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info@smartstream-stp.com
smartstream-stp.com

Editor-in-Chief Anthony Malakian
anthony.malakian@infopro-digital.com
Editor at Large Max Bowie
max.bowie@infopro-digital.com
European Editor Jo Wright
joanna.wright@infopro-digital.com
Editor, Asia Wei-Shen Wong
wei-shen.wong@infopro-digital.com
Senior Reporter Josephine Gallagher
josephine.gallagher@infopro-digital.com
US Reporter Emilia David
emilia.david@infopro-digital.com
European Reporter Hamad Ali
hamad.ali@infopro-digital.com
Reporter Rebecca Natale
rebecca.natale@infopro-digital.com
Head of Editorial Operations Elina Patler
elina.patler@infopro-digital.com

Global Content Director Victor Anderson
victor.anderson@infopro-digital.com
+44 (0) 207 316 9090
Commercial Director Ince Saleem
Tel: +44 (0) 20 7316 9258
ince.saleem@infopro-digital.com
Business Development Executive Sonja Patillo
Tel: +1 212 776 8083
sonja.patillo@infopro-digital.com
Business Development Executive Arnaud Morell-Coll
Tel: +1 646 736 1887
arnaud.morell-coll@infopro-digital.com
Account Manager Daniel De-Bruce
Tel: +44 (0) 20 7316 9126
daniel.debruce@infopro-digital.com

Marketing Manager Louise Sheppey
tel: +44 (0) 20 7316 9476
louise.sheppey@infopro-digital.com
Design Lisa Ling

Corporate and Single Subscriptions
US: Barbara Faiman tel +1 646 736 1852
info@waterstechnology.com

Global Brand Director Katie Palisoul
katie.palisoul@infopro-digital.com
Global Editorial Director Duncan Wood
duncan.wood@infopro-digital.com
Managing Director David Pagliaro
david.pagliaro@infopro-digital.com

Infopro Digital Head Office
Haymarket House
28–29 Haymarket
London SW1Y 4RX
tel: +44 (0) 20 7316 9000
fax: +44 (0) 20 7930 2238

Infopro Digital US
55 Broad Street, 22nd Floor
New York, NY 10004
tel: +1 646 736 1888

Infopro Digital Asia
Unit 1704-05
Berkshire House, Taikoo Place
25 Westlands Road
Quarry Bay
Hong Kong
tel: +852 3411 4888

Infopro Digital Customer Services
tel: +44 (0) 1858 438 800

WatersTechnology (ISSN 1068-5863) is published monthly (12 times a year) by Infopro Digital Risk Limited. Printed in the UK by Stephens & George Print Group, Dowlais, Merthyr Tydfil, Wales.

Deeply Worrying

Perhaps I'm naïve, but I believe that free and open markets, combined with technological advancements, will solve—or at least alleviate—many of the great problems facing society today. While I'm very much a believer in the dangers of climate change, I also believe the global community will band together to find solutions. In some ways, I'm even an optimist, in that I think that many of the jobs of the future will revolve around climate and the environment. I think technology can be wielded for good, and that if a capitalist society can speed up climate change, it can also help to slow it down. And then I read about advancements in the field of deepfakes, and I realize that we're probably all doomed. The word deepfake is a portmanteau of deep learning and fake, and these computer-generated videos can, at their worst, have people on video saying things they never said. In mid-September, Hao Li, a leader in the field of computer graphics and vision, told CNBC that "perfectly real" deepfakes will be available to everyday people within the next 18 months.

I have friends and family on both ends of the political spectrum, many of whom have a good 40 IQ points on me. But what makes me incredibly sad is to see these intelligent people so easily fooled by fake news generated by enemies of America to sow discord amongst our citizens. It's sad that we now have to make that distinction, being that politicians throw the phrase "fake news" around whenever they read something they don't like. And people believe them.

Here in the US, we have a potential impeachment on our hands as the 2020 presidential election draws nearer; in Europe, the confusion of Brexit still looms; in Asia, mainland China and Hong Kong are splitting at the seams. All of this requires media outlets to be at their best, it will require individuals to seek out reputable news sources and to consider what they are sharing, and it will require tech companies to better examine the information they are propagating. Even without the advent of deepfakes, to me that seems like three swings and misses. Throw in this form of AI catnip to a gullible populace, and it's hard not to think we're in for dark days ahead.

Facebook, Microsoft and Google are working to combat deepfakes before they become prevalent. But it will be an immense battle that will require the intervention of lawmakers across the globe. In September, Gena Boutin, director of digital identify for Refinitiv, spoke with my colleague Rebecca Natale about how the vendor will look to combat deepfakes when it comes to things like know-your-customer/anti-money-laundering requirements, and fraud in general. (Read the story here: waterstechnology.com/4565841) It was interesting because it's already hard to combat fraud without this latest threat. For all the talk of tech innovation on Wall Street, I'm not so sure how prepared the industry is for giant leaps in things like deep learning, 5G networks, and quantum computing. Banks and asset managers are too bogged down in the day-to-day that they can't dwell on the "what ifs." We are entering an uncertain future. I still have hope that tech will save us, but I also wonder whether we even want to be saved, or is this world of disinformation the new normal? wt

Anthony Malakian
Editor-in-Chief

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Industry Bodies: EU Consolidated Tape Needs Strong Governance by Esma

Esma will use submitted responses to draft its advice on market data costs and Europe's consolidated tape, which will be presented to the European Commission in December. By Josephine Gallagher

Trade associations including the International Capital Market Association (ICMA) and the FIA European Principal Traders Association (FIA EPTA) have called for strong governance of a European consolidated tape (CT) in their responses to a July 12 consultation paper from pan-European regulator the European Securities and Markets Authority (Esma) on the development of market data prices and the establishment of a consolidated tape.

In its response, FIA EPTA, an independent association that represents 28 European principal trading firms, says that to ensure the consolidated tape provider (CTP) will deliver a high-quality and reasonably-priced offering, EU regulators must put in place a robust governance framework that reflects the interests of all market stakeholders.

Piebe Teeboom, secretary-general of FIA EPTA, says the EU should avoid a situation like the US consolidated tapes where trading venues receive proportional remuneration for the amount of data that they provide, and urges Esma to adopt a strong governance framework that would prevent certain incumbents from dictating policies in a way that favors them.

"That is a situation we don't want to see in Europe," Teeboom says. "Cost recovery should be on the basis of actual contribution to price formation, and we should prevent any misalignment in terms of incentives."

Two Tapes

In its response to the consultation, ICMA's Consolidated Tape Taskforce, which comprises 12 buy-side and sell-side firms, trading venues and data providers, said there is a need for a CT for cash bonds. To date, much of the discussion of a European CT has pointed to the initial construction of a post-trade equities tape, as it is believed to be easier to build and would set a precedent for later iterations.

However, Elizabeth Callaghan, director of fixed income electronic trading market structure at ICMA and author of its submission, says EU regulators already have an existing example of a CT for cash bonds to learn from: the Trade Reporting and Compliance Engine, a US consolidated tape for fixed income. Callaghan also wants the EU to revise parts of Mifid II to allow for a CT beyond equities data.

"We would like the Commission to make the necessary change in level one of Mifid II so that development on a consolidated tape for cash bonds can begin," she tells *WatersTechnology*. "What we don't want is a long wait for the equities consolidated tape to be finished, to then [later] start development on the cash bonds consolidated tape."

According to ICMA's feedback, the building of two tapes—one for equities and one for cash bonds—would require parallel development paths as "their ecosystems are profoundly different".

Echoing EPTA's views on governance, ICMA says the CTP should be supervised by a "governance panel" comprised of members from Esma and/or the European Commission and other market participants, such as investors, liquidity providers, trading venues, data providers and the retail community.

Esma acknowledged that a CTP has not come forward to date, pointing to the challenges of building a commercially viable CT and offering it as a low-cost service. To help resolve this problem, ICMA proposes that the CTP contract should be awarded to a third party for "no less than five years" to give the contract holder sufficient time to recoup any development costs.

Elizabeth Callaghan
ICMA

"The whole point is that the entire ecosystem … can access this cash bond consolidated tape. The market cannot have a monopoly situation where [the CTP] decides their own pricing scheme," Callaghan says. "But at the same time the market can't have a consolidated tape that is completely 'non-profitable.' There would be no commercial incentive for any potential CT provider to step up to the plate."

In the US it is mandatory for trading venues to submit their data flows directly to CTPs. Teeboom argues that EU legislators should also make this a regulatory requirement for trading venues and approved publication arrangements (APAs), which currently are only required to make their market data publicly available free of charge 15 minutes after publication.

In addition, FIA EPTA's feedback advised Esma that stronger enforcement of current legislation was necessary to ensure that trading venues and APAs are fully compliant with the obligations of making their data flows available in a machine-readable format, 15 minutes after publication for free.

Following the September 6 deadline for responses, Esma will now use feedback from the consultation to produce advice on market data developments and the EU consolidated tape, which will be submitted to the Commission in December. The Commission confirmed that a "report on the equity CT should be expected in Q2 of 2020". wt

Man Group's Numeric Leans on Python for New Research Platform

Man Group's Gary Collier discusses the hedge fund's strategy of adopting a single platform for its funds. By Hamad Ali

Man Numeric, Man Group's Boston-based quantitative investment business, is close to finishing its migration to a Python-based system.

Numeric is "very close to completing—we are talking about weeks [or] months—their wholesale migration from legacy SAS systems onto our pure Python platform underpinning their equity investment processes," says Gary Collier, CTO at Man Group Alpha Technology, the fund's internal front-office tech team.

The migration is part of Man's efforts to ditch silos and move its investment managers onto a single platform under a single programming language.

As well as Numeric, which Man acquired in 2014, the group also includes diversified quant investment manager AHL and discretionary fund manager GLG. Collier says GLG has over the past couple of years built a team tasked with building out its usage of Python for fundamental discretionary investing.

The Python platform was first introduced to Man at AHL in 2011. Man had been deliberating about where to take its research platform and settled on that language. "Once we'd made the technical decision to move to Python, it was very much a hearts and minds exercise, as some of the quant researchers had a strong preference at the time to use R, Matlab, or some other language," he says. "It is like this with a lot of technology projects or migrations. When you have world-class engineers, it's the softer skills that become the critical project-success factors."

Man eventually moved all of the systems and research platforms at AHL to Python, resulting in a platform called Rapture in 2011. It then released capabilities around futures, foreign exchange, and interest rate and credit default swaps. Equities followed in 2013, and options were added in 2014. Collier says the platform is still evolving.

Gary Collier
Man Group

When Man took over Numeric Investors in 2014, the group had no-one dedicated to building and maintaining common components for the whole firm. But by that stage it had become obvious that the strong software they had built within AHL shouldn't be limited to that business.

"I think it was Easter 2015 when I had a few days off, and I squirreled myself away in a study to write a proposal for how we could take the Man AHL Python platform technology and apply that across Man Group." he recalls. "There has been a journey to achieve this since then."

Alpha Team

This was a first step toward the creation in May 2018 of Alpha Technology, an entity within Man that brings together several investment management-specific teams and manages front-office technology across the group.

"What started as a loose federation of technologists within the different investment managers in Man Group using what was the Man AHL platform, solidified from the start of last year onwards into much more of a definitive decision to empower the technology team with the remit of 'do things once, do things well' across all our front-office technology," Collier says.

The platform consists of several layers. The foundation is a multi-layer stack based on Linux HPC, OpenStack, and the Python scientific computing stack. Moving up a level, there is a data engineering framework and Man's in-house analytics and computation frameworks, as well as tools for strategy construction and portfolio analysis.

'Democratizing' Data

The first year of Alpha Technology was about making sure that the common set of foundations was uniform across the whole firm. From early this year, the focus shifted to democratizing data across the front office.

"The tools allow us to ensure that we are not onboarding our data more than once, and also ensure there is a catalog in front of everybody so they can see what data we have as an organization, see how different datasets relate, or request permission to have access to a new data set," Collier says.

He say the fund's move to a single platform, a single programming language, and a single set of libraries has helped to free up the firm's technologists to work on a wider array of projects. The shift created a more uniform environment in terms of its builders and users, a markedly different situation to before the move when staff worked in silos doing specific jobs. Now, they have more fluidity and a greyscale from hard-core technologists to specialist quants.

"What we have today is a very different sort of system to what we had 15 years ago, when it was largely a C++ for technology with various [fourth generation-type] languages for doing quant research," he says. "[Today we have] a much more homogeneous environment, with all research systems written in Python and underpinned by the whole Python scientific computing ecosystem." wt

Finra CAT Taps CenturyLink for Private-Link Reporting

Industry members are also being asked to focus on large-volume trades for December's deadline.
By Emilia David

Finra CAT, the operator of the consolidated audit trail (CAT) and a unit of the Financial Industry Regulatory Authority (Finra), has contracted CenturyLink to facilitate private links into the CAT.

Shelly Bohlin, chief operating officer of Finra CAT, said they decided to offer private-link file uploading and reporting because there are companies who are more comfortable submitting files through a direct link, rather than through a web portal.

"It's been a very carefully thought out decision about the type of connectivity we want. If you can't connect in, nobody's going anywhere," said Bohlin, who was speaking at the CAT Industry Conference, which was hosted by Sifma and Deloitte and was held on September 16 in New York. "We will only be supporting private-line connectivity for machine-to-machine connectivity with a private vendor CenturyLink. …Everyone [who prefers a private link] should be able to move forward with that."

She added that those who use Amazon Web Services (AWS)—which Finra CAT has chosen as its cloud infrastructure provider, in part, due to its security capabilities—may be able to use a feature called AWS PrivateLink to connect to the CAT AWS portal to establish machine-to-machine connectivity. This feature, though, will not be available until January 2020, as Finra CAT still needs some more time to set that option up.

Bohlin said Finra CAT is also in the process of identifying another unnamed vendor for private linkages for industry members who don't have CenturyLink. A private line lets firms upload files, rejections, acknowledgments, and corrections to their reported trades through a secure file-transfer protocol.

Finra CAT says some firms prefer submitting files via a direct link, rather than through a web portal

Finra CAT also set up a separate CAT Reporter Portal, which was originally going to be available in February 2020, but will be moved up to December, in time for testing. The portal will also be where feedback on reports will be displayed. CAT reporters must indicate how they want to connect to the database: through a private link or through the portal.

The CAT operator also tapped Kingland Systems to help it create the CAT Customer ID (CCID), which is used to identify individual traders and customers on the CAT while masking personal data. Bohlin, however, pointed out that the Securities and Exchange Commission (SEC) is still deciding which personal data needs to be collected by the CAT, and Finra CAT and other self-regulating organizations (SROs) involved with the platform's development are awaiting that decision.

Focus on Volume

As testing deadlines near for the CAT, industry members are also being asked to focus on large-volume trades—rather than on more complicated, specialized trades—to meet deadlines for the database.

Jeffrey Kahn, a regulatory reporting specialist at Jane Street, said during a panel at the event that industry members are focusing their questions on outlier cases, but they need to make sure they can actually meet the reporting requirements for December.

"It's a matter of prioritization," he said. "Focus on the milestones, on use cases with the highest volumes so you can get to production faster, [and] then you can move on to edge cases. This is new to vendors, too, so ultimately you're responsible for your own reporting."

Edge cases—trades that are smaller in volume and specialized—make up the bulk of questions directed to the CAT helpline, as well as the Financial Information Forum (FIF) hotline, said Chris Bok, a director at FIF.

Like Kahn, many panelists were concerned that there may be a reliance on vendors for CAT reporting, but since the CAT is completely new, industry members were told to have a frank conversation with their vendors and work together around meeting all the CAT reporting requirements.

Testing for the first phase of the CAT is expected to begin December this year, and will cover equities trades by large broker-dealers. More complicated trades, specifically complicated options, is scheduled for production in December 2021, though that date could change. wt

SEC, FIF Seek End to Rule 606 Compliance Confusion

At an SEC meeting Thursday, September 12, the regulator and association attempted to clarify the correct interpretations of guidance surrounding the new rule. By Max Bowie

A meeting between the Securities and Exchange Commission and industry body the Financial Information Forum on September 12 to finalize details of how brokers can comply with the trade routing transparency requirements of SEC Rule 606, ended in confusion as the regulator and industry disagreed over interpretations of some aspects of the rule, and which approach would ultimately deliver most transparency for investors.

Rule 606 aims to eliminate conflicts of interest when brokers route client orders to other brokers and execution venues by capturing execution data and the path it took—taking into account any fees or rebates that might sway a routing decisions. It has already been delayed until the start of next year as firms struggled to make sense of the regulation, and the SEC took longer than expected to create a document of frequently asked questions (FAQs) to help brokers understand their obligations.

However, the FAQs may have created more questions than answers.

"After the extension, and on reading the FAQs, we realized there is some confusion around the look-through piece, and firm's legal obligation," says Mark Davies, CEO of Austin, Texas-based trade analytics software vendor S3, who was part of the FIF delegation at the meeting. "What we did get answered is that by January 1, you are required to collect data on and disclose all of the routes that you place. And from April 1, you will be required to report on any destination that you have discretion over."

But he says there was a misunderstanding between FIF and SEC staff

Rule 606 has already been delayed as firms have struggled to make sense of the regulation

over how to represent different levels of data. For example, when it comes to the code applied to identify each type of order routing action, FIF interpreted the rule to mean that in any instance, the first time a trade is routed by the initiating broker, the recipient would be designated as a primary routing venue (PRV). However, the SEC clarified that if an order executes on that first route, it should instead be designated as execution venue/secondary routing venue (EV/SRV).

In addition, orders ultimately routed to the same execution venue via different brokers (or even by the initial broker) could also create confusion because the buy-side client may not understand which execution was achieved by which broker, because all would be designated EV/SRV.

"This is a problem because this rule is about identifying conflicts of interest… for example, a broker chooses to route to another broker or execution venue because they will receive a rebate or pay less for execution, rather than because they will receive better execution quality," Davies says. "That's the reason for the look-through—the SEC's stance that you need to know the reasoning by the executing broker. The industry has accepted that, and we're building to that requirement. What we discovered in the meeting is that a direct conflict [where the originating broker routes to a specific broker or execution venue because of some incentive] and an indirect conflict [when a downstream broker routes to a specific broker or execution venue because of some incentive] should be indistinguishable in the report—that's what we're disputing."

Though there is no difference in the technical challenges associated with each, Davies says the SEC's interpretation will result in greater confusion once the reporting comes into effect, because investors will not know where any conflict occurred.

Another aspect of the rule clarified by the SEC at the meeting is that orders should be reported based on execution, not on where they are routed. For example, if a customer sends an order for 100,000 shares to a broker, which executes 10,000 of those on an exchange, 10,000 on an ATS, and routes the remaining 80,000 to another broker, the first broker would file a Rule 606 report for the 20,000 shares it executed itself, and noting that the other 80,000 had been routed, but does not have to report executions conducted downstream from the second broker.

Davies says FIF will respond to the issues in writing to see if the SEC is open to changing its approach, but adds that "Barring anything else from the SEC, we will move forward with what they've said, even though we feel it is not the most effective mechanism for reporting what they've asked for." wt

HFT Firm Grasshopper Taps Google Cloud for Research Platform

The firm's chief investment officer, Tan T-Kiang, explains how his team is using GCP to "listen" to live market data. By Rebecca Natale

Two years ago, Singapore-based proprietary-trading firm Grasshopper started using the Google Cloud Platform (GCP) to build out its quantitative research and data-processing platforms to improve its trading capabilities. By leveraging GCP tools such as TensorFlow, an open-source machine learning library, BigQuery, the same data warehouse on which everyday Internet users search Google, and Cloud DataFlow, which is used for processing both batch and real-time data streaming, Grasshopper and the cloud giant have worked closely on several internal projects.

One of those projects is the firm's in-house Java application, Ahab, which was launched a year ago. Ahab, which is named for Herman Melville's fictional whaling captain, allows traders to "listen" to live market data and make better and faster trading decisions. It is built on Apache Beam, the open-source programming model.

Tan T-Kiang, who holds the dual-title of chief investment officer and chief technology officer for Grasshopper, says the data that flows through the application can be thought of as fish, gobbled up by a bottomless whale. Moby-Dick metaphor aside, Ahab sources its data directly from exchanges, and calculates, in real time, the value of order books, or the lists of buy-and-sell orders at any trading venue, and how that can impact a stock's price. The data is tied into GCP's Solace PubSub+ tool, which handles and sorts information from multiple sources, thus eliminating the need for Grasshopper's engineers to deal with basic network connectivity. The resulting data log then gets stored inside BigQuery.

Tan T-Kiang
Grasshopper

"One of the biggest things we've been trying to solve is that when you start off, let's say, 10 years ago, you built a database, and the market was probably 10 times smaller in terms of data. That system was fine, then a few years later, or even a year later, you have to re-tool because it's not good enough anymore," Tan says. "Or you, as a hedge fund or an HFT firm, decided to add five more markets to what you're covering. And what you're storing now is maybe 50 times or 100 times more data."

The scalable, adaptable environment GCP offers has allowed the firm to optimize its "cycle of innovation," and focus on the things it should: numbers, data science, and engineering. Before partnering with Google, he says maintaining infrastructure and managing anomalies, such as market spikes outside of regular market hours, monopolized too much time and effort from Grasshopper's developers.

"That's an issue that a firm like mine shouldn't be focused on," says Tan. "[Those things] shouldn't be our core competency. So we went out there to look for someone who could help us."

When conducting research now, the firm is able to query 100 billion rows of market data in less than 30 seconds, Tan adds. Before, when the firm would go to process that data, or look to do large studies on how to look at the market, it took about a week for the firm do the necessary calculations with the compute power it had. Using the cloud's parallel computing capabilities, the time to run the same calculations has shrunk to "maybe 10 minutes," he says.

The firm used to use various other open-source databases, which could be successful in the short-term, but they were ultimately faultier, or often funding dried up. And Grasshopper's teams spent a lot of time considering how many terabytes of storage to buy in a way that would both serve their present needs and future-proof themselves.

"[Now] that question just sort of goes away," Tan says. "We just don't talk about it anymore. And by not talking about that, you actually help your rate of innovation."

Big, Getting Bigger

Ulku Rowe, technical director of financial services at Google Cloud, says financial services is already a data-heavy business—and that weight isn't going to get any lighter. On top of normal market data, there's constant news, global events, regulatory shifts and changing market conditions.

"It's a tough problem, but it's also a massive business opportunity for those that can create the best trading strategies, the best risk management models, and those that can do it fairly quickly," Rowe says. "And nowhere is this need as acute as high-frequency trading."

Looking at the big picture, Tan says what they're trying to do is predict prices as accurately and consistently as possible. They start with big data, study those massive datasets on the cloud, and then produce summary tables of possible events.

"If this type of market condition happens that way, then there is a high likelihood that the market will go up in the next one second," Tan says. "And if this other situation happens, there's a high likelihood that the market will go down in the next one second. All we're doing is understanding what the probabilities are." wt

Nasdaq Eyes Blockchain Project for Over-the-Counter Markets

Technology provider's effort to track the lifecycle of a digital asset moves beyond the proof-of-concept phase. By Hamad Ali

Nasdaq says a blockchain project it has been involved in aimed at tracking the lifecycle of a digital asset has moved beyond the proof-of-concept phase.

The offering, the name of which is unconfirmed, tackles the question of how to tightly connect from the initial issuance of an asset into a marketplace to efficiently trade tokens or assets.

"Where we see [this product] primarily fit is within the bilateral OTC markets, where you don't currently have a trusted central operator in place. I think we more or less have left the proof of concept period," says Johan Toll, head of digital assets at Nasdaq.

Once assets have been traded and matched in Nasdaq's matching engine, they can immediately be settled back on the private permissioned underlying blockchain, Toll says. "We can do both the custody and the settlement on the blockchain, and we can even manage both the payment side and the asset side within the same blockchain. You can then guarantee the atomic settlement and finality of those transactions."

For the initial project, Nasdaq partnered with start-up Symbiont, in which it led an investment of $20 million in January. Other investors in that round included Citi and merchant bank Galaxy Digital.

"For the tokenization project, we already see here and there smaller MVPs [minimum viable product] moving into production with a couple of transactions or more every day. Then we see which ones of these [implementations] have most success in having identified the problems that everybody would like to solve through it," Toll says.

He says the tokenization of assets is becoming more common; however, Nasdaq is primarily targeting this offering at markets that might not have turned their physical assets into digital tokens yet, such as commodities, real estate or insurance. The aim of the project is to give multiple users the capacity to share a view of the state of an actual asset on a distributed ledger.

Nasdaq says blockchain can increase transparency and trust in the quality of underlying assets

Increasing Trust

Toll says currently there is a lot of uncertainty for token owners, who have to do manual check-ups or have to trust some third party to go and check on the quality of an asset. From the moment of issuance, investors want to feel certain that the token they are trading actually corresponds to a real asset.

He says blockchain can increase transparency and therefore trust in the quality of the underlying asset, and that the the Nasdaq offering can create a shared and open network between the different players in the industry to help participants verify each other and certify that no one is trying to play or to fool the system.

However, Toll cannot say when the solution will be in widespread use: "We are primarily acting as a technology provider to those types of markets that are in the need to tokenize solutions, so we cannot ourselves control the timelines for their production dates or when they start to scale. I think that needs to go to the various consortiums or companies running this," he says.

Toll says Nasdaq has now fully integrated Symbiont into its tech stack, Nasdaq Financial Framework. "We can combine both solutions and quickly enable business applications on both sides to create decentralized networks for trading of any types of assets, more or less."

Nasdaq says it has been actively involved in the project, ensuring integration not only with the framework and matching engine, but also building out post-trade workflows to manage the digital assets on the ledger.

Toll says the challenge now lies in transforming existing markets with the technology: "How will the regulatory regimes accept a transformation of the market into a new business model? How can the various players in the market come to agree on an open and shared environment using blockchain technology?"

That's why it is more interesting to initially look at less regulated assets where there are fewer obstacles to innovation, he adds.

Nasdaq is working on a number of other blockchain-related projects, including a product to use in e-voting for corporate elections and annual general meetings, and a collaborative initiative involving Swedish bank SEB that focuses on mutual funds. wt

Financial Conduct Authority Working on New Data Analytics Program

The UK regulator has moved much of its data to the cloud and is using more advanced analytics as it seeks to better regulate evolving financial firms. By Joanna Wright

The Financial Conduct Authority (FCA) is turning to the cloud and advanced analytics in tandem with the industry it governs, which may ultimately reduce the cost of regulatory reporting, said Steven Green, head of central data services in the innovation segment of the FCA's strategy and competition division.

As financial services firms adopt technologies like cloud computing, regulators are trying to evolve along with them, moving from a focus on control over data to one that looks at ways to exploit the data.

"We are not using advanced analytics and technology just to do our job better. Actually, we are also using it to understand you better, so we best understand how you are moving forward as an organization, so we can react and not just draw a line and stop what you are doing," Green said, addressing a room of technologists from banks and other financial institutions while speaking at this year's European Financial Information Summit in London.

"We are using this journey and these changes that are available in the world at the moment to understand how to regulate better, and to change the way we regulate," Green said.

One area where the FCA's strategy is starting to work well is in the realm of digital regulatory reporting, Green said.

"We have done a lot of industry tables around how we can lower the cost of regulatory reporting. I'm in charge of data collection at the FCA, and there is a lot of activity where we are trying to automate collections. So we are working with big banks and the Bank of England. There is a collaborative journey there, because the FCA does not have the answers alone," he said.

The regulator is launching a new data strategy

The regulator has over the past couple of years moved almost all its technology estates to the cloud, which aside from offering the promise of more flexibility and scale, has meant that it could also roll out a data analytics pilot program across the organization, enabling it to leverage the huge amounts of data from the 61,500 firms under its purview.

In the past year or so, the FCA has brought together all the data initiatives that were taking place across the organization, using data lakes and new methods of data collection. The idea now is to reduce areas of overlap and find pockets of resistance.

"We are constantly being asked for greater efficiencies, to be more effective around monitoring that broad sweep of sectors that we have," Green said.

Fintech Focus

The FCA first devised its data strategy back in 2013, and it was "old school," Green said, focusing as it did on governance and control. In 2015, the organization started thinking about encouraging fintech, and doing more systematic data intelligence. This involved the collection of data across UK financial services, including from social media, news articles and surveys, and interviewing thousands of financial services workers across the the country.

"We started to appreciate the amount of benefit and efficiency we could gain from using data intelligence more broadly," Green said.

The regulator had also been thinking about what types of data were needed within its own organization, who needed it, and for what purpose. In 2017, the regulator realized that the lessons it had learned needed to be spread more broadly, "and it was really then that we decided to start moving more consistently to the cloud with many of our IT services," Green said.

The analytics function began almost as a type of start-up within the FCA. Many on the team had backgrounds in data, but not in financial services, and were brought in to challenge the status quo of how analytics were used in the organization.

"They were a small team at the time—only a few dozen individuals—but the idea was to leverage the experience we had with regtech and fintech conversations externally and look at how we would apply those internally," Green said.

Now, in 2019, the FCA is bringing together a new data strategy to the organization and over the next two or three months will publish a version of it for the public. This new strategy will be driven by the need to exploit the data and integrate it with every function and process across the organization.

The FCA is also publishing more data to the public, Green said.

"We created a hub last year and the idea was that we publish as much data as possible externally so that some of your organizations and consumers can get value from what we have. So we are not saying, 'Give us data, give us data,' and then we hide it among ourselves and never know what it means for financial services.… The idea is to give value back on what you are giving to us: aggregated data so that you can benchmark yourselves, so that you can see what we are seeing," he said. wt

China's Asset Managers See More Interest from Foreign Investors

There is an opportunity for Chinese asset managers looking to attract investment from abroad, but transparency remains an issue. By Wei-Shen Wong

As foreign institutions' interest in Chinese assets continues to grow, market intelligence and institutional databases are seeing more searches by non-APAC firms looking to get a better grasp of mainland China-based asset managers.

John Molesphini, head of global insights at eVestment, a subsidiary of Nasdaq, says global institutional investors are looking for returns at acceptable levels of risk regardless of where asset managers are based.

As a result, potential foreign investors are having to search for information on these often-opaque firms using a variety of methods, including getting information from database providers such as eVestment, Eurekahedge, and Morningstar. Molesphini says his company is seeing a significant increase in mainland China searches.

"Among all non-APAC investor and consultant users searching for APAC-based asset managers, the percentage of those looking for asset managers specifically based in China has risen from about 10% at the end of Q2 2018 to about 20% at the end of Q2 2019," he says.

Morningstar is seeing similar patterns on its platform, says Wing Chan, director of the manager research practice for EMEA and Asia: "It's difficult to quantify the searches for Chinese asset managers in numbers, but anecdotally… including both onshore and offshore China, there's a marked increase in enquiries for onshore Chinese strategies across equities and fixed income."

Chan adds that there is more interest in Chinese assets coming from institutions in Europe and the US: "They're more open-minded about investing in Asia, and particularly China."

Foreign investors can find it hard to access detailed data on funds

The Morningstar Direct database is an investment analysis platform that allows institutional and wealth management investors to search for fund information and other quantitative data. It also features research on portfolio managers and asset management firms for its clients.

Providing Accurate Information

As interest in the country grows, China-based asset managers are finding that they must ensure their information on these market intelligence sites is accurate and up to date, which is something they may not have been accustomed to in the past. Investors and consultants often use market intelligence vendors to create a universe of similar firms. So, for example, an outside investor may look at a company's holdings, investment vehicles, retail-versus-institutional investor ratios, and ESG considerations, as well as office locations, firm ownership and key professionals.

If this information isn't up to date—or, worse, if it's blank—some asset management firms may be ruled out due to the lack of data in their profiles, Molesphini says.

"If any of that data is missing, either your firm won't come up in the search at all, or you may be eliminated because you left out key data that your competitors included and they got the RFP, and you didn't. That's why it's so important to provide as much data as possible," he explains. "In cases [where information is missing], asset management firms are being assessed by investors and consultants and either selected for follow up or eliminated from consideration, and the asset managers don't even know it."

Morningstar's Chan says basic top-level information is relatively easy to acquire, but it gets tougher when database providers dig deeper—for example, when seeking data on the fund's investment processes, its investment team, or how it remunerates managers.

Opening Up

Over the past few years, the Chinese market has become more accessible to foreign institutional investors. The equities and bond markets, for instance, have established trading links with Hong Kong. In addition, the People's Bank of China has given approval to S&P Global Ratings' Beijing-based operations to start rating onshore bonds. It is anticipated that this will make the bond market more transparent and, as a result, help foreign investors feel more comfortable.

Historically, China has been underrepresented in global indices such as the MSCI World or FTSE All-World, so these benchmarks are playing catch-up, Chan says.

Previously, the Chinese equity market was dominated by retail investors, meaning it was driven more by momentum traders rather than being focused on fundamentals. But now, he explains, there is more activity from fundamental and long-term investors.

"It's not just the local asset community; it's also international firms like BlackRock, Fidelity, and JP Morgan. They have the WOFE [wholly foreign-owned enterprise] license, they are hiring investment teams, and they are looking at stocks at the fundamental level," he says. wt

SmartStream

AI's Next Phase

Thriving Through Implementation

Many in financial services are trialing artificial intelligence (AI) applications, with projects increasingly sophisticated in methodology and ambition. *WatersTechnology*, in partnership with SmartStream, recently convened a Chatham House-style discussion with industry technologists to discuss their hopes for AI as well as the practical and ethical challenges to greater adoption. While the world of AI grows ever wider, one constant has shown through as firms inch closer to implementation—gambits with a strong data orientation will thrive, and those without will not.

Banks and asset managers experimenting with artificial intelligence (AI) have come through the early stages with enthusiasm, but, as with the peloton in the Tour de France, they are beginning to feel some strain in their legs. For many, arduous new terrain still awaits before reaching the finish line. As one contributor to the *WatersTechnology*/SmartStream discussion described it: "The struggle at the moment remains being able to articulate a business case for AI; hence the reason people are doing more proof of concepts to trial it—to help define the business case, to then move forward with its applicability within the industry." We are at the foot of the Alps, staring up at the real climb.

The industry has already cast a wide net across both functional areas and AI's various gradations, from robotics processing automation for fraud detection, document digitalization and help-desk chatbots, up to clustered machine learning algorithms for coding and automated commodities trading on predictive analysis of geography and weather patterns. Some in the discussion described targeted pockets of innovation, while others said AI has permeated multiple corners of the enterprise, be they client-facing, trade settlement operations or investment research. As companies contemplate further investment or moving proof of concepts into full production, the evaluative criteria seem familiar, too: What are the cost savings in play? What new revenue will be generated? Are there additional efficiencies to capture, and will they incur new regulatory costs?

But speakers also agreed on some wrinkles unique to AI. Specifically, while some still prefer the "short, quick wins" achievable in robotics, the real value—and likewise, the real technical challenge—lies in AI being exposed to troves of information that would otherwise lie untouched, acquiring signals and then creating the proper funnel and guardrails for what AI does with it. The next phase, therefore, isn't just about traditional metrics; it is about ambition, timeliness and navigating ethical and liability questions. And at the center of this lies the effective marshalling of data.

Battling Incrementalism

The obvious place to start is measuring institutional ambition, and, interestingly, the gathering had a strong chorus of voices urging the business to be bolder. As one voice in that chorus said, today's trap is in creating a false choice: one is short, more cost-effective and certain in outcome; the other is more strategic but far more involved and open-ended. "For some of our stakeholders, it's still about that uncertainty," she explained. "They look at the decision as 'I know this will happen; I'll choose the short-term option.' That's where you lose the battle."

Many said this drive to deliver small gains was understandable, but it also shades AI's potential, particularly given the investment already put in to big data, data lakes and related infrastructure in recent years. For instance, one firm is trying to reduce errors and identify outliers in large index datasets, which would be impossible to run without AI due to their sheer size. Another attendee, whose insurance firm already uses AI for fraud detection, argued that the greatest benefit is in manipulating data not being used at all, "looking at things that get discarded or ignored completely. Logs and other activities are just by the wayside," he said. "It's integrating those with your core datasets to get the patterns that you can't see, and that a human wouldn't be able to see because the data is too obtuse currently. That's where we see the largest strides to be made."

Indeed, this opinion leaned most into the "known unknown" problems firms face—whether in processing efficiencies or business intelligence—that require more intuition of the algorithm or neural network in play. The meeting considered yet another example: one of a potential corporate recovery team application. "When you have a client that fails, at the end there is a 'lessons learned' analysis we do, and it sits on a PDF scanned in from 10 years ago," the event heard. "There's no application right now where we can query: 'We've got a deal with an oil firm in this particular country in front of us. AI, find the things that have gone wrong with this kind of investment structure in the past—in oil, in this region, or factors that might be linked to it.' That's the kind of thing I think we should be aiming for, even if it turns out to be quite difficult. But the message I'm getting from senior management is that they're really not looking beyond what they see as an incremental move upon 'normal' IT."

Time Factors—First Nuggets and Fine-Tuning Models

Ascending from bot-based task automation to machine learning-fueled research brings its own pitfalls, and the trickiness lies in sequencing and timeliness. The temptation, one speaker said, is that firms know "they need that first nugget of something you can prove works to generate interest and be able to sell it." But this initial output can also skew expectations, if not torpedo the project over time.

"Until your model is playing well, it won't give you information on whether your decision can be taken, and our experience is that this journey, and the positioning of those outcomes, takes time," posited a speaker from a firm using AI to predict seasonal oil output. "It took us a good eight months to come to an AI-driven model with a prediction within 18% of a human analyst's estimate. You can call initial results a beginning, but we knew we had to go through and refine those models, and by the time you reach that outcome, you also need to be conscious of the time elapsed and whether the initial outcome or purpose is still valid."

From initial buildout to attenuation to measuring against original objectives, it was agreed that data lies at the heart of these more complex implementations, and again, no matter how great the AI, issues can percolate below and quickly stress the entire data estate. "It is a common problem we've all heard: 'Is our market data in a form where we can use it from day one?'" another attendee asked. "In most cases, I don't think so. There is a lot companies do in-house to cleanse that market data today. That's a huge effort companies invest to look at data quality, the data we need, the data history, and the gaps in that history. That is the bigger problem. Until we get those building blocks correct, I don't believe AI would be able to give us efficient outcomes, because then we'll only be investing our time on remodelling and defining AI's parameters."

The good news is that, unlike AI—and for reasons often secular and apart from AI—many progressive institutions have invested heavily in transformative data initiatives and chief data officers, and are better prepared than ever to support impactful AI-backed endeavors. The fact remains, though, that this will simply make things easier, rather than simple or fast. And clearly, firms are keen to observe the difference.

Frontiers in Explainability and Bias

Likewise, a final critical challenge highlighted at the session was the ethical and legal context surrounding AI, gaining visibility as it has among boardrooms and, increasingly, regulatory authorities. Examples were raised of sophisticated fraud detection and similar AI-backed systems that were successfully developed and enthusiastically supported by banks, only for them to be shelved. "They simply determined: 'We're not going to get this past the regulators'," said one person familiar with a recent case. "'It works perfectly for our purposes', they said. 'It's much better than the current process, but it was a neural network with a non-explainability problem. We're not going to go live with it, because the regulators just won't like it'."

Others pointed out that negotiating with vendors who may be reluctant to expose proprietary AI methodology, or even assume liability for it, could prove an internal point of contention as well. Still more trickiness appears in coralling the use of AI-generated metadata, guaranteeing customers' right to have personal identifiers forgotten—as privacy directives have increasingly demanded—and correct biases that machines have already learned. All of these considerations must be teased out, and implementing proper data governance around them is a significant undertaking in itself. In an era of bombshell headlines highlighting data misuse and algos operating in the dark, they are rapidly becoming essential pieces to be planned for on day one, rather than tossed in as an afterthought—when it may be too late.

Final Thoughts

This year's event nicely detailed the contrasts—and occasional contradictions—engendered by AI's next financial services wave. Popular fascination could not be higher with AI, but still many say they are dabbling too much on the edges. Technologists conjure myriad creative uses for AI's higher forms to add value within their enterprises, not only on automation but also for genuine, scalable insight. Yet they also acknowledge that the hit rate for these projects is unpredictable at best, and is hard to cost-justify in the short term until we know more about what works, how well and for how long. Meanwhile, the milieu around AI only grows more complicated as valid concerns are raised about what it should do, and how closely it can be explained and controlled.

"Because there is a nervousness about AI within our organisation, like elsewhere, we're very much focused on a combination of AI and human interaction," as one participant summed it up. "That's the sweet spot. It's about reducing the amount of human intervention, so that a human can really focus on the 'value' piece."

In 2019, that may not be quite enough, even if it may just be the limit of what is practically doable for many firms today. What's clear is that the next leap—the most persuasive, timely, and suitable AI applications—will fit hand-in-glove with the data sources, processes, and governance frameworks humming alongside them. wt

HKEx Sees LSEG Hopes Crash on the Political Rocks Below

LSEG has been involved in several failed international mergers over the past two decades, which begs the question: Is a merger involving the exchange group even possible? By Josephine Gallagher

People often like to throw around the phrase, "Take the politics out of it." It's a lovely sentiment, but rarely is it realistic—politics is everywhere.

At face value, Hong Kong Exchanges and Clearing's (HKEx's) bid to acquire London Stock Exchange Group (LSEG) made sense: It would create a true follow-the-sun exchange group; HKEx would provide an inbound investment channel for China, while LSEG could position itself as China's outbound channel; they could pick and choose the best platforms to bolster support and to better create economies of scale; and it would expand data revenues—for HKEx, anyway—in an increasingly competitive marketplace.

But politics threw its usual spanner in the works, making HKEx's unsolicited takeover bid a non-starter, with one senior European analyst telling *WatersTechnology*, "It hasn't got a snowball's chance in hell." The UK is dealing with the uncertainty of Brexit, and Hong Kong is struggling with civil unrest and just how autonomous it is from China, as the Chinese Communist Party moves away from the Sino-British Joint Declaration of "one country, two systems." The Hong Kong government is the largest stakeholder in HKEx.

LSEG's board of directors unanimously rejected the proposal in a public statement and letter, stating that the offer had "fundamental flaws" and failed to meet the exchange's "strategic objectives."

For the UK, signing over the keys of a national champion to a foreign entity or government was an unlikely endeavor. In a recent interview on *Bloomberg Television*, Financial Conduct Authority CEO Andrew Bailey said the regulator would impose "a high level of scrutiny" on the deal due to the systemic importance of the exchange.

Hong Kong Exchanges and Clearing

Another aspect involves the range of LSEG assets that would come with the takeover, including not only its exchange business, but also the LCH clearinghouse, Turquoise, its multilateral trading facility, UnaVista, its regulatory reporting platform, and Borsa Italiana. Its link to the European Union would involve another layer of scrutiny from EU counterparts, most notably the European Securities and Markets Authority.

The rejection letter has also dampened HKEx's prospects of landing deals in the future, as the LSEG response questioned the credibility of HKEx's ability to deliver the transaction and implement the cross-border tie-up.

Additionally, even though HKEx is in a unique position because of its ability to connect to the Chinese market, in its rejection letter, LSEG management said, "We value our mutually beneficial partnership with the Shanghai Stock Exchange, which is our preferred and direct channel to access the many opportunities with China." In other words: Thanks, but we're good.

On the surface, this was an M&A move, but behind closed doors, it's a battle of political will. And at the end of the day, it was a fight LSEG wasn't looking for.

As for HKEx, its response made it sound as though it was hurt by LSEG's dismissive rejection.

"The board of HKEx had hoped to enter into a constructive dialogue with the board of LSEG to discuss in detail the merits of its proposal and are disappointed that LSEG has declined to properly engage. In particular, HKEx had hoped to demonstrate why it believes that the benefits of its proposal significantly outweigh those of the proposed acquisition of Refinitiv," the response reads.

The chase will apparently continue: "HKEx continues to believe that its proposal is in the best interests of shareholders, customers and for global capital markets as a whole. HKEx believes that shareholders in LSEG should have the opportunity to analyze in detail both transactions and will continue to engage with them."

Does the snowball have a chance in hell, after all?

Perhaps there's a larger question here. If HKEx doesn't acquire LSEG, this will add to the list of failed deals involving the London exchange group. Deutsche Börse has twice failed to land the exchange, while LSEG was unable to seal a deal to acquire the Toronto Stock Exchange. While everyone likes the idea of a follow-the-sun exchange group, combining massive national exchanges across borders is challenging, if not outright impossible, in today's political climate. And though HKEx previously acquired the London Metal Exchange, LSEG is an order of magnitude more challenging.

One thing is clear: The LSEG–Refinitiv tie-up is back on the table. That, too, is not a sure thing, but at least it doesn't involve legislators and industry experts hemming and hawing about national identities. wt

NEWSDESK

WatersTechnology's roundup of headlines that hit the wire this month from around the industry

QuantConnect Aims for Algo Testing 'League'

Competing for cash incentives

Crowd-sourced algorithmic trading platform QuantConnect is allowing users to compete with each other in search of alpha.

A hedge fund, for example, might want to experiment with a particular dataset. On the QuantConnect platform—its Alpha Streams marketplace—the hedge fund releases the dataset to the community of developers and engineers, and lets them know what they're looking for. From there, the developers try to create the best algorithm to extract value from that data. The hedge fund then licenses what they feel is the best algo. In the end, the developer gets a payoff, and QuantConnect gets a piece of the licensing fee for providing the ecosystem.

The next evolution, according to Jared Broad, QuantConnect's founder and CEO, will be an environment—a league, if you will—where developers can compete against one another for a chance to win actual prizes. In this scenario, it would involve a licensing component and a cash prize. Essentially, the grand plan is a platform where participants can team up or work individually to write and live-trade successful algorithms for cash incentives.

SS&C Advent Embraces AI

Building AI into development

SS&C Advent is making a push to feature more artificial intelligence (AI) and machine learning (ML) technology in its product lines.

Robert Roley, general manager of SS&C Advent, says he wanted to figure out a way to provide more efficient workflows to clients while balancing their comfort level with the technology.

"We're looking at how we can leverage more emerging technology, so I've made it a point that every product track would have a component around artificial intelligence, particularly machine learning," Roley says. "But we also want to get our customers comfortable with the technology, so we were looking for a more transparent way to show them how these insights came about."

The project began a year ago when Roley directed Advent developers to work AI—specifically, machine learning and natural-language processing (NLP)—into their product development plans. So, for example, Advent Tamale uses NLP to read research notes and then automatically tags and categorizes them. The Geneva portfolio and accounting management platform will also be rolling out a feature that uses machine learning to find patterns of exceptions and automatically alerts the appropriate manager.

SG to Offer Clients KYC Service via API

SG aims to address KYC inefficiencies

Societe Generale is planning to open up to clients the KYC offering on its single-dealer SG Markets platform.

"We are currently developing our KYC offer massively into our platform for [our internal users]. We are going to open this offer to our clients by the end of the year," says Alain Fischer, chief digital officer of global banking and investor solutions at Societe Generale.

The KYC process can be painful and complex for banks, Fischer says. Currently, when a bank asks clients to provide KYC documents, they send them an email, and the client replies, attaching the files requested. The bank's digital offering aims to address these inefficiencies by allowing clients to directly upload files to a central platform.

The service will first be made available to corporate clients, followed by financial institutions.

ING Sets Up Fintech Spin-Off for Bond Discovery

ING is spinning out a financial technology arm that will commercially produce its bond discovery platform for asset managers, a year after ending a phase where the bank was testing it out internally. The platform, called Katana, was first produced for use within the bank and launched in 2017. Katana scans the European and UK bond market for possible pairs that have out-of-the-ordinary spreads or behave abnormally. It aims to help bond traders and asset managers find investment opportunities they otherwise could have missed out on.

Bloomberg Advances on Cloud Data Strategy

Bloomberg shifting its entire data estate and commercial offerings to the cloud as part of what it is calling its One Data strategy. Tony McManus, CIO and global business manager of enterprise data at Bloomberg, says the migration process will be done in incremental stages and the company expects to release its first batch of datasets on to the cloud in Q1 2020. Bloomberg also announced on September 12 that its flagship real-time market data feed, B-Pipe, will be rolled out globally through Amazon Web Services (AWS) PrivateLink, in conjunction with this wider strategy.

UBS Explores AI for Trading Functions

UBS is exploring the use of artificial intelligence (AI) to help automate front-office functions. The bank is in the final stages of a proof-of-concept, working with Cloud9, a provider of trader workflow and communication technologies, to develop virtual turrets and offer real-time transcriptions of conversations between traders and clients. The technology will use natural-language processing capabilities to transcribe voice from multiple languages into text.

Lost in Translation

A relatively new role has hit the financial markets that is meant to bridge the gap between data scientists and the business. Wei-Shen Wong examines the role of 'data translator' and how it can help forward a firm's data agenda.

While it was only a few years ago that "data scientist" became a widely accepted job description, in reality, data science has been in practice for the last three decades. The advent of big data and cloud computing, an increasingly competitive marketplace, and the need to uncover new forms of alpha have combined to create lucrative opportunities for data scientists.

A staggering 90% of all data was generated in the last two years, and 2.5 quintillion bytes of data are created every day. This evaluation was made by IBM in 2016 and the tech giant has not updated it since, so that number is likely vastly larger thanks to the Internet of Things and the advent of 5G networks.

The fitness industry, for example, has seen a data explosion. In the past, a runner would only be able to estimate distance traveled. Wearable devices like the Apple Watch or Fitbit record distance, heart rate, and pace, and compare that information to previous runs. Individuals, therefore, become amateur data scientists, examining their own workout performance.

But others care about that information, too. Those metrics can be anonymized, packaged and sold to, say, a hedge fund. It's no secret that both the buy side and sell side are thirsty for alternative datasets as finding an edge is becoming increasingly more difficult. This growing mountain of data is something that can no longer be ignored. The challenge is being able to sift through that data and find actionable insights.

This had led to capital markets firms—such as Vanguard and BNY Mellon—establishing data science teams and hiring data scientists to uncover value in alternative and unstructured data sources. It's no surprise, then, that data scientists are now highly sought after by banks, asset managers, and hedge funds.

However, there is a debate around which characteristics and skills a data scientist should have. Which is more important: domain knowledge of how the business works or excellent mathematical and coding capabilities? This has led to the creation of the role of data translator, someone who can bridge the gap between domain knowledge and mathematical skills.

Paul Cobban, chief data and transformation officer at DBS Bank, notes that while the Singaporean bank is growing its team of data scientists, it is also hiring and training internal staff to become data translators.

Data translators, according to Cobban, are not data scientists, but should know enough about data analytics to under-

stand what data scientists talk about. "They are also anchored in the business, so they can translate data science concepts to the business, and vice versa. This is a big focus for us, and we want many of our people to become data translators," he says.

Cobban explains that without help, data scientists are spending 90% of their time doing things other people can do, like cleaning the data.

While this role is less known compared with the data scientist role, it is gaining traction. Consulting firm McKinsey has predicted that demand for translators in the US alone may reach 2 million to 4 million workers by 2026. It said in a report that translators play a critical role in bridging the technical expertise of data engineers and data scientists with the operational expertise of marketing, supply chain, manufacturing, risk, and other frontline managers.

Two Camps

While the term "data translator" is new, some view it as an evolution of a more familiar function. "We used to call this the business analyst," says Richard Harmon, managing director of financial services at Cloudera, a firm providing enterprise data in the cloud.

Harmon, who has experience working at firms like BlackRock, JP Morgan, and Citibank, adds that this role is critical, depending on the structure of the data science team. Mainly, when there's a centralized data science team, like how many banks have set up "centers of excellence," the data translator role becomes important so as to not create an echo chamber in that centralized unit.

In a center of excellence, there is typically a core team with all the various skills sets—such as a data engineer, data scientist, programmer, developer, and architect—that supports the different lines of businesses including retail, corporate, enterprise risk, and institutional banking.

"So the function of the data translator here is critical because this team, or a group of individuals, is very agile," Harmon explains. "It's a very project-oriented sort of structure and the role of that data translator becomes hugely important because these individuals tend to have very limited domain knowledge of a particular business unless they've been actually supporting that business for a good period of time."

> "Good translators are critical to the development and execution of high-potential business cases for analytics, AI and data science."
> **Colleen Ruane, SEI Investment Management Services**

There is another model, where the data science teams are embedded directly into the business, which is often seen on the buy side. Here, a data translator is not as often needed—or it's a different role, at minimum.

"The embedded data science team potentially will have a data translator in it, but it's not quite as critical because effectively everyone on that team starts to develop domain expertise," he adds.

Investment vs. Output

Team structure aside, there is no doubt that the translator's role is becoming more necessary as companies continue to invest in analytics, data science and innovation. Because it is new, much like how the role of a chief data officer has evolved, so too will that of a data translator. So for now, the key is to deliver value to the business, Colleen Ruane, director of analytics at SEI Investment Manager Services tells *WatersTechnology*.

"Good translators are critical to the development and execution of high-potential business cases for analytics, artificial intelligence (AI) and data science," she says. "While the financial services industry may have identified a need for people to play this role, there are not enough translators out there. The combination of technical, analytical, and communication skills, along with relevant business experience, is difficult to find."

Idris Drief, data product architect at MUFG Investor Services, which is based in Toronto, believes translators should be savvy data scientists. "By necessity, the need for data translators will become more common as data continues to play an integral part in keeping organizations competitive and responsive to changing regulatory and market conditions," he says.

Bill Gartland
Broadridge

Richard Harmon
Cloudera

Data translators should be responsible for ensuring the data is clean before handing it over to the data scientist. They are also expected to know data structures, and to assist with the formulation of business strategies. The end goal is to provide value to the business, but the data comes first and the translation thereafter.

But it raises the question: without understanding the business that the data is used for, is it possible to effectively handle, cleanse and structure the data? Bill Gartland, vice president of fixed income data and analytics at Broadridge, says this is where that unique skill set comes in, making a translator more than a scientist or analyst.

"In our industry, this means being able to explain bond market concepts to the data science team and helping traders and portfolio managers understand how to interpret the results from this new breed of models. Using AI to guide trading decisions is a high-stakes approach. Simply trusting a black box model is not acceptable," he says.

Meanwhile, Drief says beyond prepping, validating, and cleansing data, translators should help shape business strategy. Their proposals should be backed up with quantitative and empirical evidence.

> "Some things are simply impractical to implement, and part of the data translator's role is surfacing achievable change."
> **Idris Drief, MUFG Investor Services**

"Data scientists can use sophisticated AI-driven techniques to help identify patterns and correlate behavior with outcomes, but for this analysis to truly become actionable, the data translator must not only be able to recognize a true opportunity from a false one, but also understand which levers can be pulled to actualize a desired result. Some things are simply impractical to implement, and part of the data translator's role is surfacing achievable change," he explains.

Domain knowledge also extends beyond understanding bond day counts, reset rates, overnight indexed swap discounting, and value-at-risk measurements. Apart from that, translators should also be well-versed in the various data formats.

Sean Byrnes
Outlier

Jay Wolstenholme, a senior principal in the capital markets group at Finastra, says good knowledge of both areas is key to translate effectively.

"This includes one-to-N [or many] data structures, meta data, unions, arrays, and data cubes, to name a few," he adds.

The types of data used today are also very different from what it was even five years ago. Enter the world of alternative data that does not reside in a bank. These datasets include, among others, satellite imagery, climate change data, geopolitical data, and social media text analysis.

"It's not just understanding what data resides in the firm and the business requirements," Harmon says. "Ideally, a data translator will also understand what data is available on the outside too."

He points to Deutsche Bank's innovation group, DIG. It launched its first product α-DIG (pronounced "Alpha-DIG"), a web-based platform that uses machine-learning techniques and natural-language processing to quantify the value of non-financial information. α-DIG collects information from patent news, product announcements, litigation, and regulatory documents to quantify intangible information, such as brand value, corporate culture, management quality, innovation, sustainability issues as well as regulatory and litigation risks.

"It's really about integrating different types of data from different sources. This is where you build more accurate models and provide a better place to measure customer behavior—be it institutional or retail," Cloudera's Harmon adds.

Are all these qualities and characteristics too much to ask of a data translator?

Focus on Impact

The lack of people who have all the boxes ticked is exactly why Singapore's DBS has taken it upon itself to train existing staff.

In a blog post, DBS has highlighted one of its analytics translators, Brandon Ho, a Hong Konger currently working for the bank at its Singapore headquarters.

In the post tagged under its Humans of DBS series, DBS compares Ho's ability to interpret data to how a professor would interpret Shakespearean prose. Ho's "stories"—his analysis of data—is

shared with his colleagues at the bank, and leads to informed decisions and business impact.

"Much analytic work stays at the theory level. I focus on business impact," Ho explained in the post.

As a project manager and data analytics translator, Ho makes the call on what the analytics priorities and strategy of the project should be. He also looks at how machine learning and advanced analytics can be applied to each project.

His key takeaway for aspiring data translators is that data analytics can create impact. "Impact is what all businesses should focus on," he said.

Again, though, the data translator role is new and some are waiting to fully embrace the term as an actual position with the organization. MUFG, for example, does not have an official data translator role, but Drief says it has individuals that are performing this function within the organization. He says each of MUFG's functions—from the middle office, client operations, investor operations, and product development, on down to finance and human resources—has at least one person it can rely on for its data and business translation, reporting and analytics expertise.

Still, he says it's difficult to provide examples of how translators would work with the data scientists and business managers.

"Hypothetically, if a data scientist has devised a model that looks at global macro market conditions and fund manager/investor sentiment, this could help predict shifts in fund strategy/asset allocation and the prevailing fee pool available to fund admins. Let's assume that the results forecast reduced single manager fund activity, but increased private equity/debt business. The data scientist can demonstrate these correlations, but cannot necessarily translate them into actions. The data translator is then in position to communicate the message in terms that the business can get behind, because they are not only able to comprehend the analysis, but convert that into a business case for change," he says.

These decisions could be in hiring individuals with private equity or private debt expertise, investing in new technology or platforms, or scaling operations up or down geographically to better serve clients, Drief adds.

> "In our industry, this means being able to explain bond market concepts to the data science team and helping traders and portfolio managers understand how to interpret the results from this new breed of models."
> **Bill Gartland, Broadridge**

SEI, on the other hand, uses translators, but generally, has them work in more traditional product management and business analyst roles within its analytics team. "Those translators are critical to our definition of new use cases and applications as we build our analytics program," Ruane says.

The projects SEI's translators work on range from traditional business intelligence to predictive modeling to natural language processing and text mining.

Although the industry currently lacks data translators, there could soon be new blood that fit the bill.

Ruane says the growth in data science and business analytics advanced degree programs in the last five to 10 years should produce an increase in the number of people entering the workforce that have a good foundation for future translator roles, which backs up what the McKinsey report predicts.

That said, some sources say this role could be fulfilled by artificial intelligence instead of a physically present human.

Deep-er Minds

The reality is that not many companies have the capacity to hire data scientists and data translators to scale their efforts in the hunt for value-added insights and, hence, alpha.

"AI platforms allow team members with all different profiles—whether they code or not—to work on advanced AI projects together, so that there is no need to hire a 'data translator,'" says Florian Douetteau, CEO and founder of Daitaku, a company offering a collaborative data science software platform.

Florian Douetteau
Daitaku

Tools like what Daitaku offers help companies scale their AI efforts by easing the process of connecting to data, cleaning and wrangling, modeling, deploying to production and, more importantly, monitoring those AI systems.

Sean Byrnes, CEO of Outlier, a company that automates business analysis, agrees that financial institutions can use AI as the data translator. "AI does not require clean data, and can inform both the business leads and the scientists as to what is happening within the data that impacts the business and requires immediate attention," he says.

Outlier uses several ML techniques such as modeling and clustering, but does not use neural networks and deep learning because they are largely unexplainable black boxes. "It's the comprehension part of understanding what's going on in Outlier's systems and the ability to show its work and tell you how it found an insight and why it's important to you. Users of Outlier can understand what happened to form that insight rather than just trusting the AI," he adds.

Outlier is active in the retail and e-commerce segments, but is looking to expand beyond that.

Whether this role is taken up by a human or AI, ultimately depends on the particular project and the scale. Although translators are scarce among financial services, the burden on them, and what they're supposed to be capable of, continues to grow. Some tackle the lack of this role by training internal staff. Others could turn to enterprise AI platforms to help their data scientists work better.

> "AI platforms allow team members with all different profiles—whether they code or not—to work on advanced AI projects together, so that there is no need to hire a 'data translator."
> **Florian Douetteau, Daitaku**

The more important question here is this: Is your data lost in translation? wt

UBS Asset Management's QED team is technically only 19 months old, but the seeds for this unit date back many more years inside the institution. Bryan Cross and Barry Gill explain the thinking behind the group, where it's been successful, and where it has faltered. By Anthony Malakian with photos by Timothy Fadek

Bryan Cross grew up

about an hour northwest of Chicago in the suburban town of Barrington, Illinois. His father would sometimes bring home six copies of that day's *New York Times* crossword puzzle—one each for Bryan, his mom, dad, and three siblings: Will, Molly, and Anne—and it would be a race to see who could finish the fastest.

To this day, Cross still has a love for crosswords, but the experience also helped to inform his thinking for what would become UBS Asset Management's Quantitative Evidence and Data Science (QED) unit. When it comes to QED staff, Cross believes in the concept of a liberal arts engineer: someone with intellectual flexibility—someone who is curious and competitive, but who can also work within the constructs of a team.

"Really good engineers like to deconstruct problems, and they're able to recognize threads in that deconstruction that are similar to problems they've seen before elsewhere. They can then convert those deconstructed problems into business solutions that leverage that cross-domain expertise," he says. "Much in the same way that you do a crossword, you say, 'Oh, I've seen that pun before,' or, 'I've seen that type of clue before,' or you've seen something related to it. You can then quickly pull that and search your database and find the solution for it."

QED is UBS Asset Management's foray into incorporating quant and data science principles into the traditional fundamental investment process. The internal group is a cross-asset effort that works alongside analysts, traders and portfolio managers across asset management and UBS O'Connor, the bank's multi-strategy hedge fund. It uses artificial intelligence (AI)—from machine learning to deep learning, with a heavy emphasis on natural-language processing—to solve bespoke problems, and sources alternative datasets to drive excess returns for investors.

Since the group's official formation in March 2018, there have been some rough patches, but QED is now starting to find its form. Users of QED come to the group for help—products range from dashboards to web apps to email alerts, to more proactive and ambitious projects that help to analyze, say, the iBuyer market, or using disease modeling to decipher fads and trends in the fitness industry.

The aim is to be creative, curious and have some intellectual flexibility in order to create unique solutions to complex problems. But as with any new creation, there have been lessons learned along the way.

Crossing the Line

Bryan Cross

Infection Rates & Workout Equipment

When you listen to Cross talk about QED, it sounds like he's describing a fintech startup that's ready to launch a Series A round of funding, rather than something that's been nurtured inside one of the largest asset managers in the world. He calls his colleagues inside of Asset Management—from analysts to investors to portfolio managers—clients. He uses a derivative of the now-common SaaS-tech delivery model: quant-and-data-science-as-a-service. There's an earnestness in his voice similar to that of a startup CEO. He talks about the need to grow adoption among users. He knows that mistakes have been made—lessons are always meant to be learned when creating something completely new. He can see the problems that analysts and portfolio managers face, he knows QED can help, and he knows they have to walk before they can run.

"It was a startup within the organization. Nothing like this had ever been done. There was no blueprint," he says. "The compliance aspect wasn't set up. The vendor management wasn't set up. Even the basics of, 'OK, what do we do now?' weren't set up. So it was really exciting to put pen to paper and come up with the strategy for how we would attack this problem: how we think about driving adoption, our ultimate goals, and what are our key performance indicators."

One example of how QED works revolves around the iBuyer market, a new term used to describe online real estate companies such as Zillow, which changed its strategy from online advertising to being a marketplace for buying and selling homes. For the QED team, the big investment question was whether companies like Zillow—and others entering the market—would be able to ramp up this business as fast as they said they could. How is an individual company doing? Can that be measured relative to their plan? Relative to others in the market?

QED proactively sourced an alternative dataset from a vendor, combined that with an S-curve model—a statistical model for the adoption rate of innovations—to provide internal users with a probability estimate as to whether or not the company would hit its long-term guidance, which can be used as a measure of long-term fundamental health.

Another use case was for the fitness industry. An analyst had asked the QED team about a particular company in the space, which inspired them to think about fads and trends, which in turn led them to think about how disease modeling could potentially be used as an analysis tool. As Cross puts it, there is a period of time where you "convert" susceptible people (this is your technology acceptance model, or TAM) into infected people (the actual users of the technology). Many of those infected people then recover (this is your churn).

QED applied that to an unnamed fitness company where they could look back at other historical fitness trends and use data—from both public and private sources—from those trends to model the "infection" rate that occurred in the historical base classes, and then apply that to the current model to come up with a forecast for user growth for that particular current model.

"I've never read a sell-side report that looks at disease models as a proxy for fads," Cross says. "I think that as a general observation about QED—and this goes back to the idea of liberal arts engineering—we're really good at recognizing analogous situations across domains. That's the value-add that we bring. We're students of everything; we're intellectually curious about everything. Someone from the team can read an article about modeling the spread of bird flu using a set of differential equations, and then she can realize that's directly analogous to fitness trends, or adoption rates of streaming providers. From there, we can build something that works, is explainable, is sophisticated, and is better than guessing."

Cross says sometimes users come to them with challenges, and sometimes

they think of something and push it out to users. The key is using quant and data science principles to find innovative solutions. But sometimes, the process can be challenging.

If at First You Don't Succeed

Barry Gill describes himself as such: "I am Irish. This is my 25th year at UBS. And I'm a dyed-in-the-wool stocks and markets guy."

Today, Gill is the head of Active Equities at UBS Asset Management. There has traditionally been a line drawn between fundamental investing and quantitative investing, but as passive investing has cut into active's inflows and returns, there has been a merging of the two—which gave birth to the portmanteau "quantamental."

To delineate between active and passive, in early 2015, UBS bucketed the fundamentally oriented managers into the active group, where they manage about $80 billion of external client assets. Gill acknowledges that the delineation may have happened for his benefit, because while he had the fundamental side of investing nailed down, the passive world was a bit outside of his grasp. Since 2015, though, this delineation has become a common framework across Wall Street.

In 2010, Gill hired Cross, who was then working on the investment bank's quant trading team, to join the bank's prop desk, which would later become O'Connor due to the Volcker Rule. As Gill recalls, quants were effectively eating part of the fundamental team's excess returns and he wanted to figure out how to bring that quant piece into their investment process.

"The primary reason I hired Bryan was because my hiring policy over time has always been to offset weaknesses that I have, or find gaps in our opportunity set, and plug those gaps," Gill says. "That makes for a much stronger team. So I hired Bryan as the guy with the quantitative horsepower."

For Cross, the move made sense because he "had no idea how to pick

stocks," as he puts it. "The deal I made with Barry [who was running the investment bank's prop desk at the time] was that I'd teach him everything he'd want to know about quant, and he would teach me how to pick stocks."

In many ways, the seeds for QED were planted, but germination took some time.

Gill says that this initial merging of quant and fundamental did not work as he'd hoped.

"It didn't work for two reasons. On one hand, I think Bryan was more keen, at that time, on learning the fundamental skillset and arming himself that way, and I needed new ideas so I let that happen, so we were never able to embed the quant perspective," Gill says.

There was a concerted effort to map Gill's framework for investing into various screens and tools to help the group to identify stocks more effectively, but he says it was like speaking into a translation device—the words would come out, but the sentences didn't make any sense.

"I—even though I knew this was important—could not adapt my workflow," Gill admits. "I've always run deeply fundamental, deeply researched, highly concentrated portfolios, and while I wanted the skillset, and recognized its importance, and recognized it could improve our risk-adjusted return, I couldn't execute on it.

> "The primary reason I hired Bryan was because my hiring policy over time has always been to offset weaknesses that I have, or find gaps in our opportunity set, and plug those gaps." Barry Gill, UBS

By the time 2015 rolled around, and Gill was asked to run Active Equities, he decided to try again.

"So I failed once at this in that regard," he says. "When I came over and was asked to run Active Equities, I did the same thing—I thought, 'Hey, I need somebody who has quant skillsets,' and I needed an organizational insider because I was coming from the hedge fund unit to run a long-only business. The guy who became my deputy, Ian McIntosh, was already heavily quantitative in nature because I wanted to keep this alive."

Active Equities has three multi-year strategic objectives, Gill says. One of them is to increase both the quality and quantity of the excess returns that the group generates for clients. The second is to add value to clients above and beyond returns. The third is to reengineer the research process so that it would enable the first point.

"QED is the beachhead in the reengineering of research process," Gill says.

Taking Off

In late 2016, Dawn Fitzpatrick, who was the head of UBS Asset Management's global equities division and O'Connor, hired Cross to run systematic research for the asset manager. While at O'Connor, Cross worked with Fitzpatrick to develop a quantitative project called Behavioral Analytics, which was used to measure some of the behavioral biases embedded within the hedge fund's portfolio managers.

When Cross moved to UBS Asset Management, it was part of a reorganization of efforts where the systematic research and quantitative

portfolio management teams moved from being an independent vertical within Asset Management's investment platform, to being part of the passive team to, in part, help bolster smart beta strategies. Cross says after the reorganization, the mandate for the systematic research team went from being the alpha manufacturer for the quantitative equity portfolio strategies, to also having responsibility for building up the proprietary smart beta business, as well as building "the future of quant," which was meant to drive quant into the rest of the firm.

After Fitzpatrick left UBS to become CIO of Soros Fund Management in 2017, Suni Harford, who had spent the previous 24 years at Citigroup, came in and, as Cross recalls, she realized the need for a centralized quant and data science capability that would be available to all of UBS Asset Management's investment professionals, and not just the quant team.

Cross and Gill had been having regular conversations about doing something like this, and they put together a pitch. It didn't take much to greenlight the project. QED was officially launched in March 2018 with a team of four people.

"It was such a large opportunity—and still is—in the marketplace. When you think about the assets in the traditional fundamental active sleeve, this is a very, very large pie and there's very little quant and data science in that pie, so the opportunity is huge," Cross says.

While QED is a cross-asset endeavor—and not just the domain of Active Equities, Gill says the point of QED is to do what quant and data are super powerful at: driving efficiency and scaling into anything.

"The future of active equity investing is delivering large amounts of idiosyncratic excess return—or alpha, however you want to call it—to our clients. The way to do that is by concentrating your portfolio more. When you concentrate more, you're taking more single-stock risk, and portfolio construction matters more. Since you're taking more single-stock risk, you need to underwrite each of those ideas in a much more scientific manner than you've been doing in the past. You need to understand the interactions between those securities. The challenge is that you still need to find the great idea," Gill says. "So QED will help us to drive efficiency into the looking-under-rocks process, and then it will help us to drive accuracy and drive up the confidence interval when we actually make the investments."

Imitation Game

As a Christmas gift, Cross' wife, Samantha—"We met at UBS; she was in the graduate trainee program a year behind me. I made her do math problems as part of training, so she didn't really like me at that point in our lives."—got two tickets to the 20th Annual Crossword Puzzle Contest in Westport, Connecticut, which is run by Will Shortz, the famed crossword puzzle creator and editor for the *New York Times*.

Bryan did very well on the first two puzzles—an unpublished Monday puzzle, then a Tuesday, then a Wednesday, and so on, advancing in difficulty, with the fastest three times moving on to the finals—but he was tripped up on a question he felt he should have had: "Help for a star witness? Telescope," he recalls, ruefully.

Sometimes, the information just doesn't make sense in the moment. This is true with crossword puzzles, and it's also true with alternative data—as many individuals are learning across the world of finance.

Cross says one of the biggest mistakes made early on was experimenting with alternative datasets that more or less sucked up time, energy and expenses. They would spend a lot of time testing datasets. If your standards are high—as they should be—the probability of finding something that's robust is low; you want to find the "special stuff" but so, too, does everyone else purchasing these datasets. And when they did find something that they thought would truly be a value-add, they would struggle to convert that into user engagement.

"We assumed this burgeoning alt data world was going to be a gold mine of potential alpha opportunity," he says. "If we were able to create golden alpha opportunities from that mine, then that was going to convert into user engagement, which is what we wanted to do—we needed to be able to drive traditional investors to use quant and data science as part of their investment process. We found both of those assumptions to not be true."

As Gill notes, QED was set up, in part, to find alpha-generating signals available to UBS AM that it is not currently ingesting. When it comes to markets and stock picking, he says, the beauty of crisis is that you're always looking at the signals that come out of interactions—or the lack of signals—and try to figure out what's happening, but you don't want to suppress that market. This creates unique challenges, in and of itself.

"What we learned is that data is very expensive, that alt data was likely in a little bit of bubble, and that where the data was highly accurate was a very narrow part of the overall investment landscape (i.e., consumer discretionary in the US)," Gill says. "Just getting the data for people, and telling them there was alpha there, wasn't proving a really winning strategy in changing behavior."

> "I think so far we've focused on the coefficient of innovation, and building new products and new techniques. I think on a go-forward basis, we're really going to have to focus on that coefficient of imitation."
> **Bryan Cross**

Which brings up another—and more important—challenge for QED: Just because you build it, it doesn't mean they will necessarily come. From four full-time staffers, QED has expanded—Cross declined to give an exact headcount, but he says the New York team has grown, they've recently added resources in Singapore, and by the end of this year they will add resources in Europe, too, which will get QED closer in alignment with the footprint of assets for UBS Asset Management.

But the key for the unit will be growing user engagement, now that it's finding its footing. Gill says that once QED starts finding patterns in the data, they will bring it in, put their own user interface on top, make it accessible to the masses, and then "market the heck" out of it internally.

"It's slow, hard, work. I wanted to do this, and I couldn't change," Gill says. "There are a lot of people who don't want to do this, so how are they going to respond? What we're trying to do is be available as much as possible. Sometimes we need to solve bespoke [problems] for them. And we need to build this body of work up through engagement with them. … I think there will be a point where the penny drops, or there will be a winning hit, or maybe it will just be an accumulation of minor interactions that eventually changes the behavior."

Cross puts it slightly differently. The Bass model, developed by Frank Bass, an academic in the field of marketing research and science, follows an S-curve and is a way to describe "permanent" technologies—think phones, microwave ovens, computers—and how a particular technology spreads into the mainstream.

If you decompose that model into the parameters that drive how fast those adoption rates happen, Cross says, it decomposes into two things. The first is the coefficient of innovation, akin to asking how "cool" is the thing you're doing? The second one is the coefficient of imitation, which is, is your neighbor using it, what's the word on the street, what's the value-add?

"I think so far we've focused on the coefficient of innovation, and building new products and new techniques. I think going forward, we're really going to have to focus on that coefficient of imitation," Cross says. "This is understanding who our internal clients are, who are the early adopters, who do they physically sit next to, and then develop targeted strategies to drive adoption to those folks. I think the future of QED will go down that pipe. I wouldn't be surprised if in a couple of years we have analysts that are doing the full investment funnel, from the idea discovery phase to the idea recommendation phase." wt

Old Dogs, New Tricks

As much as startups deliver in terms of innovation and excitement, they often lack in real-world industry experience. But a growing cadre of industry veterans—many former senior executives at major fintech and data companies—are bringing their experience to the startup world to help accelerate the next wave of innovation. Max Bowie speaks to some 'old dogs' now teaching others 'new tricks.'

Larry Ng has done pretty much everything. He's been a microprocessor designer at IBM, a marketing executive at CBS Records, a capital markets consultant specializing in risk models and options valuations, a trader on an arbitrage desk at Merrill Lynch, and co-founded Tradeweb, Moneyline Telerate (through Moneyline's acquisition of Telerate), and MarketAxess, then held senior roles at Reuters, Wall Street Systems, and Ion Trading.

Meanwhile, former Multex co-founder Jim Tousignant has just raised $5.1 million in new funding for startup FinTech Studios, which uses artificial intelligence (AI) to analyze news and connect events and people to deliver greater insight across the investment research process. Over an almost 40-year career in technology before serving as CEO of FinTech Studios, Tousignant has served in various roles at Multex (before and after its acquisition by—and spinoff from—ADP), Morgan Stanley, Thomson Financial, and Scivantage, among others.

Both believe they've found compelling solutions for the modern investor: Ng believes MarketDesk offers a true way to disrupt the provision of market data using the cloud, enabling anyone to access content from institutional data sources, while Tousignant says FinTech Studios is "Google for financial services," creating deep linkages between information that would be hard to track manually.

Though Ng and Tousignant stand out as being high-profile industry figures willingly returning to the coalface, it's not unheard of for seasoned execs to take jobs at startups. Indeed, many place a high value on their years of experience.

Ed Guy, managing partner at Nationstaff, a recruiter specializing in the financial and fintech spaces, says experienced execs with an inquiring mind, who know how to dissect a problem, and who can motivate staff and build teams, are always in demand among startups. "You can build a great product, but you sometimes need that person who knows whether a trader will actually use it," he says.

In addition, a well-known, experienced hand on deck—if not on the wheel—often opens doors that may be closed to complete newcomers, or at least makes them easier to open.

"Startups often want someone who can break them into an established business … and finance is such a niche that

sometimes you need that established 'name' who can open those doors," Guy adds.

Indeed, the presence of such a "name" can help separate the wheat from the chaff in a crowded fintech marketplace, says a data manager at a major investment bank.

"If some fintech company knocks on my door with a great idea, I can't tell how good it is. … I'd need to do an evaluation. But if a trusted person is putting their imprint on that, it goes a long way to getting my respect," the data manager says. "Generally, if the person has credibility and is a known quantity, it helps mitigate the unknown quantity exceptionally."

This is the case for FinTech Studios, which enlisted industry veteran Gerry Mintz as an advisory board member at the start of this year. Mintz, who has held senior roles at Telerate, Thomson Financial, and Fame Information Services (where he was chairman and CEO), and Reuters, now runs his own advisory firm, Percepta Partners, focusing on product and market strategy for software companies. In this capacity, he has also held similar advisory board roles at Prattle, Quandl, Investment Metrics, and FTEN.

At Fintech Studios, Mintz has leveraged the relationships and credibility built over almost 35 years in the industry to introduce the vendor to potential clients.

Dealmakers

Notably, all the aforementioned companies that Mintz advised were quickly acquired—Quandl and FTEN by Nasdaq, and Prattle by Liquidnet. So when it comes to fundraising or M&A activity, an experienced hand can help guide a nervous vessel through murky and treacherous waters filled with venture capital sharks. Most of the individuals spoken to for this story have been directly involved in raising funds and buying or selling companies, and can bring that experience to bear for those still new to the game. In some cases, this can be spotting the right opportunity, negotiating, or—as Mintz puts it—"cleaning up" a company to make it more appealing to buyers.

> "If some fintech company knocks on my door with a great idea, I can't tell how good it is...I'd need to do an evaluation. But if a trusted person is putting their imprint on that, it goes a long way to getting my respect." Data Manager at a Tier-1 Investment Bank

"In terms of fundraising, corporate development and value creation, I've sold six companies now, so I know what people are looking for and where I can bring value," says Dale Richards.

Richards has held senior roles at Interactive Data, Reuters, and Algorithmics in the 1980s and '90s before selling his data startup Benton Associates to Fame Information Services, where he served as president and CEO. He then continued on as president of enterprise data management at SunGard following its 2004 acquisition of Fame. Richards now serves as managing director of Island 20 Ventures, a Toronto-based corporate development advisory firm, where he sits on the boards of data and trading technology-focused startups and growth-stage companies, including RoZetta Technology, Eagle Alpha, and Tick Trade Systems, among others.

One of the additional benefits of having fingers in so many pies is the ability to connect companies and executives that would work well together, and being able to spot those opportunities for cross-pollination, Richards says. It was Ng's experience and connections that made him valuable to Warburg Pincus when it placed him at Wall Street Systems. And in fact, without Ng's extensive connections, he might not have got involved in MarketDesk. The company is the brainchild of Brice Hamon, former CIO for Icap's EBS currency broking business, who served as CTO of Telerate alongside Ng, and who has himself held technical roles in the fintech industry since 1992.

But the benefits of experience don't just end with dealmaking and matchmaking. Much of a veteran's experience is put to use on day-in, day-out management and strategy. Brian Hunt, chief administrative officer at Cloud9 Technologies, who previously considered becoming a consultant to help others benefit from his years of experience at Tradeweb and Thomson Reuters before being lured back to the game by Cloud9, concurs.

Larry Ng
MarketDesk

Jim Tousignant
FinTech Studios

Andy Brown
Sand Hill East

"At a senior level," he says, "you narrow the odds of making mistakes due to experience. Experienced execs have very likely gotten things wrong in the past on someone else's dime and hopefully learned from it. And they have connections—to money, and to others that they can ask for advice."

Mintz also notes that those previous senior roles were essentially the training grounds for people exploiting those years of knowledge today. "In bigger companies, you gain a lot of experience of scale, managing people in geographically diverse locations, getting product built, and communicating clearly. You learn, you make mistakes—stuff you can't learn from reading a book. And you learn how to get things done," he says.

That learning process can take an entire career, and requires ambition and mobility, as well as vision and a desire to apply those skills as you go, says Andy Brown, former CTO of UBS—who also held senior technology roles at Bank of America, Credit Suisse, and Merrill Lynch among others—and is now CEO of technology advisory firm Sand Hill East, where he counsels numerous tech startups. Brown also serves as CTO in residence at startup incubator FinTech Innovation Lab, where he spends a lot of time helping tech startups led by founders without a background in finance to understand the challenges of the financial markets and figure out how their inventions could be used on Wall Street.

"After being a good programmer, you learn to hire good programmers, then you become a good designer and architect and figure out how processes work and interact with each other, and how operations work. You have to also be interested in people and the business," he says.

Tools of the Trade

Like Brown, almost all the execs in this article started out in technical roles, then grew into other operational and management positions, using their

"Some are in it for the money, but generally, it's a desire to change and innovate. Generally, these are people who see something inefficient and want to improve it, or who see an opportunity to deliver something new to the market." **Brian Hunt, Cloud9 Technologies**

understanding of technology not as an end-result, but as an enabler.

Island 20 Ventures' Richards, for example, began his career as a database programmer, which he says means he's still likely to delve into the weeds of how things work. "I really like building stuff … so things like product and company strategy—that's like candy to me," he says.

Advising on technology issues means understanding and keeping abreast of technology issues, which requires not just being able to teach based on experience, but to be willing to constantly learn and absorb new things.

"To be valuable as an advisor, you have to stay current—and if you're good, then you want to stay current," Mintz says. "One element of this is just raw interest: I've always been interested in technology. I love reading and learning about it. I started out as an engineer and software developer. So while I may not be able to sit down today and write a program, give me a month and I'd be able to. But essentially, I don't have to be able to use a particular toolset, so long as I understand how it can be used."

Dale Richards
Island 20 Ventures

In fact, the ability and willingness to learn is critical to success, Tousignant says. "If you're not keeping up with the right stuff, you become obsolete. If you don't understand it, you'll miss opportunities, because you can't see potential places to make sales. ... You need to have a passion for constant learning and innovation. You have to re-tool yourself all the time, by constantly talking to customers every day about their challenges."

It was exactly this approach that led to the rebirth of Multex. In its first iteration, Tousignant was vice president of sales and marketing, and kept that role when ADP acquired the vendor to become its advanced development group. Tousignant was supporting the sales team and bringing in new accounts, constantly talking to clients.

One day, an investment bank client asked him whether the Multex business supported investment research. Tousignant responded, "What's investment research?" The bank was spending more than $1 billion on everything research-related, including mailing its research reports to buy-side clients daily, and wanted a way to automate the process. After four years as part of ADP, Multex.com was reborn as a research platform that would

eventually be acquired by Reuters. The key lesson: automate everything, Tousignant says.

It Takes a Village

It's one thing to set direction for a company as part of management, but those who serve as independent advisors and board members must sometimes walk a fine line with management.

Sand Hill East's Brown, for example, doesn't just show up for board meetings or wait for a phone call; his role is one of constantly challenging and guiding, and, crucially, transferring knowledge rather than giving answers. The relationship must always be "collegiate, collaborative, and constructive," he says.

Even those with star power must act as part of an ensemble cast rather than stealing the scene. "When I was at Quandl, I would sometimes go to client meetings. The company would exploit my experience and knowledge of the marketplace. Sometimes it's just to support management, sometimes supporting the board, and sometimes I would act as a fully fledged member of the executive team," Richards says. But he stresses that his interest is in helping others accelerate their companies, not to get back into running one himself. "What I try to create is an environment where people understand that I'm here to help, not to take over."

Cloud 9's Hunt says experienced execs can play the role of a pinch hitter. "I can put together the basic infrastructure and help support the business, be a key player on the management team, and understand where the organization is going—and bring in the right people and incentivize them correctly to achieve the company vision," Hunt says.

But he also says it's important to have the right mix of resources—experienced vision and leadership to set the tone and direction, alongside the creative, young energy often responsible for starting a company, with flexible resources, such as partnering with third-party providers.

However, when constructing a management team or a board of directors, it's important to ensure that individuals' skillsets are complementary and cover any gaps that others might have in their experience, adds Mintz.

> "Large corporations are far more complicated interpersonally than smaller ones. At a startup, it's a 'Three Musketeers' mentality—one for all and all for one." Anthony Schiavo, TruMid Technologies

"The different skills and approaches that people bring to the table is important—from sales skills to people management and technical skills. And the right mix can help an entrepreneur figure out what to do," Mintz says, adding that it's also key to find the right people at the right time, and match skills to a company's needs at a specific point on its growth curve.

Bill Haney was one such "right person at the right time" for startup bond consensus rating service Credit Benchmark when the company needed a new CEO, having already run businesses ranging from pre-revenue startups to mid-size tech companies and divisions of large vendors. Of course, it helped that he had already worked with chairman Donal Smith at Thomson Financial and at Bisam before its sale to FactSet. This kind of pre-existing trust, and a track record of working together, can remove some of the friction that experienced execs sometimes encounter when trying to shoehorn an entrepreneur's dreams into a capital markets business model.

"Doing that with people you know and trust takes a lot of the pain out of that," Haney says. And doing it—being an agent of change—at a startup rather than a long-established business avoids having to deal with a lot of old platforms and management expectations. "At a startup, you can create challenges, rather than inherit problems."

Common Traits

Between them, the individuals quoted in this article have about 250 years of industry experience. But two things that all these individuals have in common are a desire to learn as much as to teach others, and a genuine love of what they do. Engineer or strategist, these people thrive in an environment that allows them to create new things.

Gerry Mintz
Percepta Partners

"Some are in it for the money, but generally, it's a desire to change and innovate. Generally, these are people who see something inefficient and want to improve it, or who see an opportunity to deliver something new to the market," Hunt says.

For others, the benefits aren't monetary. "It's a two-way street. You benefit from being close to these innovators, and you can also help them. I like building product, and I like working with entrepreneurs, especially those doing technology-based innovation," Mintz says.

In some cases, startups provide the environment they need to succeed, where other companies may hinder or stifle innovation. "Big organizations spent their time managing what they've already put in place rather than innovating and doing new things," Tousignant says. "I love startups. It's a passion. I love building and creating stuff. I love the process of building something out of nothing."

In fact, some are drawn to startups because large organizations can be "claustrophobic" for those who want freedom to innovate and experiment, says Anthony Schiavo, CEO of TruMid Technologies. Schiavo previously held

> "At a startup, you can create challenges, rather than inherit problems." Bill Haney, Credit Benchmark

Bill Haney
Credit Benchmark

senior technology roles at TrueEx Group, Citigroup, RBC Capital Markets, Merrill Lynch, and Swiss Bank Corp.

"I had so many experimental and cultural ideas that I had to keep climbing within organizations to implement them, but that took me further away from technology, where my passions lie. So over time, I found myself looking for smaller roles with larger remits, which you find at startups," he says. "Large corporations are far more complicated interpersonally than smaller ones. At a startup, it's a 'Three Musketeers' mentality—one for all and all for one." wt

Unlocking the Value of Synthetic Data

The integration of synthetic data is not a new practice in the tech world. But the proliferation of sophisticated technologies and complex algorithms has established its use as a crucial step in development stages at investment banks.
By Josephine Gallagher

Synthetic data can mean different things to different people. Some consider it mass-produced, autogenerated historical data, which can be anonymized by stripping it of all identifying properties, such as names, user ID, geographies or contact information. Others describe it as computer-generated data that is manipulated to create random insights and patterns that reflect real-life scenarios.

The consensus is that it has become crucial to the testing environment.

Synthetic data has become more relevant in software development as the use of artificial intelligence (AI) grows. Much of the uptake has emerged from the need to train and fine-tune models that incorporate machine-learning (ML) algorithms. The logic behind this is that the more complex the functionality required, the more complex the scenario and datasets needed to program the model.

As one head of trading at a tier-1 investment bank describes it: "Let's put it this way: In finance, we have lots of data but not so much information, and these are two very different things."

Synthetic data has also been thought to democratize the adoption of AI as it is cheaper to generate, rather than shop around for large real-world datasets. It can also be used as a secondary layer on top of historical data to test against adverse scenarios or technical weaknesses that could impact the performance of AI or algo-powered products in extreme conditions.

"We are talking tens, if not hundreds of millions of users actively buying stuff or watching movies, versus a few hundred clients for a bank. Even in the biggest of investment banks and for the most successful of its desks, we are talking [about] 200 to 300 active clients. The statistical difference is substantial—hence the need for synthetic data." Giusseppe Nuti, UBS

What this means is that synthetic data is required to help provide valuable insights that are not often available in historical datasets. This is important, particularly in programming machines to prepare for alternative outcomes.

Waters Technology spoke to several investment banks and experts in the field of technology testing to explore some examples of where synthetic data is being used and the challenges associated with it.

Training

By now, financial institutions understand that machine learning and especially deep learning, a subset of machine learning, require large volumes of data. But sheer volume doesn't cut it. It needs to be valuable and equipped to train a machine to do arduous tasks, such as identifying unique trading patterns or making complex computations.

According to Neil Francis Ryan, head of investment analytics and data services at BNP Paribas, there are two core areas in which the bank uses synthetic data: AI training and stress testing.

For AI training, historical data can be used to train algorithms, but in areas where there is insufficient "bad data," such as embedded anomalies, synthetic data is required to cover a wider range of permutations to train a machine. This practice is particularly useful for exception-management cases, where solutions are tested to handle situations or problems outside of the norm.

In BNP Paribas' case, the investment bank is using both historical data and synthetic data to develop and test its analytics support tool, called Smart Chaser, which is set to be rolled out in the fourth quarter of 2020. The ML product is currently being trained to reduce the likeliness of trade-settlement failures by identifying problematic characteristics of a trade and providing predictive analytics on areas of intervention and corrective actions. The predictive model, which is based on a random forest algorithm, is continuously learning and being refined to build a complex picture of successful and unsuccessful trades. The model includes about 100 different factors, such as the brokers' history, the time of execution, the value of the trade, whether it was part of a block or single allocation, and geographic locations of counterparties.

According to the bank, the AI product has taken years to perfect due to the complexity of the technology, but it has now reached a trade-matching success rate of 98%.

Following Big Tech

Similarly, financial institutions are drawing inspiration from some of the major tech giants of the world, such as Netflix, Amazon, and Google, to develop new AI capabilities and personalization tools. In some cases, their top challenge is accessing the sheer volumes of valuable data required to sufficiently train a model that uses machine learning. Additionally, in this new world of alternative data and exchange data fees, firms are looking for ways to cut down on their data costs, where appropriate.

UBS, for example, is using synthetic data to replicate Netflix- or Amazon-like functionality for its recommendations engine for foreign exchange, rates and credit (FRC). The technology, which is still in development in the bank's Strategic Development Lab, uses machine learning to understand user preferences and generate recommendations on investment products to its hedge fund and asset management clients. These recommendations are sent to internal salespeople who can then pass that information on to clients.

According to Giuseppe Nuti, head of algorithmic trading for UBS's investment bank, synthetic data is necessary to compensate for the lack of historical and anonymized client data, which commercial tech firms have in orders of magnitude, to program these complex AI applications and test its functionality.

"We are talking tens, if not hundreds of millions of users actively buying stuff or watching movies, versus a few hundred clients for a bank," Nuti says. "Even in the biggest of investment banks and for the most successful of its desks, we are talking [about] 200 to 300 active clients. The statistical difference is substantial—hence the need for synthetic data."

But training algos and building new AI capabilities that could rival the tech world have not been the only areas where synthetic data is proving increasingly more valuable. Another reason for its uptake is the need to meet resiliency obligations.

Resiliency

Financial market firms are obligated to maintain resilient systems and implement strong security measures. From a reputational point of view, firms are also subject to fierce competition to service

> "We engage with our IT teams and as they go through their software development life cycle [synthetic data is used] to ensure our products perform well and can cope with large volumes of data."
> **Neil Francis Ryan, BNP Paribas**

clients with the latest and greatest technology releases. According to Iosif Itkin, CEO and co-founder of Exactpro, a provider of testing solutions, synthetic data is central to how it tests client systems and products.

"We have supplied quite a lot of solutions where people take the data and just replay it against the old system and the new one, and then compare the two," Itkin says. "This approach certainly has merits, but on the other hand, there are always discrepancies between the new and the old systems, and that needs to be taken into account."

Neil Francis Ryan
BNP Paribas

Itkin says that firms cannot solely rely on historical data or obfuscated operational data when testing solutions or critical services.

Exactpro produces synthetic data for functional testing, which ensures the system or solution functions properly, as well as for non-functional testing, which examines its performance. Artificial data is then pumped through the technologies to test against multiple permutations and adverse scenarios. Part of this is to simulate random failures and identify reasonable security steps to be administered.

"The most simple and obvious scenario might be if someone submits a particular order type, which could cause the market to stop. But if you only use production data, you cannot prepare for that as it hasn't happened in real life yet," Itkin adds.

Similarly, huge volumes of synthetic data can be used for stress testing and resiliency checks. Solutions are exposed to a high frequency of computations that are commonly used to prepare for traffic spikes, periods of irregularity, or when there is a high concentration of users on a platform. BNP Paribas' Ryan explains that large synthetic datasets are typical to performance and stress testing in the development of its internal technologies and offerings.

"We engage with our IT teams and as they go through their software development life cycle [synthetic data is used] to ensure our products perform well and can cope with large volumes of data," Ryan says.

Cross-Border Data Sharing

In many cases, the reason for using synthetic data is tied to compliance and the need to avoid using client data for testing solutions. As financial firms are under pressure to comply with global data protection and privacy laws, such as the General Data Protection Regulation (GDPR), they are having to take specific measures to adhere to cross-border data sharing and prevent client data getting into the hands of unauthorized users.

"When you have large reams of corporate client information such as we

> "The most simple and obvious scenario might be, if someone submits a particular order type, which could cause the market to stop. But if you only use production data, you cannot prepare for that as it hasn't happened in real life yet."
> **Iosif Itkin, Exactpro**

do, we have an obligation to respect the client around cross-border data sharing and there are very strict controls around that," says a senior data executive at a tier-1 bank. "Instead, we are exploring how we can use synthetic data. So, we can generate artificial data, such as credit payments or whatever it may be, and then use that for development use cases."

The bank is currently in the early stages of research and development on testing synthetic data for compliance use cases. According to the executive, the adoption of cloud technology will prove very useful in generating and storing vast amounts of synthetic data in a more on-demand and efficient way in the future.

"It is much easier in a cloud environment to have access to lots of synthetic data, to explore with and to test out your hypothesis; [it is] where you can ferment an idea that you are talking about with the business much faster," the bank executive says. However, they add the bank is still at the infancy stage of development.

Bias

While the cloud has made it easier to experiment with large datasets, challenges still abound. Machines are only as smart as the programmer who designs them. This is also true in the case of synthetic data—the data is only as valuable as the developers coding the algorithms to generate it.

BNP's Ryan explains that historical data offers two records to train an algorithm or AI machine. For example, it has the original transaction showing what went wrong and a second record that offers the corrective actions. Yet, this isn't the case with synthetic data.

"Synthetic data is only based on the skills and experience of the people who are writing the code that creates the synthetic data," Ryan says.

With regard to testing, Nuti says computer-generated data mimics real-world scenarios or scenarios that are believed to take place. He explains that if the world operates the way we expect it, and that's translated into a mathematical process, then the technology will be able to resolve the problems it is given or identify the anomalies it is programmed to detect.

But the world doesn't usually operate the way we expect it to, so this is more for informing than deciding, he adds. "It doesn't guarantee a solution because the world may not behave like the way you thought it would, but it certainly ensures that if it does, we have the appropriate model," Nuti says.

A New World

Data is king—this much, everyone now knows. Every day, there are new alternative data providers entering the market. The advent of the Internet of Things and 5G networks will only add to the amount of information that is available to be analyzed.

While these can be extremely valuable datasets, at the end of the day, investment firms cannot forget about the bread and butter, which is their internal data, including trade data, risk data, and various forms of historical and regulatory data.

As banks are becoming more comfortable using the public cloud to store and analyze data—or allowing their third-party vendors to use the cloud—it opens up new opportunities. At the same time, banks are increasingly using machine learning and deep learning to find patterns that humans never could.

Still, data costs are also spiraling. This is where synthetic data comes in. While it won't answer for every question, it allows a bank to play and to tinker and to experiment. As new technologies and data become available, this will only make synthetic data more important in the future. wt

Europe's Regulators Grope for Value of Software

In the US, the cost of software is not taken out of capital. Europe is fumbling for something similar. By Philip Alexander

In 2014, Michael Corbat, CEO of Citigroup, referred to the multinational lender as "a technology company with a banking license"—a remark that drew snickers at the time. Today, bank chiefs fight over the label. US banks vie to outspend each other on fintech, with some throwing double-digit billions at software to build products and systems that work at blur-speeds and slash costs. In Europe, however, that spending lags. And capital treatment doesn't help.

Software assets in Europe must be 100% deducted from capital, unlike in the US and Switzerland. In those places, software is considered equipment, with a 100% risk-weight. Only 8% of that amount needs be held against capital. That gives US and Swiss banks an almost freakish edge over their EU competitors. Lawmakers in the EU are addressing the mismatch—to a point. In April, the European Parliament passed a regulation that could free banks from the 100% software penalty and move to risk-weighting.

"Software investment is substantial for the banks and likely to result in [a] higher weight of software assets," says Magdalena Stoklosa, head of European financials equity research at Morgan Stanley. "That makes the proposed change logical and overdue. Banks compete globally and putting European banks on similar capital treatment of software intangibles is a positive."

But the European deduction might not go away entirely; the software's value in a resolution is the figure that would be exempt from the deduction—not the total spend. "We don't yet know what the technical details of the implementation will be. The bar to recognition and valuation of software intangible assets may initially be set

higher in Europe, but we will see when we get the details," says Stoklosa.

Parity, even a halfway one, would be a big leg-up for European banks; the capital benefits could run into the tens of billions. And software will account for an estimated 70% to 80% of new investment at global banks over the next three years, analysts say.

Tech Capital à la Europa

Under EU rules, software used by banks is classified as an intangible asset—in other words, it is considered to have no value to the bank as a loss absorber, and therefore must be fully deducted from common equity Tier 1 (CET1). If an EU bank has a piece of technology valued at $1 billion, for example, it must deduct $1 billion from its regulatory capital stock.

In the US and Switzerland, however, banks are under no such onus. Instead, software can be classified as a fixed rather than intangible asset and therefore does not have to be deducted from capital.

Technology assets in the US and Switzerland—both software and hardware—are usually classified as equipment, which carries a 100% risk-weight under the "property, plant and equipment" line item on the balance sheet. Banks must hold minimum 8% capital against risk-weighted assets (RWAs).

In the EU, that would go differently. Let's say there are two banks—one US and one EU—that need to hold $10 billion to meet their minimum capital requirement. If the EU bank purchases or builds software worth $1 billion, it must deduct the entire amount from its capital stock, reducing it to $9 billion. It must then raise an additional $1 billion to rebuild its capital stock to $10 billion to meet its minimum requirement.

> "The bar to recognition and valuation of software intangible assets may initially be set higher in Europe."
> **Magdalena Stoklosa, Morgan Stanley**

By contrast, a US bank that purchases or builds software worth $1 billion only need set aside an extra $80 million to meet minimum capital requirements.

In April, the European Parliament approved the second Capital Requirements Regulation (CRR II), which included a revision to Article 36 that could mitigate the 100% deduction of software assets from capital. Instead, banks could risk-weight the assets and hold capital against that risk-weight.

On the face of it, that would help European banks spend more on tech. And the capital benefits could run into the tens of billions. Analysts at Morgan Stanley reviewed the software assets of 15 large European banks (*see figure 1*). Collectively, the banks had €31.5 billion ($34.96 billion) of software, now classified as intangible assets and deducted from capital. Under the new rule, that €31.5 billion might not count against capital; instead it could generate a capital charge of just €2.5 billion.

It could, but that's unlikely. The new Article 36 requires the assets to be "prudently valued." To be classified as fixed assets, that value must not be "negatively affected by resolution, insolvency or liquidation of the institution."

The task of decrypting this passage and turning it into useful law falls to the European Banking Authority, a regulatory agency. And it is cagey on the new law: the change goes directly to banks' solvency ratios—their stock of capital.

"This is why we need to be very prudent before we change the treatment, because we need to be sure we are not just offering the possibility for some banks to free capital from one day to the next without an appropriate justification," says Delphine Reymondon, head of capital, loss absorbency, leverage and liquidity at the EBA.

Setting a Price on What-If

It is in tallying the value of software in resolution that the new law will either lower capital requirements for banks or preserve the status quo. The rule change takes banks and bank supervisors into the amorphous world of software, where values can dip or soar, and disruption can rapidly congeal into obsolescence.

"If we think about the degree of scrutiny applied to RWAs, internal models and capital, my sense is there is nowhere near something like that for the intangibles part," says an analyst at a US bank.

This has left some to wonder if the gift offered to them by lawmakers could be snatched away by regulators. The EBA will draft a regulatory technical standard for the European Commission, which will make the final decision on how to proceed.

"We have been skeptical as to how far this potential amendment will move the needle," says Monsur Hussain, head of financial institutions regulatory research at Fitch Ratings.

The mood music from the EBA has done little to reassure. A survey of more than 100 EU banks, with the purpose of setting value to software in a resolution, is likely to be completed in September or October. Reymondon anticipates this will lead to a consultation on the regulatory technical standard in the first half of 2020.

> "We have been skeptical as to how far this potential amendment will move the needle."
> **Monsur Hussain, Fitch Ratings**

"The mandate is directly linked to this, to define specific categories of software which may have a value in resolution or liquidation," she says. "The banks need to demonstrate this on the basis of concrete cases, real data."

So banks and consultants are scrambling to find case studies or methodologies that prove the value of their software—a task made all the more difficult by variegated accounting practices and the general lack of disclosure on software.

"The accounting rules around the servers may be different from the rules around the software needed to run the server, and then upgrades to that software may be different again," says a senior prudential regulation expert at a consultancy. "The challenge we have is that the accounting is inconsistent; therefore, turning it into a consistent regulatory framework is not easy."

It Could Be a Huge Break (Or Not)

When analysts at Morgan Stanley tried to assess the scale of the capital break that Article 36 might bring, it was complicated.

Some banks didn't separate software from the rest of their intangible assets, and the team had to estimate its value based on average levels at their peers. Some banks did break out numbers for software, but gave them as gross rather than net figures. For calculating a capital benefit, that is not particularly useful as the calculation requires a net figure. Intangible assets that lose value over time, such as software, must be amortized every year to arrive at a net amount remaining on the balance sheet.

Finally, only some banks distinguished between software purchased from vendors and that developed in-house (*see figure 1*). Showing a receipt with a price, as opposed to a bank's best idea on what its engineers coded up, could become a pivotal factor in assessing what software no longer needs to be deducted from capital.

With its survey, the EBA is looking for a granular perspective of software as expressed on bank balance sheets.

"We are asking them in particular for developed internally or purchased software that they have, the transactions with third parties, and what has happened in the case of merger, acquisition or resolution if they have such cases, which software is used for regulatory compliance or cyber security, [and] which is used for core banking activities and digitalization of processes," says Reymondon.

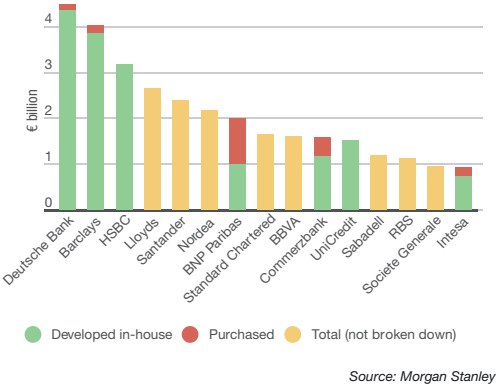
Still, the possibilities are clear. For some large banks, the break could be large, hoisting up their capital ratios. Software assets currently account for as little as 0.4% to as much as 1.5% of RWAs, with a median of 0.7% (*see figure 2*). And any capital break would be a big help to smaller, technology-driven challenger banks, the regulation consultant says.

It is to support bank technology that European lawmakers want to cut back the deduction. In the introduction to CRR II, legislators argued the full 100% deduction is unsustainable at a time when technology has come to play such a substantial role in finance.

Worse, by making banks pay twice—in expenses and in capital—the rules might even discourage investment in technology, leaving European banks exposed in the IT arms race.

The US arsenal is huge. This year, JP Morgan Chase will spend $11.4 billion

1 EU banks – 2018 capitalized software assets



Source: Morgan Stanley

on tech, Bank of America has $10 billion planned, Wells Fargo is looking at $9 billion and Citigroup has earmarked $8 billion, according to Bloomberg News. In contrast, Banco Santander, the biggest spender in Europe, has budgeted $5.6 billion.

"As banks go through the digitalization process, they are bound to spend a great deal of money. We have seen that mergers and acquisitions among mid-tier banks are potentially being driven by these digitalization costs—for example, BB&T and SunTrust," says Fitch's Hussain.

In announcing their merger in February, the two US mid-tier banks stated: "Enhanced scale and financial strength will accelerate investment in transformative technology to embrace disruption."

The Basel Committee on Banking Supervision is taking a bird's eye view of the international panorama, of which the EU law and its progress will be part. Indeed, Basel's effort could end up shaping the EU's approach.

In the meantime, the EBA claims the less capital-intensive treatment of software by the US and Switzerland is not a significant factor in its thinking.

"From our side, the potential level playing field aspect is one aspect among others," says the EBA's Reymondon. "A change in the current prudent treatment, and an appropriate calibration of this change, can only start from a clear insight into the existing types and values of banks' software in various circumstances."

As a result, most banks are reluctant to discuss what size of capital break they might get, says Stoklosa, and they are not factoring it into their capital planning at this stage.

Most, but not all. In announcing a three-year restructuring plan in early July, Deutsche Bank flagged that it would invest as much as €13 billion in new technology over the period. (In Morgan Stanley's study of European banks, Deutsche had intangible software assets of nearly €4.5 billion at end-2018—more than any other bank in the sample.)

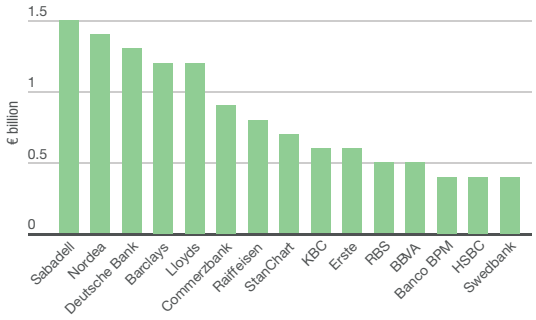
Three analysts told *WatersTechnology*'s sibling publication *Risk.net* that Deutsche executives indicated on an analyst call that, with such large investments being made, there could be a capital uplift of around 100 basis points if EU law were to match US law.

Those listening to the call had their doubts.

"Deutsche is going to mention anything that has any small chance of improving the capital position," says one analyst. "There is probably more hope than expectation in there."

Deutsche Bank did not respond to a request for comment in time for publication.

2 Net software intangibles – % of 2018 RWAs



RWAs= risk-weighted assets
Source: Morgan Stanley

Concocting a History

There is little history on valuing software during a resolution. So last year, the Association for Financial Markets in Europe (Afme) and the European Banking Federation took it upon themselves to find some.

The two groups looked at mergers, acquisitions and recent bank resolutions in Italy, says Sahir Akbar, a director on the prudential regulation team at Afme.

"If you see in those instances those banks that were bought out or maintained, it is not as if the software was integrated on day one into the new bank," says Akbar. "The software needs to stay, and through it, all the bank's activity is being conducted, so that is the value of the software to the bank for the period during which it is either being integrated or wound down."

Others see it differently. Fitch's Hussain has looked at several M&As, such as BBVA's acquisition of the Simple online bank in the US in 2014 and ING's majority acquisition of the Payvision payments platform last year.

"[With] BBVA's purchase of Simple, they've had to write that down since they purchased it. Whether that's because it hasn't grown as fast as they thought

> "Unless your platform is number one in its area, then it may have limited value."
> Prudential regulation consultant

it would, or whether the platform itself isn't quite as up to scratch and the depreciation has been faster than expected is unclear—the disclosure didn't split it out in sufficient detail," says Hussain.

In the ING case, the Dutch bank bought 75% of Payvision, which was valued at €360 million, making ING's stake worth €270 million. Of that stake, Hussain says, the accounting notes implied most was expressed as goodwill, with only €52 million of the value attributed to software.

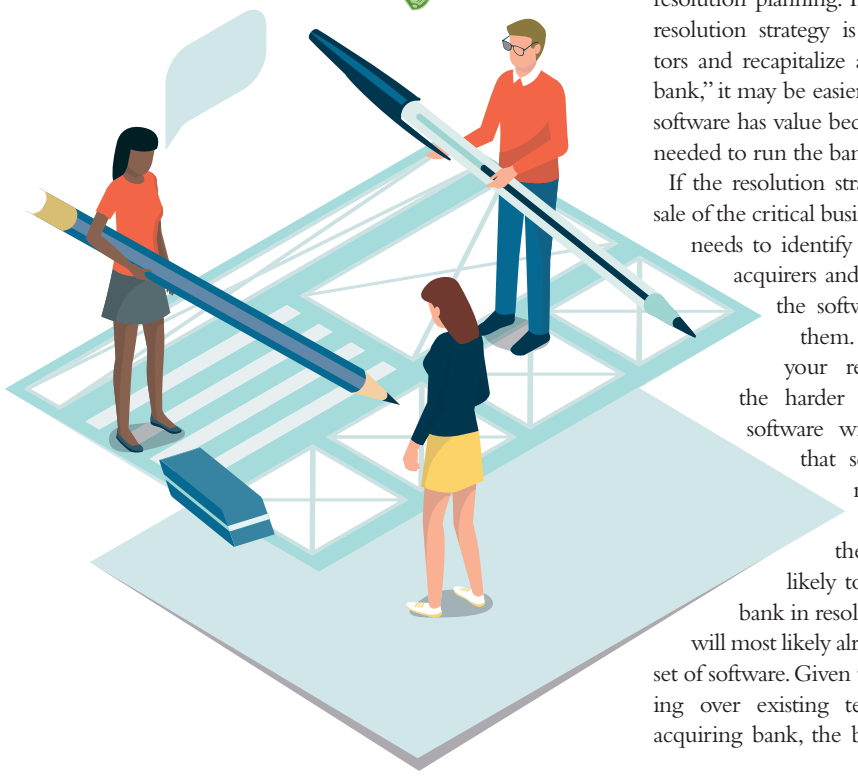
"So even when you acquire companies that are software-based, a lot of that value is in goodwill, which, as we know when there's a liquidation or insolvency, is pretty much written off—you can't rely on it for CET1," Hussain says.

Moreover, the valuation of software in a merger may be beside the point once a bank is in resolution. If the bank uses IT that is vital to its operations, and has spent money licensing or developing it, the technology is integral to a cash-generating business and clearly has value.

"But going into resolution, something somewhere has not made money and has therefore probably been impaired," says a resolution valuation expert. "How you associate the intangibles with that impaired cash-generating unit is one important consideration."

He says the revision to Article 36 takes banks from a historic cost-accounting approach—banks have spent money on software they need to operate and therefore it has value—to working out what parts of it would still be valuable in resolution.

"They might be apps or pioneering valuation software, but what matters is they might be parts you have not actually spent that much money on to date—it might be different to the bits of software you have historically accounted for," says the valuation expert. "It doesn't feel like the accounting rules are set up to say how much the software is worth."



Facing Down Resolution

The resolution expert believes banks and supervisors will try to mesh the new methodology with the process of resolution planning. If, for instance, the resolution strategy is to bail-in creditors and recapitalize a surviving "good bank," it may be easier to show the core software has value because it will still be needed to run the bank.

If the resolution strategy involves the sale of the critical business unit, the bank needs to identify a pool of realistic acquirers and assess how useful the software would be to them. "The less defined your resolution strategy, the harder it is to say the software will have value in that scenario," says the resolution valuation expert. If the acquiring bank is likely to be similar to the bank in resolution, the acquirer will most likely already have a similar set of software. Given the cost of switching over existing technology at the acquiring bank, the bank in resolution would have to have some very special programs on its books to merit ascribing them any resolution value whatsoever.

"Unless your platform is number one in its area, then it may have limited value. But if you are number one, then you are unlikely to be the firm going down," says the prudential regulation consultant. "By the time you are in resolution, it is most likely because you are not number one, and therefore your kit has limited value."

And that's not the only puzzle. The size of bank investment in IT is partly a product of how quickly software becomes outdated, which, in turn, begs the question of whether existing software would already be obsolete by the time a bank is in resolution.

At present, the accounting amortization of intangible assets is somewhat subjective, with schedules generally separated into broad categories. Analysts say software tends to fall into the shorter-term buckets—typically three to five years—and its value is then amortized in a linear fashion over the period.

But, in practice, technology depreciation is often a cliff edge. For example, the shift from card readers with code keypads to biometric customer authentication could make keypad technology obsolete very suddenly, notes Fitch's Hussain.

As a result, banks frequently write off software. For instance, in its 2015 annual report, Santander UK wrote off £206 million in software after "the decommissioning of redundant systems following the implementation of our new digital platform."

"From the outside, it is impossible to know if the definitions of useful life and amortization schedules are reasonable or not," says the analyst at the US bank. "It is a question for the auditors, and also I don't think this is something which has been audited by the regulators."

The House Creations

The consensus is that regulators are likely to prefer the valuations of software that a company has bought—the price is easily verifiable. By contrast, it can be difficult to set a price on software hatched in-house. The valuation expert says some banks simply account for it using the timesheets of the personnel who worked on it.

> "There is a concern that maybe, because there is no observable market value around it, regulators will take a harsher view in terms of the risks associated with the value of that software."
> Sahir Akbar, Afme

"For internally generated software, you are effectively capitalizing what would otherwise be the expenses of the people creating that software," he says. "Is it really an asset or just a capitalized cost of people doing something? It can be quite difficult to pin down exactly what that is."

Once a current value is decided, a bank would still need to work out how that number would change during a resolution. While it is fairly straightforward to switch licenses for purchased software from a distressed bank to a successor, the transfer of internally generated software is more difficult.

"If you develop the software in-house, if the bank went into liquidation and were sold for parts, so to speak, it is not clear whether that software could be extracted and sold," says the analyst at the US bank. "Would it be possible to take the software system of one bank and put it into another, or to disintegrate it if only one part of the bank were sold?"

Bank groups are resisting any suggestion that the EBA should end the 100% capital deductions on only purchased software. Morgan Stanley's analysis found that for those banks that did break down software, only about 12% was purchased; the rest was generated in-house.

Afme's Akbar says in-house technology is valuable precisely because it is bespoke, designed specifically for the bank's business needs. "There is a concern that maybe, because there is no observable market value around it, regulators will take a harsher view in terms of the risks associated with the value of that software, when in fact it doesn't carry a different risk profile or could even be of more value to a business than something that is acquired off-the-shelf," says Akbar.

He is also concerned how the regulatory technical standard will define "prudently valued" software, and about the criteria that will be used to determine what might no longer be considered an asset and could be deducted fully from capital. He warns that if software is deemed to no longer be prudently valued or to have lost its value because the bank is underperforming, but is in no danger of failing, this could lead to a downward spiral.

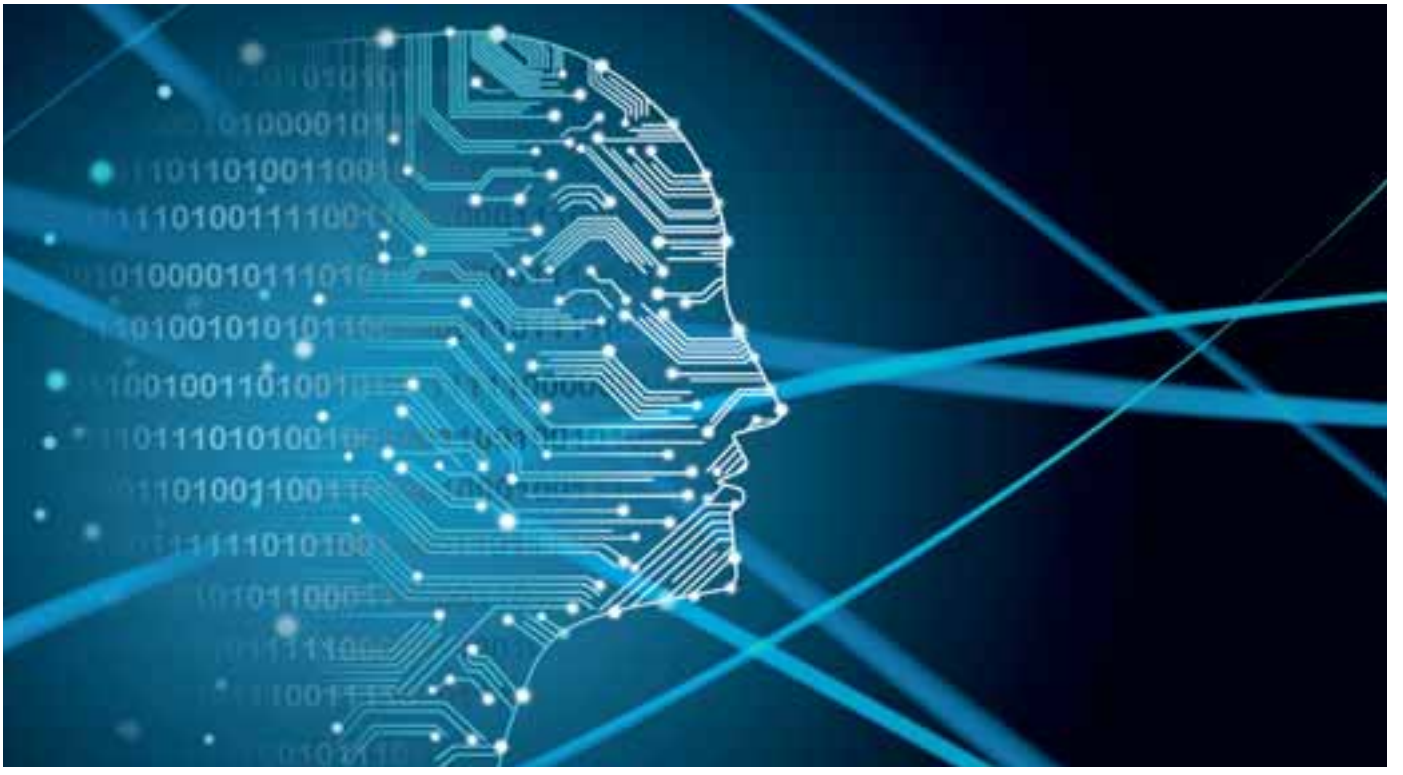
"All of a sudden, some of your capital has been written off because your software has been derecognized because the bank's performance falls below some sort of indicator," says Akbar. "If software is a large portion of your business, that derecognition could be a trigger, which the market looks at as a sign of distress, when ordinary business indicators would show no cause for concern. In other words, this could be seen unfavorably by the market and push you into a worse event."

With so many murky issues to decide, some are speculating the EBA might just take a standardized tack: recognize a fixed proportion of software for all banks and require them to continue deducting the rest from capital.

Ironically, that approach would be similar to the way Morgan Stanley's team addressed the lack of detail on bank software. The analysts assumed all software assets would be subject to a haircut of 50% to 80%. wt

Embracing the Numbers

Feeling the pinch of passive investing and fee compression, asset managers want to improve how their portfolio managers perform. To do this, they've turned to internally generated data. By Emilia David



The game of baseball has been played for over 100 years so its rules are more than a century old. Analytics in the sport have historically revolved around batting averages, numbers of home runs hit, and a pitcher's win/loss record. Then the Oakland Athletics broke new ground when the team took a deeper dive into the numbers to produce a winning organization on a shoestring budget. Their strategy crystalized in 2003 in Michael Lewis' book—and eponymous film—*Moneyball: The Art of Winning an Unfair Game*.

Fast forward to 2019 when almost every Major League Baseball team embraces analytics—also known as sabermetrics—to some extent. The data generated during games can be analyzed to help a player better see their strengths and weaknesses, and help the club optimize its roster.

Trusting analytics wasn't an easy sell to baseball traditionalists because it is a science and ignores gut feelings and instincts. If the analytics suggests a course of action that contradicts a manager's instincts, the question becomes: listen to your gut, or trust the numbers? Similarly, trading has traditionally relied on gut feelings and instincts, but everyone has specific strengths and weaknesses.

Financial institutions use myriad technologies to trade and manage a portfolio. Inside those actions are metrics that can be analyzed and used to improve how an individual trader or portfolio manager accomplishes their job.

This is a new idea for many financial institutions, but a few vendors and asset managers have begun to take advantage of technologies available, such as behavioral analytics, user-experience processing, and machine learning. These technologies create a performance baseline to follow or exceed, and offer guidance as to where to focus decision-making.

A Decision Journal

The need to compete with algorithms when picking stocks is what drew Cambridge Global Asset Management, which manages $20 billion in assets, to using data and behavioral analytics to figure out if their portfolio managers are making the best decisions.

Brandon Snow, chief investment officer at the Toronto-based asset manager, says the environment in which humans now have to compete has significantly changed, so it's important for them to have the skills that will keep them competitive in the long term.

"I think our ability to stock pick is still a competitive advantage. So we wanted a third-party view of what we do, to see where value is being added and what decisions are driving those," Snow says. "There is a shrinking market, so it's more competitive out there, but if you start

early in the process of recording your decisions and improving on them, you can be years ahead of your competition."

Snow says if his portfolio managers can understand how they make their decisions, they develop a better grasp of their abilities, lean into their strengths, and have insight into their instincts. This way, they don't have to be worried all the time about competing against algorithms.

Cambridge tapped data analytics firm Essentia Analytics to teach it to optimize the decision-making processes. The London-based vendor gathers data from individual traders—starting with their trade and holdings data—and analyzes it for behavioral patterns. These patterns can show where and when a trader or portfolio manager is more comfortable making a decision. For example, a manager may have more confidence in entering a trade when the market is on a downswing, and Essentia advises the trader on what they're better at leaning into, and what they should avoid doing.

Clare Flynn Levy, founder and CEO of Essentia, compares traders to athletes who want to constantly improve. And one of the ways athletes have found to become better is to look at the data they themselves generate and analyze it to find patterns.

Levy notes that buy-side firms have taken criticism in recent years, as passive investments have been consistently outperforming active fund managers. It's hard to justify a fee if you're getting beaten by an index fund.

"It's a well-trod story, but at the end of the day we believe that some fund managers can continuously or consistently outperform the index. But are you at the level of skill or competition as a human that you need to compete?" she says.

Levy says Essentia coaches clients to lean on these habits or to get them more comfortable with different market movements. She adds that they employ "nudges," which are questions tailored to the individual manager during critical decision-making moments.

Essentia mainly focuses on equity fund managers, but does work with companies with other strategies such as small caps, emerging markets, and environmental, social and governance (ESG) investing. They currently work with portfolio managers at 30 firms around the world.

> "Inherent biases convince you to keep making bad decisions because you don't know they're bad decisions. But if it's tied to your portfolio, you'll see its impact better. A data scientist can take my decisions and interpret what their impact was." **Brandon Snow, Cambridge Global Asset Management**

Cambridge's Snow points out that it isn't enough to have a record of your decisions—he personally keeps a decision journal—because most people don't have the insight into the impact their decision could have had. He says he wanted to understand the connection between his own investing decisions and its portfolio impact and see if he could have done something different.

"Inherent biases convince you to keep making bad decisions because you don't know they're bad decisions. But if it's tied to your portfolio, you'll see its impact better," Snow says. "A data scientist can take my decisions and interpret what their impact was."

This inability to self-reflect was exactly the challenge Cambridge experienced. Snow says there was—and still is—reluctance from other portfolio managers to submit their decisions to a third party. He was the lone guinea pig for a year before he convinced his entire team to work with Essentia. Even then, the rest of the firm remains wary. Snow notes that it is hard for many traders, who often say they rely a lot on their gut and market knowledge to make investment decisions, so he understands why a lot of people may not want to offer up their decisions to data analysts.

"Humans, in general, have documented behavioral biases about the decisions they make about money and what we see in our clients' behaviors is very reminiscent of that," Levy says. "People have a tendency to hold on to losing positions for too long; we see that all the time in the data. But it's not until you actually see yourself in the mirror doing that that you say, 'OK, how do I fix that?' There's something about seeing it in your own data that is actually key to change."

Clare Flynn Levy
Essentia Analytics

James Wooster
Glue42

Workflow Insights

It isn't just behavioral analytics that asset management firms are turning to. Some banks are experimenting with using their workflow to figure out what an ideal trader process looks like. Understanding how people use applications, including which applications they open first, how long they stay, how many mouse clicks it takes them to get information before setting up a trade, offers insights into their processes. This allows companies to create a benchmark of workflow behaviors others can follow.

Desktop integration firm Glue42 offers what it calls user-experience process mining. Process mining lets managers look at each of their traders' workflows and advises them about what they could be doing better.

James Wooster, COO of Glue42, says understanding the detailed process by which traders begin their trades also lets companies measure what stronger traders are doing compared to those who are lagging.

"Where it gets even more exciting is where you happen to know if someone is doing something above and beyond and you want to understand what behaviors they're exhibiting that are not present in others," Wooster says. "So we can therefore do a baseline of you and a baseline of either another individual or a group of individuals, and then compare the flow between applications. From that, we can start to see what it is that you uniquely do that others cannot or don't do."

Companies install Glue42's platform and can look at how their traders use each application running on the background of its interoperability system. The platform can tell when someone's opened up an application like FactSet, see if it remains in front of other windows or if it is thrown to the back, how long they spend using it and even employs mouse tracking to see how many times they've clicked on a button in an application. Once this informa-

tion is available, the company can then begin to compare individual application interface behavior and possibly set up some best practices for others to follow.

Wooster notes looking at how traders use applications already helps with determining if people are following best execution and for him, best execution ties into the idea of setting up best practices to become a better and more efficient trader.

Glue42's biggest and first client for UX Process Mining is JP Morgan Wealth Management, which Wooster says has deployed the platform to 15,000 desks. JP Morgan Wealth Management declined to talk about how it is using Glue42's product.

Wooster says getting insight into how people use applications in tandem also allows operational leaders within a team to make sure everyone is performing up to standard. And if they aren't, they can quantify the hows and whys of this non-performance.

> "Where it gets even more exciting is where you happen to know if someone is doing something above and beyond and you want to understand what behaviors they're exhibiting that are not present in others."
> **James Wooster, Glue42**

"The problem is that human beings are sometimes hell bent on breaking processes, are doing things on their own, and are just not taking kindly advice," Wooster says. "So even with the best applications in the world where you've created this beautiful desktop and patchwork of applications that the traders need, the question is, what are they actually doing? Are they following the correct procedures in terms of doing all of their data research before speaking to a customer? Are they recording the call notes at the time that they are speaking to their clients and not afterwards? That's where this user behavior analysis comes in to play and UX process mining also comes in."

Repurposing

Asset managers are also looking at how they can repurpose compliance monitoring platforms using analytics to help improve performance. One such way is using machine learning to look for conversation patterns in communication channels.

Most financial firms monitor communications of portfolio managers and brokers to prevent fraud and mitigate risk. This same technology is now being used to look at successful sales patterns.

Lee Garf, general manager of communications and financial market compliance at Nice Actimize, says the same technology that searches for abnormal patterns in risk mitigation can also become a means to find or generate alpha opportunities.

"There's a growing trend for companies to say, 'I've got this interesting data; is there something we can do with that data to make it not just a cost center and a risk reduction, but can we generate alpha or new opportunities based on this data?" Garf says. "Some of the things that we're looking for are correlating the type of communication channel to the result—does voice or WhatsApp or chat generate better results for the company? The other thing we can look at is the mix between social conversation and business conversation by better performers."

He adds that the platform can figure out if a trader or a broker is more successful in buying or selling if they introduce more banter into their conversations.

Take, for example, a broker selling to an important client. His company would like to know if he is more likely to generate additional revenue or commissions if the product is pitched through a call versus an email versus a chat. They can also figure out if, for this particular client, it's better to build more social rapport or not.

"A lot of the technologies that we use for compliance, or for a risk use case, were things around communications using natural-language processing and machine learning to identify patterns. The patterns in that case are looking for anomalous behavior. Using those same techniques, we have built models that look for this other scenario. We're looking at anomalies or patterns that can help them improve," Garf says.

Nice Actimize uses a mixture of machine learning and natural-language processing to parse through communications data clients provide them and find those patterns. NLP identifies the tone and sentiment of calls or texts and figures out a percentage of the communication that was devoted to work and non-work conversations. Garf notes that early adopter clients want to see if there's a trend showing how important the social piece of a transaction call is in settling a deal.

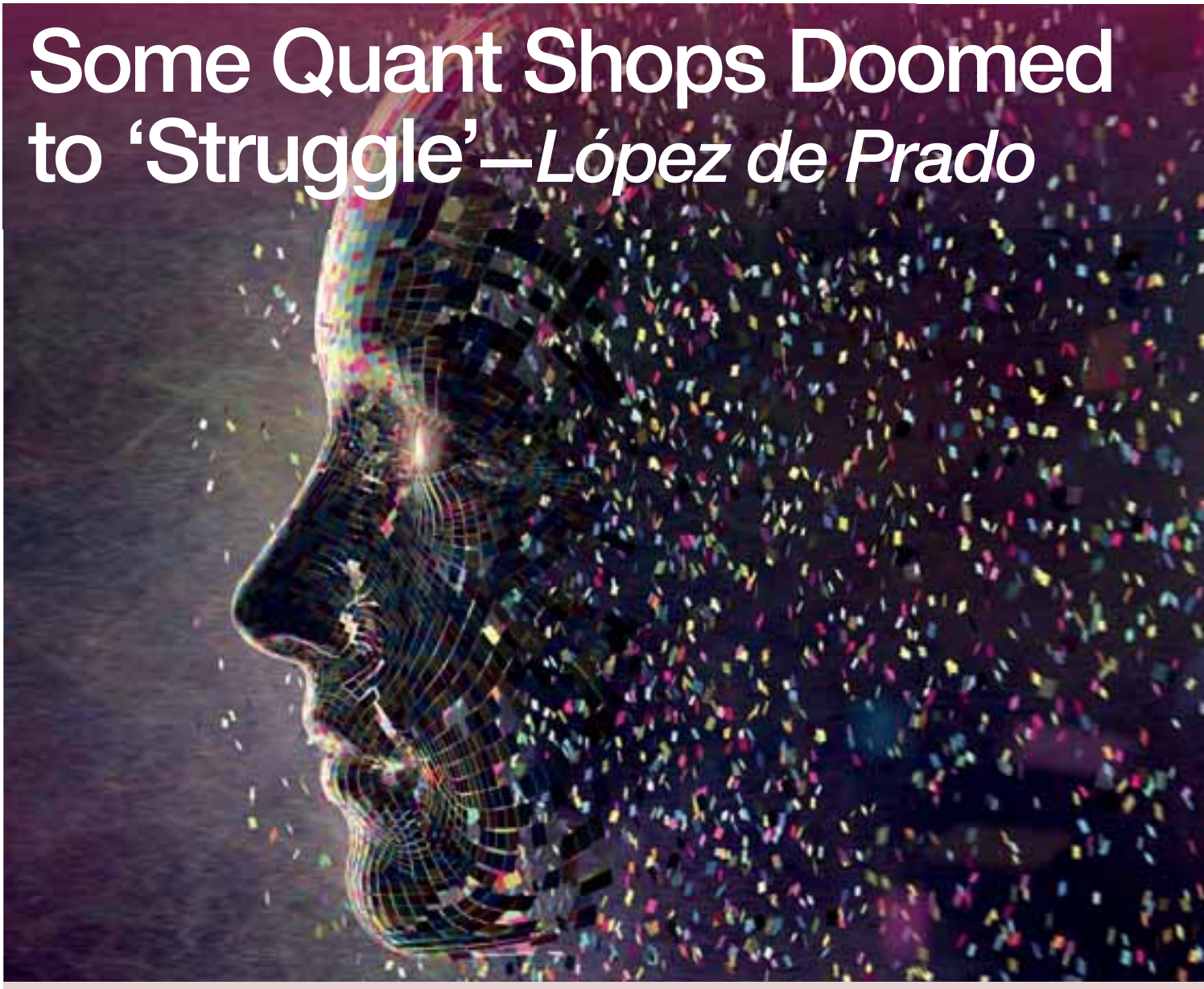
Lee Garf
Nice Actimize

Most firms using these technologies are still the early adopters. As passive investment increases, active managers have had to find a way to compete and justify the fees they charge. While it is challenging to go toe-to-toe with a machine, humans can at least make incremental improvements to their performance thanks to new technologies.

And either way, it doesn't hurt for firms to look at how their employees are using technology and make sure it is actually aiding them in the quest for alpha rather than hindering them.

"If you are playing with your company's money or your client's money, you better make sure you got exactly the right data source and applications and have no downtime or dead spots in the journey to raise a trade or to acquire some assets," Glue42's Wooster says. "When the process has to have a human being involved, you have to ask, 'How do I get the insight in order to optimize things?' and technology is the answer." wt

Some Quant Shops Doomed to 'Struggle'—*López de Prado*



Theory-first firms must modernize their methods or wither, says one machine learning expert. By Rob Mannix

Quant shops that stick too stubbornly to theory when devising strategies will trail behind math-driven "empiricists" who analyze data with no preconceptions. That's according to Marcos López de Prado, the former head of machine learning at AQR and founder of a new venture that aims to disrupt the traditional quant asset management business.

"Testing only flawed theories leads to confirmation bias. What I call the math-quant firms will continue to thrive because of the growing number of alternative datasets, greater computing power, and the development of new analytical methods," he says.

The "econ-quants," by contrast—firms that ground their strategies in theories from economists such as factor investing pioneers Eugene Fama and Kenneth French—tend to use research techniques that make them prone to formulating strategies that look good on paper, but are a figment of excessive testing. "Unless there is some sort of revolution in the econ-quant space, those firms will struggle," he says.

López de Prado left AQR in September, after just a year with the firm, to launch an enterprise that will use machine learning to scope for trading strategies in data. The project's aims are not unlike what some rivals are attempting. Where López de Prado hopes to gain an edge is by using methods borrowed from outside finance to zero in on statistically significant data and weed out false positives. The firm will then provide trading instructions direct to investors, chopping out the need to outsource trade execution to asset managers.

To aid this data-crunching effort, López de Prado is looking ahead to the arrival of super-fast quantum computers. Whoever harnesses this next-gen technology first will have an advantage over peers, he says.

"Testing only flawed theories leads to confirmation bias. What I call the math-quant firms will continue to thrive because of the growing number of alternative datasets, greater computing power, and the development of new analytical methods."

Leaden Factors

But computational prowess is worthless if the underlying strategies are flawed. López de Prado is dismissive about the rationale behind strategies centered on risk factors. Such investment techniques have become big business: BlackRock estimates the factor investing sector will be worth over $3 trillion by 2022. The Cornell University professor believes some factors are built on shaky scientific foundations, though.

"The firms that are founded by economists typically use a quantitative toolkit that mostly comprises econometric analysis or classical statistical methods," he says. "They form a theory, they select the data that helps them prove that theory, they run some thousands of linear regressions, they report only the result with the lowest p-value."

P-values measure the statistical significance of an observation. The lower the score, the less likely the findings are simply down to chance.

Frequently such tests, which firms apply to sift meaningful signals from statistical noise, ignore the number of strategies tried and discarded before finding those that work. A quant that backtests a thousand ideas will find bogus strategies with Sharpe ratios as high as three, López de Prado says.

Canadian economist Campbell Harvey has identified that most factor investing strategies fail tests of statistical significance when multiple testing is accounted for. But even Harvey was "generous" in some of his assumptions, López de Prado says. "If you acknowledge that each study is the result of thousands of unreported backtests, rather than one backtest, it is quite unlikely any of these factors is real."

Crucially, because the strategies in question target low Sharpe ratios, it will take decades or more to prove they are false, he says.

Firms also take as "axioms" ideas that often turn out to be wrong or overly simplistic, López de Prado says, such as the notion that markets pay a linear premium on risk, or that correlations are effective measures of co-dependence.

Several of the main factors proffered as persistent return drivers—such as buying value stocks—have lagged the market for years (*see figure 1*). Meanwhile, firms that use mathematics to detect patterns in data without preconceptions, such as Renaissance Technologies, have enjoyed eye-catching returns.

True Positives

The name of López de Prado's new firm—True Positive Technologies—refers to tools he developed to detect false investment strategies, so preventing unnecessary losses for investors, he explains. He sold patent applications for several such algorithms to AQR before leaving the firm.

In the new venture, machine learning will help detect patterns in data and filter out bogus discoveries—in other words, it will be used as a research tool.

"People need to prepare. We don't know how long it could take for these machines to become commercially available, but one thing is certain: once they do, it will take no time for someone to extract most of the profit."

This is different from how skeptics in the industry talk of the technology as a black box model to run portfolios autonomously. "We can use machine learning algorithms to identify which are the important features involved in a market phenomenon, and how the features interrelate," López de Prado says.

Such an approach is common for researchers in disciplines like materials science and biomedical research but is less prevalent in finance.

More than 700 papers in the field of chemometrics—the discipline at the intersection of chemistry and statistics—include machine learning terms, for example, compared with fewer than 100 papers on statistics and economics, López de Prado found.

Big asset managers assert that size gives them a competitive edge, enabling them to cross trades and lessen transaction fees for clients in a sector locked in a margin-shredding price war.

But López de Prado aims to undercut the cost-cutters by not taking custody of assets. Instead, the firm will develop strategies through its "strategy factory" that investors can implement themselves, and will advise institutions on building simpler, do-it-yourself strategies in-house.

"Institutional investors don't need to rely on asset managers any more," López de Prado says. Instead of paying for managers to maintain operational infrastructure that institutions already have, such as trading desks, "you insert within the institution the component they are missing—the advanced research," he explains.

For the simplest strategies the fees could be as low as 10 basis points of managed assets with no performance element. For more complex strategies targeting higher Sharpe ratios, the performance fees would be the main source of income.

But what if López de Prado's machines find markets to be largely efficient? Might the math-quants find that new data yields little new alpha? López de Prado insists not.

He says view of markets as efficient price-discovery machines—an idea

that underpins the notion of simple, persistent and unchanging factors—is wrong and getting more so. "Markets are adaptive. They are not stale. They do not conform to our ideals," he says.

Regulation has created inefficiencies by stopping players such as investment banks' proprietary trading desks from arbitraging skewed prices. Passive investing has put trillions of dollars in the hands of vehicles that will buy "anything in an index regardless of valuation, pricing, fundamentals, expectations."

Information, meanwhile, is becoming less evenly spread among market participants, with the math-quants able to detect trading opportunities in new data that others cannot see, so he claims. "We have more data and computing power, and better mathematical techniques to find and exploit imperfections that before we were not even aware of," López de Prado says.

He draws a comparison with mining for precious metals, where chemical extraction means more gold is extracted today than when miners were digging through visible seams.

"There was a period in history when people thought that gold had been essentially depleted. But today, through industrial processes, more can be extracted in a year than in a couple of centuries in the past. In quant investing we are talking about more than just the opportunities that were available yesterday. Markets are more inefficient than ever," he says.

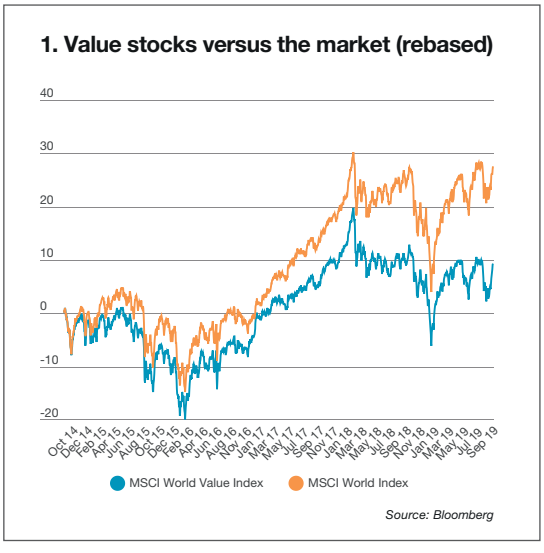
Quantum Dawn

Tech advances such as the deployment of quantum computing will also favor a minority of market players across different fields of investment.

Firms ignoring advances on computing's front line will find quantum computing is "irrelevant until it becomes the only thing that matters," López de Prado predicts. At that point "there will be no time to adjust or adapt. There will not be a year. The profits will be obtained by the first with the technology."

Quantum computers use the ability of sub-atomic particles to exist in multiple states at once to churn through data exponentially faster than a conventional machine with its binary units of memory.

Right now, quantum computers face practical impediments to their day-to-day use. They must be cooled to well below freezing to work, for example. But quants have shown already how the machines can solve complex finance problems such as optimising large portfolios.



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A patent is pending on a technology developed by López de Prado and researchers at 1QB Information Technologies that uses quantum computing to optimize portfolios.

"We don't know when these new machines will be deployed, but when they are, swathes of investing behavior will be immediately transformed," López de Prado says.

Liquidity arbitrage traders that triangulate between markets would find there was "all of a sudden" no money to be made, he says. "That's the kind of opportunity that would collapse at the flip of a switch."

Asset managers that rebalance portfolios frequently would be able to optimize their trading execution using much faster simulations from machine learning algorithms running on quantum computers.

Buyers and sellers in complex asset classes with abundant data, such as real estate, would benefit from the combination of machine learning techniques and greater computing power.

"People need to prepare," López de Prado says. "We don't know how long it could take for these machines to become commercially available, but one thing is certain: Once they do, it will take no time for someone to extract most of the profit." wt

Max Bowie

Alt Data's Mid-Life Crisis

Alternative data is maturing. But with its growth spurt comes growing pains—just ask Thasos Group. And though the market is still in its adolescence rather than full adulthood, Max says it's starting to face some grownup challenges.

The stampede of alternative data has hit a hurdle. Geolocation data provider Thasos Group wasn't the first to stumble, but the news that in August the vendor cut almost half its staff and replaced its CEO has provided a reality check for those who view the alt data bubble with blinkered optimism.

Yes, overall, alt data is more widely accepted and adopted. Many on the buy side now view it as pretty much mainstream, to be used alongside price data, fundamentals, and other factors such as estimates. In some cases, the data is so compellingly correlated to financial performance that it forms an integral part of a firm's investment models. But it isn't all plain sailing.

Though forces like increased passive investment help drive adoption—"There's nothing like margin contraction to stimulate innovation," says one alt data specialist—fee pressures mean funds don't have unlimited resources for new data.

And while some point to the staff cuts and change of CEO as a sign that the previous management had not run as tight a ship as it could have, there are other factors that undoubtedly played a role in the company's refocus, and which are likely to affect other alt data vendors—especially those who have bet the farm on one product, or have overstaffed in expectation of a flood of new business—in the near term.

"Certainly there are macro issues affecting hedge funds. Often in the tech business, you talk about customer churn," says Thasos' new CEO Craig Hattabaugh—indeed, one competing vendor estimates 15% annual turnover of traders at client firms. "But now we're seeing 'existential churn'—when a customer goes out of business. The economic pressures on funds are well known, so there has been a retraction. People are still using and consuming alt data, but they now have a lot of choices."

> The alt data market has grown fast, and is increasingly crowded in terms of providers

Certainly, the alt data market has grown fast, and is increasingly crowded in terms of providers, so over-supply is one challenge, making it more important to stand out from the crowd.

"There are several geolocation data providers, and there's a technical gap to consumption for geolocation data," says the alt data specialist.

Hattabaugh agrees: "If you think about the information and insight that can be derived from mobile data… that technology has taken longer to develop than expected. We crunch an unbelievable amount of data every day, but there is a ways to go before we can get that into more of an accurate signal," he says.

Mind the Gap

That technical gap and need to assess multiple datasets together places a significant testing burden on firms before they can use data in production. In addition, there are now so many alt data startups that using them all is not an option, and figuring out which add the most value is a real challenge, on top of which, the data scientists who perform those tasks don't come cheap.

"Firms who are data driven can't not pay attention to new datasets. And the guys at these buy-side firms are pretty savvy, but in terms of the time and resources required to analyze a dataset, they're numb—they probably get a couple of hundred pitches a week," says Bruce Fador, managing partner at Fador Global Consulting, an advisory firm that has worked with several alt data providers. "The sector has gotten crowded, and supply is exceeding demand, so there has to be a whittling-down process."

Having experienced that firsthand, Thasos is hedging its bets and broadening its datasets and client base—for example, adding credit card transaction data and telematics data from third parties to its offering, and targeting other industries such as commercial real estate, in addition to financial services.

"We're not abandoning financial services, and we're not pivoting 100% to commercial real estate, though it's part of the business plan… and holds more short-term promise," Hattabaugh says.

For example, footfall data can be an important metric for property owners looking to buy or sell a location, as well as for those who lease space—to assess visibility of a specific location, to justify rent increases or concessions, and to compare activity with other locations, where existing datasets may not deliver enough transparency. "There are blind spots, and people are willing to pay to lift the blinders," Hattabaugh adds. wt

Existential Questions for ESG

Jo says there are some basic standards that must be finalized before socially responsible investing takes off.

It's almost 50 years since Milton Friedman's screed against socially responsible investing was published in *New York Times Magazine*.

"The businessmen believe that they are defending free enterprise when they declaim that business is not concerned 'merely' with profit, but also with promoting desirable 'social' ends; that business has a 'social conscience' and takes seriously its responsibilities for providing employment, eliminating discrimination, avoiding pollution and whatever else may be the catchwords of the contemporary crop of reformers," Friedman wrote in the 1970 article.

Doesn't he sound out of touch? Look at those sarcastic scare quotes! Friedman must be rolling in his grave: it's pretty widely accepted now that social responsibility and profit are not necessarily mutually exclusive, and are not, as he says, "unadulterated socialism."

To be fair to him, he was writing before a time when the effects of unchecked enterprise had wrought havoc on the climate, when free market fundamentalism did truly seem like the path to American-style democracy, and hence peace and plenty, worldwide.

But how do we excuse the senior salesman at one of the lesser-known data vendors, whom I overheard recently remark with a smirk that ESG is a trend driven by the "millennial snowflakes"?

Leaving aside how immensely tiresome this term is, I would question this man's business sense, as someone presumably trying to sell ESG data. Asset managers and data vendors are reporting a surging demand for ESG products and ratings that has been growing for perhaps the past 10 years and seems to be reaching an inflection point in 2019. Consolidation in the industry has occurred with increased M&A activity.

And the snowflake millennials are, at least partly, driving this recent surge. They are no longer selfie-obsessed children; the older ones are closing in on 40—old enough to have accumulated some wealth and be wondering where to put it. More to the point, they will be the beneficiaries of an enormous amount of wealth as their parents die.

> "Why are the E, the S and the G even lumped together in the first place? In some ways, they can cover totally unrelated concepts

Morgan Stanley research shows that American millennials alone are poised to inherit $30 trillion from their boomer elders. And these are people with a "strong desire to produce positive change," the report adds.

A New World

Is this surprising? This is the generation that saw their prospects wane after the financial crisis, whose faith in corporations was tested post-Enron, that are contemplating starting families in a world where their offspring may witness ecological collapse. No wonder they want to put their money somewhere good. And it's not just individuals—asset managers and data providers also report a surge in demand for products and ratings among institutional asset owners.

Nevertheless, ESG is still a new frontier in many ways, and the sector lacks standards. This presents an issue for asset managers who want to run analytics on the datasets, for example; without correlation between vendors' data, there is doubt about its quality.

Other questions that asset managers are asking include: Why is ESG data considered different to financial data? What if consolidation in this space leads to a situation like that of market data, with customers feeling they are being charged too much because there is a functional oligopoly in the market? How to properly integrate ESG data with traditional financial data?

The only way standards will happen is through regulation, beginning with requiring uniform reporting from corporates. Many countries have ESG reporting requirements of some kind, but often these amount to box-ticking exercises. There is no harmonisation across the world, with the EU leading on sustainable finance standards, and the US Congress voting against them.

Crucially, no-one can agree on what ESG data is material—that is, what data is relevant to a company's financial performance.

Before that can be worked out, there is a basic question that needs answering: Why are the E, the S and the G even lumped together in the first place? In some ways, they can cover totally unrelated concepts. This is the existential question that must be asked before asset managers and owners can be certain that data and ratings truly represent the sustainability of a business. wt

Wei-Shen Wong

Evolving Roles in Financial Services

The increasing importance of data is introducing new roles to the financial sector. Wei-Shen ponders whether positions such as that of data translator will become normal a decade from now.

As a result of new technologies and regulations, the world of finance is in a state of constant evolution. While some positions are made obsolete—think about the traders in the Chicago Mercantile Exchange's open outcry pit—the flipside is that new roles are created.

Last year, I wrote about how the role of chief data officer (CDO) was gaining traction in Asia-Pacific. This position had previously seen more widespread pickup in the US and Europe, driven mainly by the aftermath of the 2008 financial crisis. However, in recent years, banks in the APAC region have also added it to the management suite.

The push for this role isn't restricted to the financial sector; it's also apparent in other data-heavy industries, such as telecommunications, retail, hospitality, and travel. The burden of identifying, standardizing, analyzing, and eventually monetizing large volumes of data within firms is increasingly falling on the shoulders of the CDO.

Local Knowledge

Banks also felt that establishing localized CDOs should be a priority. An Asia-Pacific CDO at a tier-one international bank with operations in Hong Kong explained to me that regional and country-level CDOs have become more important.

"You have to look at the country regulator, and face the challenges the organization has in terms of systems structure, processes, and data requirements. For that to happen, the CDO must be at the country level; it's too theoretical an approach if it is executed at the group level, because the data is owned by the organization in the country it operates in, [and] it changes from country to country. I think you've got to have a very thin model at the group level for it to work," the CDO says.

Enter the Translator

Now, another role has emerged in financial services: the data translator. Interestingly, while usually it's Asia-Pacific firms playing catchup with their Western counterparts when it comes to new jobs in the capital markets, for my article on data translators (*see page 16*), many of the people I spoke with who were based in Europe or the US hadn't heard of the term before.

> Many of the people I spoke with who were based in Europe or the US hadn't heard of the term [data translators] before.

Instead, it was interesting to see that more Asia-Pacific banks are considering adding a data translator to their talent pool. Some, such as Singapore-headquartered DBS Bank, are actively hiring for this role, as well as training existing staff to fill positions.

Data translators are experts who sit between the data scientist and the business. They can communicate ideas and help push the firm's data agenda along. Knowledge of the business, particularly of financial products, front-to-back processes, risk and analytics, are among the skills they should possess.

Idris Drief, data product architect at MUFG Investor Services, says data translators must have an inquisitive and entrepreneurial spirit, as well as "real respect" for the value of data. Great attention to detail, strong presentation and communication skills, and being open to change are also essential.

Chris Probert, partner and UK head of data at Capco, calls them "data ninjas." Probert says these ninjas are becoming increasingly important at banks to help address the gap between skills and experience. "Those who have the skills to use data tend to be newer at a bank and younger, while those who can understand data tend to be older and have built up experience in the organization over many years," he says.

This won't be much of an issue if banks' data is simple. But in reality, the data is often complicated and poorly defined—a challenge that many are still trying to solve.

An understanding of data's nuances is essential. "There are situations at banks where the same term means different things in different businesses, or where different terms really mean the same thing. Less experienced data scientists aren't well placed to understand these nuances," Probert says.

The data translator role is just one of many starting points within a bank's data journey. In the future, the job could morph into something entirely different. If so, it will be interesting to see what other new roles will emerge in the wake of the data translator era, and how firms will go about seeking to fill them. wt

Human Capital

Quandl Appoints Head of Data Strategy and Sourcing

Nasdaq's Quandl has hired Evan Reich to lead its data strategy and sourcing efforts, working to find new alternative data sources relevant to customers.

Reich joins from hedge fund BlueMountain Capital Management, where he held the same title. Prior to joining BlueMountain, he was one of the first data engineering hires at Millennium Management.

Reich has worked across the capital markets ecosystem, and was a contributor to the 2017 Nobel Prize in Physics for his work on the Laser Interferometer Gravitational-Wave Observatory, which is used to view gravity waves.

Evan Reich

Andrew Smith Lewis

Orbital Adds Head of Product

Orbital Insight, a California-based firm specializing in geospatial analytics, has appointed Jens Tellefson as senior vice president of product and design. In his role, he will lead global product strategy for the recently launched GO platform, which enables investors, corporates and governments to make policy and business decisions supported by geospatial analytics.

Tellefson joins Orbital from data platform Quantifind, where he was vice president of products. Prior to that, he was chief product officer for NetBase Solutions, which uses artificial intelligence for social media analytics.

Marion Leslie

New Head of Financial Information Joins SIX Board

SIX Swiss Exchange has tapped Marion Leslie to join SIX as head of the financial information business unit at the start of next year. Current department head Robert Jeanbart has announced his retirement, effective at the end of December.

Jeanbart has held the title since 2014. During his tenure, he restructured the unit by developing new business areas, expanding its regulatory data and services business, and strengthening reference data and corporate actions business.

Leslie will take Jeanbart's seat on the SIX executive board. She joins from Refinitiv, where she has worked since 1994. After holding several management roles, she became a managing director in 2013. In her last role at Refinitiv, Leslie was managing director, enterprise, in which she delivered market data, platforms and services to the global financial markets.

Once in her new role, Leslie will be based in Switzerland.

Pico Poaches ITG CEO for Board

Pico has appointed Francis Troise to its board of directors. He will advise Pico's executive team on global expansion and further client penetration across investment banks, institutional asset managers and hedge funds.

Troise most recently served as president and CEO of Investment Technology Group (ITG), where he helped lead its acquisition by Virtu Financial earlier this year. Prior to joining ITG, he was managing director and global head of JP Morgan's cross-asset execution services.

Troise is based in New York.

SS&C Hires Schachter for Relationship Management

SS&C Technologies has named Craig Schachter managing director and head of relationship management at DST Financial Services, Americas. He will help to build stronger client relationships, deliver strategic client solutions and maximize the full capabilities in SS&C's acquisition of DST.

Schachter joins the firm from Finastra, where he was most recently global head of the fintech ecosystem. He has also held global and strategic leadership roles at FIS and SunGard.

CAIS Taps Scientist and AI Expert For CIO Role

Technologist and scientist Andrew Smith Lewis has joined alternative investment platform CAIS as chief innovation officer. His arrival is part of the firm's goal to expand its technology team and its Los Angeles-based Technology and Innovation Hub.

Smith Lewis departs from a 20-year run as CEO at Cerego, an adaptive learning platform. However, he will continue to serve on the company's board of directors as vice chairman.

Asset Control Debuts Practice Group, Names Director

Gil Leon will lead Asset Control's new Practice Group, designed to be a consultancy arm on data mastering and data exploration technology for new and existing customers.

Leon joins the financial software firm after serving as a managing

partner and co-founder of Alpha-Management Group since 2013. Prior to that, he spent eight years at Moore Capital Management as director of trading services and risk information data management.

He is based in New York and reports to Nathan Wolaver, managing director of the Americas.

Finantix Appoints Switzerland Business Development Director

Jérôme Vasamillet has joined Finantix, a technology provider for the wealth management, banking and insurance industries, as business development director in Switzerland. He is tasked with growing the company's Nordic presence, and will work alongside the firm's research and development team to extend its core product suite.

Vasamillet has worked at several startups and two accelerators, including Fusion, where he was entrepreneur-in-residence helping new fintech firms.

IEX Co-Founder, COO to Retire

John Schwall, co-founder and COO of the Investors Exchange (IEX), will retire by the end of the year. His duties, which include overseeing market operations, information security, and quality assurance, will be taken on by other IEX executives: Ronan Ryan, co-founder and president; Rob Park, co-founder and CTO; and Sara Furber, CFO.

Since IEX's founding 2012, Schwall has helped build the exchange through scaling internal operations and solving structural market inefficiencies. Prior to IEX, his career spanned more than 20 years at various financial institutions.

Thasos CEO Steps Down, Scales Back Workforce

As reported by *Business Insider*, Greg Skibiski, co-founder and CEO of alternative data company Thasos, has stepped down, and the vendor has cut roughly two-thirds of its staff. Skibiski has moved into a role of non-executive chairman, but will still take part in managing daily operations.

Throughout August and half of September, Thasos's 40-person staff was reduced to just 12.

FORMER FINRA, SEC EXEC JOINS ACA COMPLIANCE

ACA Compliance, a regtech provider and compliance consultancy, has added Carlo Di Florio to its C-suite as global chief services officer (CSO). As CSO, he will manage various ACA silos, including regulatory compliance, cybersecurity and risk, and AML and financial crimes. In addition, he will contribute to new infrastructure and technology projects.

Di Florio joins from a six-year tenure at Finra, where he was chief risk and strategy officer, as well as co-chair of the Finra360 Project Management Office. Prior to that, he served as director of the Securities and Exchange Commission's Office of Compliance Inspections, working to update the Risk Analysis and Surveillance Unit by leveraging new technology and data analytics capabilities. Before entering the public sector, he was a partner in PwC's Financial Services Risk and Regulatory Practice.

Carlo Di Florio

Jérôme Vasamillet

John Schwall

DriveWealth Bolsters Exec Team

DriveWealth Technologies has made two hires to its executive team: Ryan Burke as chief information officer and Andrew Levine as its first chief integration officer.

Levine will be responsible for client onboarding and managing relationships with existing clients, while Burke will aim to grow the brokerage and wealth management business by evolving its IT strategy.

Burke joins from digital financial services company Stash Invest, where he served as vice president of brokerage and head of operations since 2016.

Levine has served as a consultant for fintech CEOs since last year. In 2018, he left his own CEO role at TraderTools, which provides FX technology solutions.

State Street Hires EMEA Head of ESG Investing

Carlo Funk has joined State Street Global Advisors (SSGA) to lead ESG investment strategy in the EMEA region. He will work with the ESG research and development, investment research and management teams to design solutions for advisors, consultants and institutional clients.

Before joining SSGA, he was responsible for the design and distribution of passive ESG investment solutions at BlackRock, and acted as EMEA-wide sustainable investing sales specialist. Before that, he worked at JP Morgan's Private Bank.

Funk is based in London.

GLMX Appoints New Head Of Client Integration

Thomas Curley has been appointed head of client integration at GLMX, a registered broker-dealer and technology provider for the securities finance and repo space. At the same time, Joe Pizzarelli, who previously oversaw client integration and onboarding, will now focus full-time on client development.

Curley joins from TrueEX, where he was head of client onboarding.

AcadiaSoft Names Chairman

AcadiaSoft, a provider of risk and collateral management services, has tapped John Shay to serve as its new chairman. He replaces Howard Edelstein, who served on the firm's board of directors since the founding of the company in 2009.

Shay founded and currently serves as managing partner at Capital MarketServices, a clearing and execution services business for the non-bank community in the over-the-counter and exchange-traded markets. He is also a senior advisor at Broadway Technology and at Virtu Financial.

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