



Financial Markets
INSIGHTS

Out on a Ledger: How the advent of Exchange 4.0 will transform trading ecosystems

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A growing number of exchanges and trading firms are embracing distributed ledger technology (DLT) and tokenisation, recognising a surge of interest in crypto asset trading from both retail and institutional investors. But many of the venues are replicating silo-based models and missing out on the most important lessons from the digital revolution. DLT, tokenisation and crypto asset trading offer a chance to create much larger market ecosystems by enabling participants to transact across borders more easily and by facilitating asset portability. Rather than divvying up the pie, it's all about making the pie much larger.

Introducing the concept of Exchange 4.0.

Forward-thinking firms are already positioning themselves for a DLT-fuelled future. But behind the buzzwords, there are lingering questions. What benefits will digitalisation bring, both to trading venues and the market participants they serve? What are the main obstacles to Exchange 4.0, whether they stem from outdated thinking or misaligned stakeholder incentives? And what sort of step-changes can we expect as digitalisation takes off?

*In this report, The Realization Group speaks to experts at some of the firms pioneering the new world of crypto asset trading to get answers. We hear from **Alokik Advani**, Managing Partner at Fidelity International Strategic Ventures, **Charles Kerrigan**, Partner at CMS London, **Hirander Misra**, Chairman and CEO of GMEX Group, **Jessica Naga**, Director Responsible for Legal and Compliance at SECDEX, **Anoop Nannra**, Global Blockchain Segment Leader at Amazon Web Services, **Nicholas Philpott**, Director at Zodia, and **Duncan Trenholme**, Co-Head of Digital Assets at TP ICAP. They offer perspectives from virtually every stakeholder group involved in the trend towards digitalisation. And they say the move to Exchange 4.0 is well underway, with profound implications for financial markets.*



Introduction

Just as the world is experiencing a fourth industrial revolution, sometimes called 4IR, financial exchanges are beginning their own technological revolution. The 4IR concept is the driving force behind the Internet of Things, where AI and web technology combine to create smart products. A similar idea is taking hold in the world of exchange trading, as DLT, smart contracts and tokenisation make it possible to facilitate true asset portability while linking far-flung liquidity centres.

But there is a great deal of confusion as to how distributed technology will change the marketplace and what benefits it will bring. There are also significant roadblocks, either in terms of old-fashioned thinking or stakeholders defending their turf. Experts at a number of firms that are working towards a new world of exchange trading say it is only a matter of time before these obstacles are overcome. The first step, they say, will involve trading venues and participants developing a new mindset, one that embraces open-source practices. As Exchange 4.0 becomes better understood, and as firms move from proof of concept to bottom-line benefits, we can expect a rash of major changes in the marketplace. New trading centres, new products and new ways of doing business are all on the way.

Creating the network effect

While Bitcoin continues to grab headlines and sell-side institutions start to build the infrastructure and expertise to deal with digitalisation, institutional investors are tiptoeing into the world of digital assets. But traditional venues that are facilitating digital asset trading are thus far each working independently. Ultimately, that approach will not serve the market.

“The key thing about this is asset portability,” says **Hirander Misra**, Chairman and CEO of GMEX Group.



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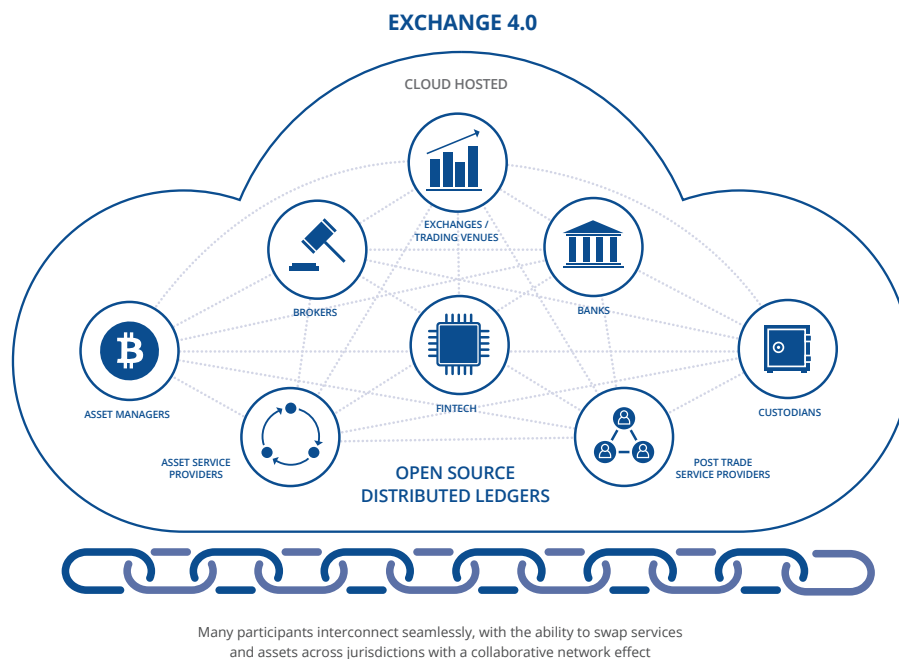
Hirander Misra, GMEX Group

Misra has established a long track record in exchange innovation since co-founding Chi-X Europe and helping to usher in the explosive growth of automated trading that began in the late 2000s. He says that many of the firms looking to move into the digital space, both new and traditional, have not properly understood the lessons that 4IR has to offer.

“If you look at marketplaces in this space, there are lots of exchanges across the world, and there’s tumbleweed growing through most of them. How do you create that network effect? But then also, how do you focus on what you’re really good at?”

Misra says the problem starts with exchanges adopting a silo mentality, where they seek to service clients exclusively rather than building a more collaborative model. Trading, clearing and settlement end up being offered in a closed-in environment. “Essentially these exchanges are just pockets of their own liquidity.”

But the future could soon look very different. “We’re already beginning to see this. You’re going to see exchanges, custodians and other services interconnect more seamlessly, with the ability to swap services and assets across jurisdictions and across different types of users to get that network effect. This is a construct that I have labelled as Exchange 4.0,” Misra says.



Tangible Benefits

Provided that network effect can be created, what sort of benefits can firms look forward to? The list is long and varied.

“Stepping back, what do we get by going to a distributed ledger technology?” asks **Alokik Advani**, Managing Partner at Fidelity International Strategic Ventures. “You get the ability to look at a chain and audit exactly what you bought, from whom, when and why. You get the fact that it’s immutable. You can’t change it. You can’t tamper with it in any shape or form. And you get instantaneous settlement, which for many markets makes a lot of sense.”

The issue of settlement is complicated by the fact that a cottage industry has built up around the value that firms can obtain from assets during a settlement period. The inefficiencies of the current systems, where it takes an extended period of time to settle a trade, have led to profitable practices and services. For instance, firms that hold the securities may be able to lend them out during this period. But there are more fundamental advantages that DLT-based trading can create, particularly for buy-side participants. Advani sees these falling into three categories.

“One is access. Which markets are they accessing? How do they access? What do they need to change?” Advani says. “There are a lot of costs, and infrastructure they would have to reconnect to. And that, again, creates some level of barriers, because, you know, some of the margins in these businesses have been going one directional.”

Beyond that are explicit costs linked to the efficiency and reliability the technology brings. Does a move to blockchain create a benefit that can make a firm move better, faster, more safely or cheaper? And a third group is based specifically on the speed of clearing and settlement.

The second category is the broadest and it is rooted firmly in the immutability factor. By being able to instantly prove the existence of trades and always audit them, or by creating an environment that helps ensure access to margin, the marketplace becomes safer and more stable. That in turn allows for more interoperability.

All of this is in stark contrast to the status quo, which is based on complex systems of checks and balances designed to prevent failed trades that can ripple through the market. Essentially, a distributed ledger acts as a more fool-proof check and balance system, one that is both real-time and permanent.

Nicholas Philpott, Director at Zodia, says the benefits of DLT become apparent as soon as one thinks about transaction reporting, such as that required by Dodd-Frank or similar regulatory regimes in Australia, Hong Kong, Singapore and elsewhere. Zodia is a digital asset custodian joint venture by Northern Trust and Standard Chartered Bank, the latter for which Philpott is head of market structure.

"You hear various horror stories about poor levels of matching in the trade repositories," Philpott says. "A distributed ledger approach would very likely have been a much more elegant solution."

While a distributed ledger creates a permanent record of all activity, tokenisation acts as a simple way to create, trade and store assets on the ledger. As such, it offers a cheaper and more efficient way of conducting business.

Duncan Trenholme, Co-Head of Digital Assets at TP ICAP, adds that Bitcoin's popularity is beginning to make people aware of such benefits.

"Right now, from a wholesale perspective, there's a barrier to adoption of this technology because you have to connect to a new infrastructure using digital wallets and distributed ledgers. It's a significant change," he says.

"Currently, the main motivation for institutions to overcome that inertia is to invest directly in Bitcoin, an asset that is finding a place in an investment portfolio as a store of value and an inflationary hedge asset."



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Duncan Trenholme, TP ICAP

But as people do connect, they'll increasingly experience the benefits of transacting on an open, interoperable, and programmable financial system. We are already seeing the early stages of tokenised versions of traditional assets on various distributed ledgers, in particular on Ethereum. An example would be tokenised versions of gold that promise to be more efficient and scalable than holding a traditional Gold ETF. "At that point, clients are going to insist, 'I'm doing it this way now anyway, why can't I hold all my other assets and service my wider financial needs here?'" And I think we will see a gradual migration of asset classes across to this new system."

Wider adoption will take place as firms realise that blockchain is simply like plumbing. **Anoop Nannra**, Global Blockchain Segment Leader at Amazon Web Services, describes it as beneath-the-fold technology.

"It's like the internet. It's like IP. No one talks about IP. But without IP, we wouldn't have online gaming, we wouldn't have voice or video online. But it is one of those technologies that is forever present," Nannra says.



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Anoop Nannra, Amazon Web Services

Careful adoption

All of the talk about the benefits around DLT make it sound like a slam dunk that is simply waiting to happen. But experts say there needs to be serious discussion among the institutions building the world of Exchange 4.0 about how to ensure those benefits either do not get lost or do not lead to unforeseen consequences.

“I think one of the one of the very interesting outcomes of this is that as you look at the space more broadly, you begin to realise that while blockchain technology is exciting – it’s new, it’s novel – at the end of the day, it makes up between 10% to 15% of an overall end-to-end solution,” says Nannra.

“There is still this misnomer that if I now introduce blockchain technology into my system, into my network, across my ecosystem, I’m now, all of a sudden, secure. The reality is that’s not the case. You still have to identify what needs to be put on, what is permissible to be put on. And before you put it on – the data that is of interest – how do you prove to yourself that what you put on is what you intended to put on?”

For instance, was any data or information manipulated prior to being introduced into a blockchain network? Nannra says there are procedures and controls that have to be put in place and adhered to from a data security perspective. Exchanges deal with efficacy. They want to know about the quality of a trade and the data that has influenced a trade. If any of that data is suspect for any reason, then a trade can fail and it has to be rewound. Trade failures happen on a daily basis.



“It’s good for the customer, because you’re removing intermediation, inefficiencies and delay from the system. You’re also broadening the market across a bigger spectrum of participants. More people can have access.”

Nicholas Philpott, Zodia

“What we have found is a lot of the time it is the classic blockchain problem of a misalignment on data reconciliation between multiple parties. Whether that’s a result of somebody fat fingering an entry or what have you, the idea is, you want to be able to capture these events before they actually get posted,” says Nannra

Philpott of Zodia makes a related observation about how the new technology, for all its positive features, can make people blind to the ancillary benefits that come with the system being replaced.

“It’s good for the customer, because you’re removing intermediation, inefficiencies and delay from the system. You’re also broadening the market across a bigger spectrum of participants. More people can have access,” he says.

But he also believes market innovators should be careful about turning every aspect of the market into an engineering problem. “If you look at doormen outside hotels, an engineer perhaps will say, ‘That’s easy, just put in an automatic door’. And they’d lose sight of all the things that the doorman does. He gives people directions. He says good morning and good evening to people. He gives the hotel a sense of grandeur.”

Overcoming obstacles

The first step towards Exchange 4.0 begins with education.

“The concept is a little abstract at first, and therefore institutions in different positions across finance are grappling with what’s going on and how this technology might impact them,” says Trenholme of TP ICAP. “At first glance it’s very easy to see Bitcoin as just a new asset. ‘Okay, I can kind of leave that over there. It doesn’t really affect us.’”

Once you explore further it becomes clear that DLT is a transformational technology, akin to the internet, and that it has huge implications for finance. Trenholme says it is difficult for some financial institutions to respond to change this fundamental because they have so much built-in inertia, bureaucracy and organisational rigidity. Firms that embrace this technology, from the top down, and make it a core part of their future strategy will be best positioned moving forward.

The need for education extends beyond market participants and venues. “There are regulators that I think are getting more comfortable with the technology, but I do think that there is still more education that needs to be done,” says Nannra at AWS. “I’m still so excited about this space, because I do think that there is significant upside. But I think that for every regulator out there, there are probably at least two regulators who still need to be educated.”

Jessica Naga, Director Responsible for Legal and Compliance at SECDEX, an exchange based in the Seychelles, had a similar view.

“I find most regulators to be extremely cautious internationally about digital assets,” she says, adding that some offshore jurisdictions, such as the one that SECDEX operates in, tend to be more open to digital innovation. “The great thing about these jurisdictions is that they are allowing proof of concepts to happen, and then afterwards, there can be much wider adoption.”

For now, legal experts are voicing optimism that the regulatory community ultimately will not stand in the way of the DLT revolution and may even encourage it.



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Charles Kerrigan is a Partner at CMS London, an international law firm that has done business in the City of London for more than 240 years. He is involved in helping firms prepare for the kind of change that digitalisation represents. He believes regulators are right to be technology-agnostic. “They have a regulatory perimeter. You’re inside or outside the activities that they care about. But you can do the activities in a digital way or an analogue way. The regulators don’t restrict the use of technology as long as it is robust.”

For instance, the Initial Coin Offering (ICO) boom that began with the initial success of Bitcoin left some in the market thinking it was possible to raise money without going through normal regulatory hurdles. “In Europe, the rules on issuing securities, which is what we’re talking about, didn’t change. And if you issued a security to the public, then you were into the prospectus rules, and everything that goes with that. The development now is that countries are updating their rules to recognise digital securities and writing rules specifically for ICO-type transactions.” Kerrigan says.

Timing is Everything

Once market participants and regulators become more comfortable, the critical issue will become timing.

“You have this long value chain. A single mover can’t be effective. You need to orchestrate so that multiple parts of the chain move at the same time or in similar timelines,” says Advani of Fidelity International.

Take, for example, a straight-forward market like cash equities. There are various participants from the buy side and sell side –market makers and takers – and there is the exchange in the middle. But there is also a host of other layers behind them, from wholesale participants to retail participants. In the middle and back office, there are then a range of functions involving reconciliation, clearing, settlement, custody, and books and records, all surrounding the exchange infrastructure.

“In order to really avail of the sort of blockchain methodologies of distributed ledger technologies, you need that whole ecosystem to be attuned to make the changes,” Advani says.



“There needs to be enough pain in the system where someone feels that it’s broken to be able to change it with speed.”

Alokik Advani, Fidelity International

The problem, however, is that each stakeholder has its own axe to grind. On the one hand, they may realise that ultimately, they may get disintermediated if they don’t embrace the new technology. But on the other hand, the existing value chain has a host of inefficiencies, such as the number of days it takes to settle a trade, and those inefficiencies create short-term revenue opportunities.

“There needs to be enough pain in the system where someone feels that it’s broken to be able to change it with speed. And I think in large swathes of the stakeholders, they may not feel it’s all broken,” Advani says.

Naga of SECDEX, however, says that ultimately the attractions of DLT and tokenisation will win out, particularly as DLT evangelists spread the message. “It just takes time. It took roughly 30 years for emails to reach the critical mass needed to be preferred to post.”

The problem, she adds, is that right now many of the participants and venues are spending time trying to understand blockchain rather than understanding what it could be used for. “Nobody asks, ‘How does the internet work?’ They ask, ‘What can I use it for?’”



“You are talking about another wave of creative destruction. We have digitalised the front office of financial institutions – what you see as a customer – but the real benefits will come from digitalising the market infrastructure.”

Charles Kerrigan, CMS London

Kerrigan sees the move towards digitalisation as a prime example of capitalism forcing change. “You are talking about another wave of creative destruction. We have digitalised the front office of financial institutions – what you see as a customer – but the real benefits will come from digitalising the market infrastructure. Crypto shows how this can be done. Payments has learnt from that. Securities issuance is following. We are simply following the logic of the information economy. This is a big one.”

A way forward

All of this leaves traditional venues and market participants in the position of having to prepare for a wholesale change in the way they operate while still conducting business in the here and now. At the same time, scores of new exchanges have sprouted up with DLT technology and digital assets that can only be traded on one platform.

“You have the crypto Wild West of unregulated exchanges, and you’ve got these traditional exchanges looking to go digital but they’re pretty much creating the same model that already existed. And actually, the right answer is somewhere in between, where you’re talking about a hybrid construct that can also then marry up different types of liquidity,” says Misra of GMEX Group.

Imagine a trader using a crypto exchange and custodian in one country wanting to trade one digital asset for another, and then use the purchased asset to swap for tokens on another exchange in another country before using those tokens to trade against sterling or the dollar. Now imagine all of the cross-border taxation and marketing issues that come into play. These could be addressed via smart contracts, which apply different conditions or provisions based on the rules and regulations for different counterparties, venues and jurisdictions.

“The problem now is even with additional exchanges that have been created, that asset portability is a big problem so when traders are looking to trade on each exchange, they’ve got to post assets and collateral. Moving assets in and out over a public blockchain, or whatever means they use, is very cumbersome, and also risky,” Misra says.

The solution will be when enough exchanges move towards common open-source distributed ledgers and understand that they and their members are better served by collaborating while simultaneously competing. Exchanges have a long tradition in such behaviour. They were founded on the same principles as their members accepted that common rules and infrastructure benefited all market participants.

It’s clear that those members are looking for exchanges to move towards an Exchange 4.0 model. Companies like TP ICAP have set up working groups, such as the one that Trenholme serves on, to ensure that they are ready for the revolution. Companies like AWS have found that their financial services business is booming. And legal experts like Naga and Kerrigan are finding that their crypto expertise is in hot demand.

“To me it’s about flexibility. Let’s say I want to get from London to Leeds. I could take the A1 or the M1. The M1 might be faster in theory, but it might have more traffic. It’s basically having flexibility and the option to do things in the way that you want to do,” Misra says.

By forging the DLT-based world of the future while still servicing traditional assets in traditional ways, venues can offer the hybrid model Misra described. They can build new motorways that get more and more motorists on the road, giving them new options for travelling to wherever it is they want to go.

Exchange 4.0: What the Experts Expect

Alokik Advani, Fidelity International Strategic Ventures: “You have to try this in pockets of smaller assets, where it can be really efficient – private markets, alternative assets, private equity, venture capital, real estate, private debt. All of these things are obscenely inefficient. They trade like bulletin boards today. If you wanted to bring that to some level of an exchange-like infrastructure with a DLT backing, it’s a revolution.”

Charles Kerrigan, CMS London: “There is now a general creep towards a digital market. People talking in FinTech are fond of saying, ‘There’s a specific problem here that we can solve with a piece of software that gets a better solution for the customer’. They’re not trying, like a traditional bank, to do a thousand things as well as they can. They pick one or two things and do them really, really well. There are quite a few of those companies now in the general ecosystem around the financial and investment markets.”

Hirander Misra, GMEX Group: “With Exchange 4.0, say you’re an existing exchange and you have existing infrastructure. You may want to set up a digital exchange, but you may not want to replicate everything you have. You may not need another matching engine or you may need digital custody or you may need issuance. The thing about Exchange 4.0 is that you can combine the services you have with services others have or augment what you already have. So, you’re not beholden to creating yet another siloed infrastructure.”

Jessica Naga, SECDEX: “There is something to be said for the countries that take the jump and do this now fast. They will have first movers’ advantage, if they build the necessary legal framework and infrastructural ecosystem in a sustainable way. The clear advantage of technology and FinTech companies is that their business is cross border and therefore from one centre, they can service the world.”

Anoop Nannra, AWS: “We look at Exchange 4.0 and the opportunities in terms of creating digital assets on virtually any aspect of our business. I think it’s really exciting, being able to create a futures index based on real-time solar energy production. Right down to the second. You create new patterns and opportunities for liquidity to occur. Capital historically will move to the environments where liquidity is most easily had.”

Nicholas Philpott, Zodia: “The locations and the cities that succeed in the future may no longer be the same as the ones at present. It’s a much more even competition now. If you can spin up a virtual exchange with none of that physical infrastructure, that opens up the possibility of some very interesting developments as far as the new trading centres of the future are concerned. You could switch cities almost like an American football team.”

Duncan Trenholme, TP ICAP: “It’s possible that some of the private permissioned blockchains get traction in certain areas and solve certain use cases, but over time we believe the open permission-less blockchains will eat market share. The idea of running your own distributed ledger, in a centralised manner, just misses the point of what this technology can do. It’s repeating the limitations of vertical silo’s all over again.”



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