CELENT

REARCHITECTING AND SIMPLIFYING POST-TRADE OPERATIONS

OPTIMIZING EFFICIENCY WITH CLOUD AND AUTOMATION

Arin Ray
19 September 2018

TORSTONE
SIMPLIFYING POST-TRADE

This report was commissioned by Torstone Technology. The analysis and conclusions are Celent's alone, and Torstone Technology had no editorial control over report contents.

OLIVER WYMAN

CONTENTS

EXECUTIVE SUMMARY

KEY RESEARCH QUESTIONS

1 *What are the challenges in post-trade operations?*

2 *How is cloud adoption helping overcome the challenges?*

3 *How can market participants improve automation in post-trade?*

Capital markets institutions have traditionally devoted the bulk of their mind and wallet share on front office revenue-generating activities. Post-trade operations have been overlooked; they are mired in legacy systems and siloed operations that require significant manual intervention, making it a critical source of inefficiency and operational risk. As revenue streams are challenged by uncertain economics and growing competition, **post-trade operations are coming under scrutiny** for reducing costs, boosting margins, and improving return on equity.

Celent has seen a drastic shift in attitude and approach to operational transformation among capital markets firms in the last 18–24 months. They are moving away from big bang transformation projects, and **now prefer a componentized and modular approach**. They are turning to cloud solutions because cloud helps address the operational challenges in a flexible and agile manner. The benefits of agility, elasticity, cost-efficiency, time to market, and on-demand provisioning have started to outweigh the concerns firms had about cloud, and cloud is making rapid in-roads in post-trade operations in capital markets.

Large sell side players have complex IT infrastructure, and prefer private or hybrid clouds to reduce costs without losing control. Tier 2 and 3 institutions are more willing to outsource end-to-end processes to third party providers, especially in commoditized functions such as post-trade. In this way, they gain cost efficiencies without needing to invest in proprietary technology, infrastructure, or human resources.

- A common theme is that **cloud is almost always the preferred choice for firms seeking to build a new solution or replace an existing component**. Therefore, for most solutions developed relating to new regulations or reporting, as well as those replacing post-trade components or implementing new technology, cloud is typically the most preferred option.
- Among existing functions, there is a **propensity to take commoditized, non-client-facing activities to the cloud**. Many of the post-trade functions are highly commoditized; therefore, firms are more willing to use the cloud in post-trade.
- Similarly, data and applications that are not latency-sensitive and have variable workload are better fits to be moved to the cloud.
- Cloud is also becoming popular in risk management. Risk modelling using advanced analytics and large data sets and frequent reporting can be cost-effectively performed in the cloud.

Cloud development is interlinked with **another major theme** unfolding in the post-trade world, which **is improving the level of automation across asset classes**. As newer asset class trading electronifies and adopts electronic trading platforms in the front office,

they will need to be complemented by automated workflows in the post-trade arena. Even **in core equities, there is need for automation levels to be improved**, and error and exception handling processes to be made more efficient, especially due to times zones and post-trade practices, and reduction in settlement cycles across the globe.

- Advanced players are using cloud technology, API, and microservices to replace manual processes, improve data management and workflows, and manage communication and electronic messaging aspects in post-trade.
- Collateral management is another area witnessing growing adoption of automation. With the push to central clearing of OTC derivatives, frequency of margin calls is growing, and there is need to manage and mobilize better for capital efficiency.
- With the advancement of digitalization, explosion of data, and cheaper computing resources, advanced analytics and robotics solutions are emerging, with many of them being applied in the domain of post-trade.
- Some firms are going beyond process automation and using artificial intelligence and machine learning for allocating trades, identifying error trades, predicting reasons for trade breaks, analyzing exception handling, and coming up with suggestions for repairing the breaks.

Capital markets firms are moving away from managing anything in-house that is not a competitive differentiator, and post-trade is a prime target for most firms in this regard. As firms rearchitect post-trade operations, Celent sees a **growing preference for managed services** solutions where firms are outsourcing technology and operations to expert third party providers.

As cloud adoption becomes mainstream, **it will have a profound network effect** by creating an ecosystem of best-in-class solutions with latest technology that can be easily accessed and integrated with downstream systems through open APIs and microservices. Smarter firms are not only preparing to respond to today's challenges, but also keeping provisions for adjusting to future evolution in the business, regulatory, and technology environment.

INTRODUCTION

The capital markets landscape has been transformed in the last decade. Several changes in business, technology, and regulations have drastically reshaped industry practices, market and asset class preferences, and roles and positions of market participants. The forces of change continue unabated. Regulations were the dominant force of market evolution in the immediate aftermath of the financial crises; recent developments are influenced by numerous new drivers which are adding layers of complexities to capital markets operations.

Capital markets institutions have traditionally devoted the bulk of their mind and wallet share on front office revenue-generating activities. Post-trade operations, which encompass clearing, settlement, record-keeping, reporting, collateral management, and similar activities, have been overlooked. As a result, **post-trade processing is still mired in legacy systems and siloed operations that require significant manual intervention, making it a critical source of inefficiency and operational risk**.

As revenue streams are challenged by uncertain economics and growing competition, post-trade operations are coming under greater scrutiny for reducing costs, boosting margins, and improving return on equity. Heightened importance of collateral in the post-crisis world has raised the importance of efficient management and mobilization of collateral, because it can offer significant improvements in capital and margin efficiencies.

Advancements in new technology such as cloud, big data, robotic process automation (RPA), artificial intelligence (AI), and machine learning (ML) offer opportunities for developing new products and services, and improving operational efficiency. But adopting them will require reorganizing workflows across the trade lifecycle, an essential component of which is modernizing middle and back office operations.

ABOUT THIS RESEARCH

The confluence of these forces is making **capital markets firms put growing emphasis on rearchitecting post-trade operations**. This research builds on Celent's coverage of evolution of technology and operational models in capital markets by discussing the latest technology trends and developments reshaping post-trade operations at investment banks and other sell side institutions. It analyzes the forces of change in post-trade and their impact, current state of affairs in post-trade operations and its shortcomings, and how market participants are using technology to improve efficiency and reduce costs.

AGENTS OF CHANGE IN POST-TRADE

Modern capital markets have been reshaped by post-crisis regulations and technology advancements. Market structures in different asset classes are evolving and rules and practices of the market infrastructure — exchanges, clearing and settlement agencies — are in constant flux.

Regulatory Changes Have Major Impact on Post-Trade

Regulations brought in the aftermath of the financial crises have significantly impacted all areas in trading. While the major pieces of post-crisis regulations have come into force by now, their impact will be felt well into the future because regulations are still evolving. The bulk of regulatory compliance activities are handled in the mid-back office; therefore **rearchitecting post-trade workflows will be essential to ensure smooth trade processing and accurate reporting**. Inconsistencies in regulatory requirements in different jurisdictions create complexities, and tight regulatory timeframes and limited budgets prevent long-term planning and redesigning of processes.

Growing Electronification in Trading Influence Post-Trade

Electronification is rapidly growing in newer asset classes such as fixed income, FX, and derivatives, and regulators are actively pushing for electronic execution in over the counter derivatives. New asset classes such as crypto currencies and assets are emerging. These require new tools and processes for post-trade processing in individual asset classes. Cross-asset trading and hedging strategies will require consolidation of data and workflow tools for optimizing performance.

Electronification and easy connectivity are expanding market reach, giving rise to international investing. On the other hand, recent political turbulence and uncertainties over trade relations present risk of dislocation and market retreat. Therefore, **agility and nimbleness in the forms of fast time to market and easy scalability will be critical across trade lifecycle** for firms with international presence.

Post-Trade Operations Must Adapt to Changes in Market Structure

Capital markets in general and post-trade industry in particular are at different stages of development in different parts of the world despite numerous attempts at harmonization. There is **high fragmentation, inconsistencies, and local nuances prevailing in each market, and markets are evolving at different speed**. Regulators are reshaping the landscape by encouraging more competition resulting in fragmentation (e.g., of trading venues) in some cases, and consolidation (e.g., in post-trade markets) in others.

Market microstructures vary in different asset classes (e.g., limit order book, request for quote, exchange or bilaterally traded), and they are evolving, driven by regulations and technology, such as shift from voice to e-trading in fixed income and FX, or from dealer-to-dealer to all-to-all platform domination in FX. Even in equities, sell side players are moving away from principle-based models and repositioning as execution agents due to onerous risk regulations.

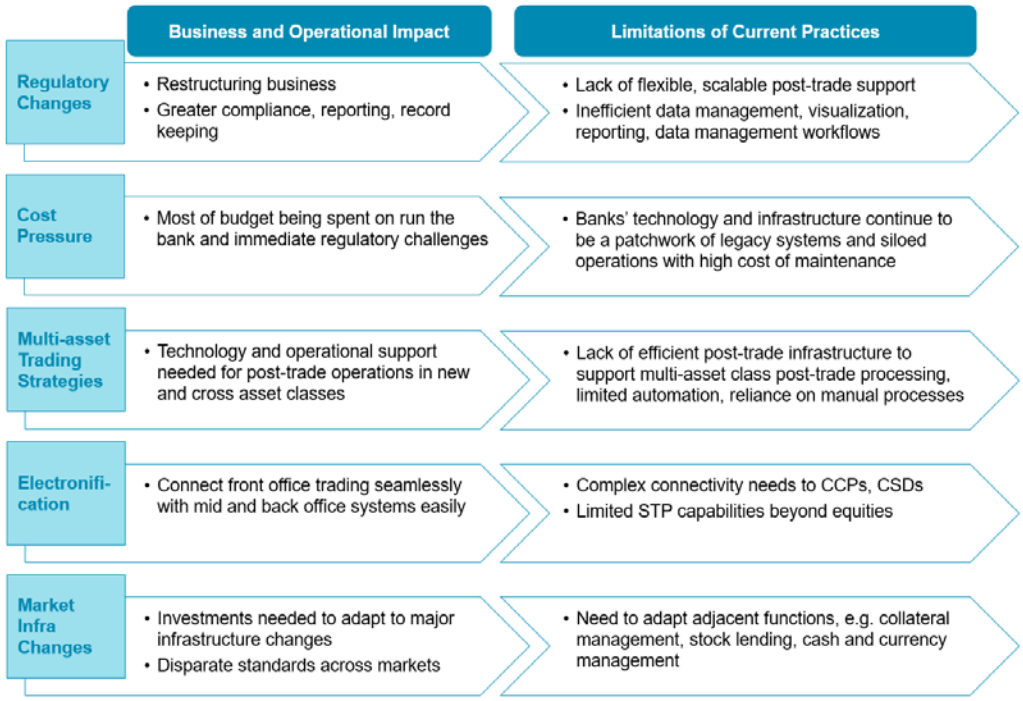
Business Model Changes Rely on Flexible Post-Trade Processes

Capital markets firms are responding to regulatory and competitive challenges by adapting their business models and value propositions through targeted growth initiatives and strategic retreats. A critical element in this phase of evolution is leveraging new and disruptive technology such as cloud, AI, ML, and blockchain to offer new solutions. Innovation with new technology takes place mainly in the front office, but **needs to be weaved in with post-trade workflows** to reduce risks and costs, and create a unified customer experience.

CHALLENGES IN RESPONDING TO THE CHANGES

The changes have major impact on capital markets operations, but responding to them is constrained by suboptimal technology and operations, as highlighted in Figure 1.

Figure 1: Operational Shortcomings Hinder Responses to Changes



Source: Celent

Restructuring business lines or asset class operations, or adjusting to regular changes in market structure and infrastructure, require agility and flexibility. International participants have the added burden of navigating the patchwork of requirements in different regions. However, most firms have a spaghetti of operations with numerous silos of business line, asset classes, or regional coverage, which are compounded by multiple platforms with overlapping functions.

Fulfilling new and growing compliance and reporting obligations needs quality and timely data that can be easily accessed, queried, analyzed, and reported on. But **most firms struggle to aggregate data from numerous systems, and lack the capability to support real-time or automated workflows**. Data storage and archiving practices are not up to the mark to keep up with increased record-keeping and audit trail requirements due to capacity constraints and expensive legacy systems.

In this era of rapid technology advancements, capital markets firms want to use new and expanding data sources and run advanced analytics on them for trade idea generation, valuation, risk management, and post-trade. However, **most middle and back office systems do not support modern data structures, and few have the capability or infrastructure to run machine learning or advanced analytics**. Many firms are looking to benefit from the new technology developments by partnering with fintech and regtech providers. However, interacting with the fintech ecosystem and integrating the new age solutions with archaic legacy systems are cumbersome because of the major gap in technology sophistication between the two.

TECHNOLOGY EVOLUTION IN POST-TRADE

Technology is the backbone of operations in investment banking and sell side business. Rapid growth in business volumes, especially during the early part of this century, resulted in unplanned growth and accretion of systems, which are proving difficult for firms now looking to rearchitect post-trade operations.

Key Research Question 1

What are the challenges in post-trade operations?

Legacy technology and siloed operations are the biggest challenges and hinder timely and efficient response to business and regulatory changes, and increase costs, risks, and inefficiencies.

CURRENT STATE OF AFFAIRS

The challenges in post-trade operations stem from siloed systems and legacy technology that result in low levels of automation and increase costs and risks.

Siloed Operations Result in Fragmented Architecture

Siloed approach to technology is the biggest barrier to change in post-trade. At most firms, post-trade operations are organized by business lines (e.g., investment banking, corporate banking, wealth management), or asset class (equities, fixed income, FX) or geographies, with lack of common capabilities and standards across the silos. Beyond equities, other asset classes, such as derivatives, fixed income, FX, and commodities, have emerged and grown in volumes, but there are few truly multiasset platforms that can easily scale. So, the technology landscape within every firm has seen proliferation of platforms based on ad hoc planning and short-term investment horizons, and without adequate considerations given to overall efficiency and synergies.

The result is a highly fragmented architecture with a multitude of point solutions, patchworks, and little interoperability among them. Data resides in different places, and aggregating and consolidating the data are challenging. Many firms are now working on large scale and expensive data lake and data warehousing projects with mixed results.

Legacy Technology Is Inadequate for Modern Requirements

The situation is exacerbated by post-trade systems that are decades old. For many firms, the most advanced technology used in post-trade is Excel; while that is an improvement over manual processes, it is suboptimal for today's scale and complexity. Similarly, communication processes with clients and counterparties are largely manual, relying on mail, messaging, or even voice channels.

Post-trade processes therefore rely on manual intervention at different steps from allocation through to settlement. Derivative operations, and particularly collateral and margin processing, are highly manual. Software used by leading institutions were hardcoded years ago and according to contemporary standards; they need to be rewritten to adjust to current changes. Some of the technology and processes are

extremely difficult to run and upgrade, because they are old, and people with knowledge about them have long left the industry.

Limited Automation Causes Poor STP Rates

These difficulties mean level of automation in post-trade is limited, and it manifests in poor straight-through processing (STP) rates, especially in non-equity asset classes. Another critical challenge is the lack of accepted industrywide standards, which makes improving STP rates difficult. **With a growing trend of ever-shortening settlement cycles, the need to improve automation levels will intensify**. The need for real time capabilities is becoming essential — not only for trade clearing and settlement but also to manage trade breaks and exceptions — because real time notifications, automated escalation, and rapid resolution can significantly improve risk, cost, and capital positions.

Operational and Business Performance Are Impacted by Post-Trade Challenges

Post-trade operations have high maintenance costs and poor STP rates, and are therefore becoming a burden on the business. Client expectations are changing rapidly, and many now demand real time pre- to post-trade support, visualization, and reporting capabilities across markets and instruments. Many buy side players are automating their workflows and expect sell side counterparts to provide structured information in a timely and automated way. The challenges also limit the scope of innovation. Failure to innovate and meet evolving client demands can result in limited growth and client attrition.

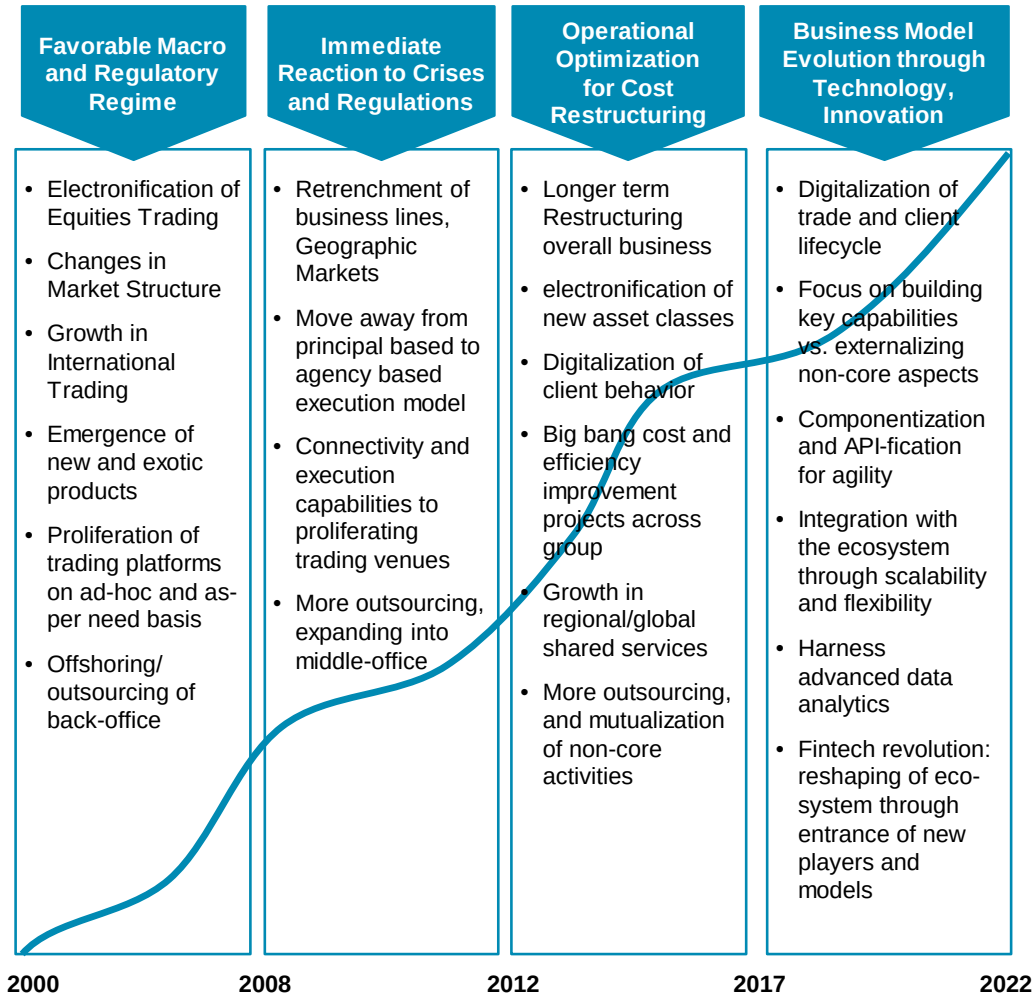
Capital markets firms have traditionally outsourced the bulk of post-trade operations to low-cost locations to drive cost reduction through labor arbitrage. However, **outsourcing has reached a plateau with limited scope for additional cost savings**. Operational transformation will now require long-term strategic thinking with agility, scalability, and flexibility at the center of planning.

PREPARING FOR THE FUTURE IN POST-TRADE

Celent sees a drastic shift in attitude and approach to operational transformation among capital markets firms in the last 18–24 months, as highlighted in Figure 2. They are moving away from big bang transformation projects that were the prevalent model until two to three years ago, and **now prefer a componentized and modular approach with smart investments** to reduce costs and avoid disruption. Complete overhaul of legacy is perceived as too complex and risky; firms are replacing smaller pieces that are coming close to the end of their lifecycle, and tying new solutions with the remaining pieces with new and future-proof technology.

There is a growing need for testing and deploying new products rapidly, and **firms are more willing to use third party solutions**, because they do not want to reinvent the wheel, especially in noncore areas such as post-trade. The provider universe is maturing, and new and innovative solutions are emerging; adopting best-in-class third party tools allows firms to focus efforts and resources on building differentiating capabilities.

Figure 2: Evolution of Capital Markets Transformation Journey



Source: Celent

There are two broad themes in restructuring of post-trade operations in this phase of industry evolution.

Key Research Question 2

How is cloud adoption helping overcome the challenges?

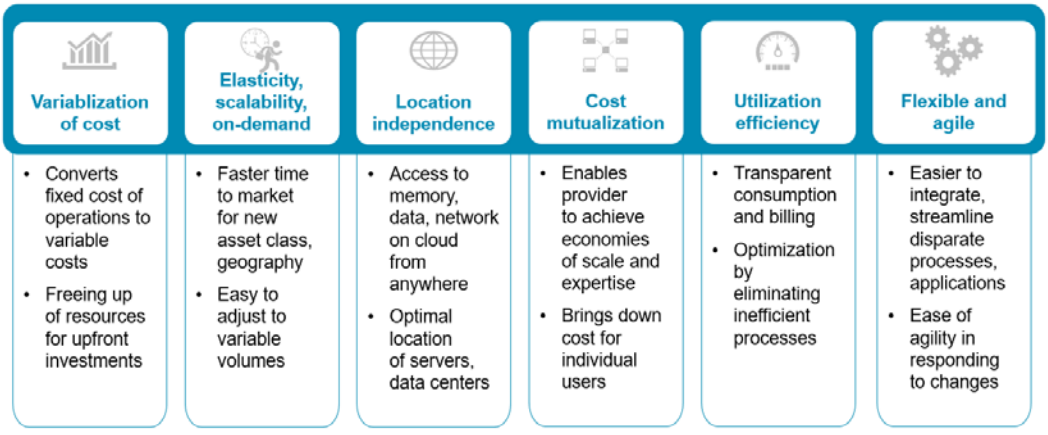
Cloud offers low cost of testing and deployment and fast time to market, which help in responding to constant changes in a flexible and agile manner. Cloud is creating an ecosystem of innovative solutions with strong network effects that allows firms to easily adopt best-in-class solutions and integrate with internal systems.

EMBRACING THE CLOUD FOR AGILITY

Capital markets firms are increasingly turning to cloud because it helps address many of the challenges discussed above in a flexible and agile manner. The cloud has been around in other industries for some time, but adoption in capital markets had been negligible until recently. In the last 18–24 months, Celent has seen a drastic change in attitude toward the cloud. Many firms that said "never" two years ago, are now exploring when and how to go to cloud.

There are different options to choose from, such as private, public, or hybrid clouds. Some firms prefer private cloud for greater control, while others want public cloud's infinite elasticity, and many are taking the middle road and using hybrid cloud. Similarly, there are different engagement models and partners to work with, such as in-house, outsourced, and managed services, and new models are emerging by the day. The optimal mix for an individual firm will depend on its specific needs, but all cloud models offer numerous advantages, as highlighted in Figure 3.

Figure 3: Cloud Offers Numerous Advantages



Source: Celent

- Cloud offers variablization of fixed costs, which is particularly appealing to small and midsize firms constrained by budget, or those who want to focus their investment budgets for building differentiating capabilities.

  - Smaller firms find implementing or replacing post-trade processes expensive. Cloud-based components or complete solutions allow them to adopt best-in-class solutions in a cost-effective way.
- Another advantage of using cloud is vast improvements in time to market and the ease of scaling up (or down) in accordance with fluctuating volumes. Firms are no longer willing to wait for months to commission new servers and hardware when much cheaper and quicker resources are available.
  - Cloud allows rapid and cost-effective testing and deployment: it has become ubiquitous in testing, and many firms are now taking cloud solutions to production.
  - New post-trade functionalities can be quickly developed (e.g., reporting tools) in response to regulatory or internal changes and quickly deployed.
  - Updates to software, interfaces, and platforms can be centrally managed, and quickly transmitted across business lines or regions with appropriate access rights and controls.
- Cloud-based data archiving and distribution are efficient and cheaper, and data can be easily queried from a single source. It relieves the need for manual intervention in data processing, and improves latency, throughput, and automation levels.
- Location independence can be achieved by placing cloud resources in strategically important regions and accessing them from anywhere if they are compliant with national laws. This removes excess capacity of having to manage infrastructure in every market of operation, and results in efficient utilization of resources, which can be tracked and further improved upon.
  - This is particularly helpful for firms operating in multiple markets, especially in Europe or Asia, where every market may not have the scale to justify setting up local operations, and can therefore be served from one location (or a few locations) in a hub and spoke manner.
- Updates to cloud solutions can be made centrally, and new solutions can be built once and delivered to all users at low marginal cost, removing redundancy and accelerating innovation.
  - Cloud allows financial institutions and service providers to not only innovate themselves but also benefit from innovation happening in the ecosystem through open APIs and microservices. That way they can adopt best-of-breed solutions for different components without having to make significant investments for development, implementation, or connectivity.

Celent has seen numerous innovative cloud-based solutions being launched in post-trade, such as in reconciliation, collateral management, and risk and compliance, and many capital market institutions have started using them.

Outsourcing, Managed Service, and Mutualization

Cloud offers the potential for further cost reduction through mutualization by resource pooling and sharing.

- At a firm level, this means sharing common resources, software, and data across multiple divisions, which improves resource utilization, efficiency, and cost reduction.
- At the next level, resources can be further pooled by multiple institutions with appropriate separation of hardware or resources. Multiple institutions can be served by a third party who optimizes cloud resources and drives cost saving through multi-tenancy and economies of scale.

In this way, cloud is reshaping traditional outsourcing and third party engagement models. Capital markets institutions are now looking to outsource not only technology, but also processes — especially in non-core areas such as post-trade. This is giving rise

to **increased adoption of managed service solutions**, where a third party provider manages technology and operations while reducing cost of implementation, maintenance, and research and developments for user institutions.

The next phase in this evolution is multi-tenanted managed service and industry utilities, where a provider offers post-trade solutions to multiple institutions based on a common pool of resources. Each institution can customize the solutions according to its needs through configurability, while common resources allow driving down costs. Some firms prefer only parts or components in a managed service model, while a few have already outsourced complete end-to-end post-trade processes to managed service and utility providers. This trend is intensifying in many commoditized functions such as post-trade, client onboarding, reference data, collateral management, and others.

Cloud Concerns Are Waning

Growing interest in and adoption of cloud solutions have traditionally been stymied by considerations around security and compliance, but they are fast changing.

- Security issues are still concerns for some players, but **a consensus is building that the cloud providers have greatly improved their security features** in recent years, and they are better positioned to invest in research and development for improving security issues than individual financial institutions.
- Few systems, whether public or publicly operated or locally installed, are completely fool-proof. The objective for financial institutions therefore should be to achieve optimal trade-off between cost-efficiency and security. One example is more advanced access controls and auditing that look at keystrokes, video monitoring, and biometric access for holistic control. The amount of investment in encryption technology and decryption techniques is exponentially increasing. The resources available from specialized cloud service providers will dwarf what firms can do on their own.
- Cloud usage by, and encouragement from, leading regulators are helping overcome the concerns around security issues.
- Data privacy and residency laws are also challenging, especially in Europe. **Leading cloud providers have expanded their coverage** and are now present in most of the strategically important markets; they can better help international firms in complying with national regulations around data sovereignty.
- Organizational culture and fear of change can be challenging as well, especially in organizations with low turnaround. Developing and maintaining cloud capabilities require different skills and resources (e.g., programmers, network engineers) compared to running traditional processes, demanding significant restructuring of teams. Celent sees many institutions restructuring workforce and “young-sourcing” strategy and technology divisions to overcome this hurdle.

Cloud Adoption Is Growing in Post-Trade

The benefits of agility, elasticity, cost-efficiency, time to market, and on-demand provisioning have started to outweigh the concerns firms had about cloud, and cloud is making rapid inroads into the capital markets.

- Large sell side players have complex IT infrastructure, and prefer private or hybrid clouds to reduce costs without losing control. As they decommission in-house systems coming to the end of their lifecycle, they are partnering with fintech companies with a focus on cloud development, analytics, and data science.
- Larger players have the resources — financial, technological, and personnel — to manage the complex technical requirements of managing a private or hybrid cloud environment and its interaction with legacy ecosystems.

- Tier 2 and 3 institutions are relatively less concerned about control, and are more willing to outsource end-to-end processes to third party providers, especially in commoditized functions such as post-trade. In this way, they gain greater cost efficiencies without needing to invest in proprietary technology, infrastructure, or human resources.

A common theme in cloud adoption is that **cloud is almost always the preferred choice for firms seeking to build a new solution or replace an existing component**. Cloud's high flexibility and very low cost of failure are the primary drivers in such cases. Therefore, for most solutions developed relating to new regulations and reporting, as well as those replacing post-trade components or implementing new technology, cloud is typically the most preferred option.

Among existing functions, there is a **propensity to take commoditized, non-client-facing activities** (such as data management of market data, reference data) **to the cloud**. Many of the post-trade functions are highly commoditized; therefore, firms are more willing to use the cloud in post-trade. Similarly, data and applications that are not latency-sensitive and have variable workload (e.g., end-of-day reporting) are likely to be moved to the cloud. **Cloud is also becoming popular in risk management**; risk modeling using advanced analytics and large data sets, and frequent reporting (intraday or real-time basis) can be cost-effectively performed in the cloud.

Key Research Question 3

How can market participants improve automation in post-trade?

Improving automation levels will require modernizing back office systems with new technology based on latest standards and frameworks, and simplifying the complex patchwork of systems accrued over the years. New technology such as RPA and AI can be important levers in the next phase of this journey.

AUTOMATING POST-TRADE PROCESSES

Cloud development is interlinked with another major theme unfolding in the post-trade world, which is improving the level of automation across asset classes. Current level of automation in post-trade is low. Many back office processes in newly electronifying asset classes such as FX, fixed income, and others are still manual. Even in core equities, there is need for automation levels to be improved, and error and exception handling processes to be made more efficient, especially due to disparate times zones and post-trade practices, and reduction in settlement cycles across the globe.

Excel may be the first step in the automation journey for some players, but **advanced players are using cloud technology, API, and microservices to replace manual processes**, improve data management and workflows, and communication and electronic messaging aspects in post-trade.

Collateral management is another area witnessing growing adoption of automation. With the push to central clearing of OTC derivatives, frequency of margin calls is growing, and there is need to manage and mobilize collateral better for capital efficiency. Automated communication and workflow management will be critical in this

endeavor. Standardization in messaging and communication is developing; the next stage of evolution will involve convergence between different phases of the trade lifecycle, beginning from execution through matching, confirmation, and settlement.

With the advancement of digitalization, explosion of data, and cheaper computing resources, advanced analytics and robotics solutions are emerging, with many of them being applied in post-trade. Robotic automation can enable easier interaction between multiple systems at the level of graphical user interface, thereby facilitating virtual integration. This can remove repetitive manual tasks. Cognitive automation, artificial intelligence, and machine learning can help in identifying error trades, predicting reasons for trade breaks, analyzing exception handling, and coming up with suggestions for repairing the breaks. These can be applied in reconciliation of trades, cash, and position management, while unstructured data analysis and classification techniques can be used for trade allocation, whereby email and PDF documents are read by machines, relevant information is extracted and classified automatically, and then are fed into automated workflows.

A challenge of using AI in post-trade is the lack of domain-specific expertise, especially in post-trade. So firms are willing to work with third party and fintech providers; cloud provides a low-cost and efficient way for delivering these solutions to the market participants. Incumbent providers are also investing in these advanced tools and offering them as part of their product suites or as additional capabilities through managed service offerings.

Technologically sophisticated banks have the resources and expertise to apply advanced analytics and artificial intelligence based solutions in post-trade. But many banks are still at an early stage of automation journey in post-trade; they struggle with immediate challenges in data and workflow management, and seamless communication with other systems and counterparties, which limit level of automation and STP. The key focus for these banks is to **upgrade and modernize their archaic back office systems with new technology based on latest standards and frameworks, and increasingly cloud-based solutions, and simplify the complex patchwork of systems accrued over the years**. Cloud-based solutions allow them to meet the scale and variable capacity needs in a flexible and cost-effective way, while workflow automation removes the need for manual intervention improving STP rates. Even for banks working with RPA and AI solutions, cloud is an essential component in overall technology architecture, because it allows easy integration with the next-generation solutions, reduces implementation time, and offers elastic scalability.

OUTLOOK

The pressure on capital markets post-trade operations will intensify due to accelerating digitalization, explosion in data types and volumes, and the need to process them faster. Modernizing post-trade operations will be essential because costs of maintaining decades-old systems will otherwise result in higher costs and greater operational risks.

Capital markets firms are moving away from managing anything in-house that is not a competitive differentiator, and post-trade is a prime target for most firms in this regard. As they rearchitect post-trade operations, capital markets firms have several alternatives to choose from: from the incremental approach of more automation or component replacement, through to adopting cloud, managed services, mutualized solutions, and artificial intelligence.

Flexible infrastructure and scalable computing power will be needed to respond to these changes in this phase of industry evolution. Cloud is increasingly becoming a critical component in most firms' strategy including financial institutions and solution providers. The providers are strengthening several aspects of their solutions, especially data privacy, security, and sovereignty issues. They are also helping financial institutions navigate the cloud journey by offering new engagement models.

While the choice of partner and engagement model are specific to a financial institution's specific needs, **Celent sees a growing preference for managed services**. Most small and midsize firms are looking for complete cloud solutions — including technology and operations — from their partners. Even large financial institutions are looking to outsource complete processes to external providers in non-core areas.

As cloud adoption becomes mainstream, **it will have a profound network effect** by creating an ecosystem of best-in class solutions with latest technology that can be easily accessed and integrated with downstream systems through open APIs and microservices. Post-trade automation efforts leveraging cloud, RPA, and AI are underway, and several pilots and use cases indicate potential for significant efficiency improvements. Smarter firms are not only preparing to respond to today's challenges, but also keeping provisions for adjusting to future evolution in the business, regulatory, and technology environment.

Was this report useful to you? Please send any comments, questions, or suggestions for upcoming research topics to info@celent.com.

LEVERAGING CELENT'S EXPERTISE

If you found this report valuable, you might 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 capital markets technology 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 post trade. 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.

ABOUT TORSTONE TECHNOLOGY

Torstone is a leading global provider of cross-asset securities and derivatives post-trade processing technology. Torstone's modern, award-winning Inferno platform is fast, flexible and future-proof. It enables global financial firms to reduce their costs, achieve greater control, minimise risk, and drive operational efficiency. Combining many decades of investment banking expertise with in-depth global financial market and technology industry knowledge, Torstone offers agile, secure, scalable, and cost-effective solutions. Torstone Technology is headquartered in London, with offices in New York, Hong Kong, Singapore, and Tokyo.

For more information visit us at torstonetech.com and follow us on Twitter and LinkedIn.

CONTACT

For more information on Torstone Technology, please contact:

Torstone PR
+44.207.418.7928
payal.raina@torstonetech.com

+44.207.324.5490
melissa.rowling@greentarget.co.uk

Torstone Sales
+44.207.418.7900
enquiries@torstonetech.com

RELATED CELENT RESEARCH

Evolution of Utilities and Managed Services: From Cost Control to Innovation
May 2018

The Great Transformation in Capital Markets: Revolution to Evolution
December 2017

A New Era in Capital Markets Surveillance
November 2017

2017 European Fixed Income Market Sizing Part II: Nongovernment Bond Market
October 2017

2017 European Fixed Income Market Sizing Part I: Government Bond Market
October 2017

The Next Generation of Post-Trade Technology: Evolution to Revolution
July 2017

European Post-Trade Infrastructure Evolution: Switching Gears for the Long Run
June 2017

Rearchitecting the Capital Markets: The Cloud Cometh
May 2017

Rates Revolution — US Treasuries: Technology for a Fragmenting Market
April 2017

The Cloud Comes of Age in Capital Markets: All Clear for More Cloud
December 2016

IT Trends in Post-Trade Processing: Insights and Implications
November 2016

Utility Solutions in Capital Markets: Paving the Way for Operational Transformation
May 2016

From Big Data to Artificial Intelligence in Capital Markets: Code or Be Coded?
January 2016

The European Post-Trade Landscape: Regional Integration Initiatives Paving the Way for Industry Consolidation
November 2015

Asian Post-trade Landscape: CCPs, CSDs Aiming for Global Standards
November 2015

Innovation in Focus: Efficiencies, Outsourcing, and Utilities in Post-Trading
September 2014

Evolution of European Post-Trade Arrangements under T2S: Competition Spurs New Settlement Strategies
June 2014

Evolution of European Post-Trade Arrangements under T2S: Impact on Asset Servicing and Securities Payments
June 2014

Copyright Notice

Prepared by

Celent, a division of Oliver Wyman, Inc.

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

Arin Ray aray@celent.com

AMERICAS

USA

200 Clarendon Street, 12th Floor
Boston, MA 02116

Tel.: +1.617.262.3120
Fax: +1.617.262.3121

USA

1166 Avenue of the Americas
New York, NY 10036

Tel.: +1.212.541.8100
Fax: +1.212.541.8957

USA

Four Embarcadero Center, Suite 1100
San Francisco, CA 94111

Tel.: +1.415.743.7900
Fax: +1.415.743.7950

Brazil

Av. Doutor Chucri Zaidan, 920 –
4º andar
Market Place Tower I
São Paulo SP 04578-903

Tel.: +55.11.5501.1100
Fax: +55.11.5501.1110

Canada

1981 McGill College Avenue
Montréal, Québec H3A 3T5

Tel.: +1.514.499.0461

EUROPE

France

28, avenue Victor Hugo
Paris Cedex 16
75783

Tel.: +33.1.73.04.46.20
Fax: +33.1.45.02.30.01

United Kingdom

55 Baker Street
London W1U 8EW

Tel.: +44.20.7333.8333
Fax: +44.20.7333.8334

Italy

Galleria San Babila 4B
Milan 20122

Tel.: +39.02.305.771
Fax: +39.02.303.040.44

Spain

Paseo de la Castellana 216
Pl. 13
Madrid 28046

Tel.: +34.91.531.79.00
Fax: +34.91.531.79.09

Switzerland

Tessinerplatz 5
Zurich 8027

Tel.: +41.44.5533.333

ASIA

Japan

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

Tel: +81.3.3500.3023
Fax: +81.3.3500.3059

China

Beijing Kerry Centre
South Tower, 15th Floor
1 Guanghua Road
Chaoyang, Beijing 100022

Tel: +86.10.8520.0350
Fax: +86.10.8520.0349

Singapore

8 Marina View #09-07
Asia Square Tower 1
Singapore 018960

Tel.: +65.9168.3998
Fax: +65.6327.5406

South Korea

Youngpoong Building, 22nd Floor
33 Seorin-dong, Jongno-gu
Seoul 110-752

Tel.: +82.10.3019.1417
Fax: +82.2.399.5534