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Pulling Up Roots

Last month, I was at a bar on Long Island, speaking to a longtime contact from the financial technology industry who had bought the place around six months before. The room smelled like sawdust and fresh paint—my contact had ripped the entire place apart when he'd bought it and built it back up from scratch, including the bar. This was a thing of beauty, a polished mahogany centerpiece that he had carved, cut and finished himself in the bar's back room, which had been converted to a makeshift carpentry shop for the renovation.

He'd been open for about a week, and it was still too early to tell if the place would be a success—Long Island, outside of the major towns, is more or less a collection of strip malls and hamlets built around the main highways and parkways, making walkthrough traffic all but non-existent—but he seemed more easygoing than I'd known him to be for years. Indeed, our affiliation, and later friendship, had started when he'd phoned me up as a cub reporter to complain (loudly) about an article he'd thought I'd gotten completely wrong.

"The last six months, I went from earning more money than I've ever had in my life, to spending more money than I ever had in my life," I remember him saying. "But I've been the happiest I've ever been."

An engineer by training, he'd spent decades building algorithms for trading firms, software for vendors, and infrastructure for some of the largest businesses on the Street. Yet, he said, being up at 2 am on a Sunday morning, welding pipes and figuring out airflow systems, had brought him back to his roots. Worrying about stock prices, purchase orders and staff problems had never been his thing, he said. At his heart, all he wanted to do was build things. The money didn't hurt—it funded this bar, after all—but after he'd left that behind to try to make something, he found a missing piece of his soul that he hadn't realized was gone.

That conversation, not to mention the IPA, stuck with me long after I made my way back to New York. The essential idea of getting back to what matters, to roots, is something we've been discussing on *WatersTechnology* for many months now. We are, at heart, a technology magazine first and foremost—and it's our aim to return to that this year.

As we move into 2019, we're going to be drilling down into the core of what matters to you, the readers, who are all technologically sophisticated professionals. We have further, exciting announcements in the coming months, but for now, it's my goal for us to become the indispensable guide to financial technology in the capital markets. We already have big plans to accomplish that. Watch this space. W

James Rundle
Editor

waterstechnology

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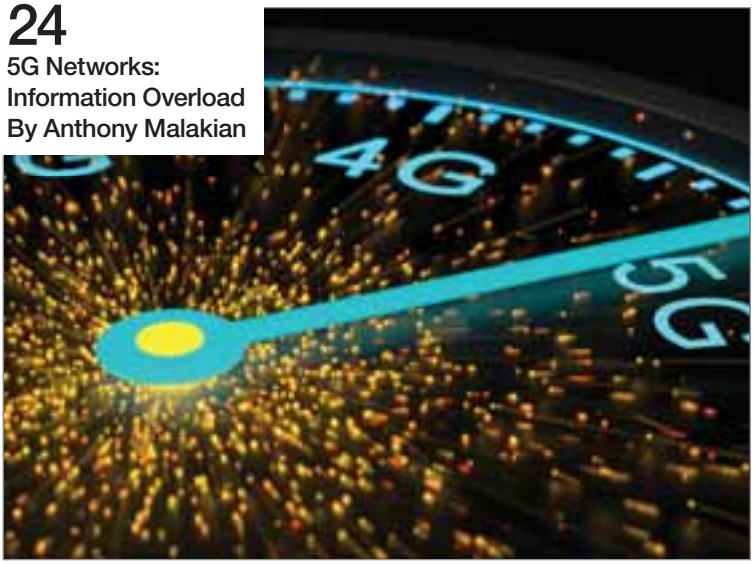
markets firms might be able to capitalize on this latest technological evolution.



GMEX Adds Digital Custody and Vault Capabilities

The company's CEO says central security depositories are well-placed to offer new digital services in tandem with current traditional services. By Wei-Shen Wong

GMEX Technologies has added digital custody and vault capabilities to GMEX Fusion, its hybrid centralized and distributed ledger technology (DLT) product suite for trading and post-trade. GMEX Fusion caters to institutional investors that require exchange custody, self-custody or third-party management of their digital asset accounts. Similarly, cryptocurrency and digital asset exchanges seeking to expand liquidity and attract new participants require custodian partners that are able to scale technology to cater to the needs of institutional participants.

Hirander Misra, chairman and CEO of GMEX, says while traditional custodians and central security depositories are well-placed to offer new digital services in tandem with current traditional services, they need to extend their capabilities to interface with the crypto markets in order to, for example, introduce distributed-ledger functionality integrated with existing technology and workflows.

"This includes custody of crypto assets and digital assets that can be validated but are not issued with an ISIN, such as private securities, as well as tokenization and handling of fiat national currencies and existing securities. [This is] so that they can be traded, cleared and settled, as well as financed in the context of a digital environment," he says. "The latter is really an extension of current business [practices] and can be done even if there is some reluctance at the outset to handle cryptocurrencies until they are more comfortable."

This is a challenging process. The existing world has to coexist with the new world because people are less comfortable with the old rip-and-replace model when it comes to new technologies. "DLT should be value-added as opposed to do less or the same as existing technology and processes," Misra says. "It is a challenge we are embracing as trading and post-trade activities are now being facilitated by us on multiple private and public blockchains with integration into existing infrastructures using the likes of FIX and Swift, leading to interoperability."

Hirander Misra
GMEX

The additions to GMEX Fusion—ForumCustody and ForumWallet—aims to address the increasing need for centralized and distributed technology to be implemented together.

ForumCustody, the digital custody piece, is being targeted at exchanges and custodians. It can be hosted and run independently from the company's existing trading system, with a direct blockchain adaptor interface to the ledger that enables connectivity between different nodes. It uses standard cryptocurrency wallet protocols, and can interface with third-party systems, for the physical transfer of coins. ForumCustody manages internal balances and locks withdrawal requests until they are confirmed. It also handles multiple types of digital assets.

ForumWallet, GMEX's digital vault offering for secure wallet management, is integrated with ForumCustody. It can be deployed by an exchange or third-party custodian, or by third-party providers looking to provide wallet subsystems. The ForumWallet subsystem automatically creates and manages wallets, which are never deleted. Wallet keys and key backups are encrypted—including with configurable periodic key rotation—and stored.

Misra says the rotation timetables can be configurable as the operator sees fit, be it daily, weekly, or monthly.

"When we designed the product suite we spent a long time investigating and assessing why some of the crypto exchanges were hacked and what could be done to progress it. In many cases, their failure was not only down to poor technology and lack of network security, but also down to poor operational processes and procedures. We are confident we have addressed all these aspects," he adds.

The ForumCustody and ForumWallet framework can also be used to tokenize existing securities and assets, an area where institutional demand is increasing, Misra says. Examples of this include SIX launching Swiss Digital Exchange with the ability to tokenize existing securities and non-bankable assets, as well as the Singapore Exchange's recent investment into iSTOX, a capital markets platform that allows issuers to raise capital via security token offerings. W

IT Advances Insufficient to Beat Compliance Challenges

Outsourcing reporting could create technological dependencies that could add to firms' problems in the future. By Amelia Axelsen

Data quality remains a problem for the complex trade and transaction reporting requirements written into new financial regulations, but some industry executives are seeing positive outcomes from reference data identifier systems.

According to a JWG whitepaper, *Regulatory Reporting: Time for a Rethink*, firms are now recognizing the benefits of upgrading legacy systems and creating centralized data sources.

A survey of 12 global financial institutions conducted by the firm revealed that more firms are now seeing the value of creating a centralized data hub that provides data visibility, transparency, and automation.

Meanwhile, in EY's annual *2019 Bank Regulatory Outlook*, the consulting and accounting giant noted that the financial industry has made significant strides in data storage and accessibility but still needs to improve data governance.

"Data architecture must be designed to harness data not just for regulatory and risk-control purposes, but also to create increased analytical capabilities," states the EY report. "The key steps to push through now are risk alignment, standardization of processes and aggregation of data from multiple sources."

Despite careful planning and improving the resources required to handle the influx of data, the scope of the Securities Financing Transaction Regulation (SFTR) and the substantial data fields it requires differ from one jurisdiction to the next.

For instance, the primary trade reporting methods in the US are mandated by the Dodd–Frank Act and similar rules, which have different data and reporting demands compared to European regulations such as the Markets in Financial Instruments Regulation and the European Market Infrastructure Regulation. Once all of these regulations are effective, all financial instruments executed between counterparties will have to be reported to designated authorities within 24 hours.

Chad Giussani
Standard Chartered Bank

Some of this data must be reported three to four times through different channels, with the result that "misaligned interpretations across several layers of regulatory obligations ultimately leads to a reduction in the quality of data for systemic risk monitoring purposes, negating the fundamental intent behind the rules," according to the JWG whitepaper.

Firms need to integrate complex technologies to address transparency and data lineage problems, said Phil Flood, a solutions architect at data automation platform provider Inforalgo, in a JWG webinar on January 15.

"There are certainly a lot of regulations that people need to comply with, and there's no standard design across regimes, which creates the usual problems of data silos and data fragmentation," such as with SFTR, he added.

Firms are at risk of accruing huge fines if they fail to report, or report incorrect data. Some of the biggest financial firms process millions of transactions every day, reported by hundreds of trading entities spread across different jurisdictions.

Many firms are implementing third-party solutions designed specifically to address this. During the JWG webinar, Chad Giussani, head of operations, transaction reporting compliance, at Standard Chartered Bank, said it is reasonable for some firms to offload technology demands to solutions providers, rather than to build it in-house.

According to EY, the onus is on financial firms to ensure the data is accurate.

Dawd Haque, global lead for regulatory market initiatives, transformation and strategy at Deutsche Bank, said in the JWG webinar that it is important for firms to achieve synergy and efficiency without creating dependencies.

Haque said firms trying to centralize data sources and create front-to-back trading systems in-house may find the platforms are hard to change when regulations are adjusted or amended. "Regulations could diverge at any time, and if you create too much dependency then you have to untick all of your systems," he said.

Haque added that these dependencies are hard to measure, but creating agile systems where data fields can be altered when regulations change is key. W

Third-Country Benchmark Administrators Struggle Ahead of BMR

Failure to comply by 2020 will result in EU supervised entities' inability to invest in products that reference benchmarks not approved by Esma. By Amelia Axelsen

The European Benchmarks Regulation (BMR) comes into force in January 2020, but the costly and complicated compliance process means big problems for "third-country" benchmarks, which could be exacerbated by the UK's departure from the European Union in March this year.

The BMR targets conflicts of interest within benchmarks, specifically due to Libor and Euribor submission scandals. The regulation aims for stringent governance practices governing benchmark administrators and the data methodologies from which indices are derived. However, the European Securities and Markets Authority (Esma) was mistaken that the world's financial watchdogs would fall in line and introduce similar rules. Third-country benchmark providers residing outside the EU are scrambling to put in place regulatory schemes, but without crucial benchmarks for those markets, EU entities cannot invest in products referencing third-country benchmarks that don't make the 2020 cut.

One way to mitigate costs and comply with the BMR is to relegate controls of benchmarks and the data that underpins them to an independent provider. "The EU misestimated that every other regulator or jurisdiction would pass something equivalent to the BMR, but no one did," says Rick Redding, CEO of the Index Industry Association (IIA). "The equivalence route doesn't seem to exist at this point."

Redding says firms outside the EU are grappling with the economic viability of maintaining a benchmark that is BMR-compliant. Owing to the expense involved in trying to achieve equivalence and the other two available options for EU benchmark compliance—recognition and endorsement—many administrators are contemplating not offering their indexes in Europe at all.

Rick Redding
Index Industry Association

According to Redding, this may lead to some benchmarks not made unavailable to EU firms, and consolidation of the industry into partnerships.

As of January 2019, there are no third-country benchmark administrators listed on Esma's BMR-compliant administrator registry. One problem for third-country administrators is obtaining access to data on exposure to EU markets, which makes it difficult to determine whether having an EU-compliant benchmark is even worth the cost.

In the Asia-Pacific region, for instance, where 55 important benchmarks stand to be affected, a survey by the EU Asia Financial Services Roundtable revealed that 36 percent of Asian benchmark administrators say they don't know how often their benchmark is being used in the EU.

"The survey thus showed that a significant proportion of the major benchmark administrators in Asia-Pacific expect their business models to be impacted, and that many benchmark administrators find it difficult to determine to what extent they may be impacted. In other words, given the lack of clarity in terms of the scope of the BMR, both administrators and users have found it challenging to identify what benchmarks are required to be compliant with the regulation," reads a briefing paper by the roundtable.

Mark Schaedel, managing director and head of index administration services at IHS Markit, says that while equivalence is hard to achieve because regulators within a jurisdiction must overhaul the entire system, recognition and endorsement may prove equally difficult.

"Most are looking at the various options, but they tend to be complicated for those sitting outside the EU because they're not familiar with the benchmark administrators in the EU, they're not regulated themselves, and they have to form relationships with the index administrators in the EU," he says.

Brexit may complicate this process even further because in order to achieve recognition, administrators need to have an agreement with their so-called member state of reference, which is based on the contracts where an instrument was first traded referencing the index or benchmark. In most instances this will be the UK, but after Brexit the UK is set to become a third country itself, and market participants remain in the dark about whether it will be considered equivalent with the BMR. W

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Cinnober Shareholders Approve Nasdaq Takeover

Nasdaq is poised to complete its acquisition of Cinnober Financial Technology, after reaching a critical level of acceptance for its all-cash offer among shareholders of the Swedish vendor. The US exchange operator announced on January 9 that 91 percent of shareholders had accepted its offer for the firm, valuing Cinnober at around $220 million. Nasdaq had been forced to revise its offer in late December 2017, after a number of holdout investors said the original asking price had been too low. With its existing holdings, Nasdaq now controls just over 98 percent of the company's issued shares.

"Cinnober's technology, talent, and development capabilities will enable Nasdaq to accelerate strategic initiatives to both extend the breadth and depth of the market infrastructure technology stack and expand into new industries—including segments outside of capital markets," says Lars Ottersgård, head of Market Technology at Nasdaq.

Under the revised offer, Nasdaq will pay SEK 87 ($9.62) in cash for each share, and SEK 121 ($13.37) in cash for each warrant, compared to SEK 75 ($8.29) per share and SEK 85 ($9.39) per warrant previously.

With the 91-percent mark reached, Nasdaq commenced a settlement on January 17 and initiated a compulsory purchase of any outstanding shares—however, it allowed shareholders who had not yet tendered their holdings to redeem them under the revised offer until January 30. Following that, Nasdaq will delist Cinnober from Nasdaq First North, its Stockholm-based venue that is part of Nasdaq Nordic. A possible hurdle remains in a review being conducted by UK's antitrust body, the Competition and Markets Authority (CMA).

If it decides that the deal is anticompetitive, Nasdaq could be forced to divest elements of Cinnober's business as a remedy to regulatory concerns. Sources indicate that this could include Cinnober's surveillance business, which directly competes with Nasdaq's popular Smarts platform, and which was brought into the Cinnober stable after its 2017 acquisition of Ancoa.

While the CMA is not due to publish a decision until February 9, Nasdaq made the successful outcome of the CMA's inquiry, as a precondition for the closure of the deal in its revised offer.

James Rundle

R3 Creates Foundation to Manage Corda Blockchain Network

Blockchain technology provider R3 has set up the Corda Network Foundation, a group that will independently manage and operate its Corda blockchain network.

R3 essentially becomes a supplier to the foundation and its members, says James Carlyle, head of network and operations at R3.

"One of the reasons we're setting up the foundation is to assure Corda users that the governance and control of the network will be conducted in a fair manner," Carlyle says. "The foundation offers a transparent way for rules and standards to be created, ensuring users are a part of it."

He says it is important for R3 "to show that the network will not be monetized, that is why we are explicit that the foundation is separate."

The foundation will comprise representatives from Corda users with two seats available for R3. First elections for the foundation's board have been slated for 2020. Meanwhile, Carlyle says the foundation will appoint a one-year transitional board to begin the process of creating standards for the network.

The foundation's other responsibilities include setting a membership fee to use the network, and setting standards around issues such as managing disputes, or creating rules around assigning identities.

"I absolutely believe this is the best way to govern a network. Blockchains are grounded in transparency, and all systems need rules, but people using the network must understand who is in control, and have a say in how it's run," Carlyle says.

Emilia David

HKEx Adopts Traiana FX Clearing Solution

Hong Kong Exchanges and Clearing (HKEx) has opted to use post-trade infrastructure provider Traiana's direct central clearing connectivity to clear foreign exchange (FX) deliverables.

Market participants can now access HKEx's OTC Clear service to clear USD/CNH and USD/HKD FX forwards and swaps using Traiana's CCP Connect clearing hub.

Steve French, head of connectivity and messaging at Traiana, says that previously, clearinghouses offered non-deliverable forwards, as there are no settlement issues to contend with. "More recently, FX options have been offered for clearing, which does involve settlement of the hedge trades and any trades from the exercise event. This is a brand new service that has not been available before and will allow HKEx to clear deliverable FX forwards and swaps in two currency pairs," he says.

If HKEx wanted to add clearing of additional currency pairs, Traiana could also support that.

CCP Connect provides affirmation, matching and trade processing capabilities.

HKEXs OTC Clear Deliverable FX service can be used to mitigate settlement risk from payments and receipts of different currencies occurring at different intervals during a standard bilateral settlement process.

Wei-Shen Wong

SGX Shifts Focus to Investor Accessibility

The Singapore Exchange (SGX), which in the last month of 2018 launched its new post-trade system powered by LSEG Technology, is now focusing on "smaller" projects, making processes more efficient and seamless for investors and fund raisers.

In the past four years, the exchange has prioritized major launches. "We upgraded our derivatives system, we launched the new post-trade system; we have also developed SGX Bond Pro (a screen-based institutional-only electronic bond trading platform). There's been a series of big projects that we have launched," Boon Chye Loh, CEO of SGX, said during SGX's second quarter earnings briefing. Loh added that SGX will continue to invest in technology, but there will not be "that many" big projects coming through.

"We started way before this, on the digitalization journey, but what you see is an externalization of that. Whether it is post-trade [or something else], being able to work with the industry to make [the exchange] even more efficient, seamless, online and to get the access through easily is where we will be accelerating those efforts," he said. "I think you will see a shift from us in terms of large project system launches to really making the investing journey coming to SGX and working with the whole ecosystem to make investing and fund-raising a joy," he said.

Loh declined to reveal any specifics, but said, "Think of it as our desire to allow investors who want to invest into the market a more seamless and digital way, and also for any issuers who are listed on the exchange, whenever you do any corporate action and services, we just want to make it a lot easier."

In December 2018, LSEG Technology implemented SGX's new post-trade system, which involved brokers, custodian banks, settlement banks, registrars and retail investors.

Sutat Chew, head of equities and fixed income said during the earnings call that following this implementation, SGX has been able to launch new services such as broker-linked balances.

He said additional services will be introduced gradually. As for maintenance, Chew said, "It has been a very long cycle time before we had the entire industry migrate to the new post-trade system in December. We certainly don't expect any immediate refresh of this."

Wei-Shen Wong

Consultancy ISN Creates Data Tech Vendor Spinoff

San Francisco-based data and technology consultancy International Solutions Network (ISN) has created a spinoff business designed to market technology platforms stemming from products created to support its consulting work to financial firms needing inventory and license management systems.

ISN set up the new business, dubbed VendEx Solutions, in response to client reaction to the VendorScape (now rebadged as VScape) vendor optimization tool that ISN created to perform client assessment projects.

"When we began approaching clients with VendorScape, we realized that we needed to create a software-as-a-service offering … and that there was an opportunity to develop more vendor management tools," says ISN managing partner Richard Clements, who will serve as CEO of VendEx.

In addition to VScape, the vendor's products include: VPort, a dashboard of vendors, license availability and cost; VSource, a searchable catalog of vendors and services that allows users to compare services and functionality; VKey, which extracts and displays contract terms and conditions and usage rights; and VReg, which maps details of existing, new, and pending regulations against vendor services to assist in compliance, risk management and reporting functions.

Max Bowie

Crypto Exchange BTSE Plans Futures Trading

UAE-based fiat–cryptocurrency exchange BTSE has announced the launch of futures products starting in February.

"We have designed a product to provide 100 percent leverage to a user," says Brian Wong, co-founder of BTSE. "This enhances the return that they can get from the volatility in price. Another thing is they can go long, and they can go short—the coin itself. So all these are very useful features that enable people to speculate on the price of bitcoin."

New features being offered include linear perpetual futures contracts, multi-currency, and FIX support. The platform claims to offer better margin control for traders looking to benefit from volatile markets, while avoiding the volatility of cryptocurrencies.

The technology used has been developed in-house. The matching engines for futures orders can process over 1 million orders per second, the exchange says.

Wong says that while normally futures tend to expire, their product is different. "Once a future expires, you have to get into a new position that creates inconvenience; it is more hassle for the user," he says. "But our future, it never expires. That is why it is called a perpetual future. So it saves users hassle and it provides a tool that people can use very easily without all these operational overheads."

Hamad Ali

Challenging US Exchanges, MEMX Faces Uphill Battle

An industry initiative to start a new US exchange promises much, but it may struggle to deliver without a clearer purpose. By Anthony Malakian, Wei-Shen Wong and James Rundle

January's announcement of a new venue for trading US stocks backed by a consortium of financial firms has industry participants excited about the prospect of lower fees, but experts say critical elements of the plan remain unclear, and warn that the participants will need to overcome competitive differences before they can truly benefit from their investments in the project.

A group of nine sell-side and buy-side firms announced on January 7 that they would file an application with US regulators to establish a new exchange—named Members Exchange (MEMX). Its aim: to "simplify the execution of equity trading in the US."

Based in New York, its founding members include some of the largest retail broker-dealers and institutional market-makers in US equity markets: Bank of America Merrill Lynch, Charles Schwab, Citadel Securities, E*Trade, Fidelity Investments, Morgan Stanley, UBS, TD Ameritrade, and Virtu Financial.

However, while MEMX may have built-in liquidity at the start—depending on the commitments of those firms, competing with incumbent exchanges such as Nasdaq, Cboe and the New York Stock Exchange, whose technology and markets dominate stock trading in the US—will be a tough task.

> "Putting MEMX aside as a business, let's have a conversation with them and ask: What do you want to do? What are you ultimately trying to accomplish?' It would cause me to say I've obviously not listened to you effectively as my customer." **Bruce Fador, Fador Consulting Group**

In addition, starting an exchange group is more than simply building a matching engine.

"You need clients. You need general rules of the road. You need the tech infrastructure to service your clients. You need the back-office functionality to keep track of assets and reconcile," says John Lin, CEO of proprietary trading firm Grasshopper. "Here is the question: If MEMX succeeds, will it just displace the current status quo with its own, and will the new status quo be more open, or less open to all market participants? Key elements of such a tight member group would probably always be averse to truly open competition."

Nature of the Game

From a technical perspective, the gradient of the hill that MEMX may have to climb depends on what segments of the market it will cater for. In this, the incumbents undoubtedly have an advantage—NYSE rolled out its modernized trading platform, Pillar, in 2016, while Nasdaq has been pursuing a unified technology program, the Financial Framework, for several years now. Cboe, likewise, has benefited technologically from its 2017 acquisition of Bats Global Markets, and is waist-deep in a program to transition its options markets to the new technology.

Equity trading, in particular, is a technologically intensive operation in modern markets. Exchanges such as NYSE and Nasdaq offer matching engines with microsecond-level latency, co-location in datacenters, and ultra-fast market data connections for the most sophisticated trading outfits, which include MEMX co-founders Citadel Securities and Virtu.

"You don't just build that level of sophistication up overnight," says a source close to the incumbent exchanges' thinking. "This has been a years-long, and sometimes decades-long project to modernize American markets, and you can't just buy this stuff off the shelf or whip it up in a few months."

Much of that infrastructure exists specifically to support the complexity of equity markets in terms of managing retail flow, order types and various other concessions to a market structure that has, in many ways, become fragmented by technological capability. Here, some say, MEMX may actually have an advantage: Its statements make it clear that it is pursuing a limited number of order types—the unfettered proliferation of which has long been a bugbear of market-structure critics—and that it will not seek to implement "speed bumps."

If that is the case, then MEMX's members may be able to use their existing order-routing expertise to build the bones of the new exchange. Most of the firms investing in MEMX already operate exchange-like technology stacks to run their dark pools and systematic internalizers, which have taken over from the old broker crossing networks in Europe with the advent of the revised Markets in Financial Instruments Directive.

"I don't think it's that complicated. Most brokers will have a dark pool or a matching engine that could be tweaked to offer this type of functionality depending on the structure," says a managing director at an Asia-based institutional broker-dealer. "Instead of a dark pool being dark, you would disseminate the pricing information."

In a dark pool or internalizer, that information is currently disseminated to the firm's smart order-router. The managing director says that changing that dissemination to a third-party data distribution platform would not be an enormous technical hurdle.

Others are more hesitant to dismiss the challenge of adapting the technology. While dark-pool technology is generally "just a derivative of normal exchange technology," says Grasshopper's Lin, most are designed to handle far lower volumes and throughput than an exchange's matching engine, and are "perhaps not the most robust platforms."

Likewise, the exchange source says the process of adapting broker platforms is "a little more complicated than that."

Cost Control

One of MEMX's founding pillars is the promise of low fees for participants. Indeed, the issue of cost is inextricably linked to the creation of MEMX.

Last year saw a fierce debate between exchanges, trading firms,

and regulators around the fees charged by exchanges for data products. This culminated in an October action by the US Securities and Exchange Commission (SEC), which struck down two long-disputed fee proposals by the NYSE and Nasdaq.

If discontent over the costs associated with modern exchanges is the root cause of industry malaise, however, MEMX is a visible manifestation of its effects. Some say that while incumbents may not be overly concerned about the threat to their businesses from MEMX, they should nevertheless consider it a warning, insofar as the emergence of the consortium shows the debate is moving beyond gripes and penny pinching, and evolving into something more serious.

"I don't believe for a second that [Nasdaq and NYSE presidents] Adena Friedman or Stacey Cunningham are shaking in their boots. Not at all," says Bruce Fador, managing partner at Fador Consulting Group. "If I'm them, I'm saying 'OK, how do we have a conversation with this group [of firms]? Putting MEMX aside as a business, let's have a conversation with them and ask: What do you want to do? What are you ultimately trying to accomplish?' It would cause me to say I've obviously not listened to you effectively as my customer."

That outcome may be a painful pill for exchanges to swallow—on the day that the consortium was announced, the World Federation of Exchanges issued a press release outlining the reasons why exchanges charge the fees they do for data products—but may ultimately be the optimal result for MEMX.

After all, this is not the first time that upstart exchanges have tried to wrest control from the incumbents. Take, for example, New York-based IEX, which launched in 2016 amid much fanfare, having been helped enormously by its profile in Michael Lewis' book, *Flash Boys*. While much has been written about the startup exchange, it has struggled to gain traction among market participants, with its month-to-date volumes reaching 2.72 percent of the US market at the time of this writing, according to market data from Cboe, and its plans for a listings business still yet to be realized.

Likewise, the industry has a patchy history when it comes to ownership of trading venues and technologies that have a stated aim of disruption, with the theme of member ownership being something of a cyclical issue. Examples include OptiMark, a trading system built in the late 1990s that was devised by brokers and institutional traders to challenge Bloomberg, but which was eventually incorporated by Nasdaq. Chi-X was another example of

industry ownership of an exchange group—which was eventually sold to Bats.

The Kansas City-based operator also picked up another nascent exchange group that had grown up under the wings of trading firms—some of whom are represented in MEMX's ownership—in the form of Direct Edge. Ironically, Bats itself would later be acquired by Cboe, creating the very power player that MEMX is seeking to challenge.

"It's not that these things don't have good objectives, but to accomplish this stuff is really difficult because our industry doesn't move quickly," says Fador. "I mean, it really doesn't. There's a portion of it that embraces change, but it's only a small portion."

Competing Interests

Many details about MEMX remain unclear. The exchange is still in an embryonic phase, and key questions around its technology and purpose remain unanswered.

"The biggest hurdle will be not tweaking their own platform, but deciding whose platform to use, from my perspective," says the managing director at the institutional broker-dealer. "Any time you get a consortium of brokers, it just becomes a bit of a mess. Every broker thinks they're the smartest guy in the room; they all think their technology is the best."

Indeed, industry partnerships are, at the best of times, hard to manage. Just ask the participants in Project Colin, the failed attempt to build an industry utility for post-trade processes, or the length of time it takes to get much of anything accomplished in industry working groups without a formal structure or organization, such as FIX Trading Community, to guide them.

A person familiar with MEMX's thinking says it is still early days for the would-be exchange, adding that its board—which includes representation from each member firm—will make decisions about technology, and is actively recruiting personnel.

"They're hiring staff for technology platforms, for running relationships, and for management," the source says. "It's very early in the process. The main focus right now is on filing and getting the application approved with the SEC."

But technology questions aside, any exchange lives and dies by one sword—liquidity.

"Building a venue, liquidity begets liquidity. The last thing I want to do is build a venue, tell all of my clients to route there, and then nobody gets any fills and they have a bad experience," says the managing director. "One of the benefits that this place will have from day one is that if Morgan Stanley, UBS, Virtu, and others send all of their flow, then it's going to be a viable marketplace."

Much depends on how MEMX's founders envisage its future growth, and the level of investment required to achieve those goals. Although it's true that exchanges invest a lot of money in building and maintaining technology to run their exchanges, Grasshopper's Lin says he believes it is possible for MEMX to succeed if the scope of its ambition is realistic.

"They do not have to be beholden to a small common denominator. That is hard work. They can just take care of their members, with perhaps an offering to others that want to participate," he says.

Lin adds that MEMX only has to mimic the current efficiency status quo, and offer moderate savings in exchange fees and data costs. "It's a brilliant move, as they have already gotten close to a critical mass of major participants," he says.

A wider expansion of the platform in order to truly challenge trading volumes—if not listings—on Nasdaq, NYSE and Cboe, however, will require the participation of retail flow. That may be a challenge in the modern trading environment, where the narrative has tended toward separating retail trading from high-speed, technologically advanced operations, or by leveling the playing field through the introduction of speed bumps or randomized pauses during the execution process.

As such, the relationship between retail and institutional brokers has tended, at least in recent years, toward the antagonistic. A substantial part of the challenge that MEMX faces will be balancing the interests of the institutional and retail segments in the same pond. MEMX has anticipated this in the composition of its membership, given the presence of TD Ameritrade, E*Trade and other retail-focused brokers, but it will need to attract wider participation to truly succeed. This will require a delicate approach to interests that may ultimately compete with, rather than complement, each other.

"If you get the right personalities in the room, you can bring up everybody's agendas and say, 'These are the major sticking issues for you as the institutional guys; here are the objectives of the retail guys'," says Fador. "And then, you know, the technology will get decided once they sort of get agreement around what this thing looks like. Ultimately, what's the objective?"

Indeed, more than low-latency connectivity, order routing, matching engines, or any other technological trinket, the existential threat to MEMX is likely to come from within.

"The biggest hurdle will be themselves," says the institutional broker. "Like I mentioned, getting seven brokers who all think they're the smartest guy in the room to agree on anything will be difficult. You've seen this before in potential tie-ups. It's easier said than done, let's say." W

Crypto Markets Turn Traditional FOR TOOLS OF THE TRADE

As interest in cryptocurrency trading refuses to wither, despite a bearish year, traders are increasingly calling for institutional-grade tooling from traditional markets to further develop the asset class. By Wei-Shen Wong

Institutional trading in cryptocurrencies is being held back largely because of a lack of infrastructure and tools that exist in traditional markets, but have yet to be properly established in the crypto world.

Although efforts are being made to further encourage institutional participation in this market, as *WatersTechnology* highlighted in the December 2018 issue, there is much work left to do before that is realized.

One example of what is missing, and what traditional traders are accustomed to, is valuations. At present, there is no way to gauge if a token is overpriced or undervalued, which is not what traders in traditional markets are used to. There is no equivalent of price-to-earnings ratios, or earnings before interest, tax, depreciation and amortization that traders can use to value cryptocurrencies, as they do for equities, for example.

SJ Oh, vice president and trader at Hong Kong-based digital asset brokerage OSL, says for this reason, traders need to resort to different options, such as technical analysis, relative valuation and momentum trading when making the decision to buy, sell or short cryptocurrencies.

"There are a few ideas that make sense in their effort to quantify value, such as a coin price being a function of network value, and Metcalfe's law, for example. However, one of the major challenges is that if these methods are not widely accepted as a consensus, the market will not behave accordingly and therefore fail to act as relevant triggers for investment decisions," he says.

While technology tools for crypto custody and settlement still remain the major missing puzzle pieces, other aspects of what exists in traditional markets, such as well-known and commonly used valuation tools, are what institutional traders look for.

Market participants have turned to the FX and commodities markets to see which tools could be replicated, or borrowed, and used in the crypto space.

"The crypto asset class will evolve into an interesting bifurcated market that exhibits the characteristics of many existing asset classes. Add the ability to support decentralized applications and crypto will truly evolve into an asset class of its own that will require an infrastructure that is purpose-built to support its evolution." **Hu Liang, Omniex**

Passing Similarities

Indeed, it's accepted wisdom that these asset classes are used as proxies to evaluate the maturation of cryptocurrencies—which, despite their name, can be similar to any number of securities. Hu Liang, co-founder and CEO of crypto trading platform Omniex, says that while there are a lot of similarities between the asset classes, they are only skin deep.

"While the current class of crypto assets, such as bitcoin, litecoin, ethereum, are not deemed as securities, a growing number of newly created tokens and many of the expected blockchain asset tokens will be considered securities tokens," he says. "As such, the crypto asset class will evolve into an interesting bifurcated market that exhibits the characteristics of many existing asset classes. Add the ability to support decentralized applications (dApps) and crypto will truly evolve into an asset class of its own that will require an infrastructure that is purpose-built to support its evolution."

From a trading perspective, crypto traders look for a lot of the same tools and flexibility that FX traders use. Craig Borysowich, digital platform strategist at consultancy firm Capco, says that with the vast number of exchanges available, high-velocity arbitrage trading is possible in the crypto market.

"Being able to create trades, set stop-losses on trades, combine direct FX-style trades on the crypto exchanges with futures trading on futures indexes—while those things are becoming table stakes in the industry, there are still a lot of challenges," he says.

Among them is the ability to move fiat currency in and out of exchanges. Not many exchanges offer direct banking connections, so unless they have specific banking relationships in place, traders will have to move money around or wait on longer wire transfers or bank drafts.

This sounds counterintuitive given that trading in this asset class is meant to be less restrictive and an overall easier process than traditional markets. While trading strategies in crypto are similar to FX and equity trading, the volatility of the market and the larger number of available exchanges has also created newer strategies.

"Having a backwards/forwards testing facility for paper trading is invaluable to crypto traders. Being able to roll back in time and look at historical markets or being able to pick out smaller trends, posting paper trades at a point in time in the past and then playing the market forward to see how those trades work out is an important tool for traders to look for these new markers and methods of trading in the crypto market. There are few facilities for this in crypto and they are usually not integrated with the exchanges and trading tools, so you need to perform these functions out of band of your normal trading platforms," Borysowich adds.

Andrew Flatt
Archax

One big difference is that there are no prime brokers at scale in the crypto markets yet, adds Prash Puspanathan, founder and CEO at Caleb & Brown, an Australian-based boutique consultancy firm providing cryptocurrency solutions. This means that crypto institutions mostly take physical ownership of the coins.

"Another big difference is that in FX and commodity markets, the derivatives markets such as futures are dominating spot trading. In crypto it is still the other way around, spot trading is by far dominating futures," he says.

This could change if the infrastructure around warehousing and futures are built out in the crypto markets. One example of this is the Intercontinental Exchange's (ICE's) Bakkt bitcoin futures, which has been delayed twice and is expected to be launched sometime early this year. One reason for the holdup is that it is waiting on the US Securities and Exchange Commission's (SEC's) decision on bitcoin exchange-traded funds (ETFs) this month—a decision that may be delayed further owing to the months-long US government

shutdown that at press time had just concluded.

Michael Unetich, vice president of cryptocurrencies at Trading Technologies (TT), says some existing ETFs in the market have received some bad publicity around pricing in the last couple of years.

"I think, before the SEC will allow other products to go out, they want to be convinced that they are high-quality products," he says.

Reflecting on the delay in the launch of the Bakkt futures exchange, Tim Enneking, managing director at San Diego, Calif.-based fund manager Digital Capital Management, says this delay is because cryptocurrency exchanges—or cryptocurrency platforms, as he prefers to call them—often do not work together to exchange information.

"The SEC hasn't approved an ETF because the exchanges don't work together, whereas in the FX and commodity spaces, they work together and exchange information," he says. This becomes a particularly acute issue when the regulator is unable to effectively monitor spot exchanges that contribute to price formation.

TT's Unetich instead sees it as additional room for ICE to launch a "high-quality product." Indeed, Bakkt recently acquired an independent futures commission merchant to strengthen its offering, with the aim of attracting institutional capital to the crypto space.

"On that note, the Bakkt contracts will launch but the Commodity Futures Trading Commission (CFTC) has been very cautious on the amount of leverage that a futures exchange can offer. Bakkt specifically will be offering a fully collateralized (zero leverage) futures contract, so it will be very similar to trading spot with the ability to short," he adds.

Caleb & Brown's Prash says the Bakkt futures exchange will be another step in the right direction for legitimizing bitcoin, and these "short-term" delays are not a concern. "After all, a nascent technology with its many kinks to be ironed out is going to take time to both assimilate into the current financial system, as well as develop the robustness of infrastructure and market maturity required for greater trust from the financial incumbents," he says.

It is worth remembering that the SEC and the US are only one regulatory body and jurisdiction in one market, he adds. As other countries start to make greater advancements in regulations, this may shift dependency on the SEC in influencing the regulatory landscape. "This will be particularly true if positive case studies of regulation from around the world start to come to light," Prash says.

New Glasses, Old Lens

It is clear that there is value in picking apart what makes traditional markets work. Charles Hayter, CEO of CryptoCompare, says there is a lot that can be grafted from the traditional financial industry. "Perhaps the most important initiative is unifying access to the differing pools of liquidity," he adds.

Herbert Sim, chief commercial officer at Singapore-based crypto community exchange Cryptology, says one of the major barriers to institutional investors is transparency. "Institutional investors are used to the traditional markets—the security, efficiency, and transparency based on security measures in place—and they're also backed by the market," he says.

This also depends on what type of exchange model the transactions are made on—decentralized or centralized.

"Decentralized exchanges use blockchain to drive transactions. Trading under the ledger system is good in a way that all transactions are transparent because they are harder to hack. But there are also disadvantages. For decentralized exchanges, transaction speed is slower. This means that trading may not be so efficient. This is among the technological issues that cryptocurrency platforms try to optimize," he says.

Charles Hayter
CryptoCompare

Centralized exchanges, on the other hand, allow transactions to be conducted more efficiently and at a faster speed. The problem here is that it is not as transparent as a decentralized model, he says.

Hayter adds that other frictions crypto traders face with existing and new crypto service providers include poor unification of instrument types; lack of coherent and consistent data; application interface programing structures and trading protocols; information and technological asymmetry; exchange risk in terms of security of funds and execution risk; and incumbent infrastructure risk in relation to banking with crypto exchanges.

John Hyland, global head of exchange-traded products at Bitwise Asset Management, says the single biggest issue for institutional investors and for fund companies looking to launch listed products is the weakness found with the spot cryptocurrency exchanges.

"That weakness revolves around the concerns, among potential institutional investors but particularly among public fund regulators like the SEC, the UK's Financial Conduct Authority, and others, that the trading results on the top 40 or so cryptocurrency exchanges are not entirely reliable," he says.

John Hyland
Bitwise Asset Management

Bitwise created and published an institutional-grade crypto index that tracks a basket of 10 major cryptocurrencies. It also runs three different crypto index funds. In his role, Hyland was brought on to work on getting public vehicles listed in the US, Europe, and Asia. The firm filed an initial registration form in January 2019, proposing a new bitcoin ETF that it says will address regulatory concerns.

According to Hyland, a group of exchanges provide two sets of outputs that are needed by other participants in a developed market—their claimed volume, and their claimed executed prices.

Although he says most of the top 40 exchanges are reporting real volume, at least for trading in bitcoin, this does not mean that all exchanges are reporting real volume or on all coins. It is the same concern with reported prices, in terms of whether or not they are based on real trades.

This creates two problems, he says. "First, how do you know what should be the 'real' price of bitcoin at this exact moment if you have 40 exchanges giving you trades and prices and yet you lack a lot of confidence that all those figures are solid? How do you build an index or benchmark? In addition, regulators will question, in that situation, how they are supposed to know if the prices being used for derivatives like futures or to price the net asset value of public funds are being manipulated if they can't even be sure what the current price is in the first place." Hyland says.

Many cryptocurrency exchanges are refusing to admit that they are public utilities. That means having clear rules designed to prevent actions by their customers that lead to incorrect volume, executed prices, or order book quotes. While most of the largest exchanges do have these rules in place, as well as systems to monitor trading behavior, there is still a large segment that do not.

"Acting responsibly means, in some cases, turning away customers who either are 'bad actors' or who just don't want to be regulated by an exchange. For example, they prefer exchanges with zero know-your-customer/anti-money laundering standards, which essentially means the exchange cannot regulate them at all," he says.

All the other issues impacting institutional activity are, to him, secondary to this.

Tooling Up

There have been quite a few new entrants in the crypto space providing technology to encourage more institutional flows in crypto assets. This includes both the startups, as well as existing technology providers, such as TT, which in March 2018 started offering market access to cryptocurrency exchange GDAX. This allows users to deploy institutional-grade tools to trade bitcoin and other digital currencies via spot or futures.

SJ Oh
OSL

Prash Puspanathan
Caleb & Brown

The Chicago-based vendor will also be providing CoinFlex, a physically delivered bitcoin futures exchange recently spun off from Coinfloor, with the front-end trading interface.

Mark Lamb, CEO at CoinFlex, says traders using the exchange will have access to all of the tools, order types, graphical user interface elements, as well as the algorithmic design elements that TT has been building on over the last 25 years.

"There's a split between brand new crypto companies and the institutional traditional technology providers that are trying to enter this space," says Andrew Flatt, founder and CTO at crypto exchange Archax. "The new-world startups lack the understanding of what the traditional trading world requires. For me, it's kind of, do I go on a journey with a new startup?" Flatt says.

Archax's stated aim is to offer the traditional institutional investment community the controls and tools they are used to, such as business continuity planning, redundant connectivity, immutability of data, and full audit-trail capabilities—"all the traditional finance stuff," he says, adding that Archax currently is leaning toward an easier model.

A lot of attention has been paid to the forward-facing side of the market while the back-end of it has been neglected, left to slowly evolve on its own. But in reality, both sides need to grow at the same time in order to further attract more institutional demand.

Though it will take time for this market to develop enough to allow for institution money to participate more widely, Digital Capital Management's Enneking says there are companies that are trying to rebuild the ecosystem that already exists in the traditional investing world.

"It's much easier to build something the second time around. It's crypto imitating fiat. It will happen much faster than how it happened in the fiat space because there is already a model for crypto to refer to," he says.

Yet, from an institutional standpoint, there was little progress made in 2018 on custodian services, and it is for that and other reasons related to its recognition as an asset class, that most institutions have stayed away from trading crypto, says TT's Unetich.

"From our proprietary trading customers, we now see and hear equal interest between trading on spot and derivatives exchanges. A year ago, spot was the primary game in town," he adds. Customers of TT expect to trade crypto with the same professional trading tools and many of the same strategies they use in approaching traditional markets.

This begs the question of whether the crypto market will end up having the exact or similar tools and infrastructure that institutions are used to in the traditional space. Is there a point if the crypto market ends up looking the same?

"Absolutely," says Prash. "Trust matters, particularly for the institutional investor. A hedge fund may see a trading opportunity in the crypto space, but if they get the process to pass risk assessment, there's no way they would deposit $100 million into an unregulated four-year-old crypto exchange. The infrastructure must mature before the institutional money will be interested," he adds.

Meanwhile, OSL's Oh says the crypto market does not need the exact same infrastructure as the current institutional market. Further issues need to be addressed first, he says, adding that the current support system does not accommodate institutional-sized positions, for example. "While this is definitely getting better, there is still much to be done," he says. W

Paul Bari's career has taken him across oceans and continents, but his true north has always been a fascination with mathematics. Now, he's tackling not only the future of North Europe's largest bank, but its employees, too.
By Josephine Gallagher with photos by Ramona August

What if your hero told

you that you were going to fail? For Paul Bari, group chief information officer and head of technology at one of Europe's largest banks, it was a very real scenario. He recalls sitting in a lecture hall at the University of Queensland, Australia in 1996, having just started a bachelor's degree in applied science in information technology. His professor was Terry Halpin, universally regarded as a giant in the field of relational databases and data modeling, and who had a way of making an entrance.

"'Pretty much everyone in this class is going to fail,'" Bari recalls Halpin saying. "'This is too difficult. I would suggest that you go and do programming.'"

It was a formative moment for Bari, who was in awe of Halpin's academic research on conceptual modeling, and for his reputation as having learned his trade under Edgar F. Codd, the creator of relational databases. As he sat in an exam room, staring at a worksheet with a language he had never laid eyes on before, known as relational algebra, he resolved to prove him wrong. If he passed, he told himself, if Halpin's theories weren't correct this time, then he would pursue a career dedicated to data and databases.

That decision would set the template for his future, one that would eventually lead to his role running technology for Nordea, in its Copenhagen offices.

The Roadmap to Success

Bari says he has always had a personal interest in problem-solving—something that has been a constant throughout his career. At the age of seven, he remembers his father handing him a Commodore 64 computer to play with, something he describes as a novelty for kids in 1980s Australia. Growing up, this focus on problem-solving manifested itself as a preoccupation with math, resulting in him graduating from AB Paterson College, a private school, as one of the top-ranked students in Australia for math in 1995. He received automatic admission to his top college choice, the University of Queensland, where his affinity for equations, algebra, and mathematical solutions

The Problem Solver

Paul Bari
Nordea

pushed him into the wider world of computer science, IT and data.

After graduating with a BA in applied science, with a major in computer science, he got his first job as a senior Oracle database administrator for Transport New South Wales. He remembers getting the role by "sheer luck" at the time and being assigned a project to help design an integrated transport database for the Sydney Olympics in 2000. The role involved learning about various forms of coding and geographical information systems, similar to a low-level version of Google Maps.

"I really enjoyed it because of the problem-solving part and I loved that it was tangible," he says. "A lot of times in IT and what we do, you don't get to see the tangible output and it can eat away at you in ways you don't really realize over time, because you start getting further and further away from what really matters and the impact of things."

A series of different roles followed. He remained at Transport New South Wales for over five years, then had a six-month stint as a consultant at a global gaming firm—a position he describes as being "morally uncomfortable"—and later worked as a treasury implementation consultant at Integrity Treasury Solutions, which was later acquired by SunGard. In 2005, he applied for a position at the Commonwealth Bank of Australia (CBA), as an IT developer.

Bari was impressed by the people he met at the bank during the interview process, and much like the day he took Terry Halpin's class for the first time, he resolved that he would work for the bank.

The only trouble was, they didn't want him—at least, initially.

"I had never been rejected from a job before, and they immediately rejected me," he recalls. "I remember doing the interview questions, and I think I got two out of 13 correct, from my memory. So, I called the recruiter, and they said that [CBA was] not interested. But I said, 'I want to work here.'"

After a not-insignificant amount of back-and-forth between the two, the bank agreed to hire him as an enterprise IT developer on the basis that he would accept a 40 percent pay cut. Bari agreed, kick-starting his career in banking. They threw him in at the deep end. Soon after joining the bank, he was assigned what he describes as an impossibly high-profile task, in developing an in-house customer relationship system named CommSee.

The platform was designed to be able to determine the risk profile of clients for the issuance of loans, such as home loans. Multiple variables and permeations were built into the system to map out and assess client relationships using large quantities of data. Bari was responsible for writing the code that would enable it to function in real time.

"So, for six months, I literally locked myself away in that bank," he explains. "I would code overnight to fix a challenge the bank had—to find a way to find all the relationships customers had with one another in real time. This was the precursor to what is called a client relationship."

After half a year, the function eventually resulted in as little as 20 lines of code for the algorithm. CommSee alone cost the bank around A$600 million to build, and in less than a year, in response to his hard work, Bari was awarded a pay rise—making back the 40 percent pay cut he forfeited when accepting the role. He describes working on the project as inspirational and that the opportunity enabled him to mix with some of the most intelligent people he had ever met.

For a man who had spent his whole life being special, from his early achievements in math through to the university class his professor told him that he wouldn't pass—which he did, albeit, he admits, "barely"—it was yet another seminal experience in his personal and professional development.

"I went from being a big fish in a small pond to being a very small fish, and I learned so much," he says.

Hygiene First

After almost three years at CBA, Bari was headhunted to join Barclays Investment Bank in Singapore as a regional head of database and global Oracle service manager. Here he learned the nuts and bolts of investment banking, and more importantly, operational hygiene.

"The key to me being here today is you have got to be able to deliver and you have got to do it the right way. And you always have to focus on [operational] hygiene first," he says.

Operational hygiene applies to a firm's entire set of processes to ensure stability, security, risk management, compliance, and effective governance. The hygiene philosophy also focuses on a firm's technology capabilities in maintaining clean, high-quality data throughout the data lifecycle, including storing, processing, managing and monitoring of data—across servers, platforms, hardware, software, networks, and devices. Hygiene also

"A lot of times we talk about what can't be done or what inhibits us. I just say to people 'let's just do it.' Let's work on the basis that it can be done, and we are the smart people who will find the way of making it happen."

seeks to minimize overall operational and maintenance costs pertaining to IT and retain the necessary data essential to the firm.

During this time, Bari learned a great deal about the importance of investing in people, infrastructure and effective communications across global teams for a bank that operates 24 hours a day, seven days a week. Each morning, his boss would call him for an update on the events that happened hours before in New York. This led him to quickly implementing early warning systems, efficient handovers and performing effective due diligence.

After 19 months at Barclays, Bari was headhunted for a second time to join Standard Chartered Bank as a global head of database in Singapore. He was pitched the prospect of having the freedom of being hands-on across operations and development. To this day, he recalls the period as his "teenage years" with regards to management and the level of maturity he had managing teams. He describes the experience as the best management school he ever attended due to the variety of challenges and complexities he encountered across operations, politics, and geographies. Although he reflects on the experience as a positive one, he says he felt as if his career in finance had reached a nadir, prompting a need for change.

"It was the best management school I could have asked for but after living in Singapore for nine years, I said to myself I was done with banking," Bari explains.

Changing Tides

As Bari toyed with the idea of leaving the industry for good and going back to Australia to spend his days micro-farming and body surfing on the Gold Coast, a close friend of his suggested that he should apply for the role of CTO at Nordea. Looking for a fresh start, he was drawn to the idea, with the intent of taking on the position for a short time, and testing out the Nordic region. He says that "doing the interviews and talking to the people [at Nordea] was enough"—enough for him to move across oceans and give investment banking another shot. Falling in love with Copenhagen and the cultural feel of the bank, he decided to stay long-term—he jokes that Danish food was also a key factor in his decision.

Eight months on, Bari was presented with the opportunity of becoming group CIO and head of technology, following his boss's departure from the firm. Bari accepted the role and immediately set out to hone in on some of the banks biggest tech challenges. To date, a core focus has been automation and the need to remove human inefficiencies.

"I don't find comfort in watching a machine going around and around perfectly without any interaction from myself. When the job is done, move on. So, I want to innovate, I want to automate, I want to push the needle forward," he says.

Bari explains that he has set out an ambitious automation agenda for 2019 to tackle these challenges head-on. Over the next 12 months, the bank will heavily focus on only hiring full stack automation engineers to help create a more seamless IT infrastructure.

"You can train them in whatever specialty you want but that's the minimum requirement," he explains to his team. "Those are the people I want to hire in 2019. There will be some exceptions, but as a general rule, because I want us to get away from how everything is 'human reliant' into a fully digitized world."

He has also attempted to broaden the type of person that enters the banking industry. Last year he launched a program with a Danish firm called Special Listeners with the objective of hiring an entire automation team of people with autism.

"I asked [the firm], 'have you ever worked with a bank before?' They said no. I said, 'I want to be the first bank,'" he recalls.

Since launching the program, Nordea has spent six months recruiting a team of developers and engineers. In that time, the project has provided an environment for individuals to access specialized support while also helping the bank to reduce bottom-line costs.

As a broader vision for his department, Bari aims to separate the conversation between jobs and roles in creating an agile workforce, capable of adjusting to technology advancements and constantly adopting new skillsets.

Although automation and tech advancements are expected to remove the reliance on humans for certain processes, Bari says that teams should become flexible in their ability to take on different roles within a firm. He believes in changing the cultural mindset embedded within a bank's psyche and diversifying his team's abilities. As one example of this, he established a program named Coding for Everyone, where his entire department was taught to code, including his secretary. As other banks such JP Morgan have also announced similar projects, Bari believes that coding will soon become as common as literacy, and a prevalent skillset.

Targeting the bank's technology infrastructure, Bari explains that it's important to keep things simple and create standard building blocks. His vision is to create a "developers' paradise" where the data and technology operate flexibly across the cloud and local datacenters, in a secured way. This objective is to provide his team with a seamless work environment for developing technologies more efficiently.

Outside the architectural concerns, part of his remit has also been investigating use-cases for emerging technology. Some of these efforts have already borne fruit—the first area into which the bank deployed artificial intelligence capabilities was assessing disability claims. Bari explains that this investment is indicative of Nordea's cultural perspective to assist with real problems rather than just focusing on profitable areas.

Using the technology, the entire claim and approval process, which normally takes seven weeks, can be completed on the same day. In his time at Nordea, Bari has helped to promote ethical conversations and encourage critical thought around technology investments, to establish long-term confidence within the bank.

"We understand now that banking is only sustainable if the consumer benefits, because if they don't, we will eventually fail as an organization," says Bari.

Reflecting on his journey until this point, Bari explains that there is no secret to his approach other than hard work and a burning desire to constantly improve, make an impact and push boundaries. He says that too often in the world of technology people fall victim to the idea something can't be done. Looking back over his career he has shown to consistent track record tackling problems head-on, no matter how complex.

"To copy a catchphrase, a lot of times we talk about what can't be done or what inhibits us. I just say to people, 'let's just do it,'" he says. "Let's work on the basis that it can be done, and we are the smart people who will find the way of making it happen." W

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5G NETWORKS:

Information Overload

Despite what some wireless carriers say, we're still a few years away from a mass rollout of true 5G networks. While they will be revolutionary, right now it's more hype than reality. But Anthony Malakian tries to look ahead to see how capital markets firms might be able to capitalize on this latest technological evolution.

Sometimes, headlines about the development of 5G networks can read like the beginning of a Tom Clancy thriller. Who will be the first to have wide-scale 5G rollouts: China or the US? The future of commerce could be at stake; national security could be threatened, if Chinese tech firms are helping their government implant listening devices across Europe and the US.

From an economic standpoint, countries and politicians are taking being the dominant developer of 5G networks more seriously. According to Deloitte, "First-adopter countries embracing 5G could sustain more than a decade of competitive advantage." Why does that matter? Well, back in 2016, Accenture estimated that "telecom operators [in the US] are expected to invest approximately $275 billion in infrastructure, which could create up to 3 million jobs and boost GDP by $500 billion." What if the US ends up lagging behind China or Japan or Germany—will those jobs end up going overseas? Unsurprisingly, politicians started to panic.

The purpose of this article, though, is to strip away the hype and think about what these new networks could mean for the data used by capital markets firms. While AT&T is already trying to hawk what it's calling a 5G E service—even though it

isn't an actual 5G network, but more of a rebranded LTE network—we're still a few years away from seeing the true power of 5G. So in many ways, this is more of a thought process: How might banks, asset managers and vendors take advantage of 5G? Answering that question requires taking a moment to understand what we're really talking about.

By putting some context around 5G's supercharged speed estimates, it's possible to understand the hyperbole. According to AT&T—which, like Verizon, Sprint and T-Mobile, is one of the biggest US wireless carriers competing for smart-device network supremacy—says latency will be cut from 10 milliseconds for 4G networks to less than one millisecond for 5G networks. By 2021, data traffic will jump from 7.2 exabytes per month to 50 exabytes—or, to put it in perspective, 25 billion times the size of the 2010 CD-ROM edition of the Encyclopedia Britannica. Peak data rates will grow from one gigabyte per second to 20. Available spectrum will rise from three gigahertz to 30. And, importantly for capital markets firms, connection density will rocket from 100,000 connections per square kilometer to over 1 million connections per square kilometer.

Data—Lots of It

Even for some young adults, it's hard to imagine that there was a time when you couldn't pull up any game under the sun on your phone, or that you had to discreetly nail cables across the baseboards of entire houses in order to connect to the internet—let alone be on a call and the information superhighway at the same time. Video conferencing and touch-screen technology were the stuff of the USS Enterprise, not HP Enterprise. But, in 2007, touch-screen smartphones using this new standard hit the markets and proved—quite literally—life-changing. All of a sudden, information was truly at your fingertips, even if you were sitting on the commode, harnessing the full power of the web without having to rely on bespoke web access protocol sites.

But even when 4G networks arrived in 2008, it was frustrating to have to wait a few minutes for this so-called smartphone to shoot a signal into the ether before finally telling us that yes, in fact, male honeybees die during mating—such trivia being the benefit of collating all human knowledge in digital repositories. Then, in 2011, 4G LTE networks came to fruition and a few years later were prevalent enough that the days of debating baseball statistics in a bar were dead, because seemingly everyone had mini-computers in their pockets to disprove erroneous claims.

It might sound like 5G is simply the next evolution of 4G, and it is, but it's also so much more. While the hype surrounding 5G's immediacy is out of control, 5G will indeed be a revolution for consumers, business and maybe even entire countries, but that revolution isn't going to happen in 2019, or anytime in the next few years. This year will likely give birth to the first true, commercialized 5G networks, but like all babies, they will be small and unintelligent.

Skeptics might say, "My phone will be faster—even a lot faster—but it's already pretty fast." And for anyone who lives in a place with LTE coverage—which is much of the US and the UK—that is correct: Mobile devices are already fast. Video streaming is fast. File sharing is fast. Data is easily accessible. But that's missing the bigger picture.

As mentioned before, connection density will increase from 100,000 connections per square kilometer to over 1 million. That's important because there's another technology revolution currently unfolding—the Internet of Things (IoT). Dan Littmann, principal at Deloitte, says people will not be constrained by network traffic or the amount of data they use because most of the devices that will be added to a 5G network are going to be machine-to-machine (M2M) and IoT devices.

Wei Pan
Thasos Group

"There's a limitation on LTE in terms of how many devices can connect to [the network] within a square kilometer; for all practical purposes, that limitation goes away with 5G," he says. "In terms of allowing the number of devices onto the network in a rather concentrated area—which is necessary for productivity gains—that's a problem that 5G solves. But it doesn't have anything to do with faster speeds or lower latency [though 5G is faster and offers lower latency], it just has to do with aggregating those devices on the network."

4G is already capable of handling IoT devices. As a result, so-called "smart cities" are, today, able to obtain data for traffic centers, pollution centers, parking meters and certain types of foot traffic. But where 4G falls short is when there's a concentration of IoT devices that exceeds 100,000 devices per square kilometer, says Adrian Scrase, CTO at the European Telecommunications Standards Institute (Etsi), which is working on developing the standards for 5G networks in Europe.

"Once you get to that stage of having massive IoT, you then have massive data [which is inherently noisy] but the value is the information you could extract from these massive datasets," he says. "So you can convert technology into business and enterprise [solutions] by having the clever people who can find the value in information from the data you've collected."

If you know anything about the alternative data space, then this is all sounding quite familiar. Capital-markets consultancy Opimas estimates that in 2018, the alternative data market—including data sources, IT infrastructure, system development, and human capital—exceeded $5 billion, and will climb to almost $8 billion by next year.

And it's important to take note of the reason for this: Namely, there's so much more data available and relatively easily captured and disseminated. In 2013, IBM estimated that 2.5 quintillion bytes of data is created every day and that's the number that's still often cited even today in data growth estimates, but that initial estimate came well before the advent of IoT, wide-scale LTE adoption, and artificial intelligence (AI) and cloud use cases. IBM hasn't updated that number but it is likely to be higher due to these tech advancements.

Safer estimates predict that wide-scale 5G will happen in five years. Once it does, it will supercharge data growth.

So what kind of new data will be created as a byproduct of 5G development? Or if not new, perhaps more accurate and clean data? Everything is speculation, but let's consider location data, which hedge funds and alternative asset managers have been using for years to inform investment decisions. A mobile phone's location sensor is largely dependent on GPS, which is a technology from the 1980s, says Wei Pan, cofounder and chief scientist at alternative data provider Thasos Group. The phone is looking around for a cell tower to connect to, or a Wi-Fi signal to estimate where the phone is currently located—that won't be necessary anymore.

Similarly, satellite imagery relies heavily on very big, expensive satellites taking pictures from space of the ground. But what if cameras closer to the ground could improve that process?

"With 5G you can imagine that signal will be achieved by deploying a lot of very small, low-flying drones, or even some fixed cameras from tall buildings. And those cameras take pictures of small regions at a very high frequency to make up this big image of the land," says Pan, adding that this can create more real-time data, rather than relying on a satellite flyby.

Now, take it a step further. You have a city saturated with cameras, monitoring traffic and people. This kind of surveillance isn't easily done with 4G because of the load issues mentioned before. With 5G, privacy concerns aside, it's not a problem. "You can have as many video cameras as you want and you collect data effortlessly," Pan says.

Octavio Marenzi, Opimas' CEO, agrees with Pan. Marenzi has been covering the alternative data space closely, and he says he believes 5G will lead to more accurate geolocation data, which could prove valuable to traders looking for an edge.

Mobile geolocation data typically comes from mobile app providers that resell the data. Sometimes the data is non-continuous because the mobile app is only able to track an individual when the application is open. Therefore, it might only locate the user a couple of times a day, or it's running hundreds of times a day in the background, but that can overlap with other apps.

Marenzi says 5G will provide more accurate geolocation data in real time, as the network mobile operator will, somewhat creepily, be able to literally follow an individual everywhere they go with great precision.

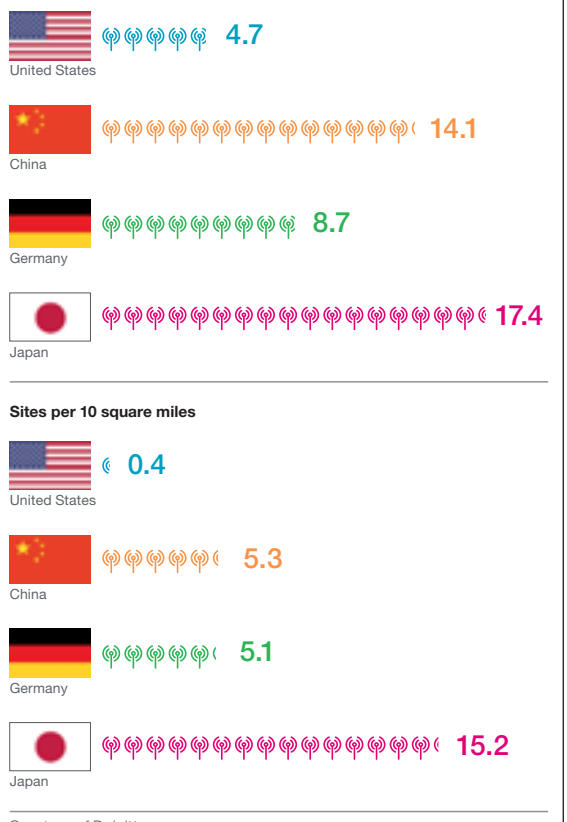
"What will change is that the mobile operators will have much, much better data about their customers and users," he predicts. "Currently, a mobile network operator has to rely on cell towers to locate you and can only do that within about 100 meters, which is fine for certain applications. But if you really want to identify where someone is, if they are in a particular shop or something like that, or on a particular floor in a building, that breaks down—but with 5G you'll be able to do that."

It's also easy to see how other industries will be able to offer more accurate data in larger quantities: for example, shipping and supply-chain management will be greatly impacted, as it will be vastly easier to track containers and analyze route efficiency; the transportation industry will be able better monitor public vehicles to direct traffic or alert people of delays; and farmers can better monitor crops or malfunctions to equipment and be more proactive.

Additionally, software companies will have new avenues for delivering their goods and services. It's still far too early to tell what new startups this will create, but much like how cloud and bring-your-own-device (BYOD) ideas helped to change the fundamental ways that work is conducted, 5G will open new, unforeseen avenues of development.

And by coupling this data with AI and machine-learning techniques, it will allow companies to better

Figure 1. Country comparison



Courtesy of Deloitte

improve their services, adds Deloitte's Littmann. "The ability to find patterns in that information is absolutely out there. The more devices operating on the network the more information you're gathering on processes and the more lessons from an AI standpoint that you can feed back in to continue to improve those processes," he says.

Octavio Marenzi
Opimas

A Lesson Learned

There's another big reason why 5G will be significantly different than 4G: design.

Etsi's Scrase says that when 3G and then 4G were first designed, "we started by first trying to guess who would be the end beneficiaries and we tried to design the system around our perception of who the end user would be. And in most cases, we got it completely wrong," he says.

A good example, he says, is with the development of LTE. He says they spent a lot of time trying to determine who would be the end beneficiary, but two years after they finished the system design, a new category of user came forward saying they wanted to use the network, but they had different needs that the original design couldn't support.

"So we had to retro-fix a lot of these ideas into the 4G design we already put to market because it was cumbersome, expensive and funky, to say the least," he says. "With 5G, we've made no presumption at all as to who will actually use the system."

By designing the system this way, it's flexible to address changes in the market or users' needs.

"The main premise that lies behind that is this concept of network slicing and virtualization," he says. "This means that the same physical hardware deployed by an operator, can at the same time deliver, say, a mobile broadband-specific slice to an end consumer who wants to download a video, and at the same time can deliver a very different performance. So you have a completely different set of end parameters being delivered by the same physical hardware by this concept of network slicing."

An aforementioned example considered moving away from satellites, but with 5G, satellites can improve, too. Previous generations of networks didn't have an integrated satellite component, Scrase says. While there was satellite use, it was very clunky and not integrated into the system's design.

With 5G, they will have an integrated satellite component. As a result, when it comes to shipping, it will be easier to track assets and follow, in real-time, a container's journey from Sydney to San Francisco, where it's loaded onto a truck and sent to Chicago.

"If you want to follow and know where that container is at any one time, asset tracking by satellite is a very, very good use case," Scrase says. "It's cheap, it's easy, and you'll always know where the containers are."

Of Time and Countries

While the hype of 5G truly arriving in 2019 is overblown (technically there were small experimental instances of 5G released in 2018, but they were not commercialized) we're still years away from knowing what the full power of 5G will bear. But that doesn't mean we shouldn't expect great strides to be made in the near-term.

Chip maker Qualcomm will commercialize its 5G New Radio (NR) global standard this year. Huawei is expected to release its 5G chip in the second half of this year. Samsung rolled out a 5G modem last year, as has Intel. ZTE, Ericsson and Nokia are also aiming to challenge the likes of Qualcomm, the dominant player in the space. Taiwan's MediaTek is also making inroads on Qualcomm. Huawei is further planning on rolling out a 5G phone this year, as are Lenovo, LG, Samsung, Honor, HTC, Xiaomi and Oppo, among others. And the big four wireless carriers—AT&T, Sprint, T-Mobile and Verizon—will be aggressive in their marketing. To say that the space is competitive is like saying that Ernest Hemingway only drank occasionally—it's a bit of an understatement.

Still, people will need to curb their enthusiasm for 5G in 2019. Etsi's Scrase says that while 2019 and 2020 might yield some big developments, it might take until 2025 to "see some of the benefits that we expect to see from the technology." Opimas's Marenzi agrees that it will take some time to see major advantages when comparing LTE to 5G, but also hedges his bet. "Sometimes new technologies appear and it's very hard to predict how they're going to unfold and what's going to happen."

Thasos' Pan notes that it took almost six years for the telecom industry to fully deploy 4G. "For 5G, the deployment is much more difficult, because in 5G the idea is to not have a single large antenna for cell phones; the idea is to install many, many small, micro cell towers. It's actually the labor part of the deployment that's going to be more intensive, more work. So I expect, the deployment of 5G infrastructure itself is going to take several years. I really think that before 2025, we won't see much."

So if 5G is still a ways away, why start thinking about it now? This industry is going to move fast—even if over a long spectrum, relatively speaking. And while it's a hype game right now, 5G will prove revolutionary—this isn't just a faster version of 4G. Now is the time to start planning and understanding how this technology will both affect your company and to see if there's a way to monetize this revolution or move into new lines of business. Deloitte said that first-adopter countries could sustain more than a decade of competitive advantage—that could be true for individual companies, too. W

Firms Carve Rosetta Stones for Non-English AI Surveillance

Development of machine learning and natural-language processing is now turning to languages other than English to keep a better eye on traders and the market. But how easy is it to teach a machine a new tongue? By Emilia David with additional reporting by Wei-Shen Wong

English has long been considered the lingua franca of international business. But as geopolitical, industrial and human trends veer away from an Anglo-centric perspective and become more globalized, the importance of other languages—and the need for fluency in them—rises in turn.

In the capital markets, there is a significant impact for artificial intelligence (AI) here. While machine learning, natural-language processing and other AI subsets have evolved to the point where they are becoming intrinsic elements of trading firms' surveillance and trading operations, there is a problem: Most have been developed and trained to analyze English. In an industry that is increasingly populated by other languages, that simply isn't enough.

"We're at the very tip of the iceberg. Technologies like machine learning in particular are starting to mature and you're seeing people use this technology in their daily lives more. You can see people in compliance and those who use trading surveillance tools recognize that we can now use this technology," says Jay Biondo, product manager at Trading Technologies. "I still think it's very much in the early stages but it's going to start to be adopted more widely and it does open the door to use this technology, maybe like [Apple's] Siri or [Amazon's] Alexa

"Whether the machine can learn multiple languages at the same time depends on the relationship between the languages. It might require a different clean-up or different processing, segmentation or stemming. But the core engine does not know and does not care what language it is. If you have a corpus of different languages in it, as long as you have a dataset with more complicated topology, it'll be able to learn."
Mike Chen, PanAgora

for trade surveillance where it actually translates the things for you and speaks to you."

Determining which language is the most widely used in the world is difficult, but based on the number of native speakers, the most commonly spoken language is Chinese. Others include Spanish, modern standard Arabic, Hindi, French and Russian. With these other languages being used by a good chunk of the world, it is inevitable that they will start creeping into business discussions as a way to talk about market movements between traders and investors.

Content is King

Market sentiment analysis is one of the areas in which AI can be deployed, for instance, but if the models are restricted to just one language then investors may miss crucial signals. PanAgora Asset Management developed its own machine learning models to track chat and blog conversations in Chinese to determine market sentiment.

Mike Chen, portfolio manager at PanAgora, says its solution relies on an entire library of languages to track conversations.

"Whether the machine can learn multiple languages at the same time depends on the relationship between the languages. It might require a different clean-up or different processing, segmentation or stemming," Chen says. "But the core engine does not know and does not care what language it is. If you have a corpus of different languages in it, as long as you have a dataset with more complicated topology, it'll be able to learn."

Understanding the market environment and the conversations being held around it involves not just taking in the data, but creating actionable insights from it. With natural-language processing, companies are able to take in content from emails, voice calls, chat and written documents on the internet and break that information down in order to categorize important topics. This is then used to generate analytics and insights. For PanAgora to get a big-picture view of the market, it helps to keep a full database of the language so the machine-learning algorithm is more entrenched in it. This allows the algo to learn more quickly if users start using slang or other words in market conversations.

Chen says another challenge the firm had to deal with has been the sheer number of conversations that take place in blogs and their comment spaces, some of which may not even be written by real people. The challenge is to know enough of a language's syntax and structure to determine the difference between a human and a bot. PanAgora has had to create a filter that not only understands Chinese and parses it for information but also determines which posts may have been authored by bots.

"When we collect the Chinese retail blog discussions, we filter out a lot of the robot posts. We keep looking at it and couple this with our ability to read and understand Chinese, and our local knowledge. We did a lot of pre-processing to do this," Chen says. "With robot blog posts, they have familiar heading patterns, or they might say 'Company ABC recommends this.' So we filter that. Those are some of the common examples but we have a whole host of them. They're usually uninformative blog posts."

But while PanAgora uses an entire database of one language, some other firms say all they need is some knowledge of non-English languages as they are more concerned about certain words in conversations and their connections to market movements. While it is important to work closely with experts and native speakers, meaning can often be determined through analyzing key works, proper nouns and other reference points without necessarily requiring fluency.

Steve LoGalbo, director of product management at Nice Actimize, says the technology concerns itself with the content of the conversation, so the machine looks for specific words used in specific contexts.

"For us, communication is communication; it doesn't matter what language you're speaking but you have to have the technology that can extract the things that people are saying in those various languages," Logalbo says. "We're using technol-

ogy that understands language and this includes a text analytics component that understands English, or understands Chinese and Japanese, or different languages, and those text analytics components are extracting interesting conversation topics."

He says the technology Nice developed is trained to recognize entities, people or places in a conversation no matter which language in the conversation it is dissecting.

As the machine monitors conversations, it can start to develop its own understanding of the different languages and mark points of knowledge by itself. Once it does learn, the software moves away from the more supervised learning. This has been proven in English-based machine learning and natural language processing but is still in its infancy for other languages.

LoGalbo says companies can customize the terms they want to monitor in the supported languages. Once these are set, the system starts to learn patterns to better classify conversations and determine their impact, the same as in English. He adds, however, that there needs to be some level of supervised learning involved, especially in a language other than English.

Limitations

This becomes important when it comes to surveillance as opposed to just gleaning insight from market chatter. Machine learning and natural-language processing in English has evolved significantly in recent years, but experiments around support for multiple languages tend to be left behind. Therefore, the technology may be a long way away from spitting out bespoke market insights based on random conversations or

to predict potential fraud, but it can eventually catch up. English-based machine learning has also begun experimenting with detecting sentiment in conversations.

The process to allow a machine to learn to read and analyze is not without difficulties. And non-English machine learning can face more limitations than its English-based counterpart.

A big difference, of course, is the availability of datasets to train a system, and people who can annotate the data to begin the guided learning process for the software—the first step toward deeper, more independent learning by a machine. Catherine Havarsi, AI science lead at Agorai and a researcher at the Massachusetts Institute of Technology (MIT), points out it is rare for companies to keep records in different languages as religiously as they do for documents in English.

"Non-English natural-language processing is still behind English and most of it is because there is a lack of datasets and training data available in these languages. Machine learning datasets need to be annotated so you also need someone who understands those languages," Havarsi says. "Most firms that really focus on keeping records are US- or UK-based companies and other firms just don't keep documents with different languages."

Of course, many of the documents that run businesses all over the world are written in English. Most regulations in developed markets, too, are written in English. But by not paying attention to records in a foreign language, the industry risks being blind to information that sheds more insight into certain markets.

Havarsi adds that there may be a limit to the number of non-English languages that can be programmed into a trade surveillance module, so not all languages may make their way into a machine-learning surveillance product.

Jay Biondo
Trading Technologies

Steve LoGalbo
Nice Actimize

"There are only [a relatively small number of] languages with their own Wikipedia page and those could be the ones we can pay more attention to. There are a lot of languages out there and there is a drop-off point for natural-language processing," she says. "Crowdsourcing has been such a huge help in the development of the technology as well so if languages don't have enough of a crowd—and it has to be an expert crowd too—then it might not have enough to really develop that particular use case."

Spoken conversations also present an issue for recognizing other languages—also a problem in English—because of different accents.

LoGalbo and Trading Technologies' Biondo both note it is important to have different training recordings of different accents, even in English, as this drastically changes how words sound and how the technology takes in information.

Slang is one other issue the technology has had to deal with in both English and non-English languages. People may take words and use them to mean something else and it takes a while for the technology to make sense of this new usage. But it is especially difficult in other languages. PanAgora's Chen says the way the asset manager deals with slang within the Chinese internet community, for instance, itself often designed specifically to evade this exact use of AI surveillance technology, which is employed by the Chinese government to monitor communications between citizens, is to wait until it gains prominence before updating its library.

"The library is the model. It just keeps on updating. When a new cyber slang gains prominence, if it's fed a few more times, it will pick up on it. It's fully automated and self-updating," he says.

Future Innovations

Non-English machine learning, much like regular machine learning, will eventually evolve further. In the future, it will be more sophisticated and possibly develop understanding of both the English content and the non-English data it takes in.

Agorai's Havarsi notes the more machine learning and natural language processing develop, the more non-English languages become integrated.

"As we keep developing natural language processing, we're definitely going to see trends. One is machine translation. But for the financial services industry, you're looking for more actionable language that may not show up in the translation," she says.

One future possibility for the technology is generating not just insights but providing additional learning for international traders. Biondo says Trading Technologies wants to develop the technology enough that it can translate conversations around certain market movements to clients in other countries.

Currently, the company uses visual cues to point out potential market disruptions. Eventually, Biondo hopes the company will have the ability to provide explanations in different languages to contextualize the movement.

"Some people train their machine-learning models with the actual language from previous cases and that's the starting point. Then you're going to have to start to add another layer where you're putting that with a foreign language while also putting additional detail on things that get to more of the mechanics of that activity," Biondo says. "Ideally, it becomes more than just a term of art that only the domain expert in the US understands, but something that somebody in Europe can understand as well."

While some of these potential innovations for non-English machine learning are still far off, everyone agreed the technology is improving and better solutions may emerge soon. W

Bad Education: How to Cure Cynicism Around SI Data

Mifid II's systematic internalizer regime went live in September 2018, but access to the new source of liquidity has not been without complications, especially in acquiring post-trade data. Amelia Axelsen investigates how buy-side cynicism of the regime could be cured through education.

When regulators overhauled the trading environment with the revised Markets in Financial Instruments Directive (Mifid II), their intent was increased transparency, but acquiring systematic internalizer (SI) data remains a huge undertaking for the buy side. Designed to change the Mifid II EU liquidity landscape, the European Securities and Markets Authority (Esma) implemented the SI regime to open up trading opportunities and generate more competition for regulated markets, multilateral trading facilities (MTFs), organized trading facilities (OTFs), and periodic auctions, while urging traders to rely less on broker-crossing networks.

Problematic data quality has been a central theme in Mifid II compliance challenges, but for firms that freely registered as SIs or were required to do so under Esma threshold obligations, unclear reporting mechanisms from Esma have resulted in insufficient and inconsistent reporting from SIs and Approved Publication Arrangement (APAs). Of course, it can be a slow process to ensure all components needed to implement such a huge piece of legislation are working as intended, but botched reporting from SIs has led to poor-quality data that can't always be used in a purposeful way.

A market structure analyst at a European research and investment banking boutique says there isn't a lot

of post-trade data on SIs, a troubling prospect for the buy side, which relies on that data to measure execution performance.

Trading with an SI is bilateral, the analyst adds—for example, brokers and traders executing orders with HSBC's SI know they are trading against HSBC's internal position and liquidity. This new mode of trading, which is different from trading with multilateral systems such as CBOE and LSE, allows traders to review data that shows the exact source of liquidity. That data yields new insights, because traders know exactly what counterparty they're trading with, but lacking the SI post-trade data, the buy side is not equipped with the tools to take advantage of the SI regime's new transparency.

However, market participants, bank SIs, and electronic liquidity providers (ELPs) are optimistic that SI venues are a viable and unique liquidity option for the buy side. Even if progress is slow, once the buy side possesses the necessary tools to capitalize on the SI data, the advantage of the new sources of liquidity will increase competition among venues.

Confusing Clarifications

The Nordic region's largest bank, Nordea, is a registered SI for interest rate derivatives, foreign exchange (FX) derivatives, equities, and bonds. Yann Calenge, Nordea's director and head of e-rates says the bank became an SI because it was the most "logical" and the "safest" choice. He says prior to Nordea making the decision, customers continually asked if the bank was going to be an SI in order to figure out reporting obligations. Although Nordea plans to continue being an SI in some instruments, he says from the onset of Mifid II, the reporting obligations were not always clear due to specific rules and waivers.

> "Buy-side firms evaluate SI liquidity sources based on the information their brokers provide, but the lack of a universal framework for assessing SI liquidity can make it difficult to accurately compare execution quality. We have been working closely with the buy side and sell side to determine what this framework should be." **Jonathan Finney, Citadel Securities**

Calenge says extensive post-trade reporting obligations covered under Mifid II have continuously made it difficult for banks to know exactly what they should be reporting. For SIs, he says the result is confusion about reporting expectations for some types of trades, such as technical trades that are executed through SIs but aren't reported as SI trades.

David Nowell, senior regulatory reporting specialist from Kaizen, who was also responsible for shaping transaction reporting while at the Financial Services Authority (FSA) in 2011 and 2012, says SIs are struggling with reporting some reference data as well. Nowell says this is largely a reporting problem and some firms believe that reference data for certain instruments should be covered.

"SIs have an obligation to send reference data either directly or via the national competent authorities (NCAs), but some of those records that are traded on SIs aren't tradeable on trading venues so they shouldn't be reported," he says. "But, because they're getting on there, firms think they should be reporting transactions in those instruments."

Banks currently make some client-level disclosures on a client-to-client basis, such as which parts of the SI the bank interacted with, but publicly, many asset managers say the data is not sufficient to get a view of overall trading activity involving the bank SIs.

David Nowell
Kaizen

The analyst adds that the scope and amount of instruments being traded varies from SI to SI and the intricacies of a bank's liquidity structure is partially to blame for the banks' struggle with reporting practices. In May 2018, *WatersTechnology* reported on problems with post-trade data published by APAs, after Esma published a clarification that raised some new questions. Calenge confirms that the regulator's clarifications haven't solved the problem. In fact, he says Esma's update confused things further because it resulted in shifting post-trade reporting standards for banks.

"The APA data can now be downloaded, viewed, and analyzed by the different participants," he says. "We are starting to see some improvements ... but the data quality remains sub-optimal and as a consequence, the results of these kinds of analysis will only be visible some time next year."

Unconsolidated Costs

Even if the outlook on post-trade reporting seems promising for bank SIs as they develop their understanding of Mifid II's requirements, asset managers still lack the resources necessary to use SI data to effectively evaluate execution performance.

Lee Sanders, head of trade execution FX and fixed income at AXA Investment Management, says the firm couldn't use post-trade data in a "meaningful way" without having to spend a significant amount of money. Ideally, he says, buy-side firms would take more ownership over their data and pool it together, creating a non-profit utility that levels the playing field.

"We kind of felt that a lot of the data had no end direction, so we're all reporting our trades in line with Mifid requirements and there's no way to bring that back to any useful work because of a lack of consolidated tape," he says, adding that a consolidated tape would allow the data to be used at a reasonable cost for official benchmarking and a review of the impact of trades overall. Often, firms are expected to pay for data, despite Esma requirements, for big data packages in order to get exactly what they need, he says.

"With buy-side data, it's our data and people are trying to sell it back to us and we're trying to find a way around that and be able to use our data without having to drop a meaningful amount of money for it," he says. "It hasn't been a particularly straight line on how that data is distributed."

The market structure analyst says the electronic liquidity providers (ELPs) are better at producing post-trade data. Some of the ELPs provide data to Rosenblatt Securities and Tabb Group in order for the buy side to get more details on SI activity. Citadel Securities' SI, for instance, provides monthly numbers to Rosenblatt to encourage other ELPs to release disclosures. But for bank SIs, data is harder to obtain, and Nordea's Calenge adds that access to data hasn't been as easy or as inexpensive as regulators initially anticipated.

"When you start looking at the APA data, for instance, if you want to have the data in real time and then multiply that by the number of APAs, the price is actually quite high," he says. "That's not even including the technological costs

and the necessary investments to store that data somewhere so you can do analysis and so on."

Calenge says once the data is obtained, the quality is so bad that banks have to spend money to fix it. For example, he says, bonds have the "best quality data in the equities world," but there are still limited transactions in the illiquid segment, so the buy side can't do any meaningful analysis on a particular trade and International Securities Identification Number (ISIN).

In 2017, SmartStream Reference Data Utility (RDU) launched a centralized SI registry in collaboration with a group of APAs to aid the reporting process and post-trade data processing. SmartStream RDU CEO Peter Moss says the post-trade data isn't particularly clear but that it's improving week by week. He says consolidated data access for SIs and APAs, and a list of who's trading what type of instrument and in what jurisdiction, would make the SI regime more efficient for the buy side.

Best Execution Education

An October 2018 survey measuring the perceived outcomes of the SI regime revealed that both the buy side and sell side feel they haven't accomplished much since Mifid II went live in January 2018. The International Capital Market Association (ICMA) conducted the research, which found respondents were not optimistic, with a consensus that the regime is not fulfilling its purpose.

Although there has been confusion surrounding post-trade reporting, there may already be enough data available to measure execution performance, and the cynicism from the buy side could be masking an education gap.

Jonathan Finney, director of European business development at Citadel Securities, says the buy side already has the tools they need to apply the data in a useful manner to measure execution performance, but could further benefit from some standardization of metrics in this area. Finney, who spent 11 years on the buy side as the head of EMEA systematic trading at Fidelity, says he understands the problems the buy side is facing.

Peter Moss
SmartStream Technologies

"Buy-side firms evaluate SI liquidity sources based on the information their brokers provide, but the lack of a universal framework for assessing SI liquidity can make it difficult to accurately compare execution quality. We have been working closely with the buy side and sell side to determine what this framework should be."

Tabb Group estimates that trades executed with market-maker SIs totalled nearly $35 billion during the first quarter of 2018. One SI says it is going to continue to register as an SI as a long-term investment for growth, touting that the SI regime is the "single biggest opportunity" in equities for the buy side to evaluate some market-makers. In summer 2018, Virtu Financial's CEO Doug Cifu said on the group's second quarter earnings call that "there's a significant amount of growth" to be had by investing in their SI. SmartStream's Moss also has an optimistic view of the SI regime and expects that many more banks and ELPs will register in the future, particularly once Esma distributes over-the-counter derivatives guidelines.

Moss also points to education as a way to improve this space. SmartStream RDU has run a series of workshops to help educate SIs about the mandatory requirements from Esma and how to report accurately and with the correct data. He says education initiatives are fostering a better understanding of reporting rules that have plagued the regime from the onset.

"The way instruments are getting registered with Esma is starting to improve, the data quality is getting better, and how the trade reporting is done is getting better," says Moss. "People are also looking at how to consolidate the trade reports across the APA community and that will provide even more transparency."

Lee Sanders
AXA Investment Management

A director at one SI says they're keen to educate the buy side about how to use data points, statistics, and valuations in order for firms to get a view of the SI process. According to that source, asset managers don't have enough data points to be statistically significant and the sheer number of SIs are overwhelming for asset managers to evaluate all the sources of liquidity.

Educating the buy side on how to use SI data effectively for best execution opens up traders to cross reference the data with SI results posted publicly, which the SI calls its "success story of 2018," because it resulted in more trades with the SI and builds trust between SIs and the buy side. This also increases communication between asset managers, brokers and ELP SIs.

One way to obtain value from the SI data is to go directly to the ELP SI and ask them to present the data—one advantage only offered by the bilateral SI regime and not other trading venues—and then cross reference the information with a broker to compare actual results. The aggregate results from the SI can be used to compare the asset manager-specific results produced by the broker. The SI notes that this is a three-way mechanism that has never existed before in equities and is one way to make use of SI data to measure execution performance.

AXA's Sanders says many buy-side firms are pulling data from the big providers, but don't know how to get value from it and at AXA, they are "currently working on solutions to use the data more efficiently."

The market structure analyst confirms a growing level of comfort with trading with SIs, particularly as their market share continues to grow. One of the main assets of SIs, which sets it apart from other types of venues, is trading with one counterparty, so "you can really let the results do the talking," he says. W

Anthony Malakian

Of 5G and Privacy

As 5G networks come to fruition, Anthony says that people, companies and governments will need to be aware of the privacy and security concerns raised by this new wave of technology.

It's an oft-told story nowadays, but at the beginning of 2015, many researchers thought they were still a decade away from developing an artificially intelligent program that could beat the best human Go players. The ancient board game was too complex and vast—in chess, there's an average of 35 possible moves at any given time; in Go, there are upwards of 250 moves on average during any given turn. By October 2015, Google DeepMind's AlphaGo beat European champion Fan Hui 5–0 in the formal game of Go. A few months later, AlphaGo bested the game's greatest player, Lee Sedol, 4–1.

This is all to say that technology advancements are accelerating. In the next few months, you will hear a lot about 5G networks. Actually, you are probably already hearing about them from your internet and/or mobile device provider. If you are unfamiliar with 5G—and why these networks are vastly different to today's 4G LTE standard—turn to page 24, but at their core they are the new standard for wireless telecommunications and they will be faster and able to handle exponentially more devices.

While these networks will be commercialized this year, most of these announcements are overhyped. It's more likely than not that we won't realize the full benefits of this new technology for several years. The consensus among the experts I spoke to is that it will take five years to see true mass adoption of the standard. But it should also be said that it's becoming increasingly difficult to make predictions when it comes to tech development. "Sometimes new technologies appear and it's very hard to predict how they're going to unfold and what's going to happen," Octavio Marenzi, CEO of consultancy Opimas, told me.

And he's right. But I do hope that the industry takes its time with this latest revolution.

> With any new paradigm shift driven by technology, the issues of privacy and security inevitably come into play.

Is 5G poised to heighten privacy concerns?
For more information and readers' feedback please join the discussion at **waterstechnology.com**

A Question of Privacy

With any new shift driven by technology, the issues of privacy and security inevitably come into play. As individuals we are increasingly willing to give up our personal information and privacy in the name of convenience and entertainment.

As a Gen-Xer, while my childhood included the commercialized birth of the internet, I was raised in a household that was wary of giving away our information to outsiders. I distinctly remember my dad railing against getting an E-ZPass automated toll tag for the car because he didn't want the government tracking him. While my dad is an eccentric, he was a technologist who built datacenters for massive international corporations. But he was also skeptical of putting what amounts to a tracking device into his car. Of course, though, convenience eventually won out. And today, my dad, and everyone else in my family, carries around a tracking device—a smartphone—at all times.

That tracking device will become much more powerful with the advent of 5G, as it will provide more accurate geolocation data to network mobile operators that will allow these companies to follow an individual everywhere they go with a sniper's precision. Considering that people are already more than willing to give up their actual DNA to third-party companies like Ancestry.com and 23andMe.com, they will undoubtedly not think twice about allowing their everyday data to be pulled in by third-party network operators and app providers. It's the price we pay to be able to yell at complete strangers about just how wrong their politics are. Ah, democracy!

There are also very real security concerns. The US government has been warning other countries like Canada, Germany, Italy, and Japan about allowing Chinese telecommunications behemoth Huawei to help in those nations' 5G development. Additionally, 5G will supercharge the amount of data created by internet-of-things (IoT) devices, which are notoriously vulnerable to security breaches.

There are serious questions that will need to be considered and addressed in the years ahead when it comes to the rollout of 5G networks. Perhaps the biggest question is who will address these concerns: people, companies or governments? W

SGX Marches On

Wei-Shen reflects on what's in store this year for the Singapore Exchange, following several major technology launches, and a dispute that involved national regulators.

What's in store for SGX?
For more information and readers' feedback please join the discussion at **waterstechnology.com**

Although the Singapore Exchange (SGX) is relatively small—its market capitalization of $776 billion is dwarfed, for example, by the New York Stock Exchange's $23 trillion as of April 2018—it packs a punch, having received numerous industry awards lauding its forward-thinking stance and innovative products.

At a recent second quarter earnings results briefing, Boon Chye Loh, CEO of the exchange, said SGX aims to make the investment and fundraising process even more seamless and efficient for participants.

It recently upgraded its post-trade system to one provided by LSEG Technology, a massive undertaking involving brokers, custodian banks, settlement banks, registrars and retail investors. Loh said the new system allows for members to use their own back-office systems to connect to SGX's Central Depository.

In August 2018, it overhauled its Titan OTC trading platform, a broker-led over-the-counter (OTC) trading platform. This enhanced trading and registrations workflows to complement the OTC commodities trading process.

Over the last four years, Loh said, the exchange has focused on implementing major technology launches such as those highlighted above, as well as its screen-based institutional-only electronic bond trading platform SGX Bond Pro.

In terms of technology, it will now focus on smaller projects to make processes more efficient, Loh said.

"I think you will see a shift from us in terms of large project system launches to really making the investing journey coming to SGX and working with the whole ecosystem to make investing and fundraising a joy," he said.

The SGX said technology-related capital expenditure for its full financial year was between S$60 million ($44.37 million) and S$65 million ($48.07 million). In the second quarter, it stood at S$13.8 million ($10.2 million), mainly owing to the development of the new post-trade system and enhancements made to its securities trading engine.

> But like many things, it will take time to see how viable the model is for the SGX and NSE.

One of the hurdles the exchange faced last year was a legal dispute with India's National Stock Exchange (NSE). In-depth coverage is available at waterstechnology.com, but in short, the three Indian exchanges—the NSE, the Bombay Stock Exchange (BSE), and the Metropolitan Stock Exchange of India—were asked by the Securities and Exchange Board of India (Sebi) to terminate their existing market data licensing agreements with foreign partners.

This essentially meant that contracts like the SGX's Nifty 50 Futures Index and others like it would cease to exist. As Lyndon Chao, managing director for Asia-Pacific equities and post trade at the Asia Securities Industry Financial Markets Association, once told me, the world of finance is full of smart and creative people.

In context, he was speaking to me about the data conflict between the two exchanges, and how even if the SGX were forced to stop trading of certain affected derivative products, it (and its people) would find a way to move on, and move on they have.

The story has evolved from the two exchanges taking the matter to the Bombay High Court, to being asked to go through arbitration. The final ruling of the arbitrator is expected to be revealed this month.

But at the same time, the SGX and NSE have resumed talks, which were put on hold due to the dispute, on setting up a trading link between the two exchanges in the Gujarat International Finance Tec-City (Gift City).

The two parties in October 2018 submitted a joint proposal to their respective regulators—the Monetary Authority of Singapore and Sebi—on the connect model. This is seen as a step forward in their relationship post-dispute. But like many things, it will take time to see how viable the model is for the SGX and NSE. W

Human Capital

Concannon Trades Cboe for MarketAxess

Chris Concannon, president and COO at Cboe Global Markets has joined MarketAxess, heading up the same role. The new role was effective as of January 22.

The veteran has more than 20 years of experience at senior level roles at trading firms. As CEO of Bats Global Markets in 2017 he oversaw the exchange group's acquisition by the Chicago Board Options Exchange, which later renamed itself Cboe. He joined Bats as its CEO in 2014, and led the group during its initial public offering.

Prior to Bats, he was the president and COO of Virtu Financial, following a stint at Nasdaq where he ran the exchange group's transaction businesses. He started his career as an attorney with the US Securities and Exchange Commission, and the law firm Morgan, Lewis and Bockius, before joining Island ECN as its general counsel. When it became part of Instinet, Concannon was the president of the firm's clearing services. The latest announcement comes in conjunction with Cboe's latest changes to its management team for 2019.

Jimmy Suppelsa

On January 14, Chris Isaacson became the new vice president and COO of Cboe, replacing Concannon. Eric Crampton, the current senior vice president and global head of software engineering resumes his title as senior vice president and has been promoted to CTO. Ed Tilly, chairman and CEO, also assumed the role of president, a role he previously held at the Chicago Board Options Exchange from 2011 to 2013.

During the Cboe acquisition of Bats, Isaacson headed up the integration of the exchanges' technology platforms. He was a founding member of Bats in 2005 and held various senior executive positions at the exchange including COO, and executive vice president and CIO.

Crampton joined Cboe in 2017, following the acquisition, and previously headed up the software engineering teams at Bats since 2008. He led the implementation of exchange's proprietary platform and the technology integrations of Chi-X Europe and Direct Edge, following their acquisitions.

Chris Concannon

Coleman Taps FactSet Vet Suppelsa for Research Management Biz

Coleman Research has hired Jimmy Suppelsa as global head of business development for the company's new software-as-a-service (SaaS) research contact management solutions business line, Coleman Exchange, which helps investors and researchers track their interactions with research providers, sell-side analysts, and other sources of research and commentary.

Suppelsa was previously COO and co-founder of Best Credit Data, a provider of evaluated pricing for municipal and corporate bonds, prior to which he spent 21 years at FactSet in various product, sales and strategy roles, including senior vice president and director of US key accounts and director of the Northeast US region, and director of US product strategy.

In his new role, Suppelsa reports to Alan Banner, COO and CFO at Coleman Research.

Accuity Appoints Wilson CEO

The COO of Accuity is now the company's CEO.

The financial crime compliance, payments and know-your-customer software vendor has promoted David Wilson to managing director and CEO, responsible for developing new partnerships, solutions delivery and client services.

Wilson has been COO for the past 18 months, driving Accuity's growth and making operational improvements. He has held several senior management positions at Relx Group, Accuity's parent company, including CEO of Proagrica and managing director of five segments of data and analytics provider Reed Business Information.

"I take the helm of Accuity in a great position to help the world's banks, insurance providers, freight and trade operators, and payment service providers not only screen an incredible volumes of transactions, but also help identify customers, partners, and counterparties who could be engaged in illicit financial activities, associated with sanctioned regions, or are politically exposed persons,"

Wilson tells *Waters*. "We also need to ensure we keep pace with client expectations and deliver innovative solutions across payments and financial crime compliance that take advantage of new technologies to help automate processes and provide better reporting capabilities to regulators."

Tom Golding, Accuity's head of product strategy and client delivery across Fircosoft and Bankers Almanac for risk and compliance portfolios, will now move into the COO spot.

Golding has worked at Accuity for three years following a 10-year stint at Thomson Reuters, most recently as global head of risk intelligence solutions.

Hugh Jones, the former CEO of Accuity, has been given an expanded role within the risk and business analytics division at Relx. He will continue to oversee Accuity, in addition to leading FlightGlobal, EG and ICIS businesses.

UiPath Hires HP Exec Myers as New Finance Chief


Marie Myers

Robotic process automation (RPA) firm UiPath has appointed Marie Myers as its new CFO. She will be responsible for the financial aspects of the company, and will report to UiPath CEO and co-founder Daniel Dines. Former CFO Mihai Faur will transition to corporate controller and chief accounting officer, and report to Myers.

Myers comes to UiPath from HP, where she was the global controller. In her years at HP, she became responsible for the financial statements of all HP operations globally and spearheaded the "Finance of the Future" initiative at the vendor, which focuses on the adoption of disruptive technologies like RPA and artificial intelligence. Prior to HP, Myers held positions at Compaq, including as audit director.

Myers was named one of *Houston Business Journal*'s "2018 Women Who Mean Business."


Sherry Madera

Northern Trust Enlists St. George to Slay Data Compliance Dragon

Exchange and vendor data veteran Tim St. George has joined Northern Trust as vice president of market data exchange and access compliance, responsible for deepening the firm's relationships with exchanges and enhancing firm-wide awareness of market data compliance issues. In addition, St. George will manage the firm's application access entitlement team in Chicago and Bangalore.

St. George was most recently principal of NorthPath Solutions, a consultancy he set up to advise financial firms about market data compliance and business management, prior to which he was executive director of information products at CME Group, where he spent 11 years. Before that, St. George was a managing director at ticker plant vendor HyperFeed Technologies, and spent six years as director of international development at derivatives data workstation provider FutureSource prior to its sale to Interactive Data.

At Northern Trust, he reports to Kristen Mologousis, senior vice president of enterprise market data services.

"With the growing complexity around market data licensing and compliance, we are pleased to have Tim come on board with his deep and relevant industry experience in the exchange and vendor spaces," Mologousis says.

Refinitiv Hires Global Head of Industry and Government Affairs

Sherry Madera is now the global head of industry and government affairs at Refinitiv, formerly the Financial and Risk business of Thomson Reuters.

Madera has more than two decades of experience in corporate finance, banking, asset management, entrepreneurial ventures, and global policy leadership, both in the public and private sectors.

She joins Refinitiv from the City of London Corporation, the municipal governing body of the City of London, where she was economic ambassador to Asia. Previously, she was minister-counselor for the UK's Department of International Trade, based in Beijing.

Madera will be responsible for communicating with customers, industry groups, regulators, and governments to advocate for fair and sustainable financial markets. She will be focused on global issues such as technology and automation and how sustainability and governance affect customers.

LSEG Names New Data Head; Makepeace Becomes Non-Exec Chair

The London Stock Exchange Group (LSEG) has appointed Waqas Samad group director of the exchange group's information services division to develop LSEG's customer partnership approach and deliver data-driven analytical insights for customers.

The current group director, Mark Makepeace, will remain with LSEG throughout 2019 and will assume the role of non-executive chairman. Makepeace spent his


Mark Makepeace

career developing the global index industry. He served 10 years at the LSEG managing and supporting the IT and information services division. Following LSEG, he founded FTSE Russell, where he transformed the London-based start-up into a global index business.

He has spent over seven years at LSEG in the group director position, and is responsible for leading the acquisitions and integrations of Russell Indexes, Mergent, TMX, Citi Fixed Income Indices and the Yield Book.

Both Makepeace and Samad will report to David Schwimmer, LSEG CEO.

Samad has spent over two years at FTSE Russell as the CEO of benchmarks, and CEO of benchmarks, fixed income and multi asset. Prior to that, he spent eight years as the CEO of the Barclays Risk and Analytics and Index Solutions, and three years as the head of index research of Europe and Asia at Deutsche Bank.

Samad was recruited by Makepeace in 2016 and was deemed "his natural successor," according to an LSEG statement.

Northey Replaces McKenna as TC68 Chair

FIX stalwart Jim Northey is the new chair of Technical Committee (TC) 68, which authors, supports and maintains ISO 20022, a single standardization approach for financial services developed through the International Organization for Standardization.

Northey is a technical committee co-chair for the FIX Trading Community and replaces Karla McKenna, director of market practice and standards for Citi Markets and Securities Services. McKenna, whose tenure was term-limited, headed TC68 for 12 years and led a significant restructure of the organization in response to technological innovations.

"[Karla] really is exceptional in terms of her skillset and her abilities," Northey says. "There's an agenda, a strategic plan and a vision that was prepared and built by Karla and other people within TC68 and I see my job as just trying to carry that out and not mess it up."

The Accredited Standards Committee X9 Inc. board of directors, in its role as the TC68 technical advisory group, elected Northey as McKenna's successor. His background includes roles in aerospace, financial engineering and financial technology.

"I really want to improve the technical quality of all of our standards," Northey says, adding he's not happy with the level of consistency across the standards. According to X9, he will also focus on forming additional partnerships with both established and emerging technology standards organizations and laying plans to guide the group through the opportunities and challenges arising from the shift toward more active financial standards involvement from Asia.


Jim Northey

"Karla's not going to go away," Northey says. "I've asked her to stay very much involved with the regulatory response. We still have a lot of regulatory response going on that involves ISO standards. I think that's an area where she's really done extremely well, and I want her to continue to lead that."

X9 adds that McKenna also will continue her involvement in refining the committee's approach to its reference data standards catalogue.

Maude 'Boards' Cboe as Data Sales Director

Cboe Global Markets has hired Kevin Maude as director of market data sales, responsible for expanding sales of the exchange group's market data and connectivity products in the US.

Maude was most recently a senior sales manager at S&P Global Market Intelligence, prior to which he was head of global accounts for the Americas at Fitch Solutions, and director of fixed income and equity data sales at Markit. Before joining Markit in 2012, he spent almost five years at Tradeweb as managing director of relationship management and vice president and market data sales manager, prior to which he served as New York senior institutional sales manager at Advantage Data, associate vice president of market data services at Citigroup Asset Management, and spent four years at Reuters North America in electronic equity sales and client training roles.


Kevin Maude

Based in New York, Maude reports to Drew Carey, head of market data sales at Cboe. W

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