

# Modernizing applications on hybrid cloud

*Essentials to accelerate digital transformation*

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*Application modernization isn't just another IT buzzword. It's a business imperative.*

## Key takeaways

### ■ Modernization is not keeping pace with business needs.

83% of executives say modernizing applications and data is central to the business strategy of their organizations. But only 27% say their organization has modernized many of the necessary workflows, including the related applications, data, and systems.

### ■ Cloud transformation demands a modern tech architecture.

Four in five organizations are modernizing their processes and applications to accelerate digital transformation.

### ■ Many organizations are just starting their modernization journey.

Three in four executives say they still have disparate systems using traditional technologies and tools in their organizations.

# Unleashing the power of disruptive tech

The technologies that will underpin the business models of tomorrow are coming of age today.

AI is transforming how companies operate, as well as the experiences they can provide. The Internet of Things is delivering real-time insights that let massive enterprises pivot on a dime. And cloud computing is enabling cutting-edge innovations that are helping companies stay ahead of the curve.

But organizations can't make the most of these rapidly maturing technologies unless they establish the right IT foundation. And the reality is, many carry massive technical debt. They're struggling to integrate next-gen tech into traditional systems that just can't carry the load—or can't support the experiences end users expect.

As enterprises evolve to navigate disruption and accelerate innovation, their technology architecture needs to mature, as well. Modernization, which involves updating traditional applications, software systems, and infrastructure to meet current tech standards, drives this evolution.



*Executives know where their modernization programs need to go—but only a few have put the wheels in motion.*

While application modernization may sound like an IT buzzword, it's not just a technology priority. It's a business imperative. It helps enterprises transform their products, services, and operations; build resilience; and respond faster to change while also generating revenue, boosting efficiency, and reducing costs across the entire company.

However, many organizations are still at the start of their modernization journey. To better understand where companies are in this process—and what's holding them back—the IBM Institute for Business Value (IBV), in collaboration with Oxford Economics, surveyed more than 400 top IT executives across industries in North America (see “Research methodology” on page 19). All respondents are involved in modernizing and transforming their application portfolio as part of their primary role in their organizations. The businesses represented comprise more than 46% of the S&P 500 and drive almost 60% of economic activity in North America—estimated to be more than \$15 trillion in 2022.

We found that executives know where their modernization programs need to go and are charting a course to get there—but only a few have really put the wheels in motion. Part of the problem is that leaders aren't thinking holistically enough. They're focused on operational objectives and incremental improvements, rather than the strategic outcomes that will allow them to thrive in the business landscape of tomorrow.

What will help enterprises make meaningful progress? Answering this question starts with understanding the common set of obstacles they face. Overcoming financial, technical, cultural, and expertise barriers can make application modernization easier—and propel them forward on their enterprise transformation journey.

# Modernization is essential for cloud-enabled transformation

Application modernization lets organizations take advantage of cloud capabilities.

These capabilities include running more mature applications and integrating emerging technologies across the enterprise (see “The UK government modernizes to deliver digitized public services” on page 6).<sup>1</sup> In this way, it can deliver enormous business benefits, such as:

- 14% boost to annual revenue
- 30%–50% lower application maintenance and running costs
- 74% lower costs on hardware, software, and staff
- 10% improvement in application operational efficiency
- 15–35% savings on infrastructure year-over-year.<sup>2</sup>

Modernization amplifies the value of cloud. The revenue impact of cloud investments can be up to 13 times higher when orchestrated as an end-to-end reinvention of the enterprise.<sup>3</sup>

This study provides further evidence that application modernization is at the core of cloud-enabled transformation. Almost four in five of the executives we surveyed say moving all applications and processes to a hybrid cloud environment is part of their digital transformation strategy. They’re also using a variety of cloud platforms in their modernization efforts.

*As cloud comes out of the hype cycle, organizations need to make application modernization a priority.*

However, many enterprises still lack the modern systems, applications, and tools needed to benefit from cloud-based technologies, as well as automation, machine learning, and other applications of AI.

Our survey revealed that 83% of executives agree that modernizing applications and data is central to the business strategy of their organizations. But fewer than 30% have modernized workflows, including the related applications, systems, and data (see Figure 1). Three in four executives say they still have disparate systems using traditional technologies and tools in their organizations—and most are still in the planning or preliminary stages of modernization.

There are plenty of reasons why organizations haven't made more progress. The past three years have offered no shortage of challenges and distractions, from COVID-19 to geopolitical conflict to macroeconomic volatility to the shift to remote work.

But now is the time for action. As cloud comes out of the hype cycle, organizations need to make application modernization a priority today. That means taking a more holistic approach to this transformation—and focusing on strategic outcomes from the start.

**FIGURE 1**

**Modernization is moving slowly**

Few organizations have made enough progress to unleash its full potential



of executives agree that modernizing applications and data is central to the business strategy of their organizations.



of executives say their organization has modernized *many* of the workflows across the organization.



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## Perspective

# The UK government modernizes to deliver digitized public services

The pandemic eliminated in-person customer support channels overnight for the UK Department for Work and Pensions (DWP), leading to a sudden increase in demand on their IT systems and digital engagement channels.<sup>4</sup> As a result, DWP needed to accelerate the modernization of its integration approach and technology landscape, to enable both today's operations and the digital capabilities needed to succeed in the future.

Being one of the UK's largest government departments, DWP's customer information and interaction data was dispersed among a mixture of service-specific applications spanning mainframes, midrange platforms, and cloud-hosted services. To rapidly redefine and deliver new digitized services to millions of customers, the department needed to connect the information stored in these distributed applications quickly, efficiently, securely, and iteratively.

*“Part of our transformation was driven by the desire, and the need, to improve data-sharing across teams, so each line of business has the necessary information to deliver rapid support,”*

says Jacqui Leggetter, Head of Integration (Deputy Director), DWP Digital, Department for Work and Pensions.

IBM Consulting helped DWP Digital move some of its critical integration applications onto a single modern platform, reducing redundant technologies and enabling seamless, independent connectivity of applications in support of old and new business processes. Adopting an API gateway solution gave DWP the flexibility to build and integrate new microservices-based digital solutions without disrupting overall functionality or business operations. This supported the provisioning of emergency support to five million unemployed or furlough-affected households.

With optimized applications, data-driven architectures, some automation, and API-enabled integration, DWP has been able to improve its claims and approvals processes, providing greater accuracy, flexibility, and information security than ever before. DWP has also seen an increase in data reuse across product teams and government departments. This saves time and allows them to deliver citizen-focused applications much faster, decreasing processing time for new claims from weeks to hours. The department's modern systems help ensure seamless payment of over GBP 200 billion annually to millions of citizens.



# Balancing the scales of strategy and operations

Emerging technologies are at the heart of the innovative products, services, and experiences customers increasingly demand—and organizations need to modernize quickly to avoid falling behind.

Our survey found four in five executives agree that they need to accelerate digital transformation to stay ahead of customer expectations. But enterprise transformation can't be sustained by net new IT assets alone.

Businesses have made big investments in their technology infrastructure, and they need to get as much as they can from existing resources. Because rewriting a company's entire application estate isn't feasible, modernization has become inevitable.

80% of executives say their organizations are modernizing their processes and applications to accelerate digital transformation. Almost all (95%) are focusing their modernization efforts on customer relations, data management, or supplier management areas within their organizations. Within these business functions, most are working to improve the user interface and change the workflow and technology components rather than ripping out the entire platform (see "Red Hat and Delta Air Lines soar into the cloud" on page 9).

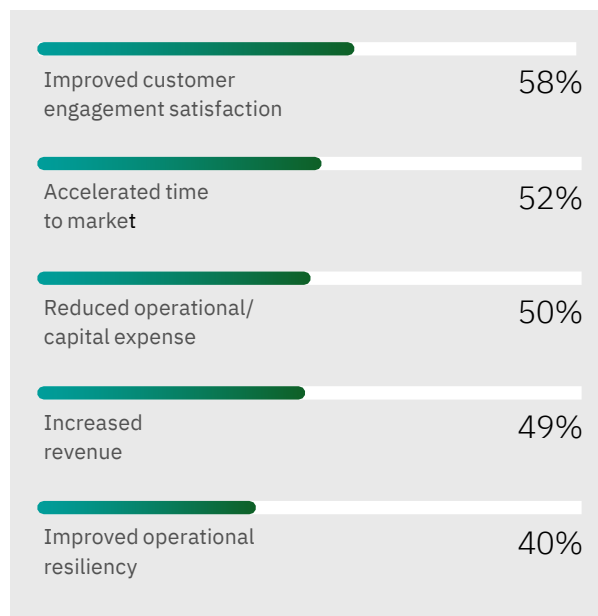
*Companies can't rewrite their entire application estate. So, modernization is inevitable.*

At a high level, executives are looking for strategic customer-focused outcomes when measuring the success of these modernization efforts, even above business resilience. 58% say improved customer engagement and satisfaction is a key success metric and 52% are looking for accelerated time-to-market. Reduced operational/capital expense comes in third, with 50% of executives saying it's crucial for success (see Figure 2).

FIGURE 2

**Look under the hood.**

Execs are prioritizing strategic customer-centric outcomes even over business resilience.



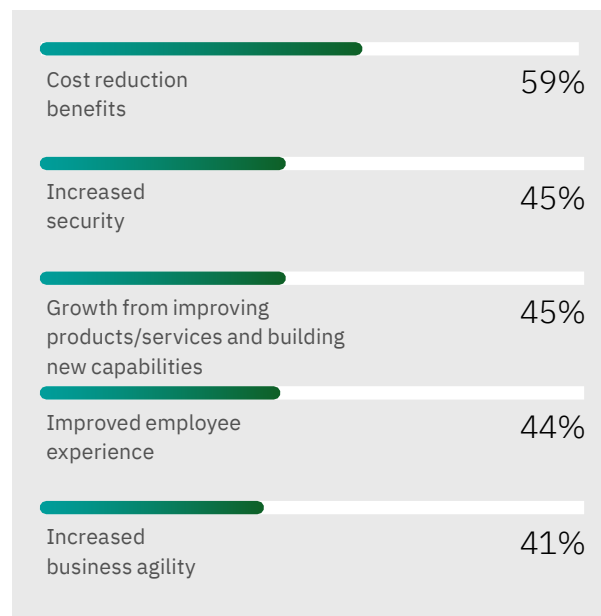
However, these priorities don't shine through in the early phases of modernization. Rather, organizations tend to focus on operational objectives. 59% of executives say reducing costs, such as operating expenses and labor spend, is important when planning or implementing modernization projects. More strategic priorities are secondary. Only 45% prioritize growth from improving existing products or services and building new capabilities (see Figure 3).

Why aren't these priorities aligned? It all comes down to implementation. There are four key areas where leaders face major obstacles on the path to modernization: expertise, culture, technology, and finance.

FIGURE 3

**Betting on the bottom line.**

Despite their strategic focus, most execs prioritize cost reduction during execution



Source: (Figure 2) How important are the following metrics in measuring the success of modernization projects in your organization? (Figure 3) When planning or implementing modernization projects, how important are the following business objectives? (The percentages reflect the portion of execs who say this is "very or extremely important.")

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## Perspective

# Red Hat and Delta Air Lines soar into the cloud

In order to increase agility, speed to market, and innovation capabilities, Delta partnered with IBM to modernize the company's existing computing environment and co-create new solutions to power their transformation.<sup>5</sup> The long-term project enables Delta to develop applications once and deploy them anywhere, integrate security across the breadth of the IT estate, and automate operations across the clouds. This helps the company drive greater software engineering productivity and enhanced customer experience in the future.

*“As an airline industry leader, we understand the critical need to constantly evolve our digital presence and enhance our customer and employee experience to not only help respond quickly to the dynamic changing conditions, but also reinforce brand loyalty from our customers,”*

says Rahul Samant, Executive Vice President and Chief Information Officer, Delta Air Lines.

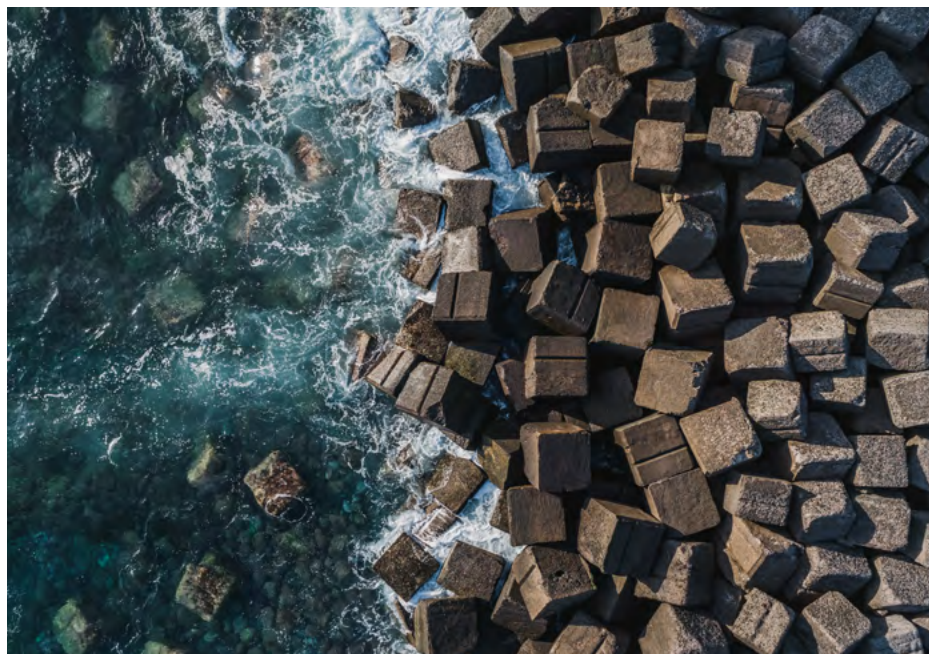
As a part of the modernization program, a cloud center of expertise has been established to provide overall architectural governance and help Delta transform to become a cloud- and product-centric organization. The airline aims to improve time to market, using a more nimble and flexible architecture to meet its clients' needs. Overall, it's also driving costs down through improved stability and scalability of cloud platforms, reduction in outages, and reduction in IT and application maintenance costs. As of today, more than 200 applications have been successfully deployed to Delta's new public cloud environment, which is run on a hybrid cloud architecture built on Red Hat OpenShift.<sup>6</sup>

Overall, Delta aims to have at least 90% of its applications and databases in cloud environments by 2024. To help the company get there, IBM plans to train more than 1,000 people on Delta's IT team to work in a cloud environment. This will equip them with new skills related to application development, data management, and security.<sup>7</sup> The modernization efforts have also provided clarity on the enterprise-wide learning models and personas required to operate in a “you build it, you run it” model. The modernization program helps increase collaboration and enables Delta to migrate to a secure, hybrid multi-cloud platform. About 30 % of the IT organization has already been aligned to the new operating model.

# Overcoming common barriers to modernization

To chart the most efficient course toward modernization, leaders must first identify the obstacles in their path. While each organization needs to overcome its own unique barriers, many leaders face similar challenges as they try to update traditional systems.

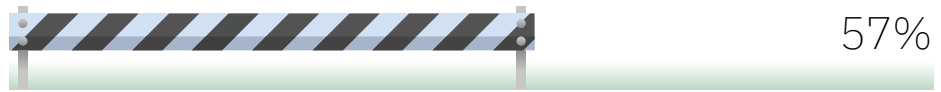
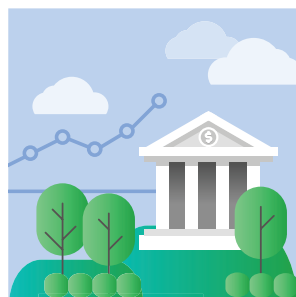
Most executives say financial (57%) and technical (51%) barriers pose significant challenges to their modernization projects. Just under half (45%) struggle with expertise barriers, such as having the right talent and skills in the organization, and almost one in three (31%) face cultural obstacles, such as a lack of executive sponsorship or employee buy-in.



Executives must understand what’s standing in their way before they can move modernization forward. Here are the steps organizations can take to address these challenges, no matter where they are in their modernization journey (see Figure 4).

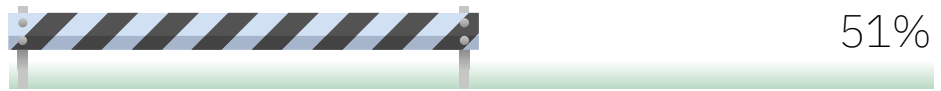
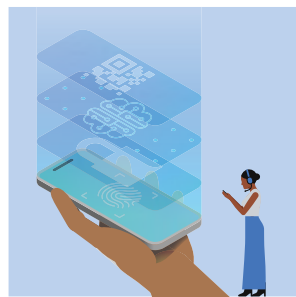
FIGURE 4

**Hurdle four barriers to deliver strategic outcomes in your modernization projects**



**Financial**

- Establish systems to capture costs.
- Take a broader view of financial success.
- Measure value each step of the way.



**Technical**

- See cost savings as the tip of the iceberg.
- Modernize faster with an agile approach.
- Steer the enterprise with a Cloud Center of Excellence (CoE).



**Expertise**

- Identify the skill gaps of tomorrow.
- Deliver personalized, engaging learning experiences.
- Retain employees by empowering personal reinvention.
- Leverage the partner ecosystem



**Cultural**

- Evolve the org structure.
- Make business leaders accountable.
- Double down on change management.

Source: How significant are the following challenges in advancing modernization projects in your organization? (The percentages reflect the portion of execs who say this is “very or extremely important.”)



## Financial

### Measure modernization's full financial impact

Businesses often look at the price tag of modernization projects without considering the full impact of the value it can deliver. While difficult to measure, the financial impact of modernization ripples across the organization, from revenue uplift to cost cutting to risk reduction.

To make the best business case, leaders need to understand the true costs, prioritize the initiatives that deliver the most value quickly, and set up self-funding mechanisms.

#### **1. Establish systems to capture costs.**

Business leaders may think IT systems aren't broken—and there's no need to fix them. Quantifying the long-term impact of not modernizing in terms of market competitiveness, cost, customer experience, and employee retention can shift the conversation from tech upgrades to tangible business outcomes. Add interventions to track current costs if those aren't clear.

#### **2. Take a broader view of financial success.**

Modernization priorities should align with a strong business case—but the business case must consider everything that influences ROI. When both direct and indirect benefits are monetized, returns will be more accurate—and it will be easier to see how modernization ultimately pays for itself.

#### **3. Measure value each step of the way.**

Track and report on costs and value realization on a biweekly or monthly basis to show incremental improvement and build ongoing support. With the right information at hand, leaders can find a source of funding within the modernization program, such as reducing costs via intelligent workflows, support cost optimization, streamlined data centers, and the elimination of duplicate applications.



## Technical

### Make modernization a business initiative—not an IT project

Digital transformation depends on the organization’s ability to build applications with innovative capabilities and deliver them quickly. Enterprises need to accelerate developer productivity and the adoption of new cloud-native technologies to enable speed at scale.

However, many organizations have sprawling technical estates, so it can be difficult to decide where to start modernizing (see “PNC taps real-time data to give customers control” on page 16). In this environment, leaders need to focus on strategic goals to determine which investments should take priority.

#### **1. See cost savings as the tip of the iceberg.**

Map the IT and application landscape, using discovery tools to understand its complexity. Decide what can stay—and what needs to go—by aligning activities with strategic objectives.

#### **2. Modernize faster with an agile approach.**

Before an organization leaps into a “big bang” transformation, it should focus on MVPs. By breaking the program into manageable chunks—and delivering results early and often—leaders can avoid taking on never-ending projects and mitigate the risk of failure while the enterprise builds new capabilities.

#### **3. Steer the enterprise with a Cloud Center of Excellence (CoE).**

When modernized systems are aligned to internal technical standards, there is a greater chance they will deliver the desired results. A cloud CoE serves as a temporary orchestrator, helping the enterprise design and build interoperable systems, accelerate innovation and adoption, proactively mitigate security risks, and deliver real-time insights to the business. As capabilities mature and teams internalize good governance, the CoE can be absorbed back into normal IT operations.





## Expertise

### Make skill development sprint zero

Cloud infrastructure is an essential part of digital transformation programs—and critical to driving strategic outcomes. However, while 75% of tech leaders say their organizations are building new products and features in the cloud, only 8% of their technical employees have extensive experience working with cloud-related tools.<sup>8</sup>

As organizations race to address this skills gap, they need to radically shift their approach to talent. Enterprises that prioritize talent development can gain a competitive edge by enabling employees to improve performance.

#### 1. Identify the skill gaps of tomorrow.

Look beyond the skills of the current workforce to determine what capabilities are needed to support the organization's transformation journey. Define required new roles, decide how talent frameworks must evolve—and assign senior leaders to drive talent transformation as a strategic agenda.

#### 2. Deliver personalized, engaging learning experiences.

Enterprises are competing with the last best digital interaction each employee had as a consumer. Create opportunities for personalized, design-led learning experiences in easily consumable formats to meet people where they are in their learning journey. Hire-to-reskill can be an effective strategy to expand the candidate pool, as long as the enterprise is committed to talent development.

#### 3. Retain employees by empowering personal reinvention.

A recent study found employees are 94% more likely to stay with a company that invests in their skill development.<sup>9</sup> Cross-skilling allows employees to develop a portfolio of technical skills and shift to “hot” skill areas in a more agile manner without disrupting their current productivity—helping companies retain in-demand talent.

#### 4. Leverage the partner ecosystem.

As emerging technologies exacerbate existing talent gaps, external technology and service partners or affiliates can be a great source of specialized skills. These external talent pools can fill niche, temporary shortfalls during the most intensive phases of modernization, while the organization builds critical capabilities needed to maintain and evolve their technology systems for the long term.



## Cultural

### Build buy-in and champion a culture of change

Modernization is essential to future-proofing the business—and promises to deliver returns in the long term. However, many executives still see modernization as an operational technology play rather than a crucial strategic investment.

Business leaders don't always understand that the customer- and employee-facing systems central to achieving business objectives are enabled by the back-office systems that need to be modernized. Organizations can overcome these cultural barriers by painting a clearer picture of what's at stake—and elevating expectations about the value modernization can bring.

#### **1. Evolve the org structure.**

Bring in key business stakeholders and end users early to support better collaboration between the business and IT. These strategic conversations help ensure modernization programs meet pressing business needs and address organizational painpoints. Set clear goals that aim to deliver measurable value across the business—not just IT efficiencies.

#### **2. Make business leaders accountable.**

Plan, execute, and measure success in partnership with leaders across business units to instill a sense of ownership. Inspire change by targeting business outcomes that people are willing to work for. Take an iterative, agile approach focused on producing minimum viable products (MVPs) for specific domains to achieve quick wins and build buy-in.

#### **3. Double down on change management.**

Communicate continuously about the behavior changes needed to achieve the desired strategic outcomes. Leaders need to overcome fear of the unknown to facilitate quick adoption of new systems and workflows. Work with change champions across the organization to boost acceptance of modernization initiatives and deliver value faster.

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## Perspective

# PNC taps real-time data to give customers control

As a result of multiple mergers and acquisitions over its history, PNC inherited a multi-bank IT architecture with many systems of record powering operations. To provide customers with easy-from-anywhere experiences, PNC embarked on a transformation program in 2019 designed to put the bank at the forefront of the industry when it came to digitizing products and services.<sup>10</sup>

PNC, the fifth-largest US bank, partnered with IBM to design and adopt an event-driven architecture, where data is sourced in real-time from across PNC's systems, creating a completely new application integration paradigm. Giving customers the control needed to easily make data-driven decisions—whether it's a deposit account balance or credit card payment status—represents a massive change for the banking industry.

By strategically employing this technology architecture, every single customer interaction streams into the platform in real-time regardless of the channel. Whether a customer is at an ATM or inside a branch, making a retail transaction or banking online, PNC's apps can tap into data and take real-time action. This data-first approach to an event-driven architecture created a completely new application integration paradigm.

Through this cutting-edge architecture, PNC is also democratizing data and breaking down application silos to build innovative new types of user experiences that rely on real-time event updates. In addition, PNC employed a full stack development approach—based on the IBM Garage Method for Cloud—which means it builds products with dedicated teams that possess all the skills needed for each new product. This has resulted in improved product quality, higher employee productivity and morale, faster time-to-market and differentiated experiences at lower costs.

Since deploying the new architecture, PNC has introduced groundbreaking new digital offerings that create seamless experiences for customers and help them stay in charge of their financial futures. One of the new customer-facing products is expected to save customers approximately \$125 to \$150 million annually in overdraft fees. PNC expects their retail banking technology modernization projects to produce approximately \$104 million in benefits, including incremental revenues, operational efficiencies, and technology cost-savings by 2026.<sup>11</sup>

*“In defining and driving the technology strategy at a large and complex enterprise, the basis for making decisions in the best interest of our business, our associates, and our customers is to ensure we are looking holistically: including both the cost to acquire and the cost to serve. It’s important to define the technology strategy and roadmap both in the near term and into a future beyond just the next few years, ensuring you can set the foundation for the business to thrive for many years to come.”*

**Marty Wolfe**

SVP and Chief Technology Officer  
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## Research and methodology

In cooperation with Oxford Economics, the IBM Institute for Business Value (IBV) surveyed more than 400 IT executives (for example, CIOs, Chief Enterprise architects, and Application Development executives) in North America from the largest companies across more than 7 industries in August 2022. The businesses represented comprise more than 46% of the S&P 500 and drive almost 60% of economic activity in North America—estimated to be more than \$15 trillion in 2022. All respondents are aware of and consistently involved with or working on modernization projects and influencing investments as part of their primary role. All participants were asked a range of questions to understand the modernization landscape, including ties to overall digital strategy, motivating factors, challenges, success metrics, and more.

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“Application modernization on the mainframe: Expanding the value of cloud transformation.” IBM Institute for Business Value. July 2021. [ibm.co/application-modernization-mainframe](https://ibm.co/application-modernization-mainframe)

### **Mastering Hybrid Cloud**

“Mastering Hybrid Cloud” IBM Institute for Business Value. June 2022. [ibm.co/mastering-hybrid-cloud](https://ibm.co/mastering-hybrid-cloud)

### **Cloud’s next leap**

“Cloud’s next leap: How to create transformational business value.” IBM Institute for Business Value. October 2021. [ibm.co/cloud-transformation](https://ibm.co/cloud-transformation)

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