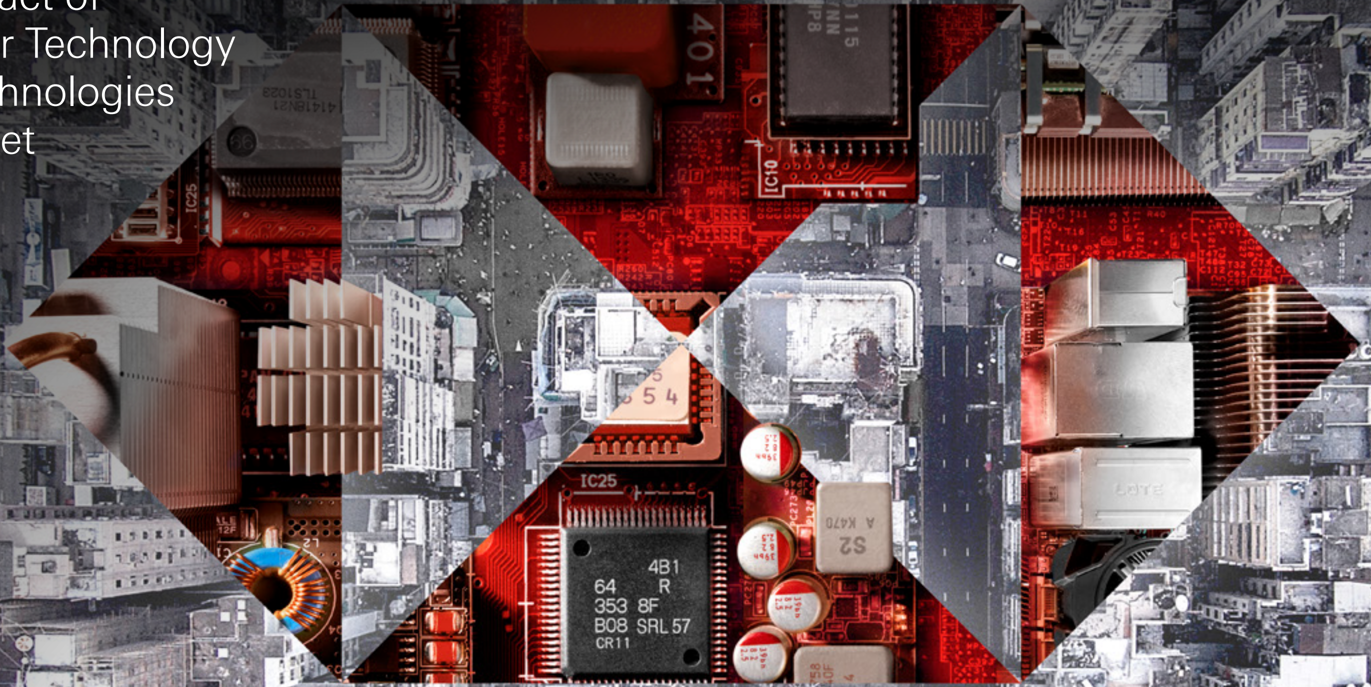
The Transformation Of Securities Services Amidst Disruption

Exploring the impact of Distributed Ledger Technology and emerging technologies on Financial Market Infrastructure, an Asian perspective



HSBC

Change is critical: threat equals opportunity

The securities services industry needs to change, to evolve, to become less complex, more efficient, more streamlined, fit for purpose, future ready and secure.

We are out of step with the pace of change evident in other more progressive industries creating a mismatch in client expectations. Meanwhile, incumbent providers start to feel the effects of commoditisation and shrinking margins. Whereas other industries have already experienced major disruption, the securities services industry has yet to feel the full force of the blow, until perhaps now. COVID-19 has turned the world on its head and as unsettling as the situation undoubtedly is, this global crisis may prove the accelerator for the transformational change our industry is much in need of.

In the mid 2000s, the publishing industry and subsequently the telecoms industry saw their business models broken as a consequence of new and emerging digital technologies and shifts in consumer behaviour. Products, services and consumers migrated online, where businesses were forced to embrace digital transformation and embed automation and digitisation throughout. Print publishing had to contend with the provision of free news, available online 24/7, whilst mobile network operators (MNO) fought to avoid being considered the 'dumb pipe,' providing the means (mobile internet access) by which other online organisations would profit (e.g. Amazon, Google). Industries such as retail (Amazon, eBay) and entertainment (Netflix) understood early on how new technologies and data could be used to support and facilitate customer experience, streamline internal systems and processes, and reinvent distribution and business models. Disruption to financial services following the wake of the Global Financial Crisis (GFC) in 2008 led to the increased stability of financial systems, along with greater resilience and robustness (Neumann 2020). However, considering securities services specifically, operationally and from a client experience perspective, little seems to have changed relative to these other industries. The current situation in which we find ourselves however, and as a direct consequence of COVID-19, has highlighted without question areas of weakness and inefficiency in our current infrastructure, processes and procedures. Reliance on paper and manual handling in a world where social distancing and remote working may persist for some time has forced us to expedite digitisation[1], digitalisation[2] and automation. Full scale disruption is closer than ever now, and we must act.

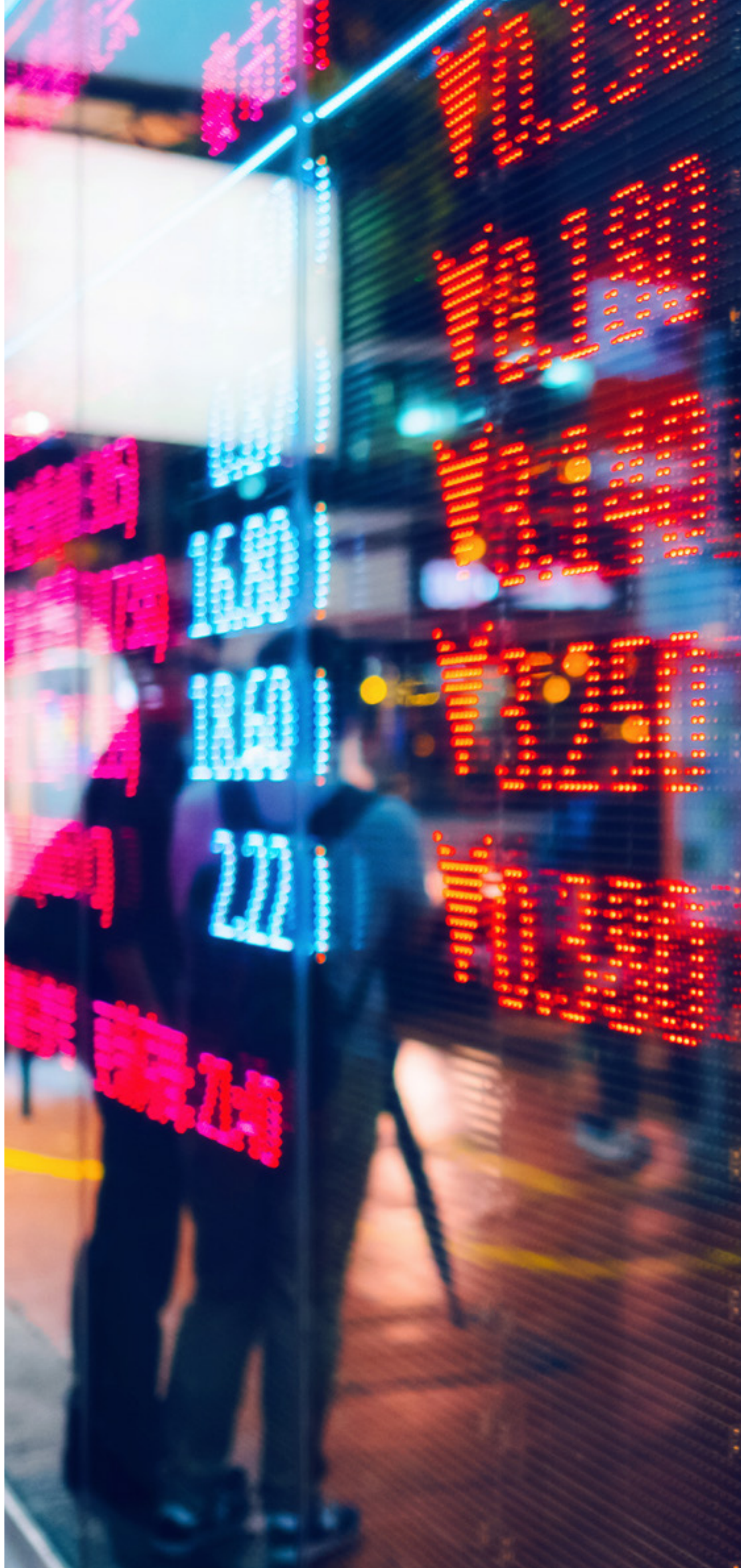
[1] Digitisation, the conversion of information from physical format into a digital format.
[2] Digitalisation, the application of digitisation to a process.

For those ready to embrace change and consider the threat of disruption as an opportunity, the increasing array of new and emerging technologies affords us the ability to deliver the capabilities required to transform the industry end-to-end and front-to-back. Success lies not just in the technology alone. Our industry is steeped in legacy systems where complex infrastructures and convoluted, manual processes and physical 'hand-offs' are commonplace. This is not therefore a question of 'plug and play' nor is it a simple 'lift and shift'. To exploit the true potential of these new and emerging technologies, we must understand the real challenges we face, macro and micro, to avoid falling into the 'solution first' technology trap. We need to develop better, more intuitive digital experiences for clients and colleagues, which place the user at the heart of the design process. We must support and facilitate human behaviours rather than dictate and over complicate.

At the same time, we must understand how the geopolitical climate and regulatory environment effect our industry and the resulting impact this may have on market structure, governance, people and processes, across the entire end-to-end securities services value chain. True transformation and the success of new solutions will rely upon consensus and a degree of federation. This will require key actors across the industry working jointly to define and implement new processes, procedures and common standards. Moreover, positive change is underpinned by open mindedness, divergent thinking and continually seeking to determine the 'why' behind the 'what'. Indeed, this is not a 'point in time' exercise, but an ongoing dialogue in which we must actively engage from within securities services and beyond. We have much to learn from innovation in other industries; we must educate, communicate and diversify.

With these challenges and issues at the fore, and prior to the advance of COVID-19, Securities Services at HSBC undertook a research study to explore potential disruption to Financial Market Infrastructure (FMI)[3] and specifically securities services, as a consequence of new and emerging technologies across Asia. Arguably more than any other 'disruptive' technology, Distributed Ledger Technology (DLT) claims to offer the potential to reinvent processes, reduce friction within and across organisations, generate new business models, create new value propositions and transform the financial services ecosystem. The study therefore specifically sought to understand levels of awareness and activity pertaining to DLT, and consider the impact this may have on the end-to-end FMI value chain whilst, at the same time explore other key issues and challenges across our industry.

We are not impervious to disruption and we must not be complacent; anticipating major change and adapting to it is crucial to ensure ongoing success. Moreover, it enables us to play an active and positive part in shaping the future of our industry. Our research is intended to help drive the conversation forward, to help encourage and inspire us to think differently, to be bold, brave and ready for whatever the future holds. COVID-19 and the current crisis afford the opportunity to change dramatically and we must seize this opportunity; we cannot afford to live in the past any longer.



[3] Financial Market Infrastructure refers to parties involved in delivering services critical to the smooth running of financial services and encompass e.g. Stock Exchanges, Counterparty Clearing Houses, Trade Repositories, Regulators and Central Securities Depositories.

Study objectives and methodology

In 2019, Securities Services undertook a qualitative research study across twelve Asian markets.

The research was designed to explore and understand potential changes to, and disruption of, FMI across Asian markets as a consequence of new and emerging technologies. The study sought to gauge levels of awareness and attitudes toward DLT across the region and the relative maturity of this technology in each market. In addition, attitudes towards other emerging technologies including Artificial Intelligence (AI) and Machine Learning were explored at a high level.

This paper provides a summary of the research based on a series of in-depth interviews with Securities Services Asian country leads and subject matter experts, along with a gauge of industry sentiment. The output represents a point of view and is not intended to provide a definitive nor exhaustive analysis of FMI across the region, nor DLT activity respectively.

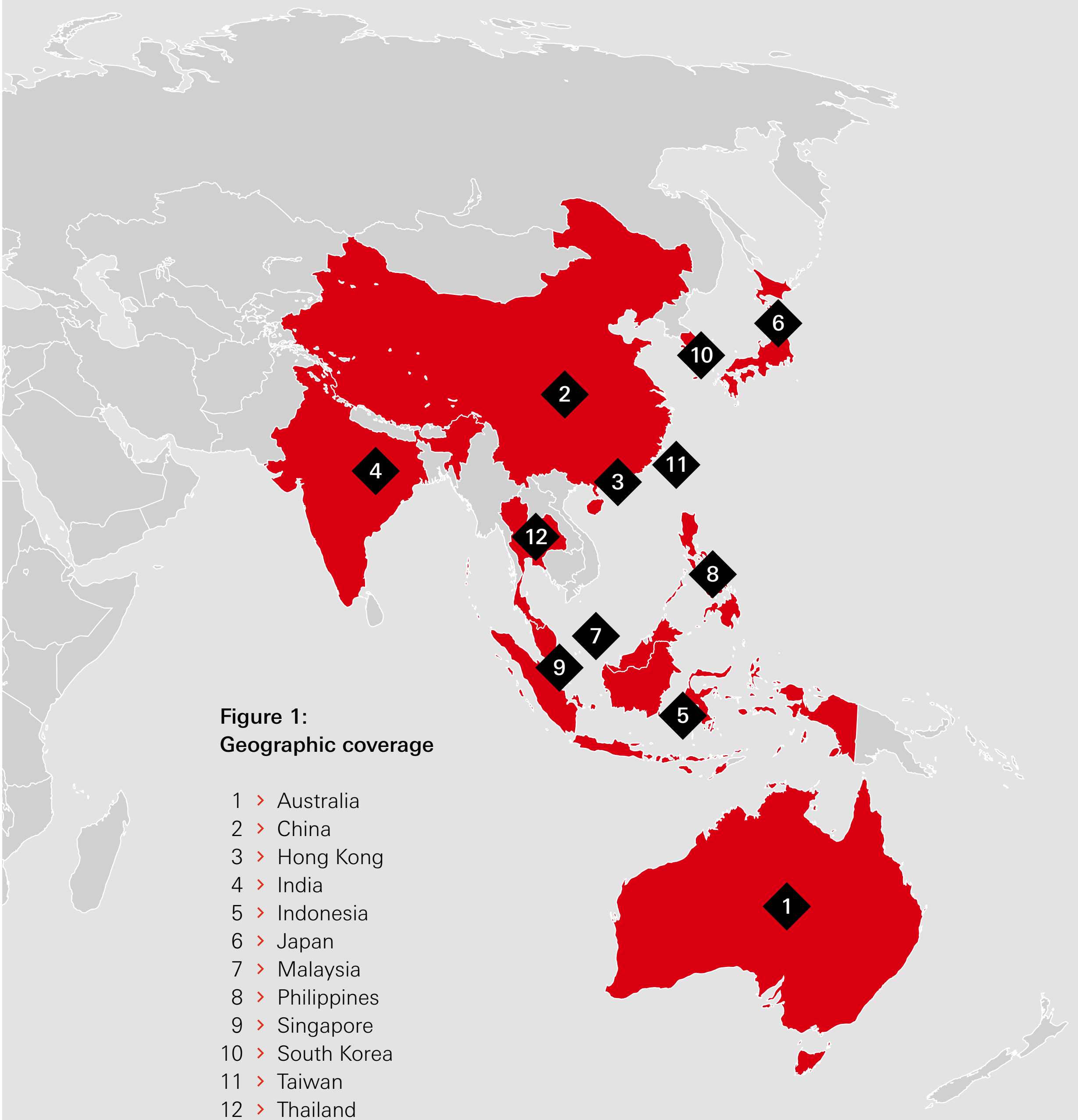


Figure 1: Geographic coverage

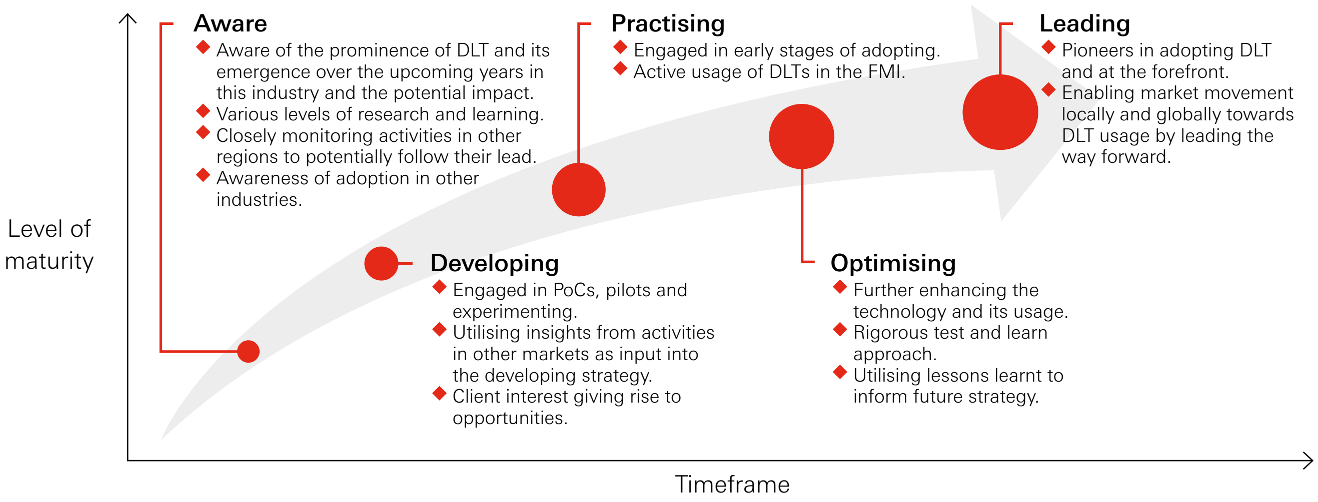
1 › Australia
2 › China
3 › Hong Kong
4 › India
5 › Indonesia
6 › Japan
7 › Malaysia
8 › Philippines
9 › Singapore
10 › South Korea
11 › Taiwan
12 › Thailand

1 › Distributed Ledger Technology: "a solution trying to find a problem"?

Our study highlights that in real terms, levels of awareness and activity pertaining to DLT across Asia remain relatively low, despite pockets of progress.

Figure 2: High level DLT capability maturity model

High level DLT capability model against which we have subsequently qualitatively assessed market maturity



At present, DLT is still considered a somewhat niche technology; use cases on the whole tend to converge around trade finance or payments, although activity is starting to emerge in the areas of document management or process improvement (e.g. digital asset management, digital identity and cross border Letters of Credit). That said, there persists a sense that DLT is still generating a lot of 'hype' and that it remains a solution trying to find a problem ("I have a hammer so I need to find nails so I have a reason to use the hammer").

In order to understand levels of DLT maturity per market, a high-level maturity model was developed against which all markets were subsequently qualitatively assessed (figure 2). In 2019, all markets except Australia, Hong Kong and Singapore reported limited activity beyond initial pilots and Proof of Concept (PoC). Activity and awareness in these markets positioned them further along the maturity curve than markets such as Indonesia, Malaysia and Taiwan (see figure 3). Interestingly in 2019, Australia was perceived to be "optimising" on the curve, in 2020 this market has been reassessed as "practicing/developing" reflecting a maturing in expectations and indicating a somewhat bullish attitude toward activity in the area earlier on. In those markets deemed to be more mature, the technology per se was not perceived as the main blocker to adoption but rather the need for a sound economic and business model, akin to a shared process management system spanning whole value chain/ecosystem. Indeed, structural fragmentation and poor interoperability across the end-to-end value chain at both a market and regional level is arguably one of the major barriers to DLT adoption. Under these circumstances, and until all actors in the chain are working collaboratively, there may be limited success for such technologies. Moreover, considerations such as the cost of the system and profit attribution will be potentially complex and challenging.

Beyond issues pertaining to interoperability and the development of shared processes across the ecosystem, another major barrier to adoption relates to the heavy reliance on paper documentation in our industry. Consequently, bigger gains can be made through digitisation and digital transformation in the first instance before the application of more advanced solutions such as DLT. This topic will be discussed and explored further in subsequent sections of this report.

Interestingly, in some markets we see the regulator adopting a pivotal role in driving DLT initiatives (Taiwan) whereas in others the regulator is turning to the industry to advance efforts (Philippines). Australia is deemed the most mature market for DLT in securities services based on the well-publicised Clearing House Electronic Sub Register System (CHESS) DLT replacement initiative. Whilst there has been some delay to the project, initial releases have proved to be a valuable feedback mechanism for the ASX. Meanwhile, the Quinhai Mercantile Exchange (QME), the commodity trading platform of the Hong Kong stock exchange, has announced a partnership with Ant Financial to create a Blockchain warehouse. We also note that there has been improved regulatory clarity within Hong Kong more recently, which will support further developments in market.

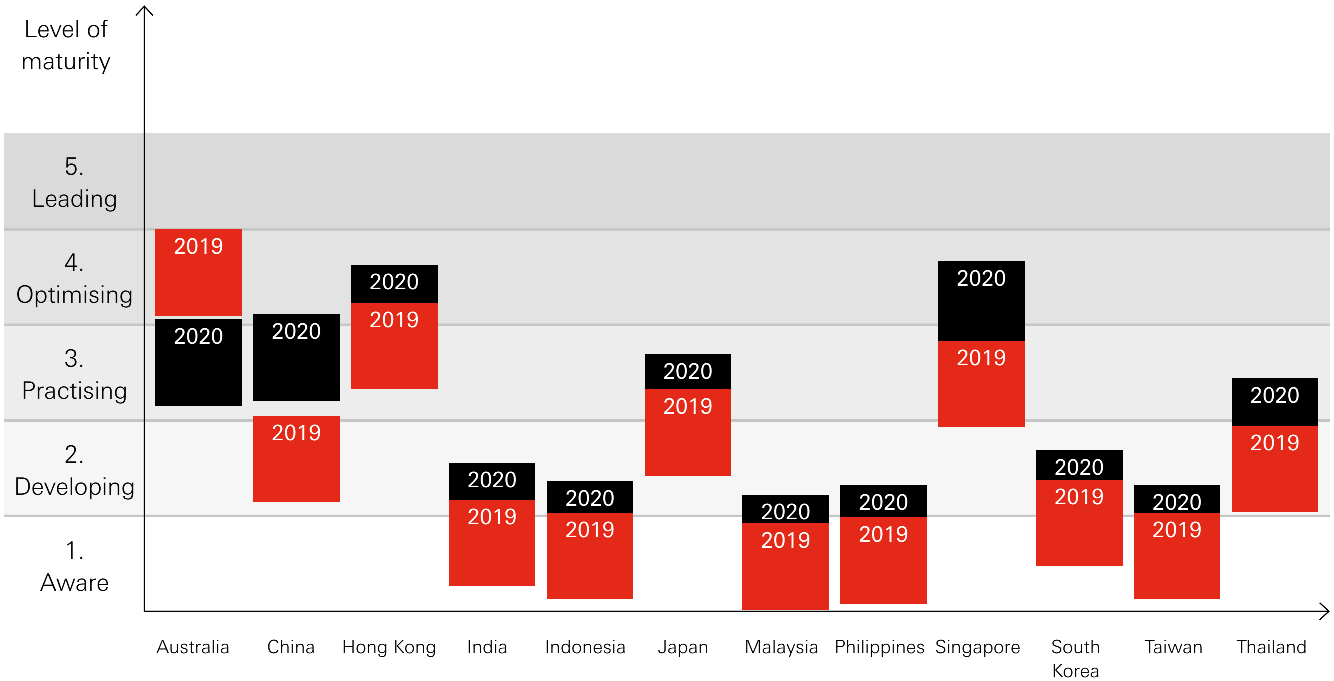
In many markets, we observe a 'wait and see' approach to DLT (India, Philippines). In Japan, industry groups are working with the local clearing infrastructure and IBM on various PoCs, though activity is still nascent. Thailand is similarly undertaking initial explorative activity and has an industry working group focused on initiatives within the domestic market, in particular Project Inthanon, a collaboration between the Bank of Thailand and a consortium of industry partners, including HSBC, to explore Distributed Ledger Technology to enhance Thailand's domestic financial market infrastructures (Bank of Thailand, 2019).

At the time of writing this paper, HSBC is working with our clients, the Singapore Exchange Ltd (SGX) and Temasek Holdings, to explore the use of DLT for the issuance and servicing of fixed income securities. This constitutes the first end-to-end digitalisation initiative focusing on the Asia bond markets. The trial makes use of tokenised securities and smart contracts over a permissioned ledger, to streamline workflows and reduce process friction, lowering costs for issuers, investors, bond arrangers and custodians. Additionally, in October 2019 Securities Services at HSBC launched "Digital Vault", a DLT based custody platform, giving investors real-time access to records of securities bought on private markets.

Whilst we do see progress, we note this is slow and potentially hampered by a preference for near term, tactical problem solving rather than investment in future facing capabilities. This, coupled with the need for parity, consistency and interoperability across markets, is in part the reason for low levels of DLT activity and maturity in Asia. It is also interesting to consider that various activity to date has resulted in using DLT to first digitise a process, before the real benefits of the solution have been brought to bear with regards to efficiency gains. This could, if not progressed, result in the application of DLT to solve problems which could be otherwise addressed through less complicated technologies (e.g. electronic identification and verification).

Increased involvement from regulators in particular will be essential; intuitively DLT should prove appealing given the promise of both transparency and security. Lobbying key actors across the value chain will expedite adoption and position key collaborators as progressive change makers across the industry.

Figure 3: DLT Maturity per market 2019 vs 2020



2 › Opportunity lies in digitisation, digitalisation and automation

Arguably one of the biggest opportunities to transform our industry lies in digitisation (the conversion of information from physical format into a digital format), digitalisation (the application of digitisation to a process) and automation, the foundational and fundamental components of digital transformation.

Securities services is still rife with paper-based assets, artefacts and documentation, where consequently heavy, inefficient manual processing persists. As noted earlier, whereas other industries digitalised early on (e-commerce, entertainment) and adapted business models accordingly, financial services and more specifically, securities services, have remained somewhat behind the curve. Compare Know Your Customer (KYC) and client onboarding in securities services with new entrants in the retail banking space. Monzo for example uses audio data input technologies as well Optical Character Recognition (OCR) / electronic identification and verification as standard to deliver end-to-end digital onboarding and Straight Through Processing (STP). However, dealing with a number of legacy systems, ingrained and complex processes spanning multiple disparate parties, makes wholesale, future facing transformation challenging. This is further compounded by the need to satisfy the regulator or adhere to strict risk and compliance mandates, all of which seem in conflict with the need to expedite change through fail fast innovation and experimentation.

Through this study we explored client pain points both within local markets and across the region. It is likely no surprise that the majority of issues and challenges raised revolve around the heavy manual activity required at key stages across the process. 'Manual processing' specifically was cited by ten country leads in interviews respectively (Figure 4). Synonymous with manual processing comes a lack of automation, digitisation and digitalisation which similarly featured as a key pain point. Throughout the course of the interviews, many seemingly disparate pain points where highlighted including, for example, regulatory constraints (China, Indonesia, Taiwan, South Korea), tight cut-off times (Japan, Malaysia), tax processing (Japan, Philippines), KYC and onboarding complexities (Philippines, Indonesia), segregation issues (China, India, South Korea), corporate action activities (Australia, Hong Kong, India) and the high cost of doing business (Singapore).

However, in most cases the underlying impact or knock on effect was the need for heavy internal manual processing and complex operational processes involving significant co-ordination across multiple parties. The cause is not always considered to be outdated technology, but rather more often, a requirement defined by e.g. the regulator, for compliance purposes, or simply the complexity of the ecosystem.

Figure 4: Perceived client pain points (2019)

In your opinion, what are the most prominent key issues or pain points that clients in your market experience at present?	Australia	China	Hong Kong	India	Indonesia	Japan	Malaysia	Philippines	Singapore	South Korea	Taiwan	Thailand
Labour intense manual processing, heavy physical documentation (incl. KYC/onboarding)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Low digitisation or automation			✓	✓	✓	✓		✓	✓			✓
Inefficient processes	✓	✓			✓	✓		✓	✓			
Antiquated infrastructure and poor interoperability	✓	✓	✓					✓	✓	✓		
Corporate actions – manual	✓		✓	✓	✓							
Regulatory constraints		✓			✓					✓	✓	
Reporting limitations					✓	✓	✓					
Demand for outsource / offshore					✓		✓				✓	
Tight cut-off times						✓	✓					
Tax / Duty / Fees						✓		✓				
High cost of doing business / expensive operational costs									✓			

Please note this table represents the frequency and intensity of perceived client pain points referenced. Analysis is based on unprompted mentions, therefore not all pain points are referenced by all markets. It should be highlighted that in many cases pain points are related e.g. manual processing and corporate actions.

The application of business process automation and Robotic Process Automation (RPA) in financial services has increased significantly over recent years and as noted by Yawar Shah, Chairman of the Board of SWIFT at last year's Sibos (2019), the securities services industry is well positioned to benefit from the significant potential for cost efficiencies through the application of this technology. However, whilst RPA offers considerable operational and cost efficiencies, it also presents the opportunity to metaphorically 'paper over' the existing cracks in inefficient processes. Applying RPA to poor, overly complex processes can inhibit innovation rather than drive true digital transformation, which is founded on the basis of simplification, digitalisation and principles of zero-based design where possible. All too often we observe the desire to automate a complicated process rather than streamlining it from the start. This wastes energy, effort and often delivers limited returns and results with further complexity and fragility. Indeed, the Securities Services Intelligent Automation team invests approximately 60% of time up front, assessing whether a process is suitable for RPA and always advising against automation in the first instance where 'traditional' process re-engineering can deliver a far better return. Only when a process has been optimised by removing extraneous steps or streamlining activities, will the team consider RPA or more advanced solutions, leveraging Machine Learning and Artificial Intelligence.

> **The challenge lies within regulation, not the real tech infrastructure. Higher levels of manual processing are needed to fulfill some of the complex regulations"**
>
> South Korea

> **"Some asset management companies are not bank backed and don't use SWIFT. Therefore, manual efforts and workarounds are at times required as an interim solution whilst working on solutionising it for the medium to longer term."**
>
> Malaysia

> **In the asset management community, they are under huge pressure to reduce their costs both in terms of manufacturing and distribution. They are looking at their distributors e.g. banks and independent financial advisers and wondering why they are paying them so much money. So, that model of distribution has been a challenge from a cost perspective, and part of that means there needs to be digitalisation around the whole distribution process."**
>
> Singapore

Encouragingly, across the majority of the markets we identified initiatives coordinated or initiated by the regulators and exchanges intended to digitise, digitalise and / or automate Business as Usual (BAU) processes. In many instances however, these are designed to address near term specific issues (e.g. the demise of physical securities by Korea Securities Depository or the automation of existing processes in Japan) rather than address the deeper underlying infrastructure issues that result in inefficiencies or by redesigning processes end-to-end.

There is clearly more to be done and we must continue to digitise, digitalise and automate processes and interactions by considering the whole, and not losing sight of the obvious. Considering how to apply the principles of Client Centred Design and Future Journey Visioning as a means to drive towards a shared, unified vision for 'what good looks like', grounded in the art of the possible, could reap real rewards for those willing to explore and experiment. As an industry we must also work to better educate as to the opportunities to digitise and encourage, e.g. regulators to move away from paper were possible by demonstrating the advantages and efficiencies realised through the technology with no impact on security (e.g. dematerialising eSignatures). True digital transformation requires us to reimagine how we operate across the entire process, end-to-end, and invent a future without faxes, printers or paper.

Complexity is easy, simplicity requires bold, brave and new thinking.

“Any intelligent fool can make things bigger and more complex…it takes a touch of genius and a lot of courage to move in the opposite direction.”

Albert Einstein

3 › Kicking the proverbial can down the road

Our research sought to explore levels of awareness and adoption of emerging technologies in addition to DLT including, for example, AI, Machine Learning, RPA. We similarly sought to gain an appreciation for where, or who, might be progressing new or alternate business or distribution models.

Whilst there was awareness of activity leveraging AI, Cloud and APIs across all markets, this was notably in other industry sectors (retail, insurance and logistics). Within financial services, trade finance and retail banking were most commonly cited as more mature users of new / emerging technologies. The payments space is also considered to be an early adopter of new technology and in many ways a marker for what's to come. In Thailand, the Securities Exchange Commission (SEC) are progressing an initiative to help local brokers and asset managers make use of AI and algorithms for retail investors.

Cryptocurrencies are also gaining momentum, for example, there is an Initial Coin Offering for Cryptocurrency in the Philippines, China are now issuing digital currencies, there is activity in South Korea (though new regulatory requirements have slowed activity) and in Hong Kong we note the exploration of Crypto as a new asset class where securities services have held innovation sessions with the Exchange. In Singapore, a new Payment Services Act was brought into effect this year (2020) which focuses primarily on usage of Digital Payment Tokens. This will help bring further clarity to various aspects of managing virtual currencies. Tokenised Fixed Income securities are due to be issued in 2020.

> **“…in terms of the Fintech space, it is largely focused on consumer or micro lending and not really about solving fundamental problems in the financial services industry…I frankly don't see [them] as having a direct impact on the securities industry.”**
>
> Philippines

> **“There is more [activity using emerging technology] on the payments side, mobile payments (Unified Payments Interface)“**
>
> India

> **“"The SEC want to see local brokers and asset managers make use of AI and algorithms in a bigger way for retail investors.”**
>
> Philippines

> **“A lot of high technology initiatives are retail client related.”**
>
> Japan

Noticeable was the absence of any discussion or awareness around full-scale reimagining or reinvention of the entire process end-to-end, and front-to-back (from client through to back office, through to tools and technologies) akin to all-encompassing Digital Transformation. There is a perception that both clients and other key actors in the FMI value chain are focused on 'burning issues', rather than future proofing their businesses through more visionary initiatives or strategies designed to deliver future facing revenue streams.

Whilst study participants could articulate proposed or aspirational changes to infrastructure designed to improve efficiencies, there was little mention in the markets of entirely new business or distribution models designed to address the challenges. This in itself was somewhat telling and suggests perhaps an 'operational versus aspirational' culture and mindset, demonstrated through detailed rather than big picture, future facing strategic thinking. Interesting also was the perception that our industry as a whole is guilty of applying technical solutions without always the having understanding of the real problem or articulating a clear long-term strategic vision. This was felt to apply to DLT itself, which is still considered, at times, a "solution trying to find a problem" in need of compelling use cases beyond, for example, Trade Finance. This is perhaps best illustrated by the fact that organisations have spent many years undertaking DLT PoCs rather than developing value-add services. However, we do believe that the time has come to move beyond experimentation and that organisations now have the knowledge and skills to build production grade DLT services.

Our findings suggest that a tension exists between the new and old, a desire to implement emerging technologies but often in a discrete and tactical way, thereby delivering only marginal improvements to the status quo. In order to really shift the dial, it will be necessary to go back to basics, to consider the whole ecosystem and understand where the real opportunities for innovation lie. Proper problem framing up front will help drive out the best, and most appropriate, technical solution.

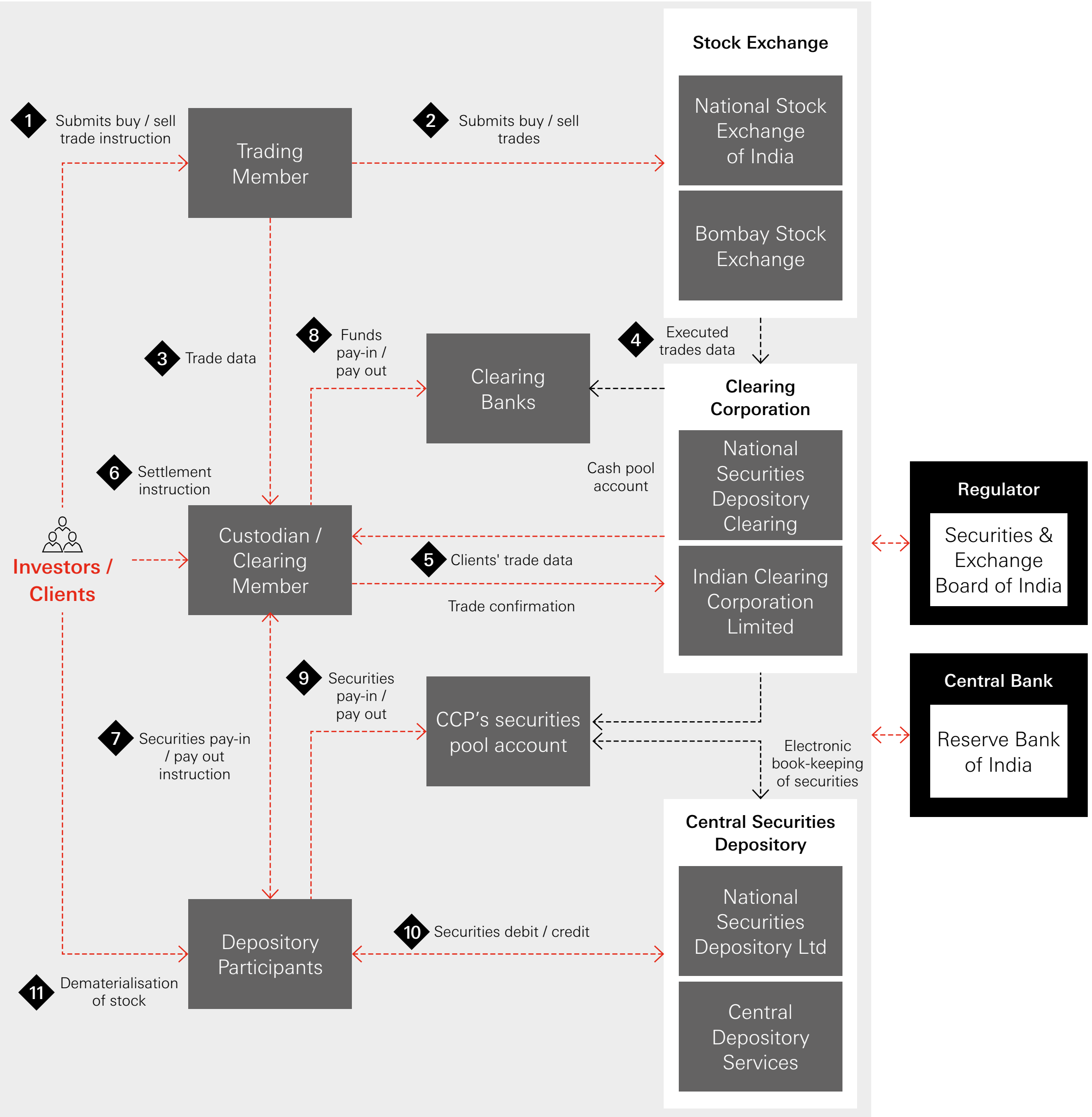
4 › A call for consistency, collaboration and consortia

Based on information obtained through the study and through subsequent research, each FMI per country was mapped in order to explore key similarities and differences (see example Figure 5).

An analysis of the similarities and differences observed between one market and the next makes it possible to consider where practices, processes or technologies may be more or less efficient, advanced or effective. This in turn shines a light on those areas where opportunities exist to cross pollinate ideas between markets, whilst at the same time identifies more specifically how and where new technologies could be leveraged in response to specific and identifiable issues, challenges or pain points.

Our analysis highlighted, on the whole, distinct and individual idiosyncrasies per market making Asia as a region, perhaps unsurprisingly, interesting, complex and challenging. Inconsistencies in process, procedures and regulations per market make it difficult to derive significant similarities across the region. However, where they do exist they can, in part, be attributed to political and economic legacy (e.g. restricted currency markets). There also exist structural differences and challenges for segregated markets (China, India, South Korea) versus omnibus (Hong Kong). We consider the FMI in Japan interesting and notable for its relatively advanced application of automated, streamlined processes compared with other markets, including for example, real time pre-matching settlement systems and low (no) tolerance for settlement failure. We also highlight Australia where the FMI differentiates due to the presence of CHESS, as well as a consequence of the consolidated Regulator / Reserve Bank of Australia (though we also note significant challenges due to legacy infrastructure). Hong Kong is similarly highlighted due to its fairly advanced, streamlined processes and omnibus market.

Figure 5: Indian FMI (Equities trades)



Trading member / Clearing member
- Members of stock exchanges e.g. brokers.
- Trade execution on exchange's platform.
- Clearing and settlement of non-institutional trades.

Stock Exchange
- Two main exchanges – National Stock Exchange of India (NSE) and Bombay Stock exchange (BSE) – transact almost 100% of the volume in the India FMI.

Clearing Corporation
- Two main clearing corporations - NSE Clearing and Indian Clearing Corporation Limited (ICCL). Acts as Clearing Counterparty (CCP) and guarantees settlement.

Clearing Banks/Custodians
- Members of clearing corporations.
- Confirms trade on behalf of clients to CCPs and assumes the settlement obligation. Clearing and settlement of institutional trades.

Depositories
- Two depositories – National Securities Depository Ltd (NSD) and Central Depository Services (CDS) Ltd.
- Holds securities in electronic form.
- The CSDs are registered owners in the books of companies therefore provide dematerialisation and re-materialisation of securities.

Depository Participants
- Agents of depositories. Provide access to the dematerialised framework and infrastructure of the country.
- Maintains investors' dematerialised securities accounts.

Regulator
- SEBI (Securities and Exchange Board of India).

Central Bank
- Reserve Bank of India (RBI).

Generic India FMI Information
- Clearing and settlement are largely STP.
  - T+2 settlement cycle. Equities – no challenges regarding this as it is more STP. Fixed Income – challenges involved due to not being fully STP. Also largely OTC rather than exchanged traded.
- Restricted currency market on cash side. Numerous regulations around FX and also tax implications, therefore there are a lot of manual and bespoke processes in bringing money in and taking money out of the country.

At a market level Taiwan, South Korea, Indonesia and Hong Kong have all transitioned to a market infrastructure which provides connectivity for funds distribution (e.g. funds hubs). Market infrastructure regulators and / or central banks are creating a centralised environment for funds distribution subscription redemptions and recording. Interestingly, this is not true for Singapore which, in many ways, modernised early. Consequently, however, this has resulted in an infrastructure which is now somewhat behind other markets in the region. Yet change is on the horizon and Singapore has started to explore opportunities to develop a more flexible infrastructure better suited to managing change.

Whilst most countries demonstrate progressive thinking in areas such as Data as a Service (Australia, Hong Kong), those operating under greater regulatory constraints demonstrate a far more conservative attitude (Taiwan). Unsurprisingly, markets operating under a strict regulatory environment prove challenging from an innovation perspective (e.g. Taiwan Sandbox requires significant regulatory approval). Other changes to market infrastructure are observed in India where an initiative designed to develop a web module for fixed income is offered to investors trading in government securities. India is also proving progressive in areas including payments and digital identity.

Taiwan, Thailand, South Korea and India, which are heavily regulated and / or restricted currency markets, are particularly challenging for foreign investors given the requirement for substantial and comprehensive physical documentation and the lengthy manual processing which that entails. This information is often requested time and time again at various stages throughout the process by different parties, across the end-to-end securities services value chain (i.e. Regulators, Depositories, Stock Exchanges).

> **“The market infrastructure itself is not inter-connected. There are still a lot of manual processes involved from pre-matching through to settlements and investment registration.”**
>
> Philippines

> **“A key differentiator of China versus other markets, whether it is securities or cash, is that everything is segregated, similar to emerging markets such as India or South Korea. So, the infrastructure from other mature markets cannot be easily applied and executed. Regardless of whether it is settlement or funding, a lot of processes need to be managed per client, per fund.”**
>
> China

One of the most pronounced and persistent challenges from an infrastructure perspective concerns fragmentation and poor interoperability across all parties in the end-to-end securities services value chain. This is exacerbating inefficiencies and inconsistencies in process both within and across market, and often results in the requirement for duplicate documentation or for investors to provide the same information numerous times. As noted earlier in this paper, for the adoption of, in particular, Distributed Ledger Technology and associated benefits to be realised, it will be necessary to create consistency across the entire Financial Market Infrastructure. This may require significant transformation encompassing Stock Exchanges, Counterparty Clearing Houses, Trade Repositories, Regulators, Central Securities Depositories, indeed all stakeholders across the end-to-end value chain.

In order to affect the changes necessary to deliver such transformation within markets and across the region, it will be essential to work collaboratively and openly with key stakeholders. Cross pollinating ideas and insights between markets which are more progressive or advanced and those which are developing will help drive consistency and improve interoperability regionally. Working alongside regulators per market in particular will be key to the successful implementation of new solutions.

The beginnings of a move towards consistency and collaboration across the industry has been demonstrated most recently by Proxymity, the digital investor communications platform developed by Citi. Proxymity has now formed its “own entity via a global, industry-led consortium” which brings together global and direct custodians as well as issuer agents, in order to provide instant access to investors and companies (Proxymity, May 2020). The consortium comprises HSBC, BNY Mellon, Citi, Clearstream, Computershare, Deutsche Bank, J.P. Morgan, and State Street. As well as providing efficiencies of scale and scope, this consortium will deliver the parity, transparency and consistency needed to drive improved interoperability across the investor communications ecosystem.

This marks an incredibly positive step in the right direction and we welcome more of the same. It will be increasingly important however, to elevate the debate and see beyond the technology to consider the real issues we need to solve. Joined up thinking at the highest level and co-solutioning within consortia will support coordinated efforts and innovative thinking across FMI for the benefit of all.

5 › Conclusions and recommendations: where next?

It is virtually impossible to ignore the hyperbole surrounding the claims made about new or emerging technologies.

Unless you are a start-up or new entrant into the market, leveraging the full capabilities of these technologies can be challenging. How do you develop innovative solutions in organisations with infrastructure legacy and complexity? How do you safeguard the business and your clients whilst embracing experimentation and innovation? How do you apply new technologies to deliver products and services that exceed client and colleagues' expectations faster than the competition? Rigid regulatory compliance and the threat of cybersecurity breaches seem in conflict with fail fast innovation.

This cultural collision is perhaps felt most acutely in financial services and goes some way in explaining the slowness of securities services' transformation, relative to other industries operating within less prohibitive parameters. Whilst there is considerable scope to leverage the capabilities afforded by emerging technologies and digital ecosystems to redesign the industry end-to-end and front-to-back, this goes beyond technology. It is far bigger. Indeed, whilst our research focused on the potential impact of new technologies on FMI and in particular on DLT, we also explored and uncovered insights and information which we believe important in helping build a securities services industry fit for the future (Figure 6).

The need for significant change, coupled with a growth mindset in Asia, suggests that the region is well positioned to exploit these new and emerging technologies. Although we cannot make specific nor robust comparisons between regions, we note that many Asia markets have reached a point in time where wholesale renewal across the ecosystem is now necessary, making them the ideal test bed for new technologies. Under these circumstances, we may see change accelerate faster in some Asian markets than in more developed regions where transformation is not yet perceived to be critical.

As noted at the outset of this paper, the devastating impact of COVID-19 has forced us to face up to our over reliance on manual artefacts and paper-based processes with more focus than ever before. Indeed, many of the issues we identified through the course of our research are now being addressed with expediency through necessity rather than choice. Over the last three months we have observed a marked shift in appetite for digitisation amongst the regulators in Asia, across areas including corporate actions (Australia, Singapore, Malaysia, Thailand) and proxy voting (Thailand) (HSBC Market Advocacy Pack, May 2020). We have also seen a greater acceptance of digital documentation at key stages

of the account opening process (China, Korea and Taiwan) and with respect to tax activities (Japan, Indonesia and Taiwan). The current situation has afforded us the ability to challenge many manual processes amongst our clients. What once seemed impossible is now being made real, and whilst some of these advances will be temporary, many will remain.

COVID-19 has forced change upon us but change is constant, and the threat of disruption will never dissipate. We must reinvent the way we operate if we are to thrive and survive in this new world and in the future. We must build businesses which can flex and adapt as securities services evolve. We should do this by working collaboratively across the industry, cross pollinating ideas and embracing new thinking. We also need to draw inspiration from seemingly tangential industry sectors to expedite change and solve problems. This will require taking more risks and hiring people with a broader set of skills, knowledge and experience from different and diverse backgrounds. We must also be open to, and acknowledge, alternate ways of working. Transformation requires bold, brave and fresh thinking from both within and beyond the securities services industry, this is what will drive us forward not result in us being left behind. We need this now more than ever, our future depends upon it.

Figure 6. Insights and recommendations

Insight	Recommendation
Distributed Ledger Technology is still evolving; maturity is relatively low. Level of perceived DLT maturity in securities services is low in most markets with Australia, Hong Kong and Singapore considered most progressive. In most cases activity pertains to Proof of Concept or experimentation and where there has been progress in areas including digital asset management and tokenisation, the industry as a whole is still exploring the most appropriate application of the technology.	◆ Clearly articulate the ask. ◆ Better match **client problems** with the **right technical solution or identify new revenue** generation opportunities, underpinned by enabling technology. ◆ Run **strategic test and learn initiatives** using robust experimental methodology to kill unsuccessful solutions, applying low cost, fail fast techniques.
The biggest opportunities lie in digitalisation and automation. Without exception, all markets cite manual processing, heavy documentation and inefficient processes as key client pain points. Synonymous with manual processing comes lack of digitisation and automation.	◆ Partner with key stakeholders to co-solve persistent, macro BAU pain points championing true future facing digital transformation. ◆ Transform processes 'outside-in' by placing the client at the heart of the experience; re-engineer processes from zero base then automate and digitise end-to-end, front-to-back. ◆ Strike the right balance between tactical automation / digitisation so solve near term pain points versus full scale transformation.
Preference for tactical versus strategic. Low awareness of new business model development signals an industry-wide tendency to focus on technologies ahead of value proposition articulation or proper problem framing.	◆ Apply Blue Ocean strategic thinking to identify the unoccupied space where high value opportunities exist. ◆ Partner with clients / key FMI stakeholders to co-create new value propositions. ◆ Partner with Fintech to fill capability gaps or super charge solution development. ◆ Start 'seeing the signals in the distance' to drive innovation in securities services creating a competitive advantage. ◆ Monitor advances in technology and innovation from other industries to cross pollinate ideas into the securities services space.
Infrastructure fragmentation, process inconsistencies and poor interoperability is exacerbating system inefficiencies. Fragmented market infrastructures across the region and poor interoperability exacerbate persistent and ongoing BAU inefficiencies. This prohibits the ability to create a consistent, efficient (digital) experience and exploit new revenue generation opportunities.	◆ Lobby regulators / FMI stakeholders; communicate changes necessary to drive market / regional efficiencies. ◆ Drive 'cultural change' e.g. present benefits of digitisation / DLT in compelling ways to effect the shift from paper to digital (e.g. Dematerialising eSignatures). ◆ Understand FMI differences between one market and the next and leverage insights to cross pollinate learnings to benefit each market.

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