

# Core Banking Modernization

*For improved operating leverage, increased flexibility  
and sustainable competitive differentiation*

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## Executive summary

Dramatic forces of change are sweeping the banking industry. The age of the empowered customer is here, changing the way financial products are being created, delivered, sold and serviced by banks. Relationships with clients, partners and regulators are more complex than ever. The digital world has leveled the competitive environment and the inflexibility of a traditional bank's core systems has become the major obstacle to achieving sustainable growth in this new environment.

Modernizing core systems is a major task that requires significant time and investment. Several different approaches to this challenge exist, and each has its advantages. Based on the experience of successful client projects, IBM has a clear understanding of what works and what doesn't, and offers a set of frameworks and accelerators to assist clients in their modernization programs.

This paper will argue that successful approaches to core systems modernization are always progressive — treating modernization as a journey rather than a fixed end-state. Equally, IBM believes that the best way for banks to gain the flexibility and efficiency they need is to create a componentized architecture that separates key constructs and their assets from their core transaction engines.

Once this modern core architecture is established, it will be easier and less risky for banks to acquire the necessary capabilities they need to support new business models and new functions. Banks can gain the ability to choose the optimal solution for each need; renovating elements of their existing system, building a customized solution or selecting and implementing a third party software package — in each case based on the rigors of a proper business case built on a single underlying architecture.



## Introduction

The increasingly networked world is changing the boundaries of traditional industries. Forward-thinking companies are seeking competitive advantage with new approaches to their businesses. Banks are not immune to these changes and are rapidly evolving how they approach markets and customers – and how they provide value and manage risk. To remain relevant and win against new, more nimble competitors, banks need to move to a more streamlined and agile operating environment.

A significant barrier to addressing their current needs and future challenges is the inflexibility of their core banking systems, which cost banks in mature markets approximately US\$200 billion annually<sup>1</sup> while increasing operational complexity. The desire to adapt to changing conditions is evidenced by the fact that nearly 90 percent of bankers in a recent IBM global survey stated that moving away from the status quo is critical to their future profitability.

The table below shows some of the ways in which banks are looking to create and measure sustainable differentiation:

Capability	Success metric
Enabling smarter commerce through the flexible, focused and fast delivery of customer-centric capabilities and compelling, customized risk-adjusted offers	Improved customer insight, customer retention, and increased share of wallet
Enabling efficient and effective operations	Improved cost-to-income ratio and higher return on equity
Providing modern product management capabilities that create and maintain flexible products and product bundles more effectively	Time-to-market
Leveraging customer profitability to create relationship pricing	Accepted versus rejected offers, cross-sell ratios of banking products per customer
Enabling improved risk insight and regulatory compliance	Improved transparency to real-time risk and required risk-based provisioning of working capital
Creating an adaptable business model and supporting technology architecture. These can improve collaboration with other parties and enable better synergies from mergers, acquisitions and divestitures.	Return on capital, increase revenue and reduced operating cost.

*Table 1:* Sustainable differentiation goals

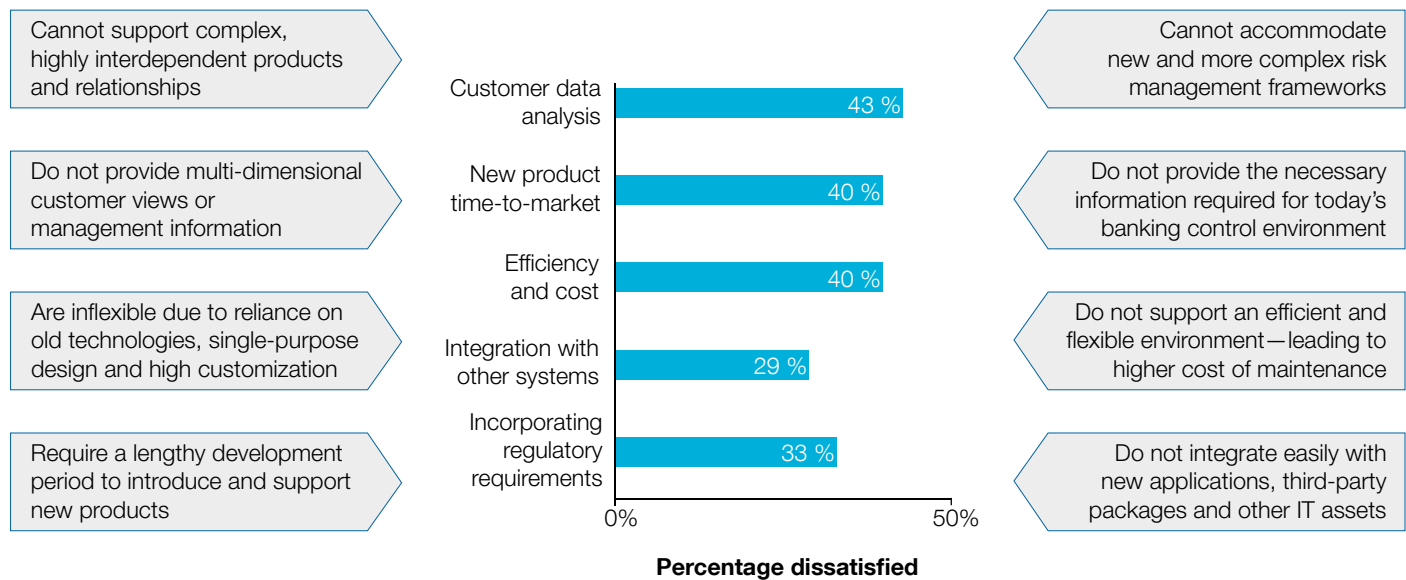


Figure 1: Dissatisfaction with the capabilities provided by current core systems. Source: IBM surveys of large banking customers.

To achieve their goals, banks need to get back to basics and re–think how information is acted upon by the business and how data is shared, distributed and maintained across enterprise operations.

Drawing on the experience of IBM practitioners and partners, we have built up significant individual and institutional knowledge on the characteristics of successful major core banking transformation programs. This paper describes the IBM point of view on modernizing core banking systems, proposing a set of principles and considerations that can help banks be more successful in their journey.

Core systems modernization is often presented as a straight choice between ‘build’ and ‘buy’. This paper will argue that the true situation is far more complex and subtle. Any given path to modernizing core banking systems will inevitably require customization work on many levels. For many banks, the chosen approach may include an element of ‘surround and modernize’, whereby selected legacy components are isolated and used as part of a larger set of processes, then incrementally replaced as required. Regardless, all successful approaches will depend upon the introduction of a centralized foundational architecture that can adapt and grow as the bank’s business changes around it.

Wherever banks choose to start, they must act quickly: new technologies and rapidly evolving customer expectations are causing profound changes in the business landscape that have opened this once impenetrable industry to non–traditional entrants. To innovate ahead of competitors, banks need far greater operating dexterity and access to the operating capital currently locked in legacy systems. Their frustrations with these legacy systems are shown in Figure 1, above.

### Imperatives for banks

Banks are revising their business and operating models to address increasingly demanding customers and fast–paced dynamic markets. The marketplace has conditioned customers to expect instant service and value from every point of contact. They measure their bank experiences against their everyday interactions with other service providers. Not only are customers looking for more value in banking relationships as individuals; they have also developed their own dialog via social media. The increasing empowerment of the collective voice of customers continues to raise the pressure on banks to improve their relationships, stay relevant and demonstrate their added value.

The complexity of core banking systems makes it difficult for banks to adapt to external change. Simplifying and modernizing legacy core banking systems is not a matter of addressing IT cost and efficiency. Rather, the sustainability of the entire business is at stake. IBM sees three key imperatives:

- A new focus on the customer through improved customer information, insight and interaction. Banks that invest in these areas will cultivate customer-centricity, build trust and drive profitable growth.
- The integration of risk management across the enterprise to meet an increasingly complex series of compliance requirements while mitigating operational risk, fighting crime and optimizing financial returns.
- Re-thinking business, operating models and technology architecture – breaking down the existing complex models into their component parts. To gain the agility required for long-term sustainability, banks must rebuild operations using shared components that balance growth, speed-to-market, efficiency and business resiliency. This third imperative will be a major enabler for the first two, providing the necessary agility in both the infrastructure and the organization.

### Making architecture the central theme in core banking modernization

To drive success, smarter banks are adopting a new architecture for their core banking systems. Specifically, they are modernizing their systems by moving from a vertically integrated product-centric operating model to a horizontally integrated customer-centric operating model.

For decades, core systems have been developed on a product-centric design philosophy that catered to delivering operational support for a single product, product line or financial instrument. The product-centric architecture of typical core systems worked adequately when the prevailing go-to-market model was structured around individual products. Each product-centric business line focused on building capabilities to achieve vertical integration from the front office to the back. This model was optimized for throughput and response time but it also introduced duplicated functionality and cost implications across business lines.

The evolution of these product-centric systems has included major system redesigns to address mergers, acquisitions, new regulations and cyclical efforts to reduce costs – all executed in the absence of clear governance policies for IT development. Aiming to accommodate new customer needs across product lines, banks have made thousands of tactical changes to their product-centric systems, creating a tangle of point-to-point interfaces, duplicated or obsolete functionality, redundant applications and inconsistent sets of data, and dead or unreferenced code pools.

Over the years, the hard coding of elements such as data, business processes, business logic and the business rules inside millions of lines of monolithic core system applications has created massive complexity and extremely unwieldy applications that are increasingly difficult to change and maintain. As a result, many banks continue to be burdened with an intertwined set of siloed core systems where even a small change required by the business can have unintended impacts across multiple levels of the architecture.

Given the resulting sprawl and limited documentation of the existing systems, a major portion of IT budgets is spent on simply maintaining existing systems in good working order. Eliminating waste across applications, code and data presents a clear opportunity to reduce infrastructure costs, freeing up budget for new initiatives.

Today's core banking systems need to be freed from their dependencies on front office and operational processes, so that they can do what they were originally designed to do: provide the scalability and throughput required for debit and credit entry workloads.

Working with banks around the world, IBM has developed an architectural approach designed to address these issues. Starting with a modular design philosophy, the approach calls for deconstructing the complex legacy systems into their fundamental architectural building blocks, enabling them to be exploited universally.

The fundamental building blocks are:

- Discrete sets of master data for customers, products and contracts
- De-duplicated and isolated business processes, business logic and the business rules that govern their relationships.

A design approach that isolates and disaggregates key architectural constructs such as data, business processes, business logic, and business rules is enabled by the adoption of common banking industry process, service and data models and Service Oriented Architecture (SOA) principles. Developing core banking systems architectures using the above approach allows business services and components to be developed once and shared across multiple channels, operational processes and product lines. Applications created in this way can be quickly assembled to deliver a business-specific solution at high speed and with less risk – and they are easier and less costly to deploy and maintain. As the portfolio of these services grows, it becomes a strategic asset that enables other solutions in risk management, payments and customer analytics.

While the value of componentizing the core architecture and sharing the resulting components is unassailable, the approach is often challenged in a clash over ‘change the bank’ versus ‘run the bank’ priorities. A pragmatic approach to architectural modularity is to surround and modernize key legacy assets on a case-by-case basis.

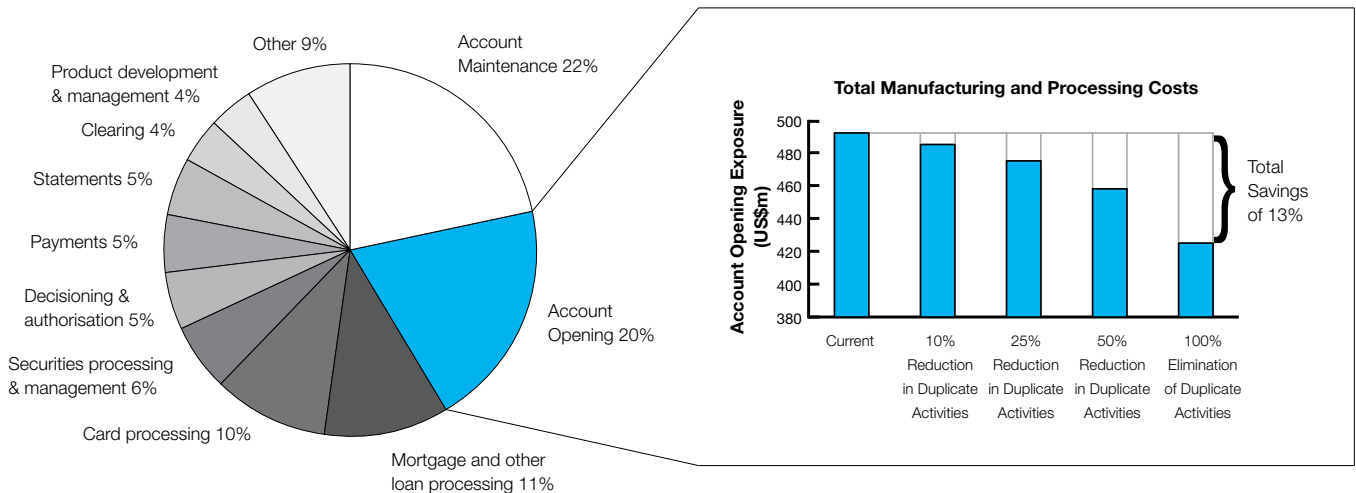
Recognizing the difficulty of maintaining operational continuity while simultaneously making deep structural changes, many large banks identify elements of the legacy infrastructure that can be surrounded with a modern technology layer while the reliable underlying legacy asset continues to function as before. This technique enables legacy IT assets to become modern building blocks very quickly. The new technology layer removes the hard coding between assets, for example, between a channel and the core system. This allows the legacy code to be modernized on its own schedule, limiting the impact that any one component has upon another.

A typical bank could recognize substantial cost savings by eliminating activities duplicated across product lines in the account opening process.

- By eliminating 100% of duplicated activities, the bank could reduce total manufacturing and processing costs by 13.4%.
- By eliminating 50% of duplicated activities, the bank could reduce total manufacturing and processing costs costs by 7%.
- By eliminating just 25% of duplicated activities, the bank could reduce total manufacturing and processing costs costs by 3%.

The significant potential for cost savings through the elimination of duplicated activities and systems is shown in Figure 2, below.

Total Manufacturing & Processing Cost Base



Note: The costs are derived from a detailed analysis of the operations of a large European bank. Labour costs and other expenses incurred to support function of components in the manufacturing and processing layers (excluding IT) are incorporated.

Figure 2: Cutting costs by eliminating activities duplicated across product lines in the account opening process. Source: IBM example from large global bank.

With this renewed architectural thinking and design patterns, banks can develop and manage these building blocks as separate constructs, outside the core transaction engines. This will provide banks with faster, easier and less costly ways to manage and modify each aspect of their operations – including transactions, processes, rules, data – in isolation, without triggering the need to cascade changes to other parts of the system. For example, if a bank wants to add a new business rule or modify an existing product definition, then they can simply make the changes to the business–rules building block or to the product–definition building block.

The newly independent core banking system will be able to provide the scalability and throughput to accommodate the volume processing needs of the front office and excel at performing its primary functions – including writing debit and credit transactions to the general ledger, posting the same transactions to each customer’s account, and acting as the key conduit in authorizing financial transactions. The bank’s operational processes – such as account opening or product bundling – will be able to call upon a consistent set of business logic and business rules that are managed outside the core banking systems and in logical isolation from them. This will provide much more agility, as the design of the system will have all but eliminated the need to manage the impact of changes that would otherwise disrupt operations. Speed to

market will improve because the number of required changes will diminish, and overall maintenance costs will shrink because it is easier to manage and maintain homogenized architectural blocks.

Thoroughly componentizing and modularizing core banking systems can enable a radical simplification of the IT environment, while enhancing the reliability and quality of business–critical information. Executed properly, this approach to modernization will position back–office systems to re–emerge as the key engine for growth and innovation throughout the bank. Figure 3, below, illustrates the use of a service oriented architecture approach to modernize core banking systems.

**IBM point of view to achieve success in core banking modernization**

Drawing on a wealth of experience working for the world’s largest financial institutions, as well as super–regional banks in both the mature and growth markets, IBM understands what it takes to successfully negotiate the obstacles and deliver the full benefits of core systems modernization. We know why certain approaches work and why others fail. We know how banks with successful programs and projects organize themselves, what architectural factors they considered, and why they made key decisions that have proven vital for successful outcomes.

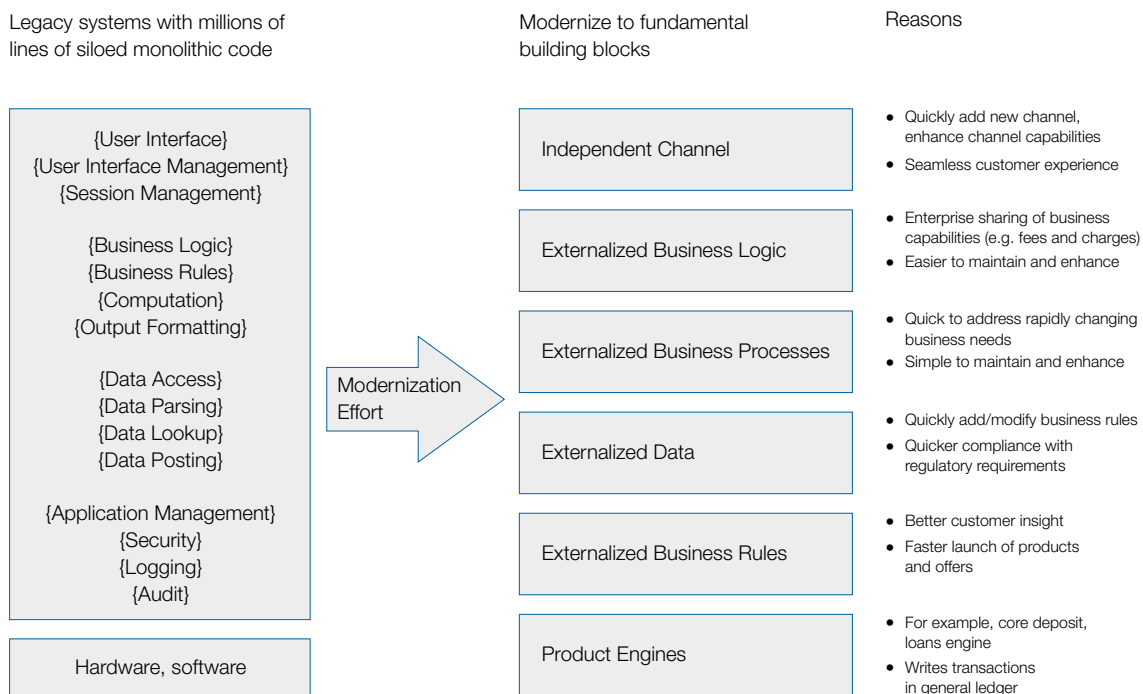


Figure 3: IBM's point of view of the required architectural building blocks for core banking transformation.

Successful core banking modernization projects adhere to six principles:

1. Based on a program roadmap and governance policy jointly developed by business and IT leadership
2. Founded on a well-defined business case with quantifiable business outcomes
3. Committed to achieve a modular architecture linking business processes with IT capabilities in a way that dramatically increases agility and reliability
4. Executed using an approach that minimizes disruption while addressing change and mitigating risk
5. Architected on an optimized infrastructure that can evolve with proven technology innovations
6. Delivered using scalable, industrial-strength 'factory' and project-management concepts.

### **Jointly committed roadmap and governance policies**

The transformation of a bank's core systems is often seen as an IT topic with IT benefits. In fact, its aim is to address a pressing set of business needs, and to deliver business capabilities while lowering overall operating costs, not just IT costs. To achieve appropriate board-level sponsorship, successful programs are intentionally business-oriented and guided by deep collaboration between the business and IT functions.

It is vital for banks to set up a joint business and IT governance structure to drive the modernization program. Once the governance structure is in place and the objectives are agreed, the bank needs to align the rest of the organization, fostering a collective strategic responsibility to drive towards a successful outcome. Business and IT, working together, can clearly define and jointly agree on a roadmap that meets both tactical and strategic requirements. They can also ensure that the modernization roadmap delivers tangible business results in stages along the journey itself, helping to maintain project momentum.

Ambiguity in roles and responsibilities can be among the major causes of project delays and even failure. Business and IT teams need to have a common forum where business priorities and objectives are discussed and their IT enablement options – including cost, time and risks – are clearly evaluated and agreed. This requires all constituents to take the time to understand how the demands for agility, flexibility and time-to-market need to be balanced against system complexity, development processes and the technology architecture.

The program will require senior management input and guidance to overcome barriers in communications and rapidly address issues that are critical to the success of the program. In preparation for these eventualities, successful banks often include the strategic goals of the roadmap in the personal performance targets of the executive sponsors, and also incent team leaders to work across traditional silos to ensure the program's success.

A large global European bank is driving its transformation effort progressively by ensuring tight linkages between business and IT stakeholders. The bank has defined a clear set of business metrics as part of its strategic objectives. These business metrics have been included in the personal business commitments of senior executives and form part of their performance measures. IT has outlined a set of initiatives to match the business expectations. In order to meet the timeline set by the business, the IT function has innovated a number of unique approaches to transformation that ensure rapid delivery of new business capabilities. Business and IT teams both oversee the progress of the transformation on a regular basis. The alignment between business and IT runs deep from strategic level to all aspects of operational level and is directly measured through service level agreements and operating level agreements. This ensures a closer match between what is required and what is actually delivered and balancing demand and supply. Over the past 3 years of transformation effort, the bank has been able to significantly reduce its net operating cost by 10 percent and reduce the cost of IT from 27 percent of total operating costs to just 15 percent.

## A well-defined business case

Given the strategic intent that a core systems modernization program targets, it is crucial to gain agreement on the business case and to establish a common understanding of the impact on the financial performance of the bank. At every level, the bank should be clear that the program is more than just reducing IT spend. Rather, it is required to enable new front-office capabilities that can deliver more profitable revenue streams, while simultaneously cutting operational costs across all lines of business.

Banks must determine and agree on the business benefits and embed those measurements into the management system. Banks should baseline and measure both the direct and indirect benefits, starting with an analysis of the current operating costs. The business case should include the assessed impact on business growth, profit margins, operating leverage and overall operating cost. Adopting key performance indicators to monitor the effect of the initiative will help the bank maintain the business case as new requirements emerge. The objective here is to reveal all instances of redundancies and poor alignment to the bank's overall strategic objectives. These can then be compared and contrasted with the existing operating cost structure to uncover inefficiencies and missed revenue opportunities such as:

- Over-reliance on manual processes, resulting in excess front office staff
- Maintenance of technical and organization links across the enterprise to get a single view of the customer, resulting in high cost and inflexibility
- Use of redundant and duplicate systems – for example, opening accounts across multiple product lines – resulting in unnecessary cost and complexity
- Inability to effectively mine customer data for cross-selling, increasing wallet share, customer retention and launching more targeted products and services, resulting in loss of market opportunity.

The benefit statements in the business case, therefore, should target both cost and income levers. The real measure is expressed in terms of direct improvement in operating margins, reduced cost-to-income ratio, increased operating leverage and overall return on equity. Use of such measures calls for the bank to make the business case using fine-grained key performance indicators (KPIs) rather than Net Present Value or discounted cash flow analysis alone.

Figure 4 on page 9 illustrates the cost savings and revenue increases enabled by a core banking systems modernization project, undertaken in parallel with a business process optimization project.

A top global bank in Europe embarked on a major core systems transformation effort backed by a strong business case. The business case projected an aggressive reduction in the cost-to-income ratio from 50 percent to 30 percent and a four-fold improvement in operating leverage. These goals formed part of the performance targets for senior executives, ensuring accountability and ownership. To align the transformation effort to the right areas of the business, the bank first analyzed its entire value chain from the manufacturing to the distribution of its products and services, compared these findings against its go-to-business model, and targeted selected areas of the value chain with a disproportionate level of investment to improve its operating margins. The bank completely modernized its distribution capabilities, putting the emphasis on growth and customer acquisition, and streamlined its operational processes to take out cost and improve efficiency. Within six years, the bank achieved both its cost-to-income and operating leverage goals.



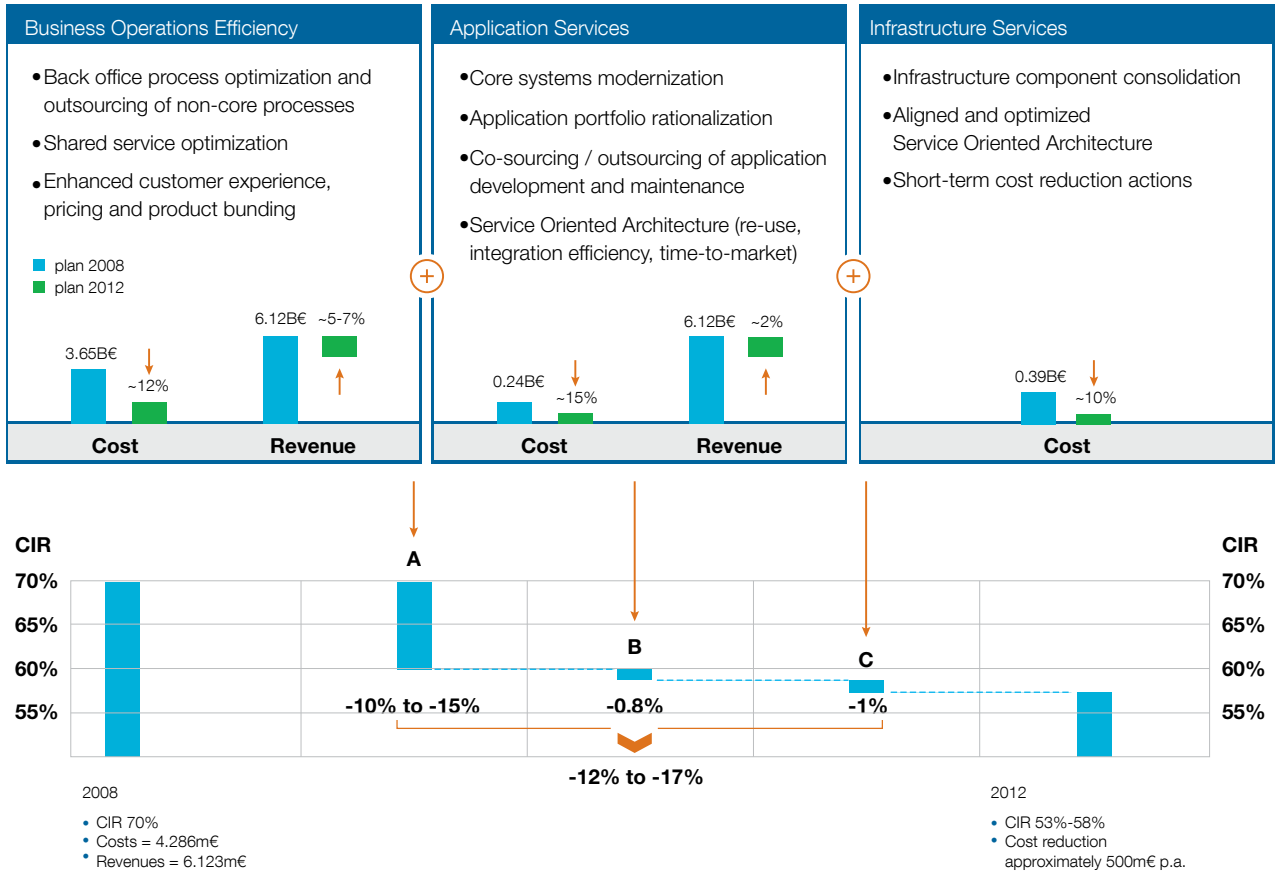


Figure 4: Cost savings and revenue increases through core systems modernization. Source: IBM analysis of a large global bank. Cost structures and potential benefits will vary by institution.

## **Modular architecture that aligns business processes and technology capabilities**

Developing a componentized view of the business architecture is a crucial input in the design of any core system modernization program. A bank can use this design principle to envision a set of business capabilities described as discrete business components. The result is a component business model that banks can use to imprint their strategic imperatives and determine which areas of their operations need the most attention to deliver on their strategy. Banks can then easily map their current resource consumption (people, process and technology) using the model and determine where resources are properly aligned and which components will need disproportionate investment. The resulting clarity will enable a razor-sharp focus on where to direct the effort of the program and which business capabilities to prioritize in pursuit of strategic goals.

A componentized model can help banks direct investments to operations where their strategic focus will achieve sustainable competitive differentiation in the marketplace. They can then engage partners to provide services in more generic areas of the business where the primary concerns are scale and efficiency. By focusing on a few business components, banks can prioritize their activities and minimize risk, disruption, and cost – while rapidly achieving tangible results.

Once the business component model has been created, the technology architecture can be componentized in a similar manner and correlated with the business architecture. The goal is to modularize the information systems architecture into its fundamental building blocks and to manage each of the blocks separately. This approach enables greater speed, agility and flexibility, making it easier to support new business initiatives, while improving control and reducing costs in IT.

For IBM, the key modular technology architecture design principles are:

- **Data:** separation of operational, analytical and master data, and further separation of master data into customer, product and contract categories.
- **Business logic:** express the logic as a self-contained set of granular components that have limited or no data dependency.
- **Business rules:** centralize into a standalone business rules engine so that they can be used both easily and consistently across the enterprise.
- **Process models:** express as a set of discrete components that can be orchestrated to deliver all the desired business services – and easily added to, modified, and enhanced as business requirements evolve.
- **Enterprise service bus:** use a defined, enterprise-standard interface between all architectural components and services.
- **Channels:** completely separated from the back office through the enterprise service bus. Business components and services are developed once, published in the enterprise service bus and re-used seamlessly across the channels and devices.
- **Core product engines:** separate out the core engines from the rest of the infrastructure and allow them to do the jobs they were designed for: authorizing and processing large and growing volumes of transactions.

Figure 5 on page 11 illustrates the key elements in a modular technology architecture.

**IBM Financial Services**  
Point of View

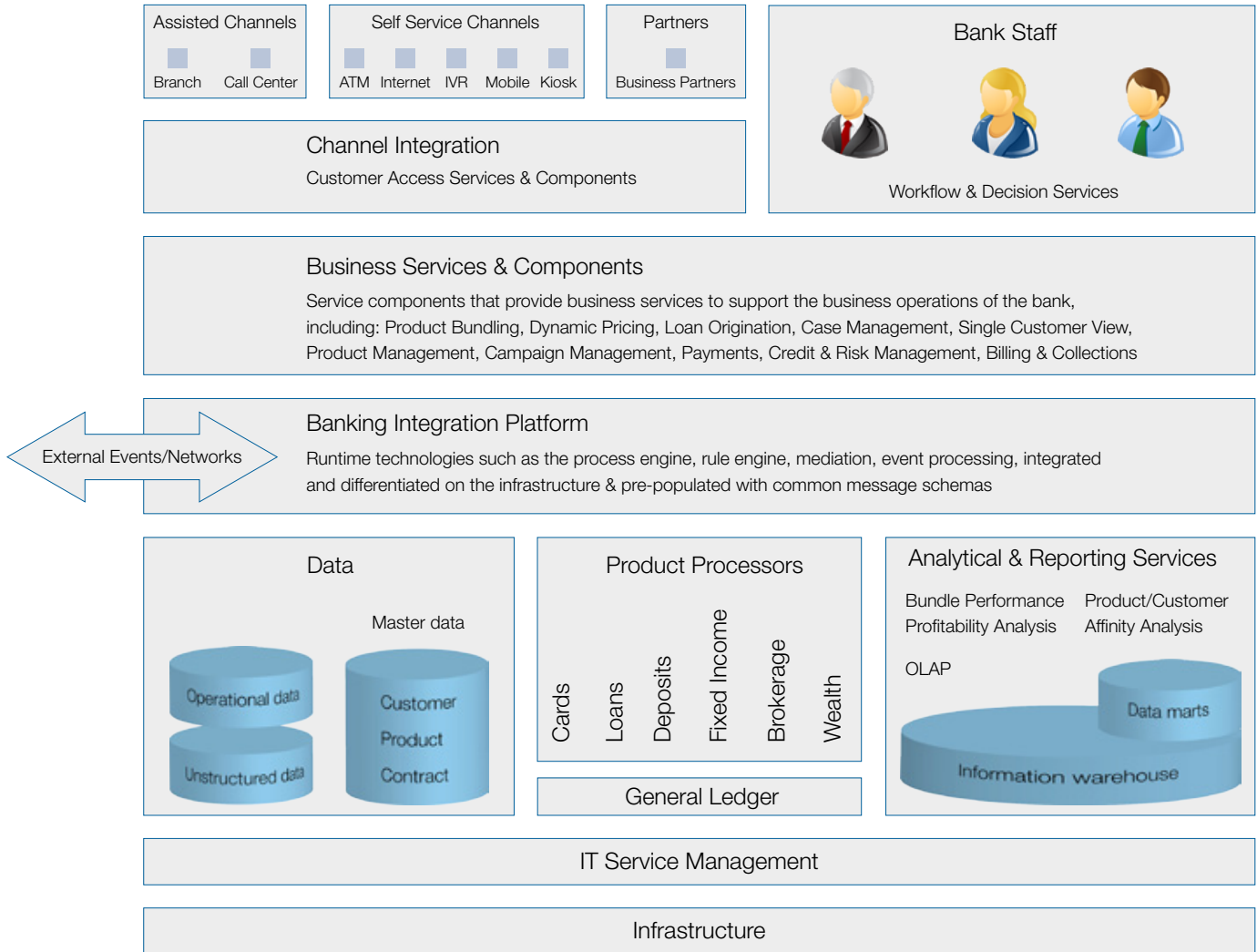


Figure 5: IBM's banking reference architecture.

Once established conceptually, the business and technology architectures can be used to guide decision-making at every step of development and deployment. It will be relatively easy to determine that certain existing assets are not aligned to the new architecture and will likely compound problems during and after each stage of development. For example, if the bank is using workarounds to address how data is organized, or is using point-to-point interfaces between various systems, then there is a strong likelihood these same problematic short-cuts will be migrated to the future. Analyzing the alignment between the existing technology assets and the future architecture will flag up such issues and enable them to be resolved.

Separation of the architectural concerns is necessary to ensure flexibility and agility. The more componentized and granular the architectural constructs are, the easier it will be for the bank to drive the strategic objectives identified in the target business and operating model. An architecture without dependencies between components will allow a bank to change its business rules without affecting other elements, enabling much faster time-to-market. Using these design principles and architecture as a guide, banks can avoid suboptimal results, a drag on development timelines, and the cost to rectify the issues again in the future.

A large global bank is implementing a componentized core banking system. The architecture follows the separation principle, keeping channels, data, business logic, business rules and process orchestration outside the core systems. Over the coming years, the bank will externalize its key architectural constructs to provide more granularity and modularity, so that future changes will be less painful and quicker to execute. By adopting these architectural constructs, the bank has been able to accelerate the rollout of new operations by 30 percent in international markets. Where changes to data, rules, and business logic are required, the bank can make them in a targeted manner without needing to spend time cascading changes to the whole system.

## The execution approach, addressing change and mitigating risk

Modernizing core systems is a complex task that will consume significant time and resources for any bank. In IBM's experience, successful banks approach modernization as a journey rather than a fixed end-state, and incorporate enough flexibility and understanding of the business to be able to change to meet new requirements along the way. IBM believes that a core banking modernization program should follow a progressive path defined by a well-laid roadmap. Banks need to take a programmatic approach, where smaller projects can deliver new value frequently and where the program is adaptable to emerging requirements. They need to create the right internal organization and incentives to manage complexity. They also need to ensure that the correct resources are in place at the right times throughout all the projects that contribute to the overall program.

Developing the appropriate approach depends on many specifics, including the objectives, scope, mandate, and timeline. For larger banks with more complex operations and broader operational and geographic scope, the challenge will be proportionately greater. Among other things, these banks will need to consider current and future regulatory controls in their markets, and will need to take into account a larger and more complex set of IT systems, carefully considering how each fits into the regional and corporate operating model. They are also likely to require more effort to model their to-be business and operating environments.

The experience of major banks points to a clear conclusion: the most important element in the transformation program is the architecture. Specifically, banks gain the flexibility and efficiency they need by creating a componentized architecture that separates out key constructs and their assets from the core transaction engines. Without the necessary discipline to separate the architectural concerns, and without investments to mature the fundamental architectural building blocks, banks are likely to repeat the mistakes of legacy approaches, ending up with a tangle of interconnected systems in which changes in one area are likely to have unintended and unpredictable consequences in another.

A bank that has a modernized core system will find that it is much easier, faster and cheaper to integrate and test a new application. Whether this application is created in-house or sourced as a packaged solution, a bank with a componentized architecture at its foundation will be able to accelerate the deployment. In IBM's experience, focusing on the architecture first, then the platform, then the solution, is the approach with the best long-term viability. The solution may entail build, buy, or a hybrid of custom and package components that provides the most effective capabilities. The proposed approach is illustrated in Figure 6, below.

Once governance, the roadmap, the business case and the core architecture are established, banks can address each particular requirement within the program on a case-by-case basis, making it possible to choose one or more options for each part of the program. This provides greater flexibility for the banks to deploy either a custom-led approach, a package-based approach, or a hybrid approach to transformation.

By keeping sight of the strategic objectives and the fundamental architectural building blocks needed to meet their strategic objectives, banks can decide where it would make sense to do legacy modernization and where it would make sense to replace legacy with a package solution.

To minimize disruption to the business and mitigate risk, the transformation program should be designed to follow a progressive approach, with each deployment decision taken on its own merits. This will enable banks to choose the right solution in each case without increasing the overall complexity of the architecture. A progressive approach also allows banks to pace their investment and easily ramp up or ramp down the transformation effort should any unforeseen circumstances cause detrimental effects. At each stage, banks can follow a 'surround and modernize' approach whether they choose packages as part of that approach or not.

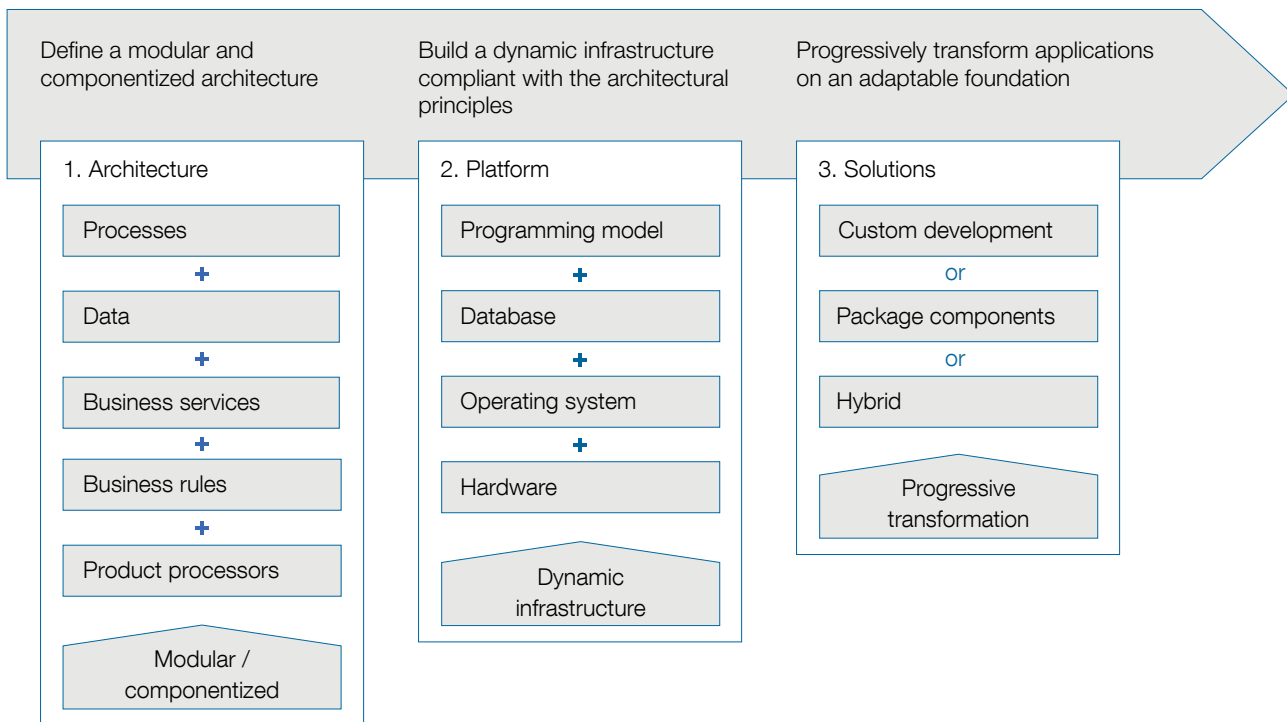


Figure 6: The IBM approach for core banking transformation.

## In IBM's view, the key considerations for a successful modernization journey are:

**Business Requirement Management:** Businesses are not static and their requirements evolve with the marketplace. It should be assumed from the outset that there will be change requests driven by new business or functional requirements. There should be periodic reviews and common governance to keep goals aligned and directly linked to the core financial metrics of the program. This can mitigate the impact of skills gaps and potential business disruptions, protecting against significant costs increases, delayed delivery and diminished benefits.

Requirements should be captured and managed centrally, allowing banks with multi-line business units or other global bank entities to centralize their requirements and de-duplicate development efforts. A common vocabulary to discuss, capture and understand business requirements greatly improves the clarity of communication and is critical to the process. Banks that agree to standardize on a uniform taxonomy of terms, defined by the same terms that appear in their data, process and services, tend to be more successful.

**Integrated Tooling Workbench:** A standard set of tools and technology will improve control over the systems development lifecycle process. An integrated tooling workbench can help drive every aspect of the project, from business architecture design to process and data modeling, from system and service design to coding, and from integration and testing to packaging software components for deployment. A common centralized repository of all IT assets should be used to post, publish and read the output of the design and/or development work effort for each phase of the software development lifecycle. An integrated tooling workbench allows the flow of effort to be managed in a seamless manner, improving governance and oversight in order to reduce risk. Equally, an integrated workbench will allow all parties in the effort to use common project artifacts, a common vocabulary, and a single source of truth to speed development and reduce time spent in testing and integration.

**Design process:** To effectively manage the risk of disruption, time to market and cost to transform, banks must combine a top-down approach with the traditional bottom-up approach to legacy modernization. The top-down approach uses banking industry process, service and data models to accelerate the definition of the future state. The bottom-up approach analyzes existing legacy systems, aiming to harvest re-usable components, logic and any other differentiating capabilities built in the past. The 'surround and modernize' approach allows the bank to create and mature the middleware infrastructure in which both top-down design and bottom-up legacy assets can be combined to quickly deliver the business needs. By pursuing both top-down and bottom-up approaches, banks can ensure that they leverage the best of the past while meeting the requirements of the future. Without a top-down business-driven process, service and data models providing an anchor point, a bottom-up method cannot accurately determine which legacy assets would be useful and which would be redundant in the future state. This is effectively the first step in bridging the functional and non-functional requirements, and emphasizes again the need for the business and IT functions to work closely together.

**Build versus buy:** When deciding whether to build or buy, banks should consider the fit between business requirements and the available functionality in packaged solutions. They should also consider the effort required to customize a generic package or to streamline and redeploy existing functionality. Other decision factors may include the overall maturity of the IT organization, the availability of skills, and the long-term commitment to support and maintain newly built systems. The bank will want to understand how the new system will continue to address regulatory and business requirements in each operating territory, its ability to localize common banking practices, and its support for the institution's regional and corporate operating models. Ideally, these decisions will be made on the basis of architectural fit, and on the potential for increased operating leverage and overall return on investment. Banks that have successfully componentized their business model and applied similar principles to their IT architecture will minimize the work required to progressively revise components of the existing systems, as well as to adapt packages as appropriate.

**Proof of concept:** To validate the transformation objectives, the bank should conduct a controlled proof of concept with its chosen design principles and integrated tooling. The scope of the proof of concept should completely mirror all the elements that will be faced during the full execution. In addition to the usual proof-points around architectural constructs, design process, time to deliver business functionality, and overall viability of the effort, the proof of concept should test aspects such as the governance, change and risk management, staffing mix, skills sustainability, technology adoption and method selection. It will then be possible to refine the case for change based on lessons learned, to revisit the effort estimates, and to determine if the chosen method can be scaled up. At this stage, the bank should assess risks to the roadmap related to any likely skills gap, and assess the potential disruption and amount of change that can be successfully handled at any given point in time. The bank should determine the outcomes along the roadmap that will help with the ongoing decision-making process, and determine the appropriate pace of change to the system and the operating environment surrounding it.

**Legacy disposition:** As modernization is progressed and new systems evolve, the old legacy systems have to be decommissioned for the full benefit of the cost case to be realized. A decommissioning strategy should therefore be defined at the outset of the modernization journey. The decision to fully and/or partially decommission legacy systems should be a business decision based on variety of factors. In some cases, the old systems may be determined to be too costly to modernize and may simply be allowed co-exist with the newer part of the modernized systems. In other cases, the old legacy systems may be completely stripped of their useful assets and the remaining portions sunsetted. The stripped assets may be re-platformed and retrofitted into newer architectural constructs.

**Testing and data migration:** In most transformation efforts, testing consumes significant resources, effort and budget. Investing in a testing strategy and using industrial-strength testing processes and facilities can cut costs and reduce lag times in development and deployment. Proper method adoption in the development lifecycle for upstream systems will help ensure that testing efforts are better managed. Equally, data migration can become very complex, especially if legacy data sources are inconsistent or incomplete. Creating a coherent data migration strategy at the outset will help reduce risk. Using industry models for defining critical banking data elements for customers, products, and contracts can help. Equally, using pre-built models for analytics and insights can accelerate deployment and reduce costs. Industry data models can provide anchor reference points during the migration of data to new systems, enabling duplicate, redundant and non-required data fields to be discarded.

**Managing change:** To ensure that risk is adequately managed, banks need to invest time and resources in robust change management. Change will result not only from the effect of modernization programs, but also from business-as-usual initiatives that have to be accommodated within the transformation journey. Senior management should be actively engaged in ensuring that all employees understand what will change, why it will change and how embracing that change will make the bank better. Critically, the post-implementation benefits of any modernization effort will scale according to the strength of change management during the program. For the bank that understands and adapts to new ways of working, modernizing the core systems will yield the significant improvements and new capabilities that were intended.

A large Japanese bank is executing a multi-year transformation program that started in 2007 and will stretch well into 2015. The bank has put huge emphasis on approach and method selection and is spending a significant amount of time in planning the initiatives and laying out the integrated tooling for transformation. The whole program has been divided in multiple phases; each phase has a specific outcome to be achieved. The outcome of each phase feeds into the learning for the next phase – the bank is using learning and repeatability as key elements of risk mitigation. The bank carried out a well-defined proof of concept to validate its assumptions and methods, then formally included the findings in its overall transformation roadmap. The results so far have been very encouraging, with minimal project delays. By following a very structured approach to the transformation, the bank is seeing fewer issues than would typically be expected in the testing phase of its SDLC.

### **Optimized infrastructure that leverages technology innovations, modernized architecture and applications**

Infrastructure has an important role to play in core systems modernization. The decisions taken during the business and application architecture stages will feed into decisions around the performance, throughput and scalability of the infrastructure. The upstream architecture decisions will also impact the initial and ongoing infrastructure costs. Typically, high infrastructure costs stem from poor decisions made without careful architectural analysis. Banks should therefore try to resolve operating cost issues at the architecture stages. This will produce far greater savings than choosing a new infrastructure solely based on low acquisition costs without conducting a total cost of ownership (TCO) analysis.

Core banking applications often span heterogeneous platforms, creating significant support and development issues for the IT function. Meeting demanding business and performance objectives while ensuring competitive TCO tends to become harder as the number and variety of systems increases.

By adopting a holistic systems design that is optimized around workloads and aligned to the business component architecture, banks can maintain the high quality of service associated with traditional core banking systems while extending them to cover a diverse set of workloads.

For example, by deploying core systems transaction engines on proven infrastructure that is massively scalable and secure design, the bank can ensure continued high performance as front office volumes grow. And by embracing server virtualization and adopting advanced IT management and orchestration tools, banks can create a heterogeneous fit-for-purpose infrastructure that provides the required flexibility and quality of service while offering the manageability and low costs typical of a homogeneous infrastructure. The fit-for-purpose infrastructure concept is especially useful because it allows different components of the architecture to be run and optimized in the best possible manner to avoid latency in end-to-end transactions.

Mission-critical core workloads and customer data management will typically require the availability, resiliency, security, and scalability of the mainframe. Meanwhile, front-end workloads such as access/channel integration services and enterprise integration services may be better suited to run on distributed architectures. New techniques and tools enable all of these workloads to be planned and managed from a single point of control, delivering the optimal blend of flexibility and cost-efficiency while delivering on non-functional requirements.



One of the world's largest managers of private wealth, with more than 60,000 employees across 50 countries, needed to renovate its legacy core systems. Its systems were account-centric rather than customer-centric, restricting the ability to provide 360-degree advice to customers. They also caused delays in the introduction of new products and services. Working with IBM, the firm undertook a multi-year progressive renovation, including a master data strategy focused on Customer, Product and Contract and supported by new enterprise components. A component model approach was used to design the business, application and enterprise architectures. The use of a single source of master data has been the key enabler for customer centricity and product agility. The firm can now introduce new products within just two weeks, faster than its competitors, and the use of common components lowers IT costs by 20 percent while accelerating development.

### Industrial strength project management based on a scalable engagement model

A large, complex, multi-year core systems program is risky. It will be characterized by changes in personnel during the project lifecycle, making it critical to have a professional, industrialized approach to project management. Designing a robust program management structure that can withstand internal and external change is a key consideration.

It is difficult to accommodate all business objectives in any transformation exercise – particularly as there are likely to be significant changes in requirements along the way – inevitably calling for compromises in some areas. To overcome these issues many banks leverage external support and create a separate internal organization to execute the program using well-defined objectives. The separate execution unit will have its own governance, program management, resourcing strategy, tooling, training and change management disciplines. The goal here is to ensure neutrality and objectivity, and to free the program team from trying to balance competing organizational goals. By creating a logical separation between the people who change the bank and the people who run the bank, it is easier to avoid conflicting interests and to ensure rigorous adherence to the key principles. Bringing in external providers can also help to plug gaps in skills, particularly around project management and change management.

Resourcing and skill issues should also be carefully considered – this is a common root cause for failed modernization projects. Core modernization projects are likely to depend on skill-sets that may not be readily available within the bank, and they will encompass techniques that may not have been used previously in the bank. This makes it critical to consider the project methodology and to ensure that the proposed approach is a proven one.

Banks that can successfully industrialize their approach – for example, by setting up a transformation factory and/or center of competency, ensuring that it is robust, scalable and not dependent on specific personnel – are more likely to achieve a successful outcome.

A large global bank created a world-class methodology backed by organizational constructs to mitigate risk and reduce disruption in its core system transformation effort for subsidiaries in international markets. The bank created separate organizations to run the bank and to change the bank. In addition, the bank separated the functions of production, development and operations into separate entities, all reporting into a common organization to maintain adequate controls, checks and balances. The bank then industrialized this concept and carved out these entities as internal consulting firms. The development organization's job is to manage global requirements and make enhancements to the core banking platform. The operations team's job is to consult at each country level and decide on the system and/or operational changes needed to run the standardized core banking system in that country. The production team's job is to implement the system in any given country and operationalize the system. By industrializing its approach, the bank has adopted a proven method for rapid internalization and time-to-market for its core banking system in any given country, ensuring the use of a standard platform across the globe for increased efficiency and scale. As a result, the bank has improved its internalization estimates with +/- 15 percent variance both for time and money.

## Why IBM

While core banking modernization has become essential for competing in today's market, it is also extremely complex and prone to failure as it poses a number of technical, business, and organizational challenges.

IBM is uniquely positioned to help you tackle these challenges, with capabilities that span the full spectrum of your needs, from

business and technology consulting to hardware and software through to outsourcing and managed services. We have the domain knowledge, business transformation skills, technical expertise, and a wealth of real-world experience to help you make your core systems modernization program a success. We have successfully completed many large programs for banks of all sizes around the world. IBM provides a number of unique industry assets and accelerators:

- A componentized business architecture for banking, represented as a business component map in which each component represents a discrete set of business capabilities that are needed to deliver a business outcome.
- Process, data and service models for banking that have helped hundreds of banks worldwide to define and evolve their enterprise architecture.
- A banking transformation workbench that brings together a comprehensive set of end-to-end tools for analysis, development, and transformation, providing an integrated and collaborative environment for business analysts, system designers and developers. This ensures greater efficiency, closer alignment between business and IT, tighter governance, and better risk control.
- Business-specific solution templates to enable the rapid delivery of unique business capabilities to support the core business operations of the bank. These include templates for product management, product bundling, dynamic pricing, account opening, and loan origination.
- A highly scalable, reliable, and secure infrastructure platform optimized specifically for banking workloads, which improves efficiency and reduces complexity.
- A model-driven transformation methodology supporting progressive transformation in line with business needs and geared to de-risk the execution.
- A comprehensive set of software products covering all aspects of banking business, including integration, information management, collaboration, business process management, business rule management, business analytics, and system management.
- The IBM Banking Industry Framework brings the software products, solution assets and best practices together to accelerate the successful execution of modernization programs. The framework includes definitions for the business architecture, enterprise architecture, integrated tooling workbench, transformation methodology, software platform, and infrastructure – helping banks to reduce risk, enhance ROI, and improve speed-to-market.

## Conclusion

IBM's extensive experience of core systems modernization programs suggests that the most successful approaches are progressive. By 'progressive', we mean that they treat modernization as a journey rather than a fixed end-state, and incorporate enough flexibility and understanding of the business to adapt as requirements change.

IBM believes that the critical success factor is to make architecture the central concern. Specifically, only by creating a componentized architecture that separates out key constructs and their assets from the core transaction engines can banks gain the flexibility and efficiency they need.

Once the core architecture is established, banks can address each particular requirement within the program on a case-by-case basis, freely choosing between custom and packaged options, and understanding the compromises that packaged solutions may entail.

By enabling deployment decisions to be made purely on the basis of business benefits, the custom-led approach to modernization enables a progressive program that delivers value at each step and can be paced up or down as needs change. Critically, this approach also ensures that the overall program remains in line with the evolving business objectives.

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