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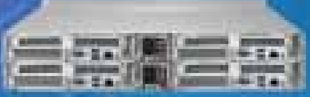

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Will AI Deliver Where Blockchain Has Disappointed?

Back in 2000, Malcolm Gladwell's debut book, *The Tipping Point: How Little Things Can Make a Big Difference*, gave name to the well-known and universally understood concept describing the process by which things or ideas reach a point in their lifecycle where, for no apparent reason, they suddenly start spreading, according to Gladwell, "like viruses." In other words, they reach a tipping point where suddenly, inexplicably, they take off. Facebook and Twitter both experienced tipping points, and in Europe, Whatsapp is arguably the best example of the phenomenon, where for a number of years the messaging platform smoldered before combusting spectacularly to become the de facto pan-European social media (and increasingly business, too) communication platform. Its success and pervasiveness, irrespective of language, country and users' demographics, is staggering.

I believe that artificial intelligence (AI) technology has reached its tipping point, and, over the course of the next 12 to 18 months, will permeate not only most industries—especially the capital markets—but just about every facet of our everyday lives, too. *Waters* has been writing about AI in its various guises for a number of years now. In my editor's letter from January 2014, *Do Algorithms Dream of Super-Fast Sheep?*, I wrote: "Now, algorithms have the ability to 'learn' from past 'experience,' intentionally routing orders to specific destinations to obtain the most advantageous and likely fills. While this behavior is far from anything approaching a consciousness and the ability to genuinely make their own decisions based on something other than programmed inputs, surely that time will come sooner or later."

While smart algos might already have taken up residence within some buy-side and sell-side firms, it is by no means the only application of AI we will see across the capital markets: AI has the potential to transform the front, middle and back offices of every capital markets firm. Of course, technologies like blockchain will continue to attract speculative capital, and will, in all likelihood, play a significant role across the capital markets in years to come, although its tangible results to date have been undeniably underwhelming. But apparently that hasn't dulled its luster: In mid-May, R3 announced that it had secured $107 million in funding to accelerate the development of its Corda distributed-ledger platform, underlining the extent of the industry's blockchain infatuation.

But to my mind, technologies that allow firms to make the best-informed, systematized and repeatable decisions for themselves and for their clients, while simultaneously allowing them to get closer to their investors and provide them with a better, all-round experience, will always trump those that focus on efficiencies and streamlining downstream operations. That's the nature of this particular beast. And so, in response to the question in the title of this column, the answer is yes. Definitely. W

Victor Anderson
Editor-in-Chief

Inside Market Data Inside Reference Data Buy-Side Technology Sell-Side Technology
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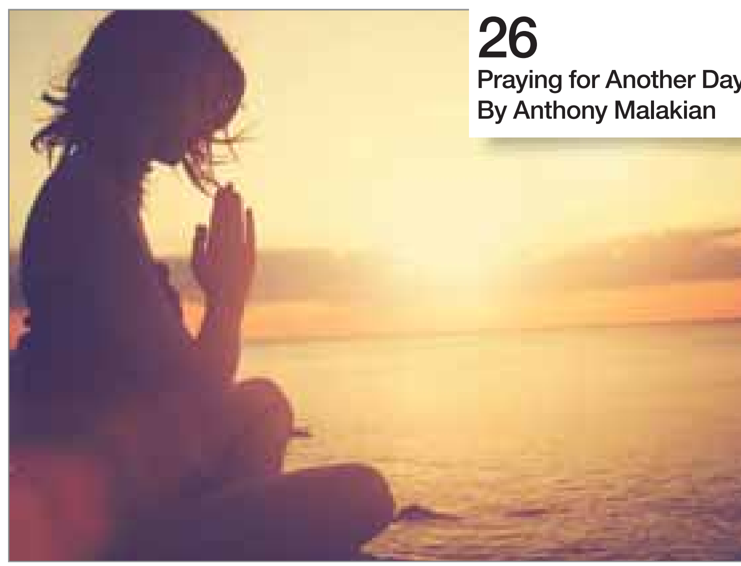

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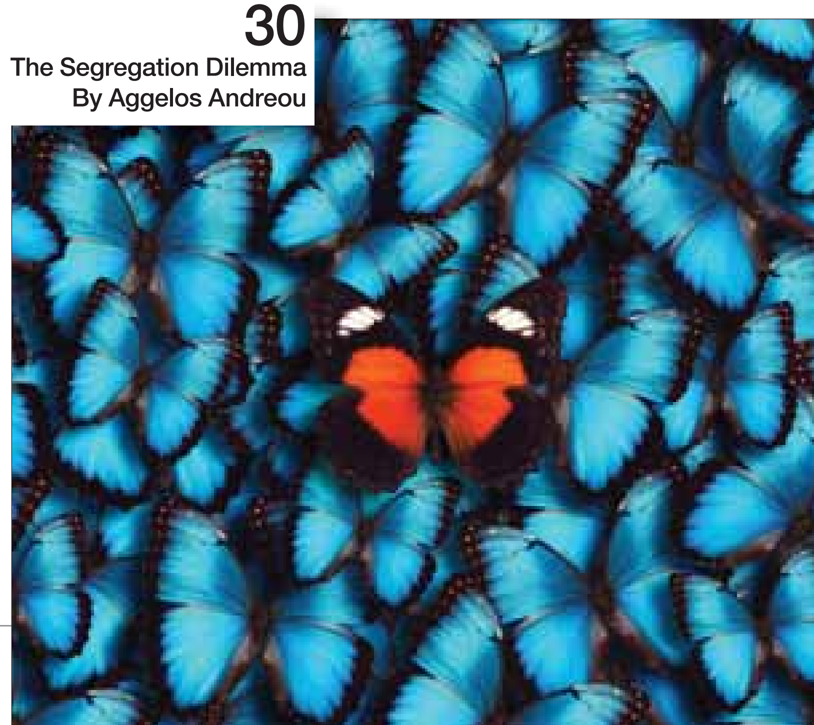


FCA Urges Buy Side to Make Assumptions on Mifid II Provisions

The FCA's Stephen Hanks says regulators will punish firms that did nothing to prepare for Mifid II compliance, but not the ones that tried and failed. By Aggelos Andreou

Speaking at this year's Buy-Side Technology European Summit in London, Stephen Hanks, markets policy manager at the Financial Conduct Authority (FCA), said that he recognized that some key provisions around Mifid II remain unclear, and urged firms to decide how to comply based on what they assume the provisions suggest.

Regulators are expecting the industry to make all reasonable efforts to be ready by January 3, 2018, Hanks said in his keynote speech, while recognizing the challenges firms face in building compliant systems because the directive is still at level 3 and therefore some parts remain unclear. "The key is to make a sensible set of assumptions, write them down and work on that basis," he said. "We will not be taking action against firms that tried and failed if their decisions were based on these assumptions."

He added that the lack of information provided by both the regulators and the firms' service providers would not be an excuse for doing nothing. "We understand that you also depend on service providers to get as much information as possible, and sometimes it may not come through in an adequate amount of time," Hanks said. "We will be sensitive to these concerns, but we will not be sensitive to firms that have not made an effort to implement the Directive on time."

Hanks also recognized that the buy side has to pay a hefty price for the adjustments it has to make to comply with Mifid II. "It is fair to acknowledge that this will involve a significant element of an ongoing cost for the industry," he said. "But Mifid II is here to deliver an important public service, such as greater efficiency in trading, financial stability, and investor protection."

The Regulator's Duty

During his speech, Hanks said market participants are not the only ones that have a significant amount of work to do. For Mifid II to be as effective as it aspires to be, regulators share the responsibility with firms. "Mifid II requires people to produce, collect, store and disseminate large amounts of new information, which we as a regulator have to work at and see how it could help us to do our job," he said. "It can't be simply a case of the industry providing information and then not making use of it."

He added that the information collected by the transaction reporting requirement will aid in market surveillance that seeks to identify instances of abuse. "We will also try to use that data for a number of other things as well."

He said these include the supervision of individual firms or looking into what is going on in the markets and assessing what is working or what is not, and providing input into the decisions of the Financial Policy Committee when looking into financial stability issues.

"As a regulator, we have become much more conscious over the last five years in our need to be smarter about the use of data that firms need to produce," Hanks said.

Outsourcing Risk

The FCA has been trying to raise awareness of the risks involved when outsourcing the required solutions for Mifid II. Hanks stressed the importance of following the provisions included in Mifid II and other regulations. "There are two main areas firms need to address with outsourcing," he explained.

First, firms need to understand, test and challenge what the provider is doing on their behalf. "You may be significantly smaller than the service provider you are relying on," he said. "There might be an imbalance that might affect the power of the relationship, depending on how important you are to the outsourced provider."

He said the FCA expects firms to be able to think about how they are going to manage that relationship and to have the resources internally to challenge the types of service they are taking.

The second risk lies in the nature of outsourcing itself, since the solutions go out not just to one firm but to a set of companies. "You need to always understand what is going on in that chain, to assess the risks and decide how to act if any issue comes up," Hanks said. W

THE BOTTOM LINE

- The FCA aims to use the data collected by Mifid II's transaction reporting requirement to aid in market surveillance and help it identify instances of abuse, while also working toward greater efficiency in trading, financial stability and investor protection.

Legacy Systems, 'Army of No' Top Hurdles for the Buy Side

A C-Level panel identifies legacy technology and culture, deep-rooted in many firms, as the biggest hurdle to business transformation. By Aggelos Andreou

Panelists at this year's Buy-Side Technology European Summit in London agreed that replacing legacy technologies and well-established mindsets are two key challenges the industry is facing and will continue to face for some time. While the buy side embraces innovation and new technologies, it is still reliant on old but widely used systems.

"Decommissioning is one of the most topical issues right now," said Stuart Warner, head of technology, UK and Europe, at Fidelity International. "We install all these new tools, but I never see the old ones get switched off because somewhere during the implementation, someone retreats."

Tom Dalglish, head of technical services, applied innovation at HSBC, underlined the difficulty in tackling the issue, due to the complexity of new tools. "When you discover how sophisticated an innovative product is, you go back to what you had that was simple and easy to understand," he said. "The biggest challenge is that we used to run it all in one big machine, and when it broke we knew where to fix it; now that same capability is spreading across a hundred places."

Dalglish said the most critical issue is that there is no access to legacy systems' data. "We are increasing the dependency on the systems we'd like to turn off because the data is not isolated," he said. "It is vital to keep the data segregated; this will let you switch off legacy tools."

"Legacy technology is not always bad," Warner said. "Some of it is quite cheap, and it doesn't change very much." But in that way, firms fall into a cycle where businesses are trying to save costs and end up paying a lot more due to this hesitation. As they keep their legacy technologies running, they become more and more expensive. "There is a subset of people within the organization who understand how these technologies operate," he said. "The longer you keep them, the more expensive they get to maintain and operate."

> "You need to disrupt yourself. It's one of the hardest things for a company with a strong heritage to do." Robert Berendt, Northern Trust

Apart from cost, Warner said keeping legacy technologies means that firms are subject to risk and production incidents. "Legacy systems are by nature slower and not compatible with the increasing demands of your client base," he said. "If you want to drive down your incident count and give a better customer experience, you need to turn your legacy technologies off."

'Army of No'

Robert Berendt, head of EMEA, cross technology services at Northern Trust, said that changing the legacy culture is the biggest hurdle to overcome. "I am very proud of our 125 years of heritage, but that also brings some cultural issues," he said. "We have a lot of people who have been working for more than 25 years and have established a culture of stability that we can't change as quickly as we want."

He stressed the need to bring on new staff who are nimbler and adopt change more readily, such as millennials. "You need to disrupt yourself," he said. "It's one of the hardest things for a company with a strong heritage to do."

HSBC's Dalglish pointed to an "army of no" creating obstacles to technology and cultural transformation. "There are layers and layers of the 'army of no'—people who come between me and a client," he said. "When you need to build innovative tools for your clients, and you require a small team to do it, they always refuse to hire more people."

Berendt says one approach is to free some staff from legacy platforms and let them work on new technologies. "That's one of our tools to bring some cultural change to our company—to give people the time to work on the new digital platforms," he said.

Another solution is for technologists to change the way they interact with the business. Fidelity's Warner said that conversations have shifted lately. "My role has changed," he said. "It is part educating and part influencing, whereas before it used to be more of an order taker."

He added that it is critical to present innovative technologies in such a way that the business can understand the benefits and will therefore sponsor the effort. "You can't just do it as a technologist—there's got to be a partnership," Warner said. W

THE BOTTOM LINE

- Controlling, managing and segregating data has become more essential for buy-side firms as it makes turning off legacy tools and platforms more practical.

Digital-First Approach Key for Buy-Side Response to Increasing Pace of Change

Fidelity International's head of technology, Stuart Warner, details how the asset manager is embracing technology for change, and extolled the virtues of a digital-first approach for the buy side. By John Brazier

Asset management firms need to embrace technology-oriented strategies and investments to better prepare for a changing environment. It's a common enough discussion and acknowledged viewpoint, but how do firms that have been historically reticent to embrace new and emerging technologies go about achieving it?

During his keynote address at this year's Buy-Side Technology European Summit in London, Stuart Warner, head of technology at Fidelity International, said attitudes are beginning to change when it comes to digital-first strategies among asset managers, partly as a result of companies like Microsoft, Amazon and Apple that have managed to realign their business models to disrupt and succeed in their respective markets. "Buy-side organizations are waking up to the fact that technology isn't a cost to control; it's not an overhead—it's a competitive advantage," said Warner. "Investment banks woke up to this a long time ago, investing huge amounts in trading, automation of liquidity, foreign-exchange (FX) global markets, and they used technology to their advantage. That is changing now and people on the buy side are starting to compete in this marketplace."

Pointing to Charles Darwin's theory of evolution—that it is those most adaptable to change in their environment that are best equipped to survive—Warner said technology is the key driving force for both reacting to and enabling positive change on the buy side, using his own firm's ongoing strategy as an example.

Fidelity International, a UK-based asset manager that operates in 27 countries, has adopted technology as one of its key business pillars, and is in the process of implementing a digital-first strategy that Warner categorized as "quite radical," following years of expensive technology optimization projects through an infrastructure-as-a-service platform.

However, digital is a term that is often misunderstood or interpreted differently, with many believing it to relate simply to the front-end. "It is not about just having a nice, clean front-end and good customer interaction; it is about having a straight-through process that runs right the way through the business," Warner said. "If you can achieve that, you can get a very scalable business, keeping your fixed costs under control, and then grow the company quickly."

Fidelity International's Simplify Technology strategy focuses on five core areas, said Warner: application architecture, where a rationalization project will eliminate overlaps and aims to reduce the organization's application estate by 30 percent over the next two years; data simplification through compression, visualization and virtualization to ensure data is in the right place and reduce transfers throughout the organization; cloud architecture, through the implementation of a platform-as-a-service cloud capability that already hosts over 100 applications; leveraging DevOps for increased automation in the middle office; and the optimization of the firm's support structure, through the adoption of test-driven and business-driven development approaches.

THE BOTTOM LINE

- The adoption of a technology-centric strategy will be the difference between those that survive and grow in the face of a changing buy-side environment and those that don't.

Improve Efficiency, Reduce Cost

The result of all this work is to streamline and refocus Fidelity International as a more agile business entity, increasing responsiveness to change while also reducing the organization's fixed costs, resulting in a more scalable business model centered on new technology.

"You can grow profit without growing revenue if you do have a very clear digital strategy and focus on the efficiencies of the business," said Warner. "That is where the secret sauce is and something that Fidelity has looked at quite closely, particularly within technology. As we battle between investing in change, it is keeping our ongoing fixed costs under control, and there is always a conflict between the two. With new technologies we are trying to make sure we get the right investments without growing fixed costs, which is a much more scalable model."

The goal of placing technology at the heart of any financial services firm is to be adaptable in the face of whatever may come down the line in the future. Warner highlighted artificial intelligence (AI) as a key technology for the future. "AI will probably be the technology that will matter the most to Fidelity over the next 10 years," said Warner. "It's got huge potential and is a multi-billion-dollar opportunity, but it is also an existential threat. Through the use of AI there is no doubt we can offer more personalized services to our clients and even tailored products in a way that we could never have done previously." W

Arbitrary Dark Pool Caps Leading to Increase in Block Trading and Innovation

The incoming caps on waivers for dark-pool trading volumes under Mifid II are still a sore point for many in the industry, but they're also leading to greater levels of innovation and block trading, while some buy-side and sell-side firms are adopting a game theory approach to dark trading. By John Brazier

One of the more contentious elements of Mifid II—the restrictions on the use of dark-pool trading waivers—will ultimately lead to more technology innovation and large-in-scale (LIS) or block trading, according to panelists at this year's TradeTech conference in Paris.

The double-volume cap states that the use of two waivers, the reference price waiver and the negotiated trade waiver, will be subjected to limits—4 percent of European trading on any one trading venue and 8 percent of European trading on all venues as a whole.

"Dark trading is one of the areas that has been spectacularly misunderstood by the regulators throughout the Mifid II process," said Richard Semark, managing director of equities at UBS and CEO of UBS MTF, referencing the Financial Conduct Authority's thematic review of trading, which found that dark-pool trading was popular with buy-side firms due to its effectiveness.

"We are moving into a situation where the effective ways of trading are being constrained by the regulators," said Semark. "As a result, we are seeing innovation as a way to maintain the ability to trade in a way that suits buy-side clients' investment processes."

Ralston Roberts, co-head of electronic trading for EMEA at Goldman Sachs, said the regulation was pushing institutions away from the "natural medium," which could "lead to unintended consequences"—namely, that it would create future trading environments that regulators had not envisaged in terms of price discovery.

There has been criticism from across the industry against what is seen as a limitation on interactions between buyers and sellers to mutually agree prices. The levels at which the caps have been set have been singled out as a ruling that many in the industry are unable to comprehend. Rob Boardman, CEO of ITG Europe, described the 4 and 8 percent cap levels as "arbitrary" and a "political compromise," pointing out that both dark and block trading have low levels of market impact and that the dark markets will have to evolve as a direct result of the rule. "Plain and simple, there will be new types of platforms, which are ostensibly lit, like systematic internalizers or periodic auctions, and that, combined with the execution above the LIS waiver, will become the new dark market," Boardman said.

Meanwhile, Semark said the caps were a result of lobbying by incumbent exchanges, reflected in Mifid II, which would ultimately result in a move away from dark trading, either via electronic dark pools or voice dark trading, onto lit exchanges. "What we will see is innovation in terms of allowing trading, which would normally take place over the counter (OTC) being moved to on-exchange," he said. "What is disappointing is that the innovation is about trying to pull existing behavior into a regulatory framework, as opposed to developing ways people want to trade."

THE BOTTOM LINE

- The dark pool double-volume caps set to be introduced under Mifid II are pushing both sell-side and buy-side firms toward block trading, as institutions seek new ways to maximize liquidity in the face of what many perceive to be a misguided attempt by regulators to increase transparency around dark-pool trading.

Game Theory

Both Semark and Ralston said their respective institutions were adopting a game theory approach—the study of participants' behavior in strategic situations—to the impending caps as industry data and volumes show that both caps will be breached soon after January 3, 2018, if not on the first trading day of the new year. "We think that most people will cap out," said Ralston. "It is very hard to dial back. I don't think it's possible for everyone to work together on this. There are a handful of stocks that will never reach those caps, so there will be a place for dark trading in multilateral trading facilities (MTFs)."

The expected outcome of the double-volume caps is that liquidity will become further fragmented over the course of the next 12 months and there has been an increasing demand from buy-side firms for more tools to increase their level of control, especially as asset managers go in search of greater returns in block-trading venues. "We're seeing the magnetic approach that large-in-scale trading has," said Semark. "But we shouldn't underestimate the behavioral change that is required; it requires considerably more patience, particularly from portfolio managers. I think we will see a growth in LIS, but there needs to be an education process through to portfolio managers about how that method of trading is better but slightly different from what they're used to." W

Automation Not the 'Holy Grail' For Buy-Side Trading Desks

Automation, best execution and transaction-cost analysis were all key focus areas during a discussion between heads of trading at Allianz Global Investors and GLG Partners at this year's TradeTech conference in Paris. However, while investment in technology is rampant ahead of the implementation of Mifid II, automation is not a by-all-means objective for some on the buy side. By John Brazier

As asset managers across the industry ramp up their preparations for the arrival of Mifid II, automation has been a top priority across many front, middle and back offices on the buy side. The benefits—reduced costs, the removal of manual processes and streamlined workflows—are both apparent and enticing for many asset managers, particularly when it comes to regulatory-related operations, but not everyone believes automation is necessarily a golden ticket to success. "

There isn't any right or wrong about seeing more or less automation, as this very much comes down to strategy," said Eric Boess, global head of trading at Allianz Global Investors. "Some people think that automation is the Holy Grail and you can get rid of most of the human traders and just have one monitoring a laptop. I don't think that's the way forward."

Boess was careful to stipulate that while automation is not without its advantages, a "sense of human oversight" is necessary to maintain cost-income ratios for a viable business model.

Drawbacks

One of the drawbacks of implementing what Boess referred to as a "monolithic IT infrastructure," is a loss of flexibility, something that multi-asset trading firms like Allianz benefit from in changing or volatile marketplaces. "It might work for some firms—commodity trading advisors (CTAs) or very quant-driven or high-frequency strategies—but for us as a broad-based strategies, multi-asset firm, I definitely need the flexibility of human traders to change their trading decisions depending on which strategies we are currently adopting," Boess said. "Automation is needed, but it's not the Holy Grail."

Erik Koenig, global head of trading at GLG Partners, part of London-based Man Group, Europe's largest hedge fund entity, agreed that while there is value in automation to optimize processes, as an active fund manager, the human element of trading is a vital component, due to the level of informational feedback derived from the trading desk when searching for liquidity. "One of the biggest problems that we face is liquidity and the hope is that in the post-Mifid world we will actually be interacting with the right people to make sure we can get that," Koenig said.

Automation will still be top of many wish lists across the buy side, particularly when it comes to optimizing problematic areas in the middle and back offices; however, the front office is still where the human trader holds sway unless there is particular call for an automated trading strategy.

THE BOTTOM LINE

- While there are proven benefits to adopting automation in the middle and back offices, there is less of a call to do so in the front office, where the experience, and, in some cases, emotional input of human traders is seen as invaluable, particularly in multi-asset and multi-strategy environments.

'Stupid' Data

One part of the Mifid II regulation that is of particular concern for asset managers is the change to best-execution requirements, which in turn is significantly impacting how transaction-cost analysis (TCA) is utilized, as firms adapt to demands from regulators and end-investors for more transparency. Both Boess and Koenig asserted that through the establishment of a holistic best-execution committee, there was no need to "reinvent the wheel" in what remains a "gray, opaque area," regardless of how a firm chooses to approach its TCA adoption. "We have in-house and external TCA," said Koeing. "Our view is that we want to overlay both to make sure that we have the purest outcome and that the facts and information overlay there."

Boess, meanwhile, said that he preferred for TCA providers to be external parties, as it provides a minor level of credibility, as opposed to doing the job in-house, in discussion with external clients and internally between traders and portfolio managers.

"There has to be a certain amount of proprietary intellectual capital going into this, because best execution is not a one-size-fits-all exercise," he said. "Trading is always the extrapolation of investment strategy. What is best execution for one strategy does not necessarily work for another, so you have to ask the right questions to a TCA provider and the data. Data itself is stupid—you have to ask the right questions to get the right answers." W

Thesys Moves Forward with CAT, Signs Contract with SROs

As the creation of the Consolidated Audit Trail continues to progress, one milestone has been completed, but there's still much more left to accomplish. By Anthony Malakian

Thesys Technologies has announced that the next step in building the Consolidated Audit Trail (CAT) has been achieved, as the technology subsidiary of Tradeworx signed a contract with the self-regulatory organizations (SROs) to build the platform that will manage the tracking and auditing of all stocks and options transactions by the Securities and Exchange Commission (SEC).

In January, the consortium of SROs tapped Thesys to build and replace legacy reporting systems, including the Order Audit Trail System (Oats), built by the Financial Industry Regulatory Authority (Finra) and was thought to be the favorite to win the CAT bid.

In what came as something of a surprise, Thesys edged out Finra for a couple of reasons, including what would happen should there be a cyberattack. In a feature detailing how Thesys won the bid, several sources told *Waters* that Finra's unwillingness to take on all liability in the event of a potential breach of the CAT database was a non-negotiable point for the SROs. Thesys has long been a vocal proponent of the importance of the CAT's cybersecurity defenses.

"Security was a key element of the Thesys CAT bid—designed from the ground up and deeply integrated into the architecture," Anshul Anand, senior vice president of business development for Thesys Technologies, tells *Waters*. "Through the bid process, we continued to innovate on security features related to advanced encryption and access management. We convened a panel of world-renowned security experts to help design and vet these security concepts."

To act as the CAT plan processor, Thesys established Thesys CAT LLC as a separate legal entity. Thesys CAT is partnering with IBM, which will provide hosting in the IBM Cloud, cognitive computing and security services, technology infrastructure, program management, consulting and help desk services. Latham & Watkins is serving as legal counsel to Thesys CAT. The SROs, on the other hand, jointly formed CAT NMS LLC to oversee the build and operations of the CAT system.

Next Steps

Anand says the company has "a number of internal work streams" looking at the technology, itself, as well as for operations and security. "We're happy to have the contract with the SROs in place. Since we won the bid back in January, we've been working on planning and delivering the CAT system," he says. "We are currently focused on the execution timeline outlined in the CAT NMS Plan—as part of the recent Industry Outreach Webex hosted by the SROs, they shared a few of the important next steps, including publication of technical specifications and billing. Simultaneously, we have been building a strong Thesys CAT bench under an exceptional management team, which we'll be providing further details on in the near future."

In November, SROs will start submitting data to the CAT. Starting in January 2018, SROs will begin implementing enhanced surveillance based on CAT data. And in November 2018, large broker-dealers will begin submitting data to the CAT.

The First Bill

According to a recent Finra rule filing, the CAT will cost the industry $50.7 million for the current fiscal year, which began on November 21, 2016. Of that cost, $37.5 million will be used for operational development of the platform, while the remaining $13.2 million will cover third-party support costs, operational reserve and insurance costs. To spread out the costs, industry members—i.e., broker-dealers—will cover 75 percent of the cost using a tiered structure depending on how much message traffic they generate. Execution venues—including equity and options exchanges, as well as ATSs—will cover the other 25 percent, with equity exchanges taking 75 percent of that cost.

"The operating committee determined that a 75/25 division between equity and options execution venues maintained elasticity across the funding model as well the greatest level of fee equitability and comparability based on the current number of equity and options execution venues," the filing stated. W

TIMELINE

- On May 6, 2010, the Flash Crash occurred.
- On May 26, 2010, the SEC held its first open meeting proposing a rule to build the CAT.
- On January 17, 2017, the SROs selected Thesys to build the CAT.
- In November 2017, the SROs will begin submitting data to the CAT.

Sell-Side Technology Awards 2017
waterstechnology

SmartStream Maintains Reconciliations Dominance

SmartSream emerged on top again in the best sell-side reconciliation platform category in this year's Sell-Side Technology Awards, thanks to its outstanding TLM Reconciliations Premium offering that continues to sweep all before it. Victor Anderson quizzes SmartStream's CTO, Rocky Martinez, about what exactly sets the company's flagship offering apart from other platforms, and what the industry can expect from the London-based firm over the next 12 months.

Q TLM Reconciliations Premium continues to win awards against stiff competition across both the buy side and the sell side. What do you believe provides the platform with its competitive advantage?

Rocky Martinez, chief technology officer, SmartStream Technologies: There are several reasons why we keep winning. The first is that we have built the technology in a way that can be configured to adjust to each client's needs at the time that they need to use it. We do have standard modules like ETDs, NAVs, cash, etc., but as you know, every time you go into a bank they have their own flavor of those functions. So, not only do we give them a module that allows them to start off with a good understanding of what needs to be done, but they also have the ability to tweak it according to the way their business processes are performed.


Rocky Martinez

The second is access to data and the ability for businesses to have a built-in process. Not only do we allow the business to control the data and the processing, but we also provide the users—the reconcilers—with the ability to match whatever processes there are in the operation.

And third, our technology is constantly evolving—we're currently in the process of producing a huge version of the platform that will be released in August or September of this year, which will feature a redesigned front-end.

Q TLM Reconciliations Premium has a number of delivery options. Have you noticed a preference for one mechanism over any of the others?

Martinez: We deliver in four ways: the traditional, on-premises model; we deliver a hosted solution; one where we provide the reconcilers [the actual workers] to manage the reconciliation function; and we also offer a model where if the client still wants to host the hardware and software but they want us to manage the software and the operations, we can do that too.

We understand that one size does not fit all. We've positioned ourselves not only with the technology but also with the operations, both technical and business, especially now that banks are trying to consolidate and reduce costs and staff numbers.

In terms of trends, what we're starting to see is that a lot of our larger and mid-sized customers are looking for a perpetual model where they pay a fixed cost and we give them the hardware and the software, plus the technical operations support, and then if they need the business operations, we'll add that to the service as well.

Q Typically, what are you clients' most pressing needs in the reconciliations space, or does that vary from client to client?

Martinez: Clients need to manage all their regulatory-type reconciliations. With ESMA coming on and some of the banking regulations being introduced across Europe—and with the current administration and what that might mean for regulations in the US—a lot of the regulatory-type reconciliations are becoming hot for us, especially those around cash and positions because of the regulatory nature of those processes.

What we're seeing is that customers do not want to do reconciliations on spreadsheets anymore because they don't have the breadth of audit in order to track those reconciliations. We're in the process of building tools to remove those spreadsheet reconciliations and get them onto our platform.

Q Given the significant rise in trade and data volumes across the industry in recent years, to what extent does scalability and processing "grunt" determine the success of a reconciliations platform?

Martinez: We are well-placed right now to deal with high trade and data volumes. The DTCC is one of our clients and we currently do tens of millions of reconciliations every day for them, so we have the scalability. But we are also starting to look at technologies like Apache Spark, Apache Hive and Hadoop, which will increase our throughput but will not require such extensive investment at the customer level to do that grinding of bits and bytes. W

Broadridge Retains Outsourcing Crown

Broadridge Financial Solutions won the best outsourcing category at this year's Sell-Side Technology Awards, retaining its crown in what is an intensely competitive and hugely lucrative industry. Victor Anderson speaks to Michael Alexander, president of Broadridge Wealth and Capital Markets Solutions, about the details of Broadridge's outsourcing offering, the business processes sell-side firms are willing to hand over to the Lake Success, NY-based firm, and trends he sees emerging over the next 12 months.


Michael Alexander

Q For the benefit of *Waters*' readers, can you provide an overview of Broadridge's outsourcing strategy and the various services it offers sell-side firms?

Michael Alexander, president of Broadridge Wealth and Capital Markets Solutions: We have three corporate strategies: big data, digitalization and mutualization. Our managed service is part of bringing those three focal points to life. We call it a managed service because what makes us unique in the marketplace is that we have our own end-to-end technology from the front to the back office, and then we couple a labor service on top of that. That model allows us to make investments that enable our clients to get value they wouldn't be able to obtain elsewhere.

One of the terms that we focus on is what we call "network value." Think of it like this: We have a community and in some cases extremely large market share in terms of volume—70 to 80 percent. There are things firms can do on their own within their four walls, but when you factor in our community, we can make changes and innovations that they could never do on their own. We call that network value. Our strategy around those three areas is to leverage the network value we have.

The services we offer are front-to-back-office, and increasingly—this is one of the trends we're seeing—our clients are going beyond operations. We focus primarily on sell-side firms, although we also have some asset managers that use the service and that part of our business is growing. Our services range from operations and compliance to regulatory accounting and tax and performance reporting—almost everything after the trade has been done.

Q Are there any areas (processes) that sell-side firms tend not to want to outsource? What do they want to maintain control over?

Alexander: This is changing, but historically for the most part, our clients would keep things that are client-facing; they keep things that provide them with their core differentiation. There are also a few things from a regulatory perspective that they have to keep. For example, they have to supervise our activities—we can give them the tools and the information to perform this supervision, but ultimately it's their accountability.

Q To what extent does Broadridge do total outsourcing lift-outs, or are outsourcing arrangements/relationships most often managed on a function-by-function basis?

Alexander: We're really client-driven—we'll do whatever the client wants. Some want an entire end-to-end service, while others want a point solution. Typically, if they do one service, they'll expand and do others later on. One thing that differentiates us from other outsourcing providers is that we have a US-based operation located within a FINRA-registered broker-dealer. It's a unique proposition in that we have a tremendous amount of subject matter expertise that our competitors don't, in addition to our technology. Often, we hire staff from our clients, which adds to our subject matter expertise. This is also a win for them because they save on severance and they maintain relationship continuity, and often it's their best people. So we end up having an operation that is the best of the best.

Q Have you noticed any outsourcing trends over the past 12 months in terms of drivers and business processes that sell-side firms are looking to hand over to Broadridge?

Alexander: People are trying to make sense of data—there's a lot of data out there, which they need to aggregate for insight and predictability. Firms often get a lot of false positives in their exception processing—they get a lot of items for attention—where they have to find a needle in a haystack. One of the trends is to help them solve that need as well as how to make sense of their data. The other is that they are increasingly comfortable with mutualization or outsourcing, and we're seeing more comfort around outsourcing more complex tasks. Most importantly, firms have done a great job taking out costs and embracing emerging technologies like artificial intelligence (AI) and blockchain. They are looking for a provider that can provide them with thought leadership where they can mutualize these investments and leverage these new technologies and realize service, risk and cost benefits that they couldn't do on their own.

Q What's in store for the next 12 months in terms of new offerings or enhancements of existing ones?

Alexander: We're going to leverage these new technologies (AI and blockchain). From an AI perspective, we're going to help clients transform their business and create new service and business support models by leveraging our network for the benefit of the community. W

BARCLAYS POINT: Any Port in a Storm?

Bloomberg's acquisition of the intellectual property of Barclays' risk and portfolio analytics solution Point has been the catalyst for a number of significant changes in the fixed-income technology landscape. John Brazier finds that alongside a number of similar risk and portfolio system acquisitions, concerns are lingering over how Bloomberg plans to integrate Point functionality into its own Port platform, even as the majority of users accept the path of least resistance.

The acquisition of intellectual property (IP) rights are often tangled, complicated affairs that can lack the brutal efficacy of outright, wholesale acquisitions. Once you've acquired the rights to the IP, what do you do with it to ensure that the deal is a success?

Bloomberg's acquisition of the Barclays Risk and Indices Solutions (Brais) business, first announced in late 2015 and completed in August last year, has already been the cause of substantial changes in the fixed-income technology space, despite Bloomberg still being in the process of integrating the solution into its own multi-asset portfolio risk and analytics tool, Bloomberg Port.

The inclusion of Barclays Point's IP as part of the deal acted as the catalyst for a number of investment banks looking to offload solutions to technology vendors in the fixed-income space, while end-users have been left facing a choice over whether to stick with Bloomberg, seek out a new solution, or bring the issue in-house. "The outlook in the market is that a lot of firms still don't have clarity with the solution Bloomberg is developing to be completely comfortable with the path forward," says David Bates, managing director at London-based consultancy Citisoft. "However, a lot of firms are working collaboratively with Bloomberg to develop their individual paths, to rationalize how they used Barclays Point, and how they will transfer into the Bloomberg Port environment."

> "A lot of firms are working collaboratively with Bloomberg to develop their individual paths, to rationalize how they used Barclays Point, and how they will transfer into the Bloomberg Port environment." **David Bates, Citisoft**

Different Paths

Following the announcement that Bloomberg was to acquire the Point IP, Barclays confirmed that it would only be supporting the platform for a further 18 months upon the completion of the deal, effectively turning Point into a legacy system as of the first quarter of next year. Under Barclays' ownership, Point was a widely used system with functionality for performance attribution, risk analytics, scenario analysis, and portfolio management. Investment managers have been forced by the acquisition to select and implement a new system for fixed-income functions, either from Bloomberg or elsewhere.

"There was quite a bit of bad feeling around this deal because a lot of people were basically blindsided by a very important part of their trading technology suddenly being retired," says the head of trading at an asset management firm that has chosen not to migrate to Bloomberg Port and is currently assessing its options. "I don't think there are many firms out there that are going to want to damage their relationship with Bloomberg over this, but at the same time, neither will they want to simply accept the Port system without some major work being done on it."

In March last year, Citisoft conducted a survey among the asset management client base of Barclays Point to assess the group's sentiments. The results were not flattering to Bloomberg, with the majority of respondents viewing the acquisition and future of Point as negative to themselves in the industry, while unknown pricing, lack of communication, a short timeframe, quality issues in Port, access to historical information, uncertainty over how migrations will occur, and limitations in Port functionality were all identified as significant concerns.

Citisoft's Bates says that over a year later, the survey's findings are still representative of the market sentiment. "Last year's survey results and feedback from investment managers was that the Bloomberg solution, in its legacy state, didn't offer the complete capabilities required by the fixed-income desks, particularly around risk and attribution and portfolio management," he says. "Bloomberg has committed to enhancing their product in integrating the Point IP and many firms have signed up to migrate onto that platform when it is developed and deployed."

Enhanced Port Offering

While the majority of Point users have elected to migrate over to the Bloomberg Port, according to Bates, there is now significant pressure on Bloomberg to provide its new clients with the technical functionality that they require across fixed-income desks. Speaking at a launch event for the Bloomberg-Barclays Indices in April, Bloomberg's head of buy-side investor analytics, Lea Carty, detailed how the vendor is ensuring that the functional capabilities of Barclays Point are being transferred into the enhanced Port offering. "Our principal goal is to minimize the amount of client disruption to the greatest extent possible given the timeframes we have," Carty said. "We are taking a number of steps to do that. One is migrating portfolio data—transactions, positions, reports and user-defined instruments that have been set up—into the Bloomberg solution so that the constitution of that history is available to clients using Port."

One of the key ways in which Bloomberg is preserving the analytical functionality of Barclays Port is by transferring the system's original code for hybrid performance attribution and global risk models. Bloomberg is currently in what Carty refers to as an "alpha state" with both codes, where the vendor is able to run reports in its technology stack across selected asset classes.

Risk modeling remains a key point of contention among those investment managers that have chosen to migrate to Bloomberg and those that are still sitting on the fence. While Bloomberg maintains that testing risk models is progressing successfully, apprehensions continue to linger over how the capability will be offered going forward. "There were a lot of functional similarities between the Port and Point solutions, but the fixed-income risk models that were available in Barclays, and the way that the solution integrates those with the broader portfolio management functionality, are the things that firms are waiting to test from the Bloomberg side," says Bates. "There are risks in terms of the underlying datasets and how they will be portrayed within the Port solution with the Barclays models."

As well as preserving essential elements of the Point system, Bloomberg is also expanding the analytical capabilities of Port with new developments, one example of which is to introduce new formula-based fields. "This is something that was quite highly developed in Point, but not at all within Bloomberg," explained Carty. "We chose to build this from scratch within Bloomberg, because we have a language called BQL that allows us to create these custom formula-based fields alongside the benefits of the rest of the terminal."

Tactical Migration

Bloomberg's work to enhance Port with selected elements of the Point IP and its own additions will continue alongside bespoke developments required by different users. Herein lies one of the trickiest elements of the migration from Barclays Point to Bloomberg Port—most firms used the Port system for different operations and in different parts of the organization, covering attribution, portfolio management, risk or data management.

As such, there isn't another solution currently available on the market that can offer the full breadth of functionality that Port provided, meaning some Port users might be forced into making a tactical migration to Point in the short-term before settling on a different long-term strategy.

"In many cases, managers have made a decision to take the most prudent, cost-effective path with respect to replacing Barclays Point, which bodes well for Bloomberg in terms of the implementation costs of a new system versus migrating onto the Port solution, which a lot of firms have in-house anyway," says Bates. "We have not seen a tremendous spend or effort toward replacing Point and in a lot of cases this can be attributed to a deferral, where firms are going to move to the quickest, most cost-effective solution."

With support for Barclays Point ending in the first quarter of next year, cost considerations will be of prime concern, as investment managers will also have the implementation of Mifid II to deal with in early 2018. This, says the head of trading at the asset management firm that has chosen not to migrate to Bloomberg, was a key consideration when making the decision.

"Moving straight over to Port would be the easiest option for us, but not necessarily the best one," he explains. "We are active in a number of asset classes, including fixed income, so the retirement of Port was a good opportunity for us to take a step back and review our technology from an enterprise-wide standpoint. We have also made sizeable investments in technology preparations for Mifid II, which has been a top priority for most people on the buy side, I would think."

Market Movements

Those firms that are opting to take a longer-term, strategic approach to replacing Barclays Point are not spoiled for choice. Bloomberg's acquisition has sparked a number of similar deals in the market, with investment banks offloading risk and portfolio analytics systems to vendors that are all too eager to increase their market share. In March this year, FactSet announced the acquisition of Paris-based performance measurement and attribution platform provider BISAM, as part of its ongoing plan to better realign its enterprise offering for buy-side clients seeking to reduce total cost of ownership without diluting technical capabilities. A month later, UK-based StatPro confirmed that it was set to acquire UBS Delta, UBS' risk and performance analytics service, to "extend its risk and performance analytics service from the middle office to the front office of asset managers."

Meanwhile, Citigroup has been reportedly exploring a sale of Yield Book, its fixed-income analytics business, since the middle of last year, with names such as Intercontinental Exchange, S&P and MSCI all connected to a possible sale, although nothing concrete has yet been confirmed.

Ian Webster, COO at risk and portfolio management vendor Axioma, says these products moving away from investment banking control has large implications for the market, where historically embedded systems will now take time to settle. Webster says there are two primary reasons for the shift in market control. "One concerns investment banks' review of their core business—defining exactly what that is and then really focusing on it," he explains. "The other is a regulatory issue, where banks need to raise regulatory capital. These types of businesses are not easy to carve out, but they are separate businesses. Perhaps a decision is being made to slim down the size of the organization?"

Ian Webster
Axioma

Vendors in this space have had plenty of time since Bloomberg's acquisition of Point was first announced to flex their development muscles, eyeing the opportunity to win over new clients from their competitors. Axioma has upgraded its risk models and portfolio analytic solutions in response to demands for more flexibility from users, while MSCI has also enhanced its fixed-income risk modeling suite in response to Point's integration into Bloomberg Port.

Uncertain Future

This consolidation of vendors seeking to build best-of-breed solutions may ultimately work to the benefit of fixed-income market participants; however, for the time being at least, it does present some difficulties for firms looking to replace Barclays Point, according to the head of trading. "It's not an ideal scenario because these systems that are changing hands at the moment won't be the same as we know them as now, and the owners certainly won't," he says. "The market landscape has changed a great deal in a very short space of time, so instability and risk have increased. It's one thing to know where we stand today, but it's something completely different to know where it will be in two or three years' time."

While market change is part and parcel of capital markets life, the fixed-income space has undergone significant change from a technology perspective. Investment strategies are also moving steadily toward a multi-asset approach, which in turn is driving a trend toward holistic technology systems that can operate across different asset classes while still providing the same level of technical capabilities.

The acquisition of UBS Delta by StatPro provides an interesting example comparable to the integration of Point into Bloomberg Port. UBS Delta will be phased into StatPro's flagship Revolution platform over the next three to five years, while UBS will continue to support the system and its client base. By acquiring the UBS Delta platform in its entirety, StatPro is well positioned to ensure that the Revolution platform is updated and reaches functional parity with the capabilities offered by UBS Delta as it currently exists before migrating clients. While Bloomberg is operating a similar model, the timeframes involved are much shorter, and having only acquired the IP of Barclays Point, there is a large onus on the vendor to match disparate and weighty client requirements in the fixed-income space with the technical functionality they have become accustomed to.

Migration to Port is seen as a straightforward option in the face of market change, and will work well for many firms in the market, with Bloomberg taking great pains to listen to the Point user-base and develop the product accordingly. However, lingering concerns over technical functionality will be enough for some to look elsewhere, while more strategic approaches may see others seeking out more holistic options as a replacement. The old phrase, "any port in a storm" might yet turn out to be inappropriate, should the fixed-income waters grow any choppier. W

SALIENT POINTS

- Bloomberg's integration of the IP of Barclays Point continues apace with the data giant seeking to address specific concerns around capabilities for risk modeling and performance attribution in the updated Port offering.
- The majority of Point users are transitioning to Port as the most cost-effective, short-term option. However, those with long-term views are instead seeking out alternatives that provide a holistic option for technology stacks across asset classes, not just focusing on fixed income.
- The acquisition has been a catalyst for other deals in the market, as investment banks slim down their organizations by offloading similar products to vendors, increasing the level of competition Bloomberg must now contend with.

THE MUNI MARKET'S Drive Toward Transparency

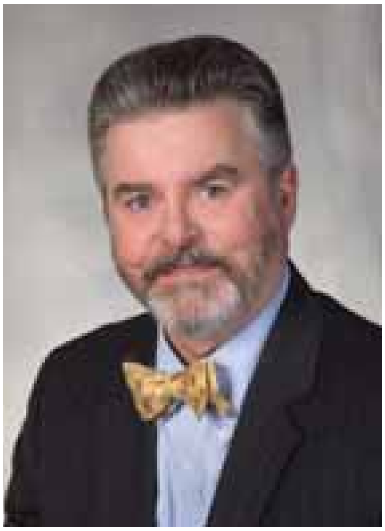
The municipal bond market has been portrayed as awesomely complex and opaque, although better data gathering through electronic means has greatly increased its transparency. And, as Emilia David explains, we're only at the beginning of this revolution.

With the focus turning to troubled issuers like Puerto Rico, whose bonds have since defaulted after the territory filed for bankruptcy, the $3.6 trillion municipal (muni) bond market is once again in the news. Debt issued by cities is often a sure bet to stash investments and round out fixed-income strategies—barring the occasional bankruptcies of the past few years. But it is also seen as an opaque market that is harder to predict than other asset classes. Still, this highly complex market has begun to share its secrets, thanks to the rise of electronic trading platforms, a tighter blend of algorithms, and old-fashioned human intuition that have led to better data gathering.

Transparency in the muni bond market has greatly increased in the past 10 years as firms have begun using more electronic means of trading, coupled with evaluated pricing from algorithms. Some—but certainly not all—market participants believe that there is an opportunity for technology to improve trading to the extent that it will coexist with the more traditional methods of execution.

Around one million issuances make up the municipal bond market, though only between 55,000 to 66,000 trade daily, less than 10 percent of the market. Data from the Municipal Securities Rulemaking Board (MSRB) shows that there were a total of 14,316 new issuances in 2016, alone, with a par value of $458,788. Last year's most actively traded security—the St. John Baptist Parish, La. Marathon Oil Corp. series A issued in 2007—was only traded 8,088 times. Much of the market trades so rarely that figuring out fair pricing takes many different approaches—most of which are manual and, thus, time-consuming. Each of the issuances has its own complexities so many traders prefer to call other traders to get an idea about prices and liquidity of certain assets.

> "Like any market, there are still challenges. Pricing is part of that challenge because you can always do better. You can get disclosures, but some come out a little late—especially for small issuances that don't trade every day, there's a 12-month delay. But we've come a long way from where we were and technology can help improve that efficiency."
> **Chris Ryon, Thornburg Investment Management**



Platform Numbers Surge

As with most of the fixed-income sector, the muni market has seen a surge in electronic-trading platforms, while algorithms to help track market activity have also begun to be used more widely. There are a handful of such platforms that serve the municipal bond market, including Bloomberg, Tradeweb, The Muni Center, ClarityBidRate, Muni Brokers, MuniAxis and MarketAxess, one of the newest entrants into municipal bonds, having launched its platform just last year.

Electronic trading has witnessed a number of other changes in the fixed-income world, with the advent of a wider range of regulatory reporting requirements added to the liquidity squeeze. Trading electronically does allow traders to easily compare bids and offers in an efficient way.

Thomas Vales, president and CEO of TMC Bonds, a broker-dealer and operator of The Muni Center platform, says one of the misconceptions about the bond market is that it doesn't use electronic trading to conduct its business. "It's interesting to me when I hear people say the market isn't electronic because at least 50 to 60 percent of the market is trading electronically," Vales says. The major difference is that while at least half of the market is traded electronically, he says munis are traded in significantly smaller values compared to other credit products. Vales adds that there are usually around 900 institutional trades executed on a daily basis, with the interdealer market adding a further 750 trades.

Electronic trading has the potential to open up the market to more investors, a market that has always relied heavily on voice trading—not just to buy and sell securities, but also to obtain information on issuers and even set a price. It's also important to remember that electronic trading will not replace voice anytime soon: Voice trading is still—and will continue to be—a big part of the market, Vales says. TMC still has at least 20 voice traders, although more small issuances are now coursed through electronic trading platforms.

Aiding Adoption

Regulatory requirementys are helping to drive electronic adoption, as these platforms make it easier to record and compile trade data. As an example, the Municipal Securities Rulemaking Board's (MSRB's) 15-minute trade reporting rule and the coming Principal Markup Disclosure rule, Vales says, has encouraged market participants to turn to electronic trading because tracking through a more automated platform is much easier and faster.

MarketAxess' head of municipal sales, Hardy Manges, says electronic trading mainly helps the municipal bond market become more efficient. One great benefit of an all-to-all platform—which MarketAxess offers and has found success with its electronic trading platform for corporate bonds—is that it allows traders see all bids on a single screen. Technology, he says, helps to streamline and make manual processes more efficient. Through the use of an electronic platform, users can compare bids and offers so that traders can better make use of their time.

"The market itself isn't inherently changing, it's just becoming more efficient. I'd say technology is letting customers do everything in an audit trail—look at evaluations, compare bids and offers to evaluations and just overall make them efficient," he says. "We've seen that our all-to-all platform can tighten bid–offer spreads on taxable municipal paper and Build America bonds, and it creates better pricing, as more and more participants participate in the same pool."

Enter EMMA

Information gathered by the MSRB makes its way to the regulator's Electronic Municipal Market Access

(EMMA) repository, created to provide transparency into the market as it provides the necessary data for determining pricing and liquidity. EMMA resulted from the MSRB requirement to report all trades—with information on price, size and maturity—within 15 minutes. The EMMA website gathers information to establish what the municipal market looks like at any given time. The website is free to use and is available to anyone interested in the municipal bond market. Trading firms can also subscribe to EMMA for more robust datasets that can be plugged into their analytics systems.

MSRB executive director Lynnette Kelly says the municipal bond market is in fact one of the most transparent fixed-income markets. The perception that it is surrounded in mystery is not accurate, she says. "Before digital technology, it was hard to access data for the municipal bond market, so the market depended on faxes and courier services to exchange that information," Kelly says. "The municipal market was the first fixed-income market to require trade reporting. No other market has a website like EMMA where trade information and disclosure documents are available for free. Just having real-time information about each trade resulted in a decrease in spreads and has resulted in better pricing," she adds. "There's no question that 20 to 30 years ago the market was a lot different. I think if you fast forward to now, I would argue that the municipal market is in fact more transparent than other fixed-income markets."

Pricing Matters

But EMMA and the rise of electronic trading is not the only way the muni market is opening up. Pricing services—or platforms that offer potential pricing options for securities—are increasingly deploying algorithm-driven technologies to set their bids and transform pricing.

This development came to a head last year when the municipal bond market was hit with what some traders call a "seismic" event. The Intercontinental Exchange (ICE) announced in March 2016 that it had acquired Standard & Poor's Securities Evaluations unit and Credit Market Analysis. In 2015, ICE also bought Interactive Data Corp. These purchases allowed the exchange group to merge these pricing services and thus presented an issue to trading firms. Chris Ryon, managing director and portfolio manager at Thornburg Investment Management, with $48 billion under management, says the market has seen improvements in the past few years, though much still has to be done. "Like any market, there are still challenges. Pricing is part of that challenge because you can always do better. You can get disclosures, but some come out a little late—especially for small issuances that don't trade every day, there's a 12-month delay," says Ryon. "But we've come a long way from where we were and technology can help improve that efficiency."

Ryon adds that pricing services do "the best job available" in this very opaque market and acknowledges how difficult it is to get an accurate idea of what's going on in the millions of bonds on offer in the municipal bond market. He says that having at least two different pricing services allows firms to get a clearer picture of where bond prices are supposed to be. For most in the municipal market, the merger of the two biggest pricing services meant they needed to review their sources, especially as these firms preferred to have independently verified prices. This meant other pricing vendors could position themselves to nab market share as firms looked for alternate sources of pricing information.

Gaining Ground

One of those companies seeking to gain ground is Bloomberg with its Bloomberg Valuation Service (BVAL), which was launched in 2008 and uses algorithms to take in large amounts of data from the EMMA website and other sources to extrapolate the process. Since it is an evaluated pricing product, a group of market veterans are on hand to verify assumptions made by the algorithms. Varun Pawar, Bloomberg's global head of its evaluated pricing service, says BVAL and other technology-focused platforms have an opportunity to gain ground. "We're in the situation now where the primary and secondary pricing providers of some firms have merged and our clients now see those companies as one. So there is definitely a spot that's opened up for some of the other vendors," Pawar says. "That's basically a seismic event in any industry and it's forcing a lot of our clients to review their vendors for the municipal asset class and make decisions about who the vendor of choice should be going forward."

Third-party providers, he adds, can more efficiently gather data, scrub that data and do quality control checks on it. These platforms can help humans to be less subjective when looking at the data, he says.

Varun Pawar
Bloomberg

Volatility

Like other asset classes, the muni market has become increasingly volatile. That can offer opportunities for confident traders, but if a firm chooses to deploy limited automated technologies, it can also present dangers. Pawar notes that an algorithm and machines can take in more information to derive a fair price more efficiently than a team of humans using manual practices. "The real proof is when you see times of volatility in the market," he explains. "When you use a technology-based approach, you can capture many more data points and move pricing to reflect that volatility, as opposed to a human-only approach, where there's only so much they can do. You don't lose movement in sectors because you didn't have the capability to listen to all that information. We saw this during the election, which was a particularly volatile time for the asset class, given the amount of emphasis on infrastructure, spending and tax reforms that Donald Trump spoke about. It reflected on the market, given how the sector reacted overall."

Adopting a technology approach captures every bit of market data so that all the moving parts of a sector are represented during moments of volatility when data points are scattered. Humans do not have the capacity to consume and work through as much data as an algorithm and they are unable to price securities accurately without some sort of mechanical aid, Pawar notes. It's about augmenting what humans can do and making them more efficient.

Vales of TMC says electronic trading and algorithms have helped make pricing faster, more accurate and therefore more reliable, though he says the complexity of the municipal bond market means that there will never be perfect pricing, just fairer pricing. "The big difference in the municipal market versus credit and even equities is that there are a large variety of structures," Vales says. "Within the market there are taxable bonds, housing bonds, asset-backed bonds and revenue bonds. Electronic trading and pricing has definitely helped pricing become better, but because this is an imperfect market, there will probably always be imperfect pricing."

Human Touch

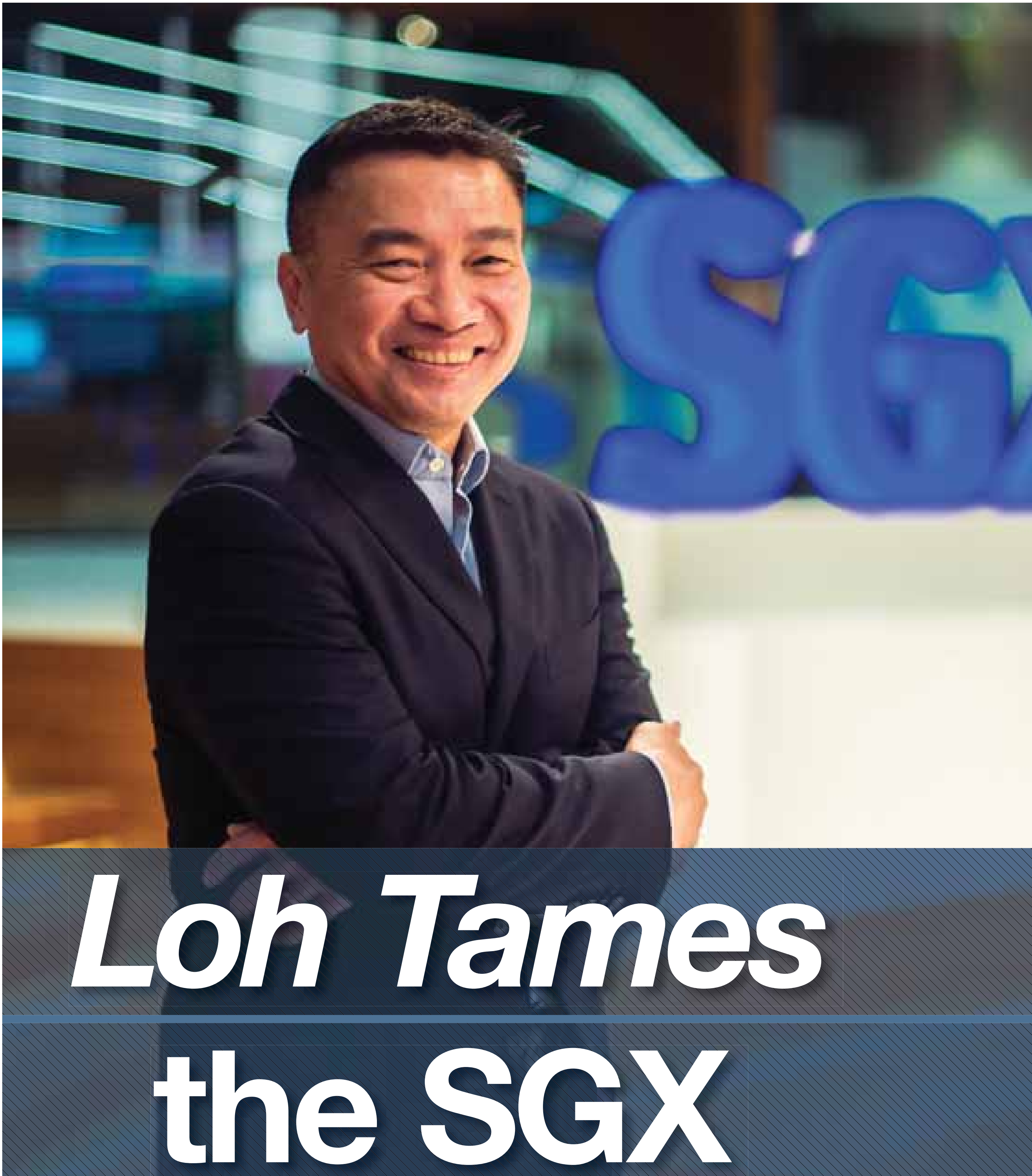
These developments, however, do not mean that the muni bond market is ready to let go of its human touch. Many are still downright skeptical of technology in this space. "There is no need for technology in munis other than what The Muni Center is already offering for odd lots for retail," notes an operations manager working on a fixed-income desk at a tier-one bank.

Additionally, even for proponents of technology, evaluated pricing must still be undertaken because some information still takes longer to gather despite the MSRB's efforts with it EMMA platform. Some issuers can still take a long time to submit disclosures and often there may be a piece of market color that an algorithm failed to see that only a person with more knowledge of the asset is able to identify.

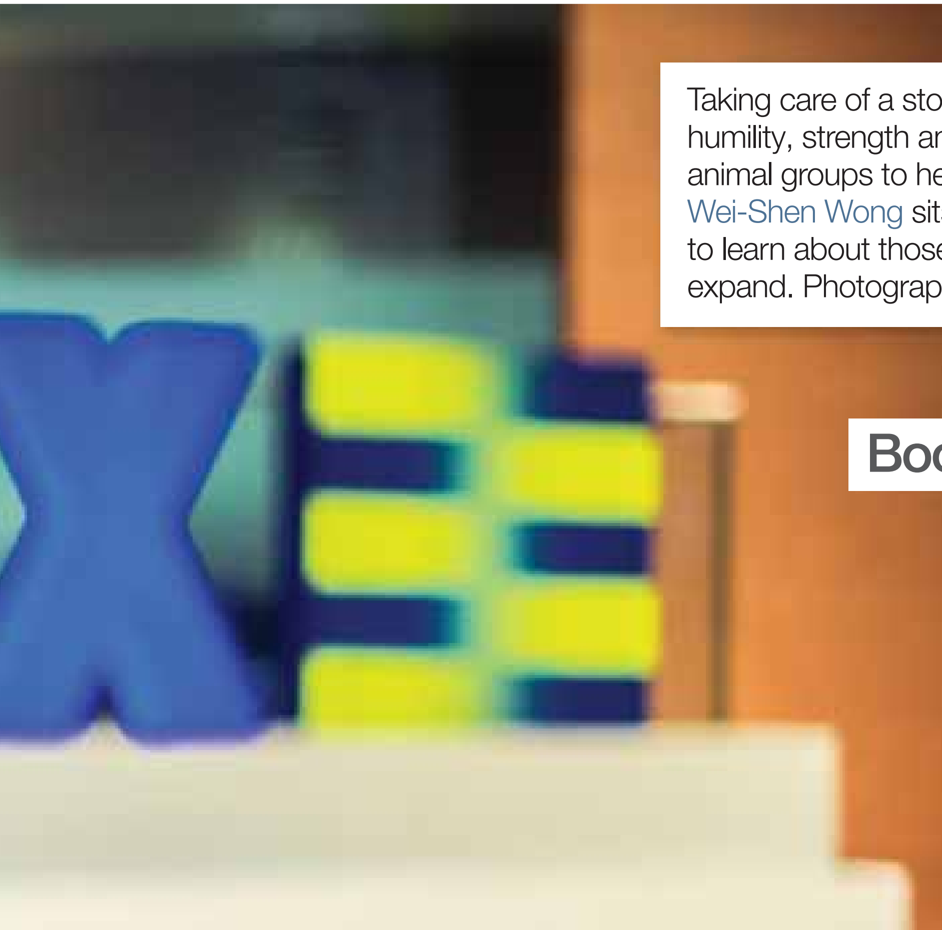
Both Vales and Thornburg agree, however, that it's still better to pair a human with a machine when it comes to the municipal bond market. And as much as electronic trading and EMMA have made the muni market more transparent and provide greater efficiency in pricing, it remains highly complex. There will always be bonds that are difficult to price, issuances that aren't black and white, and prices that may not be wholly representative. But for many that is the beauty of this market: It's a market where only the brave tread; technology will help the market to evolve, but the outlaws will still exist. W

SALIENT POINTS

- Regulations requiring trade data reporting has helped push municipal bond market participants to electronic trading platforms.
- The MSRB's EMMA website has helped increase transparency in the market by providing free access to trade data.
- Data gathering has been made easier through electronic trading platforms.
- Pricing services, seeking to gain market share, are using algorithms to make evaluated prices stronger.



Loh Tames the SGX



Taking care of a stock exchange is no easy feat. It takes humility, strength and amusing life principles from certain animal groups to help navigate through challenging times. Wei-Shen Wong sits down with SGX CEO Boon Chye Loh to learn about those principles and how SGX is looking to expand. Photographs by Gideon Lim

Boon Chye Loh, Singapore Exchange

Boon Chye Loh lights up as he describes how watching impala behave in the wild is applicable to real-life situations. Impala are one of the most common antelope found in Eastern and Southern Africa. "They tend to move in big numbers and you can observe the way they look around their surroundings. They have 360 degrees covered," explains the CEO of the Singapore Exchange (SGX). "Each one knows which direction they are looking in—that's teamwork because they are the easiest prey in the bush. It is the same with lions. When the lions are at a junction, it's the way they lay themselves out even though they are the king of the jungle," he says.

Loh—whose favorite animal in the wild is the cheetah—loves safari excursions. He is often teased by his four children about his affinity for the bush because he returns home with what they refer to as "bush principles."

"As you immerse yourself in the bush, trekking and watching animals and seeing how animals react, you can form principles that are applicable to life and to business," he says.

He adds that he now has at least 100 principles, which he hopes to publish in a book one day. His hopes for that however, have now been dampened by his own wife. "My wife recently bought me a book—*Jungle Business Management: Lessons from the African Bush*—and said to me, 'Look, someone has done this already,'—what an encouragement!" he says, filling the biggest meeting room at the exchange with laughter. Every time he goes out on a safari, he tries to bring back between 10 and 30 principles. "It's amazing to see how animals interact and then apply it to business," he adds. Loh travels to Africa once or twice a year. So far he has visited Kenya, Namibia, Tanzania, South Africa, Botswana and Zimbabwe. Each time he aims to bring something back to help him and his company.

The Start of Something

Come June 8, 2017, Loh will mark his second anniversary at the exchange. An engineering graduate of the National University of Singapore, he started his career in finance at the island nation's central bank, the Monetary Authority of Singapore (MAS), in 1989. He says that during his time in school, most students pursued a science, engineering or mathematics degree. So he became one of those who went down the science track and ended up in engineering. Although he liked it, he enjoyed research a little bit more. However, there were not many interesting research areas to work in at the time he graduated.

And so, in a sense, he was back to square one. How would he utilize his degree? Then he considered finance and thought it was an untapped field. But more importantly, Loh recalls, he asked himself what kind of role he would enjoy most. It's not the easiest question for a 20-something-year-old to answer with absolute certainty. Loh thought, though, that since he followed global affairs and liked learning about what's going on in the world, finance suited him well. What better way to immerse oneself in finance than by monitoring it as a regulator?

In his 20s, he had an idea of what finance was about, but not the entire picture. To the young Loh, finance equaled banking, which equaled lending and borrowing. That's what he knew but he soon learned that it was not quite that straightforward. "There are obviously many areas of finance that continually evolve, so it was an interesting journey," he jokes. "I did enjoy—and still enjoy—finance, and with my current role at the exchange, I'm right in the middle of finance and capital markets."

After a three-year stint at MAS, he left in 1992. It was time to get experience inside one of those firms he was overseeing to see how they conducted business. He first went to Morgan Guaranty Trust, the Asian outfit of investment bank JPMorgan in Singapore, for three years before moving to Deutsche Bank. It was a time when banks from the US and UK started extending their reach to emerging markets. Loh was a believer that markets in Asia, given the demographics, had to evolve. "It was still very much a banking market, and there wasn't much capital markets development," he says. "I felt that any institution that wanted to do that well probably needed to have a good and wide presence in Asia, and Deutsche Bank provided that platform. That's where I spent the bulk of my banking career, working with colleagues and market professionals in understanding and developing the Asian financial markets."

A New Beginning with Challenges

Loh spent the best part of two decades at Deutsche Bank, rising to the head of its Corporate and Investment Bank (CIB) for Asia-Pacific. After a brief stint at Bank of America—and always looking for a challenge—a big opportunity presented itself: "Why not take a front-seat role?" he recalls thinking. While at Deutsche Bank, Loh was also a member of SGX's board, serving from 2004 to 2012. In February 2015, it was announced that then-CEO Magnus Bocker would not look to renew his contract when it ran out at the end of June in the face of lagging volumes and an embarrassing penny-stock crash. Loh's opportunity had arrived. "It was during challenging times," he recalls. "Volumes were down, markets were volatile, and the exchange had gone through a period of adjustment. Being in the financial industry for a long time, I felt it was an opportunity to work with a group of talented people and stakeholders to see how we could take the market forward."

Two years in, Loh says he is building on his colleagues' successes. He denies any accomplishments achieved on his own, but rather points out that a lot of the work has been achieved by his colleagues and highlights that it is all about the team effort.

Although Singapore is a tiny island nation with a population of 5.5 million, almost 40 percent of the companies listed on SGX are from outside the country, while 75 percent of the bond listings are also from foreign companies. SGX has built a reputation as being a truly international exchange, although this is not something that happened overnight, Loh stresses. "It has been worked on by my colleagues and the team over the years," he says. For example, under SGX's derivatives business, the exchange is the only offshore access for any investors wanting to hedge exposure or risk-managed exposure to China and India. And for its equities business, SGX is not only well-known in the real estate investment-trust sector, but also for consumer, infrastructure and healthcare listings.

The Tech Challenge

SGX continues to innovate and upgrade its technology. It launched its derivatives trading engine in November last year, providing almost 22 hours of continuous trading. Loh feels it is important for SGX to develop more asset classes in order to become a multi-asset exchange, allowing it to diversify its revenue streams. Apart from equities, equity derivatives and commodities, SGX is building its currency and fixed-income portfolios.

"For currencies, I feel that Singapore, being the largest foreign exchange center in Asia, is possibly an area where we can—and should—see quicker development. Whereas with fixed income, being essentially an over-the-counter (OTC) product may take a little bit more time in terms of gaining traction," he says. "We launched our bond trading platform about nine months ago and that will take a bit more time as we are trying to convert OTC into a trading platform."

Loh adds that participants' adoption and initial volumes are within expectations. "If you look at how some of the other platforms have done, I think we are tracking well compared to what they were when they were launching, but changing behavior from an OTC to electronic platform takes a bit of a shift, unlike foreign exchange, which is a very large and liquid market."

Loh is also overseeing the exchange's migration onto a new post-trade system, which has been developed in partnership with industry participants. He says the exchange is also moving into a new datacenter. It currently has two datacenters and will migrate into the newer one.

The Titan OTC platform, another IT project Loh is overseeing, is aimed at bettering OTC workflow. "Today, some of the products are traded OTC—like commodities such as iron ore—but are cleared centrally through our exchange.

> "Volumes were down, markets were volatile, and the exchange had gone through a period of adjustment. Being in the financial industry for a long time, I felt it was an opportunity to work with a group of talented people and stakeholders to see how we could take the market forward."

Some of these are traded on-screen, but large parts are traded OTC. We believe that in the OTC markets, one needs to have an efficient workflow process so that participants can seamlessly see prices, get the information they need, are able to transact either OTC or in the interdealer-broker market, and are also able to seamlessly register the trade for clearing and then see post-trade all the necessary information," Loh says. This will create transparency and efficiency, he adds.

Preventing Future Outages

Loh's first year at SGX was tainted by a technical glitch, forcing the exchange to cease trading on July 14, 2016. The cause was a disk failure and an application that did not detect the problem. The disruption resulted in trade reconciliation and confirmation problems. SGX ceased trading at 11:38 a.m. local time and didn't reopen that day. IT detected input/output errors on a disk that runs the application that sends out clearing confirmation messages to members. Due to the disk failure, some clearing confirmation messages were not generated. SGX had to manually initiate a cutover to its secondary systems, following attempts by the application to resend the missed messages, which then resulted in some of them being duplicated. IT replaced the disk that day and conducted health checks with members prior to opening the following day.

"In a way, it was like an anniversary present," Loh says with a smile. "It clearly was a memorable date for us to encounter a data reconciliation challenge. The trading system continued to function at that point in time but we could not continue trading because position reconciliation had to be done and different participants had different states of readiness."

This is not the first time SGX has experienced an outage during a trading day. Back in 2014, it encountered two disruptions, the first on November 5, 2014, caused by a power supply issue that saw market participants disconnected at 2:18 p.m. before SGX declared a formal trading halt at 2:51 p.m. The exchange was able to reconnect at 4:45 p.m. and trading for both securities and derivatives that day was extended. The second occurred on December 3, 2014, due to a software defect that delayed the opening of the exchange's securities market from 9 a.m. to 12:30 p.m.

In September last year, SGX convened an industry working group to discuss what went wrong and how these type of events can be prevented in the future. The group has finished its findings and has made six recommendations, three of which have already been implemented. The remaining three will be worked on together with the industry.

Loh says the exchange frequently carries out exercises to test readiness with participants, including every weekend—which he calls a "green zone"—when the market is closed. "As an industry, we come together with either specific or industry-wide testing two to three times a year, although bilaterally or with smaller groups, we do that all the time," he says.

Top-Down Implementation

Loh says the key is to minimize top-down implementations to the industry in terms of upgrades to SGX's technology. For example, in its current migration to its new post-trade system, the exchange has opted for an open platform to allow participants or brokers to interact with it via application programing interfaces (APIs) rather than developing a system and forcing the industry to adopt it. "I think the brokers or participants should

BOON CHYE LOH
FUNDAMENTAL DATA

Name: Boon Chye Loh

Title: CEO, Singapore Exchange Ltd.

Age: 53

Hometown: Singapore

Education: Bachelor's Degree in Engineering, National University of Singapore

Hobbies/Interests: Gym, tennis, travelling for leisure, photography, reading, collecting red wine

Greatest Business Success: "That's not for me to judge."

Lesson Learned: "Early on in my career, when I was on the trading floor, I lost my temper at a colleague. You know those moments you see on TV when people bang on their phones and smash their screens? It wasn't as bad as that," he jokes. "That's where I learned to interact and better behave and control my emotions. I learned to put myself at the other side of the equation. What if I was that person? Always think about the other person."

have the flexibility as to the choice of what they want to use," Loh says. "And it is important for us to provide a platform that can cater to as much of the connectivity as possible, while obviously adhering to our standards of security."

Following the 2016 market disruption, at the end of March this year, SGX was scolded by the MAS—Loh's old employer—for failing to restore its systems within the required four hours. MAS directed SGX to implement measures within 24 months to enhance its recovery processes and operational resiliency. It will contribute S$1.5 million ($1.07 million) to co-fund the costs that may be incurred by brokers. Loh says SGX has since formed an industry working group, identifying several areas to work on, including restoring corrupt data, market recovery processes, and incident communication. "MAS also noted that while we met the objectives of maintaining a fair, orderly and transparent market, we did not have the market open up and running within the stipulated time, which is what they have asked us to work on together with the industry," he says.

Downtime

Pressure from regulators and the investment world watching every move is not something that sits easily with most people. Loh says he runs to deal with the weight of it all. "Running is the best form of de-stressing. I get on the treadmill and keep running. When I go really depends on my schedule—it could be early in the morning, or it could be late into the evening. It really depends on the day, but the key is to find the time to do it. One has to be disciplined. So far I have been able to find the time needed, which is important."

Although Loh has had many colleagues throughout his career who have helped him along the way, he sees his wife as his compass and the person who provides him with a sense of balance. "She gives me a very different perspective on things and life," he says. "When you are faced with a difficult or stressful decision, people who are less close to your business—whether it's your wife or anyone else in your life—tend to have a slightly different view, which sometimes you might not see. I think those are important moments in terms of mentorship because sometimes we can be so absorbed by the way we are trying to look at a particular issue that we forget that there are other ways of looking at it."

Despite his tight schedule, he tries to spend his free time with his wife. He says that among their close friends, he and his wife are known to spend Friday evening dinners together. Sometimes, when work does not permit it, they still manage to have some quiet time together at least once a week.

The couple has four children, ranging from the ages of 14 to 21, all of whom currently study abroad, and apart from seeing them during school breaks, he FaceTimes them.

Loh is driven by constant innovation and relevance, and these are among the things that motivate him to wake up in the morning. He tells of the time, back in 1986, when the SGX launched Nikkei futures. "We were the first to do that when Japan didn't even have the product. Today, Japan has that contract too; we were 100 percent of the market 31 years ago. Today, we are about 20 percent of the market, but the absolute volume is bigger than what it was 31 years ago. The point there is that we have to keep innovating," he says.

The competition catching up is what keeps Loh awake at night. "Relevance drives innovation," he says. W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Praying for Another Day

FRTB is a vastly complex regulation that has many industry participants scratching their heads as to how they will comply. There's hope that a reprieve might come before 2019 testing begins, but in the meantime, banks cannot simply play their usual wait-and-see games. By Anthony Malakian

In finance, chaos begets regulation and regulation begets confusion. That has generally been the cycle since the global financial crisis first took hold in 2008. Take, for example, the implementation of BCBS 239. Ayana Cavelle Richards is as close to an expert on the set of principles that were laid out by Basel Committee on Banking Supervision (BCBS) as there is.

While speaking at this year's North American Financial Information Summit (Nafis), Richards, vice president of data governance for BCBS and CCAR in HSBC's US Chief Data Office, noted that BCBS 239 compliance has been an arduous—and largely unsuccessful—push for banks since it came into effect in January 2016.

"Recently, a study came out of BCBS principles looking at how compliant the Globally Systemically Important Banks (GSIBs) are and only one bank came back compliant," Richards said. "So we can't say, as an industry, that we've figured out the BCBS239 principles. We still have some ways to go."

Regulatory Acronyms

BCBS 239 is just one in a clutch of regulatory acronyms that have swept across the globe over the last decade. When the Fundamental Review of the Trading Book (FRTB) first began its journey in 2011 to improve market risk capital requirements, with the finalized FRTB standards released in January 2016 by the BCBS, some said that the tenets comprising 239 would help GSIBs to prepare for FRTB compliance. While FRTB, like 239, is a major data challenge—storing, disseminating, segregating—as we've seen with 239, compliance will not be so easy. And that is becoming increasingly worrisome as FRTB's 2019 deadline—with its very real punishments—is drawing closer.

"FRTB is fundamentally a data problem," said Richards. "Not being able to model risk factors means that we can't aggregate our data yet; it's incomplete, which is the problem for BCBS 239. Not having accuracy and integrity around market reference data and standard definitions goes back to BCBS Principle 2," the data architecture and IT infrastructure principle that says a bank should design, build and maintain data architectures and IT infrastructures that fully support its risk data aggregation capabilities and risk reporting practices, not only in normal times but also during times of stress or crisis, while still meeting the other 14 principles laid out in the rule.

"The thing about 239 is that the industry was supposed to be compliant in early January 2016, and even though they were principle-based—less prescriptive—we are now having other rules like FRTB and CCAR and other standards coming into play that were supposed to leverage the BCBS 239 structures that the industry was supposed to build out," Richards said.

As has become a common refrain when it comes to new regulatory regimes, the industry is hoping for more time and fewer requirements. But as the clock ticks, the industry is losing hope. Cobbling together previous interviews and feedback gathered at Nafis, this report focuses on some of the major challenges facing banks' technology teams as they look to build out their systems in response to FRTB requirements.

"The challenge is that the overall computational requirement is far more complex than for traditional market risk requirements because of the need to calculate both internal models and standard approaches, to simulate over unconstrained and constrained sets, and in particular, to measure at the desk level and aggregate appropriately." **Andrew Aziz, IHS Markit**

Pool Party

At its core, FRTB is the new market risk capital regime that is supposed to replace Basel 2.5 using parallel models for calculating risk. FRTB's Pillar 1 capital charge components are broken down into two models for measuring risk: the Internal Models Approach (IMA) and the more punitive Standardized Approach (SA).

By some estimates, the Standardized Approach would create a 2.4-times spike in capital needed on hand relative to current levels. That number jumps when broken down between specific asset classes. For example, standardized capital for foreign exchange would rise to 6.2 times above current levels. Even for the less punitive IMA, capital would rise to 1.5 times higher than current levels.

Whether a bank uses the IMA or SA will be decided at the individual trading desk, and FRTB imposes requirements based on observable transaction data to consider something as modelable or not modelable. According to Richard O'Connell, global markets lead for risk, capital and regulatory change at Credit Suisse, the industry is still waiting for a lot of clarification from the Basel Committee on what is modelable and not modelable.

"As you move into exotic instruments, you might have multiple parameters that go into the pricing of a single asset," he says. "If you have an exotic option that uses two different inputs—say, two different instruments, each with their own volatility surface—there are several different risk factors that all come together into the pricing of this instrument and you're coming up with a single price."

Ayana Cavelle Richards
HSBC

The new requirement also replaces value-at-risk (VaR) calculations with expected shortfall metrics, it redraws the boundary between banking books and trading books to make it more difficult to transfer capital into the trading book, and it implements a reduction in the liquidity horizons for some categories of risk factors.

Questions

Numerous other questions remain, but right now the Basel Committee has yet to relent on its requirements. As is true with regulation and IT, it's the lawyers' job to hammer out the final rules and technology's job to figure out the most feasible ways to make sure that firms remain compliant from an infrastructure perspective.

For Hany Faraq, senior director of quantitative solutions for CIBC's capital markets risk measurement department, that starts with the data itself. He says there's a movement in the industry to pool data to lessen capital requirements. And this is where the vendor community is making a push.

"Most of us don't expect to be able to do this alone. I mean, you can, but to the extent that you're willing to take a lot more capital than you need to. This is why a lot of vendors are looking to get into the space and address data pooling," Faraq says. "The whole issue is driven by capital cost. If you take a capital hit because of illiquidity and lack of observability for the risk factors that you have to incorporate into your model, then you're driven to find a way to reduce this problem. To reduce this problem—while there are some modeling things you can do—you have to look for who else might be trading the same product and outside of exchange-trade products, in the over-the-counter (OTC) market this is the main issue: Can we all share our data? Do we feel comfortable sharing and who gets in the middle to perform the governance process to make sure we're compliant with the regulation?

Charlie Browne
GoldenSource

"It's in flux; a lot of vendors are working on it," Faraq continues. "It's probably the biggest wild card when it comes to FRTB. It is the piece that if you solve most of it, at least, you may make the capital impact as close to neutral for the modeled approach. It's a big win if we succeed, but it's a big problem if we fail to make it work. As a firm, we do the best with what we have. Not everything is easy to figure out if this needs to be modeled or observable when we go to implementation, because in two years' time the scene in the market data industry could be very different. If the pooling of data indeed works, a lot of things that right now are not modelable—and therefore you'll have to put a lot of capital toward—may easily become modeled. It just depends on who participates, who's convinced that this makes sense, and do the regulators help them in the process?"

Enter the Vendor

As has been the case with most every other regulatory mandate that has rolled onto the statute books across the globe, the vendor community is looking to fill the gap while creating new revenue streams, a trend that has given birth to the so-called "RegTech" movement.

In recent months, companies like GoldenSource, IHS Markit, Numerix, Misys, Murex and numerous others have launched products and services specifically geared to help banks meet FRTB rules. In December, IHS Markit completed a proof-of-concept with an unnamed European bank for one of its FRTB solutions where it successfully performed capital calculations for millions of trades within a few seconds. "Most banks already have systems in place that can produce valuations and many have been tweaking their engines to provide the required FRTB measures," Andrew Aziz, global head of IHS Markit analytics, told *Waters* at the time of the announcement. "The challenge is that the overall computational requirement is far more complex than for traditional market risk requirements because of the need to calculate both internal models and standard approaches, to simulate over unconstrained and constrained sets, and in particular, to measure at the desk level and aggregate appropriately."

In November, Numerix unveiled its FRTB solution, which is used to examine capital impacts and calculate risk relating to the rule. "FRTB is a game-changer that demands a fundamental shift in the ways banks function and manage risk. But at this point the market is exhausted about hearing about the myriad challenges and sifting through half-baked vendor solutions," Steve O'Hanlon, Numerix CEO, told *Waters*. "Time is running out on discussions and strategizing—and for those banks on the path to a broader enterprise-wide technology transformation, FRTB is the catalyst to take action now."

At the beginning of this year, GoldenSource unveiled a solution to help trading firms perform risk calculations required for FRTB compliance. "Banks already do these calculations to a certain extent, but FRTB is prescriptive about how you do it," Charlie Browne, head of market data and risk solutions at GoldenSource, told *Inside Data Management*.

"Banks have frameworks in place that have evolved over time, with combinations of one system sitting on top of another. FRTB says these calculations need to be done in exactly this way with your data in exactly this format, and with exactly these processes sitting on top of it. So it has forced banks to take a look at their entire market risk, independent price verification, and to a certain extent, their infrastructure. This is a big part of what we are doing with FRTB—can we calculate capital charges for a trading desk using risk sensitivity and risk weights and correlations? Now we can. We can give an expected shortfall calculation and visualize it in a way that ensures senior management within banks can really understand how the calculations happen, apply scenario analysis to them and make data management officials feel as if they are in charge of their own calculations."

Hany Faraq
CIBC

Richard O'Connell
Credit Suisse

So Many Questions, So Little Time

Testing for FRTB is expected to begin en masse in 2019, with full implementation coming in 2020. According to *Waters*' sibling publication, *Risk*, there is still hope that there might be some easing of FRTB to come from the Basel Committee. One reason for this newfound hope comes from the change at the top of the Basel Committee, which has seen the placement of a new chair: Derek Nesbitt of the Bank of England. "The change of leadership has created a slight wind of optimism that maybe we will have an opportunity to discuss the practical issues with the rules and hopefully lead to us being able to find a better place for them—somewhere where we're clearer on what the rules are and where they can actually be implemented," one source at a European bank told *Risk*.

Then, on May 23 at the FRTB Implementation Summit Europe, Mikael Katz, a manager in bank policy at the Bank of England, gave more credence to a possible delay. "At the moment it has not been agreed yet, but I would say it is possible that a three-year implementation will take place, which I think will ease the process for everyone, including us, and we are in the same situation."

Backburner?

So what does this mean for bank IT departments? BCBS 239 is still in effect and Mifid II and its many tentacles are still likely to come into effect this coming January. Does that mean that FRTB preparation can be placed on backburner? At this stage, unfortunately not.

Unlike a basic reporting requirement, something like FRTB—which deals with risk and capital requirements—has to be taken with extra precaution. The work, for IT, comes down to the data and definitions, according HSBC's Richards. That's work that should be undertaken today no matter what, whether for FRTB or any of the other regulatory acronyms populating the space.

"It starts with having consistent definitions, consistent semantics, understanding the underlying risk factors, making sure that as data moves from the point of origination to where it's used in these models, and that we understand the mathematics behind the logic," she says. "And that is driven by having an integrated architecture around the flow of the data and understanding mathematics, ontologies and taxonomies between the data from the point of origination, across the multiple hubs, into the P&Ls and into the models." **W**

SALIENT POINTS

- At its core, FRTB is the new market risk capital regime that is supposed to replace Basel 2.5 using parallel models for calculating risk.
- As is true with other regulations, making sure that data is properly tagged, stored and accessible is going to be key.
- Numerous vendors have entered the space to help firms with compliance and add new revenue streams for themselves.
- Industry testing for FRTB will begin in 2019 with implementation coming in 2020, though there is hope that personnel changes at the Basel Committee will lead to some extra leeway.

THE SEGREGATION DILEMMA

As Europe heads toward the harmonization of its post-trade infrastructure, a number of obstacles threaten to stagnate the process. Asset segregation in particular is top of the agenda as a topical issue resulting from the central securities depository (CSD) regulation three years ago, and has remained an area of sell-side conflict ever since. Aggelos Andreou speaks with CSDs, banks and sub-custodians to see how segregation affects the post-trade workflow from an operational and technical perspective.

One direct response to the financial crisis of 2008 was the creation of the Central Securities Depositories Regulation (CSDR)—one of the three pillars standing alongside Mifid II and the European Market Infrastructure Regulation (Emir). Rolled out in 2014, the program is designed to serve as something of a safe haven for European assets.

One of the most significant mandates was the CSD obligation to offer two different types of accounts to clients: a fully segregated one, in which individual assets get their own respective accounts, and an omnibus, in which the assets are commingled.

Eric de Nexon, head of strategy for market infrastructures at Societe Generale Securities Services (SGSS), says that CSDR has the potential to bring some positive effects to the market, despite being constantly amended and—hopefully—improved upon since it came into force three years ago. “First of all, it shows the will to harmonize the framework for CSD activities, as was the case for central counterparties (CCPs) with Emir,” he says. “Secondly, this regulation is strengthening the regulatory framework that applies to CSDs and partially to their participants.”

De Nexon says regulators recognize for the first time the systemic aspect of CSDs by strengthening the level of resources required for them to face their liabilities, but also their governance considering the relationship with their users. “We should also note that this regulation ‘re-authorizes’ the

CSDs at a European level, upgrading the level of compliance of all CSDs and allowing a level playing field among them," he says.

While all of this sounds promising, there are key components that remain unclear, even after several amendments to the regulation. Some of these areas have proven too critical to be ignored and have precipitated a range of views among the sell-side community as to how they should be addressed.

"We are concerned that CSDs will be authorized to provide banking services, leading them to compete with their own participants. There is a real issue concerning the level playing field between CSDs and custodians, and also the fact that it will lead to a change in their risk profile." **Eric de Nexon, Societe Generale Securities Services**

The Case of Segregated Accounts

The European Securities and Markets Authority (Esma) has published two papers this year—the first, a guideline, released in March, and the second a Q&A, published in April—that attempt to end the debate around segregated accounts and resolve their complicated nature.

Polina Evstifeeva, a member of Deutsche Bank's global transaction banking's market advocacy team, tells *Waters* that a major part of the CSDR is a set of regulations outlining the rights depositories have to segregate their assets and maintain them through the chain. "The idea was to provide more protection to clients," she says. "The regulators considered some options: Option one was full segregation through the custodial chain, while the second was no segregation at all."

However, the regulation does stipulate the level at which CSDs need to segregate the assets or how many accounts they need to maintain. Soraya Belghazi, secretary general of the European Central Securities Depositories Association (ECSDA), explains that while the rule also creates a common framework with the principle of investor choice, the reality is that in Europe, each local market has different preferences. Therefore, a unified approach cannot be achieved.

"Some markets use a lot more segregated accounts than others," she says. "It doesn't impose a single model, but it keeps some room for market preferences."

In Greece, for example, banks are familiar with working with full segregation, even at the infrastructure level, using the so-called indirect holding system, while larger markets—such as France or Germany—traditionally work with segregation at the bank level, rather than the infrastructure level. "Regulators have realized that this is more complicated than they initially thought," Belghazi says. "Just think: According to a study we did in 2015, there are four primary segregation models in Europe."

Belghazi says that apart from segregated and non-segregated markets, there are also hybrids in between. "In some markets, they use sub-accounts to segregate, and the infrastructure doesn't know the name of the end-investor," she explains. "The banks will segregate, and legally speaking, it will be a segregated account, but only the intermediary will know the identity of the client."

In other markets there are fully-independent accounts and CSDs have access to the identity information of the end-investor. "The legal frameworks in Europe are different," Belghazi says. "In one market, you have a higher level of asset protection by using a segregated account, but in other European markets, the level of legal protection is the same whatever type of account you maintain at the CSD, and there's no difference if your bank decides to segregate."

Soraya Belghazi
ECSDA

The bottom line is that as far as segregation is concerned, there is no single model, which ultimately means there is no direct correspondence between asset safety and segregation. The situation gets even more complex if the industry takes into account other regulations that define client segregation, such as Emir or the asset management regulation. "They adopted a different approach in various pieces of the European law—there are inconsistencies and overlapping rules that make it even more complex than it is today," Belghazi says.

Changing CSDs

The choice to separate accounts gives end-investors the power to better protect their assets. Where things get tricky, though, is that creating separate accounts introduces a precedent that has multiple implications on business, administration, operational and technical levels, mainly for CSDs, sub-custodians and banks, according to SGSS's de Nexon.

"We are concerned that CSDs will be authorized to provide banking services, leading them to compete with their own participants," he says. "There is a real issue concerning the level playing field between CSDs and

custodians, and also the fact that it will lead to a change in their risk profile."

For example, he says, Euroclear has €28 trillion ($31 trillion) in assets under custody, illustrating its scale and potential risk from a systemic perspective. For de Nexon, if CSDs develop banking services, it means they will face counterparty and market risks, in addition to traditional operational risk deriving from their core services. "The domestic monopoly of some CSDs may be at risk," says de Nexon. "Issuers will benefit from the free choice of places of issue."

Polina Evstifeeva
Deutsche Bank

Jesús Benito, CEO of Iberclear, says CSDs are currently in the process of changing their organizational outlook, an administrative burden that could potentially lead to a radical transformation in the way CSDs operate in the near future. "From an organizational perspective, we have to change the boards to include more independent representation," he says. "We also have to designate chief risk officers, chief compliance officers and chief technical officers and implement a user committee, as users should be represented."

Operational Change

For the CSDs, the industry expects significant changes to their IT and operations departments in three key areas—settlement, reconciliation, and collateral management—since clients may require an additional level of account segregation.

Benito says that on a technical level, this means the market will experience an increase in securities accounts. "This could affect the efficiency in netting," he says. "The more segregated accounts, the more transactions are going to be settled."

Thanos Kagiaras, manager of post-trade and prime services at the Association for Financial Markets in Europe (AFME), agrees. "If that number increases, then the number of settlement instructions also increases," he says. "That way, the complexity and the cost of processes are going to skyrocket."

Evstifeeva adds that funds should be aware that this brings consequences that firms might want to avoid. "If you do the reconciliation, you have to reconcile against all of the separated accounts," she says. "So, naturally, this creates a set of operational questions—would that increase the operational risk, or cost more money?"

The answer is yes, she says, because firms need to employ people to manage these reconciliations. "You can't rely only on technology—you have to have humans to do the checks and verify that everything went correctly," she adds.

The technical and operational side effects have been identified in the settlement process as well, which are expected to shift as CSDs may need to internalize part of their settlement activity, which must report to the authorities. This change could prove inefficient, according to Kagiaras. "Today, brokers can send settlement instructions to settle a block of shares, and once this block is settled in a CSD you can allocate it based on clients' original instructions," he says. "Sending one settlement instruction has less risk and costs less than sending several for the same instrument."

The third affected area is tri-party collateral management services. "The collateral engine holds the assets in the omnibus accounts," says Evstifeeva. "If you are not allowed assets in the omnibus accounts, that would mean that agents would have to open separate accounts for each of their customers; it challenges the core of the service."

Kagiaras adds that this asset segregation is important. "A tri-party agent has to move securities between the accounts of the collateral giver and the collateral taker, not only in its own books but also in the books of all relevant parties throughout the custody chain," he explains. "This creates extra cost complexity and delays and may become an impediment to the use of a tri-party agent, while the impact on liquidity will be large and should not be ignored."

Thanos Kagiaras
AFME

Collateral Damage

If settlement, reconciliation, and collateral management are the direct "victims" of asset segregation, the Target–2 Securities (T2S) platform is the collateral damage.

The love child of the European Central Bank (ECB) that has been praised by market participants and politicians for its operational success and its utmost importance to the markets' unification in Europe has become the battlefield of various custodians in the race to maintain or discard omnibus accounts. ECSDA's Belghazi says that T2S was meant to add greater protection to the market, as it standardizes settlement and removes cross-border costs.

"In itself, segregation is not a problem in the sense that CSDs are already offering the possibility to their clients to create as many accounts as they want," she says. "The problem is not the number—it's the lack of harmonization of segregation rules. One segregation in one country is not the same as a segregated account in another country." This complexity, she adds, creates risks and makes it difficult to transact across borders.

Jesús Benito
Iberclear

SGSS is one of the participants that strongly opposes full account segregation in T2S. "If we have to open all accounts it would be a nightmare," de Nexon says. "It could have an impact on the process, performance, and cost of the platform."

De Nexon says that for the time being the system based on segregated omnibus accounts is entirely safe and meets clients' safety requirements. "It was proven to be secure during the financial crisis as no incidents were reported," he argues.

There are a number of thoughts on how Europe could overcome national segregation mandates, which could curb T2S benefits. One of them is to build an additional platform connected to T2S, through which countries like Denmark could connect using its fully segregated accounts. According to SSGS, the most efficient way to manage the relationship of direct holding CSDs with T2S would be to interface their current platform with T2S. This way, firms can settle the instruction on an omnibus account on T2S and automatically rebalance it to the retail account on the CSD platform, referred to as the "layered model," according to de Nexon.

For now, the temporary solution appears to be connections. "What CSDs are encouraged to do right now is to have links with one another," Belghazi says. "By connecting, they can avoid handling different kinds of reference data, which can become a very risky and costly process."

Segregation in Question

To make sense of the issue, AFME has worked with its members and external legal counsel to draft generic language to disclose the level of protection associated with the use of omnibus and segregated account structures. Kagiaras says this language can be adopted in every jurisdiction, according to domestic insolvency law, and can be used to comply with the mandate.

During its research, AFME found asset segregation reappeared in different contexts, which will require harmonization. Its analysis concluded that in the end, segregation is not as helpful as regulators want it to be. "From a legal perspective, account segregation does not add protection to the client's assets or to the safety of assets," Kagiaras says.

Furthermore, Deutsche Bank's Evstifeeva says she wonders why regulators introduced the option of full segregation in the first place. They said it would be much easier to identify the items belonging to the clients, although she says a law firm looking at 90 countries found that segregation made sense in only four jurisdictions. It's clear that this issue is not yet settled. W

SALIENT POINTS

- Under CSDR, central securities depositories need to offer both segregated and omnibus accounts to end-investors—an option that has significant implications for CSDs, banks, and sub-custodians.
- Full segregation will affect the technical and operational reality of the custodians that currently offer omnibus accounts in three key areas: settlement, reconciliation and collateral management.
- The Target–2 Securities (T2S) platform is considered vulnerable to the change, as different countries have different policies that might affect the benefits of the platform's operations.

John Brazier

Brexit Offers London Banks Opportunities for a New Start

Investment banks are eyeing London's exit doors in the lead-up to Brexit, and, despite the impact mass departures will have on Britain's banking sector, it's a good opportunity for those organizations to re-evaluate their technology infrastructure, says John.

"Success is where preparation and opportunity meet," goes the quote from former IndyCar racer Bobby Unser. While Unser may not have too many opinions on the outcome of the UK leaving the European Union, his words serve as sage advice to those banking institutions that are considering leaving the UK as a result of Brexit.

There has been no shortage of reports concerning investment banks making preparations to relocate their operations and thousands of jobs out of the City of London, with British and foreign-based banks alike cementing their contingency plans as negotiations between UK and European Union officials continue over the details of the separation. Dublin and Frankfurt are seen to be the most desirable destinations for those institutions looking to jump ship. With strong financial technology hubs, both cities represent attractive options, while Paris will also surely scoop up some new clients that have escaped across the Channel.

This exodus will obviously have far-reaching repercussions for the UK economy and banking sector, but for the investment banks themselves, it's a good opportunity to review technology infrastructures and perhaps, in a few cases, even start afresh.

Greenfield Potential

Greenfield sites present something of a paradox for investment banks—one of untapped potential combined with the costs of beginning from scratch. Many organizations will likely move from the UK to a site where they already have an established presence, but bringing over the entirety of their operations and staff will require heavy investment. That investment should focus on bringing technology systems up to scratch and decommissioning legacy ones, or at least finding ways in which to preserve their vital functionality while utilizing new applications or architectures around them.

> "For the investment banks, Brexit is a good opportunity to review technology infrastructures and even start afresh.

One of the reasons why firms that begin life with a technology-oriented perspective have a better shot at achieving longevity is the flexibility and agility that allows them to be that much more responsive to change. To a certain extent it is also an advantage that some asset managers hold over their sell-side counterparts. Smaller organizations are less likely to have embedded or unwieldy applications littered throughout the infrastructure that cannot be easily decommissioned.

Of course, it is no simple task to easily switch off old systems and replace them with new ones. Speaking as part of the C-level panel at this year's Buy-Side Technology European Summit, Tom Dalglish, HSBC's head of technical services, applied innovation, identified the lack of access to legacy data as one of his firm's most crucial challenges: "We are increasing the dependency on the systems we'd like to turn off because the data is not isolated," he said. "It is vital to keep the data segregated; this will let you switch off legacy tools."

Data silos have historically been a headache for firms across the capital markets. Moving to a new datacenter as part of the Brexit relocation will afford investment banks a fresh start and allow them to implement new applications with full access to the datasets required.

Will Brexit bring tech overhauls?
For more information and readers' feedback please join the discussion at **waterstechnology.com/buy-side-technology**

APIs and Cloud

Two ways in which legacy technology is being tackled is through the implementation of application program interfaces (APIs) and cloud-based technologies. The sell side has been much quicker to harness cloud adoption than the buy side and this will stand many in good stead when setting up new operations across Europe. Creating a hybrid model of legacy and cloud technologies presents a viable way to establish a new, or at least greater, presence in a new location without having to begin completely from scratch—and preserving the embedded functionality that legacy technologies provide—while also improving agility and responsiveness required to adapt to new environments.

Flexibility will be one of the most important facets for banking institutions around Europe post-Brexit. Whatever the short- and long-term ramifications of Brexit, there will be costs to bear. For those institutions seeking pastures new, it is likely that those costs will be substantially reduced by taking the opportunity while it's fresh to review technology infrastructures. W

Partners vs. Acquirers

Vendors are collaborating more than ever, and yet M&A activity hasn't slowed. Anthony wonders whether or not a small vendor operating alone can survive in this environment.

Can small vendors survive?
For more information and readers' feedback please join the discussion
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Collaborative efforts in the financial technology space have picked up momentum in recent years. One of the best examples of this is open source, which has gained traction on Wall Street. When Goldman Sachs opens up its source code—even if it's a pared-down version of what the bank is using internally—it's clear that there's been a sea change.

Another example of vendors teaming up is cloud adoption, and specifically, greater public cloud usage. Amazon, Google, IBM and Microsoft—along with numerous specialist cloud providers—are breaking down barriers when it comes to storing data at cost.

One common thread is the explosion of data—alternative data, market data, detailed reference data. In response to the data deluge, vendors have made it easier to store and manage that data. And the development community is being brought together thanks to open source. This makes collaboration easier and breaks down barriers that might have existed before. At the same time, the trading technology industry is seeing massive consolidation as vendors broaden their reach and try to create more front-to-back offerings.

M&A vs. Collaboration

On one hand, vendors are creating collaborative tools that, combined, mimic a Bloomberg Terminal or Thomson Reuters' Eikon platform. Then, on the other, big vendors are gobbling up smaller, specialist companies. The thinking here is that firms want more of a front-to-back experience using as few vendors as possible. Which is better? And do those vendors that choose to collaborate have a better chance of succeeding than they had before? ChartIQ recently launched Finsemble, an HTML5 desktop application framework that uses OpenFin's common operating layer. OpenFin, along with ChartIQ, is clearly in the middle of the collaboration effort, with recent partnership announcements with RSRCHxchange, Thomson Reuters, Trading Technologies, and Algomi, among others. Symphony Communication Services is another leader in the collaborative space.

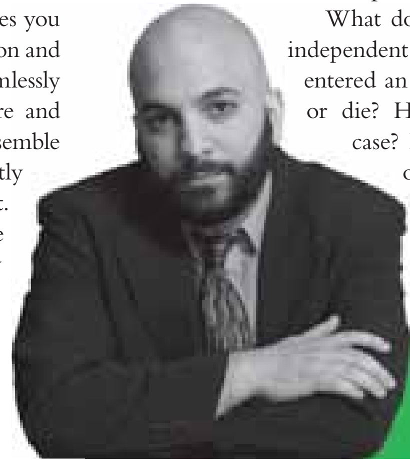
ChartIQ CEO Dan Schleifer (who, to be fair, has a horse in this race) says there's clearly a movement toward collaboration, and certain advancements are making these projects more viable. "For the past five or 10 years, we've been seeing in fintech all of these best-of-breed point solutions come about, but they had a hard time getting traction because they only do one thing," says Schleifer. "We only make charts; we don't make the other stuff. A Bloomberg terminal gives you charts and chat and trade execution and everything, and it all works seamlessly together. What's happening here and what we're trying to do with Finsemble is allow people to pick exactly which components they want. They can build it themselves, use a third party, do whatever they want and have them all work as one."

At the same time, the acquisition craze is still in full swing. Look no further than last week's announcement of Liquidnet buying OTAS Technologies. And, according to McKinsey & Co.'s Rush Kapashi, M&A is expected to remain hot in the foreseeable future, as data and analytics platforms continue to take on greater and greater importance.

"Data analytics and technology is where I believe you will continue to see more and more interest from both strategic and private equity firms, given the focus on growth," Kapashi says. "Data analytics and technology is what many, many players in this ecosystem see as the next wave or horizon. I believe that in the quest for growth—particularly as you trace the evolution of many of these players in the data analytics and technology space—M&A has been an important catalyst and will continue to be an important lever going forward."

> "What does this mean for smaller, independent vendors? Have we entered an era of collaborate, merge or die?

What does this mean for smaller, independent vendors? Have we entered an era of collaborate, merge or die? Has this always been the case? If you have any thoughts on these issues, I'd like to hear them. Shoot me an email: anthony.malakian@incisivemedia.com. W



Emilia David

Shining a Light Through Technology

As many aspects of the financial industry are already digitized, it still surprises Emilia when perceptions of a market's transparency are greatly improved through technology.

In this day and age, it's pretty much an imperative to digitize as many levels of bank processes as possible. From dealing with customers to making trading more efficient, technology has transformed the financial industry for the better.

This month I took a look at the municipal bond market and the technology overhaul the sector is slowly undertaking. As firms look to improve fill rates, digitization is taking on greater importance. What surprised me most when researching the piece was how wrong my assumptions about the municipal bond market were. I had always assumed that it was a secretive space because while there is a lot of interest in bonds issued by states like California, there's just not as much institutional activity.

I was, of course, wrong. When the Municipal Securities Rulemaking Board (MSRB) required all trades to be reported within 15 minutes, not only did traders turn to electronic trading platforms to comply, but it also inspired service providers to develop systems that both transform the market and meet the new rule. The MSRB's EMMA platform provides most of the data people need to know about municipal bonds, shining a light into what most believe is a clandestine and opaque market.

Lynnette Kelly, executive director of the MSRB, says the EMMA platform is a "game-changer" and has really helped open up the market, challenging the perception that the municipal bond market is difficult to navigate. When I went to the EMMA website, I was surprised by its depth of information. Sometimes trying to find information is like looking for a needle in a haystack. Information as simple as the entire volume traded for certain assets can be frustratingly hard to get ahold of. I do understand that there are some limitations to the kind of data that can be published, and I do know why exchanges sell this data to subscribers, but wouldn't life be so much easier if there was a specific tab on websites that captured the overall picture of a market that doesn't cost anything?

"The muni space isn't as archaic as many believe. Digitization efforts are helping to bring new tools and capabilities to the market.

It's interesting to me that the market I always assumed was so "closed off" is the one that has a fairly easy database to skim through to understand the activity of its traders—at least on the surface. While EMMA doesn't make all the information it gathers available to the public, it does offer a way for market participants to plug the data into their own systems for their own purposes.

There is also innovation going on in the muni market. Vendors are developing new ways of determining liquidity and pricing of bonds. Naz Quadri, head of Bloomberg's liquidity and enterprise quant group, says munis present a challenge when determining liquidity—hence the need for technology. "In the muni market, some bonds may look similar but possess different liquidity characteristics. It is difficult to price and gauge the liquidity of these things without using sophisticated analytics that consider more than similarity factors," he says. "Buy-side traders can rely on their brokers to provide some color, but what we've done is given them another view into quite an opaque market."

Muni market digitization?
For more information and readers' feedback please join the discussion at **waterstechnology.com/buy-side-technology**

Prompting Change

These challenges have even prompted Bloomberg to change its liquidity analytics models to make them more general to fit municipal bond securities. The vendor first thought it could apply the same model it used to determine liquidity in government bonds, but the muni market tends to have many different classifications within a single pool.

Bloomberg is working on a platform that will allow traders to find liquidity in bonds that don't normally trade, a development likely to find traction on the buy side. The idea is to find issuances that have similar liquidity characteristics. Quadri notes that some market participants think inactive securities, which make up a huge chunk of the municipal market, are illiquid. "Just because a security doesn't trade frequently doesn't mean it's illiquid; it just means that it might be illiquid," he says.

The muni space isn't as archaic as many believe. Digitization efforts are helping to bring new tools and capabilities to the market. Yes, there is still much room for improvement, but the push toward automation is clearly having a positive effect. W

Aggelos Andreou

The Case of Portugal's Blockchain

At this year's BST Summit in London, panelists and attendees agreed that blockchain is no longer seen as a disruptive technology. Aggelos says distributed-ledger technology has earned its place in the markets and waits in line to become a fully operational component in the industry's chain of trading technology tools.

All eyes on Portugal?
For more information and readers' feedback please join the discussion
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Blockchain has survived its own hype and ongoing criticism by a number of experts and industry players. Or maybe it is merely an example of how newly introduced technologies are treated by the industry and what they can expect from their circle of life. They break the news, everyone goes mad, some declare their frustration with the hype, and then they end up being just another way of doing business—AI, I am looking at you.

However, the importance of blockchain should not be disregarded. Not yet. And here's why: Let me take you on a trip to beautiful Lisbon. ...

Portugal was one of the European countries worst affected by the financial crisis. Its recovery has been slow but steady ever since it emerged from its bailout program. One of its primary objectives was to cut operational costs in the local financial market, along with injecting liquidity and regaining investors' trust.

There is little wonder, therefore, that the Portuguese buy-side community has tried consistently over the years to come up with solutions at various levels. A while back, I spoke with José Veiga Sarmento, president of the Portuguese Funds Association (APFIPP), an organization representing 97 percent of the country's buy-side firms. APFIPP has since teamed up with the University of Lisbon and Deloitte to create a blockchain solution to support the entire trading workflow of the Portuguese market. The initiative was endorsed and welcomed by the Portuguese Securities Market Commission (CMVM), the regional regulatory body, as well as the country's banking community.

The group has experimented with distributed-ledger technology and has unveiled a blockchain prototype, presented to the public earlier this year. It is seen as one of the first serious efforts to upgrade the country's financial market and establish a more efficient, stable and flexible trading cycle.

"We have created all the functionalities and the main characteristics of the future platform," Sarmento said, adding that the efforts had been centered around several key trading stages, through which blockchain could enhance the user experience. "The prototype covers everything from subscriptions and redemptions to annulments and regulatory reporting," he said. "What we developed is in fact loaded with real data, real funds, real fund management companies and funds' prospects inside the blockchain. This was to provide visibility and to state that this is not a platform in theory, but in fact, is working."

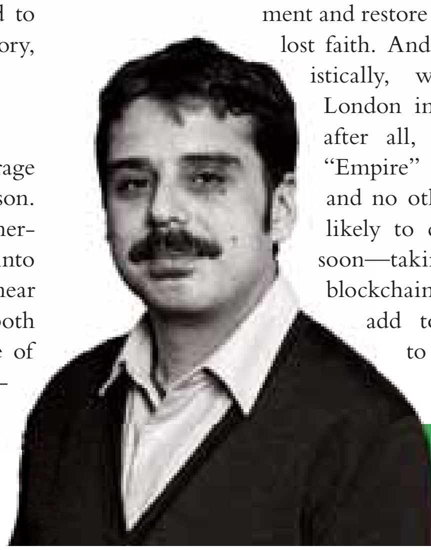
Transformation

The initiative enjoyed broad coverage by the local media, for good reason. Sarmento said that now the partnership aims to transform the project into a fully operational system in the near future. He said the support from both the public and participants is one of the driving forces keeeping it running until it reaches the final stage.

But this project is far more important than creating just another proof-of-concept—it is also a good opportunity to attract domestic and international investors to finance the upcoming platform. In fact, Sarmento said that the media coverage had already had a profound impact on the Portuguese market, as many domestic investors had expressed interest in funding the country's first distributed-ledger platform. There is no doubt that the results have given Portugal an alternative outlook, as it looks to heal its recession wounds.

> Taking advantage of the blockchain hype would surely add to Portugal's efforts to heal and grow its economy.

"We have the people and the infrastructure to pioneer in the technology field," Sarmento said. From his perspective, technology has to be an essential part of the country's effort to provide a stable trading environment and restore some of its investors' lost faith. And while Lisbon, realistically, will never emulate London in the fintech area—after all, the British fintech "Empire" is well established, and no other European city is likely to dethrone it anytime soon—taking advantage of the blockchain hype would surely add to Portugal's efforts to heal and grow its economy. W



Human Capital

Ipreo Lands Ex-Thomson Reuters Exec Lojko

Technology and analytics provider Ipreo has appointed former Thomson Reuters executive Albert Lojko as executive vice president and head of corporate solutions to drive "continued growth and innovation" in the vendor's investor relations and broader corporate services offerings. Before joining Ipreo, Lojko was most recently global head of open platform at Thomson Reuters, where he spent over eight years in roles that included global head of product for the vendor's Eikon desktop, and global head of content strategy, data delivery and quantitative analytics.

Lojko previously spent just over a year as managing director of fixed-income trading platform Tradeweb's equities business, before which he spent six-and-a-half years as a senior vice president at Thomson Corp., prior to its acquisition of Reuters. He began his career at the Carson Group, rising to managing director.


Albert Lojko

Best Credit Data Taps Data Vet Williams as Advisor

Boston-based evaluated bond pricing provider Best Credit Data has appointed Cort Williams as a strategic advisor on corporate development, reporting to the vendor's board. Williams' role will involve developing Best Credit Data's existing strategic partnerships, establishing new opportunities for new product distribution, and building a long-term plan for new product development and client service.

Williams was most recently senior vice president of business development and commercial director for the Americas at business publisher Informa, and is also managing principal of consulting firm Pinestone Advisors, which he founded in 2014.

Before that, he was executive vice president of sales, marketing and business development at SIX Financial Information, prior to which he spent 10 years at Interactive Data in various roles, including president of institutional sales for the vendor's pricing and reference data division, and vice president of strategy and business development.


Cort Williams

Curex Hires FX Vet Cudahy for BizDev

New York-based foreign exchange (FX) ECN operator and data analytics provider Curex Group has hired Kevin Cudahy as managing director focusing on business development. Cudahy was most recently head of FX sales for North America at Bloomberg Tradebook, where he spent almost four years, prior to which he was managing director of FX sales and trading at CCM Securities, and spent 10 years at BNP Paribas as vice president of FX sales.

Before that he was a director in corporate FX sales at WestLB, where he spent five years, and also held FX trading roles at Credit Suisse, Republic National Bank and NatWest Bank.

NeoXam Appoints Execs to Head New Regional Structure

Data management technology provider NeoXam has made a series of senior management appointments after creating regional businesses for EMEA, Asia-Pacific and the Americas.

The vendor has appointed Florent Fabre—who has served as COO since joining the company in 2015— as managing director of NeoXam EMEA. In addition, Fabre has been appointed co-deputy CEO of NeoXam Group, alongside CFO Manuel Michel.

The vendor has appointed two deputy managing directors of NeoXam EMEA who report to Fabre: existing EMEA head of sales Yan De Kerland, and Edgar Simiu, who joined the firm at the start of this year after holding sales and professional services positions at Riskdata and Sophis. NeoXam has also hired Norbert Boon as senior business manager on its EMEA sales team. Boon was previously global head of solutions at Pacemetrics, and co-founded Value Price, a Frankfurt-based provider of evaluated prices for illiquid instruments.

In Asia, the firm has appointed NeoXam China COO Axel Jacquet as managing director of NeoXam Asia-Pacific, while in North America,

Rimes Hires LGIM's O'Donovan as COO

Managed data service provider Rimes Technologies has hired Diarmuid O'Donovan as COO, replacing Mitesh Modi, who has become CFO. O'Donovan, who reports to Rimes CEO Christian Fauvelais, was previously chief data officer at Legal & General Investment Management in London, prior to which he was global head of data at UBS Asset Management, and held various senior roles at JPMorgan.

"Diarmuid brings with him unrivalled knowledge of buy-side data management, gained in his experience working for some of the largest brands in the industry. This knowledge and expertise will provide invaluable support in ensuring Rimes remains the buy-side's leading managed data services provider," Fauvelais said.

Diarmuid O'Donovan

Shiva Ramabadran

it has appointed NeoXam co-founder and group CEO Serge Delpla as acting managing director of NeoXam Americas, and has also hired Chris Violandi as head of Americas sales and marketing from SIX Financial Information, where he was sales manager for the Northeast US and Canada.

Separately, NeoXam hired Sandy Danet as data management director for the group, based in Paris, responsible for its NeoXam DataHub solution. Danet joined the firm in April from consultancy Ailancy, where she was senior manager, prior to which she was head of market data management at Alianz Global Investors France.

German Data Vendor VWD Promotes Ramabadran to CEO

Frankfurt-based data vendor VWD has promoted its head of technology Shiva Ramabadran to CEO, effective immediately, replacing former CEO Martin Gijssel, who has left the business. Ramabadran joined VWD in November 2015 as an advisor to "guide some key infrastructure projects," reporting directly the firm's board. He remained in that role until August 2016, when he took over as interim CTO, responsible for managing all development teams and activities and infrastructure for VWD. Prior to joining VWD, Ramabadran held management positions at firms including Blackrock, Prudential and Tudor Investment Corp.

VWD has also moved its chief product officer, Udo Kersting, into the role of chief revenue officer, where he will be responsible for consolidating all revenue-generating activities, including sales, marketing and consulting.

Wolters Kluwer Nabs Citi's Somany

Wolters Kluwer's finance, risk and reporting arm has appointed former Citigroup and Barclays executive Rajat Somany to the newly created position of global head of strategy for product and platform management. Somany was most recently managing director at Citigroup, where he spent 12 years in various roles, including COO of Citi Securities and Fund Services in Asia-Pacific, and global head of pricing and client profitability at Citi SFS. Before Citi, he was a director at Barclays, responsible for executing projects for senior management, including corporate development around M&A activities, prior to which he was a manager at LEK Consulting, and spent five years as a director at UBS.

He reports to Clive Pedder, executive vice president and general manager of Wolters Kluwer's finance, risk and reporting business.

LiquidityBook Adds Les Vital to POEMS Team

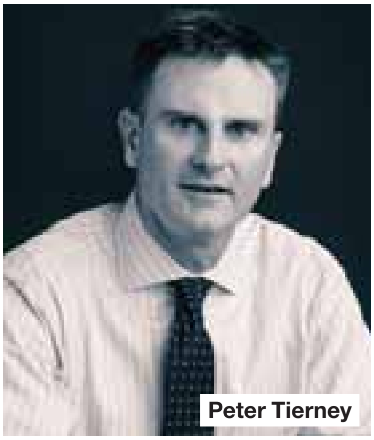
Trading-solutions provider LiquidityBook has named Les Vital as its head of technical sales.

Vital will work alongside LiquidityBook's sales, onboarding, product management and development teams to help grow market share for the vendor's POEMS platform, which serves as a portfolio, order and execution management system.

Vital joins LiquidityBook from Broadridge Financial, where he served as a project manager for the last six years in the company's investment management solutions business. He has also spent time at Eze Software Group and Morgan Stanley, where he was an operations and trading analyst.

Vital will report to Sean Sullivan, LiquidityBook's chief revenue officer.

According to the New York-based vendor, since last July,


Peter Tierney

LiquidityBook has onboarded 17 new clients, including Crow Point Partners, Pier 88 Investment Partners, Solstein Capital, and Zeo Capital Advisors.

AxiomSL Taps Data, Tech Vet Tierney in Asia

Risk, data management and regulatory reporting technology provider AxiomSL has appointed data industry veteran Peter Tierney as CEO of its Asia-Pacific business, responsible for helping to accelerate the vendor's growth as it expands its offering in the regulation and risk management sectors in the region.

Tierney was previously CEO of the DTCC Data Repository in Singapore and regional head of the DTCC's Deriv/SERV business, prior to which he was a principal of consultancy Saquish Partners.

Before co-founding Saquish in 2012, Tierney spent six years at NYSE Technologies as COO for Asia, regional managing director and managing director of TransactTools prior to its acquisition by NYSE Tech. Before that, he held senior business development roles at BT Radianz in Asia and New York, prior to which he was deputy managing director for the Americas at Omgeo and held various roles at Thomson Financial ESG before its joint venture with the DTCC to create Omgeo.

Based in Singapore, Tierney reports to AxiomSL global CEO Alexander Tsigutkin.

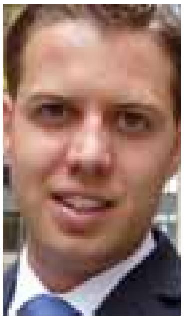
Web Financial Nabs Naumann to Expand North American Footprint

Madrid-based financial data and technology provider Web Financial Group has hired Mitch Naumann as director of North America in Chicago, responsible for expanding the vendor's growing presence in North America. Naumann was most recently head of institutional sales at Chicago-based data and analytics vendor Barchart, having also served as institutional sales director and global market data sales manager since joining the vendor in 2008 as a sales associate. He reports to Jeremy Diamond, Chicago-based president of Web Financial Group, North America.

Options Clearing Corp. Appoints Morrison as Chief Security Officer

The Options Clearing Corp. (OCC) has appointed former State Street official Mark Morrison to the newly created position of chief security officer as the firm seeks to safeguard the integrity of the markets its clears. Morrison will oversee the integration of information security best practices into OCC's services and will report to executive vice president and chief risk officer John Fennell.

Morrison served as senior vice president and chief information security officer at State Street since 2013 where he worked on the


Mitch Naumann

strategic direction and oversight of its information security program, cybersecurity defense, identity and access management, cyber threat intelligence, cloud and virtualization security technologies, and risk-based information security architecture. He was also responsible for integrating cybersecurity into State Street's project management lifecycle.

Prior to State Street, Morrison served in the Department of Defense as principal director to the deputy CIO. He was also the chief information security officer for the Defense Intelligence Agency.

DTCC Adds Wotton as Managing Director

The Depository Trust & Clearing Corp. (DTCC) has appointed Valentino Wotton as the new managing director for its subsidiary, DTCC Deriv/SERV. Wotton, who will officially assume the role in August, will be responsible for product development and strategy. He is the first person to be appointed managing director. DTCC Deriv/SERV offers automated repository and asset servicing for over-the-counter (OTC) credit derivatives for dealers and buy-side firms.

Wotton previously served as head of post-trade services and Europe operations at Barclays, where he was responsible for implementing service capabilities in a strategic global operational model. Prior to Barclays, he was with Citigroup. His association with DTCC Derv/SERV includes a stint as a member of the board of the company. He also served on the boards of OTC DerivNet and the market infrastructure and technology committee of the International Swaps & Derivatives Association (Isda). W

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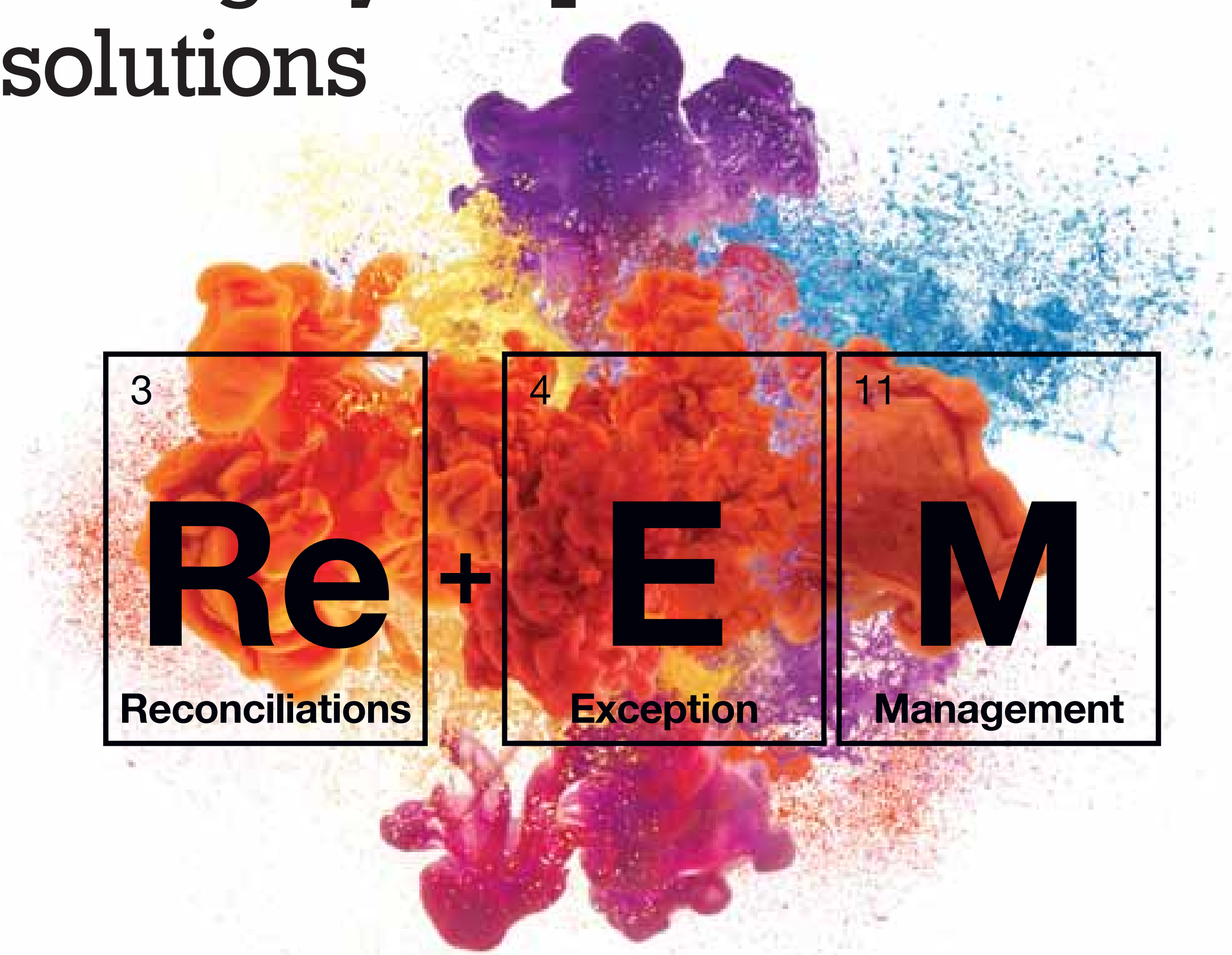

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