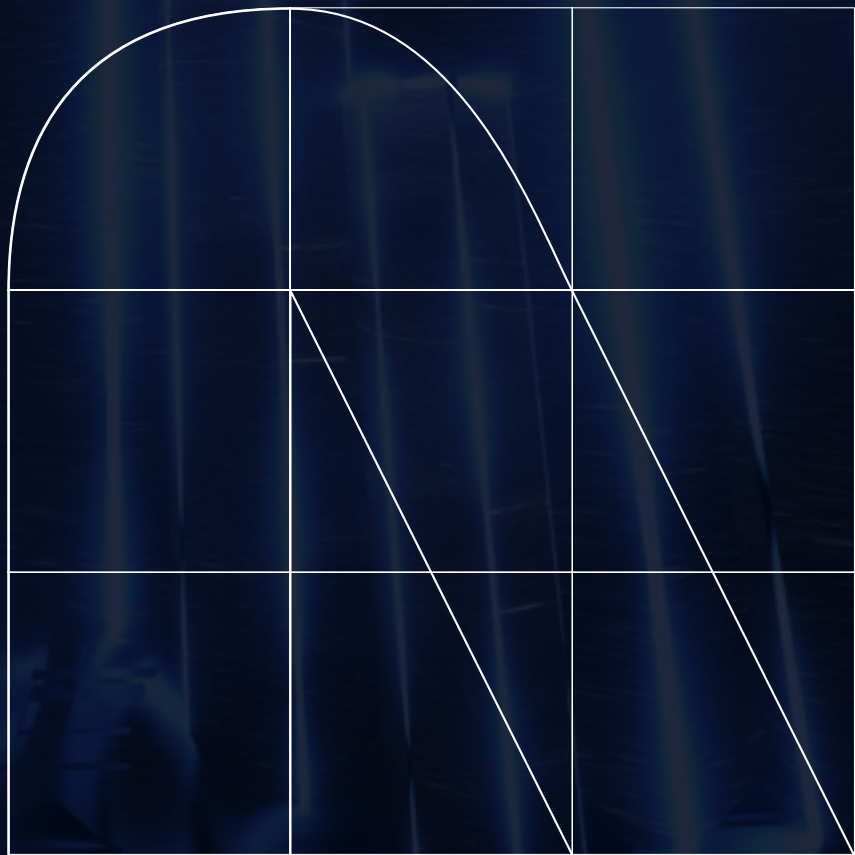


Banking & financial services | Annual decision-maker survey

Digital horizon: The technology shift in banking from mainframe to AI-driven cloud

How generative AI is accelerating the shift off legacy



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Mainframe's place in a cloud-first world

Foreword

The banking industry is standing at the crossroads of a new wave of transformation, being driven by the twin forces of evolving consumer needs and disruptive technological advancements in generative AI and cloud. It's a transformation that will alter not just the conduct of banking transactions, but the very fabric of banking institutions.

Early adopters who successfully ride this wave of change have the potential to drive efficiency and increase automation while also improving customer and employee experiences. This is a win-win scenario, with the added benefit of accelerating the move off legacy hardware.

Accelerating change: Shifting expectations

End users expect fast, convenient, personalized and frictionless access to banking services. To cater to this desire, banks are shifting from old mainframe systems to agile, cloud-based platforms.

Our research, which went out to 650 global banking decision-makers, found that while 89% of interviewees see their banks as innovators in AI and cloud, 63% still rely on mainframe infrastructure, and 20% haven't started transforming their legacy hardware. There is still a long way to go for most banks, and the persistent role of the mainframe is undeniable.

However, the balance could be about to shift.

The research findings shine a spotlight on the rapid adoption of generative AI and board-level interest in it. We found that in an astonishing 91% of the banks, there is now board-level support for the adoption of generative AI.

The latest wave of AI and cloud technologies has generated deep interest from senior leadership, with the acknowledgement that fully utilizing it will be pivotal in modernizing operations, driving efficiency, improving customer experience and unlocking new revenue streams as banks look to the future. Or to put it another way, banks don't want to get left behind in the AI revolution.

Change is coming, but banks are lacking a clear strategy

Although our research found a clear desire to implement AI, it also uncovered challenges ahead, as 80% of banking decision-makers report they don't have a clear strategy for implementation. This disconnect between ambition and actionable planning can be attributed to various factors: the rapid pace of technological change, apprehensions about ROI, the risks associated with change or simply the complexity of integrating AI into existing systems.

Our work with banking clients, from global tier ones to regional banks, forms partnerships spanning decades. Experience has shown us that barriers and perceived risks can all be overcome with the right strategy, the right execution and the right management.

"The persistent role of the mainframe in modern banking is undeniable."

These findings shine light on the innovations already making waves in the industry and the potential hurdles that might arise. They will give you a sense of where your journey might take you but also reassure you that many others are at the same stage as you.

Embracing change, while challenging, is an opportunity for growth and evolution. By understanding the current landscape and acknowledging the obstacles, it is possible to navigate change with clarity and confidence. With this research, we will guide your institution and support your thinking on the path ahead.

After all, there is boundless potential to transform the future of banking, and we're only getting started.



José Manuel Pérez Bajo,
Partner at NTT DATA



Madhusudham Magadi,
BFSI Consulting Partner & Modernization
Architecture Leader at NTT DATA

Key findings

78%

found it challenging to migrate off mainframe systems. Legacy platforms are showing remarkable resilience in banks despite a widespread desire to move to cloud-based infrastructure.

17%

of banks cite cost reduction as a top reason for moving from mainframe to cloud. Banking decision-makers now look to cloud for the flexibility and scalability it brings, not for cost savings.

94%

of banks now use public cloud, showing its significant foothold. Multicloud (48%) is more popular than hybrid cloud (32%) among banking decision-makers.

88%

of banks use technology partners to help them transition from mainframe to cloud. This is largely due to the challenge of finding the skills and knowledge to execute the migration.

66%

of banks consider themselves AI trailblazers, showing there's a real desire to innovate in banks today. Among AI trailblazers, 94% also lead in cloud adoption, highlighting that AI and cloud are dual drivers for innovation and growth.

91%

report that innovation in AI and cloud implementation has board-level support. 87% of banking decision-makers report increasing pressure to implement AI technology.

45%

are already integrating generative AI technology into their technology stacks and a further 30% of banks are in the early stages of looking at it.

63%

plan to leverage generative AI to speed up the move to the cloud, while 33% say generative AI could help with data migration complexities and 29% say it could reduce risk.

Chapter 1

Mainframe's resilience and a shift to cloud

Banks have always taken a risk-benefit analysis approach to legacy mainframe transformation. Doing so prioritizes the migration of applications that are deemed the most suitable and deliver the biggest business value in return. However, each subsequent migration becomes incrementally more complicated and riskier. So, despite the push to innovate, the mainframe remains entrenched.

In fact, NTT DATA's research found that when asked, not a single respondent among 650 banking decision-makers said that all suitable applications had been moved off the mainframe.

Risks are constantly changing, and the market landscape is evolving. A number of factors are helping to make the case for migration:

- A new wave of generative AI promises new possibilities for automation in banking processes. And as this research will show, GenAI holds the potential to help the migration itself.
- The shock of the pandemic in 2020–2022 initiated a renewed push toward flexibility and agility. Adaptability is now an important part of resilience.
- The looming mainframe skills crisis will make the job of maintaining historic applications in the face of ever-changing regulation harder.

But caution remains in the air, and banks are wise to not underestimate the complexity of a migration from mainframe systems.

We have driven \$300 million in efficiency through modern engineering practices and labor productivity, and we have developed a framework that enables us to identify further opportunities in the future. Our modernization efforts have yielded an additional \$200 million in productivity, driven by improved utilization and vendor rationalization. Adoption of industry-leading software-as-a-service solutions is an important driver of application modernization. In total, we have more than 560 SaaS solutions across our technology estate, a 14% increase since 2022. In addition, we continue to retire legacy applications, with more than 2,500 decommissioned since 2017. And finally, we are investing in modernizing the applications we build to allow more rapid delivery, efficiency and scale.

Over the next three years, we have line of sight to have 80% on modern infrastructure. Of the remainder, half is mainframes, which are highly efficient and already run in our new data centers.

— **Lori Beer,**
Global Chief Information Officer at
JPMorgan Chase & Co.



While the mainframe and its associated applications are expected to remain relevant in the foreseeable future, it is undeniable that the advent of generative AI will have a profound impact on the delivery of technology services. This will enable the deployment of viable methods to modernize existing technology landscapes, facilitating the transformation and evolution toward more modular, cloud-based components throughout the software value chain, from requirement management to coding, testing, deployment and even operations.

— **Enrique Ávila,**
IT Transformation Director at
Banco Sabadell



Challenges during migration to the cloud

Our survey of 650 banking decision-makers found that during migrations to the cloud, 78% of banking decision-makers who have gone through the process found it challenging and 18% found it extremely challenging. This is nothing new, but it certainly does not have to be the case.

The research highlights that organizations find data migration and adherence to regulatory compliance the most challenging, with both areas cited by 80% of respondents. Integrating legacy systems and allocating sufficient resources are also significant hurdles, reflecting the complexity and resource intensity of such transitions. Security concerns, the skills gap within IT teams and cost considerations underscore the need for robust cybersecurity measures, targeted training programs and careful financial planning.

Furthermore, the importance of effective change management and securing board-level buy-in is evident, indicating that successful cloud migration is as much about managing people and processes as it is about technology. Finally, the issue of vendor lock-in reflects a strategic concern for flexibility and risk management in vendor relationships, emphasizing the need for careful contract negotiation and vendor selection.

The perceived barriers tell a similar story. When asked what barriers the banking decision-maker expected when transitioning to the cloud, the primary barriers identified were concerns over security risks or data breaches and the lack of top management support, each cited by 37% of respondents.

So how do you avoid the pitfalls?

The migration from mainframes to cloud-based systems is undoubtedly riddled with potential pitfalls. One of the most significant issues arises from the inherent differences between the two environments. Mainframes are typically monolithic, with tightly integrated components operating in a highly controlled environment. In contrast, cloud systems

are distributed, with loosely coupled microservices that can be developed, deployed and scaled independently. This disparity can lead to complexities in data consistency, application dependencies and transaction management.

Moreover, the ingrained business logic within legacy mainframe applications is often deeply entwined with the hardware and software specifics of the mainframe environment. Extracting and transforming this logic to be compatible with modern cloud infrastructure is no mean feat (although there are tools that can help). There's also the challenge of managing vast amounts of data during the transition, ensuring its integrity and setting up new data pipelines and storage solutions.

This is why there's no single transformation route for mainframe modernization, but rather a selection of potential paths — from optimizing and reusing the existing mainframe to greenfield rebuilds of the entire software stack.



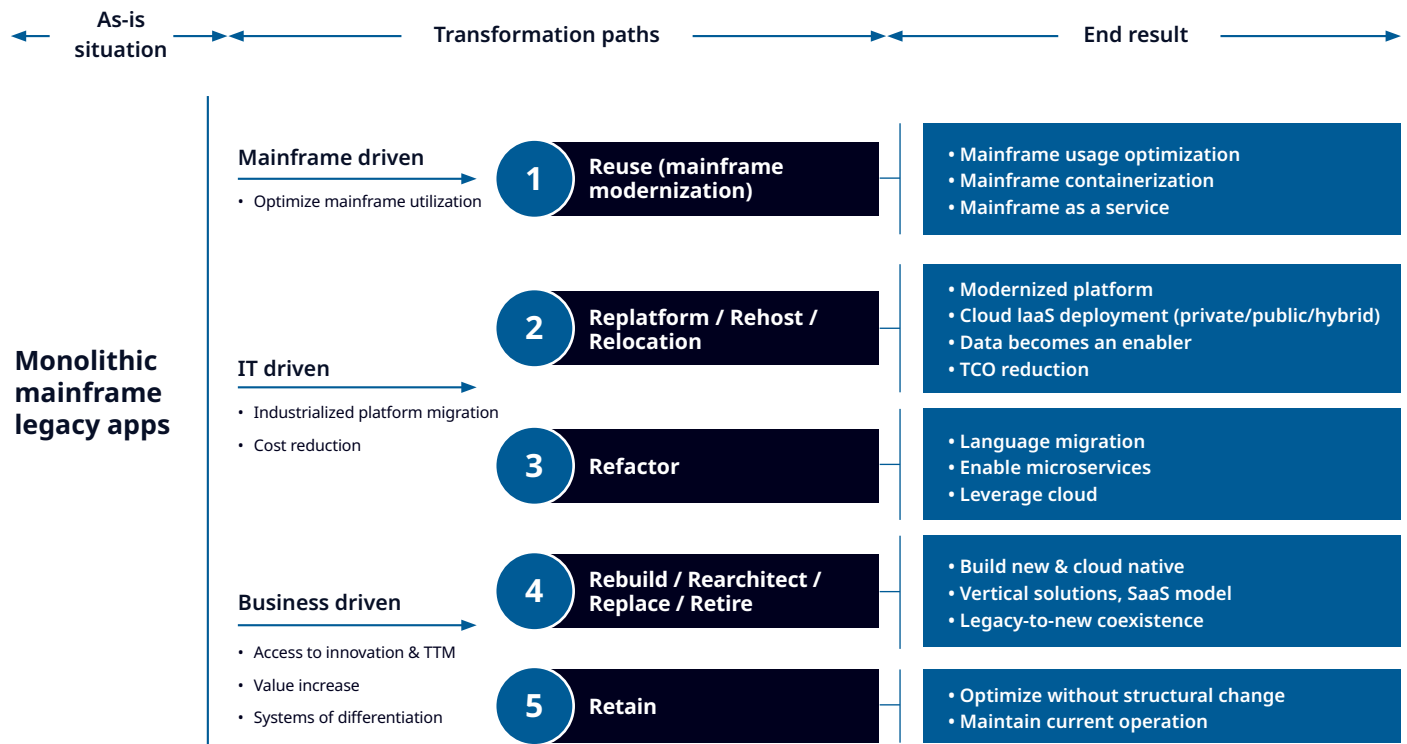
The old 'if it's not broke, don't fix it' approach is fading fast.

Banks and financial institutions still love their mainframe applications, but it's time to evolve the relationship so it includes cloud. It's not a zero-sum game anymore. Software companies and cloud providers can provide significant value-enhancing options.

— **Monica Hovsepián.**

Global Financial Services Lead at OpenText, Forbes Finance Council Member¹

Path to modernization



NTT DATA's paths to modernization

Top tips for planning a mainframe migration²

1. Application portfolio assessment & analysis

Assess and deconstruct your application portfolio to evaluate your organization's operating costs and risks, as well as identify gaps and redundancies to help optimize your business outcomes. Analyze level of maturity, TCO, obsolescence and possible modernization paths for each group of applications.

2. Roadmapping & cloud strategy

Considering your business priorities, industry drivers and current enterprise maturity, develop actionable cloud migration roadmaps that focus on operational transformation, technology modernization and business transformation.

3. Evaluate the Rs

Evaluate the risks and rewards of mainframe modernization through the different modernization paths — the so-called "Rs": Retiring, resourcing, rehosting, recording, rewriting, rearchitecting, refactoring, rebuilding, reusing or retaining.



The use of cloud in banking

Until recently, banks were laggards when it came to adopting cloud. In the early 2000s, banks typically ran a mix of mainframe and on-premises servers hosted in owned or shared data centers. While other industries were quick to adopt cloud as it gained traction, banks held back.

In 2020, IBM published a business report that found 45 of the global top-grossing banks still prefer mainframe computers.³ A cautious approach to migrating from mainframe to cloud was understandable as banks sought to understand and mitigate security and compliance concerns.

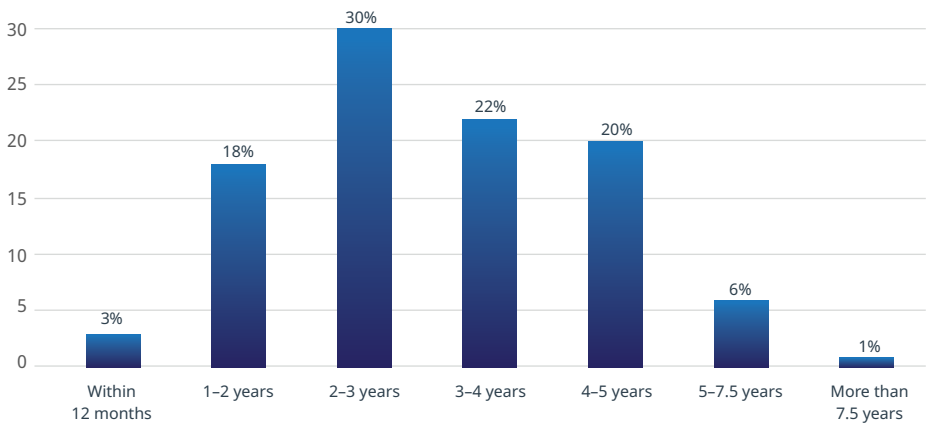
However, there's been a significant turnaround in recent years. Not only are banks adopting and implementing cloud practices, but it's also become a board-level priority.

According to NTT DATA research, 91% of respondents agree that AI and cloud implementation is now being driven by the board. Only 2 respondents out of 650 reported that transitioning from a legacy mainframe to a cloud platform is not a priority.

The research reveals a prudent yet decisive shift from mainframe to cloud within the banking sector. Despite the strategic intention to adopt cloud technologies, no decision-makers surveyed have fully transitioned all suitable applications, and some legacy systems may remain indefinitely non-cloud-migrated due to current technological constraints. With 3% of organizations close to finalizing their cloud integration and the majority anticipating a 2- to 5-year journey, the path to cloud adoption is progressive yet complex.

This indicates a clear but gradual move away from mainframes, signifying the sector's intent to leverage the cloud's flexibility and innovation while navigating the intricacies of such a pivotal transformation.

Expected timeframe for full cloud-native implementation



Partnerships with IBM, Google and Microsoft are allowing CaixaBank to implement its hybrid cloud strategy, moving each workload to the most suitable destination and combining it with processing in its own data centers.

— **Lourdes Mercadal**,
Head of Innovation and Transformation at CaixaBank Tech



What that shift looks like in banking in the US

The banks and financial institutions of 2030 will look very different than those of today. They will face the rapid evolution of consumer expectations, emerging technologies, innovation and alternative business models. These organizations need to start putting strategies in place now to help them prepare for this future. An important indicator of the shifting landscape? Cloud computing is moving to the forefront as a focus for chief information officers, C-suite executives and board members.

Banking and capital markets leaders increasingly recognize that cloud is more than a technology. It is a destination for banks, financial institutions and financial services firms to store data and applications. Cloud also provides access to advanced software applications via the internet.

Leading hyperscalers (Amazon Web Services, Google Cloud Platform, Microsoft Azure and IBM) offer an array of innovative products in as-a-service models that can be accessed on their platforms. These solutions help banks implement business and operating models to improve revenue generation, increase customer insights, contain costs, deliver market-relevant products quickly and efficiently, and help monetize enterprise data assets.

The cloud also offers a huge opportunity to synchronize the enterprise — to break down operational and data silos across risk, finance, regulatory, customer support and more. Once massive data sets are combined in one place, the organization can apply advanced analytics for integrated insights.

In the past, bank and financial institution leaders focused on the technology's value as a cheaper, faster and more elastic alternative to on-premises data storage. Now, they are considering, or using, cloud to synchronize the enterprise, power business innovation and develop talent (connected ecosystem). Doing so will create new business frontiers. Cloud also helps banks build resilient operations, enhance business security, and deliver automatic/on-demand scaling of computing and storage to optimize the organization. Applying cloud technology in these six areas may help banks improve business performance and shareholder returns.

Many banking and financial services (BFS) enterprises have undertaken cloud initiatives, at varying levels of maturity. BFS firms at higher maturity levels stand to derive greater value from their cloud investments.

Firms at higher maturity levels stand to derive greater value from their cloud investments⁴

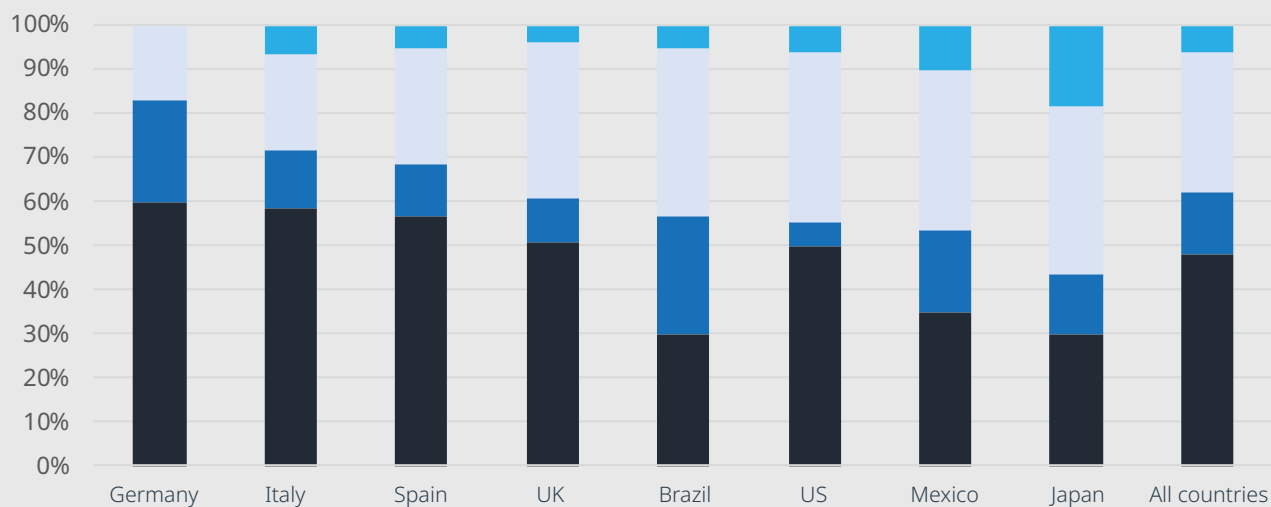


The different cloud approaches

Public cloud has become entrenched in banks. The research shows that only 6% of respondents have a private cloud-first (on-premises) strategy. In fact, the shift has now moved beyond simple hybrid cloud and toward multicloud, where banks are leveraging multiple cloud providers.

However, the approach varies significantly around the world. Japan has the most traditional approach, with 57% of banks adopting a hybrid or private cloud approach. On the other hand, in Germany, only 17% of banks use a hybrid approach and no banks report relying solely on private cloud.

Global mix of cloud environments used in banks



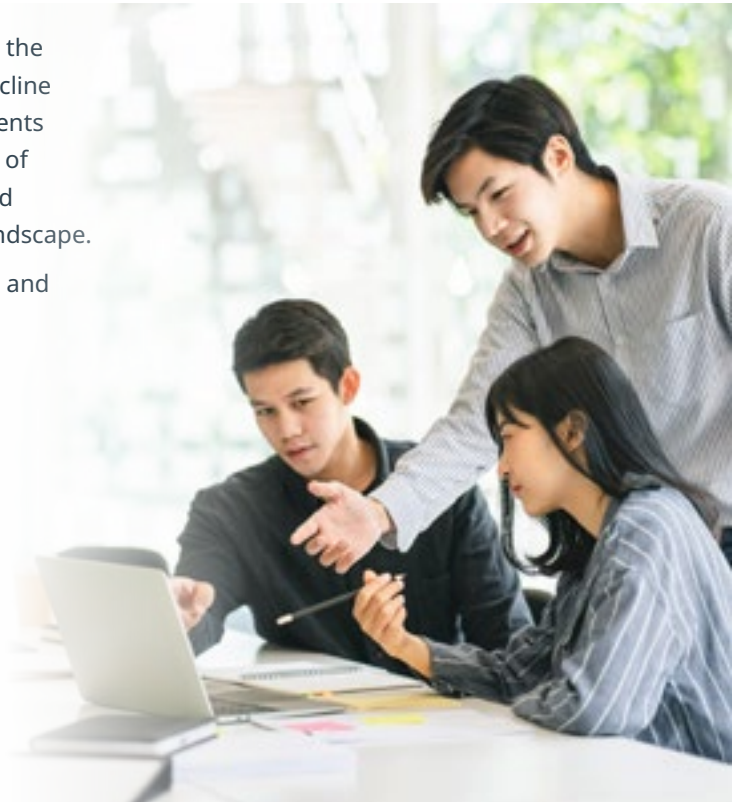
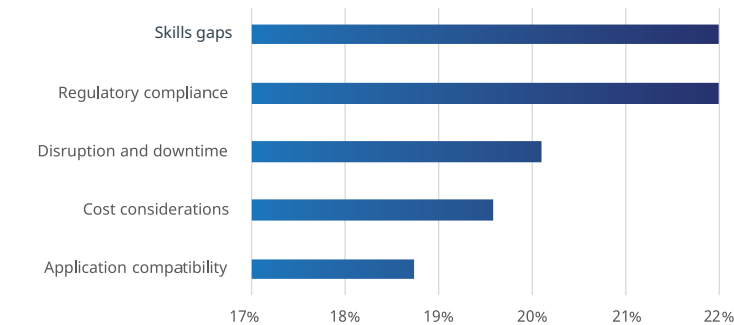
- **Private cloud:** We host our applications and data on a private cloud infrastructure to maintain greater control and security
- **Hybrid:** We have a combination of on-premises infrastructure and cloud-based services to ensure seamless integration of our operations
- **Mono-cloud:** We leverage services from one public cloud provider
- **Multicloud:** We leverage services from multiple cloud providers to meet specific business needs and optimize performance



A spotlight on skills

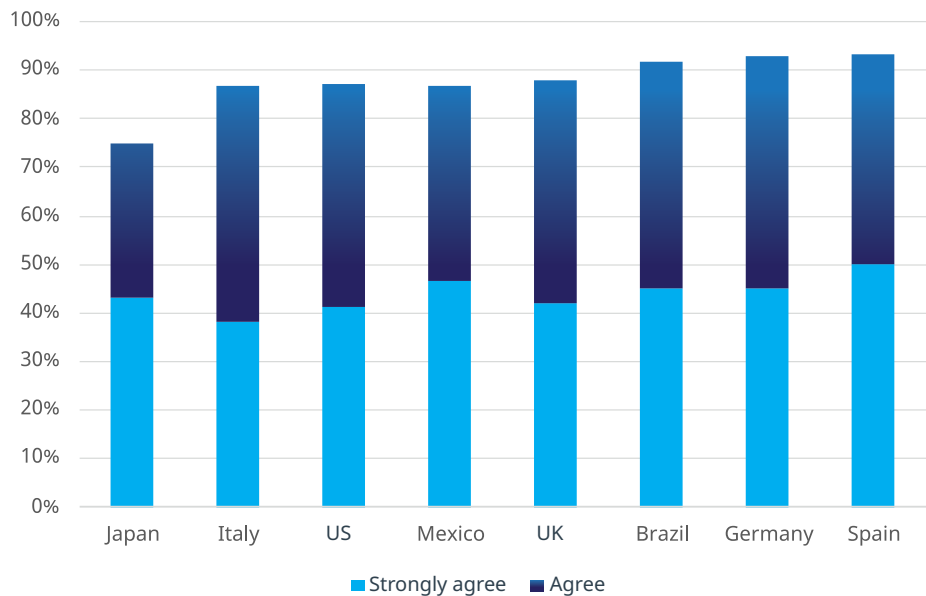
An important dimension of the persistent reliance on mainframes is the looming skills gap. As the industry advances, there's a noticeable decline in the availability of seasoned mainframe experts. This scarcity presents banks with a two-fold challenge: ensuring the continuous operation of their existing mainframe systems while simultaneously updating and modernizing them to keep pace with the rapidly changing digital landscape. Our research found that a lack of skills is a bigger concern than cost and technical challenges.

Top challenges to transitioning from mainframe to cloud-based platforms



The situation becomes even more difficult when banks must adapt these legacy systems to comply with ever-evolving regulatory frameworks. This conundrum underscores the urgent need for strategic investments in training and skills development to bridge the knowledge gap and ensure a seamless transition to newer technologies. Banks are getting around this challenge by turning to partners to support their modernization, transformation and innovation initiatives. In fact, 88% of banking decision-makers confirm that technology partners are integral to helping them implement cloud and AI technologies — with Spain and Germany the most reliant on their partners.

Banks look to technology partners to support on cloud and AI implementation



Global attitudes to leveraging technology partners to support cloud and AI implementation

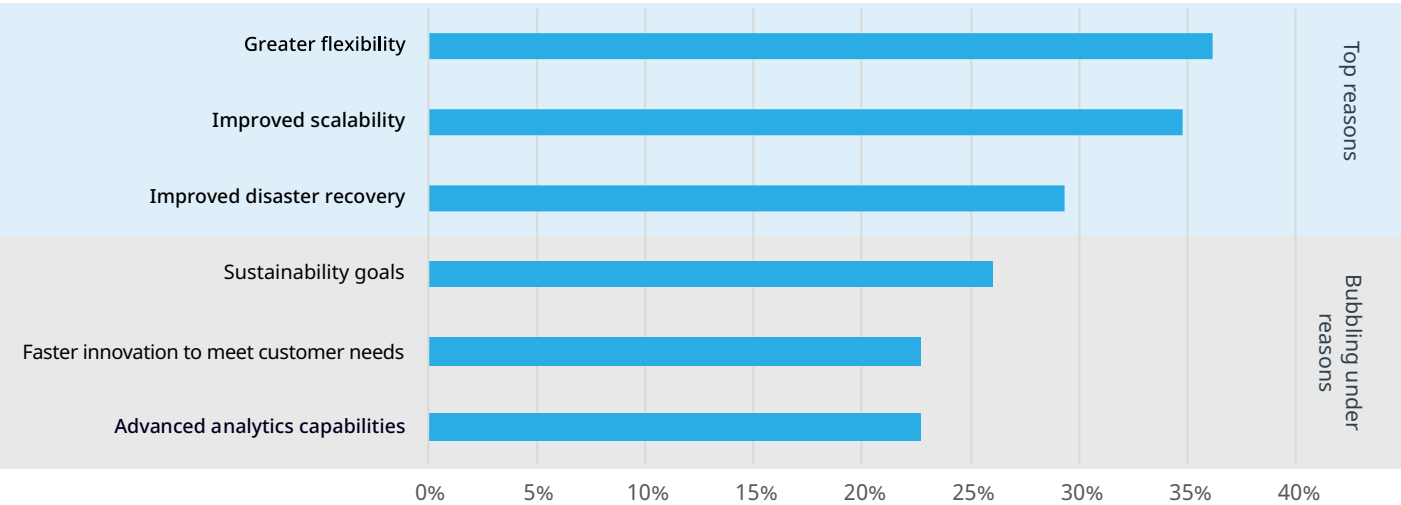
Chapter 2

Why the future is banking in the cloud

As we've seen, there is a desire to move off mainframe systems, and a definite strategy to adopt cloud where possible. Most banks have already adopted a multicloud or hybrid cloud approach, but what are the reasons for change?

NTT DATA's research found that the move is spurred by a combination of reasons.

Motivations behind transitioning from mainframe to cloud



The desire for greater flexibility is top among banking decision-makers, with 36% stating that cloud solutions can offer operational agility beyond that of mainframes. As these institutions expand, 35% see the cloud as the answer to their need for scalable solutions, outpacing the capabilities of traditional mainframes and a traditional reason for cloud adoption.

The quest for enhanced disaster recovery plays a role, with 29% trusting the cloud's robustness to ensure a rapid response to unforeseen challenges. This might come as a surprise, given mainframe's reliability, but the combination of cloud's geographic distribution and its speed of recovery means that it is now perceived as a more resilient solution.

Alongside these main reasons are considerations that are "bubbling under." Embracing ecofriendliness and delivering on sustainability goals are of growing importance, and 26% of respondents are moving to the cloud as a step toward meeting these goals.

Focus on sustainability

As organizations increasingly prioritize sustainability, the move to cloud is recognized as a significant contributor to goals:

- **Energy efficiency:** Cloud data centers optimize server utilization, reducing energy waste. The scalable nature of cloud allocates and reallocates on demand, ensuring that energy is consumed more efficiently compared to traditional data centers.
- **Carbon footprint reduction:** By consolidating data operations in the cloud, companies can decrease their carbon footprint. Cloud providers often utilize renewable energy sources and invest in sustainable infrastructure, contributing to a greener IT ecosystem.
- **Resource optimization:** Cloud services eliminate the need for physical infrastructure for each organization, leading to a significant reduction in the consumption of electronic hardware and the associated waste.
- **Remote accessibility:** Cloud enables remote work, which can reduce the carbon emissions associated with commuting and office space operation.



Cost reduction is not a primary driver

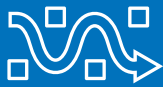
It might come as a surprise that only 17% of banks cite operational cost reduction as a primary driver for their move to the cloud.

In the ever-evolving banking landscape, “run the bank” cost reduction has become a strategic focus for many institutions, but the notion that cloud infrastructure is significantly cheaper than on-premises is outdated — and the research backs that up.

The cloud is better considered as an enabler of operational efficiency savings and enhanced customer experience, both of which are core to staying competitive in a challenging economic environment. For NTT DATA's clients, this isn't just about immediate savings but about sustaining long-term profitability, with the emphasis on smart investments in technology and processes to enhance service quality and fast-track innovation.

The driving force behind the move to the cloud

650 banking decision-makers give their top reasons for moving to the cloud



36%

Greater flexibility: The quest for operational agility is paramount and cloud infrastructure brings that adaptability.



35%

Improved scalability: Infrastructure needs to grow as required; cloud offers the scalable solutions that banks need.



29%

Enhanced disaster recovery: Cloud infrastructure offers geographical distribution and redundancy that can be spread across cloud providers through multicloud setup.



26%

Meeting sustainability goals: A shift toward ecofriendly operations prompts banks to reassess their existing infrastructure.



23%

Advanced analytics capabilities: Banks are increasingly veering toward platforms granting superior analytics prowess in this data-centric age.



23%

Faster innovation to meet customer needs: The race to remain ahead hinges on the pace of innovation.

Navigating mainframe-to-cloud transitions in banking

The banking industry has gone through successive waves of digital transformation, from the introduction of ATMs in the 1980s, which first allowed retail and commercial customers to perform transactions without a teller, to embracing the internet in the late 1990s and early 2000s, which laid the foundations for online banking and electronic trading today.

Looking back, the technology changes in all areas of banking have been dramatic, and the trend toward digital services is clear. But review it year by year, and you'll see that banks take a cautious and measured approach to change.

Typically, banks only spend around 15–30% of their IT budgets on “change the bank” activities, with most budget allocated to running the bank and maintaining the existing technology environment within the prevailing regulatory framework.⁵

That's because digital transformation is notoriously hard to deliver. A commonly referenced statement is that 70% of transformations fail to achieve their goals.⁶ For banks, there are a number of hurdles to navigating off mainframe systems and transitioning to the cloud.

At Banco Pichincha we are taking IT modernization very seriously. Within recent years, we have increased the speed of our transformation, launching different programs such as the stabilization of legacy platforms, modernization and strong promotion of our digital channels, launch of data fabric platforms and multicore architecture or full renewal of our customer service processes. All these programs are helping the bank continue to be a leader in the region.

— **David Muñoz,**

Executive VP Technology and Operations at Banco Pichincha in Ecuador



A note on measurement

The research sought to understand the key performance indicators banks measure against as an indicator of success for their cloud technology implementations. The leading metric is improved operational efficiency, identified by 30% of respondents. Close behind are increased customer retention and enhanced data security, both crucial for maintaining competitive advantage and safeguarding information in the digital era.

Other significant metrics include scalability to meet demand, customer satisfaction and a strong return on investment. While cost savings, compliance and sustainability are also measured, they are slightly less prevalent. Metrics like uptime/reliability and faster time to market, each at 22%, underscore the importance of agile and reliable technology in driving business growth.

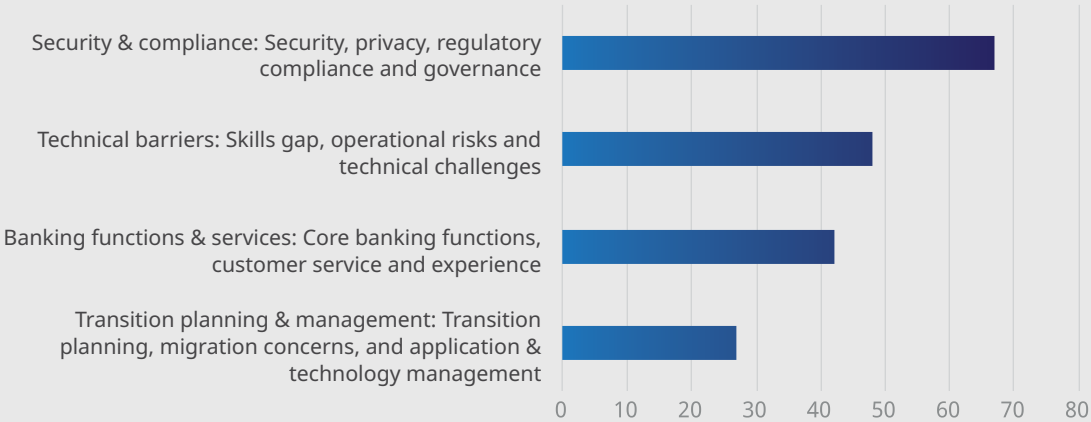
Key challenges in delivering transformation from mainframe to the cloud

The research identified four specific groups of challenges when it comes to transitioning from mainframe to cloud.

- 1. **Security and compliance concerns:** The banking world, known for its emphasis on security and stringent regulatory standards, continues to express reservations about cloud technologies. Though cloud solutions have advanced significantly, the shadows of data integrity and regulatory compliance issues linger. In a sector where safeguarding customer data and facilitating vast monetary transactions are daily operations, such concerns are magnified.
- 2. **Technical barriers:** Migrating from tried-and-tested mainframes to unfamiliar cloud territories is not just about adopting a new technology. The sector faces a real challenge in finding expertise, particularly when it comes to cloud security.

The key challenges identified in digital transformation from mainframe to cloud include addressing security and compliance worries, overcoming technical hurdles, accurately translating functions and services to the new platform, and executing the transition meticulously. Navigating these challenges effectively is crucial for a successful transformation, which can ultimately lead to significant benefits, such as operational agility, cost efficiency and the capacity to innovate. For decision-makers in banking, acknowledging and strategically approaching these challenges is the cornerstone of moving digital transformation forward.

Hurdles to transitioning from mainframe to cloud



- 3. **Recreating functions and services:** Translating functionalities from mainframes to the cloud is a nuanced task. Each service or function on the mainframe has its intricacies, and ensuring they work seamlessly on the cloud requires both time and specialized skills.
- 4. **Transitioning with precision:** Migration is more than just a move; it's a transformation. Ensuring that this shift happens without downtimes, loss of data or glitches necessitates a well-thought-out strategy.

78% found security a challenge during their migration to the cloud.

- Security and compliance:** Emphasize ongoing concerns about cloud's security and compliance, especially in the banking sector.
- Technical barriers:** Point to the expertise gap, especially in cloud security.
- Function replication:** Showcase the challenges of translating mainframe functions to the cloud.
- Strategic transition:** Highlight the need for a robust migration strategy to avoid potential pitfalls.
- Org shifts:** Touch on the cultural, skill-based and operational changes necessary for successful migration.

Chapter 3

The road ahead

In navigating these crossroads, the banking industry's future is a complex tapestry.

While the era of mainframes might extend to the foreseeable horizon, banks should regularly reevaluate their roadmap when it comes to so-called legacy technology.

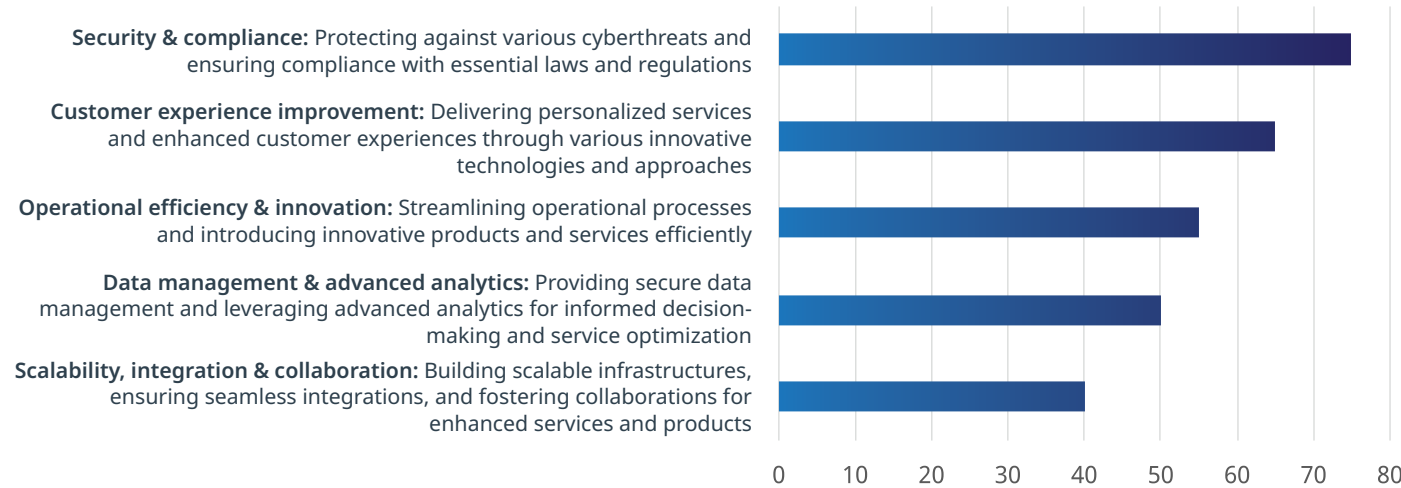
Ultimately, it's a balancing act. Mainframe will be around for a long time, but banks need to look to cloud and AI as technologies that enable them to stay ahead of their banking peers in the digital revolution. They can't afford to let a mainframe hold them back.

Cloud as the enabler

Traditional mainframe infrastructures, though reliable, are increasingly juxtaposed against the myriad advantages of the cloud. As banks and financial institutions continue to evolve in response to changing customer expectations and regulatory demands, the call for agility, security and innovation becomes ever louder.

The answer, as it turns out, lies in embracing cloud-first strategies and making cloud a central enabler of the modern banking ecosystem.

Top reported benefits of implementing cloud technologies



1. Security and compliance at speed

The banking sector's stringent security and compliance demands are well-known. The cloud facilitates a nimbler response to these demands. Microservices-based architectures, a notable departure from traditional monolithic systems, offer faster turnaround times and substantially reduce the risk of prolonged downtimes. It's imperative, however, to understand the dual-sided nature of security in the cloud context. While the cloud provides enhanced security measures, these same features sometimes raise concerns for institutions, primarily because of the decentralized nature of cloud storage and operations.

2. Uplifting the customer experience

A seamless and intuitive customer experience is no longer a luxury; it's a necessity. The cloud, with its innate flexibility and adaptability, lends itself to creating customer-centric experiences. The ubiquity of mobile devices and the rising preference for self-service tools further underscore the cloud's importance. With cloud at the core, banks can serve customers anytime, anywhere, on any device.



believe the cloud will create personalized customer experiences and tailored services



believe the cloud will improve response time and efficiency



believe the cloud will allow real-time data insights and analytics

3. Driving operational efficiency and innovation

Gone are the days when mainframes were the sole drivers of operational tasks. The cloud, with its broader ecosystem, offers a plethora of options to drive efficiency. Harnessing the power of AI, especially the concept of GenAI, banks can smoothly transition from mainframes to the cloud, streamlining operations and fostering innovation. The future of banking hinges on innovation, and the cloud is its bedrock.

4. Harnessing the power of advanced analytics

Data is the lifeblood of modern banking. The cloud provides a holistic environment for data management, with tools facilitating advanced analytics. With the cloud, data-driven insights are not just faster but also more accurate, aiding decision-making and strategy formulation.

5. Scalability and collaboration

Perhaps the most talked about advantage of the cloud is its elasticity. Banks can easily ramp up or scale down their operations based on demand, and theoretically only pay for what they need. But more than this, the cloud fosters collaboration, breaking down silos and promoting a more integrated working environment.

The ultimate goal for most banks is clear: transition to a cloud-centric model. The cloud is not just an operational tool; it is a strategic enabler, laying the groundwork for innovative services and solutions.

The move to cloud centrality

As banks move forward, the goal is straightforward: adopt a cloud-centric approach. This shift is about practicality and necessity. Cloud technology allows banks to meet current customer expectations for on-demand service and helps them adjust quickly to market changes and regulatory requirements.

In essence, the cloud is not just about keeping up with the times; it's about setting the stage for future innovation. For banks, this means using cloud technology to create a more integrated, efficient and customer-focused operation. The transition to cloud is a strategic move toward a more agile and cost-effective banking model.

Chapter 4

The rise of AI

The application of artificial intelligence in banking is not a novel concept; banks have long harnessed AI for various purposes, ranging from algorithmic trading to risk management and credit scoring to fraud detection.

However, the advent of generative AI marks a significant shift in capabilities. Unlike previous AI models that focused largely on data analysis and pattern recognition, generative AI — a term that only saw widespread use from early 2023 — transcends these boundaries by creating new, original outputs, effectively expanding the realm of what's possible in banking.

At its core, generative AI refers to algorithms that can learn from data inputs to create new, original digital outputs. These can include text, images, and even complex data patterns and code. This technology leverages neural networks and much of its potential stems from the exceptional fidelity of the output it generates.

Through the course of 2023, there was growing excitement around potential GenAI use cases in banking. GenAI strength lies in its exceptional versatility. It acts as a multifaceted tool, adaptable to myriad banking functions and capable of producing a diverse array of outputs, from predictive models to personalized customer communications. This versatility enables GenAI to transition seamlessly between different banking domains, be it crafting bespoke investment strategies for private banking clients or conducting complex scenario analysis for corporate risk management.

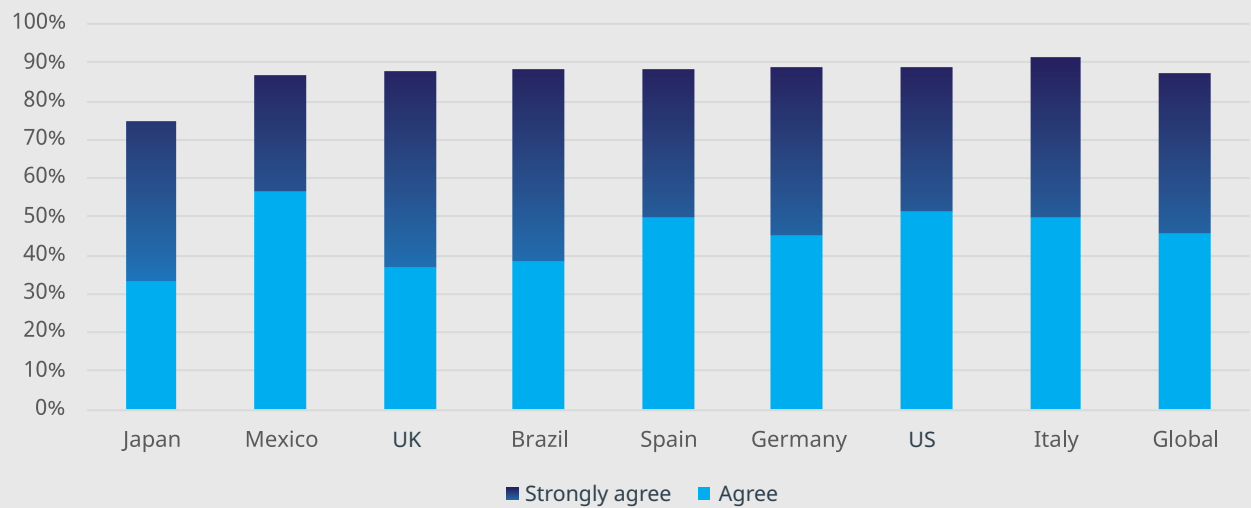
Its ability to learn from and synthesize vast datasets into coherent, actionable insights makes it not just a solution for individual problems but a transformative force that can pivot according to the shifting demands of the financial landscape.



GenAI: From buzzword to talk of the boardroom

Generative AI has rapidly ascended from a tech industry buzzword to a subject of discussion in the boardroom. Its emergence reflects a broader shift in the financial sector, as bank executives increasingly recognize the technology's potential to revolutionize customer experience, operational efficiency and strategic decision-making. It's seen as a fundamental driver of future banking innovation.

There is increasing pressure to implement new AI technologies from the board and leadership teams.

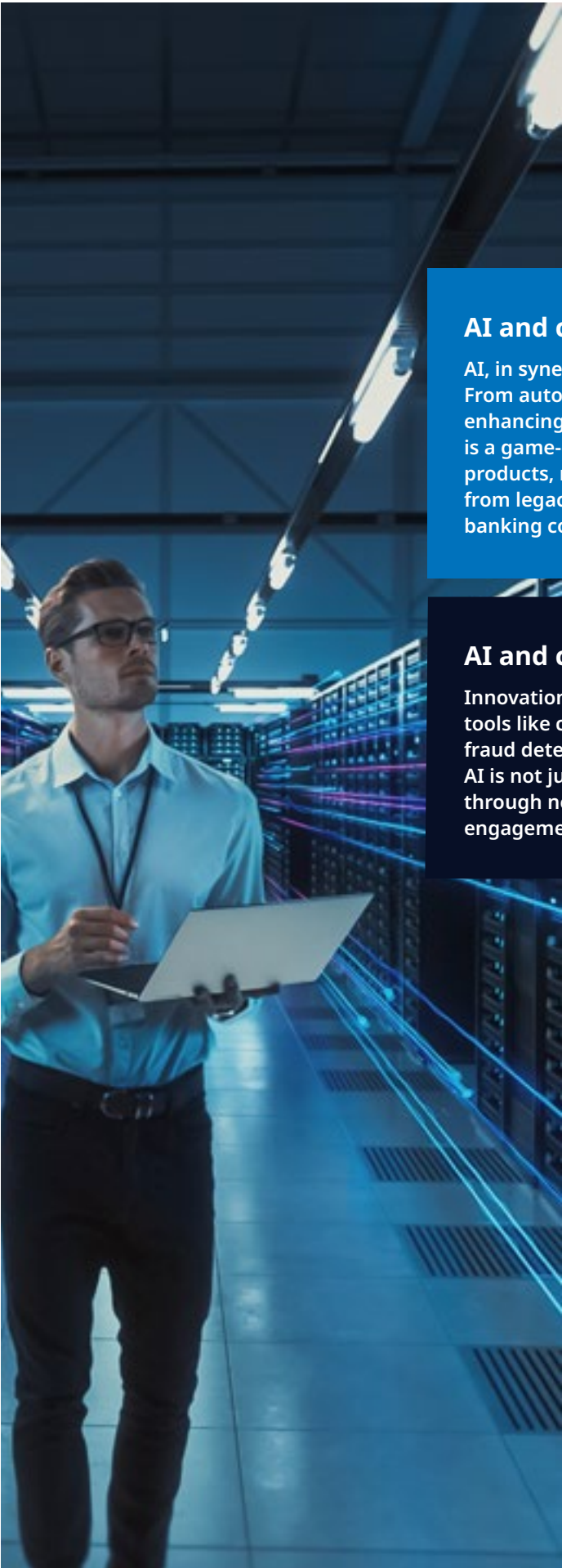


At the highest levels of bank leadership, generative AI is now a key focus, with discussions centered around deployment strategies, investments and the competitive edge it can offer. Importantly, this board-level interest is driven primarily by the vast business impact potential of generative AI in areas like customer engagement, contract automation, fraud prevention and accelerating digital transformation.

Among banking decision-makers, 87% agree that there is increasing pressure to implement new AI technologies from the board and leadership teams. According to Celent research, generative AI tops the list of emerging

technologies with which banks are experimenting. At a global level, 41% of banks are currently exploring use cases for this technology, while a further 31% have projects related to this technology on their roadmap for 2023/2024.⁷

The technology is integral to banks' efforts to meet rising customer demands and remain relevant in a market where digital agility is a prerequisite for success. Consequently, generative AI is shaping up to be more than just a strategic advantage — it's becoming an essential component in the evolution of banking.



AI and cloud: The power of two, driving the future of banking today

AI and cloud as an enabler:

AI, in synergy with the cloud, is ushering in a new era for banks. From automating mundane tasks such as transaction processing to enhancing customer service with personalized recommendations, AI is a game-changer. The potential of AI extends to developing novel products, refining risk management and supporting the transition from legacy systems. Yet, as with all technology, AI's deployment in banking comes with its challenges, notably in security and compliance.

AI and cloud as an innovator:

Innovation is the name of the game. Banks equipped with AI-powered tools like chatbots for around-the-clock customer service or advanced fraud detection systems are redefining the banking experience. But AI is not just about efficiency; it's also about revenue generation, be it through new product development or smarter customer engagement strategies.

In the end, it's clear: The best innovators are tapping into the cloud, and the real trailblazers are leading in AI. The brightest minds in banking are gravitating toward these twin pillars, ensuring that legacy systems don't impede progress.

Generating value: Generative AI use cases and business impact

While GenAI holds vast technological promise, its true value lies in the real-world problems it can solve for banks and the concrete benefits it enables.



Customer engagement

While analysis of customer data is integral for banks, high volume and variety of information pose a challenge. Generative AI holds potential to transform customer engagement through highly personalized recommendations informed by mining vast amounts of transaction data and spending behaviors. It stands to enrich customer service by enabling around-the-clock responses via chatbots that could emulate contextual, human-like conversations.



Contract and content generation

By synthesizing large customer datasets, generative AI has the potential to automate customized contract drafting and documentation tailored to unique attributes and needs. It also unlocks the possibility to rapidly develop a wide variety of targeted marketing content and campaigns that resonate across customer segments.



Fraud and risk management

Applying process automation and pattern recognition, generative AI offers the potential to accelerate fraud identification and equip analysts to make decisive risk management interventions through sophisticated customer profiling. Additionally, by testing myriad scenarios, it can enhance financial institutions' credit allocation decisions.



Digital transformation acceleration

With possible applications in automated code conversion and data migration, generative AI offers significant potential to hasten legacy modernization efforts. It also promises more rapid development and testing of cloud-based solutions aligned to dynamic business demands and consumer expectations.

Mainframe's tenacity and its inevitable sunset

The demise of mainframes has been forecasted for decades, often dubbed as legacy tech on the brink of extinction. Yet, as we have seen from the research, these robust machines continue to power core business processes for banks. Their longevity can be attributed to several factors:



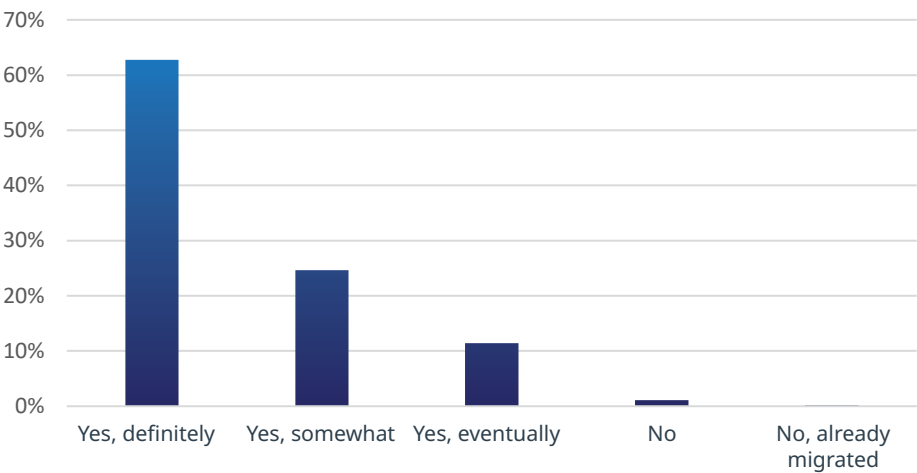
- **Reliability and stability:** Mainframes are renowned for their impressive uptime and resilience against failures, making them an attractive option for businesses that require high availability.
- **Security:** Built with robust security features, mainframes offer an unmatched defense against cyberthreats, ensuring the protection of critical data and operations.
- **Legacy applications:** Many legacy applications, developed over years, are so deeply embedded in organizational processes that migrating them to newer platforms poses a daunting challenge. The cost, risk and time associated with these migrations often deter companies from moving away from mainframes.
- **Performance:** For large-scale transactional workloads, mainframes still offer impressive processing power that is powerful enough for the tasks they were built for, and new mainframe hardware is still being developed and released.

However, while these factors have contributed to the mainframe's impressive lifespan, technological advances and changing business needs indicate that its reign may be waning.

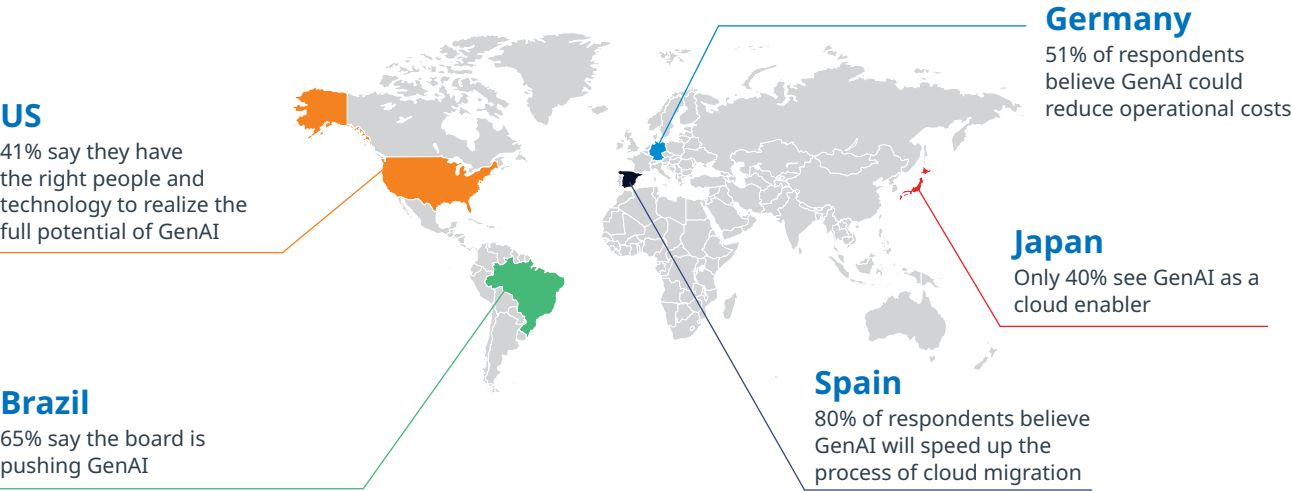
The influence of generative AI

The influence of generative AI on accelerating the cloud migration process is clear. A significant majority, 63%, affirm that generative AI is definitively prompting more banking applications to transition to the cloud. Another 25% acknowledge a trend in this direction. A smaller group, 11%, sees potential but believes a solid business case is necessary to drive the transition. Only 1% of the respondents do not believe generative AI will make a difference to their cloud journey.

Will leveraging generative AI speed up your cloud migration?



The data conveys a strong sense of optimism about the role of generative AI in cloud adoption, signalling that as AI technology advances, it could become a key catalyst for cloud migration in the banking sector.



There is strong positive sentiment toward the impact of generative AI on the acceleration of cloud adoption across countries.

In United States, 71% of respondents affirm that generative AI is definitively catalyzing the cloud migration process. Germany and Spain report 51% and 80%, respectively. Japanese respondents are more cautious, with only 40% seeing a definitive impact.

While optimism is generally high, a contingent across all regions acknowledges the need for a compelling business case to support the transition. A small percentage of skeptics exist, particularly in Japan and Brazil, where some do not foresee a difference or have already completed migration.

Overall, the data suggests that generative AI is perceived as a significant enabler for cloud migration in the banking sector, though views on its influence vary by region.

Generative AI and the opportunity to advance faster

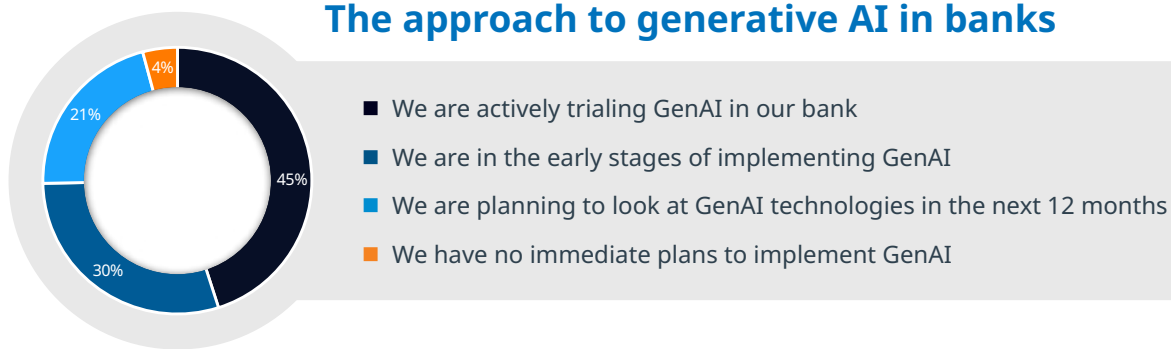
Mainframes aren't only a legacy technology from a hardware point of view, they often run legacy software too. For example, software that is written in languages such as COBOL and PL/I, and transactional programs that aren't well suited for running in cloud environments.

Similarly, generative AI's capabilities aren't simply confined to the written word; they also extend to computer code. Therefore, it has the potential to port an entire code base from a legacy language such as COBOL to a more modern language — and speed up the process of user acceptance testing and quality assurance too.

For example, NTT DATA is solving legacy modernization using fintech to create a GenAI-based solution accelerator (advanced data science, such as Open AI, deploying multiple large language models) to generate a natural language processing technique) to reverse-engineer and generate architecture, design, data map and business logic by reading and parsing legacy code (mainframe and distributed). The solution roadmap includes automatic code generation in target-state technology standards to deliver multitudes the value (speed to market, reduction of technology debt, better risk management and return on investments) to clients across the globe.

The research shows that these applications are already being considered by many banking decision-makers.

The approach to generative AI in banks



Key insights include:

- A substantial 34% believe generative AI plays a crucial role in optimizing costs, resources and overall business strategy — this is indicative of AI's capability to make the migration process more economical and efficient.
- The emphasis on efficiency, scalability and data migration by 33% of respondents highlights AI's potential to streamline and accelerate the transition, addressing some of the main concerns businesses have about moving away from mainframes.
- The identification of obsolete components in legacy systems by generative AI, as agreed upon by 30% of respondents, can drastically reduce the complexity and cost of migration.
- Additionally, the emphasis on risk reduction, employee upskilling and seamless integration through AI-driven tools points to a holistic approach that looks beyond mere technology migration, focusing on overall organizational readiness.

It seems likely that the confluence of emerging technologies, evolving business needs and the undeniable advantages of cloud platforms will predicate the eventual decline of the mainframe. The argument that the skills don't exist to refactor or rewrite code doesn't stack up when generative AI, with its myriad capabilities, has the potential to solve the challenges of the past and unlock the opportunities of the future.

Overcoming barriers to the implementation of generative AI

With any pioneering technology, the integration of AI and, more specifically, GenAI, comes with its set of challenges:

The third-party quandary

A significant portion of banks, 34% to be precise, grapple with concerns surrounding the use of third-party AI models. Entrusting external providers with such pivotal technology presents several issues:

- **Control & customization:** External models often come with limitations on adaptability, posing a challenge for banks to align them with their unique requirements.
- **Data privacy:** Handing over sensitive banking data to third-party providers raises inevitable questions on data security and confidentiality.
- **Dependency:** An over-reliance on external AI vendors can jeopardize banks' operational autonomy, making them vulnerable to vendor-specific challenges and limitations.

Integration hiccups

With 31% of banks highlighting the challenges in melding generative AI with their existing IT infrastructure, it's evident that seamless integration is easier said than done. GenAI, with its advanced requirements, often necessitates an overhaul of traditional systems, which can be both time-consuming and resource-intensive.

The human element

Perhaps the most intractable of all challenges is the human one. As AI's capabilities grow, so does the fear of potential job losses due to automation. A significant number of banks (30%) are wary of the societal implications of replacing human roles with AI. While efficiency is paramount, it's crucial to strike a balance to ensure the workforce's morale and security aren't compromised.

It's important to note that while the technical challenges posed by AI might parallel those encountered with cloud integration, AI's implications are more far-reaching. The considerations extend beyond the technical realm, touching upon ethics, job security and societal responsibility. As AI solidifies its place in banking, these wider considerations are gaining traction, and banks need to ensure that the transition is not just technologically sound but also ethically responsible.

But, as AI continues its ascent in the banking world, its prioritization is no longer limited to tech teams or IT departments. It has become a board-level priority, with top-tier executives acknowledging its potential and deliberating on its optimal integration.

AI's role in mainframe-to-cloud transition

AI, with its forward-thinking capabilities, is potentially the lynchpin in the shift from traditional mainframe systems to agile cloud platforms, as 63% of respondents affirm that generative AI is prompting more banking applications to transition to the cloud.

Two primary reasons fuel this argument

Fear of being left behind: The advantages offered by the new generation of generative AI technology can't be ignored. Traditional banks face a real threat from agile neobanks, unfettered by outdated mainframe constraints.

Reduced risk & cost: Generative AI offers automation and intelligence that mitigates risks and reduces transition costs to an acceptable threshold.

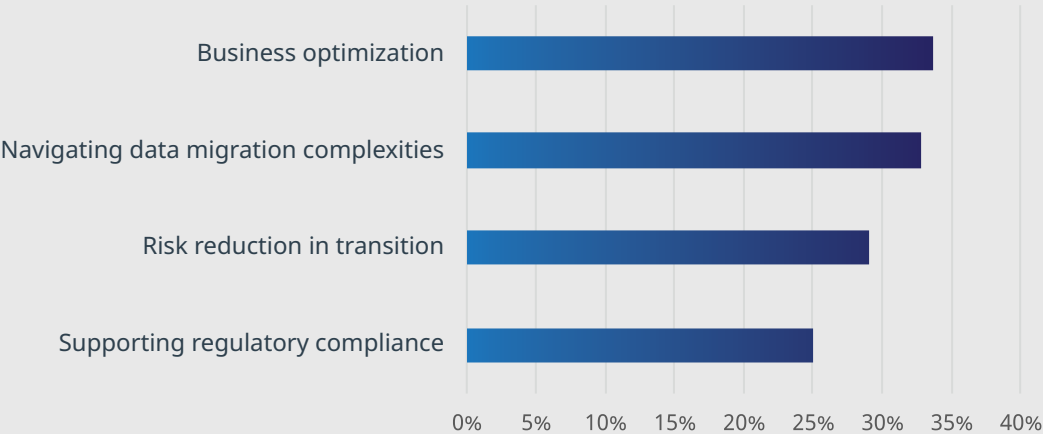
Digital transformation catalyzed by AI and cloud

With the integration of AI and cloud-native technology, a promising future awaits where banks can cater more responsively to customer needs. According to the research, 87% believe that generative AI will expedite their migration to the cloud. Furthermore, 63% opine that it's a valid reason to transition more applications to the cloud.

The extended use cases for generative AI

Generative AI is poised to transform banking, and there is already a broad shift in the ways GenAI will integrate into the banking framework.

Extended use cases for GenAI in banking



The research found that about a third of industry leaders (34%) recognize the potential of generative AI to fine-tune business processes, leveraging its advanced analytics to drive operational excellence. Equally important, 33% of these executives see this technology as a key player in easing the complexities of data migration.

Everest, a leading global BPO research firm, explained in a recent research paper that there are several ways enterprises use generative AI: "For example, in banking, generative AI can be applied to industry-specific processes such as credit evaluation and account maintenance, and horizontal processes such as hire-to-retain and accounts payable."⁸

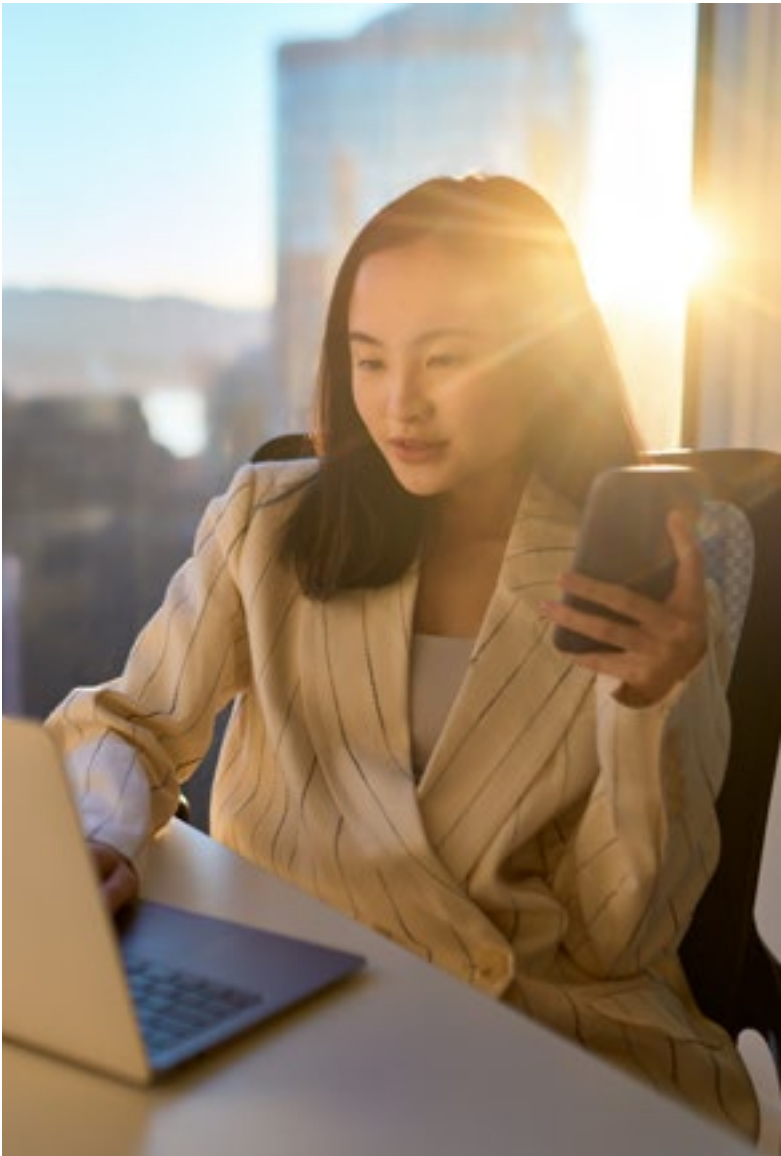
29% of leaders in the field are counting on generative AI to reduce the risks associated with the transition from mainframe to cloud-based systems. And when it comes to regulatory compliance, 25% believe that generative AI can offer substantial support, pointing to its expanding role in maintaining governance and adherence to industry standards.

These insights paint a clear picture: GenAI is rapidly becoming an indispensable element in the banking sector's ongoing digital evolution.

Generative AI for sustainable banking

45% of banking decision-makers strongly agree that generative AI will help meet sustainability goals and that the technology's disruptive capabilities will extend to assisting financial institutions achieve their ESG goals.

From reducing reliance on legacy hardware to reimagining roles and creating AI co-pilots, the promise is that AI will help banks increase efficiency across multiple metrics.



Conclusion

The journey to the future of banking

In the evolution of banking, mainframes have been the bedrock, demonstrating unparalleled tenacity in managing business-critical operations. Their resilience is legendary, yet the industry stands at the cusp of a remarkable shift.

While mainframes have begun their gradual sunset, their legacy presents twin challenges in skill management. On one hand, there is the imperative to retain the diminishing pool of institutional knowledge as many experts in mainframe technologies approach retirement. On the other are the competitive challenges of attracting talent skilled in modern cloud technologies.

Our research confirms that many crucial banking processes are still anchored in the mainframe. However, GenAI is emerging as a transformative catalyst, enabling the transition to agile and innovative cloud environments without compromising the security and robustness that mainframes have provided. It's a balancing act of preserving the old while embracing the new.

The advent of AI and cloud technologies heralds a significant overhaul in banking operations. This transformation is as epochal as the shift to internet banking and mobile platforms. But unusually, it extends far beyond technology; it heralds a redefinition of roles and jobs within the banking

industry. As banks navigate away from their mainframe dependencies and leverage AI, they do not merely alter their technological landscape; they reshape the very fabric of their workforce.

This shift will bring banks closer to their clients, empowering these organizations to provide more personalized, efficient and responsive services.

The integration of AI and cloud technologies will enable banks to have a more profound understanding of customer needs, preferences and behaviors, allowing for the delivery of faster services that are more secure and more attuned to the individual demands of modern consumers.

In conclusion, the future of banking, buoyed by the winds of digital transformation, is set to offer an unprecedented level of service excellence. While generative AI holds remarkable transformative potential, it is better viewed as an enabling force that accelerates change rather than wholly reshaping banking models on its own. Mainframe migrations are not just a sign of technological progression but a beacon of the enhanced customer relationships and innovative financial solutions that lie ahead.

As this new era dawns, banks will find themselves not only operating with greater efficiency but also engaging with their customers using entirely new methods and channels, ultimately redefining the essence of what it means to be a trusted financial partner.



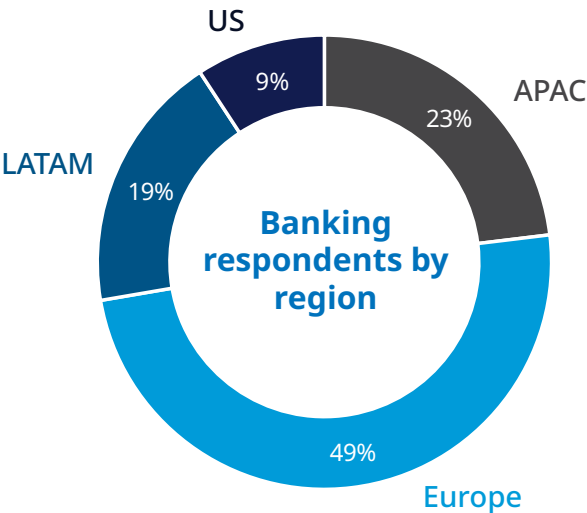
Appendix

Demographics of respondents

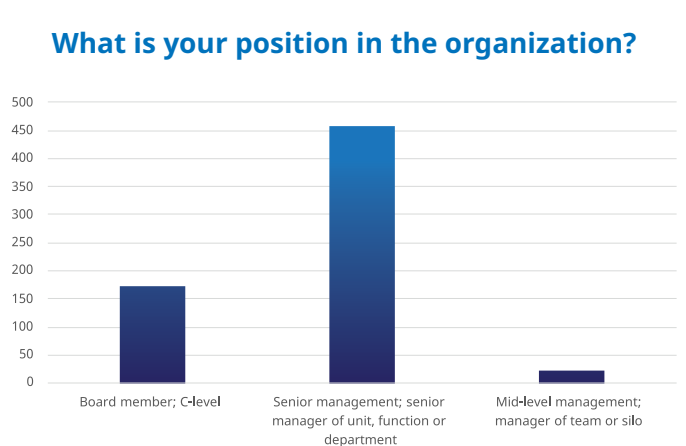
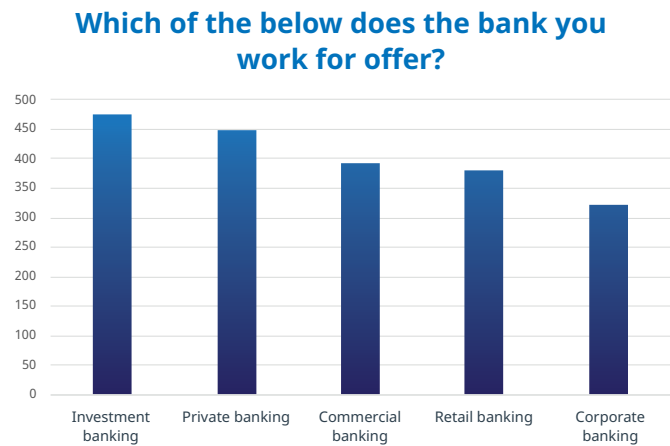
The research went to senior IT/technology decision-makers working for banks with more than \$10 billion in revenue to understand their bank’s approach to AI, cloud and mainframe technologies.

In total, 650 interviews were conducted with respondents from 8 different countries split as follows:

Country	Responses
Brazil	60
Germany	100
Italy	60
Japan	60
Mexico	60
Spain	60
UK	100
US	150
Total	650



Demographic breakdown:



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