

CELENT

IMPROVING OPERATIONAL EXCELLENCE WHILE MIGRATING TO A HYBRID, MULTI- CLOUD WORLD

Financial Services Executive Summary

Craig Focardi

November 1, 2023

This is an authorized reprint of a Celent report granted to Hitachi. The report was written by Celent and was not sponsored by Hitachi. For more information, please contact Celent (www.celent.com or info@celent.com).

CONTENTS

- Cloud Adoption Is Accelerating Globally.....3**
 - Cloud Migration is Accelerating.....3
 - Which Banking Applications Are Moving to the Cloud?5

- Cloud Costs & Complexity Are Increasing7**
 - The Changing Calculus of Cloud Computing Costs.....7
 - Optimal Management of On-Premises and Off-Premises IT8

- Modernizing Applications For Operational Efficiency in the Cloud9**
 - Application Modernization Is Central to Cloud Migration.....9
 - Operational Excellence is Central to Hybrid Cloud Success.....10
 - The Role of IT Solutions and Services Partners in Hybrid Cloud11

- Path Forward 13**

- Leveraging Celent’s Expertise..... 14**
 - Support for Financial Institutions14
 - Support for Vendors.....14

- Related Celent Research 15**

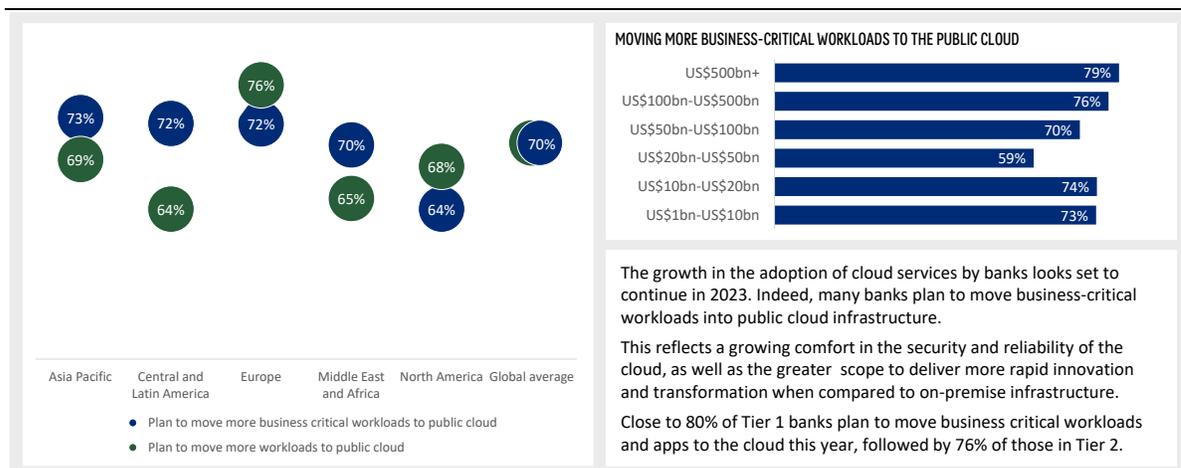
CLOUD ADOPTION IS ACCELERATING GLOBALLY

External technology innovation, competition from new market entrants and the need for more rapid system changes are forcing incumbents to rethink where and how they source and deploy technology. The technical flexibility of cloud deployment is enabling financial institutions to more rapidly introduce new products and services to attract, grow and retain customer relationships. However, shifting to the cloud does not mean that all systems will move there. Therefore, financial institutions will work in a hybrid cloud world for the foreseeable future.

Cloud Migration is Accelerating

According to a 2023 Celent survey of financial institutions, the pace of cloud adoption continues to increase. Figure 1 shows the plans of financial institutions across the globe to move more workloads from on-premises to third-party cloud hosted.

Figure 1: Banks Are Migrating Non-Critical and Critical Applications to the Cloud



Source: Celent Technology Insight and Strategy Survey 2023. Base: All Retail Banking respondents (sample: 228). Question: Please indicate your agreement with the following statements: “We will move more of our business-critical workloads to the public cloud in the next 18 months” and “We will move more of our workloads to the public cloud in the next 18 months.”

There are four main points to emphasize from the chart:

- Two-thirds or more financial institutions in most global regions plan to move more workloads — including mission-critical ones — to the cloud.
- Europe is leading other regions in moving all workloads to the cloud.
- Plans to move mission-critical workloads to the cloud are more balanced regionally, with the Asia Pacific, Central/Latin America and European regions leading the way.
- Institutions of all sizes are steadily moving mission-critical applications to the cloud, with a significant percentage of the largest institutions doing so.

The Celent survey also supports the assertion that cloud computing will improve IT resilience, agility and customer experience. Another question focused on the most critical reasons financial institutions are migrating to the cloud. Ninety-two percent of respondents indicated that improving customer experience is important. Another 84% indicated that IT agility (to accelerate the pace of IT development) and technical resilience (maintaining acceptable service levels through severe disruptions and reducing the risk of system failure) are the top reasons for migrating to the cloud. Operational efficiency will also improve if these three things are done well.

These 2023 survey results are consistent with Celent's 2022 survey, where 29% of respondents indicated that cloud migration was the fourth highest priority for 2023 and the highest priority focused on operational excellence. Financial institutions' focus is increasingly moving away from shifting workloads to enabling product innovation.



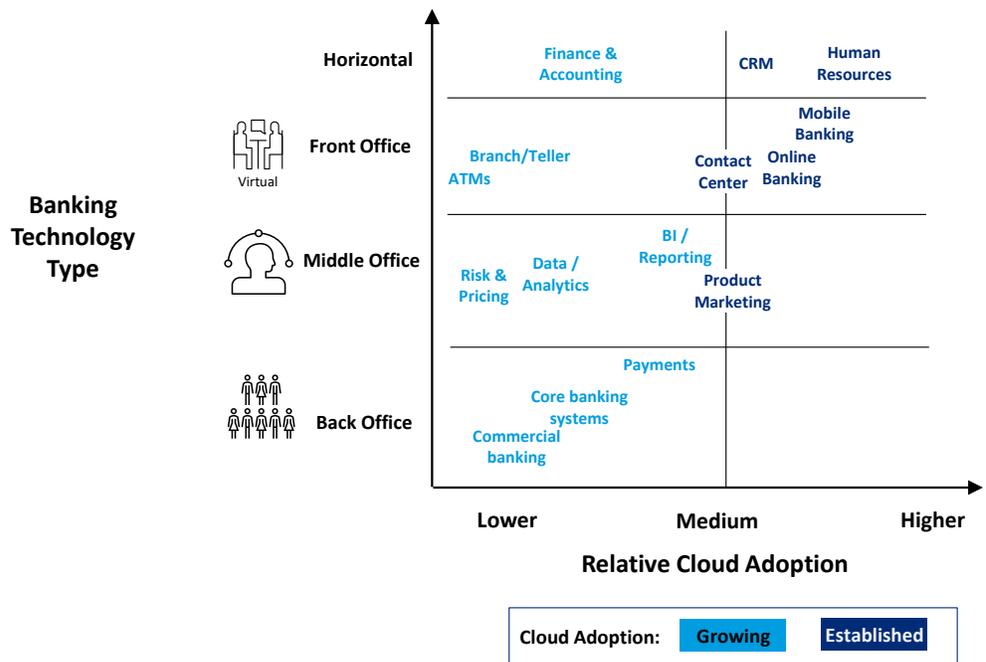
Cloud migration is about the benefits to both the business and IT sides of the organization, with the IT benefits being IT flexibility, resilience and the sustainability of IT platforms. The business benefits are organic sales growth, cross-sell and customer retention.

Celent

Which Banking Applications Are Moving to the Cloud?

Figure 2 shows Celent’s assessment of the rate at which banking and related software solutions move to the cloud. This analysis is based on Celent surveys, published and unpublished research and banking client engagement. A general conclusion is that some technologies and the processes they support are better suited to the cloud, such as systems that involve posting and retrieving information with minimal data exchange, while other heavier, complex solutions managing large volumes of data are often better suited for on-premises deployment.

Figure 2: Horizontal and Front Office Software Is Moving Fastest to the Cloud



Source: Celent (September 2023).

The first point to note is that *horizontal technology applications* — human resources and finance/accounting — are moving to the cloud at the fastest rate. These solutions are for internal functions, don’t involve external customer engagement, are in more controlled environments and don’t involve consumer protection regulation. Customer relationship management solutions (such as Salesforce CRM and Microsoft Dynamics), which have elements of the vertical line of business and enterprise software applications, are also moving to the cloud more quickly than vertical line of business software solutions.

Vertical banking industry software applications, especially in customer-facing *front-office* technology, are also moving steadily from on-premise to cloud deployment. These solutions often require real-time data and customer interaction for sales and service and usually have low data requirements. Mobile banking solutions are most likely in the cloud, followed by online banking and call center technology. Advisory

relationship management technologies that combine agent-assisted sales and service engagement with digital self-service are also growing.

Middle office technology is beginning to move to the cloud. These are solutions used internally by financial institution staff but are not customer-facing; they enable front-office customer engagement with back-office customer and product data. Examples are banking product marketing, BI/reporting, data/analytics for risk management and product pricing.

Bank office technology cloud adoption is the slowest. Many of these systems require high data volume and manage back-office ledger and transaction updates and are better suited to being on-premise for large- and mid-sized institutions. Examples include the core banking system, commercial banking and risk and compliance because these solutions are the 'heaviest' in terms of lines of source code, volume of data and transactions, system age and level of hard-coded customization.

CLOUD COSTS & COMPLEXITY ARE INCREASING

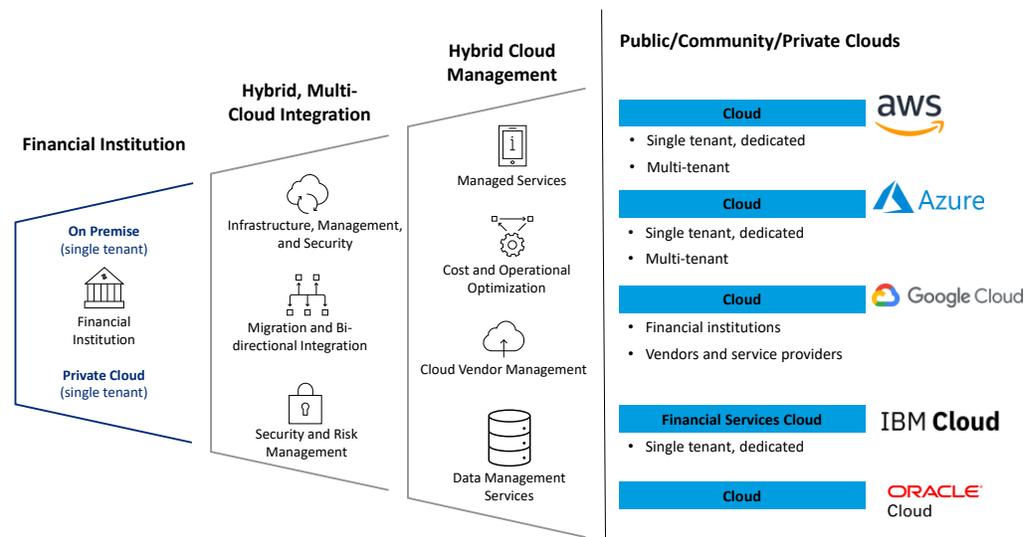
As cloud adoption has grown, so has the complexity of managing cloud platforms and making them interoperate with on-premise systems. Cloud costs have also increased, including transaction costs from greater usage and the costs of managing the platforms. Financial institutions are, therefore, looking for ways to improve hybrid cloud platforms' operational efficiency and acquire internal and external partner resources to accomplish this goal.

The Changing Calculus of Cloud Computing Costs

The 2023 Flexera State of the Cloud Report indicated that managing cloud spending (82% of respondents) overtook security (79% of respondents) as the biggest cloud computing challenge. Lack of resources and expertise (78%) is the third biggest challenge among firms surveyed. These changing challenges result from financial institutions' success in moving to the cloud, but must now be managed.

Figure 3 depicts a summary of a financial institution's IT platforms.

Figure 3: Financial Institution Architecture is Hybrid Cloud and Multi-Cloud



Source: Celent Technology Insight and Strategy Survey 2023. Base: All Retail Banking respondents (sample: 228). Question: Please indicate your agreement with the following statements: "We will move more of our business-critical workloads to the public cloud in the next 18 months" and "We will move more of our workloads to the public cloud in the next 18 months."

While the internal, on-premise technology systems are more complex than shown here, an increasing share of all systems now reside in multiple cloud environments. The 2023 Flexera State of the Cloud Report also reported that 87% of institutions surveyed operate in a hybrid cloud, multiple cloud environment. This complexity is the primary driver of cloud cost increases.

A financial institution's hybrid cloud environment expands as it moves on-premises applications to private and public clouds, and IT flexibility increases to optimize what IT applications should be where. Two key questions, however, are: Can or should all the application workload go to the cloud? Is the cloud the only way for banks to modernize their applications in a way that provides flexibility for the future? Moreover, *how* should financial institutions migrate solutions to the cloud?

Hybrid Cloud Computing

A hybrid cloud is a mixed computing environment where applications are run using a combination of computing, storage and services in public clouds and private clouds, including on-premises data centers. Most large firms are now using multiple public clouds, and need to migrate and manage workloads between these cloud environments based on their specific business needs.

Financial institutions need to increase the efficiency of the initial cloud setup and move to ongoing hybrid cloud management to manage costs better.

Optimal Management of On-Premises and Off-Premises IT

Hybrid cloud management increases the need for IT software and solutions firms with multiple capabilities: application modernization and management, system conversion and migration, integration and workflow, security, data management, IT infrastructure and partner ecosystem management.

Hybrid cloud deployment helps modernize on-premises infrastructure and enables a higher degree of automation, more self-service capabilities and flexible deployment and management of workloads. Financial institutions gain the flexibility to build and deploy applications on-premises or in the cloud to optimize cost, availability, scalability, performance and security. Financial institutions can develop, deploy and run applications faster for new and incremental software releases. They can also optimize cost and performance by rebalancing workload deployment.

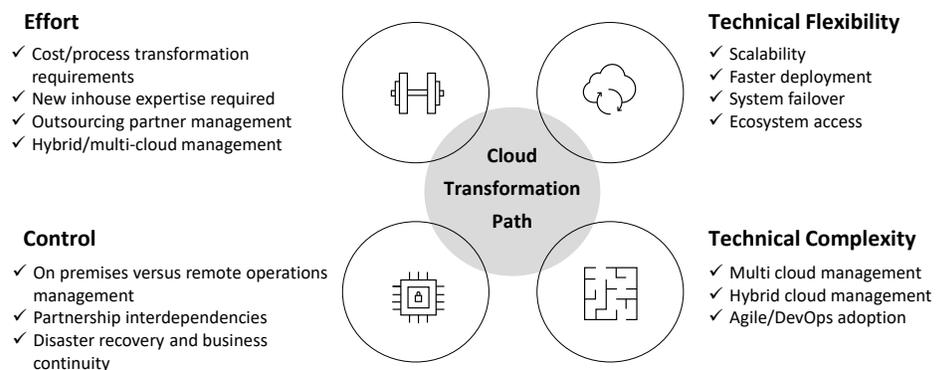
MODERNIZING APPLICATIONS FOR OPERATIONAL EFFICIENCY IN THE CLOUD

It is universally understood that cloud computing has changed how software is built and where it is sourced. The optimal application modernization choices and cost/benefit tradeoffs for modifying application software, databases, digital documents, core systems, integrations and telecommunications to operate efficiently in the cloud are less clear for financial institutions. The type of modifications made directly impacts the benefits derived from cloud migration.

Application Modernization Is Central to Cloud Migration

On-premises software applications may or may not be modernized when shifted to the cloud but will operate there in either case. However, the degree of modernization impacts the level of benefit that financial institutions receive from cloud computing. Figure 4 outlines the tradeoffs and benefits of application modernization.

Figure 4: Application Modernization Drives the Benefits From Cloud Migration



Source: Celent

Financial institutions must evaluate and match the effort required to migrate applications to the cloud and compare that with their strategies, budgets and timelines. There are multiple ways to modernize applications that move from on-premise to cloud environments. Solution providers specializing in cloud migration strategy, cost/benefit assessment and implementation provide additional experience for making optimal decisions.

Figure 5 outlines the primary application modernization approaches for implementing a cloud migration strategy. The choice will vary based on the firm's specific business solutions and strategies.

Figure 5: Migration Paths to the Cloud Vary in Cost, Complexity and Benefits and Require a Sound IT Solutions and Services Strategy

	Cloud Enabled			Cloud Native	
Approach	Rehost	Refactor	Rearchitect	Rebuild	Build new
	Redeploy as-is to the cloud	Minimal changes to move to cloud	Materially alter/decompose apps into services	Rebuild existing code	Create new code ("Born in the cloud")
Business drivers	<ul style="list-style-type: none"> • Quicker, lower ROI • Reduce data center space • Capex to Opex • Some cloud efficiency 	<ul style="list-style-type: none"> • Small updates • Faster updates • Improved code portability • Higher cloud efficiency 	<ul style="list-style-type: none"> • Easier adoption of cloud capabilities • Greater code portability • Good cloud efficiency 	<ul style="list-style-type: none"> • Accelerate innovation • Build apps faster • Reduce operational cost • Strong cloud efficiency 	<ul style="list-style-type: none"> • Accelerate innovation • Build apps faster • Reduce operational cost • Full cloud efficiency
Scalability	May be limited to server capacity, or required specific configuration to scale		Performed automatically	Performed automatically	Performed automatically
Maintenance	Must be customized to the installation environment May require specific configuration			Maintenance/updates can be applied automatically without interrupting service	
	Approach: Good Better Best				

Source: Celent

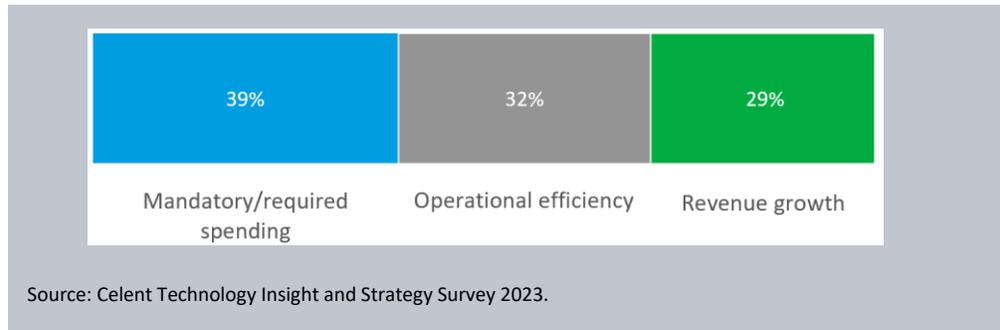
There is a continuum of application modernization options for financial institutions to choose from. There is a direct connection between effort and money invested and the benefits received. Cloud-native solutions are ideal; they're designed to be deployed in the cloud using microservice design principles, maintenance can be performed automatically without interrupting service and capacity is always readily available.

In contrast with cloud-native solutions, financial institutions must re-engineer ("cloud-enable") on-premise solutions initially designed to run on-premise. Rehosting is also known as "lift and shift." Applications are moved to the cloud "as is" but take advantage of cloud infrastructure. Refactoring involves relatively minor changes to an application to support the cloud environment better and redeploy in a cloud platform. Replatforming (aka, "lift, tinker and shift. ") modifies the software application to better take advantage of the new cloud infrastructure. Rebuilding is a major rewrite of the original source code for it to operate nearly as optimally as a cloud-native solution.

Operational Excellence is Central to Hybrid Cloud Success

Celent's 2023 global IT spending survey indicates that financial institutions value operational efficiency more highly than revenue growth for determining IT spending priorities; only mandatory spending for things such as system maintenance and compliance ranked higher.

Operational Efficiency is a top priority for directing IT spending



Operational excellence (or efficiency) is the ability of a financial institution to effectively manage and operate the hybrid cloud environment to ensure that it meets the financial institution's needs. It includes streamlining processes, making data available 100% of the time, and modernizing legacy infrastructure to meet Sustainability/Net Zero goals. Operational excellence is important for the success of a hybrid cloud technology structure to achieve:

1. **Agility and Innovation:** Hybrid cloud technology can enable financial institutions to be more agile and innovative. Operational excellence can help ensure that the hybrid cloud environment is flexible and can adapt to changing business needs.
2. **Cost Optimization:** Hybrid cloud technology can be complex and expensive to manage. Operational excellence can help financial institutions optimize their hybrid cloud environment to reduce costs and improve efficiency.
3. **Security and Compliance:** Financial institutions are subject to strict regulatory requirements and must ensure their hybrid cloud environment is secure and compliant. Operational excellence can help ensure that the hybrid cloud environment meets these requirements.
4. **Performance and Availability:** Financial institutions rely on their hybrid cloud environment to deliver critical services to their customers. Operational excellence can help ensure the hybrid cloud environment is highly available and performs well.

In summary, operational excellence drives the success of a hybrid cloud technology structure in financial institutions.

The Role of IT Solutions and Services Partners in Hybrid Cloud

A financial institution's IT division is central to planning and building cloud solutions. This is necessary but not sufficient. External IT solutions and services partners, software and outsourcing providers/partners engage with various organizations, building and enhancing multiple IT solutions and services and software that enable cloud migration and hybrid cloud environments. External partner expertise is often

broader and deeper than in-house expertise in various areas and can augment internal capabilities.

External partners help financial institutions develop and execute platform deployment strategy, make application modernization choices, perform platform design, recommend hybrid cloud architecture structure, make system changes, perform application migration, test and debug applications, perform maintenance and other services.

Financial institution size and strategy. Cloud strategy and IT solutions and services will vary based on the financial institution's size, strategy and tenure. Financial institutions should select third-party partners with the relevant experience for their institution's characteristics. General guidance would include:

- For startup financial institutions, all or most application workloads could start in the cloud or migrate there. A startup may have experience in modern application design but require third-party experience for long-term platform design to support the firm as it grows.
- For smaller Tier 5 and Tier 6 institutions (from community banks under \$1 billion in total assets to banks up to \$20 billion), more rapid cloud migration is possible but dependent on their risk appetite and the ability of the core system vendor to help them get to the cloud.
- For mid-sized and large (Tiers 1/2/3) financial institutions (large regionals, super regionals and multinational banks), however, moving everything to the cloud in the near- to mid-term is not desirable. At a minimum, systems must be modified or cloud-enabled — or be completely rewritten to be cloud native. The interdependencies and complexities of large bank systems also add to the task, and only solution partners with this prior, deep experience are best to co-lead the initiative.

IT solutions and services partners should also be able to support other changing aspects of a hybrid cloud environment. For example, executing on integration and ensuring efficient, optimal interoperability, managing cybersecurity risks in the new hybrid cloud, multi-cloud environment, data management and accounting for financial regulation implications and automation. All these items are integral components of operational excellence.



Cloud migration is about the flexibility of the IT department to create and deploy new system functionality faster and at a lower cost.

Celent

PATH FORWARD

As with many technology projects, the road to the cloud is paved with good intentions. Fortunately, all financial institutions are on the cloud journey, so there is a lot of knowledge, experience and use cases in the market.

Most financial institutions are generally on the right path with cloud adoption. The goal, however, is to advance and improve operational efficiency, stay ahead of the competition, or catch up. Cloud adoption is continuing at a steady pace. Financial institutions need to not only migrate solutions to the cloud but also to analyze which solutions to move to the cloud, the priority for moving them and the optimal modernization level with which to move them. This strategy will help financial institutions better manage the new costs of hybrid cloud computing and enable them to manage the combined on-premise/off-premise platform environment more efficiently. Underlying cloud initiatives is the goal of improving operational excellence.

Third-party ecosystem partners are invaluable in helping financial institutions develop and execute platform deployment strategies, make application modernization choices, make system changes and perform application migration and maintenance.

Celent suggests that financial institutions think about a few main principles as they evaluate which applications to move to the cloud:

Guiding principles

Consider the application: Not all workloads will likely be ready to move to the cloud in most application landscapes. Institutions should consider which applications are best suited to a cloud environment and which are good targets for rearchitecting to cloud-native. Some applications should be cloud-native, but it's unlikely that all have to be.

Consider the use case: Not all technology problems require a cloud-native or cloud-first solution, although many may benefit from incorporating cloud principles. In the long term, the cloud will be a primary state, but most institutions should think about how to prioritize cloud migration across the most pressing use cases.

Consider the current state: Some applications may be suitable for the public cloud, but the effort to get them to a cloud-native or cloud-first state may present significant barriers. Many institutions have looked to establish cloud strategies in other layers of the application stack (e.g., databases, workflow) before undergoing longer-term migration efforts.

LEVERAGING CELENT'S EXPERTISE

If you found this report valuable, consider engaging with Celent for custom analysis and research. Our collective experience and the knowledge we gained while working on this report can help you streamline the creation, refinement or execution of your strategies.

Support for Financial Institutions

Typical projects we support related to policy administration systems include:

Vendor short listing and selection. We perform discovery specific to you and your business to better understand your unique needs. We then create and administer a custom RFI to selected vendors to assist you in making rapid and accurate vendor choices.

Business practice evaluations. We spend time evaluating your business processes, particularly in policy administration, rating, and claims. Based on our knowledge of the market, we identify potential process or technology constraints and provide clear insights that will help you implement industry best practices.

IT and business strategy creation. We collect perspectives from your executive team, your front line business and IT staff, and your customers. We then analyze your current position, institutional capabilities and technology against your goals. If necessary, we help you reformulate your technology and business plans to address short-term and long-term needs.

Support for Vendors

We provide services that help you refine your product and service offerings.

Examples include:

Product and service strategy evaluation. We help you assess your market position in terms of functionality, technology and services. Our strategy workshops will help you target the right customers and map your offerings to their needs.

Market messaging and collateral review. Based on our extensive experience with your potential clients, we assess your marketing and sales materials — including your website and any collateral.

RELATED CELENT RESEARCH

For more information on cloud adoption, cloud migration rates, and the critical role of application modernization, see:

[Corporate Banking IT Strategies and Priority in 2023](#)

July 2023

[Retail Banking IT Strategies and Priority in 2023](#)

July 2023

...

[Banking on the Cloud: Accelerating Away From the Pack](#)

May 2023

[Harnessing Public Cloud For Transformation and Resilience](#)

May 2023

[UnionBank of the Philippines: Migrating Core Banking to the Cloud](#)

March 2023

[Toward a New Retail Banking Architecture: Defining the Future Digital Core Platform](#)

December 2022

[The Future of Payments is Cloud: Are You Ready?](#)

August 2022

[Continuous Digital Transformation in the Cloud: Next Generation Core Platforms That Will Future Proof Banking](#)

June 2022

[Solarisbank: Germany's First Bank in the Cloud](#)

March 2022

[EQ Bank: EQ Bank to the Cloud! Winner of the Celent Model Bank 2020 Award for Banking in the Cloud](#)

April 2020

[RattanIndia Finance: How to Transition End-to-End Lending to The Cloud](#)

April 2020

COPYRIGHT NOTICE

Copyright 2023 Celent, a division of Oliver Wyman, Inc., which is a wholly owned subsidiary of Marsh & McLennan Companies [NYSE: MMC]. All rights reserved. This report may not be reproduced, copied or redistributed, in whole or in part, in any form or by any means, without the written permission of Celent, a division of Oliver Wyman ("Celent") and Celent accepts no liability whatsoever for the actions of third parties in this respect. Celent and any third party content providers whose content is included in this report are the sole copyright owners of the content in this report. Any third party content in this report has been included by Celent with the permission of the relevant content owner. Any use of this report by any third party is strictly prohibited without a license expressly granted by Celent. Any use of third party content included in this report is strictly prohibited without the express permission of the relevant content owner. This report is not intended for general circulation, nor is it to be used, reproduced, copied, quoted or distributed by third parties for any purpose other than those that may be set forth herein without the prior written permission of Celent. Neither all nor any part of the contents of this report, or any opinions expressed herein, shall be disseminated to the public through advertising media, public relations, news media, sales media, mail, direct transmittal, or any other public means of communications, without the prior written consent of Celent. Any violation of Celent's rights in this report will be enforced to the fullest extent of the law, including the pursuit of monetary damages and injunctive relief in the event of any breach of the foregoing restrictions.

This report is not a substitute for tailored professional advice on how a specific financial institution should execute its strategy. This report is not investment advice and should not be relied on for such advice or as a substitute for consultation with professional accountants, tax, legal or financial advisers. Celent has made every effort to use reliable, up-to-date and comprehensive information and analysis, but all information is provided without warranty of any kind, express or implied. Information furnished by others, upon which all or portions of this report are based, is believed to be reliable but has not been verified, and no warranty is given as to the accuracy of such information. Public information and industry and statistical data, are from sources we deem to be reliable; however, we make no representation as to the accuracy or completeness of such information and have accepted the information without further verification.

Celent disclaims any responsibility to update the information or conclusions in this report. Celent accepts no liability for any loss arising from any action taken or refrained from as a result of information contained in this report or any reports or sources of information referred to herein, or for any consequential, special or similar damages even if advised of the possibility of such damages.

There are no third party beneficiaries with respect to this report, and we accept no liability to any third party. The opinions expressed herein are valid only for the purpose stated herein and as of the date of this report.

No responsibility is taken for changes in market conditions or laws or regulations and no obligation is assumed to revise this report to reflect changes, events or conditions, which occur subsequent to the date hereof.

For more information please contact info@celent.com or:

Craig Focardi

cfocardi@celent.com

Americas

USA

99 High Street, 32nd Floor
Boston, MA 02110-2320

[+1.617.262.3120](tel:+1.617.262.3120)

USA

1166 Avenue of the Americas
New York, NY 10036

[+1.212.345.3960](tel:+1.212.345.3960)

USA

Four Embarcadero Center
Suite 1100
San Francisco, CA 94111

[+1.415.743.7960](tel:+1.415.743.7960)

Brazil

Av. Dr. Chucri Zaidan, 920
Market Place Tower I - 4° Andar
Sao Paulo SP 04583-905

[+55 11 5501 1100](tel:+55.11.5501.1100)

EMEA

Switzerland

Tessinerplatz 5
Zurich 8027

[+41.44.5533.333](tel:+41.44.5533.333)

France

1 Rue Euler
Paris 75008

[+33 1 45 02 30 00](tel:+33.1.45.02.30.00)

Italy

Galleria San Babila 4B
Milan 20122

[+39.02.305.771](tel:+39.02.305.771)

United Kingdom

55 Baker Street
London W1U 8EW

[+44.20.7333.8333](tel:+44.20.7333.8333)

Asia-Pacific

Japan

The Imperial Hotel Tower, 13th Floor
1-1-1 Uchisaiwai-cho
Chiyoda-ku, Tokyo 100-0011

[+81.3.3500.3023](tel:+81.3.3500.3023)

Hong Kong

Unit 04, 9th Floor
Central Plaza
18 Harbour Road
Wanchai

[+852 2301 7500](tel:+852.2301.7500)