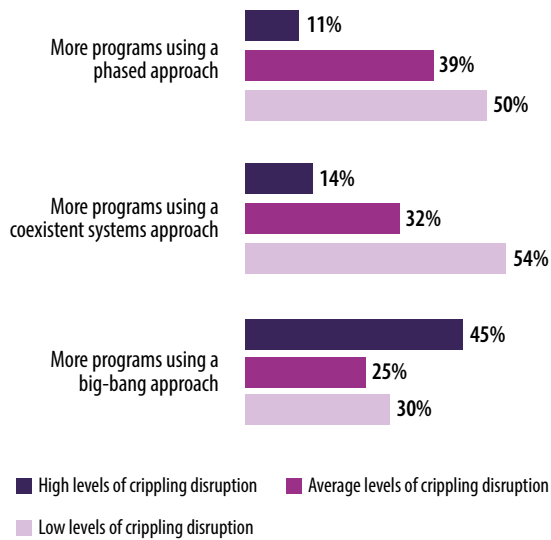
The coexistent approach, often deployed in Infosys' zero-disruption method, is frequently used with more invasive strategies.[10] Here, planning is critical. Instead of a big-bang cutover, the modernized system runs in parallel with the legacy system until IT infrastructure and applications gradually transition. This transition runs over three phases (see Figure 15).

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.

More programs using a phased approach
- 11%
- 39%
- 50%

More programs using a coexistent systems approach
- 14%
- 32%
- 54%

More programs using a big-bang approach
- 45%
- 25%
- 30%

■ High levels of crippling disruption ■ Average levels of crippling disruption
■ Low levels of crippling disruption

Source: Infosys Knowledge Institute

Figure 15. The zero-disruption approach to app modernization

Current state	Interim state	Target state
Legacy platform	Legacy platform / Modernized platform	Modernized platform
Business as usual	**Dual-mode coexistence** with two-way data syncing	**Scalable, flexible, modular, and decoupled** microservices architecture
	Dovetail BizOps operations into **dual-mode** landscape	**Secure, open source best of class,** cloud-native, and few chosen partners
	Modernization framework and leveraging **accelerators**	Key **business capabilities** enabled by each transformation track

Source: Infosys Knowledge Institute

Separating the winners from the also-rans

The reasons for, and goals of, modernization vary. Senior executives across industries 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 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. User experience is also a problem for healthcare firms, for instance, with data locked in legacy vaults that firms find difficult to set free.

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.[11]

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 financial services modernization success

Firms can take four steps for more effective app modernization. These steps cut across all 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.

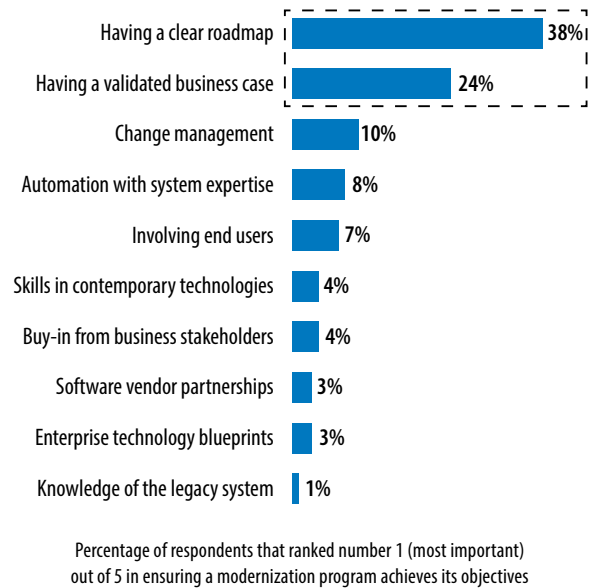4. Start small but start now, and use a modernization expert.

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

Financial services 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 the second place was a validated business case against the commercials of the solution (see Figure 16).

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, employee experience and business processes (like new hire onboarding) were reimagined at Infosys, and a "digital runway" was established through small implementations rolled out every six weeks.[12] 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 at their highest.

Figure 16. Focus on business outcomes is key to modernization success

Category	%
Having a clear roadmap	38%
Having a validated business case	24%
Change management	10%
Automation with system expertise	8%
Involving end users	7%
Skills in contemporary technologies	4%
Buy-in from business stakeholders	4%
Software vendor partnerships	3%
Enterprise technology blueprints	3%
Knowledge of the legacy system	1%

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

"Infosys truly partnered with Goldman Sachs by providing best practices and guidance in our service management transformation journey. They collaboratively worked with us to understand our pain points and challenges. Based on their experience, Infosys ensured that the solution was aligned with our requirements and expectations, thus resulting in improved agent productivity and enhanced user experience."

Robert Naccarella
Managing Director, Goldman Sachs

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 around 63%.[13] This is true across industries, including FS&I. 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 17).

The Citizens Bank modernization strategy referred to earlier revolved around the development of an Agile operating model at the bank, marking its importance. This focus was supported with a further four pillars that included high-caliber engineering talent, APIs and microservices architecture, taking a cloud-first approach to application rationalization, and the development of what the CIO Ruttledge called "core resilience".[14] In this sense, modernization became business transformation at the fundamental level, with business-IT alignment to accelerate new product development.

To get a head start and follow in Infosys and Citizens Bank's footsteps, organizations should upskill employees across domains such as AI, microservices, and containers. Security practitioners can become members of DevOps pods, forming DevSecOps for more automatable software provisioning and deployment.

This way, financial institutions will achieve sustainable agility; increase experimentation and innovation; and transform from "doing modernization" to "becoming a live enterprise (agile, modernized organism that is relevant to clients, resilient to market shocks, and responsive to market forces)".

Figure 17. Successful teams adhere to Agile tool set and mindset
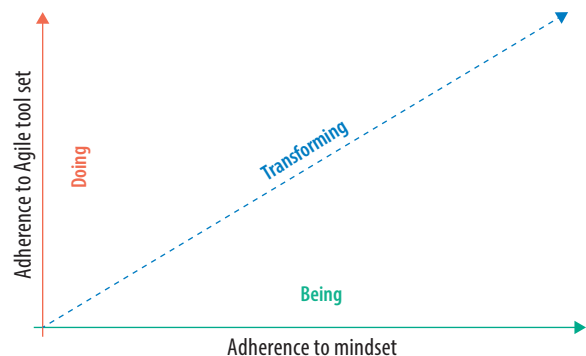
- Adhere closely to the recognized tools and practices associated with Agile.
- Follow methodologies rigorously, enabling consistent methods to be scaled across an organization.

- 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

"The need for agility is universal now. The demand for virtual agents and direct-to-consumer models is increasing. While cloud adoption strategies will be nuanced, it is imperative to manage the continued growth expectation and reduce technology debt."

Kannan Amaresh
Senior Vice President, Industry Head, Financial Services, Infosys

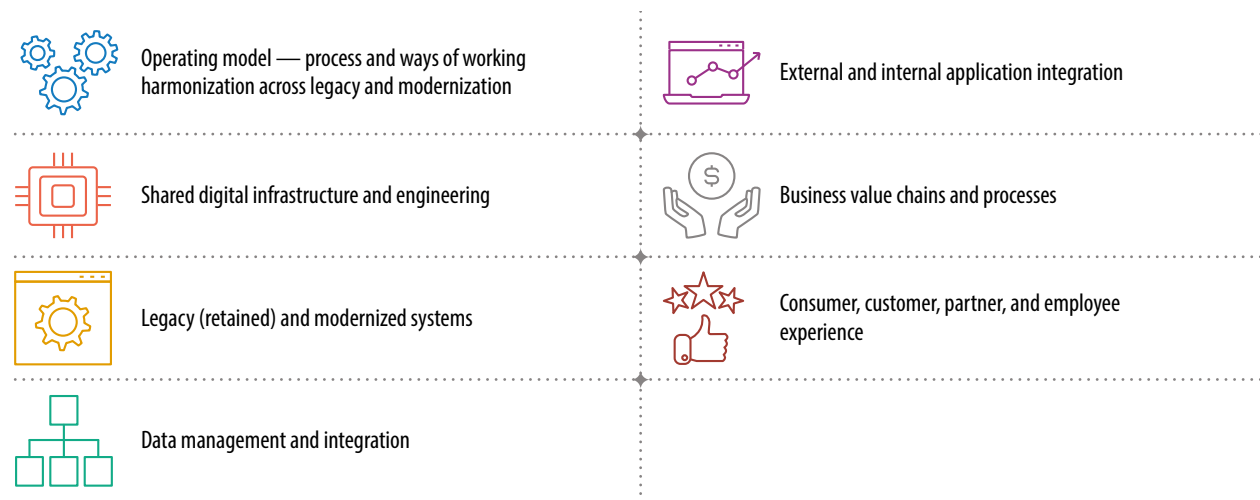# 3. Use a zero-disruption modernization method

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 18) to ensure minimal disruption and business resiliency during modernization.[15]

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 consider the experience of all relevant stakeholders at the early stage of modernization. Employees should be upskilled as part of stakeholder considerations. Layer 2 focuses 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 working across legacy and modernized systems and teams.

Figure 18. The seven layers of zero-disruption modernization

Operating model — process and ways of working harmonization across legacy and modernization

External and internal application integration

Shared digital infrastructure and engineering

Business value chains and processes

Legacy (retained) and modernized systems

Consumer, customer, partner, and employee experience

Data management and integration

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 financial services' customer-centric, turbulent climate. But it comes at a cost. Organizations are spending a significant amount on app modernization. Our research shows that roughly 65% of the discretionary budget is spent 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.
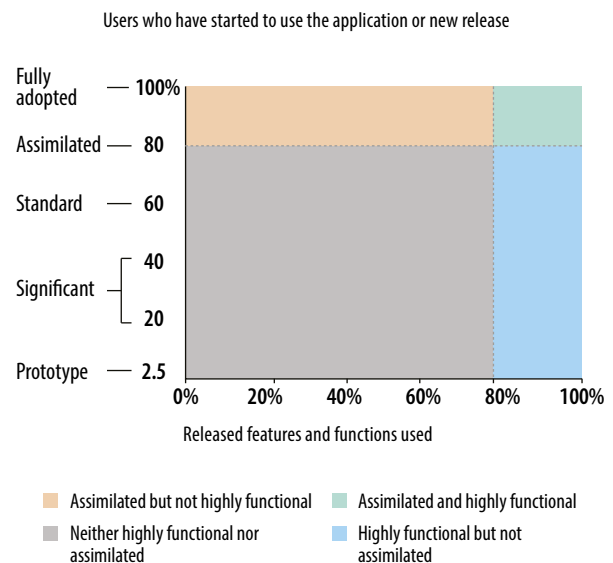
Microchange management, as discussed in as discussed in a recent Harvard Business Review article recent Harvard Business Review article, provides some guidance. Instead of doing all changes at once, big modernization projects can be broken down into small components — such incremental work results in 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 also has 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 19).

Organizations can 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%.[16] 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. This framework of repeatable services can reduce development efforts by 40%, time to market by 20%-40%, and modernization costs by 15%-30%.[17]

This is what Vanguard did. They went all in on cloud, APIs, and microservices, but they did it phased with business benefit aligned to objectives and key results. Instead of just running applications "in the cloud", they were able to fully capitalize on real-time enhancements to modernized technology, including hyperpersonalization, a 21st century customer experience must-have. As Czonstka, the head of client experience, says, starting small, but then moving to a fully integrated cloud platform, enables plan sponsors with the flexibility to "create custom plan management tools, integrate third-party services, and share plan data with consultants in a seamless, secure way."[18]

Figure 19. Measuring change at scale

Users who have started to use the application or new release

Released features and functions used

Legend:
- Assimilated but not highly functional
- Assimilated and highly functional
- Neither highly functional nor assimilated
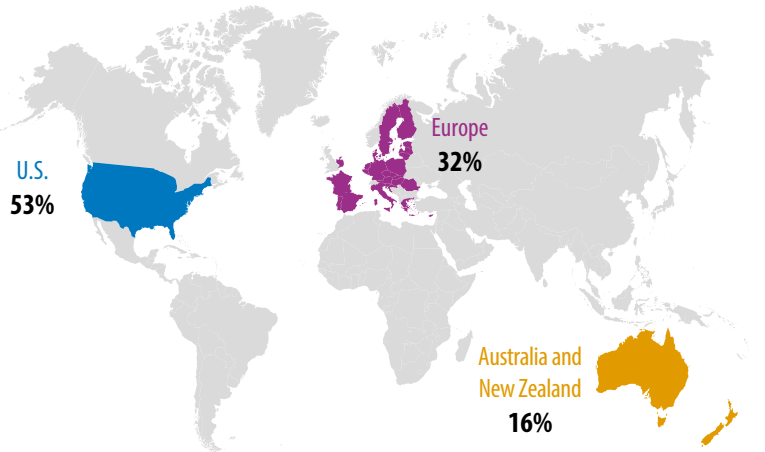- Highly functional but not assimilated

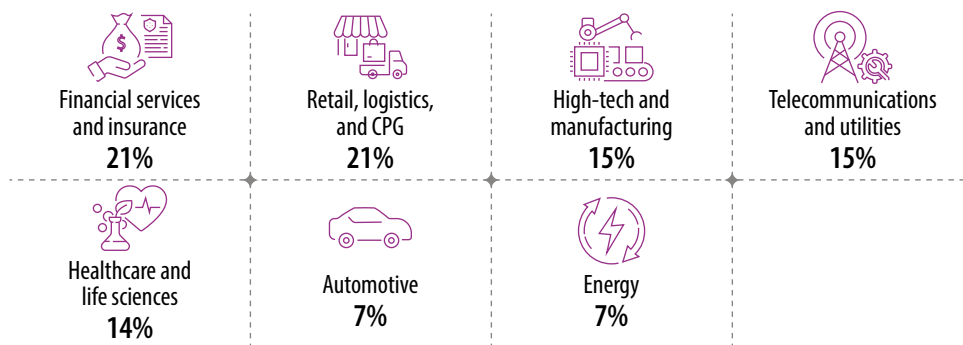Source: Infosys

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.
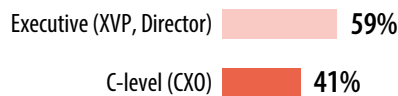
Respondents by region (for all industries)

U.S.
53%

Europe
32%

Australia and
New Zealand
16%

Source: Infosys Knowledge Institute

Respondents by industry (for all industries)

Financial services
and insurance
21%

Retail, logistics,
and CPG
21%

High-tech and
manufacturing
15%

Telecommunications
and utilities
15%

Healthcare and
life sciences
14%

Automotive
7%

Energy
7%

Source: Infosys Knowledge Institute

Respondents by seniority (for all industries)

Executive (XVP, Director)   **59%**

C-level (CXO)   **41%**

Source: Infosys Knowledge Institute

Respondents by modernization role (for all industries)

Strategy:
set the vision and direction for app modernization initiatives — 20%

Implementation:
implement app modernization initiatives — 25%

Evaluation:
plan, design, or evaluate app modernization initiatives — 54%

Source: Infosys Knowledge Institute
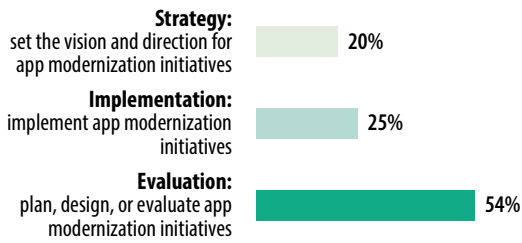
Respondents by discretionary spending level (for all industries)

Low discretionary spending — 19%

Normal discretionary spending — 52%

High discretionary spending — 29%

Respondents by modernization budget change (for all industries)

47%

31%

19%

⬆ increase
⬇ decrease

>20%	16%-20%	11%-15%	6%-10%	3%-5%	0%-2%	No change	3%-5%	6%-10%	11%-15%	16%-20%	>20%
0%	0%	31%	47%	19%	0%	0%	1%	0%	0%	0%	1%
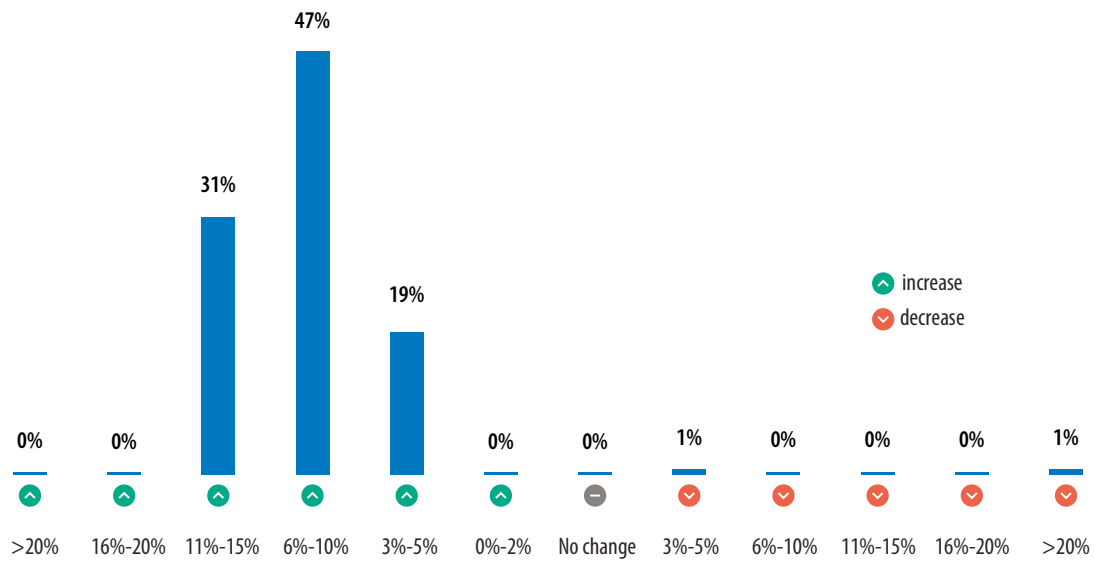
Source: Infosys Knowledge Institute

References

1. Cloud Radar 2021, Infosys

2. Banks turning to the cloud for growth and improved customer experience, Patrick Moorhead, Dec. 17, 2020, Forbes

3. Why enterprises are adapting their COBOL apps vs. ditching them, Johanna Ambrosio, Tech Beacon

4. Vanguard – reimagining the retirement experience, again, Patrick Moorhead, Oct. 4, 2021, Forbes

5. How digital transformation is helping you pay your mortgage, Patrick Moorhead, Apr. 6, 2021, Forbes

6. See Ref 2

7. Ibid

8. IT modernization in insurance: Three paths to transformation, Krish Krishnakanthan, Jens Lansing, Bjorn Munstermann, Peter Braad Olesen, and Ulrike Vogelgesang, Nov. 4, 2019, McKinsey & Company

9. The cost of downtime, Andrew Lerner, July 16, 2014, Gartner

10. How zero-disruption modernization works, Arvind Balasubramanian, Rafee Tarafdar, Naresh Duddu, and Isaac LaBauve, July 2021, Infosys Knowledge Institute

11. Break down change management into small steps, Jeff Kavanaugh and Rafee Tarafdar, May 3, 2021, Harvard Business Review

12. Ibid

13. Agile Radar 2021, Infosys

14. See Ref 2

15. See Ref 10

16. Kmart Australia migrates its transaction systems to AWS, Patrick Moorhead, Aug. 17, 2021, Forbes

17. Ibid

18. See Ref 4

Authors

Harry Keir Hughes | Infosys Knowledge Institute, London
Sharan Pradeep Bathija | Infosys Knowledge Institute, Bengaluru

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

About Infosys Knowledge Institute

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.

To view our research, visit Infosys Knowledge Institute at infosys.com/IKI or email us at iki@infosys.com.

Infosys®
Navigate your next

For more information, contact askus@infosys.com