

# Securities Services Evolution 2023

Disruption and transformation in financial  
market infrastructures

# Contents

Foreword	3
Executive Summary	4
Introduction	6
Methodology	6
What is driving the FMI agenda today?	7
In the spotlight: A single market for Latin America	12
In the spotlight: Clearing consolidation in Europe	14
Settlement Transformation	16
In the spotlight: T+1 and Securities Lending	26
DLT and Digital assets	28
Conclusion	37
Acknowledgments	38
Contributors	39
Endnotes	40

# Foreword

Since the launch of this whitepaper back in 2021, Citi Securities Services has been at the forefront of ongoing market infrastructure developments and how the industry is responding to these changes. Each year we have relied on the collective insights of industry leaders across the world, and we would like to extend our thanks to the 483 survey respondents and 12 financial markets infrastructures (FMIs) and industry participants that have contributed to this year's "Securities Services Evolution" whitepaper.

Last year we saw the emergence of major trends including digitization and accelerated settlement that are now dominating the industry agenda. This year, the data shows increasingly strong consensus amongst market participants on the likelihood of T+1 in major markets and the significant impact this is likely to have on legacy technology and global operating models. As a result, much of the world is now also engaged in an urgent effort to prepare for and make the most of imminent changes to accelerated settlement cycles. In parallel, we've also seen a growing number of live and commercially viable initiatives amongst banks, broker-dealers and FMIs.

How organizations manage the balance of these two core trends is a highly complex question. Supporting innovation while maximizing global consistency of the client experience remains core to the Citi Securities Services offering and we look forward to continuing our partnership with organizations across the globe as they seek to prepare for another significant year of transition ahead.

We hope you find this year's paper insightful and informative as always.



**Okan Pekin**

Global Head of Securities Services, Citi

# Executive Summary

Securities Services Evolution 2023 tracks the continuing evolution of our industry from being on the brink of change (in 2021), to seeing ongoing transformation (in 2022), to a year in which execution and realization have become core priorities in 2023. Not only is the industry preparing to remove an entire day from the settlement cycles of the world's largest capital market, but firms are also readying themselves for what they expect to be imminent changes to other settlement cycles, digital currency adoption and even atomic settlement in the next five years.

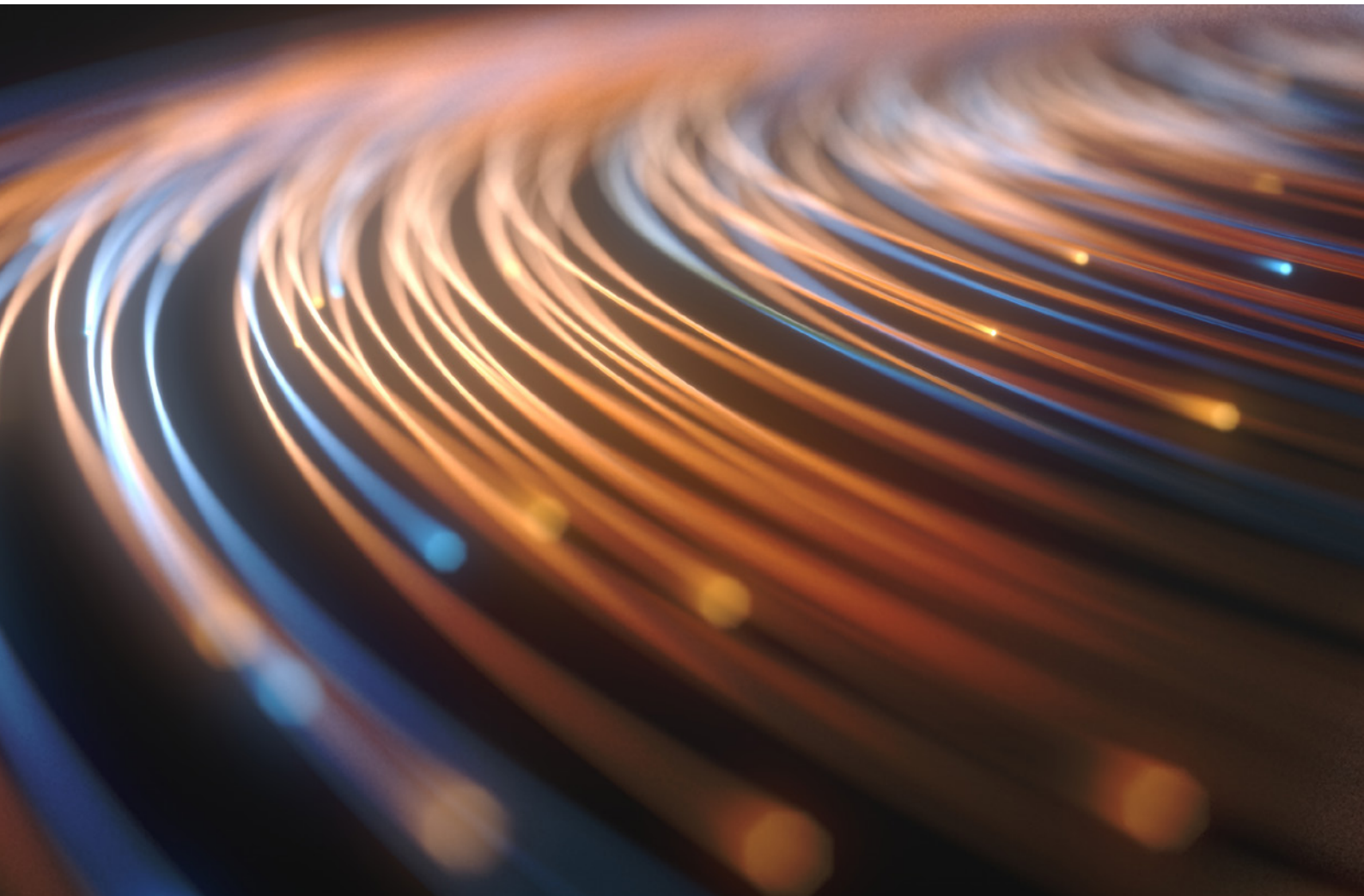
## The FMI agenda

Across the world, FMIs (most notably the Central Securities Depositories, or CSDs) are almost all facing the same two headline challenges: How to accelerate transformation and innovation (in settlements and digital assets above all) while at the same time managing a transition away from ageing, legacy infrastructures. Across digitization, accelerated settlements and legacy transition, the ecosystem impacts of these pressures are now top-of-mind for

many FMIs, as they shift their historical focus from managing (their own) platforms towards managing a wider ecosystem. From owning individual change to facilitating change across the industry.

While FMIs struggle with these challenges almost uniformly, almost regardless of location, there are important differences. In Latin America, we are about to see one of the most ambitious consolidation projects ever realized between Colombia, Peru and Chile. In Europe, the lasting benefits of clearing competition are now coming into question. In the digitization space, those in Asia and Latin America continue to innovate to drive financial market participation – while their peers in North America and Europe are shifting their focus towards the provision of common industry platforms. In Europe, Australia and other markets, corporate action standards continue to be a focus.

Faced with what seems to be an inevitable acceleration in settlement cycles (coming to the US, Canada and most likely Mexico in 2024), FMIs look set to have an increasingly complex operating agenda for years to come.



## Settlement transformation

89% of our survey respondents expect their local settlement cycles to shorten to T+0 or T+1 within the next five years. This means a vast amount of change ahead for an extended period. As firms across the world are discovering with their preparations to T+1 settlement cycles in the US and Canada next year, the impacts of accelerated settlement are profound and touch everything from trade fails to headcounts and treasury requirements. Next year's transition will impact up to eight different departments in each organization but in differing ways, depending most of all on where firms are located in the world. Those in Europe and Asia will be profoundly impacted by the treasury implications of T+1, while those in North America contend with regulatory requirements and securities lending liquidity.

With each market transition, the industry's best-practice sharpens a little. After India's T+1 move in early 2023, the path towards market readiness is clear: First get clients and counterparties engaged; then drive internal automation; and finally put in place resources and location strategies. Across all of these areas, the ability to depend on real-time communications, feeding a real-time view of inventory is increasingly critical.

With each market move increasing dislocation risks between different global settlement cycles, the likelihood of the T+1 domino effect continuing is high.

## DLT and digital assets

2023 sees 74% of our respondents engaging in distributed ledger technology (DLT) and digital asset initiatives (increased from 47% in 2022), in a clear

sign that the DLT momentum continues to grow, despite negative news headlines around FTX and other initiatives. But while digital asset and crypto-currency activity continues (notably in Europe and Asia), building and preparation activity seems increasingly focused on DLT and tokenization, as the industry looks to leverage the choice and flexibility that the technology offers in operating processes and market rules.

As this increased activity moves into live environments, the dependencies that lie ahead are becoming more granular. In need of a currency leg for digitized transactions, the industry is increasingly bullish on their expectations of digital cash being operational within five years (through a range of Central Bank Digital Currencies (CBDCs) and more commercial mechanisms).<sup>1</sup> Organizationally, the focus is increasingly on those whose role it is to govern our infrastructures – not just regulators but also risk, compliance and finance teams. Technologically, there has also been a marked shift in who is expected to manage the burden of legacy platform connectivity – from the market participant to the provider. And lastly, but not least importantly, financial markets regulators across the globe are sharpening their guidelines and legislations to ensure continued oversight on market integrity and investor protection.

Looking ahead, the continued momentum of DLT and digital assets looks set to depend on two factors. First is the sell-side's ability to successfully engage the buy-side, using a narrative that is built around the needs of a portfolio manager (more than an operations head today). Second is the ability to change industry processes to realize the benefits that DLT offers.

## Key takeaways



1

**FMs globally are facing two headline challenges:** how to accelerate transformation and innovation (in settlements and digital assets) while simultaneously managing a transition away from legacy infrastructures.



2

**Settlement acceleration continues to lead the agenda** and will impact every step of the trade and post-trade lifecycle from account opening through to FX and treasury, settlements and asset servicing.



3

**DLT and digital asset adoption continues to accelerate** with momentum growing around the use of DLT and tokens. Industry knowledge around the operational benefits of DLT is maturing quickly and now needs to evolve to include the benefits for the buy-side.

# Introduction

The central theme of this year’s whitepaper revolves around the volume and diversity of change that market participants are facing around the world. This change centers on three broad areas:

- **FMI transformation:** Significant change pressures being felt by financial market infrastructures across the world to manage a growth agenda during a phase of major technological transition (and removal of legacy platforms).
- **Settlement transformation:** Preparations by all profiles of global market participants for accelerated settlements in the US and Canada (transitioning in May 2024) and more to follow – giving rise to a new, real-time target operating model.
- **Digital assets and DLT:** Adoption and live deployment of digital assets (including crypto-currencies) as well as tokenization projects (digitizing traditional securities), building on the increased optionality that DLT offers each firm.

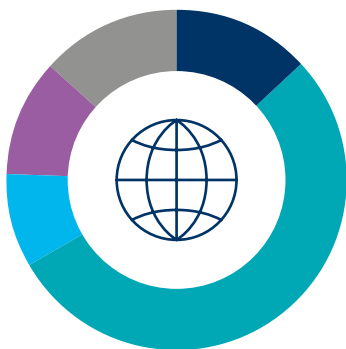
# Methodology

In order to deliver global and highly relevant insights on the future of securities settlement across Asia-Pacific, Europe, North America and Latin America, this whitepaper draws on two core sources of qualitative and quantitative expertise.

**1) Quantitative:** In May 2023, Citi Securities Services collaborated with the [ValueExchange](#) to run an online survey of 483 individuals around the globe, including FMIs, custodians, broker-dealers, investment managers and institutional investors.

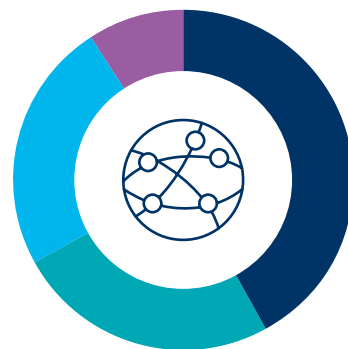
**2) Qualitative:** In June and July 2023, a total of 12 FMIs and industry participants (from all regions and profiles) participated in in-depth interviews, to share their specific insights and experiences. FMI representatives included exchange and depository leaders; while industry participants included broker-dealers, fintech providers and a taskforce.

## 1a. Market participant breakdown



● Asset manager	12%
● Bank	53%
● Broker-dealer	10%
● Custodian	12%
● Institutional investor	14%

## 1b. Geographical breakdown



● North America	42%
● APAC	26%
● EMEA	24%
● Latin America	9%

# What is driving the FMI agenda today?

*“The role of a CSD is significantly evolving. A CSD’s value is not just about their own services and managing their infrastructure, it’s also about how they add value by reinforcing and supporting the market ecosystem.”*

Ivan Nicora, Head of Investor Services, Euroclear

This means a shift in the CSD business model that now includes much more active market engagement, two-way feedback and expertise on global regulations.

It also means wider engagement than ever before – as awareness of the importance of issuers and investors grows. Practical experience shows that both constituents are part of the ecosystem now and are central to the CSD discussion.

## The changing role of CSDs

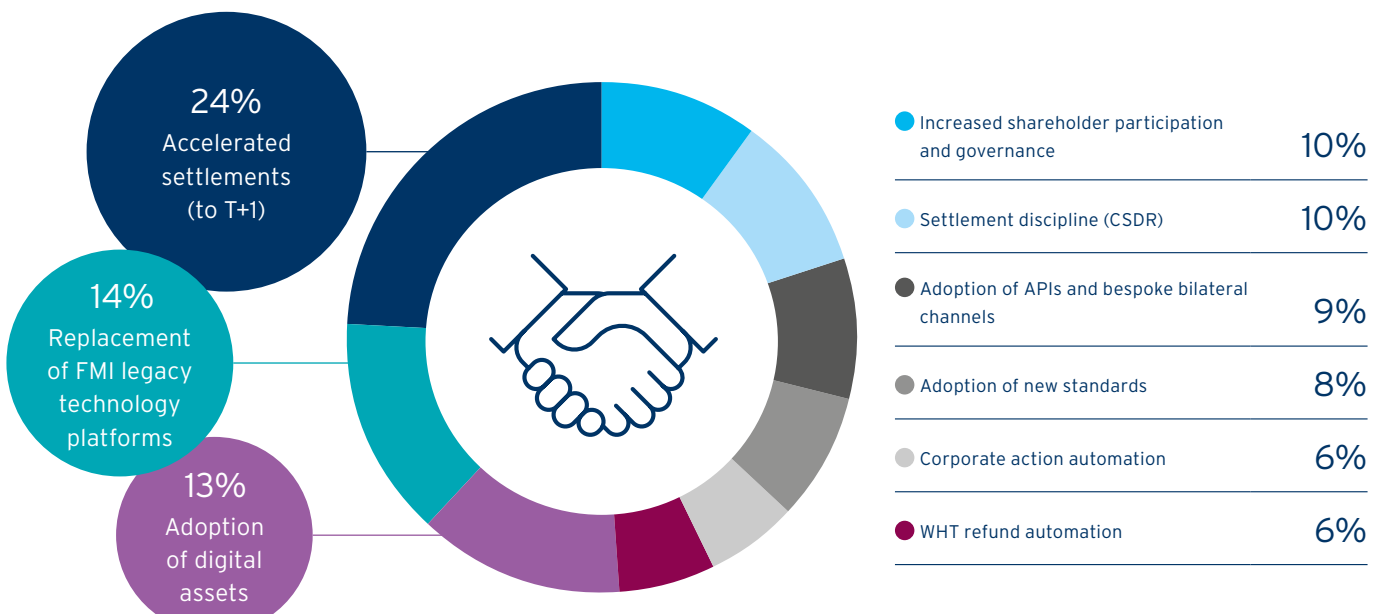
The CSD mandate has transformed in the last decade. As initiatives such as accelerated settlements and DLT/blockchain have evidenced, progress can be easily achieved when viewed only at a CSD level but market adoption often proves to be significantly more challenging. The deployment of a new blockchain in a market or a move to T+1 settlements may require only minor system changes at CSD level, but a successful market transition depends on readiness across the entire, global investment ecosystem.

In this context, CSDs have become ecosystem managers – facilitating market progress and innovation by leveraging their connectivity at the heart of the securities industry.

## Accelerated settlements lead the agenda

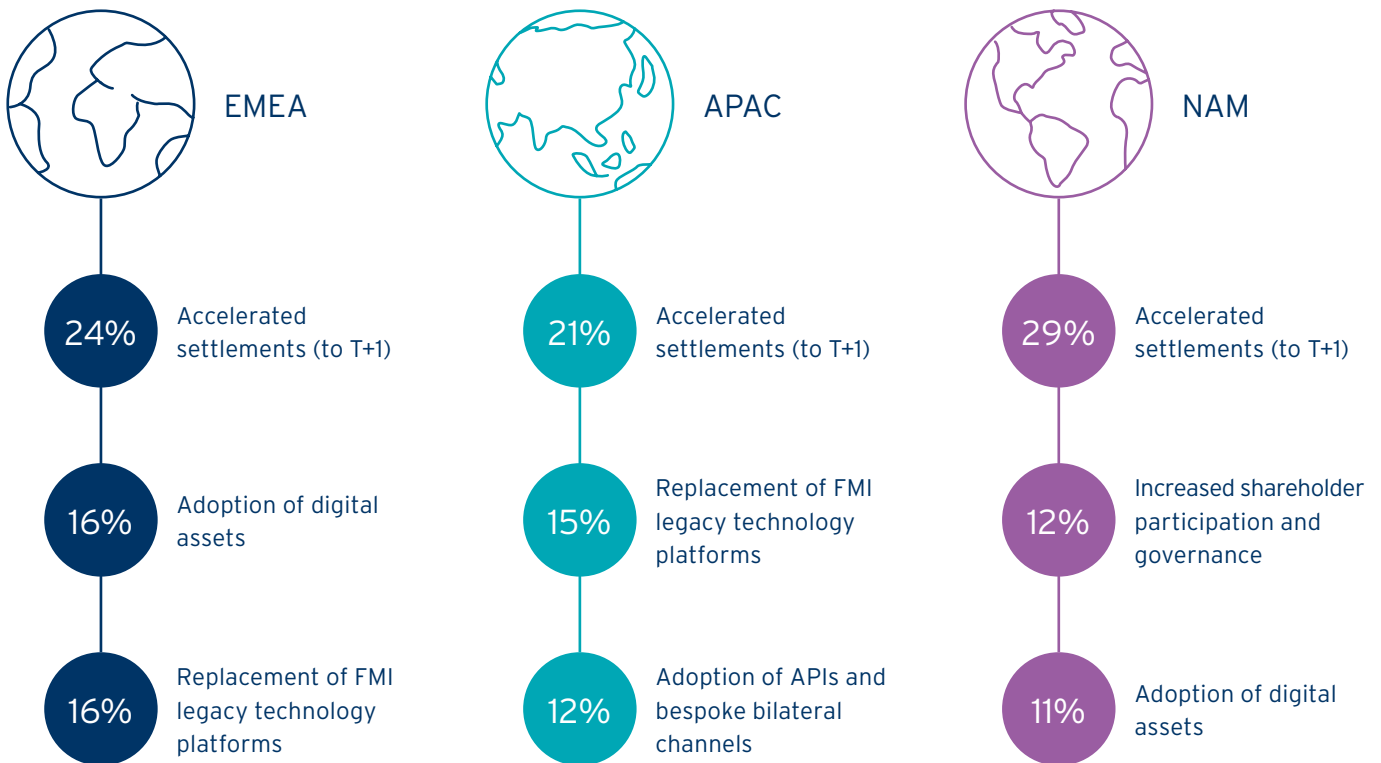
The strongest example of this ecosystem role today is the global focus on accelerated settlement – the single largest area of focus across all FMIs and participants globally. This was also noted in our survey where 24% of market participants ranked accelerated settlements (to T+1) as the most significant change in the post-trade space based on impact of their business. (see Figure 2a) This is followed closely by replacement of FMI legacy technology platforms (14%) and adoption of digital assets (13%).

## 2a. Most significant changes in post-trade today – based on impact to business



% ranking each option as #1. Percentages might not add up to 100 due to rounding

## 2b. Top three changes – Based on impact to business (by region)



*“T+1 is very relevant for us in Mexico as approximately 50% of what is traded on the exchange in Mexico is related to foreign securities. We are aligning ourselves with the US just as we did when T+2 went live in 2017 and will be adopting T+1 simultaneously with the US.”*

**Roberto Gonzalez Barrera, CEO, Post-Trade Division, Grupo Bolsa Mexicana de Valores (BMV Group)**

After India’s move to T+1 in the first quarter of 2023, the domino effect has begun in North America with the US confirming their transition date (May 28th 2024), prompting a move by Canada (May 27th 2024) and most likely, by Mexico around a similar date in order to avoid alignment issues with the US market. Similarly, the UK’s “Accelerated Settlement Task Force” has identified dislocation and alignment issues at the centre of its evaluation. With 89% of market participants expecting settlements in their own markets to accelerate in the next five years, there is clearly an expectation for this wave to continue well beyond the markets scheduled to move in 2024 (see Figure 3).

Experience to date in India, the US and Canada has shown that accelerated settlement is far from an FMI-only issue though. Nor is it just a settlement issue. T+1 preparations so far have underlined the critical importance of participants working as a network to “get it right the first time” as trades move from the middle office, to treasury, FX, settlements, securities lending and asset servicing teams. As the section below explains, the transition to shorter settlement cycles is also evidencing the critical importance of time-zones, funding cycles and offshore regulatory regimes in complicating transition in any global market.

### Replacement of (FMI) legacy technology

*“We have a generational challenge in the CSD business: to manage a safe transition to new platforms.”*

**Kristine Bastøe, CEO, Euronext Securities Oslo**



## Timeline



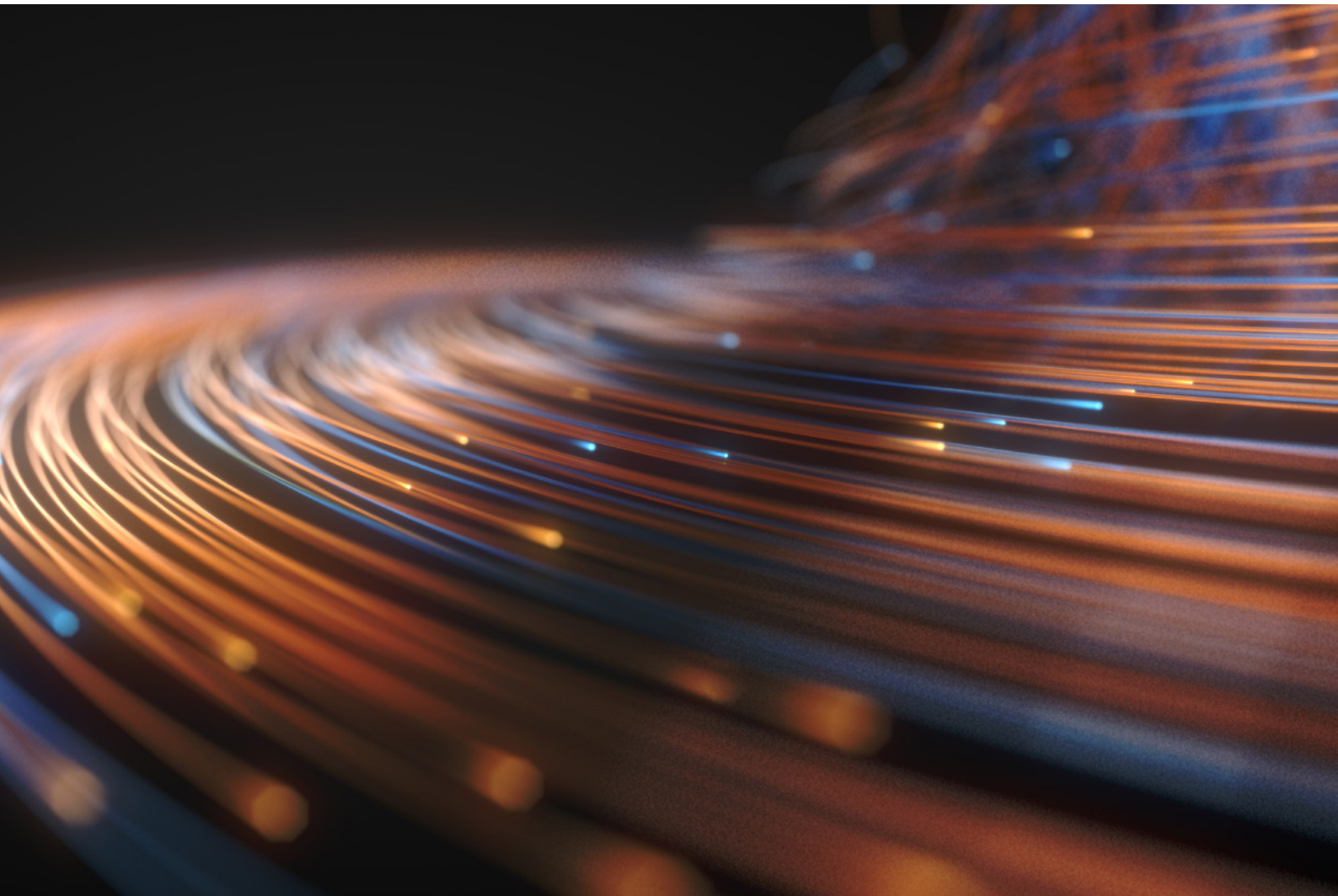
While managing and driving ecosystem change, CSDs are also faced with a difficult balancing act: How to drive innovation in settlement cycles and digital assets and other areas, while managing inevitable, large-scale, market-wide technology transitions away from legacy systems. 14% of the world’s post-trade systems are getting old but as ongoing examples in Australia, Canada, Hong Kong and the USA continue to show, changing them is a considerable task.

Regulatory considerations and the extremely interconnected nature of settlement systems have meant that CSDs have often shied away from replacing or managing their legacy technologies, leaving us today with an increasingly acute problem. They want to use their core systems to grow into new asset classes and capabilities, but they are aware that those core systems are going to have to be updated very soon. Legacy platforms are at minimum a hurdle as they slow innovation and draw in additional time to manage. When overlooked, they can be a blockage to future innovation and market growth.

*“With much of our technology based on local, self-built platforms, we knew it was time to change. In moving now to a new platform across the entire post-trade space, we can move quickly towards international standards and automation for our participants”*

**Roberto Gonzalez Barrera, BMV Group**

But the best-practice roadmap and transition plan are far from clear. “Built like tanks”, many FMI systems are old but dependable, causing many organizations to defer change year by year in response to participants’ asking, “If it’s not broken, why are you trying to change it?” High numbers of involved parties can also make roadmap planning and testing highly complex – as can local complexities in markets where individual accounts are maintained. For example, SGX shared that they are constantly dealing with new challenges and intricacies pertaining to its retail facing depository services.



With several markets struggling to manage a timely and orderly transition today, the costs and implications of failure (in prolonged testing, continuing change management and roadmap planning) are increasingly evident – generating increasing resistance to change at a time when it is increasingly inevitable. FMIs need to ensure they find the right transition path today in order to avoid market disruption and to reduce the trust placed in them by their participants.

*“There are so many opportunities for us to improve the value that we add – through shorter settlement cycles, revised operating procedures and through new, digital products – but the key question is how we can retain our role as an agent of trust in the industry?”*

**Dr. Pakorn Peetathawatchai, CEO, Stock Exchange of Thailand**

### Digitization: A new role for FMIs

As market participants continue to focus on digital assets with increasing momentum in 2023, the role of FMIs in facilitating innovation in this space is evolving. Early experimentation by FMIs has largely focused on transforming specific asset classes: either by bringing new asset classes (such as bonds or mutual funds) into a digitized CSD structure; or by transforming existing (equities) marketplaces. As banks and broker-dealers have continued to issue greater volumes of digital assets themselves, the need for a regulated player to aggregate and facilitate liquidity across different asset pools has become clearer. Who is going to bring together the multitudes of micro-liquidity pools that are forming for digital assets?

In response, it appears that FMIs have taken on a new role in digitization in order to provide a common, industry platform, in a regulated environment that the market can use to build applications and processes on and, in doing so, aggregate liquidity.

This is a distinct change from previous models of using DLT as the basis for (centralized) FMI processing platforms – and is designed to remove friction between participants while leveraging industry scale. By looking to empower all levels of market participants (instead of focusing on disintermediation potential), today's CSDs are charting a new path for digital assets.

## Shareholder governance and participation

*“How can we keep the power and efficiency of the omnibus account structure while also creating the transparency and connectivity needed for investors and issuers to communicate seamlessly?”*

Ivan Nicora, Euroclear

Inherent in the shifting role of CSDs towards managing market ecosystems is also the growing importance of connecting issuers with investors more effectively and transparently than ever before. In a world where institutional investors can be given only 3 to 5 days to respond to proxy voting notifications<sup>2</sup>, the existing infrastructure is clearly sub-standard in many markets and not ready to meet the increasing ESG-driven demands of asset owners (especially in the US and Latin America, where shareholder participation and governance is the second biggest priority for market participants). But with a growing number of institutional and retail investors looking to take more active roles in the management of the companies where they invest, the pressure on the intermediary market (including CSDs, custodians and broker-dealers) is to facilitate better, faster and clearer shareholder governance through proxy voting and tax reclaims.

This pressure is driving two main changes: First is the emergence of new, collaborative, technology platforms (such as Proxymity) aimed at fixing the plumbing and negating the problems that omnibus accounts create (in obscuring share ownership). The second is an increasing friction driven by a lack of clarity around who “owns” the relationship with issuers today in the post-trade space – is it the CSD or the Issuer Agent or someone else? Put together, these changes are leading to a growing proliferation in operating models (e.g. CSD-managed platforms in the US or South Africa; versus collaborative platforms in the UK and Ireland) and risk diluting the ability to respond to investors’ growing needs.

## Trade-offs: Corporate action automation

*“We cover securities from 25 countries, where the creativity of corporate events is triggering a significant custodial risk for us.”*

Roberto Gonzalez Barrera, BMV Group

And what about corporate actions? In a world of varying, urgent priorities, are they a natural casualty in the need to manage trade-offs in the project agenda?

Fortunately, not. Notable progress has been made in facilitating corporate action automation improvements of over 80%<sup>3</sup> in such markets as Australia, India and Switzerland, showing that change is now possible. And as more markets facilitate these levels of improvement, the pressure from global investors to see standardization of messaging and processes across multiple markets is increasing. Cross-market standardization is emerging as a key driver behind asset servicing standardization – to avoid making it harder for people to participate in one market than in others across a region.

But these change projects have also highlighted marked obstacles in driving and managing change. Increasingly, issuer agents are at the center of the discussion and need to be brought into change discussions, often for the first time. Local market “uniqueness” in practices needs to be accommodated – as does the continuing innovation of issuers in their corporate event structures. And depository participants need to be given a clear path to benefit from changes – overcoming the inertia of established messaging formats and processes that will need (costly) revisions.

With many CSDs continuing to drive automation in this space (in Europe, US, Canada, South Africa,<sup>4</sup> Hong Kong and Singapore), corporate actions don't appear to have fallen off the agenda yet.

*“Standardization is becoming a key driver for us in how we deal with and attract foreign investors. We have to avoid a situation where it is harder for investors to trade in our markets than in other European markets – and that is why we're investing heavily in this space.”*

Kristine Bastøe, Euronext Securities Oslo

# A single market for Latin America

*“This is not about interoperability, we are creating a new, single market with more liquidity and more opportunities for global investors.”*

Juan Pablo Córdoba, CEO, Colombia Stock Exchange

## What is happening?

In 2024, three markets look set to realize a major milestone in global FMI cooperation. When the stock exchanges of Colombia, Chile and Peru go live as a single trading venue, they will be bringing together three FMIs, across three regulatory jurisdictions, in what is one of the most ambitious change projects in the world to date. Under this scheme, Colombia Stock Exchange and Santiago Stock Exchange will each control 40% of the holding company, with Lima Stock Exchange owning the remaining 20%. While some have attempted similar integration projects in the past, this new cooperation looks set to considerably increase the “investability” of Latin American assets by integrating three markets into a single pool of liquidity – making it easier for global investors to trade, clear and settle across the region. For example, issuers can list in one country, but their shares can be traded in all three markets. With trading, there will be a single rule book and single matching engine for investors across the three markets.

## What has been done so far?

Following the initial announcement of the initiative in 2018, much has already been accomplished on the path to realization. The project’s holding company is live in Chile (headed by Juan Pablo Córdoba of the Colombian Stock Exchange); mutual recognition of issuers across the three jurisdictions has been achieved; and interoperability of settlement across the three CSDs is also done; interoperability of the CCPs will follow. The path towards integrated trading looks clear.

What lies ahead now is the “consolidation of the real estate” across the post-trade space. Experience from past ventures has shown that the significant weight and value of integration effort comes in moving from post-trade integration to consolidation – which is why the next step is the creation of a single clearing and settlement process for all three markets, similar in principle to the TARGET2-Securities (or “T2S”) model in Europe. While this may seem like a natural evolution of the model, management of complexities around cash movements may prove to be challenging.

*“This is an opportunity to redesign the entire business logic of three markets. Consolidating trading is the easy part, the real challenge is clearing and settlement integration.”*

Juan Pablo Córdoba, Colombia Stock Exchange

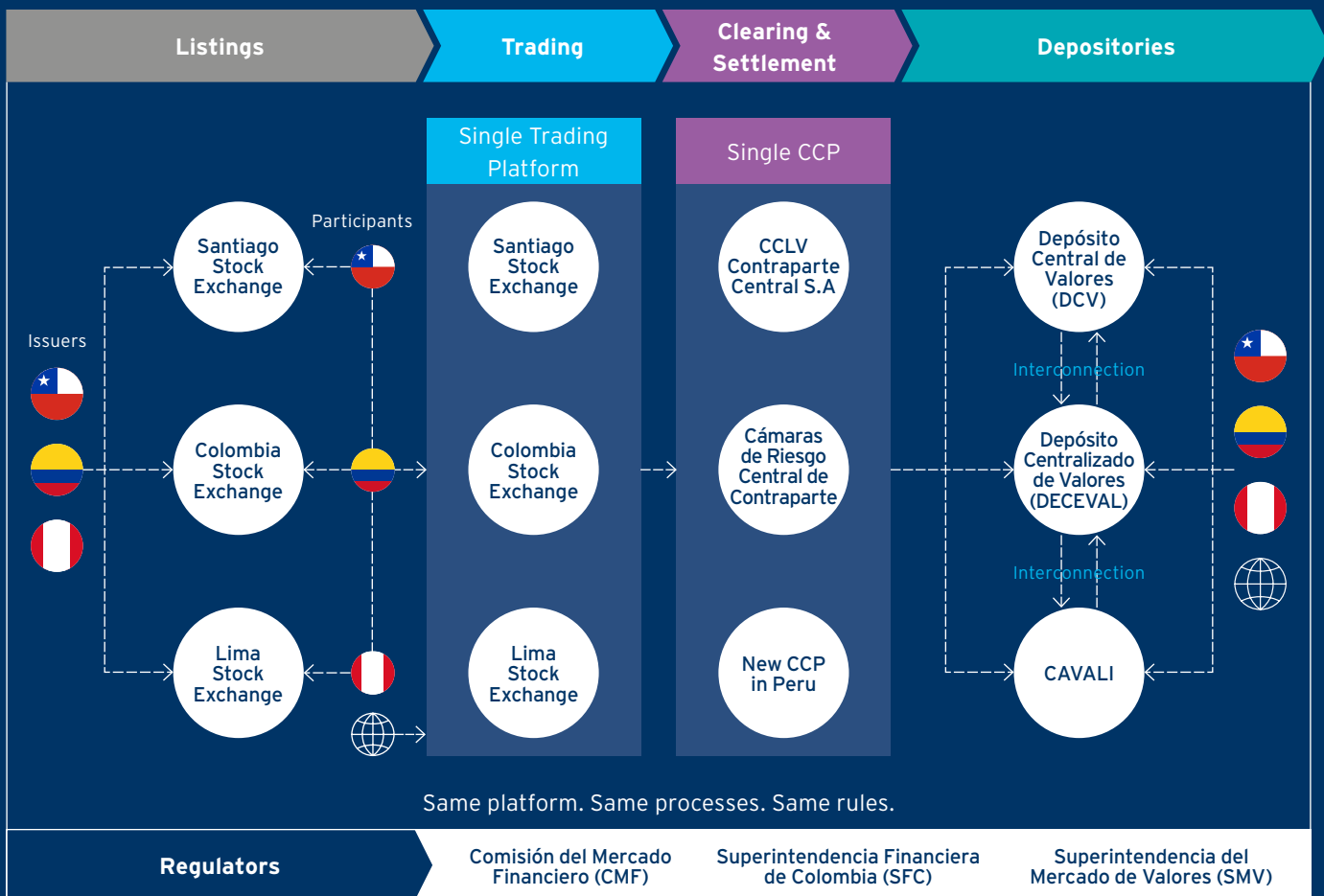
## Creating new opportunities

While this integration is likely to initially benefit equities, it could down the road, be extended to other asset classes as well, including listed derivatives. Nonetheless, Córdoba cautioned that fixed income may take time as it continues to be traded mostly on an OTC basis and trading practices differ between countries.

Once consolidated, the new trading bloc will open up extensive opportunities for participants. With any new platform comes the chance to streamline and revise market processes – and also to introduce common standards that can drive greater levels of automation. With liquidity consolidated into a single venue, opportunities for securities lending and finance become available. Even transformative ideas such as the use of stablecoins become possible (to manage currencies outside of current settlement cycles, for example).

## Operating model for the integrated market

The operating model for the integrated market maintains the institutions in each jurisdiction.



But of course no change is easy when it is across multiple markets. Existing, beneficial owner level account structures in Colombia and Peru (but not in Chile ) will make account standardization difficult. Equally, global investors' willingness to change is a key dependency. Being a smaller market than Brazil or the US means that investors may be less willing to accommodate new market changes straight away. Finally there is the dislocation risk from global initiatives such as accelerated settlement – where market participants may demand more structural change at the exact time when stability is needed.

### Impact for global investors

This important development means a range of benefits for investors across their front, middle and back offices. Crucially, liquidity will increase as the market consolidates, creating efficiencies in access to investments and better pricing, not to mention opportunities in securities finance. From a usability perspective, investors will also see a standardized user experience for the region, using the same matching engine, rulebook and support channels for all three markets.

Operationally, global investors will benefit from the unification and standardization of connectivity across three markets into one. By connecting to a single clearing and settlement platform, investors will be able consolidate their data connectivity, focus their banking and funding relationships and remove any issues in managing disparities between the three depositories that exist today.

And this is just the beginning. As liquidity grows, more issuers and market makers will join the market ecosystem and hopefully create a virtuous circle for years to come.

# Clearing consolidation in Europe

*“Clearing in Europe is at an inflection point. Since MiFID, we have built interoperability across Europe’s clearing houses so that we can work with those that we chose to – not with those that we have to. This now looks set to change – unwinding all of the hard work that the industry has done.”*

**Jeff King, Global Head of Custody Product Management, Securities Services, Citi**

## What is happening?

Since the introduction of the Markets in Financial Instruments Directive (MiFID I) in 2007, competition in clearing has transformed European trading. As multilateral trading facilities (MTFs) and clearing houses have proliferated, the interoperability of these venues across Europe has driven down the cost of clearing from around EUR1 to less than a few cents. Individual firms have been able to direct their clearing volumes into single venues, achieving scale in fees and margining to the benefit of investors globally.

Euronext Clearing’s entry in the heart of European trading (as the CCP in Belgium, France, Italy and the Netherlands) means that these continuing efficiencies of scale may prove hard to sustain.

With the introduction of a “Preferred Clearing” model in these markets, firms will no longer be able to unilaterally direct their clearing flows to their preferred venues. All choices to direct clearing away from Euronext Clearing will need to be agreed by both counterparties to the trade and, if both sides cannot agree or fail to instruct properly, clearing will default to Euronext. All trades cleared in Euronext will then default to Monte Titoli for (cross-border) settlement in T2S; with all asset servicing being managed there as well.



Euronext NV, a pan-European bourse purchased Borsa Italiana from the London Stock Exchange Group in 2021. The acquisition included the Italian stock exchange, Monte Titoli (the Italian CSD) and Cassa di Compensazione e Garanzia (the Italian CCP). This acquisition lays the foundation for a vertically integrated stack of stock exchange to CCP to depository for a massive share of exchange traded securities on continental Europe.

In late 2022, Euronext announced the rebranding of Cassa di Compensazione e Garanzia as Euronext Clearing and the appointment of Euronext Clearing as the default CCP for all the Euronext exchanges. The change of the default CCP is a market mandatory switch and will impact all participants, all Individual Clearing Members and General Clearing Members will need to build connectivity if they wish to support the Euronext French, Belgian, Dutch & Portuguese cash equity exchanges. Maintaining links with LCH SA and CBOE Clear Europe as a preferred CCP will not be enough.

The migration of the default CCP is scheduled in phases with the Brussels exchange migrating to the new configuration on Oct 23, 2023 followed by the Amsterdam, Lisbon and Paris exchanges on Nov 6, 2023. We’ve been told that the Italian market will move to Euronext Clearing’s enhanced technology platform sometime in Q2-Q4 of 2024.

## What does that mean for market participants?

*“Choice in the preferred clearing model is an illusion.”*

Jeff King, Citi

This may appear to be a small change but, in practice, this will likely create a complex P&L evaluation for market participants as they look to manage additional burdens and risks in their clearing.

On the positive side, the scale of Euronext Clearing’s market reach means that participants will only have to face two markets (in place of today’s five) – triggering margining efficiencies and potentially reduced unit costs across the five trading markets.

Yet these efficiencies will need to offset a number of operational challenges and risks. At best, firms will only be able to identify their clearing venue after the trade (meaning potential delays to cost projections and inventory management). The failure of counterparties to elect to use the right clearing house could lead to i) a loss of choice, ii) scale and margin inefficiencies (through splitting volumes across multiple CCPs) and iii) increased clearing fees (through the loss of volume-based tiering benefits) for firms in these markets. With very limited cross-border flows in T2S today, the increase in settlement volumes into Monte Titoli could also create initial settlement risks as volumes grow through this new and largely untested mechanism.

Most of all, with firms still struggling to come to terms with the impacts of the Central Securities Depositories Regulation (CSDR), now looks to be an inopportune time to increase pressures on inventory management and indirectly the risk of settlement failures and buy-ins.

## What's next?

*“The die is cast now – but it remains to be seen how market participants will react to this model. Unfortunately, preferred clearing is the path of least resistance.”*

Jeff King, Citi

With initial operating details only now becoming available, the outlook for the risks mentioned above is unclear. Increased fails and loss of clearing flexibility are still not inevitable – as participants could still succeed in coordinating to the point of retaining full control over their clearing – but there appears to be little chance of cost savings for market participants. While it is too early to tell if and how costs rise, Euronext Clearing will be the path of least resistance if nothing else.

### Differences between interoperable and preferred clearing (cash equity)



**Interoperability:** the choice of which CCP is used to clear transactions, while the counterparty can select another. I.e. the trade can ultimately be cleared by two different CCPs.



**Preferrable clearing:** a trade is sent to the chosen CCP only if both counterparties select the same CCP. Otherwise the transaction is sent to the default CCP. However, since order books are anonymous, market participants are not able to coordinate.

# Settlement Transformation

## Settlement transformation today: where are we?

The securities industry is already well into its settlement transformation journey and the need for timely and reliable settlements across the global portfolio has been increasing steadily over the last decade.

But now things look different.

In 2014, the world began T+0 settlements (from Hong Kong) in China, as the first global equities market to move to same-day settlements. Since then we have seen the world’s leading global markets accelerate their equities settlement cycles from T+3 to T+2. Last year, the European Union saw the introduction of settlement penalties under the Settlement Discipline Regime of the Central Securities Depositories Regulation (CSDR). This year has seen India move to a T+1 settlement cycle, in what was the latest in a continuing wave of changes to settlement operations.

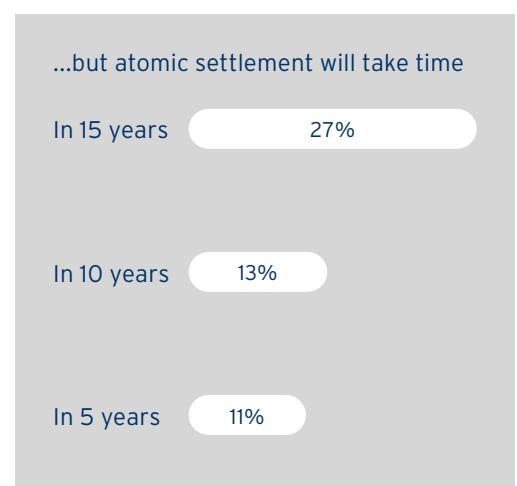
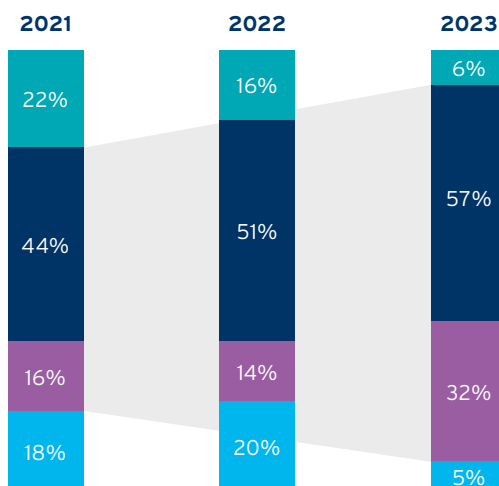
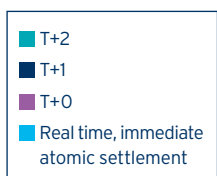
In this context, the move to T+1 settlements in Canada and the US (on May 27th and 28th 2024, respectively) might appear to be just another – albeit major – step in the ongoing global transformation of settlement processes. But as the entire world moves closer to the target live date, the scale of this latest move is becoming clear.

Those in the US and Canada are faced with the need to perform the majority of their middle, back office and funding activities on a trade-date basis for the first time. Firms based in Asia-Pacific and Europe will effectively be dealing with their US and Canadian settlements on a T+0 basis for the first time – creating operational risks and funding pressures that are entirely new. This transition to T+1 crosses a major threshold that will determine how global settlement operations are run for the foreseeable future.

The move is also creating new dislocation risks and, with them, pressure on more markets to follow suit. In order to avoid unnecessary funding gaps (driven by different settlement cycles) with the US market, Canada will also move to T+1 settlements in 2024 and Mexico is likely to also transition around the same time. Meanwhile the UK’s Accelerated Settlement Task Force also sees dislocation risk as a key theme in its ongoing evaluation of a T+1 move (due to be completed in 2024), as it is in other markets (such as Australia<sup>5</sup>) where T+1 consultations are just starting. The domino effect has begun.

## 3. Expected settlement timeframe in major markets in five years

89% of the market now expects to move away from T+2 in the next five years



Within the following time frames, what do you expect to be the prevailing settlement timeframe for equities in your major markets? (% responding to the five year time frame)

What do you expect to be the prevailing settlement timeframe for equities in your major markets? (% selecting atomic settlements per time frame)



*“In evaluating the path towards a potential T+1, we have identified two categories of issues: alignment (i.e. the challenges of not being aligned with the US and/or the EU) and operational issues.”*

Charlie Geffen, Chair, UK Accelerated Settlement Task Force

### Accelerated settlements – it will always be T+1 somewhere

There is little doubt that accelerated settlement will continue to lead the global change agenda for the near future. Since our first whitepaper was published in 2021, expectations around the adoption of T+1 as a standard settlement cycle across global markets have grown, to the point where **89% of market participants now expect their own markets to move to T+1 (or even T+0) in the next five years** (see Figure 3).

If this wave of settlement transformation began over a decade ago, it does not appear set to end with T+1. Beyond T+1, there is also a **growing belief that atomic (or instantaneous) settlement will become a core part of our market activity in 15 years**, with 27% expecting this mode to become the prevailing time-frame for their major markets by then. While NSCC (in the US) already settles ~USD 40 million per day on a T+0 basis<sup>6</sup> (largely for securities finance activities), it is likely that these trades will accelerate down to mere nanoseconds to

improve settlement certainty and remove risk. This will no doubt take time (only 13% of respondents expect atomic settlement to prevail this decade) and require significant infrastructure investment, but the direction is clear.

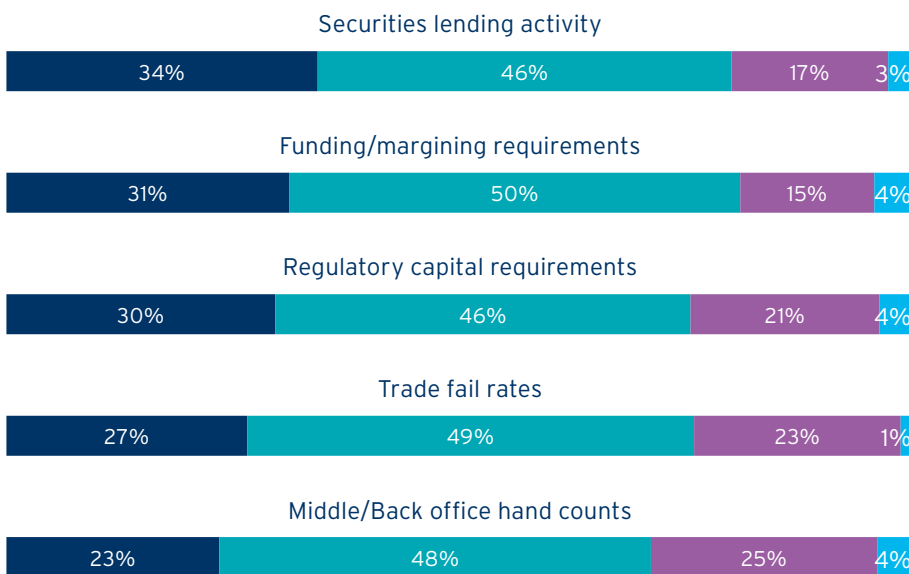
### Accelerated settlements – no one is left untouched

The impacts of T+1 are difficult to under-estimate. 77% of firms expect this move to have a major impact on their businesses, most of all broker-dealers and custodians.

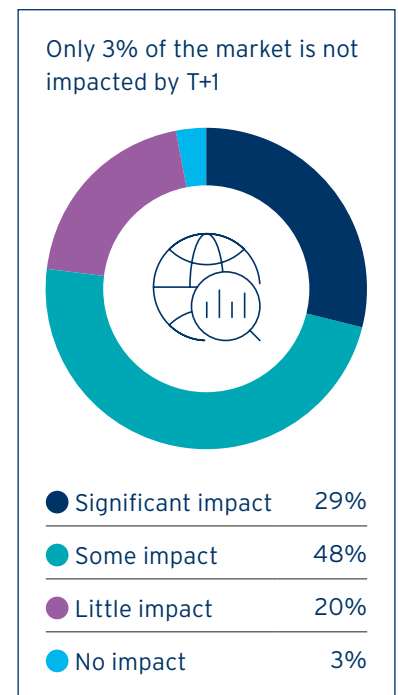
Across all client types, T+1 means change at every step of the trade and post-trade lifecycle as seen below.

- Account opening: logging of standard settlement instructions (SSIs)
- Middle office: allocation of trades on trade date
- FX and treasury: booking same-day FX and managing funding imbalances
- Settlements: affirming trades on trade date
- Securities lending: managing recalls and inventory
- Record-keeping: keeping records of digital confirmations
- Asset servicing: with the alignment of effective dates and ex dates for corporate events

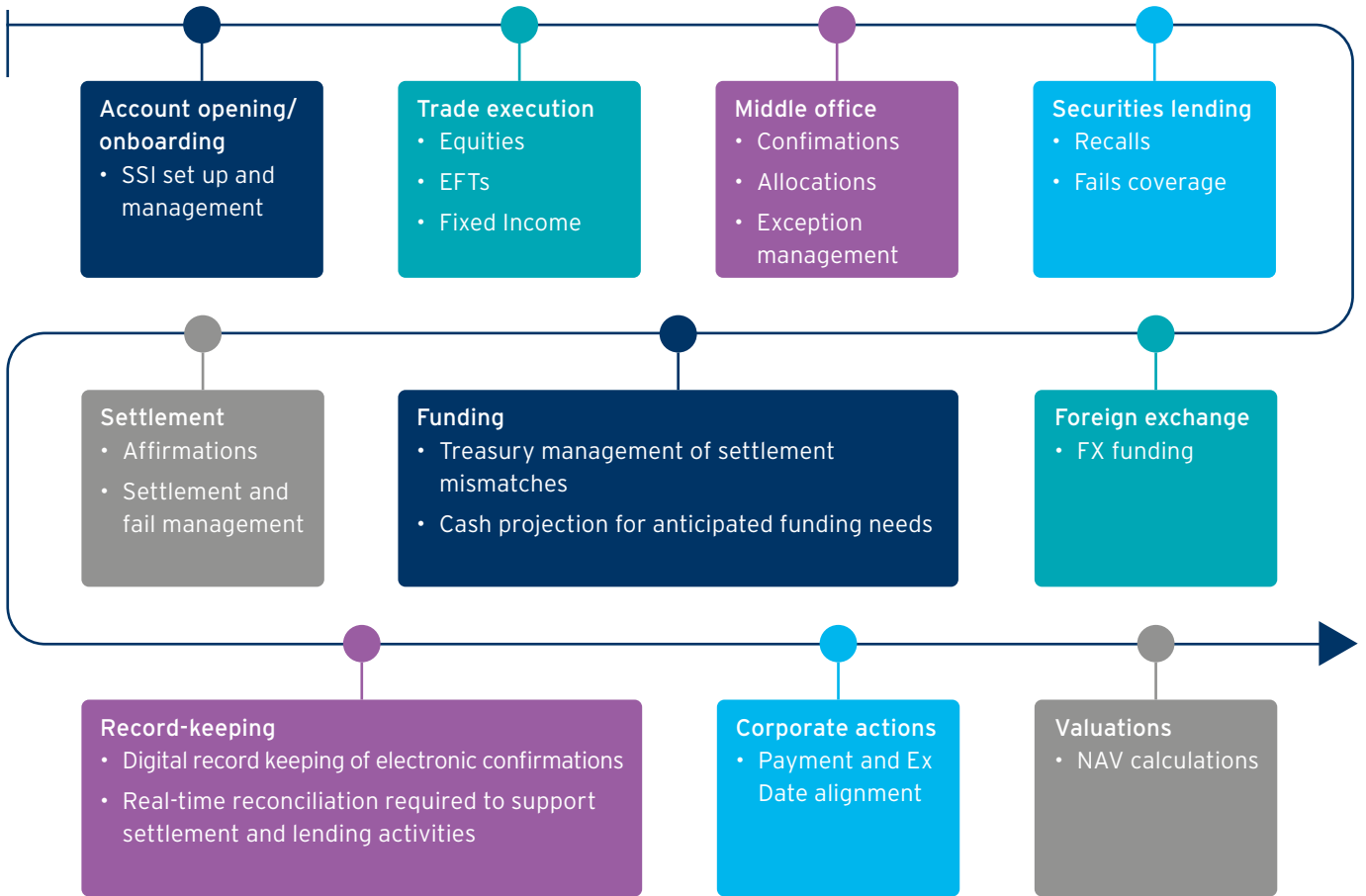
## 4. Expected impact of a shortened settlement cycle



What do you expect the impacts of a shortened settlement cycle to be for your organization?



## Impact of T+1 on trade and post-trade lifecycle



It is increasingly clear that preparation for T+1 is an enterprise effort – not just a settlement problem.

T+1's expected impacts are equally wide-ranging – and look set to create a significant P&L impact for for asset managers, broker-dealers and custodians. With increased timing pressures around settlements, 27% expect their trade fail rates to be significantly impacted by the move to T+1, particularly in the short term (see Figure 4). As we saw during India's transition to T+1 earlier this year, trade fail rates are likely to peak for a period of time as new processes and procedures take hold. In dealing with these new processes and increased fails risks, 23% of firms also expect a significant change in their headcount requirements as they take on extra staff to provide urgently needed capacity – meaning a short-term cost spike that many will have to absorb.

On the positive side, funding and margining requirements look set to be restructured alongside regulatory capital requirements (with 30% and 31% expecting to be significantly impacted in each

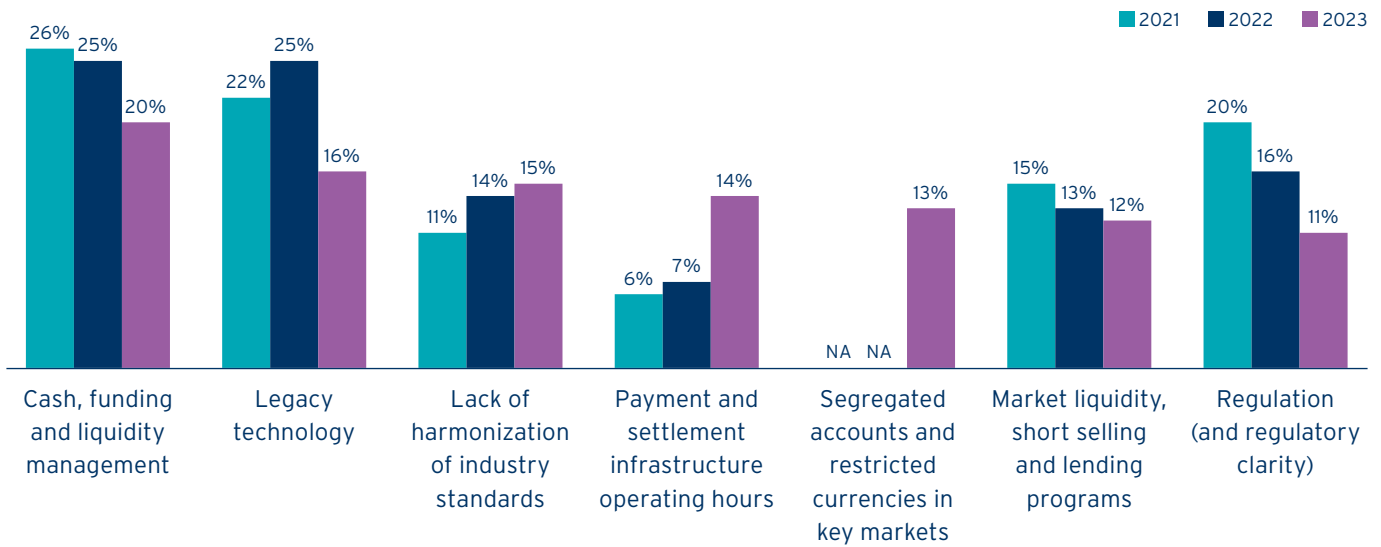
area respectively), generating a treasury benefit for depository participants especially (see Figure 4).

And somewhere between an opportunity and a challenge is securities lending – one of the most strongly impacted activities across the organization. As 34% of market participants contend with challenges around recalls, inventory management and communication, the opportunities for those that successfully optimize their flows can be significant – as are the downside risks for those that don't. This is covered in greater detail in the following sections.

### Accelerated settlement is a funding issue

For the last three years, market participants have consistently cited the funding and cash leg of the trade as being the leading obstacle to achieving shortened settlement cycles. While regulatory pressures and the need for clarify around rules has been steadily addressed, funding is and remains a core challenge.

## 5. Greatest obstacles to achieving reductions in the global settlement cycle



\*Note: The option for segregated accounts and restricted currencies in key markets is a new option this year. Rankings have also been changed into percentages.

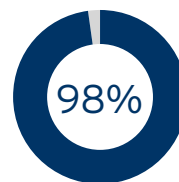
In China and India, the management of restricted currency liquidity (particularly into segregated, beneficial-owner accounts) has created a host of operational challenges and a drain on balance sheets for many depository participants. With many more beneficial owner markets in Asia-Pacific and globally, these examples are clear reminders that funding complexity can end up far more costly than moving securities between accounts.

As we look ahead to the US and other (omnibus) markets, almost all of firms see cash clearing as a leading key area of change needed to facilitate to T+1, with 98% of respondents citing it as a top three priority. This core area of focus breaks down largely into two core areas (see Figure 6).

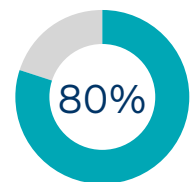
1) For (offshore) portfolio managers, the question is how to book, fund and settle any required foreign exchange trades within the required one-day time-frame (when most FX markets settle on T+2 today), especially in less liquid or more exotic currency pairs.

2) For treasurers of fund vehicles, ETFs and depository receipts (GDR/ADRs), the pressing issue is how to manage liquidity differences of up to two days between (e.g.) a T+3 subscription cycle for a fund or GDR, against a T+1 settlement cycle for the underlying securities. With interest rates and the costs of overnight funding rising quickly, these funding gaps are becoming critically important.

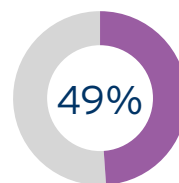
## 6. Key areas of change to facilitate the move to T+1



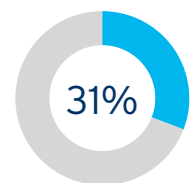
Cash clearing



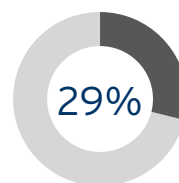
Settlement and trade matching



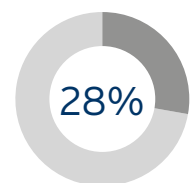
Allocation/confirmations



Securities lending



Corporate actions



FX

In your opinion, what are the top three key areas of change that would help your move to T+1? Select three.

\*Due to multiple responses allowed, the percentages do not add up to 100%.

## It matters who you are...

*“On T+1 in the US, we believe larger sell-side houses are looking at driving efficiencies from their current processes by moving from batch to real-time, for example. Many of the smaller firms would likely need to redesign their entire operating models so that they can keep up.”*

**David Kirby, Executive Director, Americas Relationship Management & Global Account Management, DTCC**

While the steps of a trade are universal for anyone dealing in securities, the impact of the shift to T+1 settlements vary significantly depending on the profile and geographical location of the firm.

Existentially-focused as they are on trading and settlement efficiency, larger US and Canadian broker-dealers and custodians have been quick to implement the required changes ahead of T+1 – but are now struggling to ensure that their customer networks are equally ready for what is to come in 2024. Their focus has now shifted significantly in 2023 from internal to external readiness.

By contrast, smaller market participants (wealth managers and regional broker-dealers) are faced with new requirements in SEC rules 15c6-2 and 204/2, which requires electronic record keeping of trade confirmations – and to transfer their processing away from manual trade confirmations to digital forms of communication. These managers' will need to automate significant parts of their trade cycles if they are to remove 50% from the time it takes them to book, clear and settle a trade.

## ...and where you are

More important than who you are is where you are. Time-zones matter in the move towards accelerated settlements and foreign investors are always the hardest hit.

As we experienced first with China equities, investors who are 12 time-zones away from the market have to define how they can book a trade or an FX during the middle of their night. Next year's move to T+1 in the US and Canada is demonstrating this same challenge in reverse. While domestic market participants contend with an acceleration towards 7pm allocations and 9pm confirmations in their local time zone, European based firms will have to be operational up to 3am (Central European Time), for

example. As shown in the diagram below, implementation of T+1 will mean financial institutions will have 16.5 hours less time to process allocations; 14.5 hours less time to process affirmations; and 15.5 hours less time to process securities lending transactions.

According to the Association for Financial Markets in Europe (AFME), losing one day in the settlement cycle does not simply mean having 50% less post-trade processing time, adding it is closer to 83%.<sup>7</sup> AFME also noted that trade settlement teams will only have two core business hours between the end of the trading window and the start of the settlement window compared to 12 core business hours in a T+2 environment.

How to be operational during these extended hours is a simple question that entails huge complexity – given that firms' funding, operations, issue-management and authorization processes all need to be revised to cater for a new 24-hour operating cycle. In many cases, this can lead to a fundamental re-evaluation of operating models (including offshoring, night-desks, outsourcing, etc.) as well as significant market innovation (i.e. HKEX Synapse in Hong Kong).

Making this question even more complicated is the key role that global investor regulations play in defining the choices available to global firms. European funds (covered by the UCITS V regulation), US (“40 Act” or 17f-5) funds and US Pension funds (covered by ERISA) are all subject to stringent regulations that limit fund managers' ability to cater for global changes – by limiting cash or credit exposures, for example, or by requiring evidence of best execution on FX trades where possible. In each market move towards accelerated settlement, these rules and regulations quickly become paramount considerations in investors' action plans.

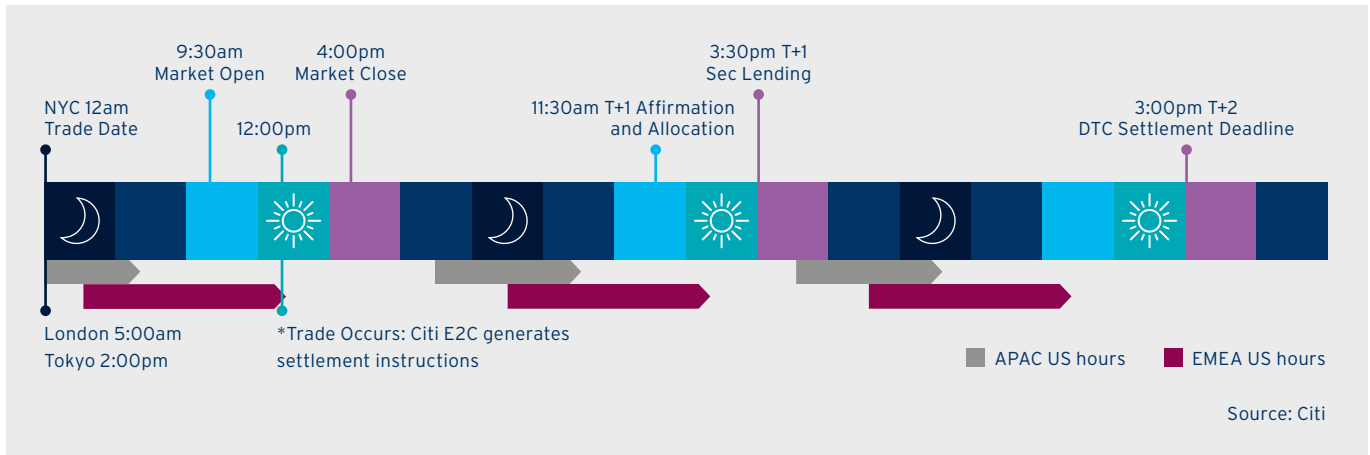
Given their significant role in providing liquidity to most markets, foreign investors are a core constituency whose unique considerations need to be understood in every market move.

*“Foreign investors are critically important to our markets. We need to adopt global best practices and innovative solutions to remain competitive.”*

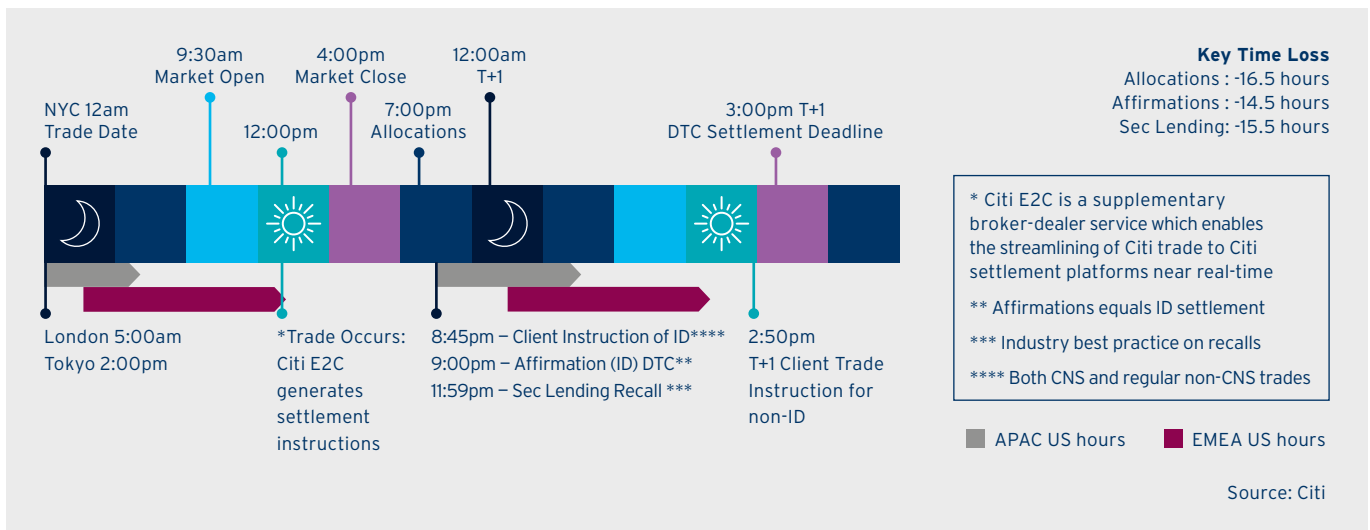
**Roel A. Refran, Chief Operating Officer,  
The Philippine Stock Exchange, Inc.**

## Global timing impact

### T+2 Settlement Cycle



### T+1 Settlement Cycle



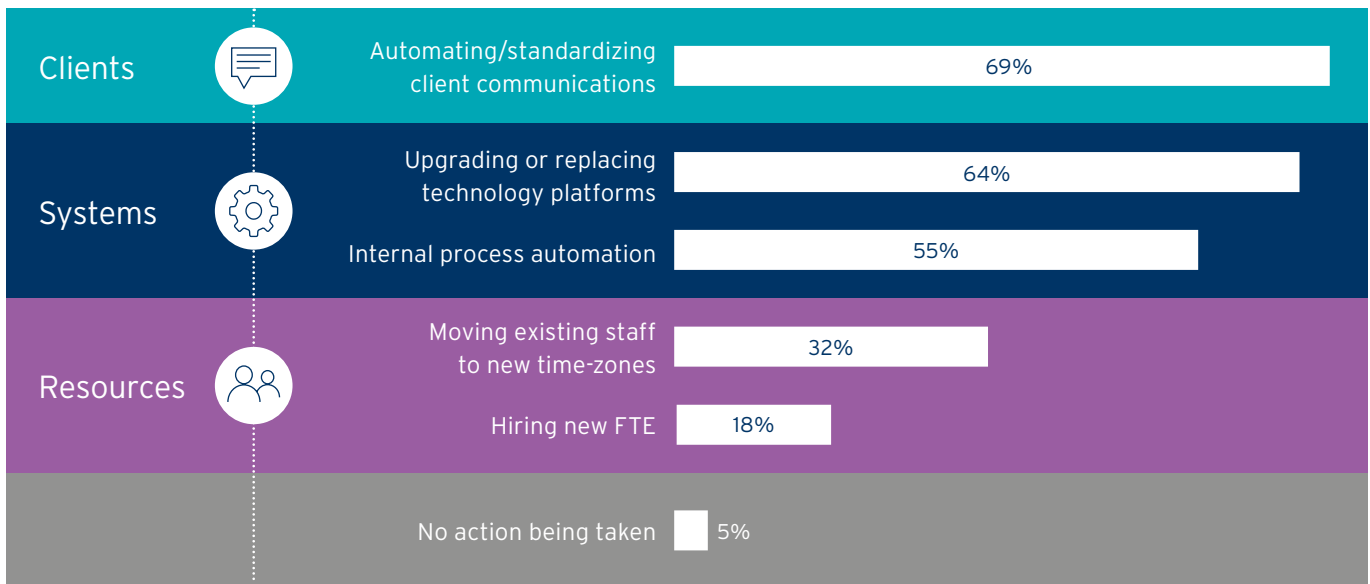
### The T+1 journey: building a new target model for accelerated settlements

*“Taking a market-by-market approach to T+1 readiness is likely going to cost more in the longer term – as every market moves, the costs are going to rise exponentially. It’s key that the industry takes a strategic approach to this.”*

David Kirby, DTCC

As settlement acceleration becomes the global norm, the “best practice” action plan towards readiness is becoming increasingly consistent. First focus on clients and counterparties; followed by in-house platforms and processes; and then evaluate your staffing and location strategy. This is consistent with this year’s survey results where 69% of market participants are focused on automating and/or standardizing client communications (as a top three priority), followed by 64% who are looking to upgrade or replace technology platforms. Internal process automation was third on the list followed by various staff considerations (see Figure 7).

## 7. Action taken to prepare for T+1 in the US & Canada



Due to multiple responses allowed, the percentages do not add up to 100%.

What are you doing to prepare for T+1 in the US/Canada? Please select all that apply.

Faced with multiple transitions in the near future, it is also clear that that firms can not afford to prepare for each market transition individually – meaning that they need to be building towards a single, accelerated settlement operating model that is bigger than any one market.

Forming these considerations into a single and scalable journey is core today.

### Clients and counterparties: Education and standardization

The client and counterparty engagement begins with **investor education**. Does everyone understand what is required of them and what the downsides are of failing to prepare? With every technology and process change carrying a project cost, it is critical that everyone be armed with the facts and justifications as early as possible – most often two to three years ahead of a planned market change.

Next is the **automation and standardization of client communications**. Often supported by global standards bodies (such as SWIFT and FIX) and facilitated by industry associations (ASIFMA in the case of India’s T+1 move), the definition of market-wide norms for the format and timing of trade instructions is an essential step in driving STP rates and removing points of risk. Since our whitepapers began in 2021, the use of standards has grown steadily in importance to market participants, with 11% citing the lack of standards as a core obstacle to T+1 success in 2021, rising to 15% in 2023 (see Figure 5).

Within the firm, this automation effort can be supported by **reviewing existing error queues across the trade cycle today** – to identify consistent issues with specific counterparties or processes. What causes problems in a T+2 environment will cause greater problems under T+1 and so these issues and error queues are a great starting point.

Equally, automation needs to be supported by **clear client communications around service standards**. Several FMI interviewees have highlighted the importance of clarity and of ‘red lines’ in discussions with clients – helping to define what will and will not be offered post-transition to shorter cycles and to reduce reliance on ‘best efforts’.

### Internal platforms and processes: Trade date processing

*“As settlement times have accelerated, the legacy systems and processes have come under increasing pressure. It is clear that post-trade frictional costs are too high and a move to T+1 will provide a catalyst for the significant investment and change that will be required.”*

Charlie Geffen, UK Accelerated Settlements Task Force

The upgrading of existing legacy technology was a standout priority in 2022 for 36% of respondents – and a key enabler of a successful transition to accelerated settlements (see Figure 8). Ensuring that our ageing, (single) batch-based platforms can manage the transition to multi-batch real-time processing is critical if the majority of trade-related activities are to be managed on trade date.

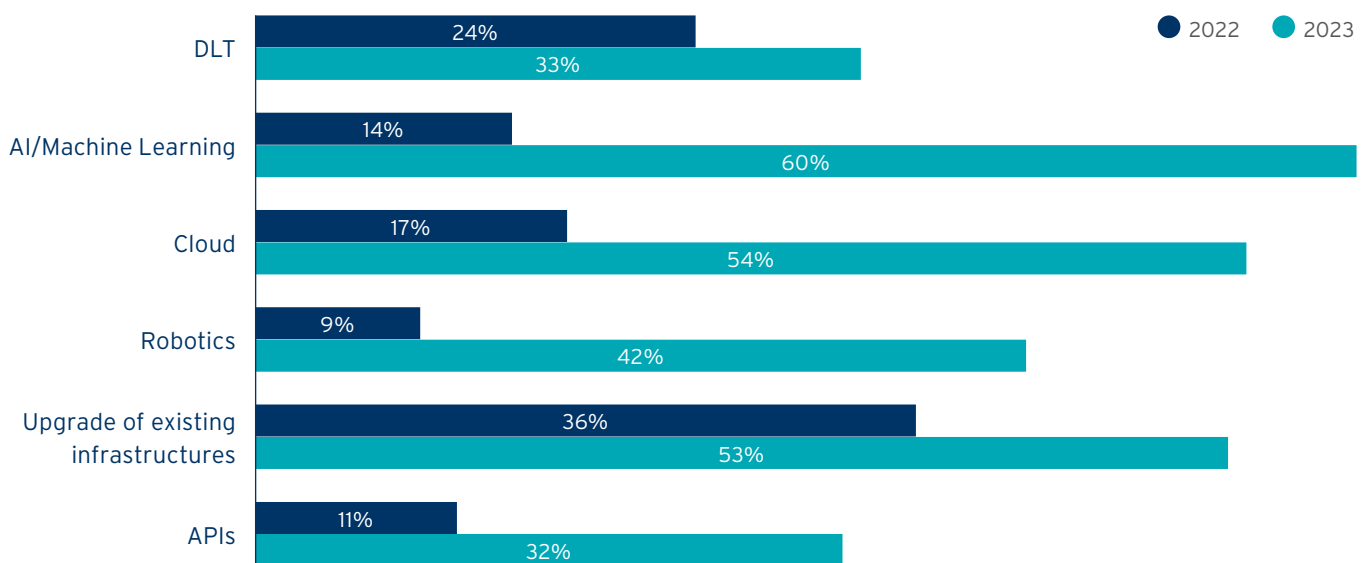
Yet as we move closer to the market transition date, new, tactical technologies – notably **artificial intelligence (AI) and robotic process automation (RPA)** – are a growing component of firms’ abilities to accelerate their settlements. For example, AI can identify data quality problems, remedy payment issues or manual errors and even eliminate manual touch points and automate reconciliations. AI has also been used in collateral management to provide predictions on price, risk and liquidity. Securities settlements are another area where AI tools could bring disruption – custodians are already using AI to predict whether a trade will fail in order to remediate potential problems throughout the transaction lifecycle. Quick to deploy and with programming resources available today, these solutions have steadily become the preferred T+1 readiness tools for 60% and 42% of firms today (when asked to select their top three priorities respectively). Given that it can often take more than a year to plan, test and implement a major system transition, many firms are now starting to shift from “strategic planning” to “tactical readiness” (see Figure 8).

Similarly, the use and deployment of platforms on the **cloud** is also an increasing enabler to the T+1 transition, growing steadily in importance to being a top three priority for 54% of respondents this year. In providing flexibility and quick scale across development, testing and live operations, cloud-based platforms are increasingly becoming the norm for organizations that can successfully transition – as a foundation to more agile and speedy system development in the coming year.

Alongside systems comes process – primarily which processes can be moved from T+1 (today) into overnight or T+0 processing. In order to update inventories and reconcile positions faster and more accurately, firms need to focus on the **removal of paper-based processes** (such as trade instructions or confirmations) **and manual-checks** (four-eye checks, issue handling and approvals) that add risk and latency to procedures.

Participants are not the only ones who are changing to facilitate accelerated settlements. With the T+1 cycle putting significant pressure on time-critical and overnight processes, FMI’s are changing their processing and cut-off times. New solutions to facilitate automated straight-through-processing in trade processing, recalls and borrowing (for example, DTCC’s Match to Instruct and HKEX Synapse) are now being offered to market participants. Standing at the heart of the industry, a FMI’s role in innovating to solve for accelerated settlement is core to each market’s success.

## 8. Critical technology for a smooth transition to T+1/T+0



Due to multiple responses allowed, the percentages do not add up to 100%.

What technology will be critical to a successful transition to T+1/T+0? Please select all that apply.

## People and location strategy

Finally comes people. Recent research from the ValueExchange<sup>8</sup> has highlighted that 53% of European firms are expecting to **transition their staff to continental America** (both West and East coast) in order to help manage time-critical processes around FX booking and trade affirmations without having to resort to night-desks. The effects of T+1 will also be felt disproportionately by Asia-Pacific based firms – Alex Lee, Head of Global Deposit & Settlement Team at Korea Securities Depository shared in a related Citi article "[T+1: A Race Against Time](#)" that in preparation for T+1, they will be changing their global staffing resources and will also be requiring some of their staff to start working night shifts.

Elsewhere, international clients are increasingly embracing the "follow the sun" model, whereby personnel are deployed to multiple post-trade locations across the world. In this instance, some global firms are seconding staff to the US ahead of T+1. DTCC's Kirby shared that he believes a growing number of European buy-side firms are currently or likely to send operations teams to New York, while one Canadian provider had shifted some of its operations personnel from Toronto to Vancouver so it can support Asia-Pacific based clients in a more time-zone friendly way.

## What if I do nothing?

Preparing for the shift to accelerated settlements is often seen as a choice – not an obligation – particularly for offshore investors. After the US's transition to T+1, for example, only SEC-regulated firms will be obliged to follow the new market rules, leaving overseas firms unclear on the case for expensive platform and process changes. "Surely the custodian and the broker can handle this for me?"

However, there are commercial and contractual reasons for T+1 compliance, wherever you are in the world. In China and India, no-fails regimes mean expensive penalties for any firm that triggers a failed trade and mandatory buy-in. In the US, an investment manager's failure to affirm trades will trigger an additional charge for each settlement processed. It will also put their broker-dealer into conflict with the SEC's market rules, meaning an increased risk of broker-dealers declining to trade for problematic investors.

The downside risk of doing nothing is evident and compelling, regardless of your regulatory jurisdiction.

## What lies ahead?

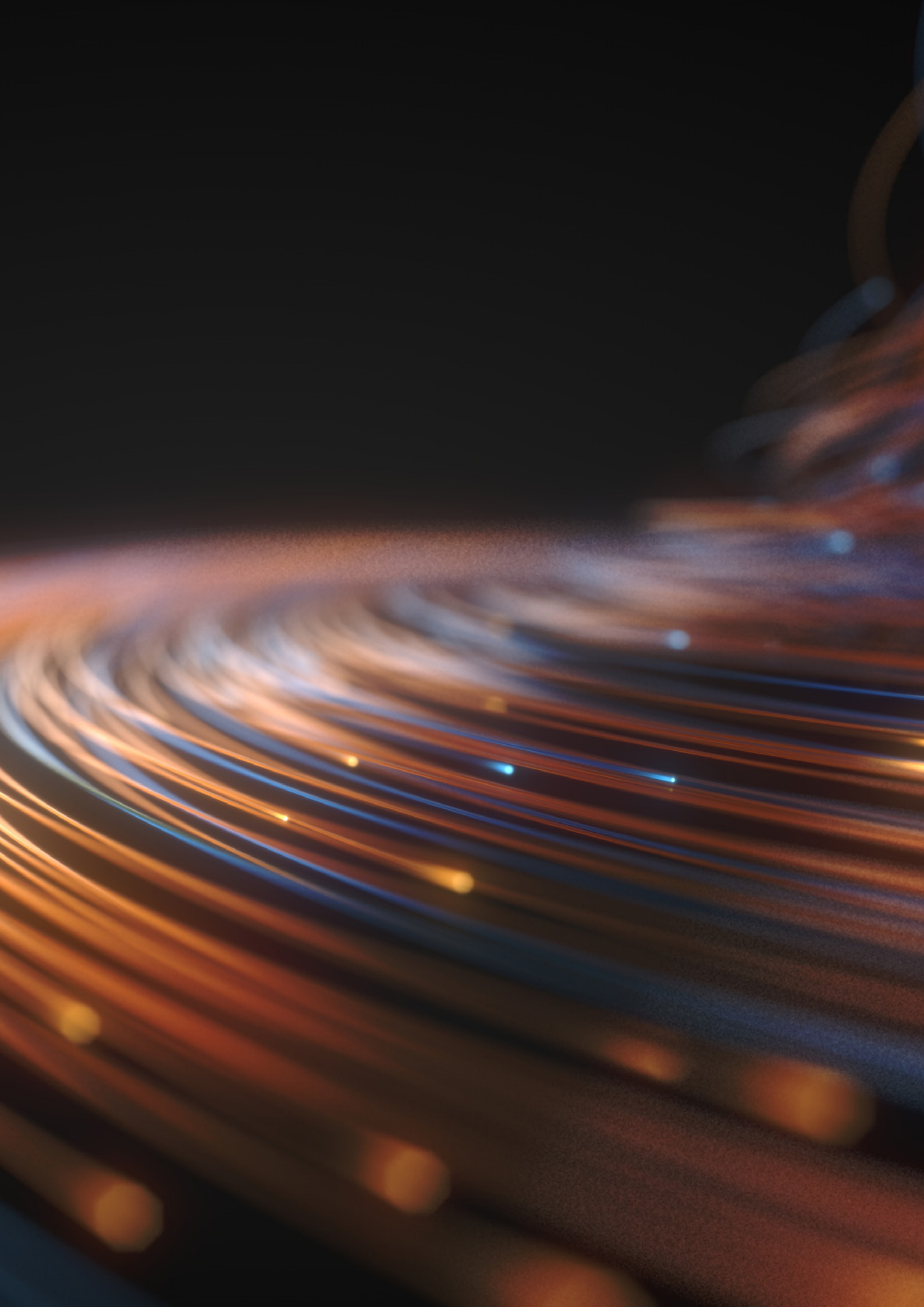
*"This is an ecosystem play and we will succeed or fail in T+1 together. Every participant in the trade cycle needs to take an active role in driving readiness – from the beneficial owner through to the marketplace."*

**Steve Everett, Head of Business Strategy and Innovation, CDS (The Canadian Depository for Securities Limited), TMX Group**

The US, Canada and Mexico will soon be moving into testing cycles, offering depository participants and their investor clients the opportunity to test and verify readiness. Being certain of readiness for T+1 will become the new, minimum standard for all firms.

In parallel, market consultations on accelerating settlement will continue across several key markets (including the UK and Australia), creating an opportunity for specialists across the buy- and sell-sides to share their concerns, plans and challenges – regardless of where they are in the world.





# T+1 and securities lending

*“Securities lending is going to be the solution to facilitate T+1, not the problem. We’re going to need more securities lending liquidity if we are going to settle trades faster – and those who can manage their inventories in real time will have a significant advantage.”*

Anonymous

## T+1 and securities lending: What is the link?

Securities lending and borrowing is one of the single-most impacted area by the move to T+1, across the entire trade cycle, with 80% of firms seeing significant to some impact on their businesses in this space (see Figure 9).

## 9. Expected impact of a shortened settlement cycle on securities lending activity



● Significant impact	34%
● Some impact	46%
● Little impact	17%
● No impact	3%

As a worst case, uncertainty around securities movements may drive both asset owners and brokers to reduce their lendable inventories after T+1, creating a significant drain on market liquidity. Asset owners could be deterred from lending by increased settlement risks on their portfolio trades, while brokers could withhold too many securities from lending (i.e. over-buffering) in an effort compensate for potential shortages in delivery, driven by challenges in recalls. By contract, a best case could see those with (real time) certainty of inventories turn the T+1 transition into a major commercial opportunity.

## Where are the potential challenges?

In the US and Canadian context, the risk of impact is divided into two core groups. Those participating in the US onshore/domestic lending market (typically lending USD securities for cash collateral and settling on T+0 on a DVP basis) are unlikely to see significant pressures after the shift to T+1. Those **engaged in the offshore lending market** (lending USD or CAD securities against securities as collateral, and settling on an free-of-payment (FOP) basis on T+1 or T+2) **look set to struggle** due to the manual nature of their lending and recalls processes today.

On the lending side, **existing indemnifications** (by agent lenders to asset owners) **should protect asset owners from any potential liquidity implications** of the T+1 move and hence avoid any discouragement from trading – and from deriving the important investment returns from lending. However, these same pension funds may opt to reduce their lending in certain areas where there is perceived to be an increased settlement risk (and hence potential for any negative portfolio impact).

On the broker side, the **management and processing of recalls poses significant risks**. Recalls are one of the most manually intensive activities in the securities lending space today and the risk of errors and delays will escalate in a T+1 regime as firms struggle to communicate, book and reconcile their positions at the required velocity across the market. These elevated risks are compounded by the fact that each recall may entail several settlement legs – meaning an exponential growth in risk across a multi-leg settlement. Looking ahead, the timing of recall bookings is also likely to prove critical, in order to ensure that stocks can be returned in good time for settlement to continue.

*“We already deliver stock loans on T+0, but you have to remember that everything always gets sold off – and that means a new returns process when we accelerate settlement cycles.”*

**Anonymous**

There is also a risk of imbalance for borrowers looking to **recall stocks from hedge funds** – who may be using lent stocks to cover short-selling activity. With limited penalties applied to a failed trade under the current US regime, hedge funds may opt to decline a recall request because the economic case for doing so is compelling (i.e. significant returns versus very limited penalties).

## Where are the potential solutions and opportunities?

While the lack of certainty around settlement movements may be a challenge, those who can ensure maximum visibility of their inventories in real time will be able to benefit from the T+1 opportunity in several ways.

With most firms running on batch processes today, critical inventory can be tied up in processing delays. By **transitioning to real-time infrastructures**, brokers can not only avoid reducing supply, they can significantly increase their lending activities, provided that they can communicate (and hence recover supply) in real-time with counterparties; and then book the recall instantly in their platforms, updating their lendable inventory straight away. With speed and certainty, these brokers will be able to increase lending and borrowing at a time when others can't.

Building on the above, those firms who can **manage their provisioning risks on a real-time basis** will be able to avoid unnecessarily over-buffering throughout the day and hence increase the amount of stocks available for loan. Those willing and able to manage **partial recalls** will also have an advantage in avoiding failed recalls, although the timely and automated management of the client authorization leg will key.

Finally, those with inventory (and low settlement risk) can begin to provide **'fails coverage'** solutions to the market – providing coverage for otherwise expensive, failing trades.

## What lies ahead?

Unfortunately, the highly interconnected nature of the securities lending market today means that no one firm can succeed entirely on their own. While technologies exist to support a significant improvement in settlement certainty, the ability to move to real-time processing will depend on the timely, ecosystem adoption of core platforms in the US and further afield if firms are to deliver for the move to T+1.

As a core area of impact for the T+1 transition in the US and Canada, securities lending is the center of much industry discussion today (notably at the RMA, CASLA and ISLA). These discussions will continue to center on driving industry-wide clarity around:

- Recall notification timing and deadlines
- The communication/response process for recalls
- Settlement standards, including the management of partial recalls

*“T+1 must not end up deterring people from providing liquidity. If accelerated settlements mean that there are fewer lenders available, then we've done a bad job as a market. We must use this as an opportunity to create an environment that encourages lending.”*

**Anonymous**

# DLT and Digital Assets

## DLT and digital asset engagement has continued to grow

*“There is a very clear trend that DLT and smart contracts are coming into our post-trade world – so let’s start working out the capabilities and limitations of these tools today.”*

**Derek Neo, Head of Digital & Depository Services, SGX Group**

The last year has seen the DLT and digital asset landscape transform in several key ways. News of crypto-exchange defaults and high-profile project failures (most notably FTX) have dominated the world’s headlines, leading to a belief that “the DLT narrative has far exceeded delivery” to date. Faced with evident failures and relatively few success stories, talk of the ‘crypto winter’ and the ‘DLT bubble’ have become commonplace.

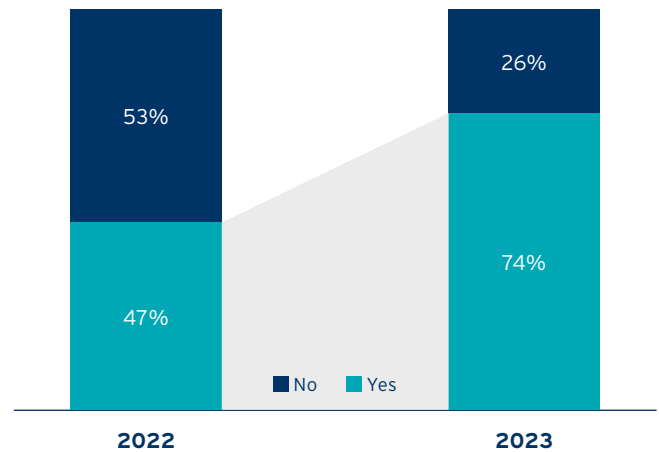
Yet, the global focus on DLT has continued as we move closer to commercial execution and scale. Leading digital initiatives (such as BondbloX, Deutsche Boerse’s D7, SDX, HQLAX and Broadridge’s DLR) have begun to accumulate volumes and to prove the validity of the model in key areas of our industry.<sup>9</sup> Billions of (US) dollars of value are now being managed on DLT, across a combined ecosystem that includes over 20 of the world’s leading financial institutions.

The balance of these two conflicting narratives has been strongly positive in the last year, with the volume of firms working on DLT and digital assets growing from 47% in 2022 to 74% in 2023.

In Asia and Latin America, the conversation has focused on bringing (institutional) liquidity to the masses; in Europe it has centered on building a safe regulatory environment that facilitates growth in all forms of digital asset; and in North America, banks and investors have begun evidencing serious returns from tokenization across numerous asset classes.

The industry is still in the early stages of its maturity but the last several years of experimentation are now paying off – giving us a body of experience that shapes a sharper understanding of the operational benefits of DLT, its challenges and the best practices that are needed to drive successful and commercially viable projects. And of these challenges, the pressing issues that firms face today are usually not with the technology, but with the people and processes that put it in place.

## 10. Engagement in digital assets and/or DLT



Is your organization currently engaging in digital assets (including crypto, NFTs) or DLT?

### Digitization: running at two levels of maturity

The last year has also marked a shift in the parallel evolutions of digital assets (including crypto-currencies) and DLT-based projects (including tokenization). Until late 2022, crypto driven development led the development agenda as firms rushed to provide trading, financing, custody and asset servicing around crypto. As a result of these pressures, 38% of respondents are today live with crypto offerings – well ahead of the 22% using DLT offerings in a live environment.

The developments of late 2022 have left today’s crypto landscape divided and slowing in momentum versus broader DLT-based initiatives. Having been at the forefront of market development for several years, crypto momentum in the US has slowed significantly in the last quarter of 2022. Meanwhile regulators in Europe, Middle East and Asia have pressed ahead, embracing the potential of crypto assets and shaping regulation, such as the Markets in Crypto Assets regulation (MICA) that can create a safe and transparent marketplace for these assets in the future. With speeds and directions of development varying by region, the net effect appears to be a slowing in the global momentum around digital assets, with only 32% of firms now in build-out phase (predominantly in Europe), compared with 44% of respondents working on DLT and tokens (see Figures 10a & 10b).

In the world of DLT and tokenization, a small number of asset classes and activities are quickly proving their worth as they move into large-scale deployments – notably in bond issuance, securities finance (including lending, repos and collateral), mutual fund distribution and private equity. In each of these areas, the operational benefits of real-time data synchrony, complex data models and smart contracts are material – transforming highly manual, highly networked ecosystems into coherent data ecosystems.

Beyond these proven areas lies a continuing amount of experimentation, which is the core objective for 24% of DLT initiatives today (see Figure 10b). As firms explore the potential applications of DLT in resolving some of their most complicated operational headaches, new focus areas have emerged. While the (OTC product) issuance process has had much attention, corporate action pilots have also evidenced benefits in data management and workflow automation. Custodians and FMIs have begun to use DLT to bridge the operational gap between ownership and account structures, providing increased transparency and reduced risks for investors, while maintaining the benefits of netting and trade book consolidation. As momentum continues, so does the sophistication of DLT’s applications.

*“DLT helps to make the world a safer place – by giving full visibility of ownership at a depository level and eliminating brokers’ book keeping risks.”*

**Rahul Banerjee, CEO and Co-founder, BondbloX**

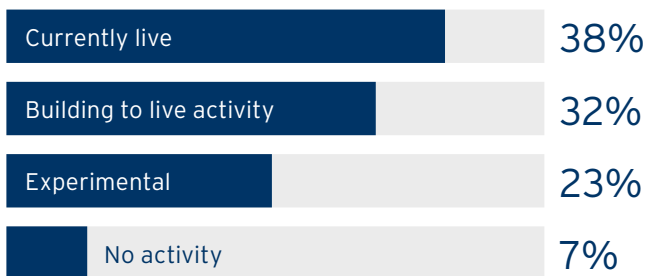
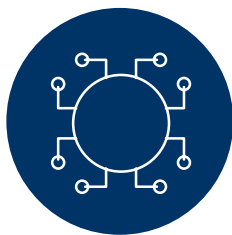
### Using DLT today: is DLT still a banker’s game?

87% of custodians surveyed are actively working on DLT and digital asset projects today, however only 25% of their asset owner (end-)clients are similarly active – which begs the question why three quarters of institutional investors are still not engaging. (see Figure 10d)

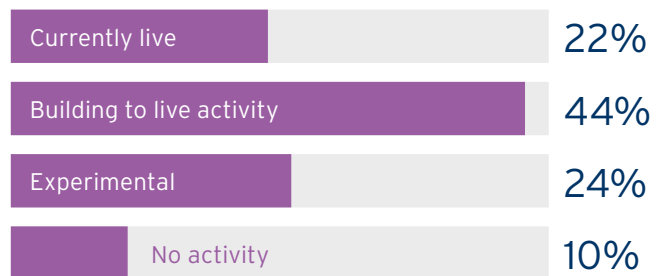
Based on our survey results, the industry’s focus to date with digital assets and DLT has centered heavily on realizing operational efficiencies from process transformation, where more respondents see the technology having a significant impact. In tokenizing securities, banks and broker-dealers are focusing on the ‘factory-floor’ processes and on reducing their costs of production, to the benefit of the product manufacturers. From an end-investor perspective however, these reduced production costs mean little. DLT is generating basis point savings today, but investors are looking for percentage returns in their portfolios.

Still under-developed is the understanding of the ‘phase two’ benefits of DLT and digital assets – namely how they change the fundamental value and liquidity of the securities that we hold and trade every day. Moving from simple ‘electronication’ of securities to producing securities that behave and trade entirely differently, can open up a new line of benefits for treasurers and portfolio managers especially. In creating an intraday repo that has instant and certain delivery (for example), banks can transform their balance sheets by removing free-of-payment (FOP) transfers and shifting from expensive, overnight funding to secured, intraday funding. In bond issuance, consolidated book-keeping

### 10a. Digital asset adoption



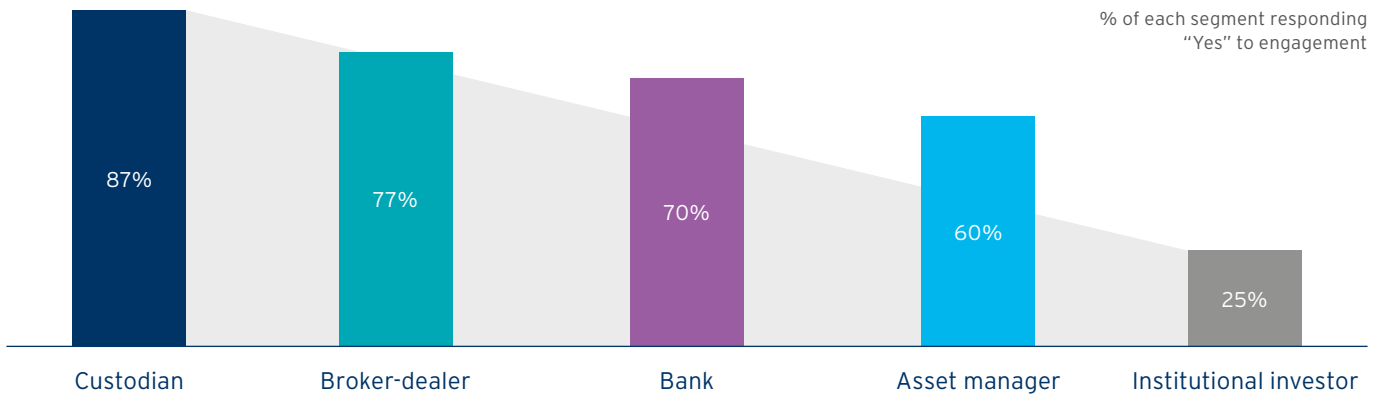
### 10b. DLT adoption



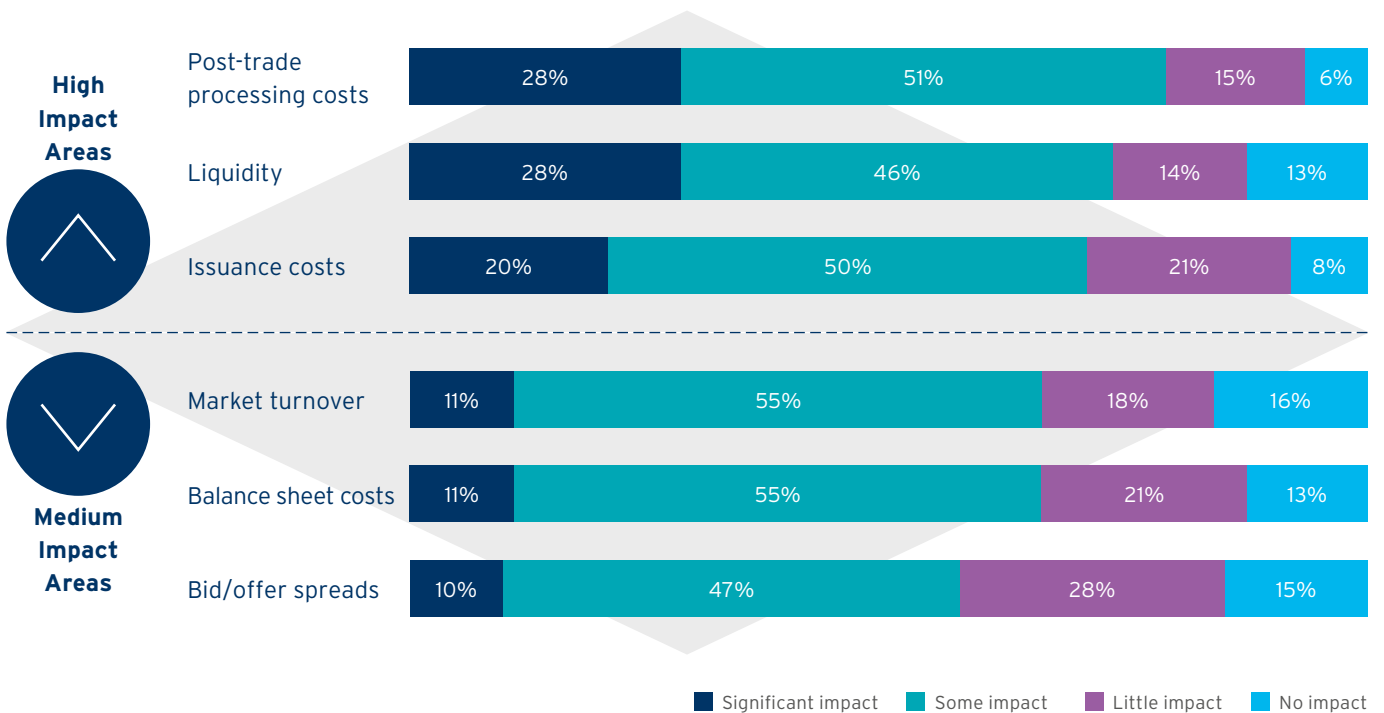
and reduced frictions around settlement can open bonds up to entire markets of new retail liquidity. In the private markets, reduced frictions around trade settlement can drive secondary market liquidity and hence improve bid/offer spreads for investors.

How does DLT drive portfolio impact (i.e. through narrower spreads or deeper market liquidity)? As the industry begins to answer this question for portfolio investors or treasurers, market participants and providers will see the returns on their DLT and digital asset projects grow exponentially.

### 10d. Engagement with digital assets/DLT – by segment



### 11. Impact of a DLT-based market structure



Please rate the extent to which you think a DLT based market structure could impact the following activities?

## DLT as an enabler – not a destination

*“Many market structure rules (such as denominations of securities or settlement cycles) are dictated to us by technological limitations today. DLT and tokenization means that those limitations no longer need to apply at a market level – they can be managed at a trade or account level by choice.”*

**Rahul Banerjee, BondbloX**

As the use of digital assets has grown, so has scepticism around the securities industry’s ability to really benefit from innovations such as atomic settlement. In many cases, these possibilities are considered to be ‘one step too far’ and unrealistic given the current state of the capital markets.

Importantly, DLT is increasingly about creating the flexibility of choice in operating models – not dictating specific features as mandatory. By removing limitations that have historically dictated how we trade today, each firm can become more efficient, one trade at a time.

Rather than expecting industry-wide adoption of atomic settlement, for example, the ability to offer instantaneous settlement can become a competitive advantage for some. Those that can offer quick settlement can win by reducing their balance sheet costs (potentially the difference between

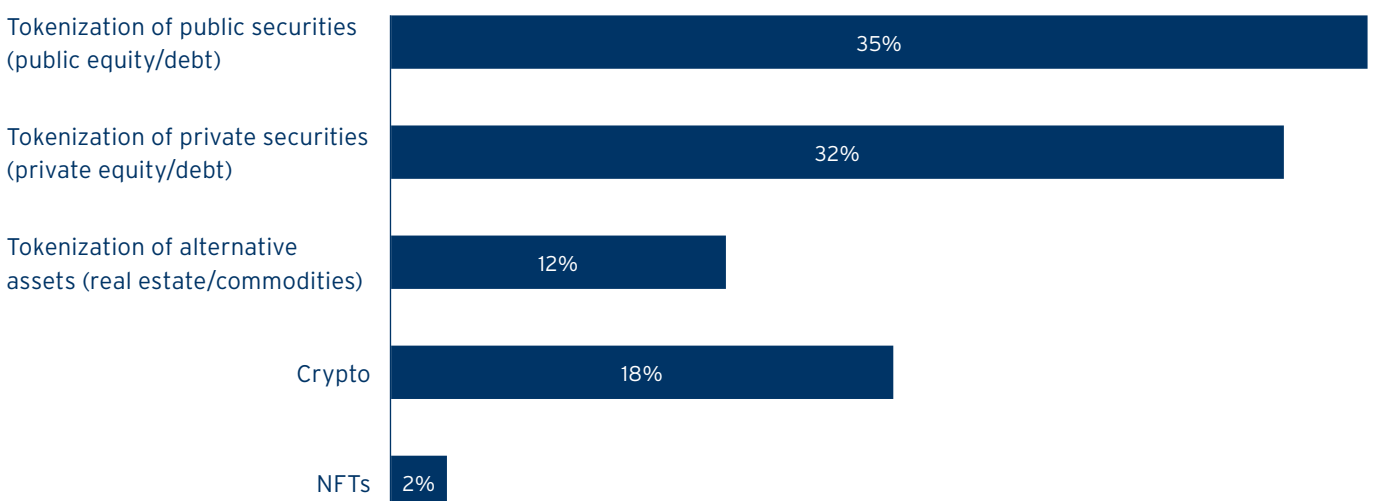
five days of overnight funding for some bond trades and no funding costs at all) and passing those efficiencies back to the investor. Equally, those who are able to settle instantly and avoid counterparty settlement risk will be able to trade with a wider range of investors than ever – tapping into new pools of liquidity that were previously off-limits.

*“Our role is to improve the liquidity of every asset class – and fractionalization is a key mechanism to enable that.”*

**Dr. Pakorn Peetathawatchai, Stock Exchange of Thailand**

The same concept of flexibility and choice also applies to fractionalization, where central banks and monetary authorities in Asia<sup>10</sup> and Latin America<sup>11</sup> are growing market liquidity through the wider distribution of (government) debt to individual investors – one bond at a time. The Hong Kong Monetary Authority’s “Project Genesis” issuance<sup>12</sup> reduced the book-closing period to one day (from five) and facilitated real-time record keeping and reconciliations between over 40 wealth managers – removing major obstacles (and costs) that have prevented widespread distribution in the past. The efficiencies have not only reduced unit costs but they have given central banks the option of using these issuances to also fulfill the broader objective of financial inclusion by allowing whole populations to hold their own government debt.

## 12a. Fastest growth in the digital assets space



Percentages might not add up to 100 due to rounding.

## Tokenization, digital issuance or smart contracts?

Given the choice of issuing natively digital securities or tokenized representations of traditional securities, 79% of respondents see their core growth as coming from tokenization. In the face of continuing challenges in regulatory and accounting treatment of natively digital securities, tokenization is surprisingly simple by comparison. Tokenizing can be like a club in that everyone only needs to agree on the rules to be a member and the presence of traditional securities (and cash) gives providers the option to limit their risks as they build.

But which assets should be tokenized? The sell-side sees the strongest growth prospects in tokenizing listed equities and public debt, motivated by the workflow efficiencies that they can derive in issuance and asset servicing. 47% of institutional investors, however, see the private space as the center of their tokenization focus – looking to DLT to remove friction in private equities, private placements and private debt to the point where liquidity improves, transparency grows and pricing narrows (see Figure 12b). While few providers have successfully delivered benefits at scale in the private space, the attention and focus of investors in this area is a clear opportunity.

Tokenization aside, one of the most compelling and adopted developments in recent years has been the smart contract – used today across a wide array of digitization projects to provide automation even when blockchains are absent. With many major DLT projects struggling to bridge the divide between digital and traditional infrastructures,

smart contracts are being used to great effect today, notably in cases such as HKEX Synapse or SGX's DLT project which seeks to transform post-trade workflows with minimal disruption to core infrastructures.

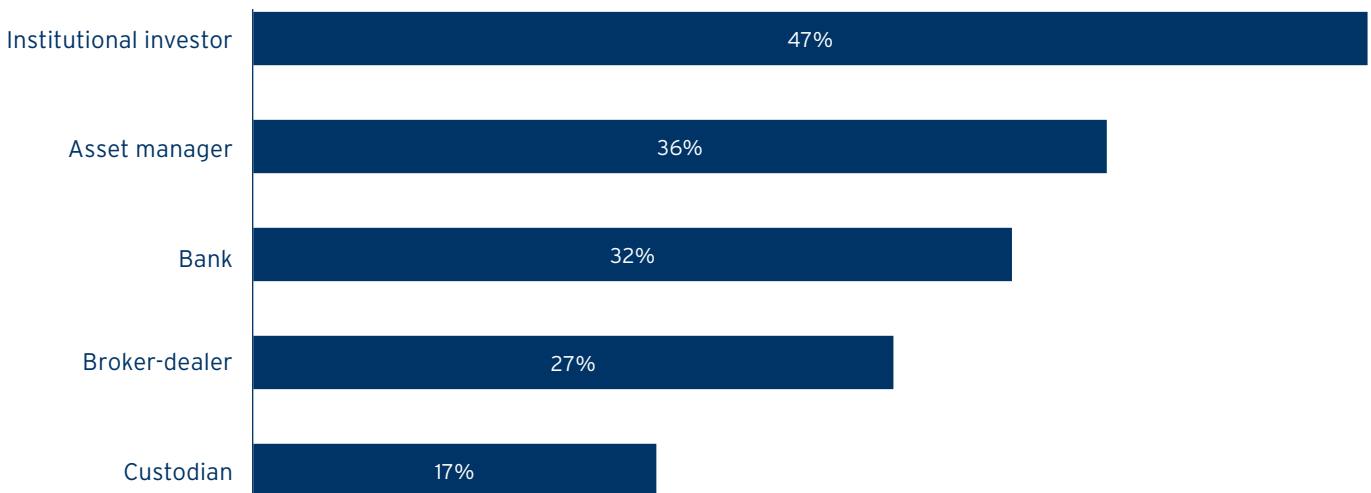
### The funding leg: digital cash is coming quickly

There is a growing belief across the industry that digital money is maturing quickly, with an overwhelming 87% of market participants surveyed (versus 72% last year) seeing them as viable before 2026.

At the center of the digital money discussion are Central Bank Digital Currencies (CBDCs), where most respondents expect progress in the next three years. This sentiment has been consistent year after year. The industry has accumulated significant experience from multiple global pilots in the last year, based on projects led by the Banque de France<sup>13</sup>; Digital Dollar project<sup>14</sup> (in the US), the Swiss National Bank<sup>15</sup> and the Monetary Authority of Singapore<sup>16</sup> (among others). From earlier domestic pilots, recent cross-border multi-bank experiments are now providing detailed insights into how central bank funding can be operationalized in a digital context, both internally and across entire markets.

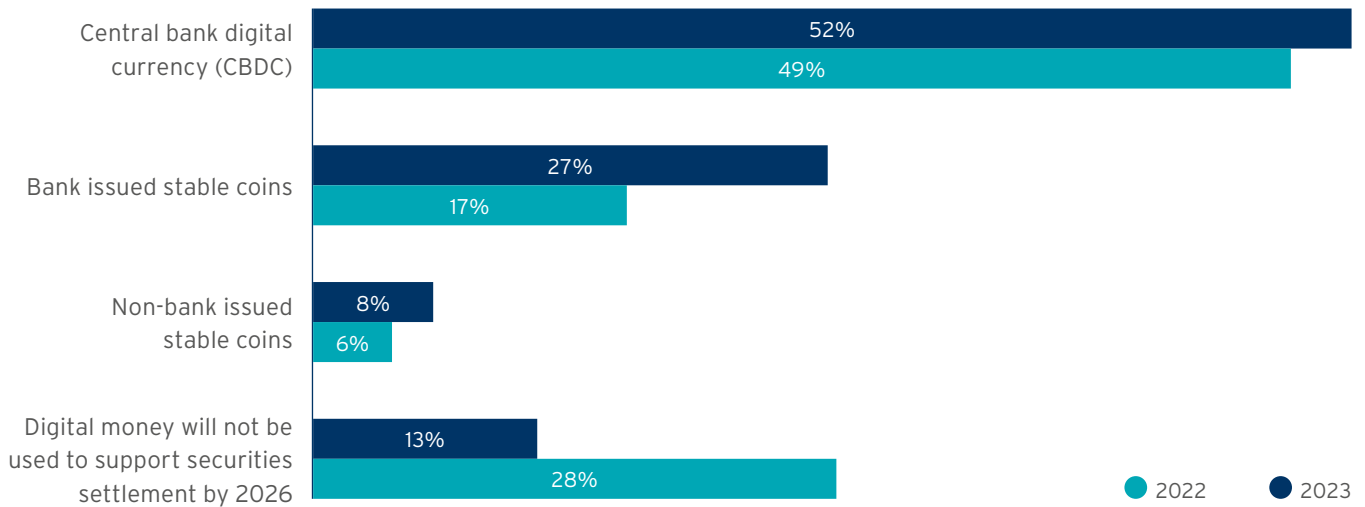
In this year's survey, 52% of market participants expect CBDCs to be live within three years – providing a robust and scalable solution to the long-running question of how to store and transfer value on blockchains. Yet around one-third of market participants are considering alternative solutions in the next three years, a significant jump from last year's findings. This year, 27% of respondents are expecting to be live using bank issued stablecoins within three years, 10% more than a year ago.

## 12b. Tokenization of private securities (by segment)





### 13. Expected form of digital money to be used to support securities settlement



In your opinion, what form of digital money will be used to support securities settlement (in the majority of your markets) in the next 3 years?

Most likely driven by conservative expectations around central banks’ speed to innovate on CBDCs and/or by the need to find quick solutions, an increasing constituency of firms is looking closely at how they can provide the transparency, liquidity and regulatory acceptance that investors need in order to form the basis for a scalable form of tokenized deposit.

#### The digital journey: best practices emerging around people and process

With three-quarters of the industry engaged on digital assets and DLT today, the industry is quickly shaping an extensive range of considerations that build on daily successes and failures in moving projects forward. This emerging best-practice implies several key steps:

**1. Business definition: what is the problem we’re trying to solve and do we need DLT to solve them?**

Beyond simply quantifying the problem, today’s digital asset projects also center on where and how DLT can provide the right solution. Based on a growing awareness that DLT is not a silver bullet and that it may be harder to put everything on a blockchain, there is an increasing focus on where DLT can play a unique role.

Industry practice so far indicates that this unique territory is most often in the registry and data-layer. Singapore’s MarketNode today refers to itself as a ‘digital registry’, and Deutsche Boerse’s D7 project uses the T2S platform

for settlements, feeding into a digitized registry. In other cases, what begins as a DLT project can quickly evolve into a smart-contract deployment.

**2. Building ecosystems: market engagement is key**

The importance of hand-shaking the business case for change with ecosystem participants has been underlined repeatedly through projects in the last year – and is a critical determinant of a project’s success or failure.

And there appear to be no limits to how active this engagement can be. Stretching beyond simple outreach to the full devolution of decision-making to ecosystem members, Equilend’s ‘Digital Transformation Working Group’<sup>17</sup>, for example, has been fully empowered to prioritize issues, select technologies and even vendors. By engaging the entire ecosystem in every step, DLT solutions are beginning to evolve with their members’ needs – instead of being presented as a complete platform.

**3. Governance is the key enabler (and obstacle to) success**

*“The core dependencies for digital asset adoption today are regulation, accounting and taxation. It is not all about technology.”*

**Dr. Pakorn Peetathawatchai, Stock Exchange of Thailand**

## 14a. Top impediment to the widespread use of digital assets in the next three years



Due to multiple responses allowed, the percentages do not add up to 100%.

What are the 3 top impediments to the widespread use of digital assets in the next three years? (Select 3)

Once in project mode, more than half the respondents surveyed this year view regulatory uncertainty and knowledge gaps in their key control functions as one of their top (three) obstacles to DLT development today – especially in Europe and North America. As the above graphic underlines, the ability of people to understand, quantify and manage the risks of DLT projects is the standout concern in execution – more than being a question of technology or performance (see Figure 14a).

In the last year, many regulators have become more conservative around any project that may have a connection to crypto assets – creating a gap in the readiness of markets and firms to constructively engage on DLT. Luxembourg and Germany have become leading centers for digital asset projects, owing to their readiness to engage with market participants, as has Singapore (where the MAS has actively championed the growth of digital security ecosystems). With many digital asset regulations still evolving, this engagement with the industry is critical in order for all parties to have the clarity they need to operationalize projects.

The same is true within each organization. One by one, risk and compliance teams are having to devise new frameworks today to evaluate and manage digital asset risks and, as many firms are now discovering, these functions can become critical blockages in project development if they are only engaged late in the project cycle.

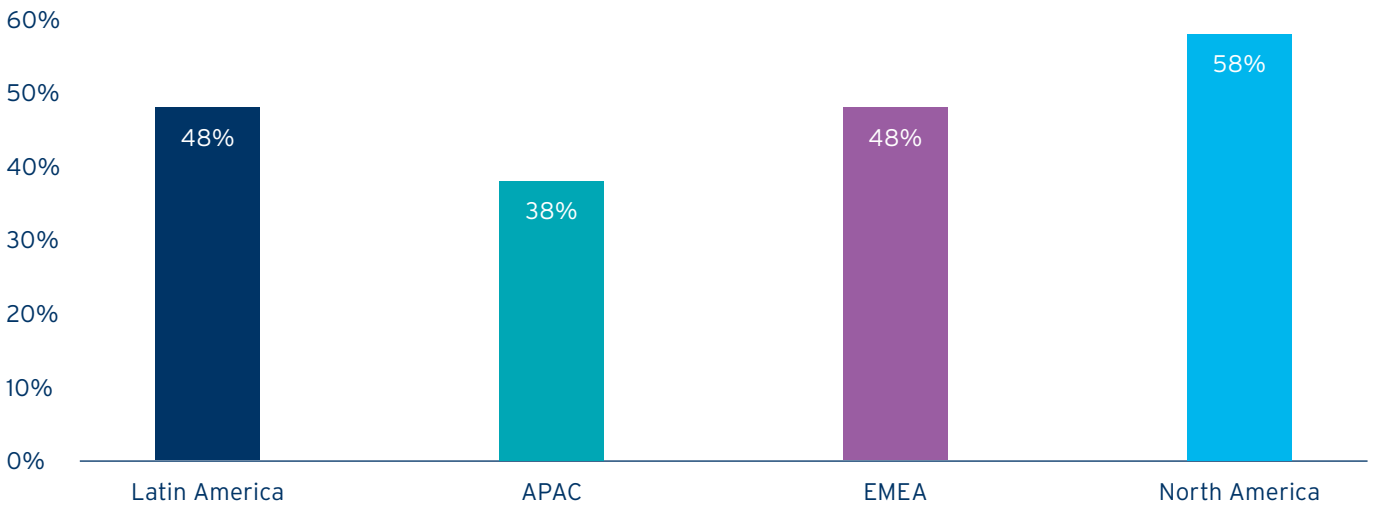
In both of these cases, the active engagement of regulators and internal risk or control functions during the early stages of DLT projects is a necessity – and is a behavioural shift for many organizations. Answers need to be worked on together if firms are to avoid the above delays and risks to DLT projects.

### 4. Using technology partners to extend reach

With respondents in Latin America and Asia-Pacific struggling the most to build and reach wider ecosystems for their DLT projects, several of the FMIs interviewed have underlined the critical role that partnerships play in engaging the wider community. Far from looking to disintermediate market participants, projects at the Singapore Stock Exchange (SGX), the Stock Exchange of Thailand (SET) and the Philippine Stock Exchange (PSE) have all relied heavily on key players (such as wealth managers) and technology platforms to provide reach and connectivity into the retail investor base.

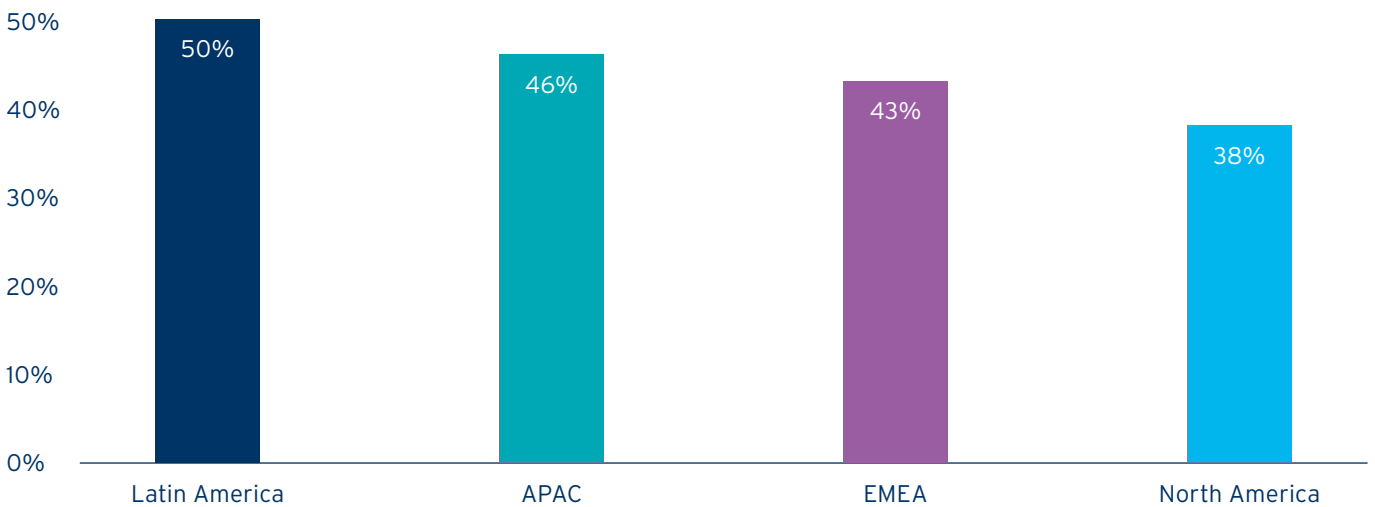
In many cases, the target of this outreach has been the retail digital wallet. Emerging as a new pool of liquidity across Asia<sup>18</sup> and Africa (in particular), these wallets are seen as a critical part of the Exchanges' growth plans. If their stocks can be held in a digital wallet then they become accessible to the millions of people today who already hold (crypto) currencies.

### 14b. Regulatory uncertainty around governance, legal and risk (by region)



Based on percentages of respondents in each region citing this option as one of the top three obstacles to DLT development. Due to multiple responses allowed, the percentages do not add up to 100%.

### 14c. Formation of market-wide ecosystems around a solution (by region)



Based on percentages of respondents in each region citing this option as one of the top three obstacles to DLT development. Due to multiple responses allowed, the percentages do not add up to 100%.

*“Electronic wallets have already become a huge part of our economy. It is critical for us to be able to work with innovative technologies and partners to reach a broader base of market participants and be part of these channels to reach the investing public.”*

Roel A. Refran, The Philippine Stock Exchange, Inc.

#### 5. Assuming the legacy burden

As we move from an era of experimentation with DLT into an era of commercialization, the connectivity of our digital platforms to our core infrastructures is a central problem for around one in every seven firms. Most often manifest in core banking and treasury systems, the central question is how to reflect and manage digital assets (and balances) alongside traditional ones in systems that may be up to 40 years old.

*“We are in the early phases of our DLT project which is being run as a side-car to our current system. We’ll grow it in parallel and at its own pace – focusing all the time on where it can do better than services we have today.”*

**Derek Neo, SGX Group**

Over the last year, the ownership of this question has shifted – from being the problem of the holder (of the digital security) to that of the operator (of the digital platform). Faced with firms who are unable to proceed in an entirely digital environment, FMIs and technology platforms have begun to assume the legacy burden and incorporate it into their platform designs. This is why SDX offers a consolidated platform across traditional security issuance and digital assets<sup>19</sup>; it is why Deutsche Boerse’s D7 still manages settlements in T2S<sup>20</sup>; and it is why BondbloX is able to connect with banks via APIs or even file transfers if needed. In all of these platforms, users can connect on day one and derive all of the business benefits of these platforms with almost zero transition risk. How they then deepen their integration over time is up to them – but it is no longer a critical dependency on the path to digitization.

**6. Vendors’ scalability: a new form of due diligence**

How can a bank that employs 500,000 staff become comfortable partnering with a firm of 20 people to execute its digital strategy? This is a brand new question for many investors and banks surveyed, 35% and 32%

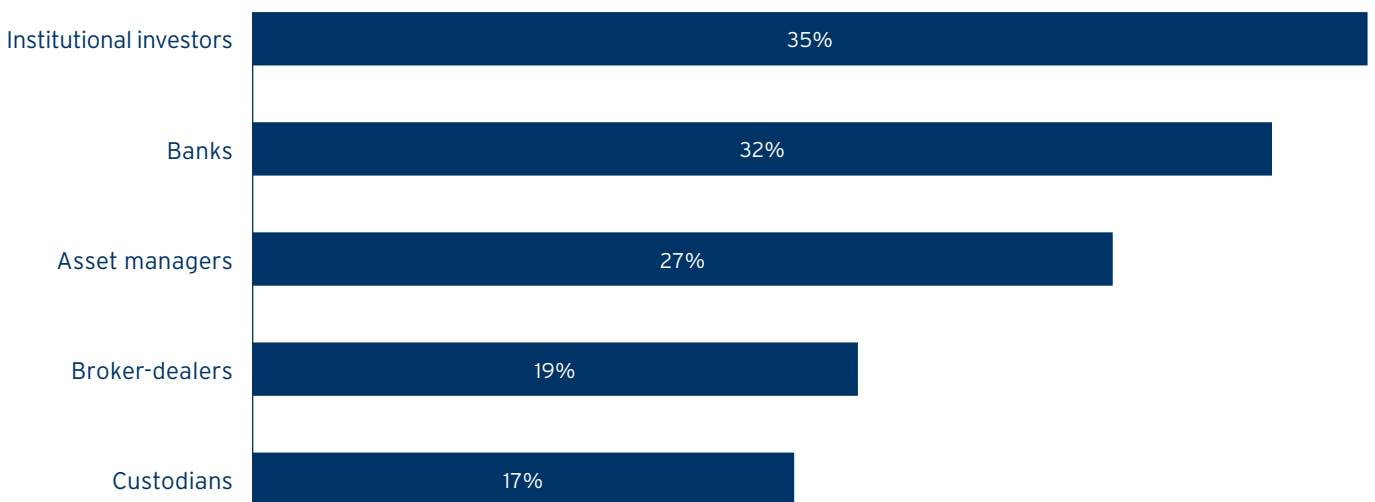
of whom respectively are struggling to adapt their established due diligence and oversight models today (see Figure 14d). What questions should firms ask to make sure they pick the right partner? What KPIs can expose a partner’s (in)ability to scale? What controls should be expected from a start-up firm? Existing and often rigid due diligence procedures (usually designed with other large-scale institutions in mind) cannot be applied in these cases – both because they can quickly overwhelm a smaller firm and because they most likely may fail to identify key risks.

Managed badly, these relationships can create multiple layers between the client and the provider – and in turn negate the core value of the original partnership. By tying up expert specialists in calls with compliance departments for days on end, for example, large banks risk ultimately destroying the original value of their partnerships.

**7. “We can’t change anything, if we don’t change anything”**

Above all, DLT and digital assets are about change and process re-engineering – and one of the most common reasons for DLT projects’ failures is an inability to revise the operating model to optimize the use of the new technology. In order to realize the significant benefits of DLT and digital assets across operations and market liquidity, it is critical that firms begin their initiatives on the assumption that significant investment in re-shaping processes and systems will be needed. DLT and digital assets are proving themselves to be excellent enablers of new efficiencies, but these benefits can only be derived once processes are reformed.

**Figure 14d: Ability to scale and deliver market-wide solutions (by segment)**



Based on percentages of respondents per segment citing this option as one of the top three obstacles to DLT development. Due to multiple responses allowed, the percentages do not add up to 100%.

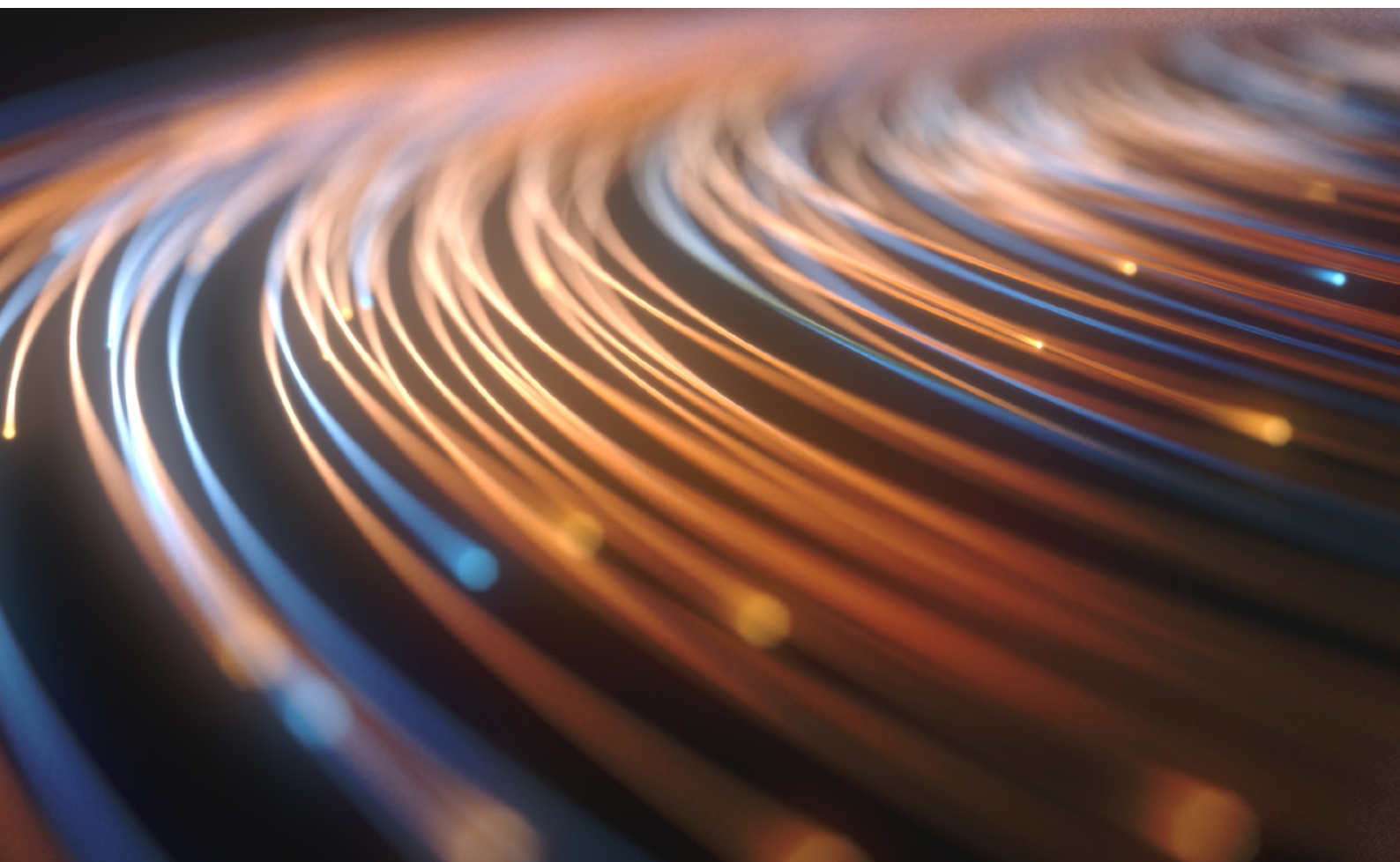
# Conclusion

There is much more happening in the world of securities services than just T+1. In the face of increasingly pressing priorities across settlements, asset servicing, digitization and legacy transition, FMI and market participants are maturing quickly in their approaches to planning and realizing change. By being more practical than ever and more collaborative, they are realizing successes that seemed unimaginable a decade ago.

The coming five years will bring massive amounts of change to our industry.

- Settlement cycles will continue to shorten in more markets.
- DLT will be used not to experiment but to deliver.
- Funding mechanisms will evolve into digital cash.
- Core banking systems across the industry will be removed and replaced.

In an era of increasing competition for investment and resourcing, firms will face significant challenges and trade offs in the year ahead as they look to accommodate and balance their solutions to these changes. What is different today is that those trade offs look set to be managed as an ecosystem discussion.



# Acknowledgments

We would like to thank our financial market infrastructure partners, industry participants and clients who have contributed their time and insights to this whitepaper.



# Contributors

We would like to extend special thanks to our Securities Services teams whose knowledge and insights contributed to this paper.

## Bryan Murphy

Global Head of Banks Sales, Securities Services

## Ingrid Collazo

Head of Securities Services, Latin America South

## Jack White

Head of Client & Industry Engagement, Data, Digital & Innovation, Securities Services

## Jeffrey King

Global Head of Custody Product Management, Securities Services

## Jolene Han Berg

Global Head of Banks Marketing, Securities Services

## Joseph Eggers

SVP, NAM Product Management, Securities Services

## Josh Freiberger

Director, Data, Digital & Innovation, Securities Services

## Marcello Topa

EMEA Head of Market Policy and Strategy, Securities Services

## Michele Pitts

Custody Product Head for NAM Strategic Initiatives, Securities Services

## Nadeem Hussain

APAC Head of Marketing, Securities Services

## Ryan Marsh

Global Head of Blockchain, Digital Assets & Innovation, Securities Services

## William Mascaro

Global Securities Financing Trading Head, Securities Services

## Yajnesh Pandey

Head of LATAM Product Development, Securities Services

# Endnotes

- 1 <https://icg.citi.com/icghome/what-we-think/citiqps/insights/money-tokens-and-games>
- 2 <https://thevx.io/campaign/proxy-voting-in-australia-and-new-zealand/>
- 3 <https://www2.asx.com.au/blog/corporate-actions-in-australia>
- 4 <https://thevx.io/campaign/corporate-action-transformation-in-south-africa/>
- 5 <https://www2.asx.com.au/content/dam/asx/about/business-committee-agendas/2023/business-committee-22-march-2023.pdf>
- 6 <https://www.dtcc.com/ust1/by-the-numbers>
- 7 AFME – September 2022 – T+1 Settlement in Europe: Potential benefits and challenges
- 8 <https://thevx.io/campaign/operationalising-t1/>
- 9 [https://infogram.com/da-nbt-sbl\\_milestones-1hzj4o3md80l34p?live](https://infogram.com/da-nbt-sbl_milestones-1hzj4o3md80l34p?live)
- 10 <https://www.adb.org/publications/project-inthanon-and-project-dlt-scripless-bond>, <https://www.worldbusinessoutlook.com/the-philippine-dealing-system-launches-digital-native-bond-on-dlt-network/>
- 11 <https://www.ledgerinsights.com/chile-tokenization-csd-central-securities-depository/>
- 12 <https://www.hkma.gov.hk/eng/news-and-media/press-releases/2023/02/20230216-3/>
- 13 <https://www.banque-france.fr/en/communique-de-presse/banque-de-france-and-banque-centrale-du-luxembourg-jointly-conducted-successful-wholesale-central>
- 14 <https://digitaldollarproject.org/>
- 15 [https://www.snb.ch/en/mmr/speeches/id/ref\\_20230330\\_amrtmo/source/ref\\_20230330\\_amrtmo.en.pdf](https://www.snb.ch/en/mmr/speeches/id/ref_20230330_amrtmo/source/ref_20230330_amrtmo.en.pdf)
- 16 <https://asianbankingandfinance.net/news/mas-new-york-fed-unveil-results-study-dlt-use-cross-border-wholesale-payments>
- 17 <https://equilend.com/services/equilend-1source/>
- 18 <https://www.adb.org/sites/default/files/publication/222061/financial-inclusion-se-asia.pdf>
- 19 <https://www.sdx.com/news/benvenuta-lugano/>
- 20 <https://www.deutsche-boerse.com/dbg-en/media/press-releases/Deutsche-B-rse-launches-next-generation-digital-post-trade-platform--2800582>

The insights in this whitepaper have been prepared in collaboration with the ValueExchange. The ValueExchange is a global market research firm, specialising in the capital markets. Leveraging extensive market connectivity and practitioner expertise, our objective is to help market participants and providers to make the case for transformation. More information on the ValueExchange is available at [thevalueexchange.co](https://thevalueexchange.co)



The material provided is for informational purposes only. Information is believed to be reliable but Citigroup does not warrant its accuracy or completeness. Citigroup is not obligated to update the material in light of future events. This does not constitute a recommendation to take any action, and Citigroup is not providing investment, tax accounting or legal advice. Citigroup and its affiliates accept no liability whatsoever for any use of this information or any action taken based on or arising from the material contained therein.

© 2023 Citibank, N.A. (organized under the laws of USA with limited liability) and/or each applicable affiliate. All rights reserved by Citibank, N.A. and/or each applicable affiliate. Citi and Arc Design is a trademark and service mark of Citigroup Inc., used and registered throughout the world.

CBS37184 08/23

