CORE MODERNIZATION AS A CATALYST

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Introduction

Apple, the most profitable company in the world, continuously disrupts itself, modernizing its business and operating model every year to stay at the top of the Fortune 500 list. And it has to.

It is projected that in less than a decade, a company on the S&P 500 will live for only 12 years, according to a 2018 study by Innosight [1].

Digital, then, is a great leveler. The size, product portfolio and tradition of incumbent organizations are no longer enough to keep smaller, more agile and more innovative firms off their turf. To survive, traditional organizations must also transform into fast-moving digital enterprises.

Unfortunately, their legacy core systems stand in the way.

The core platform of incumbent organizations usually includes multiple legacy applications that have been acquired over time through acquisition. This core diminishes a firm's ability to deploy new products or processes at scale. To address this issue, incumbents can consolidate all existing functionality on a "dominant" platform; this is the system within the organization that meets most business needs. If this platform has significant technical debt, then the enterprise should consolidate all existing processes and functionality onto a "best solution" – a platform that currently caters to a sufficient minority of business needs, is stable and offers a good backdrop to build out new digital technologies. Finally, if consolidation is not viable, either due to cost or difficulty in migrating the architecture and applications, then a greenfield solution – complete replacement – of core IT systems is an attractive option.

Obsolete technology is another problem faced by incumbents. These mainframe or AS-/400- based applications, though sufficient to support mission critical use cases, are difficult to maintain and become more of a liability than an asset over time.

Core cost structures within incumbent organizations are usually high due to the way older technologies or ways of working are set up. Agile and DevOps address this issue and have become required program components for firms to modernize their systems. Other cost-saving alternatives include new cloud applications using platform-as-a-service or software-as-a-service; open source alternatives to expensive proprietary software; and "firelaning" application programming interfaces in the legacy systems to create microservices.

Modernizing the core is a difficult process and shouldn't be addressed lightly, whether a firms' objective is to bring new applications to market faster, better and cheaper, or 360-customer views within an e-commerce franchise. Emotional and political baggage are tied to this existing footprint, with a history of investment decisions, long hours and careers at stake. Business must closely align with IT when undergoing a modernization effort, with goals clearly defined, risks outlined, and both short- and long-term costs considered.

Once armed with a modern, scalable and flexible core, the enterprise can build the digital capabilities needed around that footprint. These capabilities include connected devices, data analytics and even cognitive computing, and lead to improved efficiency and an optimized customer experience.

Which business priorities will increase core modernization traction? How can CXOs understand the full scope of modernization efforts? Identifying the right acceleration approach is difficult, given the complexity of existing systems and the many choices available. Even leaders with good ideas can struggle to create feasible plans and then deliver upon them successfully.

To better understand modernization challenges and opportunities, Infosys commissioned an independent market research firm to survey 160 senior leaders in Australia, Canada, Europe, New Zealand and the United States, spanning several industries. The survey assessed respondent views on core modernization role in digital transformation and their investments across key technologies. It also explored their likelihood to work with external providers and off-the-shelf products versus building greenfield solutions in-house. Finally, because partnering brings opportunities but also complexity, they were asked what critical capabilities they seek in their alliances.

The key findings are presented in this report, along with recommendations for how enterprises with heterogeneous underlying core architectures and applications can modernize their business to compete with digital natives who do not carry the same legacy burden.

Executive summary

Organizations recognize the importance of core modernization in digital transformation (64% said it is "important" or "very important").

Profitability through increased operational efficiency is the highest value realized by modernizing existing core systems.

Cloud, followed by data analytics, attracts the greatest investments in core modernization.

75% of organizations seek the services of external providers, to varying degrees, either through commercial off-the-shelf products or customized engagements.

When partnering, firms prioritize expertise in emerging and digital technology, innovation and thought leadership, and knowledge of Agile and DevOps methodologies.

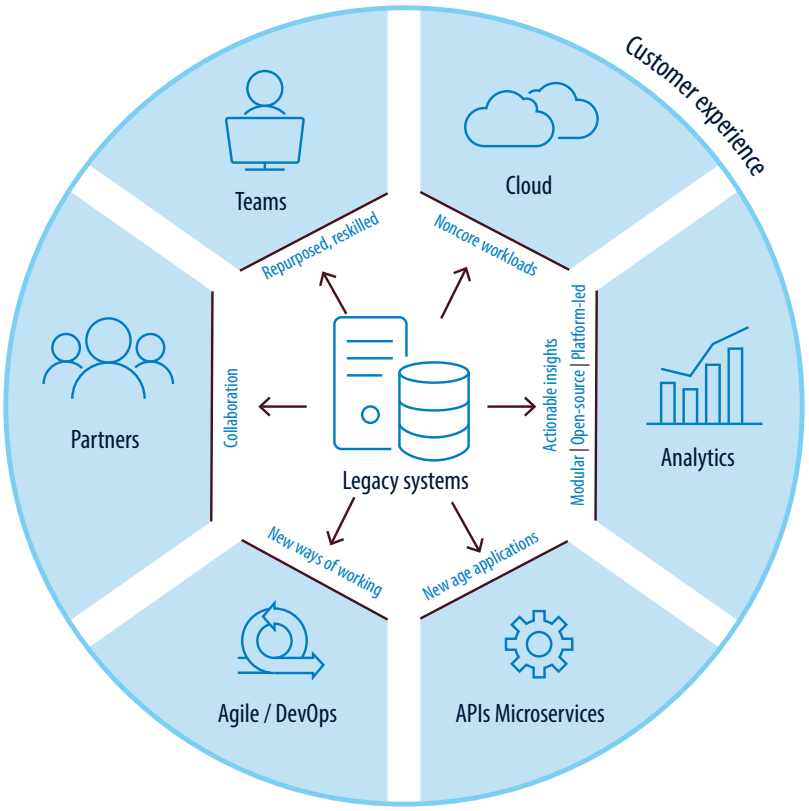
Multiple components of core modernization

Aging software and hardware; legacy mainframe applications that can't exploit open source capabilities; cumbersome customer purchasing experiences. These problems often result from a sluggish, legacy core. However, even when the cause is clear, how can a company refresh, update, or completely rebuild their foundational platforms? Where to start when you are an enterprise with many processes and applications running in parallel, and with units operating under different business models?

Firms tend to update systems in a patchwork manner, fixing immediate pain points and issuing subsequent renewals when problems occur. But in a market where digital natives force incumbents to reinvent their IT landscapes and bring better products to market cheaper and faster, IT must be modernized with the bigger picture in mind.

To do this, they must take stock of what system modernization actually entails. It's not just the technology, but the people, processes and underlying business model that need to be considered. Can Agile or DevOps be deployed aggressively in their portfolio? How important are microservices and new age applications to the revitalized enterprise? Which data types are appropriate for cloud storage? Is a two-speed model, in which only critical functionality changes, better than a greenfield approach? When consolidating functionality, how important is increased visibility, transparency and collaboration?

Figure 1. Legacy modernization requires multiple components to realize its potential



Source: Infosys Knowledge Institute, 2019

While questions abound, most incumbent organizations admit that change is inevitable if they are to succeed in this digital era. In the survey, nearly two-thirds of the respondents (64%) agreed that refreshing the core was important or very important. This figure was even higher among IT users compared to business leaders, indicating just how prescient the topic is in IT circles.

A platform-led system of engagement

Legacy core systems are dominated by back-end databases that store data and process rules, with separate systems for customer engagement. A modernized core shifts from these systems of record to a platform-led system of innovation and engagement. This platform enables enterprises to interact effectively with an external ecosystem.

Partner ecosystems provide support to collaborate at market pace on a standardized digital platform. These ecosystems focus on what user's value and why they want to connect with others, accelerating transformation (and modernization) with a flywheel effect.

Interestingly, the survey findings suggest many enterprises value partner collaboration: One in four (26%) said that collaborating with partners across their value chain was a primary modernization objective in the short term, and another 40% hope to achieve this in the medium term.

To share data internally as well as with ecosystem partners, enterprises can "firelane" application programming interfaces in their legacy systems. This method leaves the core of the core untouched, while creating microservices to deliver software functionality. These firelanes act as secure integration channels for legacy systems to communicate with new user-facing applications and channels. Firelaning makes transaction data available through APIs to systems outside the core. Through this tactical, targeted approach to core modernization, companies reduce risk by keeping their legacy core while improving experience with new edge applications.

Case study

Carving out firelanes

Firelaning establishes integration channels in core legacy systems to communicate seamlessly with new applications and channels for customer engagement.

Through firelaning, Infosys helped a leading provider of personal care products interact with its partner ecosystem via a API management strategy and robust microservices architecture. This platform-led system now supports a new website and social selling platform featuring more than 230 applications that serve markets in more than a hundred countries.

Functional consolidation

Legacy applications proliferate in enterprises over time through acquisitions, and ERP platforms are no exception. These ERP systems are expensive and time-consuming to rationalize, with insufficient ROI if viewed only through a technical lens. These systems inhibit incumbents' ability to deploy new products and processes at scale. To address this, enterprises should follow one of these strategies:

Consolidate on the dominant platform

If the majority of enterprise IT resides on a platform that meets the business need, consolidate all existing functionality on that "dominant" platform. This may be the lowest cost approach and best suited for situations where the business units consolidated have the same operating model.

Consolidate on the best solution

The "best solution" is the platform that supports a minority of the business, but does so effectively. If the dominant platform has significant technical debt or doesn't adequately meet the business needs, it may be more effective in the long term to consolidate on the best solution, even if more expensive in the short term. This approach is also well-suited for situations where the business units consolidated have the same operating model.

Process harmonization

In the scenario where an organization has multiple operating models - and there is a dominant platform that they would like to consolidate - it may be necessary to "harmonize" the best practices across the multiple models. However, this is a costly and time-consuming approach to functional consolidation.

Whatever mode an organization takes for consolidation, the objective is greater visibility and transparency, and the ability to look both horizontally and vertically across the business. Once core systems have been consolidated, a 360-customer view emerges, and questions such as "what is our total spend on a particular purchased item?" or "what are our total sales of a product in each market?" can be quickly answered. End user impacts are minimized because the refactored system retains the functional behavior of the legacy system while running on a stable, modern technology platform.

Which route an enterprise chooses usually comes down to cost and risk, as incumbent firms have significant investment in infrastructure. A cost-risk assessment uncovers viable approaches and potential value.

If none of these solutions meets the business need, modernization will require completely overhauling the systems and replacing the legacy footprint. This greenfield implementation is the route to take when a completely new set of functionalities are needed. To implement this solution, enterprises can either start from scratch, implement a bundled, pre-integrated suite or choose best-of-breed technology. But this approach requires caution. Rather than simply adapt to new technologies, enterprises following the greenfield solution should redesign their delivery processes and software development, and ensure that the human element of the redesign is kept in mind. This point will be covered later in this paper in the section on capabilities firms seek in a partner.

Modernizing the mainframe

Functional consolidation works when the core systems to be consolidated work well and are efficiently maintained. But what happens when an enterprise works with mainframe- or AS/400-based applications, complex legacy technologies used for decades and require a workforce with knowledge of legacy programming languages and applications? The modernization risk to the firm is high in this scenario. Horror stories such as the failed upgrade at The Savings Bank in the UK in 2018 have dampened the spirit of many firms to upgrade their mainframe systems. But if companies don't modernize infrastructure and applications that run on a mainframe, soon what was once seen as an asset – secure, fast and reliable processing platforms - will quickly become a liability as the workforce retires and loses operational capability.

However, there are a number of potential replacement strategies:

Greenfield

This involves replacing mainframe functionality with an off-the-shelf or custom re-write solution, potentially the most cost intensive strategy. Here, legacy applications are moved to an environment where they can benefit from the scalability returns of cloud deployments and open source solutions.

Automated code conversion

Code conversion tools are available to convert legacy programming languages into modern languages like Java and .Net. This is an imperfect solution, since code conversion on its own does little to clean up code quality.

MIPS reduction

New use cases are driving MIPS (millions of instructions per second) and costs higher, presenting new challenges for IT leaders. Mainframe emulation software allows organizations to continue to run their mainframe code on more modern architectures and reduce the cost of mainframe hardware. However, emulation doesn't address the lack of programming talent risk.

Mainframe modernization seeks to enable applications to take advantage of innovations fostered by open source software and respond more quickly to the needs of the business. Mainframe modernization also enables new digital technologies to be added at the periphery, reducing the cost structures associated with these old technologies and ways of working. With the advent of smartphone and other connected devices, applications force these mainframe legacy systems to work harder due to a surge in demand for processing power. This processing requirement, along with mainframe performance risk and usage fees, are reasons to consider replacement.

Profiting from efficiency

While firelaning, systems consolidation, greenfield, and reimagining the mainframe are all valid, the right approach depends on risk aversion, cost, and existing infrastructure.

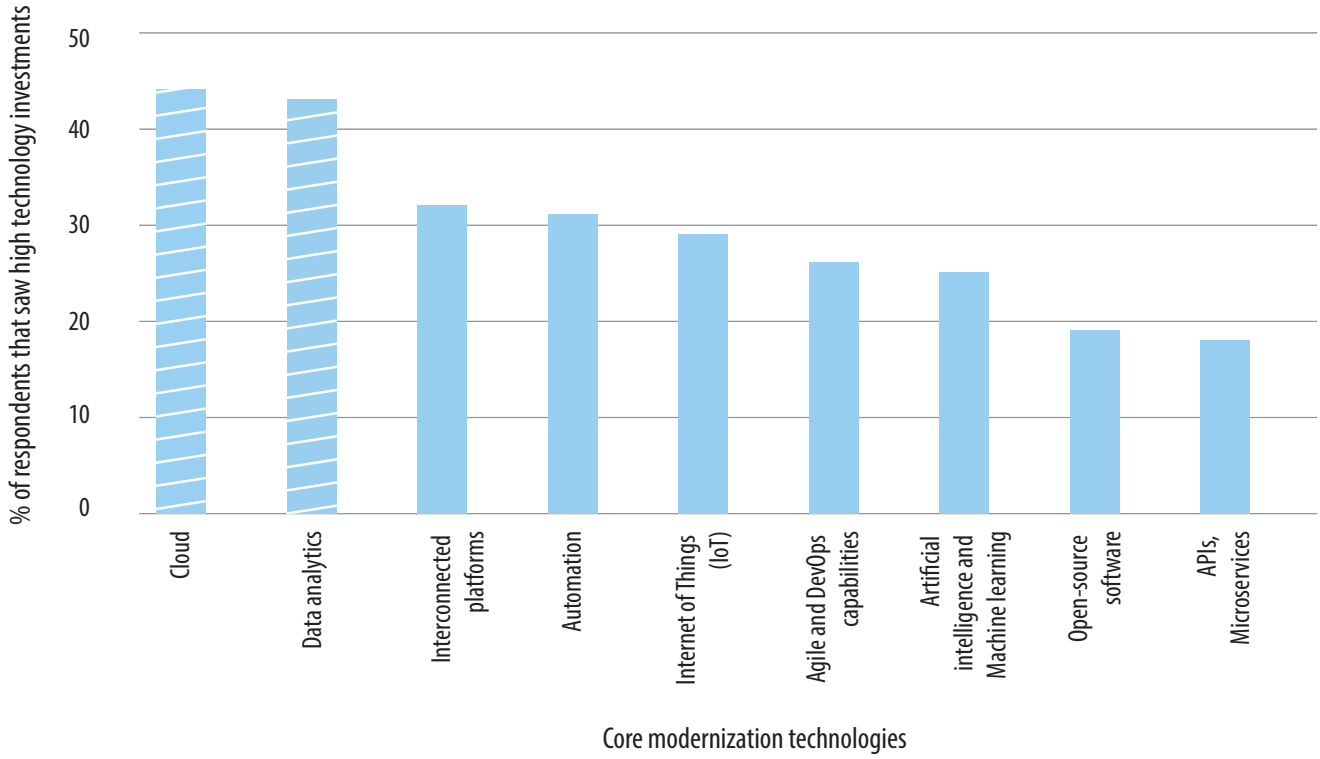
According to the survey, the primary goal of modernization is to improve profitability through operational efficiency over time.

42% of respondents named operational efficiency as the highest value expected from core modernization, and enhancing customer experience was the next largest driver of value, receiving 13% of the vote.

"Increased efficiency in operations leads to higher productivity," said one director from a large telecom firm in Canada. A senior executive at a large U.S. consumer goods manufacturer said that modernizing the core leads to "more efficient, cheaper ways of working while simultaneously reaching more customers for less."

Cloud and data analytics take the lion's share of investments

Figure 2. Cloud and data analytics receive the highest investment among core modernization technologies



Source: Infosys Knowledge Institute, 2019

In addition to the core modernization solutions mentioned above, there are other digital strategies and technologies organizations can use to reduce the cost structures associated with older technologies. These technologies can be highly beneficial but are dependent upon an enterprise's progress level in their modernization effort.

Although many incumbents have undertaken core modernization, these renewals are expensive, and consume much of IT budgets. There is also a PR problem associated with renewing the core: high cost is perceived as low value. But technical ROI can be misleading. Along with the benefits already described, core renewal is necessary because the accepted value from trendy emerging technologies is highly dependent upon underlying data and processes the core enables.

Core modernization investment, when combined with digital technologies, transforms legacy solutions into agile, intuitive, and responsive systems, driving the business value levels that please both the operations and transformation leaders.

In the survey, cloud received the highest priority for investment, with 44% of respondents naming it as their top modernization initiative (Figure 2). The share was even higher from IT respondents, with 60% of the vote. Regardless of whether a firm initiates a holistic or piece-meal approach to modernization, the way to work with cloud is to identify simpler, noncritical workloads and prepare those for migration first. To do this, these workloads must be made cloud-capable. Senior executives need to make several decisions about the type of cloud to use, core assets to renew and processes to re-engineer. Modernization may be only the beginning; the goal should be to eventually drive enterprisewide cloud transformation across data, applications and infrastructure. Cloud technology potential is enormous, and importantly there are many proven cloud solutions that meet enterprise needs with minimal risk.

Data analytics was a close second on the core modernization investment list, with 43% indicating significant investment. This is no surprise; the rate at which data is produced by devices, sensors and people is accelerating — and that data is being harnessed in real time through analytics to expertly guide business decisions once governed by instinct and intuition. Analytics also allows incumbents to gain a deeper understanding of their customers and deliver more personalized communications and services as a result.

Platform development was the next highest investment category, followed by investments in automation. Investments in APIs and microservices are still tentative, with only 18% of the respondents ranking them as a high investment preference.

Case study

Monetizing data

When an aircraft manufacturer wanted to monetize its data and create a new line of business, Infosys conceptualized and implemented a cloud-based platform. This solution provided enhanced services to airlines in the form of event and maintenance data. It also has product manuals and authentication systems for data from more than 300 aircraft applications. High-quality analytics offered as a service enable airlines to plan maintenance operations in advance, maximizing flying time. The platform improved data accessibility by 35%, maximizing revenue for the aircraft manufacturer.

Despite acknowledging the importance to keep up with digital natives, organizations seldom allocate the budgets necessary to match the required effort. The majority of spending continues to be on existing systems and processes for basic operations, essentially to keep the lights on. This becomes an insidious circular argument where operations budgets starve transformation plans, which delays transformation and worsens operations, which consumes more budget and starves transformation, and so on… For organizations serious about transformation, core modernization provides an answer. It increases efficiency to produce savings that may be channeled into new digital technologies. Investment in the core may achieve their own ROI and also provide the financial oxygen for other initiatives.

It is important to refresh processes, skills and talent in parallel with the enterprise core. In our Infosys Digital Radar 2019 report, visionary organizations (those that perform many digital transformation initiatives at scale) target higher-order business objectives, such as new business models and culture, when thinking about core modernization. These disruptive incumbents tackle the absence of digital skills and change management capabilities head-on. They build ecosystem alliances and challenge their partners to improve processes and workforce capabilities.

Partnering with external service providers accelerates core modernization

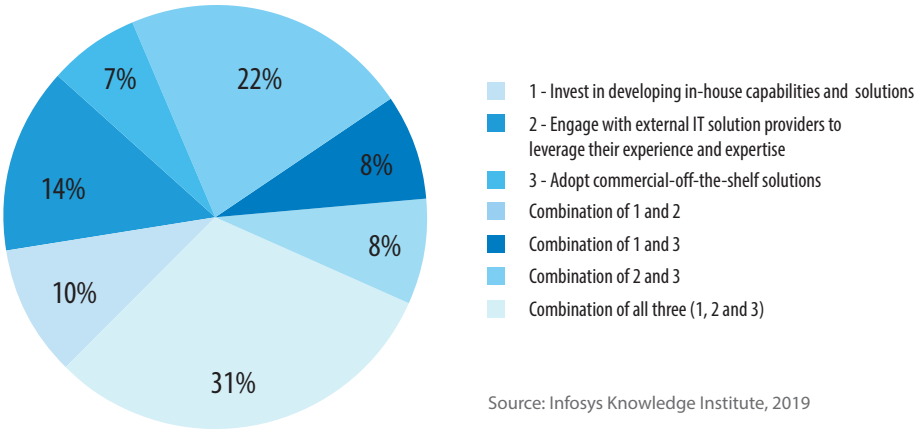
Reimagining the core should be considered through a transformational lens, whether taking a consolidation or greenfield approach. Even though enterprises can modernize without transformation, the resulting platform is more agile and enables the performance and experience improvements that transformation leaders seek.

Should organizations undertake core modernization on their own, or should they seek outside support?

To understand this, the survey asked respondents about their approach to technology modernization. Only one in 10 organizations preferred doing everything in-house. The majority (75%) sought varying degrees of assistance from external providers for core modernization.

The most preferred approach for core modernization, preferred by a third of respondents, was a combination of developing in-house capabilities, partnering with external service providers and adopting commercial off-the-shelf (COTS) products and solutions.

Figure 3. Partnering is the main approach taken by organizations undergoing digital transformation



Source: Infosys Knowledge Institute, 2019

This is especially true when modernization initiatives involve artificial intelligence (AI)-based solutions, where 56% of the respondents engage external IT solution providers. About 50% of respondents sought external partners for implementations in cloud, automation and robotic process automation, and in API and microservices.

When working with external service providers, organizations consider expertise in emerging digital technologies as the most critical capability, closely followed by innovation and thought leadership.

Survey respondents rated emerging or digital technologies as 5.3, on a scale of 1 to 7, where 1 signified "not at all critical" and 7 was "very critical".

As the vice president of an Australian retail firm said, "To ensure our firms are able to keep up with the change, we need to seek out partners who are leaders in the technology front and are able to guide us."

Innovation and thought leadership came next, with a rating of 5.3. Respondents felt external providers should possess these capabilities so they could drive their organization forward amid changing trends, as well as keep them a step ahead of the competition.

Agile and DevOps capabilities received the next-highest preference, reflecting the emphasis on agility and responsiveness. Rapid time to market and fast provisioning of new functionalities are now essential for any incumbent organization, undergoing core modernization or not, and especially for those with consumer-facing applications. "The higher the importance placed on DevOps, the faster you can bring products and software to market as well as pare down redundancy," said the director of a U.K.-based insurance firm.

PayPal, the US online payment provider, self-disrupted its operating model by transitioning from a waterfall delivery methodology to an agile one. The approach applied to both new digital platforms and to legacy system enhancements. But existing architecture on the legacy platforms wasn't nimble enough to take advantage of the new methodology. The back-end systems were re-architected and the existing data center infrastructure was deployed into a private cloud using OpenStack cloud management software. After the modernization effort, accelerated product cycles became the norm, along with scalable applications featuring up to 40% fewer lines of code. The firm is now known as a broad-reaching "payment OS for all transactions."

Case study

DevOps for transformation

A telecom client transformed itself from a provider of commoditized services to a technology-based company for both internal operations and the services it offered customers. Leaders determined that their conventional ways of working with different teams for application run, build and infrastructure would not work. They developed a new agile organization model with 100 teams, each with eight to nine members. These units were cross-functional and self-organizing, and using customer insights from the marketing team they built products and services with integrated DevOps and agile ways of working. Deployment cycle times were reduced from three months to three weeks, and new differentiated capabilities were launched.

Organizations prefer external providers that can support and even drive cultural change necessary for enterprisewide transformation (this earned a rating of 5.0). This suggests that in addition to modernizing the core and bringing in new technologies, providers must possess capabilities in soft skills to train and reskill the talent within client organizations. Work proximity is another facet of success drivers. In our Digital Radar report, partnering with a firm that is proximate to the client greatly improves collaboration and can remove physical barriers to success in product and IT development projects.

"Value creation occurs when companies bring teams together end to end in proximity," says Deverre Lierman, leader of the Infosys Raleigh Technology Hub. "Companies should structure their ecosystem and choose their partners with an eye to maximizing innovation, speed and responsiveness. The key is to capitalize on the benefits of high-quality, low-cost locations without sacrificing the advantages that proximity brings."

Conclusion

Legacy systems have often been acquired over decades, and inhibit the ability of incumbent firms to deploy new products or processes globally. Core modernization is the answer, but how do firms modernize the core when so much complexity and risk is involved? Consolidation on either the dominant platform or the "best solution" are efficient options. Firelaning, leaving the core of the core untouched, provides a quick and low complexity means to create microservices that communicate with the partner ecosystem, accelerating digital transformation in focused succession. As the workforce matures and retires, technologies that exist on mainframe architectures will soon be obsolete; greenfield implementations, automated code conversion to modern languages and emulation software are possible solutions to this quandary.

Legacy systems, at least the technology and related barriers they represent, hinder the digital transformation journey. If these landscapes are not renewed soon, incumbents will be unable to take advantage of other more forward-looking digital technologies, surrendering the opportunity to keep up with digital natives. Of course, "do nothing" is a strategic choice as well, when applied to non-differentiated areas of the business. But for high stakes customer-savvy applications, this is not a preferred approach.

There is no hard-and-fast calculation to determine which approach to take in core modernization, but a useful principle is to persistently focus on value and business objectives, factoring risk and overall cost into the process.

Modernizing the core is a difficult process and shouldn't be addressed lightly. Business strategy and goals must be aligned to the modernization efforts, and key stakeholders should be brought into the process early to ensure success.

Senior leaders from large companies were in sync when asked about the main objective for core modernization: improve profitability through operational efficiency in the medium to long term. To carry out the modernization process, cloud investment was most popular, with 60% of the IT respondents seeing this as a critical enabler of transformation, followed closely by investment in data analytics to deliver more personalized customer communications.

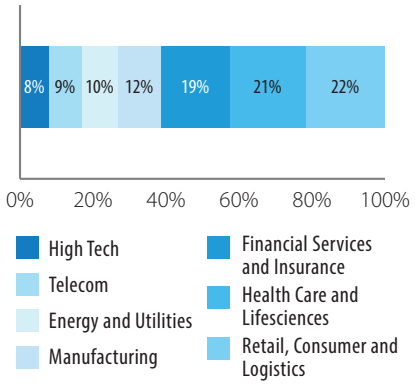
While core modernization is still evolving, those surveyed recognize its criticality for efficiency and foundation for digital transformation. They are also clear that this is not a journey they wish to take alone. The support of a partner that combines expertise in digital technology with a capacity for innovation and thought leadership is crucial to core modernization success.

References

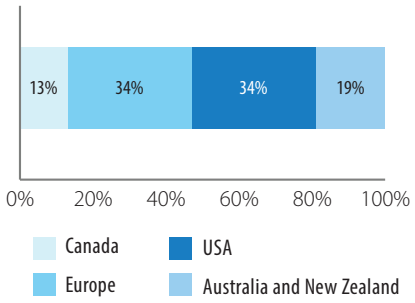
1. 2018 corporate longevity forecast: creative destruction is accelerating, Innosight

Survey methodology

In March 2019, Infosys commissioned an independent market research firm to conduct an online survey, which attracted responses from 160 CEOs and other senior-level respondents from Fortune 500 companies. Respondents represented multiple industries and hailed from Australia, Canada, Europe, New Zealand and the United States.



Coverage by industry



Coverage by region

Author

Harry Keir Hughes
Senior Consultant – Infosys Knowledge Institute
harrykeir.hughes@infosys.com

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