

Simplifying the Banking Architecture

Transforming banking enterprise architecture for business innovation and growth



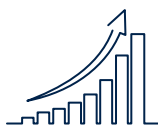
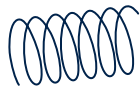
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1 Introduction

In the face of increasing competition from non-banks, cost pressures, and proliferating product environments, banks today must constantly evolve their operating models. This includes an increase in investment in modern core banking systems to overcome constraints in their existing environments and upgrade products and services.

In particular banks are exploring the need for a quick and efficient way to simplify their architecture in order to respond more effectively to constantly changing market conditions. This paper highlights the growing importance of architecture simplification within the banking industry, the importance of an effective business architecture transformation, and the factors that will drive the simplification process.

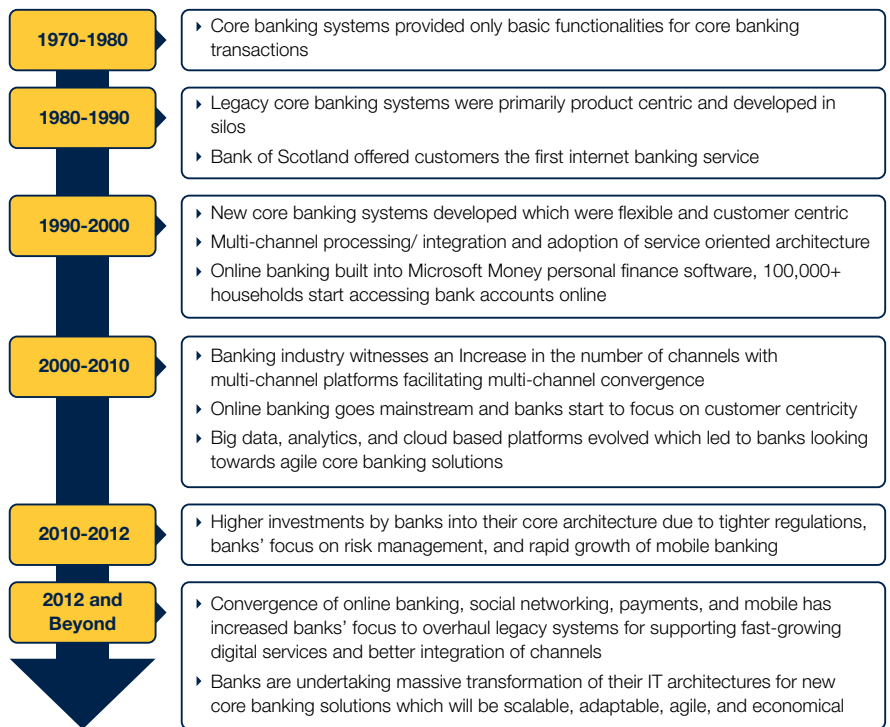


2 Banking Architecture Overview

Banks are undergoing a massive transformation in their IT architectures for driving agility and competitive differentiation

The first core banking systems appeared in the 1970s, and provided only basic core banking functionalities to customers. In the last decade, banking architecture has evolved to provide platforms that facilitate multi-channel convergence (see Exhibit 1), while digitization has propelled the growth of online banking and mobile banking. Banks today need to transform their IT architectures for new core banking solutions which will be scalable, adaptable, agile, and economical.

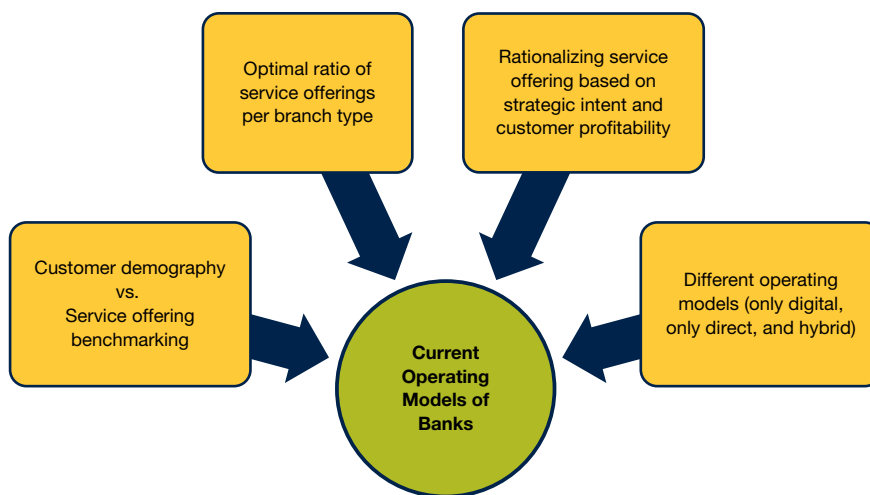
Exhibit 1: Evolution of Banking Architecture



Source: Capgemini Financial Services Analysis, 2015; "Core Banking Transformation: Measuring the Value", Capgemini 2013; "The History of Internet Banking", The Financial Brand, October 2012; Capgemini SME Inputs



Exhibit 2: Current Operating Models of Banks

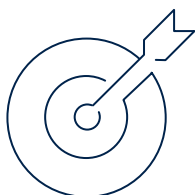


Source: Capgemini Financial Services Analysis, 2015; Capgemini SME Inputs

This massive transformation in IT architectures drives increased agility and competitive differentiation. The core banking solutions of the future will focus on agility and simplicity to provide quick and efficient customer-centric solutions, as well as to respond swiftly to the changing business landscape.

In the swiftly changing banking industry, these are some of the changes¹ that are expected in the near future:

- The ability to adapt to change will be paramount in order to maintain a competitive advantage. Therefore, banks will invest in maintaining a presence on all mobile devices and platforms as they evolve.
- Non-Banks will seek to enter the banking domain, at first through non-core services. Over time they will invest in core banking products such as line of credit and fully insured deposit services.
- Banks will partner with professional services firms to set up and maintain back office operations, and reduce the cost of operation per transaction.
- Technology services firms will proceed aggressively with digital innovations and try to capture a part of the banking value chain.



1 "The Future of Bank Branches", Capgemini 2013; "Anticipating the Bank of the Future", Bank Administration Institute, July 2014

3 Simplifying Banking Architecture

As customers increasingly demand convenient access to banking products and services, banking architectures will need to provide the foundation for business applications across various functional areas. To develop a customer-centric banking platform, banks will need to simplify their current architecture, ensuring data consistency and the integrity of various processes.

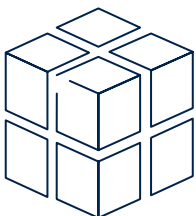
3.1. Drivers for Transformation of Banks' Architecture

Drivers for Non-Banks to Enter Retail Banking

The banking industry is facing a new challenge with the emergence of non-banks into the banking value chain. These non-banks are offering discrete financial services without becoming fully-fledged banks. Disruptive technological innovations and their acceptance have led to the fragmentation of the banking value chain with non-banks leveraging technology to offer innovative products and services to consumers. Key drivers for non-banks to enter retail banking include:

- **Changing customer needs and technology innovations:**
 - Customer needs are evolving towards more digital channels. Non-banks are addressing the need to provide this enhanced customer experience.
 - Innovations such as cloud technology and Infrastructure as a Service have lowered the barriers for setting up a financial services back office.
- **Customer reach of non-banks:**
 - Non-banks such as Google, Apple, and Walmart have a high customer reach through their traditional business operations.² They are using brand association as a tool to launch products which are secondary to their core business, but fall under the financial services domain. This allows them to avoid a direct conflict with banking firms.
- **Favorable regulations:**
 - In some countries, regulators have been assisting innovation in the banking space. Non-banks have been issued banking licenses (e.g. PayPal in EU) and have been given access to large value payment systems (e.g. Mexico's Real Time Gross Settlement System, SPEI).³

While banks deal with higher costs, innovative technology has allowed non-banking firms to enter into the financial services domain



² "Banks' New Competitors", Harvard Business Review, February 2014

³ "Non-banks in retail payments", Bank for international Settlements, September 2014

Drivers for Bank Architecture Simplification

Customer-focused concerns are among the most important external drivers for architecture transformation such as regulations, competitive differentiation, and new products and services. Internal drivers include reducing costs, improving analytics, and managing risk (see Exhibit 3).

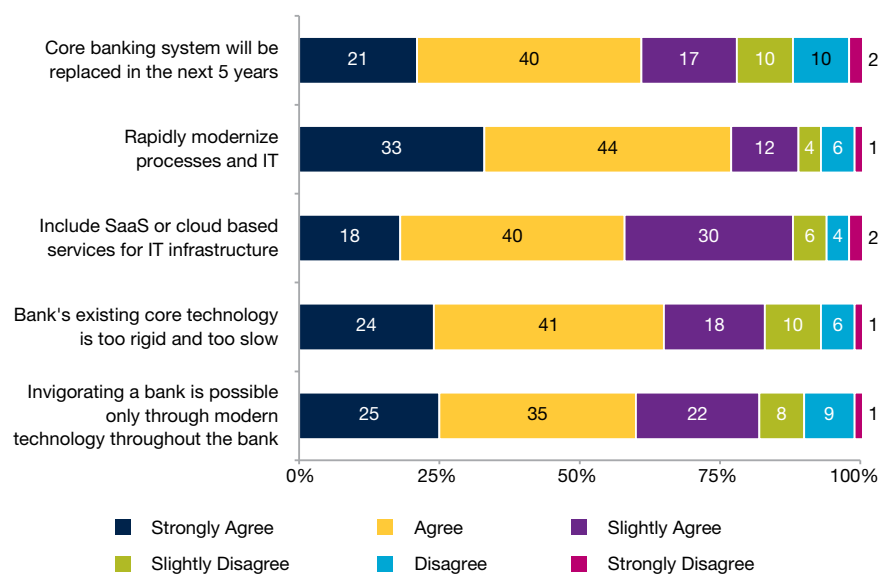
Exhibit 3: Drivers for Bank Architecture Simplification

	Regulations	Competitive Differentiation	New Channels, Products, and Services
External Drivers	<ul style="list-style-type: none"> Banks must comply with an increasing number of new regulations and standards such as Basel 3 Stricter regulations such as Dodd-Frank Act and the Volcker Rule have led to tightened margins for most banks: <ul style="list-style-type: none"> Banks require the flexibility to accommodate local regulations as well 	<ul style="list-style-type: none"> Banks need an agile architecture to implement innovations ahead of their competitors Banks such as Paypal and Alipay which provide end-to-end payment services with real-time payments capabilities must deal with the threat of non-banks eroding their market share Digital-only banks like Moven, Simple, and Frank are creating a positive customer experience and are a threat to traditional banks 	<ul style="list-style-type: none"> Customers are accustomed to enhanced digital applications in other industries (such as retail). Banks need to meet increased customer expectations for doing business digitally in the banking domain Accommodating innovations in products and services (such as immediate payments) requires a significant investment Cross channel solutions, multi-channel integration, and new channels require a migration from archaic legacy systems to more agile architectures
	Cost Reduction	IT Simplicity and Improved Analytics	Risk Management
Internal Drivers	<ul style="list-style-type: none"> Globally, banks are seeking to reduce IT maintenance costs by improving core banking systems for an improved back-office performance: <ul style="list-style-type: none"> The resulting agile architecture will provide operational savings through front-to-back office integration enabling straight through processing 	<ul style="list-style-type: none"> Component-based development and cloud based solutions lead to a scalable IT infrastructure thereby allowing banks to renew their systems in an incremental and multi-phased manner Analytics/business intelligence offer improved insights about customer behavior and preferences which helps in focused sales 	<ul style="list-style-type: none"> Banks are looking to improve their risk management by managing technology and application risk: <ul style="list-style-type: none"> Convolutd IT architectures have resulted in IT outages at major banks in the past which has led to reputational damage, dissatisfied customers, and clampdowns from regulators Mergers and acquisitions lead to IT complexity and banks need new applications to bridge system incompatibilities

There is strong support for core system replacement as modern transformation-oriented architecture supports digitization and provides better business flexibility for banks

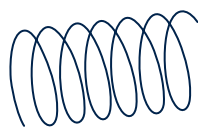
Underscoring the need for core banking transformation in the current climate of technology advances, regulatory pressures, and changing customer needs and preferences, a recent survey on banking core modernization conducted in 2015 shows that approximately 80% of banks are expected to replace their core systems within the next 5 years (see Exhibit 4).

Exhibit 4: Banking Core Modernization Survey, 2015



Note: Respondents from Financial Services Institutions were asked a series of questions related to modernizing and invigorating their bank, and were asked for their opinion among the following choices: (1) Strongly Agree; (2) Agree; (3) Slightly Agree; (4) Slightly Disagree; (5) Disagree; (6) Strongly Disagree

Source: Capgemini Financial Services Analysis, 2015; Invigorating Banking Survey, Finextra and Five Degrees, 2015



Modern core banking solutions bring the ability to create innovative products and services rapidly, and this transformation is imperative to remain competitive. In another study on key focus areas for transformation, 47% of respondents stated core banking systems transformation as their topmost priority (see Exhibit 5).

Exhibit 5: Key Initial Transformation Areas Focus of Bank



Note: 116 BT decision-makers in financial services were asked the following question - "Which will be the top three to five initial focal points of the transformation of your landscape of business applications"? Percentage means: Percent of respondents having that particular business function as one of their key focus to transform

Source: Forrester Research Inc., "Architecting Banking Systems Of Engagement", December 9, 2014; Capgemini Financial Services Analysis, 2015

Service-oriented architecture allows non-technical personnel from the banking industry to pick and choose existing functionalities in order to build new products and services

Transformation through SOA

Service-oriented architecture (SOA) refers to the frameworks and processes that enable banking application functionalities to be provided as sets of services relevant to specific business functions. These services carry out a number of functions such as validating customer data, viewing a transaction, or providing simple analytical services. This approach can be used to create the banking architecture based upon the use of services independent of any vendor, product, or technology.

SOA allows non-technical personnel from the banking industry to pick and choose existing functionalities in order to build new products and services. SOA is critical to achieve an efficient architecture simplification (see Exhibit 6):

- Most of the financial services firms around the world share similar business drivers, such as improving customer service and improving sales capabilities. A standard SOA will help define the architecture for banks to better support customer-facing processes.
- Adoption of SOA will result in increased bank product offerings and innovation, allowing banks to better respond to market demands and maintain a competitive edge over non-banks.
- Adoption of SOA standards provides the potential for an app store for banking functionalities. Banks would be able to pick and choose from an array of components that would allow them to build new products and services.
- SOA will provide banks with a quick architecture transformation by facilitating the improvement of development processes and re-using service components which reduces redundant components.

Exhibit 6: Transformation through SOA



Source: Capgemini Financial Services Analysis, 2015; Capgemini SME Inputs; BIAN website

Benefits of SOA

SOA ensures that different IT systems within a bank work together seamlessly without additional time or cost requirements. A well-designed and implemented SOA lets banks tackle multiple smaller integration projects with less capital investment, as opposed to the high investment associated with traditional legacy overhaul of IT architectures. Banks can realize the following benefits (see Exhibit 7) of incorporating SOA in their IT architecture:

- SOA provides banks with the ability to adapt quickly and efficiently to changing market conditions in a constantly evolving industry.
- Core banking systems featuring a standard SOA will directly address banks' regulatory and compliance concerns.
- Interoperability between IT systems through widely agreed standards ensures the highest degree of efficiency.
- Banks can cut down on IT maintenance costs by moving to a common standard, resulting in improved back-office performance.
- Standardized Application Program Interfaces will improve collaboration with third-party vendors.
- Creating standardized services enables best practices to be replicated and facilitates the improvement of development processes.

Banks require a service-oriented architecture in order to provide them with a competitive edge and help them respond quickly to external and internal pressures.

Exhibit 7: Benefits of SOA



Source: Capgemini Financial Services Analysis, 2015; Capgemini SME Inputs; "BIAN Service Landscape 3.0", BIAN, April 2014

SOA implementation is a combined business and IT imperative and requires that continuous improvement will no longer be hindered by complex and rigid IT legacy structures

Challenges for Implementing SOA

For a successful SOA implementation, continuous improvement must not be hindered by complex and rigid IT legacy structures. SOA implementation is a combined business and IT imperative that sets the direction on how banks' IT processes will support agility in the future. Some of the challenges⁴ include:

- **Cost drivers** - SOA will require a thorough understanding of different cost drivers for the bank, regardless of the geography or business unit implementation.
- **Organizational culture** - An organization's culture needs to have cross-discipline and cross-business collaboration to understand the application design and identify shared services for appropriately leveraging SOA standards.
- **Potential future-state scenarios** - System transformations may be disruptive and a thorough analysis is required to understand the process and technology impacts. Enterprise architects will need to identify potential future-state scenarios to design appropriate standards.
- **Technical understanding** - Defining a standard SOA is still a relatively new approach to application development. Different stakeholders with the relevant technical knowledge of service protocols and platforms must be involved in implementation.
- **Risk minimization** - SOAs must comply with all regulatory, compliance, and internal controls that are necessary to run bank systems securely and minimize transaction processing risks.

⁴ "The Business Value of Implementing a Service Oriented Architecture", Viewpoint, Liquidhub; Legacy Evolution to SOA: Best Practices, The Open Group

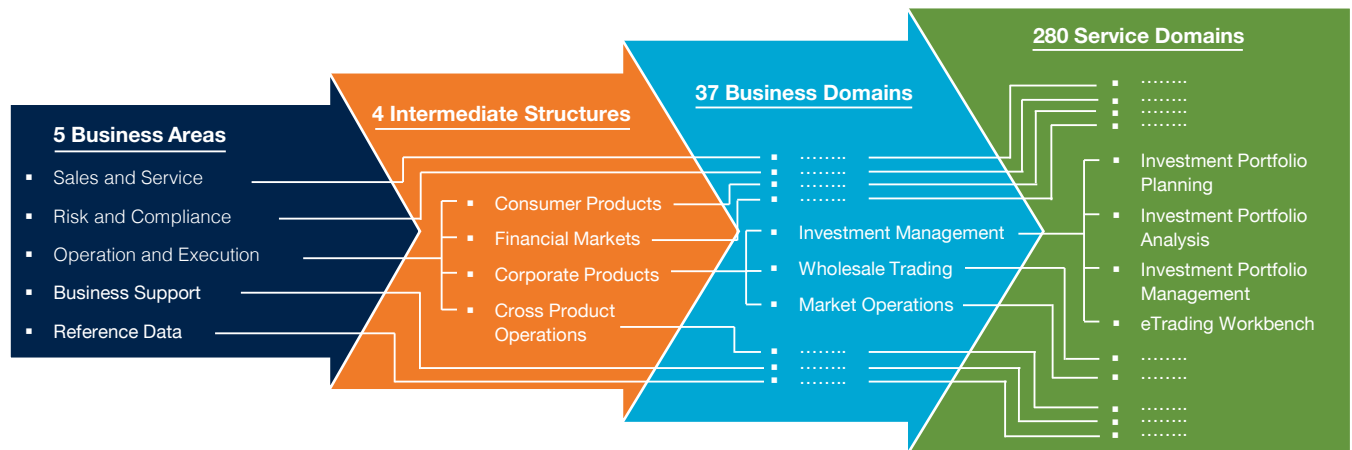
4 Operating in a Simplified Architecture Future

A simplified architecture (through SOA adoption) eliminates redundant linkages and streamlines processes for the bank

To create a simplified IT architecture, banks will need a standard SOA which can be provided by associations such as the Banking Industry Architecture Network (BIAN). The BIAN framework is comprised of three elements that capture the design of the BIAN Service Landscape (see Exhibit 8):

- **Business Areas** are the highest-level classification and groups together a broad set of business capabilities having similar supporting application and information needs.
- **Business Domains** define a coherent collection of capabilities within the broader business area and are associated with the specific skills and knowledge of the banking business.
- **Service Domains** are the finest level of partitioning, and each domain defines unique and discrete business capabilities.

Exhibit 8: BIAN Service Landscape



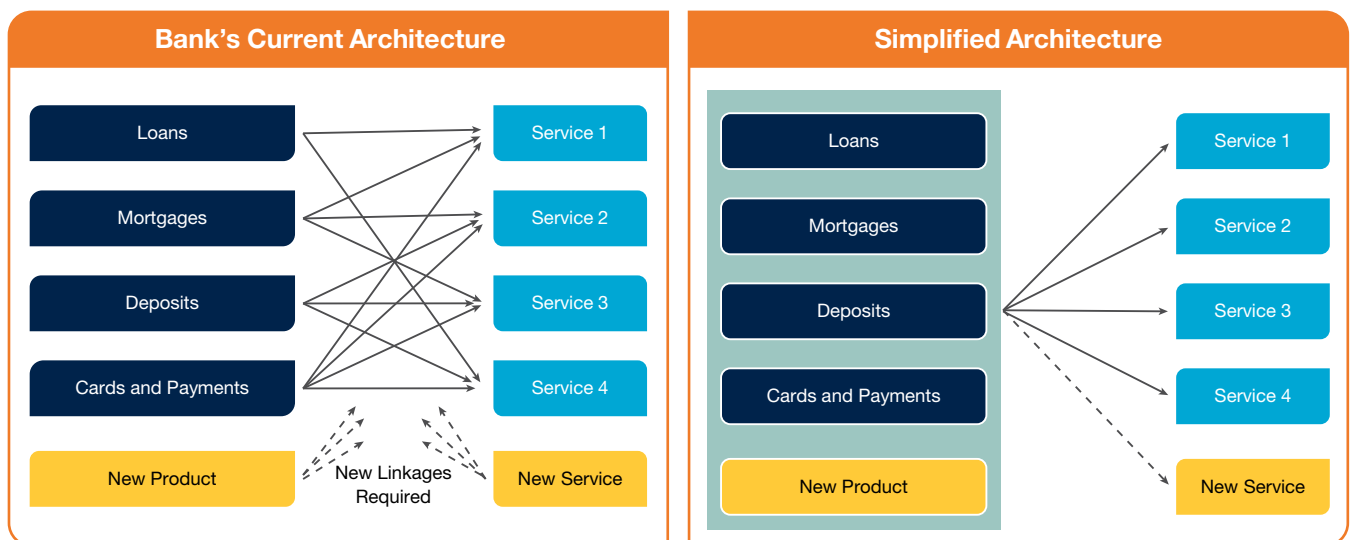
Source: Capgemini Financial Services Analysis, 2015; Capgemini SME inputs; "BIAN Service Landscape 3.0", BIAN, April 2014

Technologies that disrupt traditional notions of process flexibility, insights, delivery speed, and support costs will transform banking industry business architecture

A simplified architecture (through SOA adoption) eliminates redundant linkages and streamlines processes for the bank (see Exhibit 9):

- **Current banking architecture** puts products in silos invoking different services, which leads to lot of linkages. SOA simplifies the banking architecture by integrating different interface silos and disparate products. The result is a better interoperability among core functions, and refinement of internal application services.
- Under banks' current architecture, **new product additions** require new linkages with existing services and interfaces. This increases IT complexity, reduces flexibility, and increases costs. In a simplified architecture, new product additions can be done seamlessly without affecting existing services and interfaces.

Exhibit 9: Simplified Architecture Example



Source: Capgemini Financial Services Analysis, 2015; Capgemini SME inputs

Future of Architecture Simplification

Standard SOA will reshape the future of business applications and technologies, leading to new notions of process flexibility, insights, delivery speed, and support costs (see Exhibit 10).

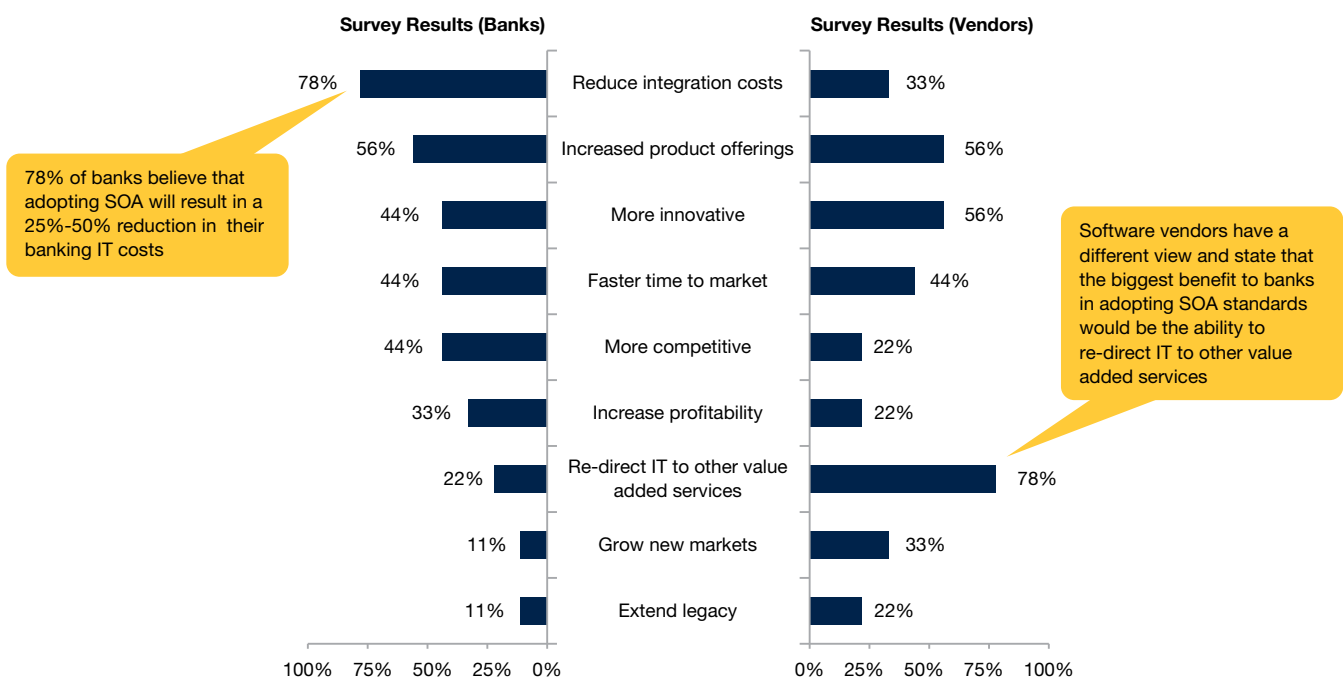
Exhibit 10: Future of Architecture Simplification

Business Aspect	Present State	Way Forward
Cloud Deployment Models	Customizations and extensions complicate core upgrades, and cloud-deployed models are being used as an alternative	Multi-tenant cloud based models feature better data isolation and more flexibility to manage upgrade timing, and become sufficiently extensible, flexible, and scalable
Standardized Service Semantics	SOA is providing an easier interoperability between service providers and consumers, providing semantic specifications for business service interfaces	Semantic business service specifications will result in a quantum leap in architecture extensibility, and the banking industry will see a convergence of semantic definitions
Componentization	Componentization is enabling application delivery teams to combine custom-built applications with off-the shelf-components	Banks will use internal and external business application components within component frameworks, while vendors will look to provide pre-packaged end-to-end application suites
Application Extensibility	Most vendors are offering proprietary tools to customize business applications, but these tools are complex, cost prohibitive, and may impact business continuity	The banking industry will look towards elastic application platforms that provide improved speed and scalability of in-memory architectures
Analytics	Banks are leveraging consumer preferences and behavior across channels, while trying to get a single view of their customers from internal business applications	Architecture systems will leverage adaptive intelligence providing a 360 degree view of customers. Real-time analytics will improve results by acting on predictive analysis



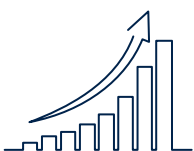
A survey of banks and software vendors asked for attributes that would benefit banks once they adopted SOA standards (see Exhibit 11). The majority think that SOA standards will lead to increased products and services and innovation. Although the survey was conducted in 2012, these attributes are still valid and remain true today.

Exhibit 11: Benefits of Adopting of SOA Standards (% of Respondents), 2012



Note: Questions Asked to Banks - "How will the adoption of SOA Standards increase the success of your business"? Percentage means: Percent of banks expecting the corresponding business benefit for their institution; Questions Asked to Software Vendors: "How will the adoption of SOA standards increase banks' success"? Percentage means: Percent of vendors expecting the corresponding business benefit for the banking industry

Source: Capgemini Financial Services Analysis, 2015; "SOA, standards and IT systems: how will SOA impact the future of banking services", BIAN, October 2012



5 Recommendations for Banks

Banks will need to identify gaps and process changes between the desired transformation state and current architecture state in order to choose the appropriate transformation approach

Depending on strategy and target core banking architecture, banks can choose one of the four approaches for architecture transformation:

SOA-Based Architecture - An SOA-compliant, component-based architecture will provide banks with interoperability between their core functions and lower the integration costs. Also, working with a common service landscape will lead to the development of an architecture that will align to bank's current and future needs.

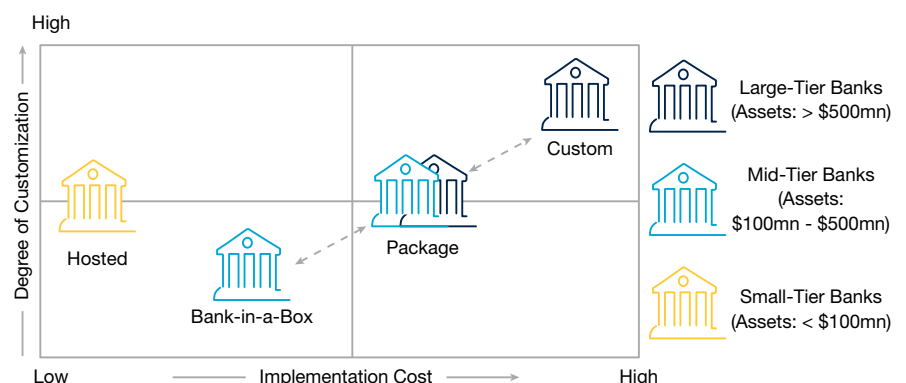
Progressive Simplification - Instead of completely overhauling core legacy systems, banks can opt for progressive simplification, choosing selective customizations which will provide them with competitive advantages without changing all legacy products. But, banks will need to determine if the transformation package supports country-specific regulation policies and accounting rules, bank-specific business processes, and existing legacy core products.

Core Banking on the Cloud - Banks can opt for a cloud-based solution to host processes, applications, platforms, or infrastructure to leverage different pricing options. This approach might result in some amount of risk transfer for the bank since functions like disaster recovery and data storage will be handled by the cloud service provider.

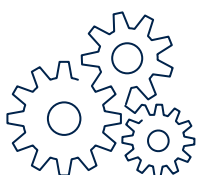
Pre-Integrated Complete Banking Ecosystem - Another alternative for banks is to have a capabilities-driven simplification approach for their banking architecture (needed to 'future proof' their business). Such an approach requires banks to reinvent their architectural design process by selecting capabilities that are available in the market as a pre-integrated banking ecosystem. This is preferably done via a subscription-based model.

It is imperative for banks to identify gaps and process changes between the desired transformation state and current architecture state in order to choose the appropriate transformation approach. A well defined transformation strategy is essential for success and it must complement banks' existing strategic directives (see Exhibit 12).

Exhibit 12: Tier-Based Banking Transformation Strategy



Source: Capgemini Financial Services Analysis, 2015; Capgemini SME Inputs; "Core Banking Transformation: Measuring the Value", Capgemini 2013



For a successful architecture transformation, it is important to evaluate key business and technology parameters, and choose a transformation approach based on these requirements

The strategy will also depend upon the size of the bank, complexity of operations, and IT systems currently in place. Banks will need to evaluate whether the costs and risks associated with simplification are worth the investments needed. Finally, they will need to choose an approach that provides them with more flexibility, scalability, and augment their capabilities.

Large-tier banks have complex operations and require flexibility in the system architecture to meet unique requirements. The following strategies are recommended:

- Developing their own custom systems in-house, but this will require substantial cost, resources, and technical expertise.
- An alternate approach would be to purchase vendor packages providing core banking solutions and customize the package as per their requirements.

Mid-tier banks have lower IT budgets and require comparatively lower levels of customization. We recommend the following approaches:

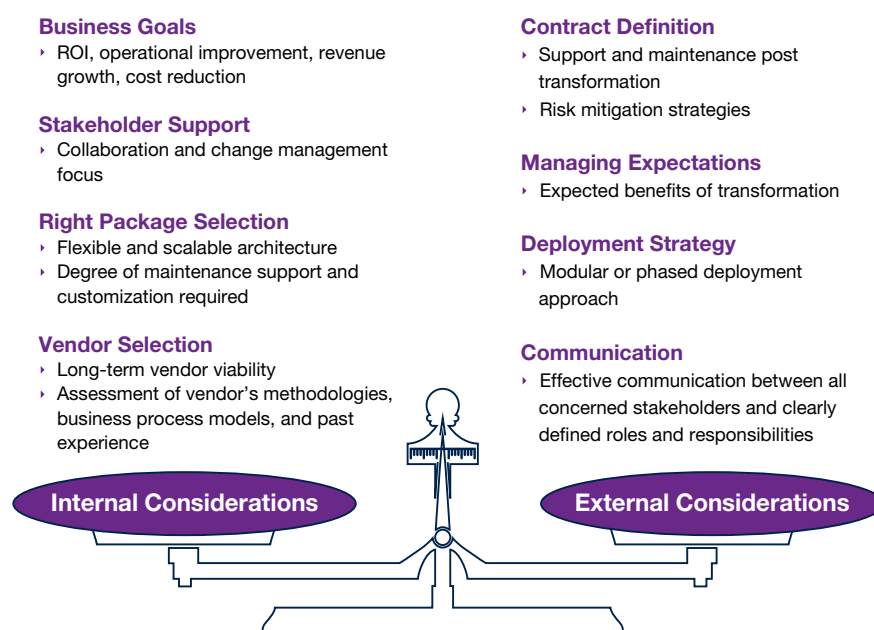
- Package-based solutions with some degree of customization.
- Accelerated implementation through a Bank-in-a-Box approach that will provide pre-configured and pre-integrated solution components.

Small-tier banks require lowest levels of customization and can opt for a cloud hosted solution where the management of data centers is outsourced to a vendor.

Key Success Factors

For a successful architecture transformation, it is important to evaluate key business and technology parameters, and choose a transformation approach based on their requirements (see Exhibit 13).

Exhibit 13: Key Success Factors



Source: Capgemini Financial Services Analysis, 2015; Capgemini SME Inputs

6 Case Study

Accelerating the origination workflow with a framework designed based on BIAN standards.

Context

- Building a framework for the Loans and Credit Card Origination Workflow in collaboration with IBM's Business Process Management tool:
 - With the BIAN framework, designing a consolidated business service diagram for Customer Onboarding to support Onboarding with Know Your Client verification and ID creation for retail and corporate banking customers.
- This framework can be used by banks and financial institutions as a configurable loans and credit card origination workflow platform.

Current State

- Presently, package-based loans origination process models are used as a starting point and the package is then configured / customized to reflect the requirements of banks.
- Alternatively, existing bank processes and architecture are used with a risk of redesigning the existing solution and not detecting any opportunity for improvements and state of the art customer service.

Process Design

- Three products selected from the BIAN resource to design the process:
 - New Customer creation
 - New Credit Card Application creation
 - Corporate Loan
- 51 activity lines were determined when all business services were brought together.
- The Repeating Activity names were deleted (duplicates deleted) and activities similar in nature were grouped under a single 'Swimlane'.
- 51 identified activity lines were consolidated into 17 swimlanes.
- 70% of the processes recommended in BIAN were incorporated.

Benefits for Bank

- Accelerator – This IP based framework offers a predefined origination workflow with industry accepted practices for the onboarding process, along with configurable checks for Know Your Customer.

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