Digital asset exchanges

Will tokenisation be the nemesis of exchanges or the re-making of them?

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On 13 March 2025 Future of Finance hosted a one-day event at the offices of Reed Smith in London. Entitled Digital asset exchanges: *Will tokenisation be the nemesis of exchanges or the re-making of them?*, the event attracted more than 200 registrants from stock exchanges, trading venues, digital asset exchanges, fund administrators, central securities depositories, central counterparty clearing houses, technology vendors, data vendors, consultants, custodians, asset managers, wealth managers, banks, brokers, insurers, payments service providers, law firms, venture capital funds, cryptocurrency firms, blockchain platforms and academia. This is an account of what they and the panellists contributed to the five sessions that day, both live and in the multiple-choice questionnaire they completed in advance, the results of which are also published here.

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Panel 1

Are tokenisers making a mistake in choosing to ignore the conventional public capital markets?

Panellists: Reyer Kooy, Global Head of Operations – Digital at Apex Group; Remo Glauser, Product Head in Tokenisation at Sygnum Bank; Prasanth Kalangi, Founder and CEO at Zoniqx; and Richard Shade, Chief Operating Officer at Archax.

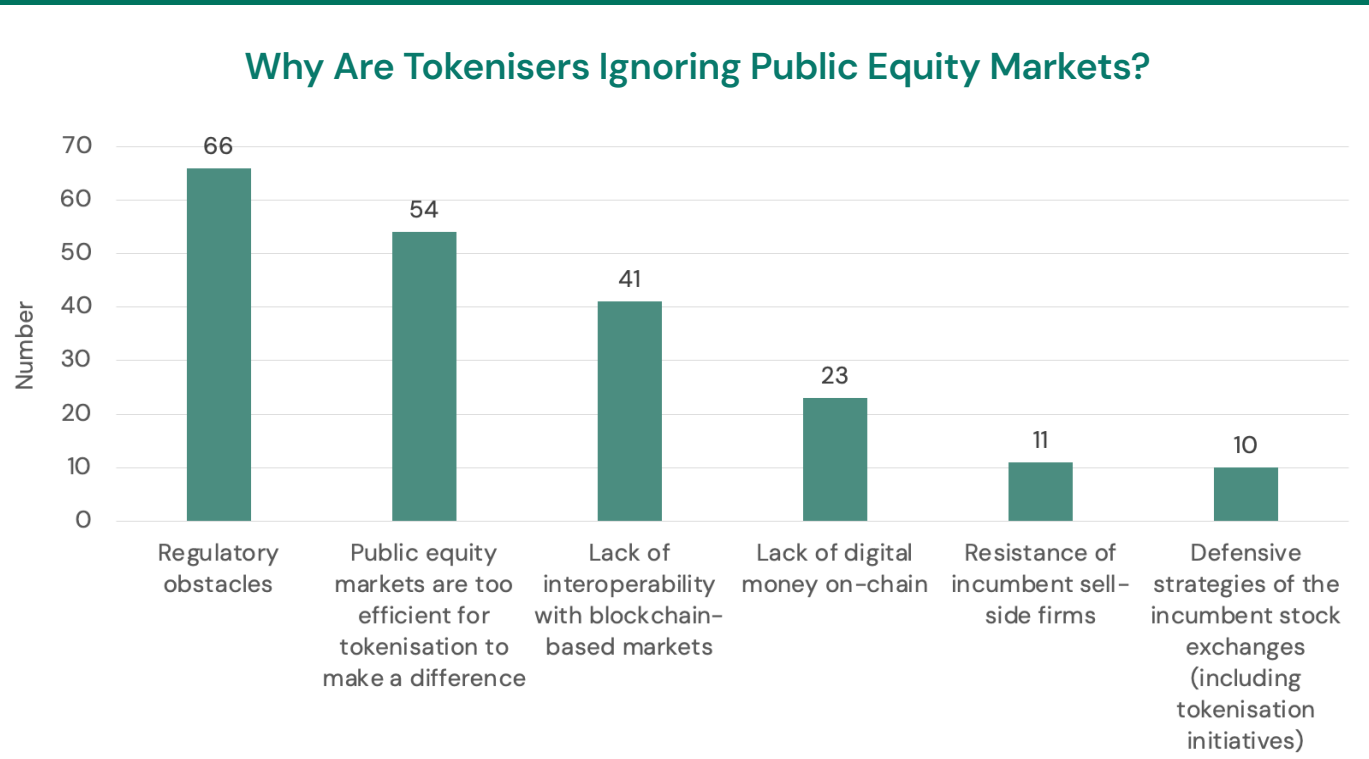
Are traditional exchanges doing nothing about tokenisation?

Anecdotal evidence suggests all major exchanges have large teams exploring digital assets, some of which have moved beyond Proofs of Concept (PoCs) and pilot tests and are now close to launching products, but little of their work has seeped into the public domain. This is less because of intellectual property considerations, or lack of buy-in by senior management, than the fact exchanges tend to be regulated and often listed entities and must be careful what they disclose to avoid any suggestion of market abuse. Certainly, it is hard to judge from public information how seriously exchanges are taking the tokenisation opportunity. A Future of Finance survey in June 2024 of information made public by 87 traditional stock exchanges found two out of three were apparently doing nothing at all about tokenisation. Of the third that were active, half were focused on cryptocurrencies only. A World Federation of Exchanges (WFE) paper, also published in June 2024, argued that blockchain-based tokenisation technologies lack the processing capacity to displace traditional exchanges; are bedevilled by inter-operability problems, even conflicts of interest; that atomic settlement procedures are antithetical to liquidity; and that blockchain technologies are too expensive to implement anyway. This encouraged the perception that traditional exchanges were content to adopt a wait-and-see policy on tokenisation.

What explains the apparent lack of investment by traditional exchanges in tokenisation?

Regulatory uncertainty, which was identified by the audience as a barrier (see Chart below), is an obstacle in Europe. Under the Central Securities Depositories Regulation (CSDR) of the European Union (EU), a security must be issued into a central securities depository (CSD). Which means an existing equity, for example, must be issued in traditional form into a CSD as well as in tokenised form on to a blockchain network. This undermines the economic rationale for tokenisation, which depends on assets being issued on to blockchain networks in native form only. Once the regulatory uncertainty is cleared, and native digital assets become possible, traditional exchanges can be expected to embrace tokenisation. This is happening already. Exchanges that are taking part in the DLT Pilot Regime, the regulatory sandbox launched within the EU on 23 March 2023 and overseen by the European Securities and Markets Authority (ESMA), offers participants multiple exemptions from the provisions of the CSDR.

What the Audience Said



Is the indifference of traditional exchanges towards tokenisation a failure of imagination?

By seeing regulatory uncertainty as a constraint, traditional exchanges are calling in effect for a replication of the existing system. They struggle to envisage a capital market without the conventional infrastructure of CSDs and central counterparty clearing houses (CCPs), the surrounding carapace of regulatory permissions and the prevailing fiat currency division of cash between central bank money and commercial bank money. By their implicit acceptance that tokenisation must accommodate itself to the status quo and by expecting the tokenised future to imitate rather than transform the current system, incumbent exchanges hobble their ability to formulate strategies for a tokenised future.

Have traditional exchanges failed to identify a tokenisation model that is commercially viable?

Certainly, the systems and infrastructural investment required to move the high volumes of equity issuance and trading in the developed markets on to blockchain networks is immense. Nor is the technology enough. Exchanges face the further burden of investing to generate liquidity. In the United States, for example, where tokenisations have taken advantage of Rule 504 of Regulation D (Reg D) of the Securities and Exchange Commission (SEC) – which allows companies to raise up to US$10 million in securities within a 12-month period without full registration of the offering with the SEC – liquidity is intrinsically hard to generate, because investors are subject to a 12-month holding period before they can resell the tokenised securities. Furthermore, the benefits within reach, such as round-the-clock trading, real-time atomic settlement, operational cost savings

and more efficient asset servicing, do not yet promise a sufficient return to warrant making the investment. Indeed, real-time settlement risks inflating costs if it reduces the scope for netting transactions and increases the number of transactions that settle cash and assets gross. The end-state, of peer-to-peer trading between issuers and investors without intermediation, is too remote to influence the behaviour of exchanges now.

Are the traditional capital markets too efficient?

The public bond and equity markets function well. New issuers and issues are accommodated efficiently. The markets are large, the securities are accessible and transferable, transactions are agreed in microseconds and settlement is secure. But the main reason traditional markets appear relatively efficient is that token markets are struggling to prove they can deliver meaningful value. Token markets are plagued by unpredictable costs such as surges in gas fees; asset servicing deductions charged by smart contracts; frequent Layer One blockchain downtimes; the need to purchase from vendors the services that facilitate interaction with multiple blockchain protocols; and a lack of standardisation across token specifications, data "oracles" and digital asset exchanges as well as the underlying blockchain protocols. Institutional experiments with blockchain are conducted largely on permissioned networks without disintermediation, when capturing the benefits depends almost entirely on peer-to-peer transfers on public networks. Firms that aspire to service tokenised markets as brokers, market makers and custodians also incur considerable costs clearing regulatory hurdles to secure a licence to operate as a "virtual asset service provider" (VASP), even if they are already meeting the same or sterner tests in another part of their business. So it is a challenge for tokenisation, in its current state of development, to bring measurable benefits to the public markets. This, rather than the intrinsic efficiency of public markets, is why tokenisation pioneers are focused on the alternative funds markets and the markets in privately managed assets, where the assets are demonstrably harder to access, trade and transfer with current systems and infrastructure.

Is tokenisation technology too expensive for exchanges and their users to deploy?

Tokens traded on blockchain networks face several technological obstacles. They cannot match the transaction speeds achieved by traditional exchange technologies. Interoperability between blockchain networks, and between blockchain networks and traditional markets, is limited. Cost savings over current methods have proved elusive. At present, the blockchain infrastructure cannot compete with the traditional securities market infrastructure. But blockchain technology is closing the gap with traditional markets, so the technological barriers to adoption are being cleared.

Is the lack of fiat currency on-chain a barrier to engagement for traditional exchanges?

It is, in the sense that their users are fiat currency based. However, institutional quality Stablecoins are now available from payments service providers such as PayPal and Stripe as well as Paxos, so the problem is being solved. As on-chain forms of cash gain acceptance, operating a traditional stock exchange that settles transactions off-chain through the conventional banking system will become an increasingly irksome and costly point of friction for users. User preference for digital forms of cash could prove to be the instrument that drives adoption of tokenisation by traditional exchanges.

Are issuers letting exchanges off lightly on tokenisation?

In theory, tokenisation enables issuers to reach new investors, especially across national borders. So far this has appealed mainly in privately managed and specialist areas, such as tokenisation of real estate (where developers seek liquidity by selling to retail investors) or reinsurance contracts (where insurers as issuers are eager to reach international investors). Transaction volumes in these issues are low, even when technology vendors add interoperability for assets listed on multiple exchanges. In Germany, corporate issuers such as KfW (which issued in December 2022, July 2024, October 2024 and January 2025) and Siemens (which issued in February 2023 and September 2024) have issued bond tokens on to public blockchains under the German Electronic Securities Act (*Gesetz über elektronische Wertpapiere*, or eWpG). But equity tokens remain the preserve of smaller companies prepared to experiment with novel security token platforms, usually as an alternative to crowd-funding. Large corporations, by contrast, continue to believe that they can maximise distribution by listing conventional securities on large traditional exchanges. They are concerned that digital asset exchanges will fragment liquidity in their securities, causing them to be mispriced, and so potentially raising their cost of capital. And traditional exchanges have no incentive to encourage them to behave differently, since they earn handsome listing fees from large corporations. Digital twin tokenisations of the kind launched so far – in which the security continues to exist in analogue form, and investors are free to choose between the digital and the analogue versions – have done little to change issuer attitudes. Experience with "wrapped" equities traded on blockchains also shows liquidity remains with traditional exchanges and multi-lateral trading platforms (MTFs).

Are exchanges failing to engage with end-investors such as sovereign wealth funds, pension funds and insurers?

Institutional end-investors are cautious about investing in digital assets because law and regulation is not yet settled. They do not trust smart contracts to pay their entitlements. They are not convinced digital asset custodians will make them whole if their assets are stolen or lost. This is partly because independent, bank-owned custodians are still a rarity, and partly because the right combinations of regulated exchanges (to buy and sell the tokens) and regulated custodians (to safekeep the tokens) are hard to achieve in such a fragmented marketplace. In the United Kingdom, pension funds also incur additional consultancy fees if they invest in any asset class that is not listed on a public exchange, which inevitably makes them less adventurous. This disincentive will persist until tokenised assets are recognised by law and regulation as an acceptable asset class for pension funds to invest in without taking advice. In the meantime, one catalyst that exchanges could use to encourage engagement by

end-investors is cash. Tokenisation offers end-investors convenient access to higher-yield alternatives to bank deposits as a way of holding cash or cash collateral margin payments. Tokenised money market instruments or money market funds are alternatives available already. Tokenisation can also help end-investors lend tokenised cash or money market instruments in the securities financing markets to generate additional revenue. If tokenisation means they collect a yield pick-up, or work existing assets harder, end-investors will engage with tokens. There is still a need for education too, because even some otherwise sophisticated end-investors still struggle to distinguish between cryptocurrencies and security tokens. Likewise, insurance-linked contracts, despite their long track record, lack of correlation with other asset classes and enthusiastic recommendation by the legendary Warren Buffett, remain obscure to most institutional investors in their conventional form, let alone in tokenised form.

What other potential client groups might be interested in working with exchanges on tokenisation?

Stablecoin issuers investing their reserves in tokenised money market funds are one target. Corporate treasurers using Stablecoins to hold cash and make payments are another. Decentralised Finance (DeFi) applications (dApps) that offer users lending and borrowing or asset management services could also play a role in attracting institutional money to the token markets. Aave Labs, for example, has launched an initiative called Horizon, which aims to encourage institutions to trade tokenised real-world assets by giving them easier access to Stablecoins to use as cash on-line, secured by tokenised money market fund shares posted to Aave as collateral.

Panel 2

Are tokenisers currently focused on alternative assets for want of something better?

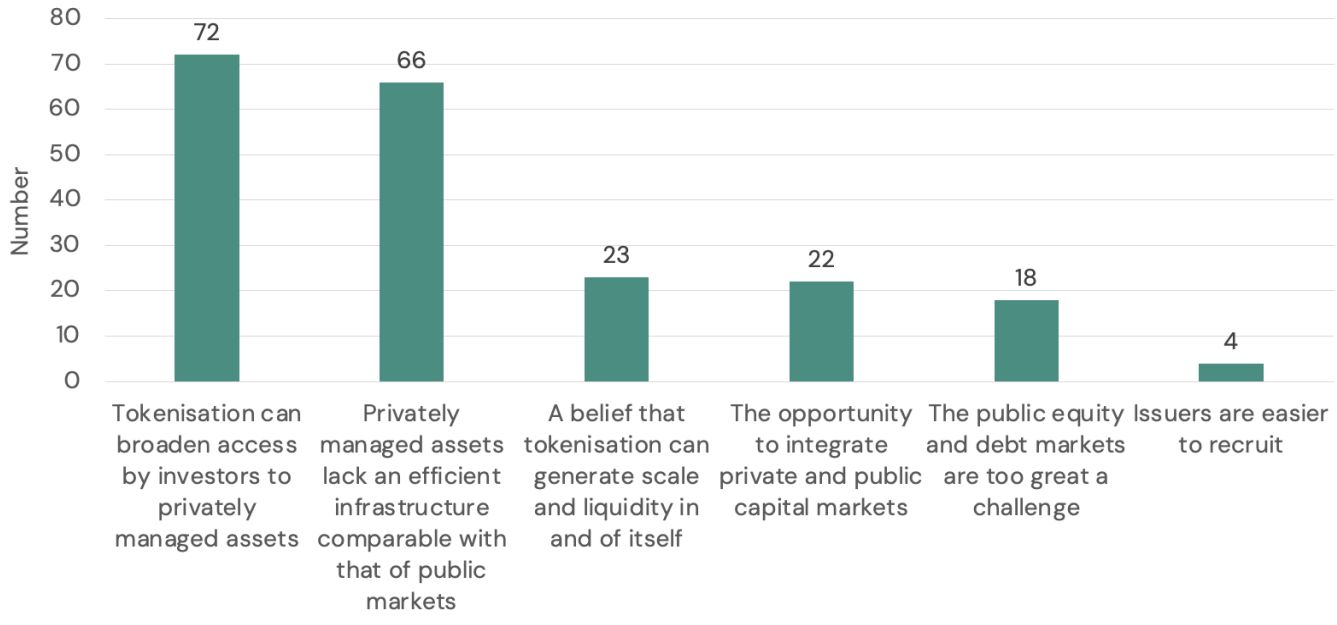
Panellists: Hirander Misra, Chairman and CEO of GMEX Group; Marcus van Abbé, Head of Digital Market Infrastructures at r3; Rita Martins, Head of Product Ecosystem, Digital Assets, at the London Stock Exchange Group (LSEG); Dr Robert Barnes, co-CEO at BPX Digital Securities Exchange; and Thomas Labenbacher, CEO and Founder of Assetera.

Are tokenisers focusing on privately managed assets because they are the easy option?

This was not the view of the audience. Only minorities thought that tokenising privately managed assets is an easier option than attacking the public markets, and hardly anybody thought issuers are more readily found there (see Chart below). Broader distribution of privately managed asset classes, making privately managed assets more tradeable, and building an infrastructure to support them, are the priorities identified by the audience. In other words, tokenisers believe privately managed assets have problems which tokenisation can solve. Their goal is to raise privately managed asset markets to the same levels of accessibility and efficiency as the public markets. Contrary to the implication of the question, this will be far from easy. Both general partners (GPs) and limited partners (LPs) in private equity investing, for example, retain legacy systems, workflows and processes. They will not want to invest in connecting to blockchain networks.

What the Audience Said

Why Are Tokenisers Concentrating on Privately Managed Assets?



Are tokenised privately managed assets a growth opportunity for traditional exchanges?

There are obstacles to rapid scaling of the marketplace. Investors are reluctant to engage with privately managed assets until they achieve a certain scale. On the issuance side, private companies considering an equity or debt issue on to a blockchain often lack the necessities to issue a security token, such as a legal structure or an awareness of regulatory requirements. Which means they must be hand-held throughout the process by tokenisation platforms and independent consultants, lawyers and advisers. Private issuers can also have unrealistic expectations about what is achievable in terms of price and structure and are surprised when platforms do not invest heavily in marketing their tokens to investors. Yet such issuers are also averse to high issuance costs. US$20,000 would be at the upper end of what they pay to issue a security token, which means the advice is not always economic to provide.

Will tokenisation erode the liquidity premium that makes privately managed assets attractive to investors?

In principle, tokenisation will bring product standardisation and price transparency and discovery to privately managed asset markets, creating expectations of increasing the liquidity of the assets as well as broadening their distribution. Already, intermediaries are pressing for full disclosure of information about tokenised private equity funds distributed via private blockchain networks, largely to ensure that valuations and prices remain honest. On public blockchains, such disclosure would be unavoidable, and the application of Artificial Intelligence (AI) to fragmented and unstructured data in capital markets is likely to accelerate increased transparency of information, with consequent effects on price discovery. So it would be surprising if tokenisation did not reduce the extra return investors receive for holding an asset that is less liquid. Eventually, institutional limited partners (LPs) will have to choose whether they prefer a closed market in privately managed assets or an open one.

Can tokenisation make privately managed assets more liquid?

Increased liquidity – the ability to turn an asset into cash – is part of the purpose of tokenising privately managed assets. But offering investors in, say, a private equity fund, the option to exit three times a year instead of once or not at all, does not meet the proper definition of liquidity. In the case of digital twin tokens, liquidity is affected by the underlying asset. Real estate, for example, is intrinsically illiquid; it can take months or even years to sell a building for cash. A private equity listed on a digital asset exchange but held by a small number of investors, even in digitally "native" form, will not necessarily be liquid.

Are the tokenised privately managed assets markets over-serviced?

The privately managed assets opportunity has certainly attracted a lot of capital and contenders offering infrastructural and other services to issuers and investors. Paradoxically, this has created an obstacle to growth: tokenomics. Building an infrastructure to accommodate the trading, clearing, settlement and custody of tokenised privately managed assets is easy. Creating the network that brings the marketplace to life is hard. In principle, it is worth doing. Metcalfe's Law – which holds that, while the cost of a network increases linearly in line with the number of users, its value grows by the square of the number of users – implies successful networks will be extremely valuable. But the incentive to capture that value is high. This militates against accompanying calls for interoperability – let alone greater cooperation and collaboration - between the numerous sub-scale businesses that currently make up the digital asset universe. The tokenised privately managed asset markets would grow faster if the three main blockchain networks that host them – Ethereum, Provenance and r3 Corda - were inter-operable, and the various private networks were integrated with the public ones. Potential token issuers and investors are bewildered by the fragmentation of service provision in the tokenised asset markets. But commercial incentives argue against interoperability and consolidation. Product, service and technology silos are as commonplace in the digital asset markets as they are in the traditional securities markets. Indeed, the current dispensation is not unlike the electronic trading revolution of the early 21st century, when challenger equity trading platforms found the clearing houses controlled by the traditional stock exchanges were closed to them.

Is the process of silo-isation in token markets reversible?

The initial response of major financial institutions to the emergence of blockchain was to form a consortium. This would have built collaboration into the design of blockchain services from the outset. But it proved unsustainable because some members of the consortium wished to proceed faster than others, so progressive firms chose to work alone or with smaller groups of like-minded firms. However, now the pioneers have proved the technology works and found a series of worthwhile use-cases, there is something of a return to the original collaborative approach in the shape of open networks. In other words, tokenisation platforms are open to connecting with other platforms to create network effects. This creates a countervailing incentive to favour interoperability.

Can digital asset exchanges encourage interoperability?

Exchanges can build new infrastructure in collaboration with market participants. In this sense, they are "convenors" of markets. But they must also respond to what clients want, as opposed to leading clients in a particular direction.

Are legacy systems an obstacle to the growth of token markets?

Yes. However appealing the user experience, many banks are still running systems on IBM mainframes. Much of their code is written in COBOL. As digitised data has become available, Application Programming Interfaces (APIs) have become more important, not less. Legacy systems are still exchanging data point-to-point via traditional messaging standards such as SWIFT and FIX. Making these systems interoperable with blockchain is not impossible but it costs time and money. A longstanding preference at traditional financial institutions for proprietary systems has affected even the digital asset services they have developed. An intermediary firm that wanted to connect to all the major institutional-grade digital asset custodians, for example, found each was using a different blockchain technology and that some of the blockchains were private and others public. Making these systems interoperable is essential, but it adds cost and complexity.

What tokenised privately managed assets have proved to be liquid?

None so far, though voluntary carbon credit markets were expected to be liquid because of the anticipated popularity of the asset class. This proved not to be the case, even though voluntary carbon credits are well suited to blockchain technology in terms of data and trade capture. Indeed, they have traded at wide spreads. But creating a basket of high integrity carbon credits and calculating the net asset value (NAV) of the contents once a week has resulted in relatively stable pricing over time. This has attracted market-makers, allowing the basket of voluntary carbon credits to be broadened, and the NAV is now calculated on a daily basis.

Is carbon a growth market for tokenisation?

Tokenisation can contribute to building trust and confidence in both the voluntary carbon credit markets and the markets in Energy Attribute Certificates (EACs). In the EAC markets, tokenisation can digitise the issuance and trading processes. Carbon credits are well-suited to a hybrid of a traditional and a digital exchange that makes use of APIs to source data and blockchain technology to host trades, capture trade details and reassure investors about the provenance of carbon reduction projects. Verifiable data can help to counter the mismeasurement and misreporting issues that have undermined trust in the voluntary carbon credit markets. For example, Internet of Things (IoT) sensors were attached to a small-scale solar energy project, which provided sufficient reassurance for the associated solar credits to sell at a premium. But it was tokenisation that made it possible, by using a smart contract to reduce the costs of reporting the electricity output to holders of the credits.

Will tokenisation turn privately managed assets into public assets?

This is the wrong question. The right question to ask is whether the market in an asset or the participants in a market in the asset are or will be regulated once the asset is tokenised. If a tokenised asset is broked or invested in by a regulated intermediary, or must be valued by a regulated intermediary, regulators will insist on supervising activity in the market. That is a tighter definition of whether an asset is "public" than, say, being listed on a digital asset exchange open to everybody.

What can accelerate progress towards scalable token markets?

The shortening of the settlement timetable in the traditional securities markets from trade date plus one day (T+1) in the European Union and the United Kingdom in October 2027 provides an opportunity to embrace tokenisation as part of the solution. This will bring Europe into line with the T+1 timetable adopted in Canada and the United States in May 2024, easing transfers of capital between western Europe and North America. If this infrastructural integration is accompanied with efforts to harmonise the regulatory treatment of digital assets between Europe and North America, it will catalyse network effects. It will also facilitate the integration of tokenised asset markets with the traditional financial markets, by giving investors the choice of assuming the same exposure on different terms.

Where do we trade tomorrow? Exchanges, P2P, and the quest for a safe and fair digital assets market

Author: Waqar Chaudry, Head, Digital Assets, Financing and Securities Services, Standard Chartered

The world of digital assets feels like it is constantly pulling in two directions. On one side, we have established players, the centralised exchanges who we think of as the familiar gateways where people first dip their toes into crypto. They offer slick interfaces, deep pools of liquidity and often the crucial bridge back into fiat currencies. However, using them means handing over control, trusting them with your assets and data, operating within their operational controls, and of course, navigating an increasing web of regulations.

On the other side, we see the promise of decentralised exchanges and direct peer to peer trading. Here you hold your own keys, interact directly or via smart contracts, and enjoy greater privacy and freedom of trading counter parties. Transactions are often transparently recorded on the public blockchain. Yet, this part can be complex, with limited liquidity, and fraught with risks from smart contract bugs and scams to sophisticated manipulation tactics like frontrunning.

In the future, would one win over the other? The answer lies in the regulation and regulatory approach.

Regulators, understandably, are trying to get a handle on this rapidly changing space. Their role is clear; protect investors, ensure markets are fair and transparent, maintain financial stability and curb illicit activities.

So, can exchanges in their current form continue to operate as they are in a fully digital future or is there a middle ground? Can exchanges and decentralised platforms exist in harmony or do exchanges become defunct as more users get access to peer to peer (P2P) technology for asset transfers?

There are three key scenarios which can be quite simply assessed with a key metric that drives regulation of markets: The Fairness and Transparency Challenge.

Scenario 1: Peaceful but separate coexistence

It seems quite possible that we will see a future where regulated exchanges solidify their role as the go to venues for big institutions, complex financial products and essential links to the traditional banking systems. Much like today, they will offer compliance and deep liquidity. Meanwhile, P2P platforms and the broader world of decentralised finance thrive as a space for retail traders, those prioritising privacy, niche assets and cutting-edge technology such as experimenting with certain financial instruments.

The fairness and transparency challenge: Regulating the exchanges is straightforward using existing tool kits mandating disclosures, surveillance, best execution rules and asset safety with regulated custodians (typically banks). But ensuring fairness in a P2P and decentralised realm is a much harder task. The effort mostly relies on the design of protocols, user awareness, and indirect regulatory pressure like policing the on and off ramps. While P2P transactions are often visible on chain, this does not guarantee fair treatment to protect users from hidden risks or manipulation. We could end up with a two-tier system where regulatory oversight is significantly higher on the exchanges as compared to the P2P platforms.

Scenario 2: The decentralised dream or nightmare

Imagine a future where P2P protocols, especially sophisticated decentralised platforms, become the norm for digital asset trading. Centralised exchanges fade into the background, just acting as regulated gateways for getting traditional money in and out. Most financing activity i.e. lending and borrowing also therefore moves onto decentralised platforms and self-custody of assets becomes mainstream.

The fairness and transparency challenge: This scenario presents a significant problem for regulators aiming for fairness. How do you stop manipulation on infrastructure that is not centrally controlled and there is no central party to hold accountable? Enforcement would heavily depend on the robustness of the code, the effectiveness of the community governance, and advanced monitoring tools like blockchains analytics which have their own limitations in terms of accuracy and dealing with anonymity. While transparency remains high, the complexity could obscure risks, and tracing bad actors would remain extremely difficult. We might see the rise of regulation driven protocols - building compliance features simply because it becomes necessary to interact with the regulated world to gain institutional trust. But the fundamental ability of regulators to directly ensure fair play would be significantly diminished compared to an exchange centric world. Self-custody would become a major bottleneck and a security threat to asset holders, eliminating the protections offered by regulated bank custodians with capabilities that mitigate operational and cyber risks, and back the assets with significant balance sheet.

Scenario 3: Hybrid-bridge the gap

The most pragmatic future involves the rise of hybrid model platforms trying to blend the best of both worlds. For example, exchanges that use fast centralised systems for matching orders but settle trades transparently on chain. Alternatively, platforms where assets are kept with a regulated custodian to keep control of the keys but benefit from pooled liquidity and large-scale operational savings.

The fairness and transparency challenge: A hybrid set up offers regulatory anchor points. The centralised components could be subject to rules on fair execution or market manipulation. On-chain settlements add a layer of a verifiable transparency and a regulated custodian that is prudentially regulated provides asset protection and safe settlement. However, these models also create complexity. Where does responsibility lie if something goes wrong? How do you effectively monitor activity both on systems and changes? Regulators would need serious technical capability to understand and oversee these models effectively. Yet if done right, hybrid models could potentially offer a richer data set for ensuring market integrity than either pure opaque centralised exchanges or purely synonymous decentralised exchanges.

Which path will prevail?

The road forward likely involves elements of all the scenarios. It seems improbable that either centralised exchanges or P2P will completely vanquish the other.

Regulating centralised entities is a far more familiar territory, allowing for direct rules and enforcement. Trying to achieve the same level of guaranteed fairness in a decentralised P2P world requires a different, more indirect, and less certain approach.

It might be that we must accept different levels of regulatory assurance depending on where users choose to operate. The big questions remain., Will regulation find effective ways to oversee the decentralised world, or will the decentralised world itself evolve through hybrid models or embedded compliance to meet the markets need for trust and legitimacy? Does self-custody scale? Do banks approach custody differently to interact with un-hosted wallets? The answer to these questions will continue to evolve, but may be quite simple if one focuses on risk appetite for trust, accountability and asset safety.

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Panel 3

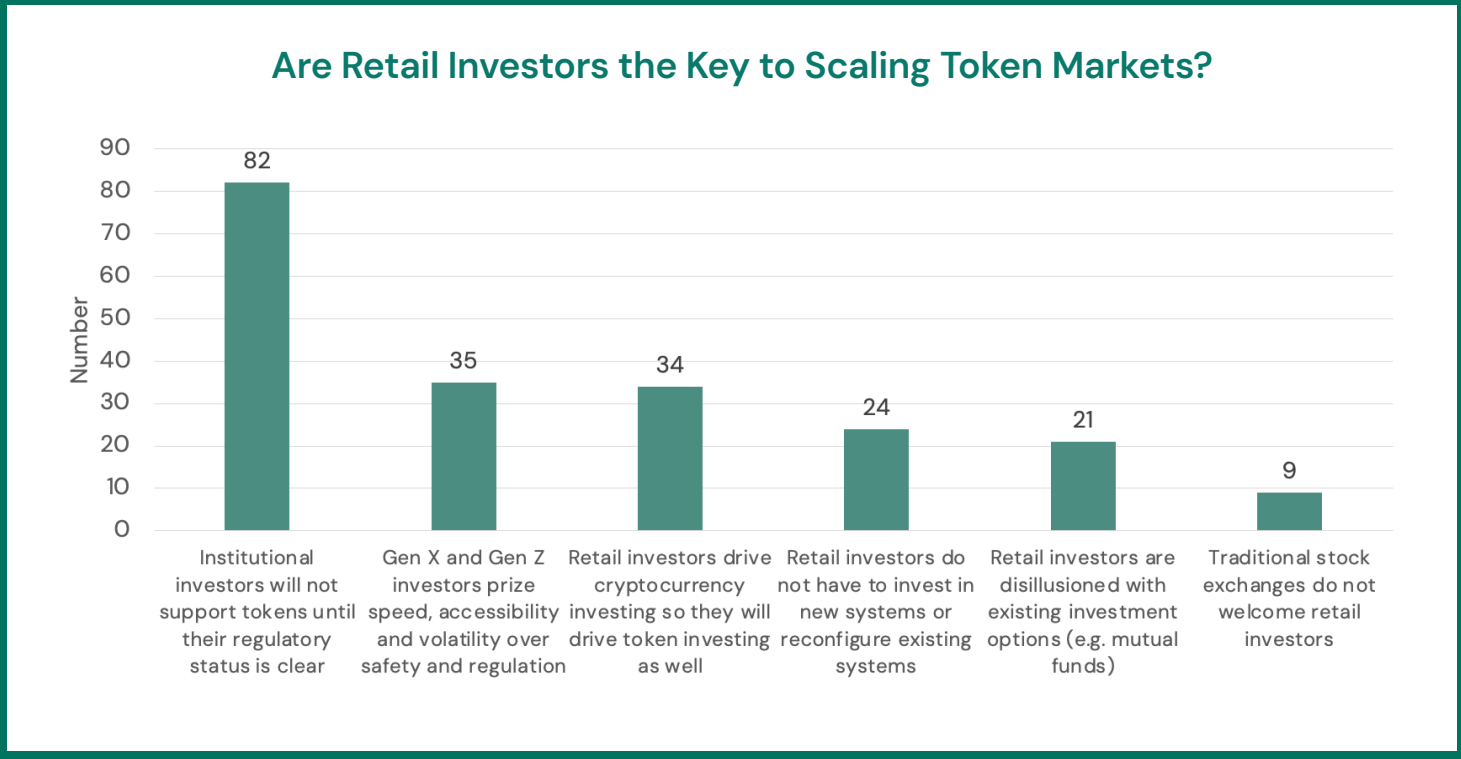
Are retail investors the key to digital assets trading taking off?

Panellists: Benjamin Dean, Director of Digital Assets Strategy at WisdomTree; Katie Richards, Head of New Markets and Product Development at Incore Bank; Murat Ögat, Co-founder and CEO at Aktionariat; and Pat LaVecchia, CEO and Founder of Oasis Pro.

Are institutional investors looking for a higher level of regulatory certainty before they invest in digital assets?

The audience certainly thought so (see Chart below). Institutional investors care primarily about their investments, the speed with which they can be executed, the transparency of information about them and how safely they are kept. So, for them, a sound regulatory environment is a requirement that must be met before they will invest.

What the Audience Said



Do institutional investors need to understand blockchain technology?

Institutional investors are not interested in the technology that supports their investments in traditional markets. They are not investing in tokens to use blockchain either. Tokenisation will have succeeded when institutional investors stop asking questions about blockchain technology and accept that it works, in the same way that they accept end-to-end encryption of WhatsApp messages works. Investors do not and should not care whether an asset is tokenised or not. They should judge tokenised assets by normal investment criteria such as risk appetite, multiples and yields.

Have institutional investors embraced cryptocurrencies?

In 2025 cryptocurrencies make up the same proportion of the investable asset universe (1.5 per cent) as they did in 2022, when the FTX cryptocurrency exchange failed, and the market capitalisation of the cryptocurrency market plunged. So the value of cryptocurrencies relative to conventional assets has remained steady through severe market fluctuations. It follows that any institutional investor wanting to maintain a market-neutral position ought therefore to allocate 1.5 per cent of their portfolio to cryptocurrencies. The decision by the Securities and Exchange Commission (SEC) in January 2024 to permit Exchange Traded Funds (ETFs) to invest in spot Bitcoin has furnished institutional investors with a safe, transparent, regulated physically backed vehicle to acquire the necessary cryptocurrency exposure. In 2024 spot Bitcoin ETFs attracted US$129 billion in inflow from institutional as well as retail interest, making them the best performing ETFs in terms of assets under management during the year.

Are digital assets following the same path of development as other novel asset classes in the past?

Digital assets are available now because the computing power that makes them possible is available now. This was the same factor that spurred the explosive growth of the OTC derivative markets across equity, credit, currencies, commodities and other asset classes from the 1980s onwards. In other words, digital assets are on an unstoppable path because they are an aspect of underlying technological progress.

What does the experience of cryptocurrency exchanges in selling wrapped versions of blue-chip stocks prove about retail appetite for tokenised securities?

Wrapped token versions of existing stocks were a development that built on wrapped cryptocurrency tokens. For example, tokenised versions of Gamestop, Google, Microsoft, NVIDIA and Tesla trade on INX. The option is valuable, in that tokenised versions of the securities allow round-the-clock trading in full compliance with securities laws. But transaction volumes do not match those on traditional exchanges, even though newly launched cryptocurrencies have attracted substantial retail interest and put large amounts of retail capital on-chain. Indeed, what will determine the success of tokenisation is its ability to make use of the retail capital now residing on-chain. That in turn depends on its integration with Decentralised Finance (DeFi) applications, which would enable holders to profit from lending or investing in on-chain assets, or from leveraging positions by borrowing against them as collateral, without the help of intermediaries. This is as true of tokenised blue-chip stocks as it is of cryptocurrencies. Such integration is not theoretical or futuristic. Cryptocurrency and token exchanges and trading platforms incorporate un-intermediated collateralised lending and borrowing functionalities for retail investors already. They include self-operating margin calls operated by smart contracts. The same smart contracts also sell inadequately collateralised positions automatically. These tools are expected to be available to institutional as well as retail investors within five to ten years.

Have traditional exchanges focused on institutional business at the expense of retail business?

Even in the traditional securities markets, established exchanges have ceded retail relationships to alternative platforms and retail brokerage firms such as Charles Schwab, Fidelity and Robinhood because the alternatives offer margin lending and access to listed securities in exchange for minimal transaction fees. The success of firms such as eToro in the cryptocurrency markets suggests the pattern is repeating itself there. For traditional exchanges, this indifference to retail investors is short-sighted, for several reasons. First, the technology underpinning retail investment is changing fundamentally, from broker-intermediated transactions on domestic exchanges within fixed trading hours to settlement timetables measured in days, to instant-settlement, peer-to-peer trading apps based on open-source software and distributed databases accessible round-

the-clock by anyone with a smartphone. Secondly, it is retail investors, not their institutional counterparts, that pioneered the cryptocurrency markets – in large part because the gains, unlike conventional securities, were not taxed - and will likely do the same in security token markets. Thirdly, the rising generation of younger retail investors – the beneficiaries of a wealth transfer from Baby Boomers that McKinsey estimates at US$84 trillion - are more comfortable investing in digital assets via digital devices than in buying conventional securities or funds. Fourthly, as the Gamestop short squeeze of January 2021 proved, retail investors can overwhelm institutional money when sufficiently motivated, because social media makes it relatively easy to create a "swarm." Fifthly, retail investors have a larger appetite for small and mid-cap stocks than institutional investors, which adds breadth and depth to transaction volumes. Sixthly, fractionalisation makes it possible for retail investors to buy tokenised equities, bonds and funds in sizes far below the minimum subscriptions of institutional investors. So it would be prudent for traditional exchanges to extend trading hours, reduce trading sizes and offer retail investors trading apps and educational materials comparable to those provided today by cryptocurrency exchanges and trading platforms. As they do so, traditional exchanges can call on a marketing advantage start-up exchanges do not have: public trust, earned from looking after institutional money for decades. Significantly, Nasdaq announced in March 2025 it was talking to regulators about enabling trading 24/7 five days a week, as a response to increased retail engagement with Nasdaq stock market.

How will retail and institutional investors interact in tokenised markets?

The distinction between retail and institutional money is somewhat bogus. Major asset managers that issue funds that gather retail money to invest in spot Bitcoin, for example, are institutions following a retail lead. Retail investors are also pioneering security tokens, partly because, so far, the issuers of security tokens are a case of adverse selection akin to crowdfunding: the company issues tokens because it could not raise capital from institutional investors. This will change as the token markets mature, and institutions are attracted by the rising quality of the issuers. Besides, retail investors are not just pioneers. They are also followers. Retail investors have always observed which securities institutions are buying and selling, because they can piggy-back on the research capabilities institutions command. In fact, studies of conventional securities markets show that retail money follows institutional money, certainly in benchmark products. This pattern is likely to recur in the case of digitally native securities tokens. Trading platforms and apps will emerge to service retail investors that follow an institutional lead into the new asset class.

What advantage do tokens offer retail investors over spread betting and contracts for differences (CFDs)?

Retail investors in developed markets can open accounts with discount brokerage firms and retail trading platforms and trade around the clock on a smartphone a personal portfolio of equities, commodities, bonds and other financial assets without having to master the intricacies of clearing, settlement and custody. However, not all retail investors are comfortable running their own spread betting and CFD account. Nor are such services available in all markets around the world. In addition, the technological infrastructure is not yet in place on a sufficient scale to enable tokens to compete with existing retail investment services. Furthermore, regulators in many jurisdictions prevent tokens competing because retail investors are not allowed to purchase tokens or even access the Ethereum blockchain (which hosts almost all tokens). Once they are, the younger generations of investors that are comfortable trading cryptocurrencies on their smartphones will adapt to buying tokens more readily than opening a spread betting and CFDs account. Older and more experienced retail investors with more money to invest are less likely to switch to token offerings. Lastly, conventional accounts with conventional firms ultimately offer access to conventional securities using conventional money only. Blockchain networks, on the other hand, also host assets not obtainable elsewhere and, through Stablecoins, enable investors to hold and use cash on-chain instead of needing a bank account.

Do tokens make commercial sense for digital asset exchanges?

Benefits of tokenisation, such as fractionalisation, make sense for investors with limited savings. They can also make sense for issuers, who might put a high value on broadening their investor base even if the transaction costs of doing so appear excessive to others. For exchanges, the attraction is harder to discern. Exchanges trading, say, tokenised equities in small lots might struggle to survive on the spreads and transaction fees small trades generate, especially if their cost base and business model are unchanged. But if an exchange builds a blockchain infrastructure, the cost efficiencies might enable it to host trades in smaller lots profitably. In other words, transactions that are unprofitable under the present cost structure ought to become commercially viable in a tokenised future and, by enlarging the number of customers that can be serviced profitably, substitute volume for value. Institutions are also likely to emerge (or evolve) that can aggregate retail business into larger lots. Firms that want to attract retail investors should not treat institutions as irrelevant to that ambition.

Is there a risk that a spectacular cryptocurrency bust leads to the disillusionment of an entire generation of retail investors drawn into the market by the success of Bitcoin?

A conventional solution – diversification – is the obvious answer to that risk. After all, there are good reasons not to hold fiat currencies such as the US dollar as well as good reasons not to hold Bitcoin. What is reassuring about Bitcoin is that it is part of a wider technological transition and money will likely to need to change to keep pace with it. The technological shift is the next iteration of the Internet and, whatever else Bitcoin has achieved, it has proved consumers can transmit value over the Internet without the intermediation of banks. This is a genuine technical innovation and an undeniable technological breakthrough. However, the endorsement of the present generation of cryptocurrencies by the Trump administration, and the possibility of central banks adding Bitcoin to their currency reserves, represent departures from the founding principles of Bitcoin.

Panel 4

Are exchanges relevant if tokens are traded peer-to-peer?

Panellists: Ben Brophy, Head of Blockchain at Fidelity International; Bob Ejodame, Vice President, Capital Markets, at INX; Lucas Bruggeman, CEO and President of the Board at BX Swiss Exchange; Massimo Butti, an independent adviser to several companies involved in digital assets; and Severin Kranz, Head of Business Development at 21X.

Are digital asset exchanges offering peer-to-peer trading?

The cryptocurrency markets have proved that peer-to-peer trading is technologically possible. This is not surprising. The original vision of blockchain technology was to replace trust in centralised intermediaries with trust in decentralised technology. The collapse of the centralised FTX exchange reinforced, rather than undermined, the validity of that claim. Which places centralised digital asset exchanges hosting the trading and settlement of tokenised securities in the paradoxical position of being centralised but also hosting peer-to-peer trading. To live with the paradox, centralised digital asset exchanges must pursue a hybrid strategy. To secure a regulatory licence, they must perform customer due diligence on all participants to ensure they are not in breach of Anti Money Laundering (AML), Countering the Financing of Terrorism (CFT) and sanctions screening requirements. To generate activity, digital asset exchanges must also interact with other blockchain-based networks and with the systems operated by traditional financial institutions. While centralised digital asset exchanges can capture, settle and record transactions in native digital assets without intermediaries by using smart contract-based order books hosted on a public blockchain, not every user of a digital asset exchange can use such an infrastructure to trade, settle and safekeep assets on-chain. Regulated brokers and corporate treasurers, for example, prefer to operate largely off-chain at first, even if they eventually get comfortable with buying and selling tokenised assets with on-chain cash substitutes such as Stablecoins and tokenised money market funds. These constraints – the need for on-boarding compliance checks and to inter-operate with traditional systems – mean true peer-to-peer trading is possible only for participants that are wholly on-chain. But digital asset exchanges expect more and more business to migrate on-chain over time as the convenience and economy of peer-to-peer transactions - say, buying units in a tokenised money market fund via a smart contract using a Stablecoin - become obvious to bank and corporate treasurers. Certainly, it is too soon to say that peer-to-peer trading will not work. The task for digital asset exchanges is to identify the use-cases for peer-to-peer trading and persuade incumbents to make use of it by proving it can reduce costs through disintermediation, enhance existing products and services and improve the customer experience.

Would token markets benefit from netting through a central counterparty clearing house (CCP)?

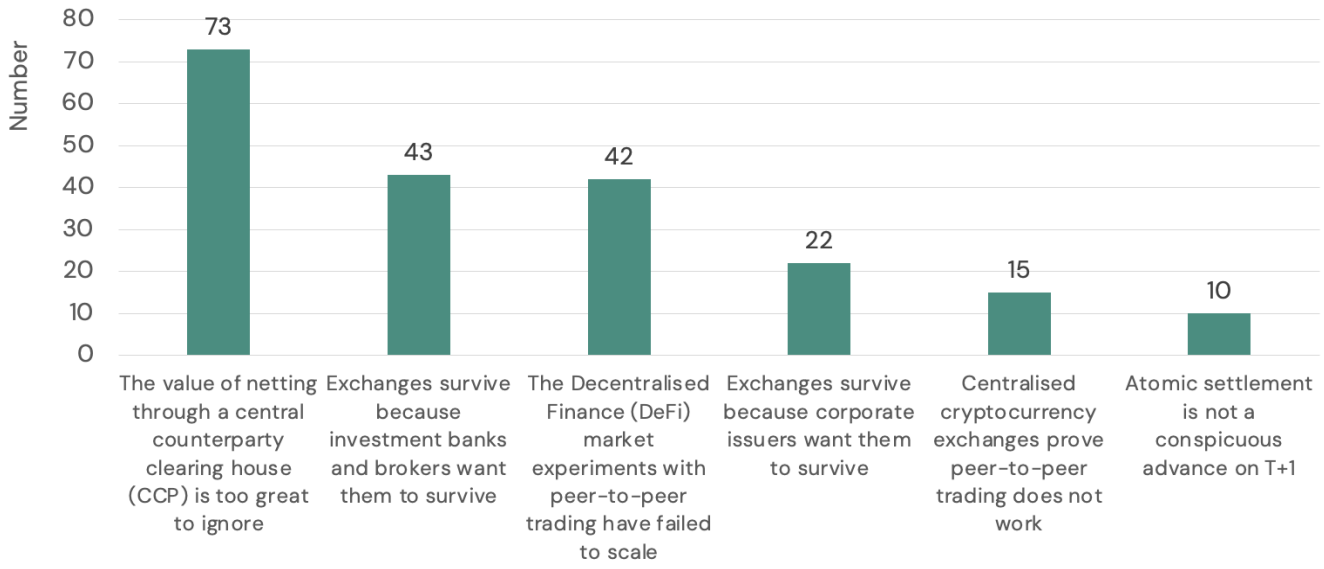
The audience certainly thought netting through a CCP would be helpful (see Chart below). This is counterintuitive, given the theoretical preference of blockchain enthusiasts for gross, atomic, un-intermediated peer-to-peer settlement, in deliberate contradistinction to the credit and leverage-driven system of conventional, fiat currency-based money and securities markets. Yet at least one start-up is proceeding on the basis that the benefits of netting – reduced counterparty and settlement risk, greater capital efficiency, the netting and offsetting of collateral posted, and a reduced operational burden – are just as valuable in digital asset markets as they are in traditional financial markets such as equities, bonds, repos, swaps, foreign exchange and payments. Established CCPs are also alert to the potential threat, reasoning that, no matter how important their current role, the beneficiaries and victims of technological disruption are inherently unpredictable. The European CCP trade association engaged in detail in 2023 with another counterintuitive idea: decentralised clearing.[1] If and when disintermediation becomes

1. The European Association of CCP Clearing Houses (EACH), *Decentralized Clearing? An Assessment of the impact of DLTs on CCPs*, EACH Forum paper, February 2023.

unavoidable, CCPs will act to protect their franchises from disruption by blockchain-based markets. In doing so, they will be able to draw on longstanding relationships with powerful financial institutions that use their clearing services today.

What the Audience Said

Why Has Peer-to-Peer Trading Failed to Displace Centralised Exchanges?



Are digital asset exchanges incorporating netting into their business development plans?

For now, digital asset exchanges are proceeding without the benefit of netting through a CCP. However, they are aware that bi-lateral netting is sufficiently valuable to some brokers and banks to persuade them not to use an exchange at all. In this sense, peer-to-peer trading is happening already in traditional markets, and the opportunity for token markets is to bring that activity back on-exchange. Nor do digital asset exchanges expect existing financial market infrastructures such as CCPs to disappear as atomic settlement becomes widespread. Until the financial incentives to adopt tokenisation in general and atomic settlement in particular are truly compelling, the new and the old systems will coexist, and interoperate. Netting may survive even the eventual displacement of the traditional markets. This is unlikely to occur until wealth is fully transferred from the Boomer generation to their digitally native children and grandchildren. At that point, blockchain networks will incorporate "nodes" that clear and net transactions in tokenised assets. These nodes will be invisible to users but also valuable to them, just as other nodes run by artificial intelligence algorithms will deliver value by creating personalised portfolios for individual investors without them needing to make any decisions or take any actions at all.

Does peer-to-peer trading imply increased market volatility because it eliminates the role of market makers in smoothing market fluctuations?

There is a risk that, without the moderating influence of market-makers, buyers and sellers will drive digital asset prices up and down vertiginously by "swarming." This is what happens in the cryptocurrency markets. In the conventional securities markets,

by contrast, market-makers suppress volatility by providing liquidity consistently in a variety of market conditions by quoting bid and ask prices. The Automated Market Makers (AMMs) pioneered by the Decentralised Finance (DeFi) industry are intended to address this problem. Although experience so far suggests that AMMs have not solved the problem of price volatility – and that they suffer from other issues such as deliberate mispricing and market manipulation – their track record is encouraging. Even in the aftermath of the failure of FTX in November 2022, all contracts in the DeFi market were completed. In conventional securities markets, by contrast, market-makers tend to be unavailable when markets are truly turbulent. Like many if not most intermediaries in conventional securities markets, market-makers are rent-seekers in the good times that cannot be trusted to fulfil their duty in the bad times. On the narrow question of honouring contracts in a financial crisis, such as that of 2022, blockchain technology has proved more trustworthy than long-established and regulated intermediaries.

Is peer-to-peer trading suitable for some investors but not others?

Token issuance, trading, settlement and custody in their purest forms, being based on blockchain technology, reflect the mindset of a software engineer. The engineering axiom of "Keep It Simple, Stupid" (KISS) argues for systems that fulfil their intended purpose as economically as possible. Which leaves no room for intermediation, or a division of labour between brokers, exchanges, CCPs, central securities depositories (CSDs) and custodians. The engineering mindset sees no need for market-makers to manufacture liquidity in cases where the natural buyers and sellers of an asset are absent. Minds less focused on engineered efficiency are more likely to respect the checks and balances on risk in financial markets that have accumulated over time, such as clearing houses, market-makers and independent custodians. Similarly, adventurous cryptocurrency investors – known in the industry as "degens" - are more comfortable with self-custody wallets and metal back-ups to protect their seed phrases than institutional investors, let alone widows and orphans. A lesson of cryptocurrency investing, which applies to all forms of digital assets, is that there is no typical investor. There are self-custodying "degens" that engage in wild speculations on decentralised exchanges (DEXes) in assets that are off-limits to regulated asset managers and end-investors. There are technologists fascinated by the technical mechanics, keen to display their mastery of complex technologies and convinced they can make outsized profits by capitalising on it. There are retail investors in developing economies such as Argentina and Nigeria that invest abroad using Stablecoins and fractionalised security tokens to get round domestic capital controls, weak fiat currencies and relatively small amounts of savings – and they can be serviced without risking compliance breaches by reverse solicitation. There are retail investors in developed economies that are entirely passive, and which prefer to invest on centralised exchanges via full-service intermediaries that provide asset management, broking and custody services or via established and regulated asset management vehicles such as Exchange Traded Funds (ETFs). There are price-conscious retail investors in developed economies incentivised mainly by the lower transaction costs of tokenised

investing. There are distributors such as private banks - and indeed digital asset exchanges - that can compliance-check and on-board retail investors on behalf of regulated asset managers. There are institutional investors in developed economies concerned primarily about remaining compliant and keeping their assets safely. However, such differences between investor types will matter little in a crisis, when investors of all kinds find they cannot realise the value of what they own by turning it into cash. Regulators are concerned about the impact of such a crisis on retail investors, whether they are invested via institutional intermediaries or not, since they tend to command the most political attention. A hidden danger for digital asset markets lies in the risk that self-custodying retail investors fail to protect their seed phrase or forget their password. Which is why security tokens – unlike cryptocurrencies, where the loss of the private key equates to total loss of the asset - are already protected by registrars which maintain the integrity of the issue and can cancel and reissue lost tokens. Experience suggests that intermediation by institutions is not an unnecessary cost for digital asset markets but a sine qua non of long-term success.

Will peer-to-peer payments accelerate the velocity of money?

In principle, peer-to-peer payments can increase the velocity of money, and so contribute to increased economic growth. There is some evidence that peer-to-peer payments funded from bank accounts such as PayPal, Apple Pay and Western Union and instant payments between bank accounts, even if not truly peer-to-peer or indeed even instant, are increasing the speed at which money circulates in an economy. Factoring was invented to enable companies to get paid earlier by selling their accounts receivable, and blockchain technology is being used to modernise the factoring market. The opportunity is to reduce the haircut taken by factoring companies by tokenising invoices and distributing them to alternative buyers through a digital asset exchange.

How difficult is it to move tokenised assets from a centralised or regulated digital assets platform or exchange to a self-custody wallet on another blockchain?

Cryptocurrency and digital asset exchanges often hold investor assets in a digital wallet on the exchange, which means the exchange itself holds the private key for that wallet address and so controls the assets. Assets are transferable to self-custodial wallets but the process can be awkward. A digital asset equivalent of Open Banking Application Programme Interfaces (APIs), by which investors would authorise third parties to access their data held on digital asset exchanges, would make the process simpler. Regulated banks and asset managers are certainly attracted by the opportunity to capture wealth held in digital wallets on exchanges. Building the necessary connectivity, including bridges and data standards, is largely a technical matter.

Are the digital markets embarked on a long transition from centralised trading to peer-to-peer trading?

If digital asset exchanges enable established firms to trade existing asset classes in tokenised form at substantially lower cost – which means at least ten times lower - they will create an incentive to trade. At the same time, digital asset exchanges need to work with the systems and networks that incumbents have organised their business around, such as SWIFT. In other words, exchanges must be able to support non-tokenised, as well as tokenised, assets. Digital asset exchanges also need to price assets fairly. DeFi innovations such as Automated Market Makers (AMMs), which yield counter-intuitive results such as "impermanent loss" (a phenomenon in which the value of the tokens inside the AMM liquidity pool diverges from the value of the same tokens outside the pool), are not always helpful to valuations. Likewise, the data "oracles" that feed the smart contracts that execute trades on blockchains with the external information they need to act are dogged by out-of-date data feeds and allegations of manipulation. Digital asset markets may well remain fragmented because the underlying infrastructure is insufficiently respected and standardised to support efficient flows of capital between them. Some assets will trade and settle peer-to-peer on-chain and be self-custodied on-chain. Other assets will trade on-chain and net before settlement and custody off-chain. Some payments will be made peer-to-peer on-chain, disintermediating banks. It will take time – perhaps decades - before the digital asset markets scale and settle into the peer-to-peer model that blockchain technology has always promised – and perhaps not even then. After all, the differences in the ways in which different types of investors wish to interact with the financial markets are likely to persist, and digital asset exchanges will need to cater for those persistent differences.

Panel 5

What is the future of exchanges?

Panellists: Martin Watkins, CEO of Montis Group; Michele Curtoni, Head of Strategy at SIX Digital Exchange; Max Heinzle, founder and CEO of 21X; Vic Arulchandran, Director, Deutsche Börse | Clearstream and Head of Digital Product and Market Design; and Yalini Isweran, Head of the Digital Launchpad at the Depository Trust & Clearing Corporation (DTCC).

Why have digital asset exchanges found it difficult to disrupt traditional exchanges?

Many domestic exchanges are monopolies, so they are intrinsically hard to disrupt. A blockchain-based order book does not offer a sufficient improvement over a traditional order book. Exchanges are also often owned by their users, which want lower prices at least as much as fatter dividends. In such cases, digital asset exchanges are better advised to focus on post-trade services, with a view to cutting the operational costs and risks incurred by users rather than seeking to disrupt issuance and trading.

What strategies should traditional exchanges pursue?

Experience has shown that it makes no sense to replicate a traditional stock exchange on blockchain, and offer issuers and traders a choice of issuing, trading, settling and custodying digital assets in much the same way as they issue, trade, settle and custody traditional assets. Investment in new technology must either make an incremental improvement to the existing system or redesign the functions performed by an existing system completely. This does not mean traditional exchanges face a binary choice. Their investments should aim to bridge the gap between digital assets and conventional securities. For example, enabling traditional clients to issue digital assets or trade cryptocurrency on a secure blockchain, and cryptocurrency investors to custody digital assets in a traditional central securities depository (CSD), allows both existing and prospective clients to experiment with established techniques as well as new ones. Once momentum builds and volumes appear to favour a transition to digital assets, traditional exchanges can reinforce their investments and build an infrastructure to support a wholesale shift of business. An obvious axis of growth in the back office is to offer settlement of digital as well as traditional assets in central bank money.

Must traditional exchanges overcome internal opposition to investing in digital assets?

An established institution, in which people have worked for a long time, will struggle to develop a culture of innovation. Yet the management knows they cannot expect technological developments and market conditions to favour their existing systems, products and services indefinitely. This is why major financial institutions invest in start-ups and partner with digital asset companies. The investments bring external skills and knowledge into the organisation, which do influence corporate cultures. They also expose the company to innovations that might be profitable. But public companies must be mindful of the share price, and ensure the shareholders support the management strategy.

Is it easier to launch a digital asset exchange now than it was five years ago?

The exchanges – both traditional and digital asset – that pioneered the construction of security token exchanges faced two principal constraints. First, they worked with earlier versions of the blockchain protocols, which affected design decisions, and favoured private rather than public blockchains. Now digital asset exchanges can use public blockchains, combine matching,

trading, settlement and custody within a single entity, and offer settlement not just atomically but on any timetable the parties choose. Secondly, the pioneers had to invest despite a high degree of regulatory uncertainty. Now, legal and regulatory uncertainty has abated in enough major jurisdictions, including at least two in the European Union (EU), to enable businesses to plan with confidence. That said, regulatory differences between jurisdictions do remain a disincentive to investment by digital asset exchanges. The United Kingdom regulators do not approve the use of Stablecoins to settle the cash leg of transactions, for example. The Swiss blockchain legislation, to take another example, is now less progressive than the EU equivalent. Yet the need, under the Central Securities Depositories Regulation (CSDR), for securities tokens in the European Union (EU) to be issued into a central securities depository (CSD) remains problematic – at least outside the DLT Pilot Regime sandbox, where waivers and exemptions allow issued securities to be registered on a public blockchain. Lack of harmonised regulatory frameworks for digital assets across Europe, Asia, the Middle East and North America are likely to remain a serious obstacle to the growth of digital asset markets, but the problem is much reduced by comparison with five years ago.

How will digital asset exchanges interact with central securities depositories (CSDs) in the future?

It is difficult for incumbent CSDs, which not only fulfil crucial depository and settlement (and sometimes clearing) roles in traditional markets but operate under regulatory mandates, to embrace change wholeheartedly without putting vital market functions at risk. In addition, their users, which often double as owners, have digital asset strategies of their own which CSDs must be careful not to disrupt. A CSD cannot, for example, build a digital asset exchange, but a digital asset exchange can build a CSD. What CSDs can do is build the operational market infrastructure which enables their users to support the digital asset activities of their underlying clients in a fully compliant way. That work includes making it easier for users of one digital asset exchange to inter-operate with counterparts on different digital asset exchanges. This course is obviously easier to pursue in the United States (which has a single CSD) than in the EU (which has more than 30 CSDs).

What is the attitude of European regulators towards the role of CSDs in tokenised markets?

In the short term, CSDs in the EU will operate within a dual regime. Inside the DLT Pilot Regime, issuers of tokens on to digital asset exchanges will not need to issue into a CSD. Outside the Pilot Regime, they will continue to be obliged to issue into a CSD. This dual system will not persist indefinitely, because the crucial role of a CSD is not the maintenance of the integrity of an issue, which can be done more efficiently by blockchain. The crucial role is to achieve settlement finality or legal certainty, enforceable in the courts, that the ownership of an asset has been transferred. This is as important to digital assets as it is to traditional assets, but blockchain currently delivers only probabilistic finality, not the legally irreversible finality defined in the Settlement Finality Directive of the EU. Until security tokens are genuinely native and do not exist outside the blockchain, and European law is fully adapted to blockchain technology, settlement finality will remain the preserve of CSDs. So incumbent European CSDs are, by definition, unable to deliver settlement finality for digital assets, even if a digital asset exchange is a regulated entity. The DLT Pilot Regime does not envisage successful experiments with alternative models supplanting the CSDs either but, rather, integrating with them. This is why digital asset exchanges have had to develop their own solutions, including building their own digital CSDs.

Should European CSDs consolidate in the face of the blockchain challenge?

Europe has more than 30 CSDs. Efforts to consolidate them at the turn of the century, accompanied by an animated debate on the respective merits of "vertical" integration with domestic stock exchanges or "horizontal" integration across borders, were only partially successful. Vertically integrated stock exchanges that incorporate CSDs have inhibited further consolidation. However, even those exchanges that have evolved away from primary and secondary market revenues must recognise that the history of financial markets proves that technology can move market participants and the liquidity they bring from one location to another quickly if the financial incentives are powerful enough. The exchange-traded derivatives markets, which were completely overturned by the switch from open outcry to screen-based trading at the turn of the century, provide a particularly vivid instance of this phenomenon. Since blockchain represents a similar technological paradigm shift, prudent exchanges will be working out how best to coax traditional instruments into the era of digital assets, by working with issuers, intermediaries, investors, regulators and legislators to design an efficient transition and a supportive legal and regulatory environment. But blockchain presents even independent CSDs with a long-term structural challenge in the sense that the decentralised nature of the technology undermines the role of CSDs as centralised depositories of issued securities, settlers and recorders of transactions and registrars of who owns what. By building a blockchain market infrastructure a CSD inevitably diminishes its value as the operator of a regulated market infrastructure in a particular location. However, the role of CSDs as controllers of data on blockchains might even increase. National CSDs might survive in Europe not in their current guise of post-trade operational monopolies but as guardians of the integrity of data held on blockchains.

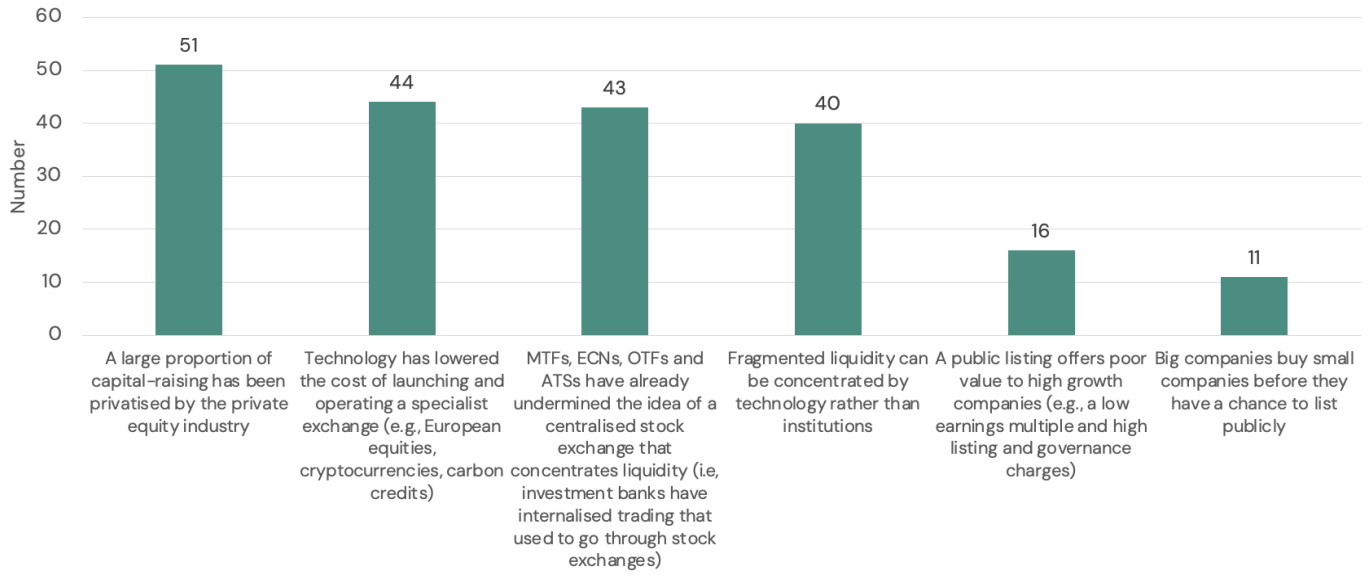
What does the history of traditional stock exchanges teach about the impact of technology?

Internet technology has already transformed traditional stock exchanges. At the turn of the century, traditional stock exchanges generated most of their revenue from listing and trading securities. It was profitable business. At the time, the major stock exchanges of Europe all enjoyed operating margins of more than 50 per cent. Such high levels of profitability encouraged regulators to increase competition. Regulation National Market System (Reg NMS) in the United States in 2005 and the first iteration of the Markets in Financial Instruments Directive (MiFID 1) in the EU in 2007 gave rise to all sorts of alternative trading venues, fragmenting liquidity, and squeezing margins. Some traditional exchanges adapted by increasing their exposure to post-trade services and data vending, where they have restored healthy margins, while exchanges that persisted with traditional business have continued to see their margins squeezed. Indeed, some traditional exchanges were eventually acquired by newcomers that understood better the impact of Internet technology and digitised data. Today, the London Stock Exchange

makes more money out of data than it does out of listing or trading. None of these adaptations surprised the audience, which believes that the privatisation of equity, the disruption of established markets by new trading platforms and increased asset class specialisation by challenger exchanges empowered by new technology explain the shift by traditional exchanges into data and post-trade services (see Chart below). They record a history that proves digital technology has the power to disrupt incumbent exchanges. Indeed, blockchain technology is already fostering a new breed of specialist token exchanges, focused not just on cryptocurrencies but on corporate bonds, real estate, Real-World Assets (RWAs) and carbon credits. These new exchanges pose a familiar question (to what extent is liquidity fragmenting and, if so, how can it be consolidated again?) and force traditional exchanges to ask once again what, if anything, they should do in response. But the lessons of the history are clear. First, they suggest that the exchanges that survive, let alone thrive, will have lower costs, the ability to offer their users access to every asset class, excellent collection and publication of price and other information and the ability to distribute a wide variety of both digital assets and traditional financial instruments. Secondly, history shows that law and regulation ultimately determine where issuers and investors gather to do international business. Many exchanges will always dominate their domestic market, but only a handful will enjoy the legal and regulatory strength and stability to win cross-border business.

What the Audience Said

Why Are Traditional Stock Exchanges Shifting From Capital Raising and Trading Into Data Vending and Post-Trade Services?



Is there an opportunity for an emerging market to leapfrog the established financial markets by building a public blockchain market infrastructure?

The idea of a common or unified blockchain ledger, which provides interoperability by design because all asset classes (including cash) conform to the same technical standards, has been advanced or endorsed in different ways by the Regulated Liability Network (RLN), the International Monetary Fund (IMF) and the Bank for International Settlements (BIS). The governments of several countries, including Abu Dhabi, Ghana, Kazakhstan and Saudi Arabia, have embraced the idea of blockchain-powered cities or government machines. The opportunity to gain a technological head-start is sometimes likened to countries without legacy telecommunications infrastructures leapfrogging developed economies by switching straight to wireless communications. In the case of digital asset exchanges, a country could skip the order book phase of the transition to digital assets and adopt native assets issued on to and traded on a public blockchain immediately. However, translating theory into practice will take time and money. The opportunity is created by the absence of legacy, but the absence of legacy also means that liquidity must be conjured out of nothing.

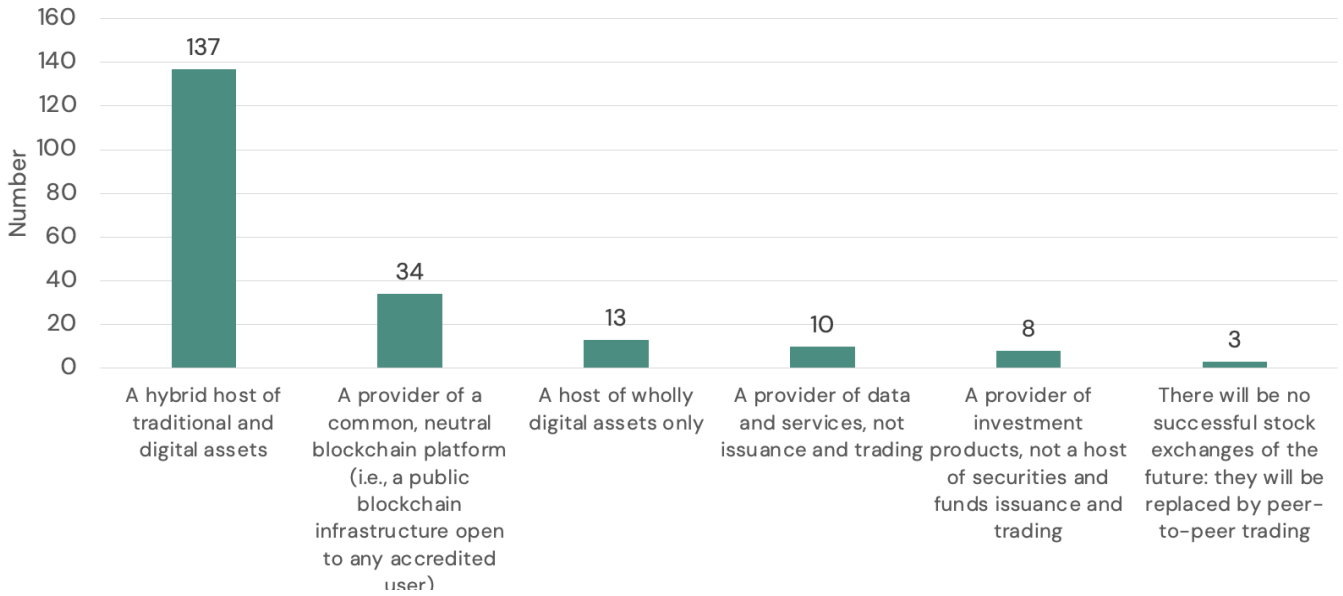
Would a public blockchain infrastructure create an unacceptable risk in terms of operational resilience?

There are two views on this. One is that a government and financial and real economy entirely reliant on blockchain technology would be intrinsically resilient, in the sense that blockchain is a distributed database, in which every node has a complete copy of the current state of the machine (or ledger). The other view is that a government and financial and real economy reliant on blockchain to issue and trade and settle money and securities would be vulnerable to catastrophic failure if the government defaulted on its debts. After a default, it would be impossible to pay or get paid, or value assets, because the transition of the machine (or ledger) from one state to another would be fatally undermined and become chaotic.

What will the successful stock exchange of the future look like?

The audience had a clear view of what will determine success for the exchanges of the future. Two out of three members of the audience said the future is hybrid. In other words, the stock exchange of the future will host both traditional and digital assets (see Chart below). The second most popular choice – that stock exchanges will provide public or common blockchain platforms for apps designed and operated by third parties - attracted just one in six votes. Virtually nobody thought stock exchanges will disappear altogether and be replaced by peer-to-peer trading. The strategic choice made by some traditional stock exchanges over the last 20 years – namely, to become data vendors – is no longer seen as relevant. Nor, contrary to the advice proffered by some analysts of exchanges, did the audience believe exchanges have a secure future as manufacturers and distributors of investment products.

What Will the Successful Stock Exchange of the Long Term Future Be?



How long will it take to transition from the status quo to liquid digital asset markets?

Digital asset exchanges exist. They have secured operating licences from regulators. They have hosted issues of tokenised funds, securities, real estate and commodities. They have attracted investors. They all believe that securities will be held on public blockchains in the future. But no digital asset exchange has yet achieved scale and day-to-day liquidity within and across asset classes. Which suggests the transition period will be extended. In parts of the capital markets, blockchain technology will not be embedded for a long time. Yet the industry is possibly at an inflection point. The digital asset exchanges that exist are less intermediated than the exchanges of the past. Retail investors can connect to them directly. So can corporates, giving them the power to execute treasury functions such as payments, cash management, short-term credit, collateral management and foreign exchange in tokenised forms. Stablecoins and tokenised money market funds are already being used by corporates to make payments and earn yield. Exchanges are also less specialised in terms of functions they perform. They fulfil multiple roles – issuance, trading, matching, settlement, custody, asset servicing – that imbue them with the character of comprehensive financial market infrastructures rather than specialist exchanges. This broader remit is a function of the distributed ledger nature of blockchain technology and may over time precipitate a faster pace of change by eliminating costly intermediary functions. For now, however, digital asset exchanges are working with intermediaries such as brokers because they are a source of clients and liquidity. They are also working with cryptocurrency firms and exchanges, and DeFi applications, to build bridges between the three basic types of financial asset: traditional money market instruments and securities, security and fund tokens and cryptocurrencies. The bridges broaden access for assets and investors. A traditional custodian bank or CSD, for example, can now offer an existing traditional market client access to cryptocurrencies through their existing securities account. In the end, the transition is not between states but through convergence.

Upcoming Future of Finance Events in 2025

Carbon Credits	11 September 2025
Tokenisation	14 October 2025
Digital Securities and Digital Cash Summit	November 2025
Digital Asset Custody	3 December 2025

**Dates are subject to change*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