

Innovative Technologies and Their Reshaping of Securities Trade Settlements

創新科技改變證券交易結算模式



Many of the processes that define securities' post-trade processing are plagued with inefficiencies and unnecessary costs, which have an adverse impact on client experiences. Compounding these issues are revenue challenges associated with margin compression and regulatory restrictions. In response, the industry is increasingly embracing innovative and disruptive technologies – such as DLT (distributed ledger technology) and digital assets – as a means to improve the operating model and facilitate cost savings. Trade settlement is one area which is likely to benefit from such technologies.

許多證券交易後的程序不但欠缺效率，而且引致不必要的成本，導致客戶體驗欠佳。再者，保證金借貸和監管規則的限制，均影響證券買賣業務的收入。有見及此，業界逐漸採用創新及顛覆性的科技，例如分佈式分類帳技術 (DLT)、數碼資產等，以改進營運模式和節省成本，而交易結算的程序亦有可能從中得益。

How trade settlements work

After a security transaction on a stock exchange or regulated market, ownership normally transfers from seller to buyer at either a domestic central securities depository (CSD) or an international central securities depository (ICSD) such as Euroclear or Clearstream. Historically, trade settlement would normally take between five to seven days to complete, and even longer in certain markets. Most countries have now shortened their settlement cycles to two days, otherwise known as T+2 (trade date + two days), an achievement largely enabled through the dematerialisation of securities markets. “During the 1990s, securities markets switched slowly from physical paper to electronic settlement. As a result, the time it took to settle a securities transaction after the trade date

reduced significantly from anything up to T+15 down to T+5, T+4, T+3, and now T+2. T+2 is the de facto norm across North America, Asia-Pacific and Europe,” said Marty JETTON, Chief Operating Officer at Hex Trust, a Hong Kong-based provider of digital custody solutions.

Under current operational and infrastructural constraints, T+2 is widely considered to be best market practice as it mitigates counterparty risk by reducing to two days the duration of buyers' exposure to sellers and vice versa. However, the model has serious limitations. T+2 is the tightest settlement period achievable in the current settlement environment when other factors are taken into account. “Movements of cash across national boundaries and conversion of currencies are key elements within the settlement process, and these are limiting factors,” said JETTON.

交易結算的過程

在證券交易所或受規管市場進行證券交易後，證券擁有權通常在本地中央證券寄存處或國際中央證券寄存處（例如Euroclear或Clearstream）由賣方轉移至買方。以往交易結算通常需時五至七天完成，有些市場甚至需要更長時間。目前大部分國家的結算時間已縮短為兩天，一般稱為T+2（交易日加兩天）；能有這樣的成績，很大程度上是證券市場無紙化的成果。Hex Trust營運總監Marty JETTON表示：「在1990年代，證券結算方式由紙張為本逐漸轉變為電子化結算，結果交易日後證券交易結算的時間大幅縮短，由長至T+15縮減至T+5、T+4、T+3，以至目前的T+2。T+2實際上已成為北美洲、亞太區和歐洲的規範。」Hex Trust是香港公司，提供數碼寄存方案。

在目前營運和基礎設施的限制下，市場普遍認為T+2是最佳做法，買賣任何一方不履行合約義務的不確定性能夠縮短至兩天，減低了交易對手風險。然而，這模式有很大限制。考慮到其他因素，T+2是目前的結算環境中所能達到的最短結算期。JETTON說：「跨國現金流動及貨幣兌換，是結算過程中的主要元素，這些都是限制的因素。」

T+2: A model in need of improvement

The exposure of counterparty buyers and sellers to each other for two days after a transaction has been executed represents a serious risk, especially in the context of recent market volatility. Some within financial services have recommended the settlement cycle be shortened to same day or T+0. The DTCC (Depository Trust & Clearing Corporation), which settles the bulk of securities trades in the US, does not endorse a T+0 model, but it has made compelling arguments for the market to shift to T+1. A handful of Asian regulators have also spoken about reducing the trade settlement cycle to T+1 but to limited avail. For instance, the Securities and Exchange Board of India (SEBI) floated the idea of shortening the settlement cycle to T+1 in 2013, but its proposals were met with fierce opposition from industry bodies which warned T+1 would pose operational difficulties for foreign portfolio investors.^[1]

However, industry attitudes are gradually shifting in favour of a shorter settlement cycle. “Shorter settlement cycles could help reduce counterparty risk, especially during market turbulence. It would also mitigate market risk, namely the threat of adverse market movements in the case of settlement delays,” commented Rajah THIYAGARAJAH (Rajah-T), Chairman of Hex Trust. In addition, shorter settlement cycles would provide benefit through operational efficiencies and lower clearing costs. These savings should not be underestimated. When the US migrated from T+3 to T+2 in 2017, the DTCC calculated market participants’ average daily capital requirements for clearing trades via the NSCC (National Securities Clearing Corporation) fell 25%, corresponding to USD1.3 billion in savings on margin requirements alone.^[2]

COVID-19 has further heightened calls for a shorter-settlement cycle. According to Rajah, during the volatility of March 2020, margin increased dramatically by more than 300% over historical averages, largely attributed to higher turnover. A shortened settlement cycle would significantly lower margin requirements. “The reduction of liquidity demands and lessening the amount of money that needs to be collected is a key benefit that will strengthen our financial markets, especially during critical market events that result in significant market volatility,” according to the DTCC paper.^[3] Others concur. “Shorter settlement cycles would enable participants to net significant collateral cost savings. Settlement efficiencies would also help generate further liquidity and increase overall trading volumes,” added Rajah.

T+2模式有待改進

買賣任何一方在交易後兩天內有可能不履行交易義務，構成了重大風險，尤其最近市場波動，風險尤大。一些金融服務業界人士建議把結算期縮短至即日交收，亦即T+0。處理美國大部分證券交易結算工作的存管信託公司（DTCC）並不贊同T+0模式，但提出有力的理據，主張市場向T+1模式進發。一些亞洲監管機構也提出把交易結算期縮減至T+1，但進展不大。例如印度證券交易委員會（SEBI）在2013年提出把結算期縮短至T+1，但遭業界組織強烈反對，指T+1對持有海外證券的投資者構成運作上的困難。^[1]

然而，業界正逐漸傾向接受較短的結算期。Hex Trust主席Rajah THIYAGARAJAH (Rajah-T)稱：「較短的結算期有助降低交易對手風險，在市場波動的情況下更見可取。縮短結算期也可減輕市場風險，亦即交收延誤期間市況逆轉的風險。」此外，較短的結算期也可提升營運效率，降低結算成本，這些節省的成本不容低估。美國在2017年由T+3轉變至T+2，據DTCC的計算，市場參與者透過全國證券結算公司（NSCC）作交收所需的平均每天資本要求下降了25%，折合現金計算，僅保證金借貸的需要便節省了13億美元。^[2]

新冠肺炎疫情也加強了縮短結算期的迫切性。Rajah指出，在2020年3月市況波動的時候，保證金借貸額較歷史平均激增超過300%，主要由成交額增加所致。縮短結算期，可大幅減少保證金借貸的需要。根據DTCC文件，「對流動性的需求下降，減少須收取的金額，是一大好處，可使金融市場更穩健；尤其是有重大市場事件，導致市場大幅波動時，降低流動性的好處特別明顯。」^[3]，其他人士也有類似的看法。Rajah補充：「縮短結算期，可讓交易參與者節省大量抵押成本。提高結算效率也有助增加流動性，提升整體交易量。」

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Hong Kong has an excellent track record of innovation and its regulators are pursuing a policy focused on digitisation.”

Achieving the ultimate panacea of T+0

Some go further and argue that the market should embrace T+0 or instantaneous settlement. It is possible to settle trades on T+0 using today’s technology infrastructure and, in theory, T+0 makes perfect sense for market participants as instant settlements should hypothetically reduce their counterparty risks and costs. Even though T+0 is technically feasible today, however, it would create a number of operational challenges, not least because it requires market users to pre-fund their transactions – which can actually lead to increased counterparty risk.

Mainland China practices T+0 for securities settlement, with cash funding required on T+1 at the latest and with a lien put on the securities while waiting for the cash funding. Around 95% of A-shares turnover is settled on T+0, with the remainder settled on T+1. This worked well while the market was largely domestic and retail driven, but as mainland China increasingly opens to overseas investment it creates funding issues for international investors, especially those in different time zones. So far foreign investors have needed to adapt to the A-shares’ prevailing practice rather than the market accommodating foreign investors’ needs. Saudi Arabia, on the other hand, moved from T+0 to T+2 in 2017 as part of market liberalisation to attract greater foreign investment. Despite the difficulties, some aspects of mainland China’s A-shares market could be useful for other markets to learn from or at least reference when looking at options for shorter settlement cycles.

追求最終目標T+0

有些人更進一步提出，市場應追求T+0，也就是即時結算。利用今天的技術設施，有可能做到T+0，而理論上，即時結算應可降低交易對手風險及成本，對市場參與者而言，實行T+0很有道理。然而，即使今天T+0在技術上可行，在運作上將面對一些考驗，包括市場使用者須為交易事先付款，這可能增加交易對手風險。

內地證券結算實行T+0，現金最遲須在T+1支付，未付款前以證券作為抵押。A股交易當中，約95%以T+0模式結算，其餘為T+1。在以本地交易為主，由零售客戶帶動的市場下，T+0運作順利。但隨着內地逐漸開放予海外投資，T+0的要求便為國際投資者（特別是身處不同時區的投資者）帶來融資問題。至今為止，外國投資者均須適應A股市場的一貫做法，市場並無遷就外國投資者的需要。另一方面，沙特阿拉伯在2017年由T+0更改為T+2，作為開放市場措施的一部分，以吸引更多海外投資。儘管實行上有困難，內地A股市場某些方面的經驗十分有用，讓其他市場在考慮縮短結算期的做法時可仿效，或起碼作為參考。

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香港的創新紀錄優良，監管當局的政策以數碼化為重點。”



Logistically, adopting T+0 would be quite difficult because of the existence of multiple intermediaries in the transaction chain and the sequential nature of securities processing. “There are a huge number of intermediaries involved in the settlement process including asset managers, international brokers, local brokers, global custodians, local sub-custodians and CSDs. Instructions need to pass through this chain in a sequential manner, with queries and answers often requiring numerous to-and-fro communications across multiple time-zones,” said Colin BROOKS, Chairman of the Advisory Board at Hex Trust. Ongoing reliance on legacy IT infrastructure, requiring off-line batch runs, is also a barrier for T+0 adoption. “Often, overseas investors are not allowed to have connectivity with local CSDs. A move to T+0 would also require intermediaries in the settlement chain to have 24-hour capacity, which most do not possess,” said Rajah. The costs of investing into new technology to make T+0 possible under current market shortcomings would be prohibitively expensive, especially given the revenue constraints facing the industry today.

However, the industry continues to make efforts to shorten the settlement cycle. The DTCC has been implementing operational improvements to optimise its existing framework to further accelerate settlement times, arguing that a transition to T+1 is eventually inevitable. The DTCC added it had reengineered its night cycle process, producing greater operational and capital efficiencies, improved intraday settlement finality and facilitated major savings in the form of lower transaction costs.^[4] In mid-2020, the DTCC announced its Project ION initiative, which is examining whether disruptive technologies such as DLT and digital assets can be leveraged to accelerate trade settlement.

Recently, the broker-dealer business of Credit Suisse and Nomura-owned broker Instinet settled US-listed equities trades on a same day settlement cycle using Paxos, a blockchain-based settlement platform.^[5] According to reports, the trades were executed at 11:00am EST and 3:00pm EST on 4 March this year and both settled the same-day at 4:30pm EST, thereby achieving T+0 settlement. This was part of a limited trial being conducted by Paxos with “no action” approval from the US SEC.^[6]

Although large swathes of the financial services industry are not entirely convinced by the merits of moving to T+0 right now, these new technologies could certainly make it a reality within the next few years.

在運作安排上，由於交易鏈上有多個中介人，加上證券交易程序須順序進行，採用T+0相當困難。Hex Trust顧問委員會成員Colin BROOKS表示：「結算過程牽涉大量中介人，包括資產管理人、國際經紀、本地經紀、環球保管人、本地次保管人、中央證券寄存處等。交易指示須順序經過這交易鏈，其間如須澄清細節，處於不同時區的多個中介人往往須來回溝通。」舊有的資訊科技基礎設施須作離線批量處理，因此繼續使用這些設施將對實現T+0構成障礙。Rajah稱：「海外投資者往往不得連接本地的中央證券寄存處。要實現T+0，結算鏈上的中介人便須24小時運作，而大部分中介人並沒有這樣的操作能力。」要補足目前市場的缺點以實現T+0，須對新科技作巨額投資，令人卻步；況且現時業界收入欠佳，更難以在這方面投入大量資金。

不過，業界仍然努力縮短結算期。DTCC一直改善運作，並完善現有制度，以進一步提升結算速度。DTCC認為最終無可避免須實現T+1，亦已重組晚間運作程序，以提升運作效率和資本效益；並且已改善即日交收的終局性，降低交易成本，從而達到大規模節約的效果。^[4] 2020年中，DTCC公佈展開ION項目，研究可否利用DLT、數碼資產等顛覆性科技，提升交易結算的速度。

最近，瑞信的經紀業務以及野村持有的經紀公司極訊(Instinet)，均使用以區塊鏈為基礎的結算平台Paxos，為美國上市證券的交易作同日結算。^[5] 據報道，交易在今年3月4日美國東部標準時間上午11:00及下午3:00進行，並同時在同日美國東部標準時間下午4:30結算，因而達致T+0結算。這是Paxos進行的限時試驗的一部分，獲美國證監會批准。^[6]

對於現在就實行T+0，金融服務業內不少人士仍然不盡認同，但上述新科技肯定可讓T+0在未來數年內成為現實。

“Recently, Hong Kong’s Financial Services and Treasury Bureau (FSTB) and the Securities and Futures Commission (SFC) confirmed they are developing regulations which could potentially usher in security token offerings as a lower cost alternative to traditional fundraising channels such as IPOs.”

Leveraging new technologies to reshape trade settlement

“Disruptive technologies like DLT and Blockchain will have a transformative impact on capital markets by supporting instantaneous securities settlement,” said Jehan CHU, Board Member of Hex Trust and founder of Kenetic Capital, a Hong Kong-based venture capital investment firm specialising in companies focused on DLT and digital assets. So how would this work in practice? As DLT is real-time in nature and facilitates trustless execution, it supports a process known as atomic settlement. By leveraging smart contracts, it is possible to synchronise the movement of cash with the movement of assets or cash in other systems instantaneously. Atomic settlement “means that the transfer of two assets is linked in such a way as to ensure that the transfer of one asset occurs if and only if the transfer of the other asset also occurs – that is, settlement is conditional. So the outcome of a settlement is either both parties successfully exchanging those assets or no transfer taking place,” said a Bank of England paper.^[7] In other words, atomic settlement would make it possible for traders to settle on T+0.

While smart contracts and atomic settlements can be implemented fairly easily in closed and trusted environments, the disruptive potential of blockchain will enable the same to happen in open and trustless environments. An open and trustless environment is one where anybody can become a participant and participants do not need to know or trust each other or trust a third party for the system to function.

利用新科技改變交易結算模式

Hex Trust董事會成員兼Kenetic Capital創辦人Jehan CHU表示：「DLT、區塊鏈等顛覆性科技，可支援證券交易的即時結算，將為資本市場帶來重大變化。」Kenetic Capital是香港的風險投資公司，專門投資於DLT及數碼資產等業務。這些科技實際上如何改變交易結算程序？DLT有即時處理功能，有助在無需參與各方信任的情況下處理交易，可支援原子結算程序。利用智能合約，現金流動便可與資產流動或其他系統中的現金流動同步進行。根據英倫銀行的一份文件，原子結算是指「把兩項資產的轉移連結起來，確保只有在另一資產同時轉移的情況下，資產才可轉移；也就是說，結算是有條件的。結算的結果只有兩種：雙方成功交換資產，或沒有任何資產轉移。」^[7] 換句話說，原子結算使T+0結算成為可能。

在封閉和可靠的環境中，智能合約和原子結算可相當輕易地實行；區塊鏈的顛覆性技術，則可讓智能合約和原子結算在開放和無需信任的環境中實行。開放和無需信任的環境，指的是任何人都可以參與的系統，參與者不必互相認識或信任，不必信任第三者，系統都能運作。結果是，在無需信任的環境中，沒有任何一方有權操控系統，信任分佈在參與者之間，造成的經濟系統可鼓勵某些行為。區塊鏈帶來的革命性改變，為全世界實現24/7、全球性、開放和可編程的結算層帶來可能。



As a consequence, in a trustless environment, there is no single entity that has authority over the system, and trust is distributed across the participants themselves, in a type of economic system that incentivises certain behaviours. The revolutionary potential of blockchain is to realise a 24/7, global, open, programmable settlement layer for the world.

“This settlement layer does not require participants to trust central authorities or other financial institutions, and enables participants to send and receive assets to anyone, anywhere, anytime,” said Alessio QUAGLINI, CEO at Hex Trust. “However, the decentralised and trustless nature of blockchain-based systems do not necessarily imply lack of control and oversight on the rules that govern the system itself. Decentralised systems can be designed at inception to comply with specific rules, as well as the governance processes that determine how the system is maintained and updated. Blockchain decentralisation should be regarded as a mechanism that allows a system to function by itself, whereby participants can govern its rules in line with deterministic and transparent processes stipulated a priori,” he continued. Different types of blockchain with different characteristics will be created to address specific use cases and applications, not only in financial markets. The power of blockchain will allow connection of heterogeneous blockchains and enable cross-chain interoperability, with the objective to extend this global settlement layer to include different systems and applications without the need of a centralised orchestration layer.

“T+0 can be achieved because DLT operates on a 24/7/365 basis. It would also remove a lot of the sequential processing in the settlement process as all parties to various transactions would work on the same version of the same record,” said BROOKS. By creating an environment supporting instant DVP (delivery versus payment), market infrastructures such as CSDs and CCPs (central counterparty clearing houses) would need to transform their business models or risk disintermediation. Others argue instant settlement is only just the beginning. “The power of DLT is revolutionary. If a common DLT with standardised rules can be established, it might not just be a case of settling my USD cash against Tesla securities, but I could even pay for my apartment rent denominated in USD with Tesla shares,” explained QUAGLINI. Of course, this scenario would also require QUAGLINI's landlord being willing to accept Tesla shares in lieu of USD cash, but it illustrates the many possibilities that could emerge from an inter-connected DLT environment.

Hex Trust行政總裁Alessio QUAGLINI表示：「這結算層不要求參與者信任中央機關或其他金融機構，讓參與者隨時隨地向任何人轉移資產，或收取任何人轉移的資產。不過，區塊鏈系統去中心化、無需信任的性質，並不意味着系統的規則不受控制或無人監管。去中心化的系統在設計階段可設定遵從特定的規則，並遵守維護和更新系統的管治程序。區塊鏈去中心化，應視作可容許系統自行運作，參與者則可按事先訂立的確定透明的程序，支配系統的規則。」因應不同情況，可設計不同種類、不同特色的區塊鏈作特定用途，應用範圍不限於金融市場。區塊鏈力量強大，可讓性質各異的區塊鏈彼此相連，交互操作，目的是讓這個全球結算層可容納不同的系統和應用程式，而不必設立中央編排層。

BROOKS表示：「DLT按24/7/365的基礎運作，因而可以實現T+0。由於參與交易的各方均按同一紀錄的同一版本處理，因此結算過程中的許多步驟也不必順序進行。」DLT創造了即時貨銀兩訖交收的環境，中央證券寄存處及中央對手方結算所等市場基建也須改變其營運模式，否則其中介地位便會降低。也有人認為即時結算只是個起點。QUAGLINI解釋：「DLT有着革命性的力量。假如建立了共用的DLT，按標準的規則運作，那麼其作用就不只限於以我的美元現金購買特斯拉股份的結算程序，我甚至可以用特斯拉股份支付以美元計算的房租。」當然，在這個例子裏，還得要QUAGLINI的房東願意接受特斯拉股份代替美元才行；但這個例子說明在彼此相連的DLT環境裏，有那麼多不同的可能性。

“最近，香港財經事務及庫務局以及證券及期貨事務監察委員會（證監會）證實正擬定規則，可能引入證券型代幣發行，以便在公開招股上市等傳統集資途徑以外，提供成本較低的集資方式。”

Exchange of assets in a Blockchain environment 在區塊鏈環境中交換資產



Exchange workflow 交換流程

- 1** X & Y agree to exchange digital assets and X及Y同意交換數碼資產及
- 2** X & Y transfer assets to Smart Contract (SC) X及Y把資產轉移至智能合約
- 3** SC matches both sides of trade 智能合約配對交易雙方
- 4** EITHER SC successfully executes and automatically 智能合約成功進行交易，在區塊鏈上自動交換資產
- 5** OR execution fails and SC automatically returns assets to original owners 交易不成功，智能合約自動把資產交還原擁有人

Pivot towards T+0

Digital assets are also likely to be instrumental in the pivot towards T+0. Digital assets mean different things to different people. For some, digital assets consist of unregulated cryptocurrencies such as Bitcoin, Ripple and Ethereum. To others, digital assets can be security tokens whereby a conventional asset (e.g. an equity) or illiquid asset (e.g. private equity, real estate) is tokenised to be traded whole or fractionalised making it more accessible to a broader group of investors, thereby generating greater liquidity. And finally, there are CBDCs (Central Bank Digital Currencies), which are digital assets issued by Central Banks whose value corresponds to an underlying fiat currency. All of these digital assets can be transacted on DLT.

It is CBDCs which market participants are becoming increasingly excited about, however some markets are at more advanced stages than others in terms of CBDC development. The People's Bank of China (PBOC) is widely considered to be at the forefront of CBDC innovation, having established a digital renminbi which is now in circulation. So how does this tie back to T+0 settlement? Accenture highlights that “if financial instruments were to be available in a tokenised format, CBDCs would allow an end-to-end settlement in tokens”.^[8] The roll-out of CBDCs could also have ramifications for cross-border transactions, especially if non-resident investors can hold CBDCs enabling

轉向T+0

在轉向T+0的過程中，數碼資產也可能發揮作用。對不同的人來說，數碼資產有不同的意思。有人認為數碼資產包括不受規管的加密貨幣，如比特幣、瑞波幣、以太幣等；也有人認為數碼資產可以是證券型代幣，以數碼形式代幣表達傳統資產（例如股份）或非流動資產（例如私人股權、房地產）的擁有權，以便買賣全部或部分資產，接觸更多投資者，從而增加流動性。最後還有央行數碼貨幣，這是由中央銀行發行的數碼資產，價值相當於相關的法幣。所有這些數碼資產，都可透過DLT買賣。

市場參與者都對央行數碼貨幣興趣日增，但在央行數碼貨幣的開發方面，有些市場比別的市場成熟。一般普遍認為中國人民銀行位於央行數碼貨幣發展的前列，目前已推出市面流通的數字人民幣。這與T+0結算制度有何關係？Accenture指出：「假如金融工具以代幣形式呈現，央行數碼貨幣便容許以代幣形式作點對點結算。」^[8] 推出央行數碼貨幣，對跨境交易也有影響；假如非居民投資者可持有央行數碼貨幣，以央行的金錢為國際貿易作結算，影響便更大。^[9] 要是這成為現實，跨境貿易中許多昂貴的中介程序便可消除，同時結算速度也可加快。

them to settle international trades using central bank money.^[9] Should this materialise, it would remove many of the costly intermediary processes synonymous with cross-border trading while simultaneously expediting settlement times.

Overcoming barriers

The ability to leverage DLT and digital assets when conducting trade settlements is not without its impediments. Firstly, there is limited – if any – regulation of DLT and digital assets across different markets, said CHU. However, a number of markets including the US, Singapore and Germany are slowly starting to introduce rules overseeing crypto-custody. The US OCC (Office of the Comptroller of the Currency) issued guidance in 2020 saying that OCC-regulated institutions could provide custody of digital assets. German regulator BAFIN has created a standard definition of what constitutes crypto-custody together with an application process for authorisation and anti-money laundering (AML) requirements. If and when more regulations are enacted, there will need to be a degree of harmonisation to allow for interoperability.

Similarly, industry-wide standards on digital assets and DLT are absent, although there is an abundance of different blockchain protocols being promoted. If the DLT infrastructure in different markets is to interoperate, then the industry will need to create standards to make it happen. A failure to develop standards risks the emergence of even more DLT protocols, which would simply exacerbate complexity in post-trade. "It is crucial that all market participants are involved in developing regulations and standards around tokenisation and DLT. A further obstacle to be overcome is the lack of widespread acceptability of smart contracts in the courts" commented JETTON. In the case of different blockchains being utilised across various markets, Fintechs such as crypto-custodians could sit in the middle and provide connectivity between different participants.

Other challenges need to be addressed if these technologies are to be incorporated into the securities settlement process. DLT capacity must be increased to provide adequate bandwidth in major markets. Also, there needs to be wider usage and acceptance of smart contracts across the financial services industry given they underpin the entire digital asset ecosystem together with the ownership transfer process. If the technology is to thrive, then providers – including Fintechs – must educate the wider industry about the virtues of DLT and digital assets. "Broader acceptance of DLT as a concept is key as this will provide confidence in its use in mainstream securities markets," added Rajah. "Most significantly, there

克服障礙

在交易結算過程中利用DLT及數碼資產的能力，也有其障礙。CHU指出，不同市場對DLT和數碼資產的規管不一，有些市場甚至沒有規管。不過，美國、新加坡和德國等市場已逐漸開始頒佈規則，規管加密貨幣保管業務。美國貨幣監理署 (OCC) 在2020年發出指引，說明由OCC監管的機構可提供數碼資產保管服務。德國監管機構BAFIN為加密貨幣保管業務提供標準定義，頒佈申請核准的程序，並訂立反洗黑錢規定。日後有更多相關法規時，便須彼此配合，以方便交互操作。

同樣，儘管開發商各自推廣大量不同的區塊鏈協議，關於數碼資產和DLT，業界並無統一標準。假如不同市場的DLT基建須交互操作，業界便須統一標準，使DLT可以互通，否則便可能有更多不同的DLT協議，令交易結算工作更添繁複。JETTON指出：「所有市場參與者必須共同訂立有關代幣及DLT的規則及標準，這是至關重要的。另一個需要克服的障礙，是法院普遍不接納智能合約。」至於不同市場各自採用不同區塊鏈的情況，則可使用加密保管人等金融科技作為中介，連接不同的參與者。

要在證券交易結算的過程中採用這些科技，還須應付其他挑戰。DLT的能力必須提升，以便在主要市場提供足夠的頻寬。此外，智能合約是整個數碼資產生態系統和擁有權轉移過程的基礎，因此金融服務業界必須更廣泛採用和接納智能合約。假如相關科技變得流行，服務提供者 (包括金融科技提供者) 便須教育整個行業，說明DLT和數碼資產的好處。Rajah又稱：「業界廣泛接受DLT概念十分重要，這可讓人有信心在主流證券市場使用DLT。」CHU補充：「最重要的是，要改變結算模式，數碼資產市場便必須有更大流動性。要有足夠的優質數碼資產注入整個生態系統，這是一大挑戰。」

香港領導潮流

香港的創新紀錄優良，監管當局的政策以數碼化為重點。最近，香港財經事務及庫務局以及證券及期貨事務監察委員會 (證監會) 證實正擬定規則，可能引入證券型代幣發行，以便在公開招股上市等傳統集資途徑以外，提供成本較低的集資方式。^[10] CHU表示：「香港是亞太區科技市場領導者，積極邁向數碼化。證監會等監管機構均主動與市場參與者合作，促進DLT等新科技的發展。香港的基建穩固，服務提

has to be greater liquidity in the digital asset market if settlements are to be transformed. The big challenge is having enough high-quality digital assets to feed the entire ecosystem," added CHU.

Hong Kong as a leader

Hong Kong has an excellent track record of innovation and its regulators are pursuing a policy focused on digitisation. Recently, Hong Kong's Financial Services and Treasury Bureau (FSTB) and the Securities and Futures Commission (SFC) confirmed they are developing regulations which could potentially usher in security token offerings as a lower cost alternative to traditional fundraising channels such as IPOs.^[10] "Hong Kong is a technology market leader in APAC which is actively embracing digital adoption. Elsewhere, the regulators – including the SFC – have been hugely proactive in engaging with market participants on new technologies like DLT. With its incredible infrastructure and deep pool of service providers and talent, Hong Kong is well positioned to become a leader in digital assets and DLT," said CHU. With Hong Kong's technology credentials firmly cemented, the jurisdiction is a strong candidate to drive the integration of DLT and digital assets into the securities settlement process.

If Hong Kong shows continued determination to bring together the various relevant parties such as issuers, regulators, securities industry and digital practitioners to facilitate the use of digital assets with sensible regulatory safeguards, it has a real opportunity to become a digital trailblazer. Not only would this benefit the domestic Hong Kong market, but it could also potentially gain traction in the Greater Bay Area (GBA) within southern China. If a T+0 settlement model is one day achieved as a result of this innovation, then the cost, risk management and liquidity advantages will be immense. **BT**

供者和人才充足，有充分條件成為數碼資產和DLT的領導者。」香港的科技資歷深厚，實力強勁，足以推動在證券交易結算過程中結合DLT和數碼資產。

假如香港繼續決意集合發行人、監管機構、證券業界和數碼科技行業等各方的力量，提供合理的法規保障，促進數碼資產的使用，便有很大機會成為數碼開路先鋒。這不僅為香港本地市場帶來裨益，更可能在華南大灣區受到歡迎。這項創新假如最終能實現T+0結算模式，將在成本、風險管理和流動性方面帶來龐大的好處。 **BT**

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