Introducing the Newest Technology to Capital Markets: The Industry's Perspective

Speakers: Katie McDermott and Ilana Singer

Ilana Singer:
Hello everyone and welcome to our TC podcast. I'm Ilana Singer, chair of the Toronto Centre Securities Advisory Board. Today we will be discussing an initiative of the Australian securities exchange to use the latest technology to improve its clearing and settlement infrastructure. The Australian securities exchange or the ASX as it is commonly known is one of the world's leading financial market exchanges offering numerous services including listings, trading, clearing and settlement. The ASX is incorporating Distributed Ledger Technology or DLT into its post-trade system. And for those who are not familiar with DLT, blockchain is one form of DLT. That may be a more familiar term for some of our listeners.

Ilana Singer:
To learn more about this initiative, I'm excited to be joined today by Katie McDermott, General Manager for equity post-trade services at ASX. Katie is responsible for delivering ASX's Equity Post-trade System, leveraging distributed ledger technology to replace CHESS. She has more than 20 years of international and financial services experience working in numerous management, technology, and operational roles. Prior to joining the exchange, Katie managed global teams for Barclays based out of New York and held senior relationship manager roles at the Depository Trust and Clearing Corporation in New York and London. Welcome Katie.

Katie McDermott:
Thank you.

Ilana Singer:
So, to start off for some of our listeners who are not as familiar with the exchange can you tell us about CHESS and the role that it plays at the exchange and in the Australian capital markets more generally?

Katie McDermott:
Sure. CHESS is the core system used by ASX license clearing and settlement facilities. So that's ASX clear and ASX settlement. CHESS is an acronym and it stands for Clearing House Electronic Subregister System. It was introduced in 1994 to perform clearing and settlement of trades, asset registration. And other post-trade services for the Australian equities market. So, prior to 1994 you had physical certificates which were physically exchanged and you had a lot of risk in the system and the settlement cycles were not reliable. But by introducing CHESS we were able to remove a lot of risk and set settlement cycles so starting with the T plus five settlement cycle. It also had the sub register which is slightly different than other CSD's globally. In CHESS we have actual name on register so legal title name on register and that's where the sub register comes in. And CHESS enabled the successful de materialization of equity markets. And so, that means there are no physical certificates anymore in the Australian financial

markets. This enabled the improvement of efficiencies for additional post-trade services.

Katie McDermott:
CHESS settles equities as well as other products such as warrants, units of lists of trusts, ETFs, managed funds, and other even Australian government bonds for retail customers. The trades that are executed on approved market operators so market trades are then registered through CHESS with the clearing house and that's where they become innovation. And so, ASX clear becomes the buyer to every seller and the seller to every buyer and this removes counterparty risk and it also enables us to manage market risk through margins. The Australian market is moved to a T plus two settlement cycle. So it was T plus five from 1994. It moved to T plus three in 1999. It took us a while to get to T plus two in 2016 but we are operating on a T plus two settlement environment right now.

Katie McDermott:
Another thing that CHESS provides is netting. So, with innovation process the trades are then netted on on T so that every participant has one market obligation per security. The market trades approximately 1.5 trades a day and this is netted down between 15,000 and 30,000 settlement transactions so that's a 98 and 99% settlement efficiency. So, by moving from the 1.5 lines down to only 50 to 30,000 trades you remove a lot of operational risk and it creates a lot of efficiency in the market. That's basically the function that CHESS provides in today's market for the Australian equities market.

Ilana Singer:
Thank you Katie. It sounds like CHESS was delivering its services quite reliably and efficiently and so I'm curious as to what triggered the change to replace CHESS?

Katie McDermott:
CHESS is 25 years old. It was developed more than 25 years ago. It's developed in Coble which is a legacy language and it was, we also had to use proprietary messaging. While it's very reliable and it's still performing what it needs to do every single day it just is not a platform for the future. And it was time for us to replace CHESS. So, it was also timely in 2015 when DLT had all that hype or blockchain as it's more well known for us to investigate that technology. It's interesting because being a core system as a FMI people have said it's really brave of us to use this technology but we look at it quite differently. We think it would be very brave not to explore this technology when especially for a post-trade system you only swap them out every 20 to 30 years potentially. So, it was important for us to explore current technology like DLT especially when you had a lot of talk in the market of the efficiencies and to future proof a system that requires a lot of investment from all of our stakeholders.

Ilana Singer:
Thanks Katie. That's very helpful in terms of putting it in context and talking about future proofing the system and really thinking about platforms for the future. So, when ASX was considering replacing CHESS I'm sure there were alternatives considered. Why did ASX ultimately choose DLT?

Katie McDermott:
We did explore other technologies. What we discovered is that DLT would be able to provide efficiencies that don't currently exist in the post trade environment. So, right now for post-trade systems most organizations are limited to straight through processing in their own tech stacks. But by providing an infrastructure and an ecosystem that everyone's connected to and that they're leveraging in distributed ledger technology, so they're all operating on the synchronized data source, you can also implement multi-party workflow. And with the introduction of multi-party workflow you're able to achieve distributed straight through processing because you're no longer limited to your internal tech stack.

Katie McDermott:
Everyone who's using DLT and they're on that shared ecosystem is sharing the same source of truth and that means they can operate on common domains and leverage multi-party workflow. This is really innovative especially in the post trade environment. There's been a lot of investment in technology, especially low latency in the trading side but there hasn't been in the post-trade side. You have those old COBOL legacy systems that have basically spaghetti junctions of connectivity into other systems. And so, innovation has been quite challenging.

Katie McDermott:
And the changes that the market has required from let's say a regulatory perspective has been very costly and expensive for the market to implement. And so, by uplifting the post-trade technology, and putting it on a modern language, and allowing it to leverage something like DLT and the multi-party workflow we feel that we're opening up the possibilities for a lot of innovation as well as cost savings. We see through the permission ledger the ability for third party vendors to come in and create applications that can be leveraged by those connected parties but it's also an opportunity for our participants to develop their own applications which can be just permission for them and their customers and this would allow them to gain a competitive advantage.

Ilana Singer:
So, it sounds like having the private permission ledger has many advantages over what I would think about as more traditional DLT. Are there other benefits that you can describe to us?

Katie McDermott:
Sure. So, our decision to go with DLT was after extensive testing with our partners digital asset. It was two years of ensuring that the technology could provide what we needed especially from a nonfunctional perspective in terms of scalability, resilience, security and ensuring that privacy and confidentiality that's required for capital markets. Better known use cases such as Bitcoin are public and the problems they were solving or the problem that that solved was quite different than the problem we were looking to solve. Bitcoin was looking to solve a problem of trust and this is a public ledger, it is consensus driven, and it's anonymous and none of these things would work for our

market and that's why we've chosen to go with a private permission ledger. The other thing is with the consensus driven model that's the one that uses up a lot of power and it also doesn't cater for the privacy that we need.

Katie McDermott:
That evolved then into Aetherium. So, Aetherium's platform is also quite useful and it's when financial markets became quite interesting in it. So in 2015 you had the smart contracts and smart contracts introduced automated workflow and that's where you can see, you can leverage the the ledger and the smart contracts to achieve the distributed straight through processing. But Aetherium still had a latency issue or a throughput issue where Bitcoin was only processing seven transactions per second Aetherium does about 11 or 12 transactions per second. We needed 50 trades per second in order to be able to leverage it for the CHESS replacement and the US market needed a even greater number. And independent studies proved the capability to manage 27,000 trades per second. So, we've more than proved the throughput capability and through our rigorous design and development with digital assets we've also proven out the security, the resiliency, and all the nonfunctional aspects as well as the functional aspects related to trade registration, innovation, and settlement for the DLT.

Ilana Singer:
Now Katie, we've talked about all of the advantages of DLT and why the exchange chose DLT let's shift gears a little and talk about some of the challenges. So, what are some of the challenges in replacing a system like CHESS that is so entrenched in the Australian financial system and that requires significant system changes by so many different stakeholders?

Katie McDermott:
The main challenge yes is the diverse stakeholder group that is connected to CHESS. So, one of the other things is that the issuers, we support their sub registers. So, the 2300 listed issuers are members in the settlement facility. So, we have the issuers, we have their registries, we have the participants, and even our participants cater to different segments of the market. So, retail brokers are quite different from the institutional brokers, custodians, margin lenders. We also have banks who act as payment providers for our system. So, dealing with all of these various stakeholders that have their own motivations and their own interests that they want to achieve the CHESS replacement has been a challenge.

Katie McDermott:
One of the most important things to do is to make sure that we bring everyone on the journey. So, we've had an extensive consultation process. This is to help identify what all of our users want to get out of the replacement system. So, one of the things was to ensure that ASX made a decision to leverage DLT. That's not to say that everyone in the market would come to the conclusion that DLT was something that they wanted to invest in. So, to extract away that technology choice we have connectivity options. You can connect direct leveraging DLT or you can connect using traditional messaging and the traditional messaging can be either through the Swift Network or AMQP. This allows

all stakeholders in the Australian market the choice to decide how they want to leverage this new technology and they can operate with the traditional message based solution or they can leverage current state, and the applications, and the innovation that we think DLT will bring.

Ilana Singer:
It clearly sounds like there've been many stakeholders, many discussions, and many consultations along the way and as you said you've been taking all of the stakeholders on the journey with you. Now with all of the challenges and interesting opportunities that this initiative has presented there is also no point of specific reference for the exchange since ASX was the first mover in the DLT space. Are there particular challenges in being a first exchange in the DLT space and is there anything particular about the Australian market that made it attractive for this initiative?

Katie McDermott:
Well, as first mover the biggest challenge we face is the amount of education we have to provide. People are very, very interested in this technology and the number of C suite executives who have taken an interest in trying to understand the intricate details of the technology as opposed to someone asking about a traditional database that's been one of our largest challenges but it's also been an opportunity. Because we're able to design and leverage the DLT in a way that is most useful for the Australian financial market.

Katie McDermott:
We've invested in building a dedicated showcase suite so that we can demo the functionality and we've performed over 120 demonstrations to more than 700 attendees. The extensive stakeholder consultation included two market wide consultations, one in 2016, just to understand what it was that people wanted from CHESS replacement and another in 2018 on the new functionality and the nonfunctional requirements as well as with the proposed timeline. We've held more than 30 working groups and focus groups where we test out the solutions with our customers and we've engaged highly with the regulators and provided them with regular updates as well as demonstrations of what the new technology will be able to do.

Ilana Singer:
So now shifting gears and moving away from challenges to opportunities, what opportunities, Katie, do you believe this technology and the new CHESS system will provide to stakeholders of the ASX such as listed companies, investors, other market participants, data system vendors, regulators, and supervisors?

Katie McDermott:
So what we're doing with CHESS replacement is we're basically laying the rails. First and foremost, we need to be able to clear and settle the financial market. And so, how we actually settle on the last day of CHESS and operate on the last day that CHESS is live will be what we will be striving to achieve on the first day of the new system. But then what we expect is the market to be able to leverage that technology in lots of different ways. So, you will have all of those various stakeholders connected and able to

on a permission basis for data that they are entitled to to see golden source synchronized data.

Katie McDermott:
We see this as a huge opportunity for issuers for them to be able to have real time access and to understand who is on their register of members real time. And we see the opportunity for third party vendors to come in and create applications that suit the needs of the Australian market. We expect to be able to provide nodes first to clearing and settlement participants but then provide node access more broadly to that. And as applications are developed that could be our participants providing node access to their customers on a permission basis of the data that they're entitled to see and then providing instructions all operating on the same data. That can make something like corporate actions processing for a rights offering much more timely, much more seamless, and much efficient.

Ilana Singer:
Thank you Katie. Now shifting gears to international responses to the initiative what responses have you seen, others at ASX seen from regulators and supervisors and from other stock exchanges around the world?

Katie McDermott:
There's a lot of interest obviously in what we're doing and we know the world is watching us. We've provided, again from an education perspective a lot of demonstrations or presentations to explain what it is we're doing and why we're doing it and we have extensive consultation with our own regulators. Just for context, the equity market in Australia operates under regulatory expectations with obligations around user input to governance, transparent, non-discriminatory, and fair, and reasonable pricing, and commercial, transparent, and non-discriminatory access to clearing and settlement services. And these have all been guiding how we actually implement a DLT solution for CHESS replacement.

Ilana Singer:
Well as you said, Katie, the world is watching how this is going to play out at ASX and I think that's really a testament to how cutting edge it is and how you and your team at the exchange are taking the lead on this important initiative. Now, based on your experiences throughout this piece how can securities, regulators, and supervisors today and into the future facilitate the creation and adoption of the latest technological innovations especially in the exchange space?

Katie McDermott:
So thinking about our journey, I think it's really important for the regulators to set out what it is they expect new technology to be able to meet. What are those requirements? And then this way it's up to then the organizations to prove to the regulators how they meet them. It's also important to make this publicly available and the expectations of what the regulators have in regards to consultations and engagements should be known upfront. And then, this will help facilitate for organizations to be able to leverage

innovation and technology and to know what it is they need, the bar that they need to meet as it's set by the regulators.

Ilana Singer:
Thank you. I know that for many of our listeners who are regulators and supervisors that will be a particularly helpful suggestion. So Katie, coming back to change management and how to manage expectations we talked about some important lessons and takeaways for regulators and supervisors. Can you speak a little bit about other challenges that you've had from the markets and from particular market participants in terms of resistance to change?

Katie McDermott:
Yeah. So as the case when you are swapping out critical market infrastructure there is change required and so we have had pushback in terms of the amount of change that is required. In abstracting away the DLT technology one of the things that we introduced was the adoption of ISO 20022. This is a global standard and many financial institutions, central banks, and payment systems are migrating to ISO 20022. In Australia the RBA is currently consulting on the move for the Australian payment system.

Katie McDermott:
So, it's quite appropriate that the equity post-trade system would be leveraging ISO 20022 but the uniqueness of the Australian market with new on register provides additional challenges in looking to match current proprietary messaging to a global standard. And the workflow used for that messaging is different than what would currently be in CHESS. And so, this change can be difficult for people to digest especially when it is just a move from one message type to another message type they're not actually seeing at face value the efficiencies and the benefits. We are bringing in things like standardized registration details which will allow for better data mining. And it's about helping our stakeholders to see the benefits of things like just introducing a global standard and how that can provide efficiencies and benefits to the market.

Ilana Singer:
Thank you for your candid response on that front Katie. It's always helpful to know the challenges and the opportunities that any initiative can bring. And so to wrap up, this session has been very insightful and it is unfortunately time to conclude. What do you want our listeners to take away, Katie, as the most important takeaway that ASX has learned through this initiative?

Katie McDermott:
The most important thing we've learned is the value of the network with the DLT, so a lot of the proof of concepts that have been going on have been in the margins or with limited number of parties. We really feel that providing the connection that CHESS, the CHESS replacement system has, and the diverse stakeholders even though that made it quite challenging but it will be where the value is. Because we're going to have this

diverse group of people all connected through the same technology leveraging synchronized data on a common domain model using [inaudible 00:23:08] a common language. Which also means that when the workflow is processed it's processed in the same way. And so, I would just encourage everyone to investigate and figure out what problem you're looking to solve with this technology. For us, it was the synchronized data and the multi-party workflow and I think in the financial markets it's very appropriate to use DLT to help achieve efficiencies and innovation in that space.

Ilana Singer:
Thank you very much Katie. I really wish we had more time to today but even in the short time we have spent together I'm taking away three things. First, ASX has been a lead player in putting this initiative forward in a very innovative space. Second, you and your team at ASX have really been building a platform for the future and trying to future proof really this post-trade infrastructure. Third, the amount of time and effort that has been put into the change management and the management of multi-stakeholder expectations and challenges has been really admirable. So, thank you again for taking the time out of your very busy schedule to provide us with your valuable insights today.

Katie McDermott:
And thank you. I've enjoyed sharing.

Ilana Singer:
I would also like to thank all the listeners of this podcast. Toronto Centre is currently working on numerous podcasts regarding different initiatives in the capital markets. So, please check back on the Toronto Centre website regularly.