transforming global foreign exchange markets

e-FOREX

e-forex.net **AUGUST** 2020

REGIONAL PERSPECTIVE
The growing use of e-FX amongst U.S. regional banks

MACHINE LEARNING
Stirring up competition in FX algo trading

DIGITAL ASSETS
e-platforms help facilitate increased institutional demand

ULTRA LOW LATENCY
Technology solutions and implementations

BROKER OPERATIONS
How to adapt and scale your business

COVER INTERVIEW
HARPAL SANDHU
CEO of Integral

LIQUIDITY • RISK MANAGEMENT • STP • E-COMMERCE

Welcome to

e-FOREX

transforming global foreign exchange markets

August 2020

In this edition we have summarised some of the key findings from the latest FX survey carried out by Refinitiv amongst more than 1,000 of the firms clients from 50 countries about the impact of COVID-19 on their forex trading, including their biggest challenges and favoured execution methods. The results provide some interesting reading. As many of the firms' clients are currently working in a virtual office environment(VOE), they were also asked about any problems they were experiencing when working from home. The most significant VOE challenge was 'Communication', both with colleagues, and with clients and/or dealers. The problems that this presents may explain why electronic trading was found from the survey to be far more reliable for Refinitiv's participants than 'Voice risk transfer'. It also demonstrates that instead of reverting to voice, the market appears to be so far down the path of electronification that it pushed even further in this direction when a crisis situation like COVID-19 evolved. In the Autumn we will be exploring the role of Regtech in helping to ensure that FX trading firms remain compliant and can meet their trade surveillance and other regulatory obligations whilst many of their staff operate in a VOE.

Our regional e-FX perspective feature this month focuses on regional banks in the U.S. It seems remarkable that many of these Tier 3 institutions have been relatively slow to acquire and implement the same sort of e-FX capabilities that many similar sized banks around the world have enjoyed for some time. But the incentive and resources to invest in the necessary technology and associated integration just hasn't been there for them. However, U.S. regional banks now stand at a crossroads. Some of their customers have started moving some or all of their FX activity from bank relationship channels to more competitive industry platforms, where automated pricing is essential in order to protect customer wallet share. And coupled with this the underlying driver of their FX activity – cross-border payments - is being threatened by non-bank FinTech payments providers who are offering much more competitive FX rates on smaller-value transactions. So it will be interesting to see what steps they take to meet these threats by increasing their investment in e-FX and automation.

As usual we hope you will enjoy reading this edition of e-Forex.
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NEWS

Sucden Financial goes live with BierbaumPro/ NTPro

Sucden Financial, the global multi-asset execution, clearing and liquidity provider has become a Principal on the BierbaumPro trading platform, branded as NTpro in Russia. BierbaumPro/ NTPro's clients can now benefit from low latency access to Sucden Financial's unique and customisable liquidity streams. The integration utilises servers in LD4 and a new dedicated high-speed connection to DSP datacentre in Moscow, underlining Sucden Financial's long-standing commitment to the region.


Aleksei Suturin

Aleksei Suturin, Sucden Financial's Moscow representative said, "Our new BierbaumPro/NTPro integration allows us to grow our presence in the CIS and Europe, providing low latency streaming within a single eco-system. The new high-speed connection will also help us develop additional credit intermediation opportunities with institutional clients, both locally and internationally."

Nasdaq and DGCX sign technology agreement

Nasdaq and Dubai Gold & Commodities Exchange (DGCX) have announced a major market technology agreement for Nasdaq to provide DGCX with a full suite of integrated marketplace solutions. The marketplace solutions, delivered via the Nasdaq Financial Framework, include multi-asset trading and real time clearing capabilities, pre-trade risk management, as well as market intelligence, market surveillance and quality assurance applications required to safeguard the integrity of the market.

"We are pleased to be partnering with Nasdaq in the next stage of the development of DGCX, with their highly-renowned suite of technology solutions that will enable us to provide our Members and their clients with ever-increasing levels of service performance," said Les Male, CEO at DGCX.

OANDA partners With FairXchange

OANDA has selected FairXchange to provide the firm with independent execution analytics. As part of the deal, FairXchange will provide OANDA with access to its Horizon platform, which offers tools and techniques that help users manage and optimise their eFX business. Horizon is designed to facilitate constructive, data-driven dialogue between counterparties, helping them to identify mutually profitable opportunities.


Guy Hopkins

FairXchange's CEO, Guy Hopkins, said, "We are delighted to be partnering with OANDA, one of the true pioneers of the electronic trading industry. Our core philosophy is that everyone in financial markets – both liquidity consumers and providers – should be able to transact in a way that is commercially sustainable in the long term. Being truly independent, we are ideally placed to provide a fully transparent and impartial offering to OANDA."

Barclays launches NDF algos on BARX

Barclays has announced the launch of new non-deliverable forwards (NDF) algorithms on the BARX electronic trading platform. The NDF algorithms are the latest addition to the BARX Gator™ algorithm suite for FX trading. BARX Gator™ is Barclays electronic order execution channel which combines liquidity available on external venues with BARX principal liquidity. The channel now supports 1-month NDFs for multiple algorithms in seven Asian currency pairs; USDCNY, USDIDR, USDINR, USDKRW, USDMYR, USDPHP, USDTWD. Naseer Al-Khudairi, Global Head of Markets Electronic Trading and Digital Strategy at Barclays said: "The launch of our NDF algorithms puts Barclays at the forefront of a significant evolution in FX algos and we're pleased to offer this innovative product to our clients. This is an exciting addition to the BARX platform as we continue to make significant investments to our electronic offering to provide clients with the solutions they need."

Naseer Al-Khudairi

Vela and IPC expand market data partnership

Vela has announced the expansion of its strategic partnership with IPC. This will provide IPC customers with access to Vela's award-winning market data solution, SuperFeed, via Connexus Cloud, IPC's flagship financial ecosystem that interconnects more than 6,600 capital market participants across the globe. It will also enable IPC customers, utilizing Connexus Labs, to access an on-demand market data solution to support trading application testing along with third-party product evaluations. Ollie Cadman, Chief Product Officer at Vela, commented, "We are delighted to expand our partnership and have the strength of IPC as part of our ecosystem connecting SuperFeed to the global financial markets community. Now more than ever, firms are looking to trusted providers and private and public cloud environments to support the growing demand for access to global data sets for business processes such as automation, artificial intelligence and analytics."

Ollie Cadman

FXCM Pro partners with Devexperts

FXCM Pro, the institutional arm of the FXCM Group has partnered with Devexperts to provide liquidity to its innovative trading platform, Dxtrade. Dxtrade launched in May 2020 and is a new off-the-shelf trading platform for forex and CFD brokers, FXCM Pro becomes one of the first major names to onboard onto the trading platform as an institutional liquidity provider. Conor O'Driscoll, VP of OTC Platform at Devexperts, commented: "FXCM Pro is the primary source of multi-asset liquidity for many brokers worldwide. Their excellent service, coupled with Devexperts' knowledge in building trading platforms and integration for our clients into DXtrade, results in a turn-key and affordable solution for new entrants launching their forex or CFD brokerage."

Conor O'Driscoll

Cürex Group announces additional algo collaboration with Barclays

The Cürex Group has announced a collaboration with Barclays to bring their mutual clients additional benefits resulting from Barclays' integration of Cürex's liquidity onto its extensive algorithmic platform. Barclays' clients have had access to Cürex liquidity through executions on the BARX platform via its BARX Gator™ algorithmic suite since July 2019. As a result of this new initiative, clients using Barclays' individual algorithms will be able to select Cürex's liquidity pool as an exclusive destination for their executions. Commenting for Cürex, James Singleton, Chairman and CEO, said, "We have built a great relationship with Barclays over the last year. This next step underscores the value of Cürex's unique liquidity pool and pre- and post-trade data analytics. Our mission is to provide buy side institutions with compliant executions when held to the highest standards."


James Singleton

MARKTS joins forces with OSL

TradingScreen Inc. (TS) subsidiary MARKTS, a digital asset order and execution management system (OEMS), has announced that it has partnered with OSL, Asia's leading digital asset platform, to launch OSL Exchange and OSL intelligent Request for Quote (iRFQ) trading services on MARKTS. OSL Exchange and iRFQ connect directly into TradingScreen's all asset class Order and Execution Management Systems (OEMS). The connectivity allows institutional investors to price, buy, and sell the top digital assets by market capitalization. Commenting on the partnership, Alexandre Carteau, Head of MARKTS at TradingScreen said, "Our integration with OSL Exchange is a key part of our ongoing drive to aggregate high-quality liquidity across the world. As the digital asset market continues to evolve across Asia, ensuring institutional investors can trade digital assets seamlessly regardless of location is imperative."


Alexandre Carteau

TraderEvolution integrates with ICE Data Services

End-to-end trading technology provider TraderEvolution continues to build up its strategic relationships with a brand new integration with ICE Data Services. The collaboration enables TraderEvolution to offer its customers unique pricing and normalized exchange data from ICE Data Services' Consolidated Feed. ICE Data Services is part of Intercontinental Exchange (NYSE:ICE).

The ICE Consolidated Feed aggregates content from 600+ sources and offers cost-effective, low latency access to depth-of-market data and multi-asset content to power proprietary and 3rd party applications and desktops across the front, middle and back office. Commenting on the collaboration, the CEO of TraderEvolution, Roman Nalivayko said: "We are very excited to unveil this data-oriented collaboration. ICE Data Services provides global coverage which is in line with the concept that we pursue at TraderEvolution to offer a universal and diversified multi-market solution. This integration is important for us to deliver a fully-functional trading software covering multiple global markets."


Roman Nalivayko

TradeTech FX event highlights FX algo use in Covid crisis

The TradeTech FX Virtual event ran 21-22 July, bringing together heads of FX and their teams in a bid to benchmark their response and solutions to the Covid-19 crisis. The online programme included a live interview with Christian Gressel, Head of FX Algo Trading, UBS and Brendan McMurtray, CFA, Vice President, FX Electronic Trading Analyst, T. Rowe Price to discuss how to implement advanced algorithms to achieve best execution during increasing volumes and times of high volatility.

Gressel began with an overview of the main challenges facing FX algo providers during the crisis, with the biggest challenge coming from the external influences that they witnessed over February, March and also into April to some degree. While leading investment banks such as UBS had detailed business continuity plans, Gressel noted that these plans had not needed to be fully tested for more than a day here or there and certainly not to the extent we've seen, particularly in March, where market volatility added to the additional strain. "If you think of our business, we have a group of sales traders globally who monitor the FX algo flow and the client business. Now, if you are now trying to relocate those people to backup sites and to working from home situations, you can see how capacity very, very quickly becomes a little bit of an issue or a strain and working environments change dramatically," he says.

Christian Gressel

In addition, Gressel noted the loss of quick interactions and the physical contact gained from being in the office environment. Yet overall, taking into consideration how volatile the market was and how much volume was actually traded during that time, Gressel says that the business weathered that period very, very well and he was amazed at how few problems they encountered.

McMurtray agreed with Gressel and echoed his own experiences of the sudden loss of an office environment where there's so much cross pollination and collaboration, which he adds can really impact the way that things get done at T. Rowe as even with WebEx, Zoom calls or chats via Symphony, that contact is still a spectre of its former self. Even so, he agrees that on the whole, they were pleasantly surprised as far as business continuity was concerned. An audience poll taken during the conference day also found that 100% had experienced a seamless transition to working from home during the crisis.

CALLS FOR BETTER FUNCTIONALITY

However, one major concern McMurtray found was the lack of flexibility available from their providers. "This was an issue that we had previously, but was certainly exacerbated in the higher volatility environment, specifically having the ability to partially fill an FX algo, mark the portion traded as complete and carve out the balance. We had a number of situations where trades either ran away from us or, you know, market news came out and we decided that we needed to change tactics. But our current provider couldn't support this, which was definitely a detriment that we saw that was kind of highlighted in this environment," he explained.

McMurtray looked forward to the provider releasing the functionality which will allow users to trade an algo part way through, effectively mark the portion that they have traded as complete and then carve out the balance and trade it via a different mechanism, either via voice, RFQ etc. As of the writing of this article, this has been made available. Aside from that, McMurtray added that the extreme widening of spreads and market volatility did drive T. Rowe Price to reduce its RFQ trading in favour of other execution types. "When we couple this with a significantly higher internal volumes that we saw, as well as an elevated demand for execution flexibility from our traders, FX algos did become an increasingly important execution tool for us," he says. "During the crisis our algo usage definitely did increase on an absolute basis."

Brendan McMurtray

TradetechFX continues to bring many leading buyside firms together

In terms of strategies, McMurtray says they continue to favour opportunistic strategies, although there has been some additional uptick in the usage of internal only or non-displayed strategies throughout the crisis, at the expense of more purely passive or pegging based strategies. He explains: "We did find that these pegging strategies tended to underperform in times of volatility and trending markets, especially given their asymmetric payoff. When these trades were moving against us, they would have filled slowly as no one would come in from the other side across the spread. And then on the flip side, when they moved in our favour, they would fill too quickly and not benefit from the market movement."

LESSONS LEARNT

Gressel says that UBS had also seen a general increase in algo usage and the use of more opportunistic and urgent strategies by clients. In turn, he says that one of the main takeaways from the crisis is the need to consider much more flexibility around the parameters that are going into the FX algos. "Before this crisis, although we have seen volatility, we haven't seen those intraday and very short term changes - not just for a single event, but actually being in place for a couple of days and literally changing the environment that we're in for a few days or a week. So that was something that we definitely have looked into and that we learned that we needed to adapt much quicker to," he adds. On the algo front, McMurtray adds that he believes this crisis will drive further integration of real-time market conditions within the algo ecosystem. "So whether it's on the execution side itself or on the analytics and execution decision making side, being able to adapt to changing market conditions will be crucial to minimising some of the tail events that both Christian and I referenced. Algos have been, and continue to be, an excellent tool for the buyside to be able to capture spread and achieve cost savings versus risk transfer," he concludes.

FORTHCOMING EVENT

On 22nd and 23rd September 2020 the Tradetech FX organisers are holding an invite-only Virtual Forum for FX leaders to benchmark their COVID-19 recovery strategy.

More information can be found at:
https://www.wbresearch.com/events-trade-tech-fx-virtual-boardroom-eu-september-2020/?utm_source=ttfxeuwbr&utm_medium=referral

Refinitiv's FX Survey results – May / June 2020

The latest FX survey from Refinitiv asked more than 1,000 of the firms clients from 50 countries about the impact of COVID-19 on forex trading, including their biggest challenges, favoured execution methods, and their experiences working in a virtual office environment.

The survey found that Refinitiv clients' biggest challenges included spreads –especially in hedge funds and banks –and a lack of access to liquidity, which was a prominent issue for banks during the onset of the pandemic. Clients also expressed opinions on what they have found to be the most reliable methods of execution, their experiences of the virtual office environment, and their expectations for the rest of 2020?

Refinitiv collected a wealth of information from participants on their FX Transactions Venues –FXall QuickTrade, FXall Pricestream, Refinitiv Matching and Orderbook. The survey was conducted in mid-May through the first week of June. Respondents came from across Refinitiv's four client segments (asset managers, hedge funds, corporations and banks) and they represent significant buy-and sell-side participants in the FX market.

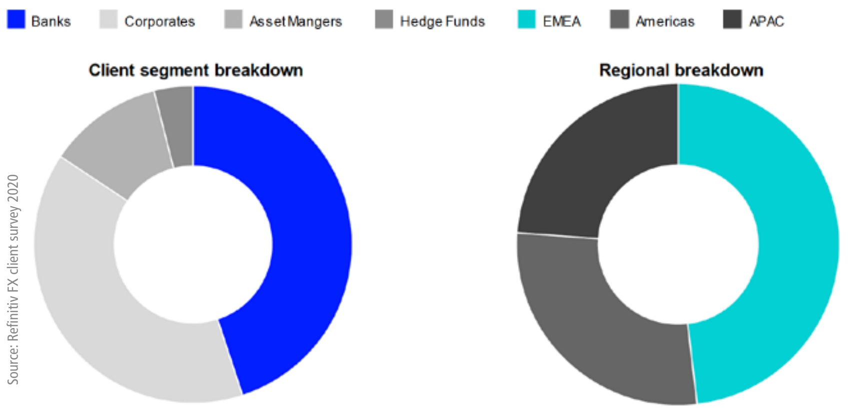
SPREADS

Clients were asked about their biggest FX trading challenge. Unsurprisingly, 'Spreads' was the most popular response, with 50 percent giving that answer. This was felt more significantly at hedge funds and banks. 68 percent and 57 percent respectively said this was their biggest challenge, as opposed to only 35 percent of corporates. The changes to spreads during this period have been well documented. Spreads widened as volatility increased and providers became concerned about client credit.

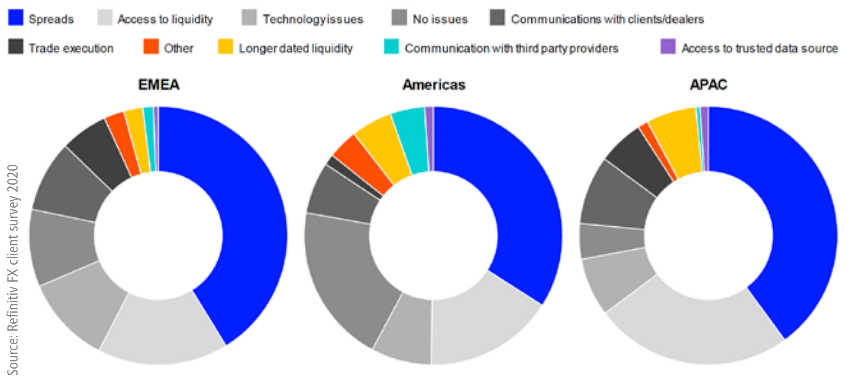
This was clearly a market-wide impact, but one that was mitigated, at least partially, by utilization of tools to aggregate available pricing and find that elusive 'best price'.

The second most popular answer was a lack of 'Access to liquidity'. This seems to have been an issue predominantly for banks; 31 percent of the banking segment chose this answer compared with much smaller percentages from the other client segments.

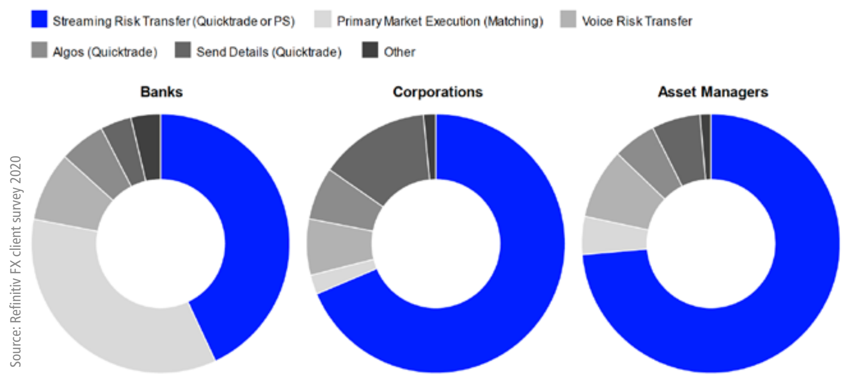
In parallel with this, Refinitiv saw a significant uptick in interest in sourcing liquidity from their Primary Market –Refinitiv Matching. 28 percent of respondents (that are not currently using it) expressed an interest in sourcing liquidity from Matching, which has traditionally underpinned FX price discovery and pricing by liquidity providers. This could be seen as a flight to quality as the trading community opt for the certainty of firm pricing and low rejects.



Breakdown of survey respondents



What was your biggest trading challenge? - Respondents could select multiple answers



What execution method have you found most reliable? - Respondents could select multiple answers

RELIABLE EXECUTION METHOD

Refinitiv also asked which execution method participants found to be the most reliable during the crisis period. The top two answers were 'Streaming risk transfer' (as provided by FXall QuickTrade and Price stream) and 'Primary market execution' (as provided by Refinitiv Matching).

This latter point reinforces the aforementioned flight to quality. Banks wanted to trade on the Primary Market because they found it the most reliable mechanism to get their executions completed, while most buy-side participants opted for immediate risk transfer to their relationship banks.

If you dive slightly deeper into the numbers, you can see that over 70 percent of Refinitiv's corporates and asset managers favoured streaming risk transfer. The balance of their answers highlighted an increased use of tools to automate the workflow around a voice trade (Send Details) and algorithmic execution.

This belies some recent press coverage about the death of the Request for Quote (RFQ). The results clearly show that this is the most reliable way of getting FX business done for a very significant proportion of the market. The use of Send Details is interesting.

This is a facility that allows trades to be agreed by voice, but then automates the booking through normal STP. Its increased use suggests that even trades that would normally take place over voice need the reduced risk of automated booking. It further demonstrates that a fully integrated electronic solution is the lowest risk method to execute FX.

VIRTUAL OFFICE ENVIRONMENT

Conscious that most of their clients are presently working in a virtual office environment(VOE), Refinitiv also asked them about their biggest challenges working from home.

The most significant VOE challenge was 'Communication', both with colleagues, and with clients and/or dealers. This difficulty communicating could be part of the reason why electronic trading was found from the survey to be far more reliable for Refinitiv's participants than 'Voice risk transfer'.

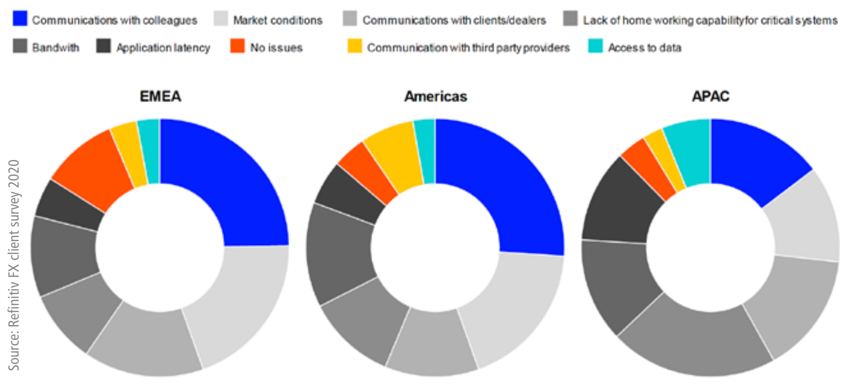
It also shows that instead of reverting to old-world methods (voice), the market is now so far down the path of electronification that it pushed even further in this direction when a crisis situation evolved. 18 percent of respondents described 'Lack of a home-working capability for critical systems' as the biggest challenge. This seems to demonstrate the initial teething issues that most people experienced while transitioning to their crisis working set-up.

The anecdotal updates that accompanied the survey results suggest that most of these home-working issues were resolved relatively quickly, and business-as-usual working was proven to be successful in most instances, despite extraordinary market volatility. Indeed, when asked a follow-up question about what clients would retain when working practices returned to normal, the most common answer was that they had proved working from home could be viable, and they were likely to do more of it.

PROSPECTS FOR REST OF 2020

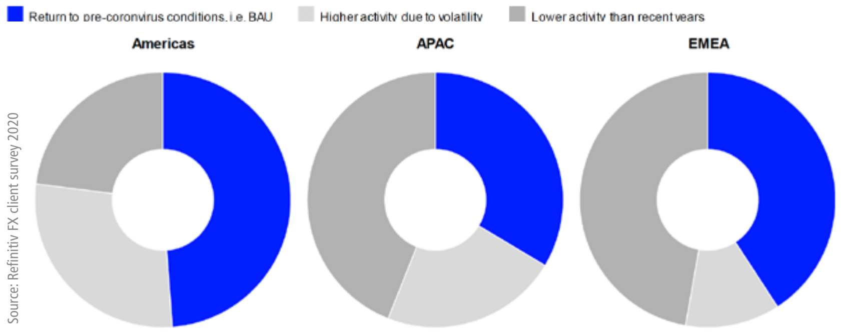
A final questions asked respondents for their outlook on FX trading market conditions and what is expected in Q3 and Q4 of this year.

The responses showed some divergence between regions and client segments. However, the general theme is an expectation

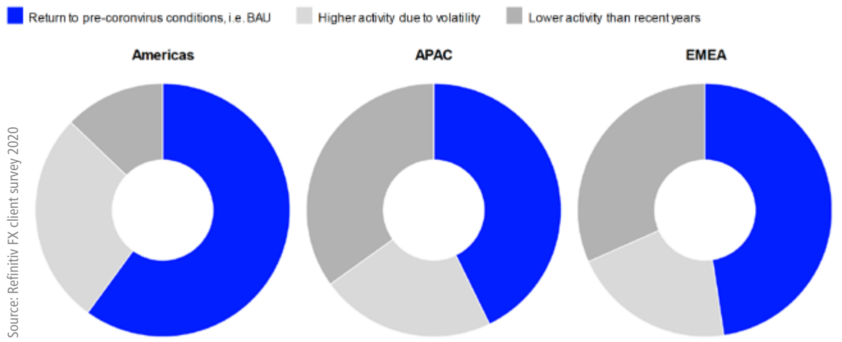


What have been your biggest challenges in working from home? - Respondents could select multiple answers

Refinitiv's FX Survey results – May / June 2020



What FX market conditions do you expect to see in Q3 2020? - Data is based on proportion of respondents who expressed an opinion on this particular question in the survey



What FX market conditions do you expect to see by Q4 2020? - Data is based on proportion of respondents who expressed an opinion on this particular question in the survey

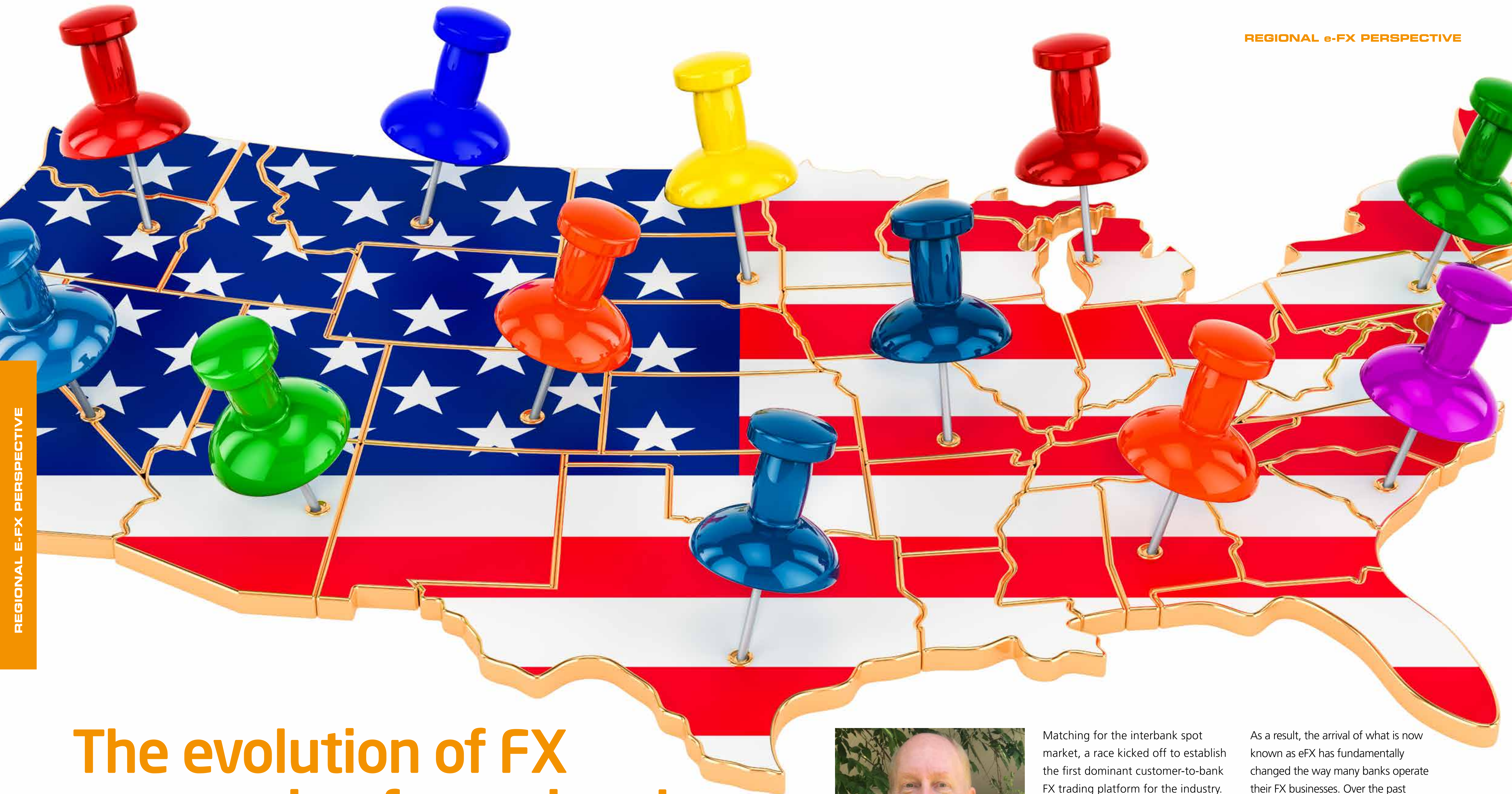
that the market remains somewhat subdued in Q3 but bounces back to pre-crisis conditions in Q4. Of the three regions, the Americas was the most optimistic, with a strong belief among the corporate and hedge fund communities that the market would bounce back sooner.

If we dive into the client segments a little deeper, we see some divergence in opinion on what comes next. Corporates definitely see the landscape improving over the next two quarters.

There is some fear that Q4 will bring high volatility (perhaps a second spike in the virus) in Asia and Americas, but far less in EMEA. Asset managers globally seem broadly confident we will get back to business-as-usual conditions as soon as Q3. There is less concern about an overheating market in Q4. Those situated in EMEA seem particularly confident that we will get back on an even keel in Q4.

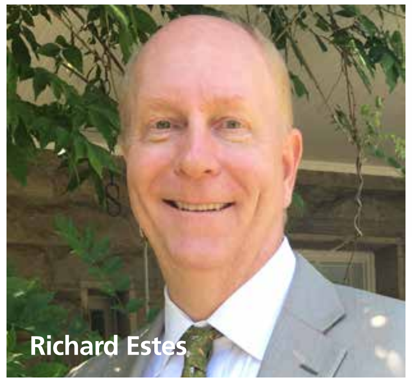
Hedge funds in the U.S. (which include HFTs) seem to have a slightly different outlook to other constituents. The data shows that they see conditions in Q3 being marginally better than Q4. Perhaps thinking that the unwinding of the crisis removes some of the trading opportunities that have arisen from the volatility in the first half of the year.

Within the corporate client segment, we split the results into sectors. There was general consistency across the segment, but a line can be drawn between the health, manufacturing and technology sectors and all others in terms of optimism. Retail, entertainment, transport and professional services remain relatively pessimistic about a recovery, which chimes with the overall impact to those sectors imposed by lockdowns across the world.



The evolution of FX automation for regional banks in the U.S.

By Richard Estes, Founder and President of eFX Consulting



Richard Estes

Twenty years ago, the foreign exchange market entered the dawn of electronic trading. Several years after the launch of EBS and Reuters Matching for the interbank spot market, a race kicked off to establish the first dominant customer-to-bank FX trading platform for the industry. The establishment of FX electronic trading platforms such as FXall, FX Connect, Currenex, 360T, Bloomberg, and many others over the proceeding years has had a profound effect upon the FX market. Notably, it has impacted how many end-users such as corporations, asset managers, hedge funds, and others trade with their banks and other liquidity providers.

As a result, the arrival of what is now known as eFX has fundamentally changed the way many banks operate their FX businesses. Over the past two decades FX has changed from a predominantly manual business to one that is highly automated, with eFX capabilities such as liquidity aggregation, price generation and distribution, algorithmic execution, risk management, and performance analytics necessary in order to operate in today's FX market.

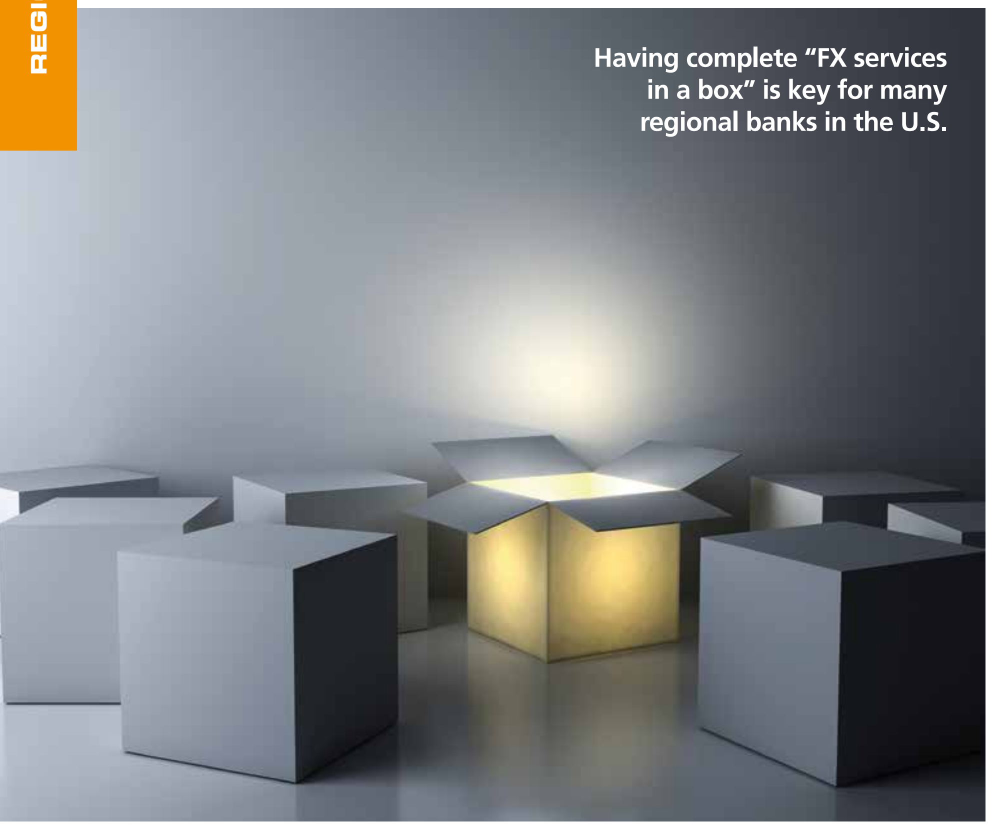
However, regional banks in the U.S., commonly referred to as "Tier 3 banks", have been slow to acquire and implement such eFX capabilities. Consequently, their FX businesses still operate much more manually than those of the Tier 1 and 2 banks. For one, U.S. regional banks have not been required to automate in the same way as their customers typically transact FX on a relationship basis, using a bank where they maintain their core banking activities. For another, their FX revenues are a fraction of what they are for the Tier 1 and 2 banks, due to the much lower customer volumes. As a result, there has been both a lack of motivation and resources to invest in the necessary eFX capabilities and associated integration.

U.S. regional banks, though, are at a crossroads today. Some of them are experiencing a handful of customers moving some or all of their FX activity from bank relationship channels to more competitive industry platforms, where automated pricing is essential in order to protect customer wallet share. To provide automated pricing on FXall, Bloomberg, or 360T, they have made basic investments in eFX technology but operate it on a standalone basis without proper integration into the rest of their FX trading workflow. Meanwhile, the underlying driver of their FX activity – cross-border payments - is being threatened by non-bank FinTech payments providers who are offering much more competitive FX rates on smaller-value transactions.

Fortunately, there are technology providers who are now focusing now on servicing this segment of the FX market who can provide both the full functionality and integration of eFX capabilities, and at a reasonable cost. The challenge for U.S. regional banks is determining the right solution for their mix of customer business and legacy technology.

SOURCES OF U.S. REGIONAL BANK FX TRADING ACTIVITY

In servicing the FX needs of the world's largest companies, as well as those of asset managers, hedge funds,



Steve Jacobellis

and other financial institutions, Tier 1 and 2 banks offer FX trading not only for transactional purposes (e.g., payments and securities settlement) and risk management purposes (e.g., hedging), but also as an outright asset class. However, the FX trading of U.S. regional banks is chiefly driven by transactional purposes of their customers, namely small- and medium-sized businesses engaged in cross-border trade.

Over the years as more and more companies have begun importing and exporting goods and services, this has provided an opportunity for U.S. regional banks located near these companies to expand their relationships beyond core banking and lending services into International Banking services to support them, both broadening the relationships and adding higher margin products to them. Such services include International Treasury Management, Trade Finance, and Foreign Exchange.

International Treasury Management services account for the bulk of a regional bank's FX activities, with cross-border payments comprising the largest component. Says Steve Jacobellis, an industry consultant specializing in banking and capital markets and a former FX trader

Cole Augustine

at a U.S. regional bank, "These banks generate most of their FX revenues from their payments activity". Cross-border payments are a natural extension of a customer's relationship with a bank that provides core banking services, as payments are normally pre-funded from the customer's DDA. Some larger regional banks offer foreign currency accounts which enable customers to receive payments in a foreign currency and use the proceeds to fund future expenses in that currency.

Trade Finance services typically do not generate FX transactions for U.S. companies, due to the fact that Import, Export, and Standby Letters of Credit are primarily denominated in U.S. dollars. However, they play an important part in the overall credit relationship with customers, one which can lead to a Foreign Exchange trading relationship for risk management purposes.

Foreign Exchange is a growing part of International Banking services, with many U.S. regional banks touting their capabilities in Spot, Forwards, Window Forwards, and Swaps. Focusing on a basic list of trading products, which have been standard in the FX industry for decades, appears overly simplistic at first. However, for many small- and medium-sized companies only familiar with making cross-border payments, these products are not so basic as they contain a credit provision component.

Providing Foreign Exchange services requires a minimal but significant investment in people, beyond what is typically needed to provide FX transactional services for cross-border payments. Traders are required for pricing, risk management, and nostro account funding; salespeople or "advisors" for customer guidance and assistance with trade execution; operations staff for trade processing, confirmation, and settlement; and credit and compliance staff to support the business. Noting this, Jacobellis adds, "U.S. regional banks' FX desks are staffed to support what are considered more sophisticated trades even if they don't necessarily execute large volumes of them."

EVOLUTION OF CROSS-BORDER PAYMENTS CAPABILITIES

Historically, most U.S. regional banks lacked the proper payments infrastructure to provide cross-border payments capabilities for their customers. Instead, the existing domestic payments infrastructure included different back office systems implemented by a regional bank to support individual banking functions such as wire transfers, ACH, check clearing, lockbox, loans, and information reporting. To support the need to make cross-border payments, many of them outsourced the activity to a larger correspondent bank, including the profitable FX conversion.

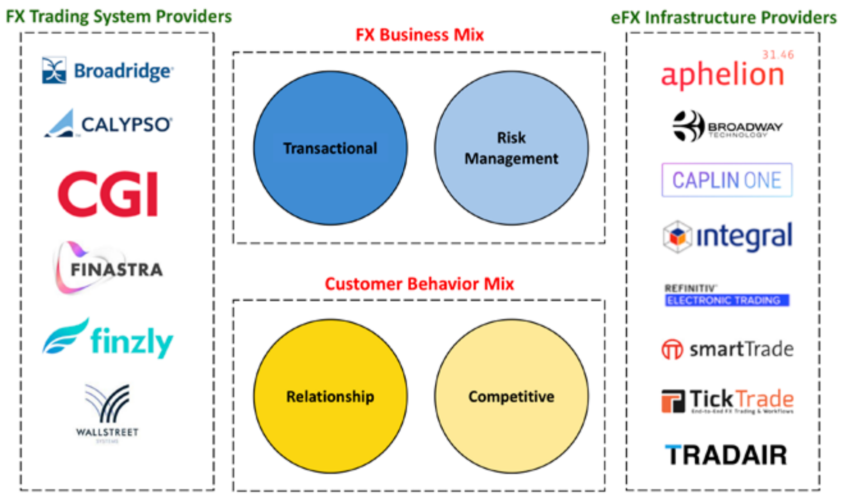
Over time, however, U.S. regional banks have upgraded their payments infrastructure by implementing a core payments platform which included the ability to handle non-USD payments. Examples of such platforms include Finastra's Global PAYplus, ACI Worldwide, and Fiserv's WireXChange, states Cole Augustine, founder of Galactic Trade Consultants and who has worked in Treasury Management and International Banking roles at several U.S. regional banks during his career. While these systems have provided more control over initiating cross-border payments, they still have left many U.S. regional banks dependent upon the FX capabilities of their correspondent bank partner, including the supply of daily static FX rates.

As their cross-border payments volumes have grown, and with it revenue opportunities, the larger U.S. regional banks have implemented separate FX trading platforms which offer a core FX front office and back office along with a web-based customer front end, include Finastra's Fusion Opics, ION Group's Wallstreet FX, CGI's FXSuite 360, Calypso FX, Broadridge FX, and Finzly's FX STAR. The addition of an FX platform, complete with payment workflows, has enabled these banks to shift their larger cross-border payments activity to it, thus consolidating its FX trading activities, adds Augustine.

Having complete "FX services in a box" is vital for U.S. regional banks, which have limited IT budget and resources to support their FX businesses and often cannot afford to acquire and integrate separate front- and back-end components. Concludes Augustine, "The driver in choosing [a vendor system] is often the customer front-end. [These banks] also have little desire to build a pricing engine for it, relying instead on their correspondent banks to provide an FX rate feed".

Support for an FX rate feed is an increasingly important consideration, as the use of real-time FX pricing for

The evolution of FX automation for regional banks in the U.S.



Regional Bank FX Automation Solutions

cross-border payments now mimics how FX is customarily traded. Finzly, for one, has recognized the need to provide real-time core market pricing and risk offset tools for banks who lack any eFX infrastructure. It offers in FX STAR a configurable pricing engine that supports both RFQ and RFS pricing, as well as liquidity provision from FX SpotStream or Bloomberg's FXGO for auto quote and cover. CGI's FXSuite 360 also includes an integrated liquidity management engine with options for liquidity provision via FXSpotStream or from select Tier 1 banks.

INCORPORATING EFX INFRASTRUCTURE

Relying on one of these all-encompassing FX trading solutions is sufficient for servicing the transactional and other basic FX trading needs of a U.S. regional bank's customers who exclusively use the bank's relationship-based channels. But what happens when some of them ask that bank to trade with them via FXall, 360T, or Bloomberg? Here the bank needs to consider employing additional eFX infrastructure to support these customers, minimally for price generation and distribution but potentially as well for liquidity aggregation, position management, and other features.

Providing FX services requires a significant investment in people

There are numerous options for a U.S. regional bank to consider, as an increasing number of firms are offering hosted eFX services that can be provided modularly or in entirety depending on needs and budget. A number of the established market leaders, such as Refinitiv (Electronic Trading), Integral (Bank FX), Aphelion (Aphelion eFX), and TradAir, initially designed core eFX infrastructure for top tier banks, but now find regional banks to be a major segment of their customer base. Similarly, firms such as Broadway Technology and smartTrade (LiquidityFX), who first developed sophisticated e-trading tools for Tier 1 banks, are now looking to move down market and offer their services to regional banks.

Meanwhile, TickTrade, founded more recently by a cadre of former regional bank eFX specialists, is focused on supporting the specific needs of U.S. regional banks, with separate modules for eFX infrastructure and for global payments. Finally, Caplin Systems, a longtime market leader in HTML5-based web front ends for banks, has rolled out basic e-trading capabilities via its Caplin One product.

PAYMENTS PROVIDERS AS BOTH A THREAT AND OPPORTUNITY

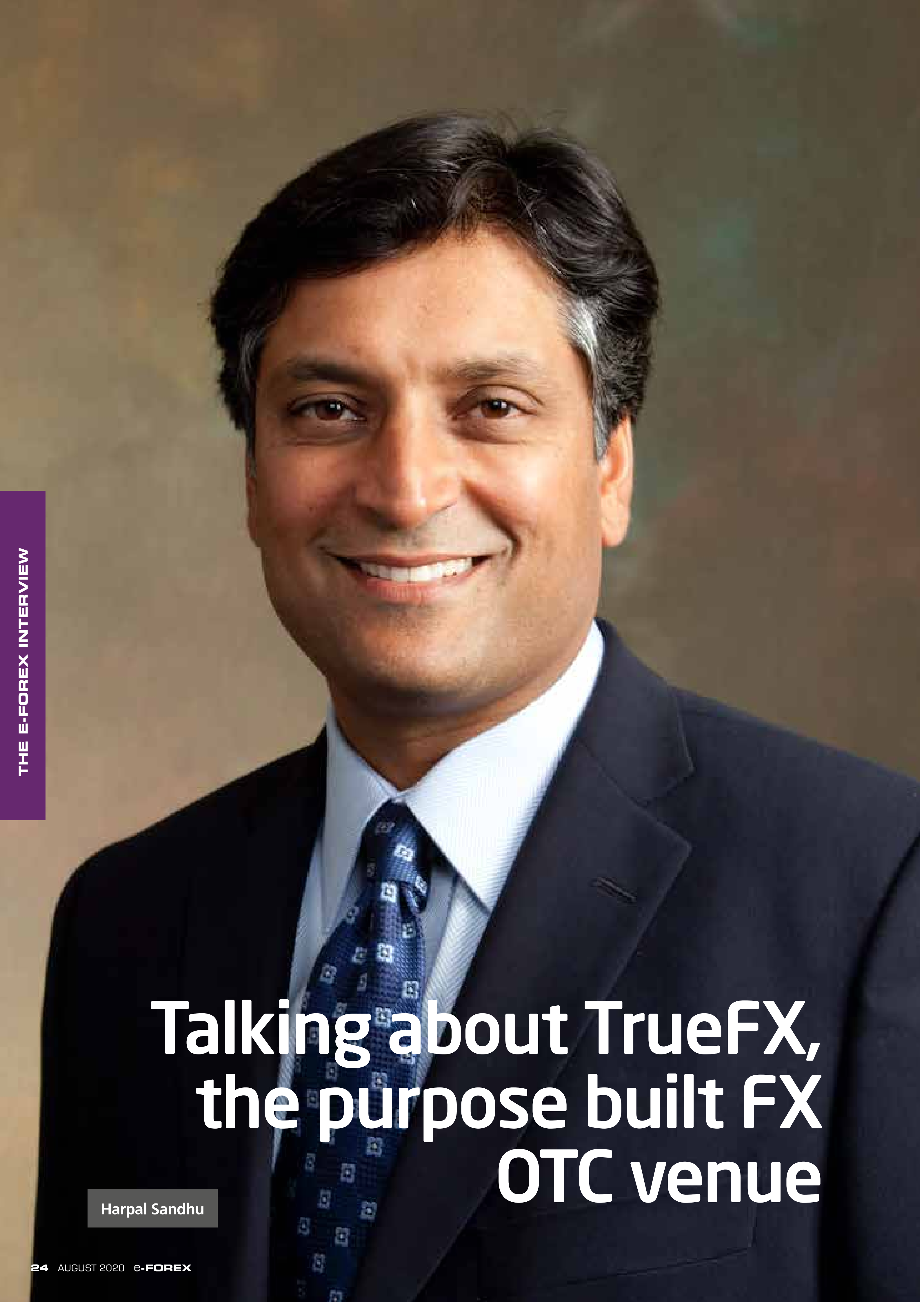
As the payments business is considered as one of the last profitable areas of FX, there have been significant efforts by numerous non-bank payment providers to take this business from regional banks by offering much more competitive FX pricing for cross-border payments, even for smaller value payments. One advantage these providers possess is their foreign currency account infrastructure across an extensive correspondent bank network that allows them to separate the FX trade component from the payment transaction. A regional bank, meanwhile, may be limited to using its correspondent bank for payment delivery as its sole FX counterparty.

Interestingly, some FinTech firms provide multi-currency account infrastructure to enable smaller regional banks to offer cross-border payment capabilities with competitive FX rates without having to maintain correspondent bank relationships. One such firm, Currencycloud, also supports virtual named accounts for a regional bank's customers without the need to complete extensive documentation for actual physical accounts.

DETERMINING THE RIGHT APPROACH TO AUTOMATING FX

U.S. regional banks earn just a fraction of the FX revenues of Tier 1 and 2 banks. As a result, their investment capability in FX systems and automation is limited. Still, for a bank whose overall revenues are in the millions, not billions, of dollars, additional revenues from FX activity can be meaningful to the bottom line. "We see regional banks bringing FX business in-house as they see growing demand and the non-interest income opportunity available. They can earn millions in FX revenue in a very short period of time", says Brian Anderson, Vice President of Business Development at Finzly.

The challenge, therefore, is to determine the right approach to choosing technology solutions to support and ultimately automate a bank's FX business. Important factors include the mix of transactional- versus risk management-related FX, and the use of relationship channels versus industry platforms by customers. For many U.S. regional banks, depending simply on a comprehensive FX trading platform may be sufficient to operate a purely relationship business. However, the addition of an appropriate-sized eFX infrastructure, with proper integration to an FX trading platform, can provide additional benefits to improve the efficiency and profitability of the business. Technology firms, thankfully, have recognized the need to package eFX functionality with integration services, running in cloud-based environments that can be provided to smaller banks at reasonable costs.



Talking about TrueFX, the purpose built FX OTC venue

Harpal Sandhu

Integral Development commenced business in 1993 and led the way with the first ever Internet based derivatives pricing and risk management system in 1997. Since then the firm has pioneered the use of advanced technology to deliver increased transparency, best execution and operational efficiency to banks, brokers and asset managers around the world. Integral's CEO, Harpal Sandhu talks to e-Forex about the current product set of the company and is then joined by Brandon Mulvihill, Global Head of FX Prime Brokerage at Jefferies to tell us more about their joint venture TrueFX, an award winning purpose built FX OTC venue that was launched late last year.

HS: Harpal, you have had a long and illustrious career in the FinTech sector. What have been some highlights and key business milestones for you during that time?

There is no doubt a highlight of being in the markets for as long as we have been are the relationships we have developed along the way. Working in longstanding partnership with market participants, intermediaries, and other technology providers has been very important to us as we've grown our business and we are incredibly appreciative of the support we have received.

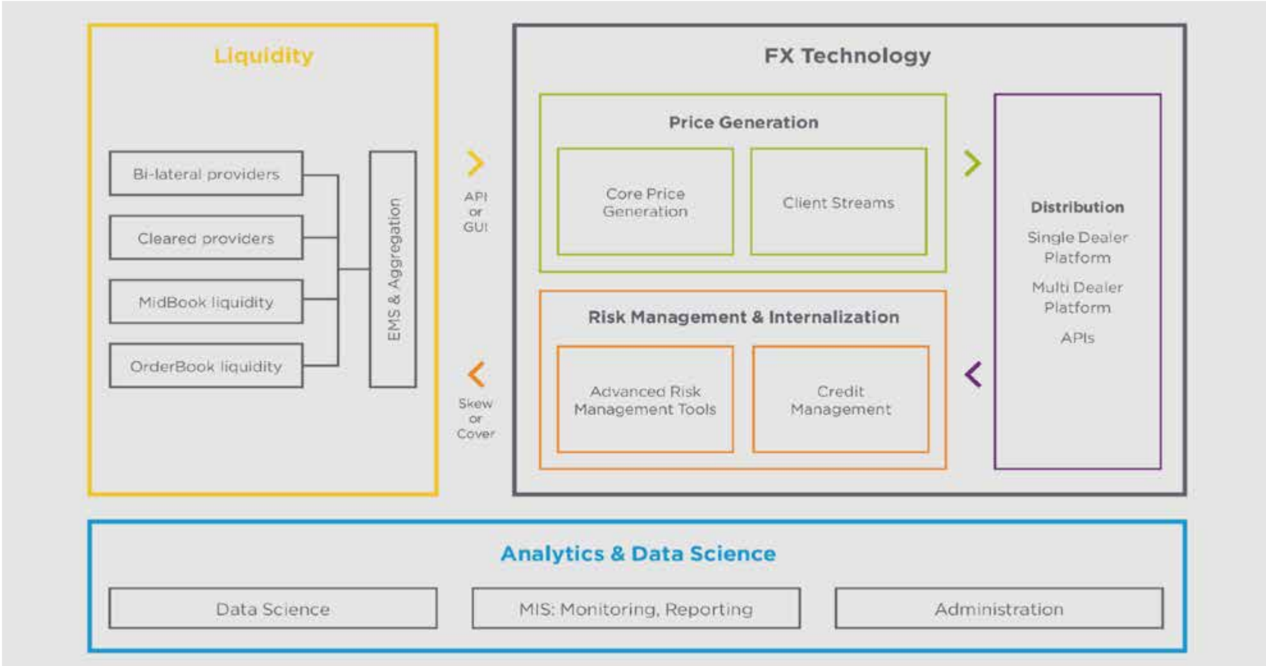
Since the company was founded 20+ years ago, Integral's intention was to lower the barriers to entry in capital markets by using technology as a democratising tool. To make trading accessible in the OTC markets though, you need multiple services available to you, notably technology, credit, and liquidity. Of course these services have been around a long time, but more often than not they are offered as bundled services at a high cost, which has made access to the core market more expensive to the buy side.

We've been working hard and organising ourselves with other providers to lower these barriers, so any institution can access and trade at a fair price. This type of restructure helps to bring dramatic and long-term changes to a trading ecosystem, and I'm pleased to say our collective hard work is now coming to fruition.

HS: Please remind our readers about the type of clients that Integral now provides services for and the range of workflow and advanced execution solutions it offers to help them achieve competitive advantages in the FX market?

First and foremost, we are a technology company that enables capital market participants - including banks, brokers, hedge funds, and asset managers - to manage their risk and serve their customers optimally.

We help clients grow their business' through the provision of highly configurable eFX automation technology which spans the full trade lifecycle. All our technology can be



Integral FX workflow solutions. Users can select the specific solutions they need or take as part of a full stack offering

Talking about TrueFX, the purpose built FX OTC venue

The three pillars of TrueFX

consumed as modular solutions for a fixed monthly subscription. And because our technology is built in a cloud environment, services can be deployed in a matter of weeks.

Separately, our ECN - the Open Currency Exchange (OCX) - brings together the widest variety of market participants and execution models into a single integrated network of liquidity. Our trading platform is supported by a global liquidity management team, who work closely with clients to help them optimise their eFX business across the network.

HS: Ok so let's talk about TrueFX, the purpose built FX OTC venue which Integral launched with Jefferies in November last year. What are you each contributing to the joint venture?

TrueFX is something we are all very passionate about given its potential to help transform the marketplace. We launched with the objective of making high quality credit, advanced trading technology, and valuable liquidity accessible to any institution - irrespective of their size - in a single, low-cost and convenient environment.

It is a best-of-breed offering, with Jefferies FX Prime Brokerage acting as the primary credit intermediary, Integral provisioning the technology, and the world's primary automated market makers in FX providing liquidity across the ecosystem.

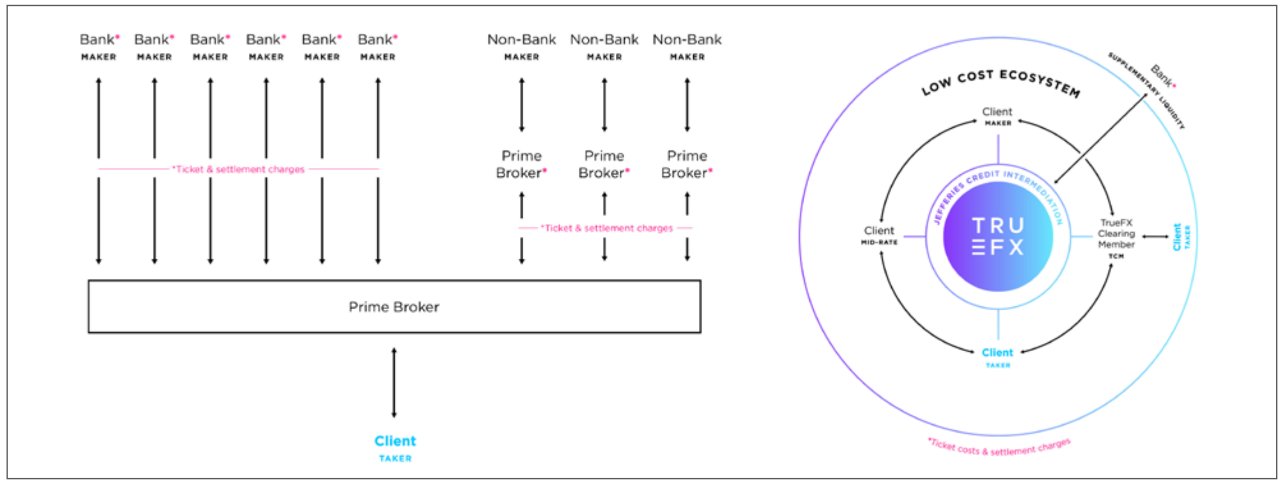
We think of it as an OTC exchange, and by that I mean it is incorporating the best components found in a regulated exchange environment with the benefits of an OTC model. It's really the best of both worlds.

HS: How would you describe the philosophy behind TrueFX and what it's trying to achieve?

TrueFX delivers improved efficiencies across the three layers of the FX OTC market, that being credit, technology, and liquidity.

We set out to open up the market to the widest possible user base and have achieved this by bringing together independent organisations specialised in their respective fields into an innovative and self-contained environment. This has allowed any natural taker of FX liquidity - irrespective of their size - to gain direct market access to primary sources of liquidity in an organised, transparent, and low-cost way.

The service was started with support from Integral and Jefferies FXPB, however, in the last few months the venue really has taken off through a wider network of clearing members supporting an even more diverse range of clients. I think we've seen such high interest and uptake because people recognise how the service can help transform their business in a meaningful way, yet the simplicity



Traditional versus TrueFX workflow

of the venue makes it extremely easy to join and incorporate into their pre-existing business models and infrastructure.

HS: What specific efficiencies has TrueFX been designed to bring about?

The best way to answer this question is by looking at efficiencies by audience type. For market makers, we've created an ecosystem where they can stream custom prices to their customers directly, without intermediation. This is important because it allows them to offer better prices and reach a wider range of clients with lower risk. In respect to the network of clearing members utilising the venue, they are now able to expand their business to a broader client base who are showing interest in moving towards efficient OTC markets. For natural takers of FX liquidity, including retail brokers, macro hedge funds, asset managers, and regional banks; TrueFX affords access to the primary sources of FX liquidity without anyone getting between them and the market maker. Users of TrueFX can ultimately trade however, wherever and with whomever they want at significantly lower cost. In fact, all natural takers of liquidity can trade on TrueFX and use its technology at zero cost. Combined with significantly lower credit fees, total costs of trading FX are reduced by up to 80% in the TrueFX environment.

BM: Brandon, the legacy credit environment has become an increasingly difficult service for the buy side to navigate. In what ways does Jefferies FXPB credit intermediation through the TrueFX environment help to solve this?

The buy side has had to manage between market related costs versus credit related costs. Historically, banks have won this battle because they leverage their credit access to send flows their way, which monetizes their credit offering. Today, the buy side is taking liquidity management and algo creation into their own hands, which reshuffles their balance of priorities. TrueFX is perfectly timed for this.

TrueFX delivers a single access point for both technology and credit whereby both are priced for scale. Immediately, buy side participants can complement bank liquidity with some of the largest market makers in the world. They can access their liquidity in a variety of ways, without any minimum ticket fees, while settling through a centralized institution in Jefferies.

BM: How does TrueFX manage to significantly reduce costs?

The primary way TrueFX reduces costs is via the elimination of third-party fees such as settlement and post trade messaging. Because the ecosystem is direct and client to client, there is no need for settlement with parties outside of the ecosystem. Additionally, Jefferies and Integral developed all required post-trade messaging so the ecosystem is fully self-sufficient.

HS: What problems have the buyside traditionally faced when it comes to technology and how have you designed and engineered TrueFX to address these?

Buy side institutions should not have to be technology companies, yet I think it's fair to say these organisations have

Brandon Mulvihill

had to spend a lot of time and money on integration and technology projects.

The technology underpinning TrueFX was built with the automation and workflow efficiencies of a buy side audience or a natural taker of FX liquidity in mind. These efficiencies cover all aspects of the venue, spanning trading workflow, technology, and intermediation.

The venue has been built to ensure that the many and varied primary sources of liquidity a buy side audience needs to connect to are easily accessible. Users also get to utilise high quality - yet low cost - credit and clearing services. Cost savings are incurred thanks to the fully integrated and centralised ecosystem that allows intermediaries to pass cost savings directly onto the client.

We've created an extremely efficient state for customer workflow, including the ability to trade using a wide range of execution styles beneficial to both maker and taker. Users have the option to trade via anonymous matching, bilaterally with preferred counterparties, or at mid-point to off-set risk. The venue also offers a small ticket friendly environment, meaning users can submit as many tickets as they want without penalisation as there is no minimum per-ticket charge.

HS: Is TrueFX open to all market participants and how ambitious are your plans to grow its user base?

In short yes, it is! TrueFX is open to any institution that wants to use it. The venue is facilitated by leading and independent FX organisations specialised in their respective fields of technology, trading, and clearing. This network takes away the burden of our clients having to be technologists, needing a large balance sheet to access credit, or trading necessitating relationships with multiple intermediaries to access liquidity.

It's all about removing these barriers and supporting any institution wanting to trade FX - anywhere in the world - that makes TrueFX such a compelling proposition.

BM: You have also launched the TrueFX clearing network. Please tell us a little more about it and what it offers?

As mentioned before, TrueFX is built for scale. Integral provides technology scale while Jefferies brings the ability to clear an enormous amount of tickets in a cost-effective manner. The more ecosystem customers, the better the system runs. Enter the TrueFX Clearing Member or TCM.

Clients can either access TrueFX directly through Jefferies or they can gain access to the ecosystem via a TCM. TCMs directly clear each trade, charging the underlying client a commission. TCMs have the flexibility to determine their liquidity on offer, further differentiating themselves.

TRUEFX
CLEARING MEMBERS

To date, we are thrilled to have AxiCorp, FXCM, Sucden Financial, and Velocity Trade as the first TCM's on offer.

BM: How supportive of TrueFX have you found market participants to be so far and in what ways has this helped you to accelerate the development of the service?

Market participants have been far more than supportive, and are actually driving the direction of the ecosystem. One factor that makes TrueFX different is the multitude of ways clients use the product. Some participants want fully disclosed liquidity, some want undisclosed, some want a combination. The end benefits remain the same, but the delivery of the product is dynamic. Thanks to market participants, our disclosed and undisclosed offering is now live with clients accessing liquidity from Integral in LD4, NY4, and TY3.

BM: How resilient has TrueFX been during the Covid-19 crisis?

Firstly, I would like to address our industry. FX is almost entirely an online enterprise, with everyone quite accustomed to the 24X5 nature of our market. I think the industry has handled this pandemic extraordinarily well. It is certainly sad that our transient style of business in FX grinded to a halt, with many popular conferences appropriately cancelled. This pandemic has us missing those business trips and meeting with people face to face, sharing our collective experience. I sincerely hope all are well.

Circling back to TrueFX, the product itself has been galvanizing. At Jefferies, we shifted a few technology priorities to support this exciting endeavor. Integral has brought in grade A talent to the firm, folks who proactively made the decision to be part of this story. We have bolstered liquidity, optimized performance, and acquired a new TCM all during this pandemic period. Yet, the gravity of attracting great minds is what I think we will look back on a year from now as truly distinct evidence of the products' resiliency.

Jefferies shifted a few technology priorities to support this exciting endeavour.

HS: TrueFX is built in an ultra-low latency cloud-based environment. In what ways is the Coronavirus pandemic likely to play into the strengths of FX in the Cloud and further strengthen the value proposition of platforms like yours?

We know the financial industry has been on a journey in moving towards acceptance of cloud computing. I think it's fair to say that today, incorporating cloud into an organisation's infrastructure has to be a central part of any institution's tech strategy. The need for flexible architecture is being felt even more acutely at present, as organisations manage distributed workforces, who are in need of continuous access to high-performing technology wherever they are working.

Of course, cloud computing is not just about remote working. From hardware, software, and network layers, our systems were built from the ground up for ultra-low latency and high reliability. The reality is we can deploy and deliver premium FX services at a fraction of the cost through cloud. Today more than ever these cost reductions are welcomed in the market.

TrueFX is case in point. It's only by Integral's technology operating in a cloud environment and already at scale that we can pass such significant cost savings - that being access to free trading and technology - onto the client.

BM: In what ways have you recently been working to enhance the TrueFX service?

Onboarding. Right now, we continue to onboard new accounts directly or via a TCM. We onboarded market makers, so we have been mapping direct liquidity steadily. In addition to this, TrueFX aims to increase market share with a couple of different buy side participants. We anticipate a lot of meaningful updates in the fall, and we have one update that we can discuss now.

Jefferies FXPB has revolutionized the way clients roll their overnight positions. Jefferies teamed up with Integral to launch an advanced trading platform for clients to execute their rollover swaps and residuals. Liquidity is sourced from a collection of the largest market makers in the world with all-in pricing and no brokerage charges. Jefferies FXPB customers will now have the flexibility to perform

Talking about TrueFX, the purpose built FX OTC venue

Jefferies FXPB has revolutionized the way clients roll their overnight positions.

their roll and residual trades on competitive pricing and on their own schedules, 24/5*. We believe a swap platform with multi-contributor derived liquidity, offered directly by an FXPB, to be the first of its kind within the industry.

I close with this thought because while our latest offering sits adjacent to TrueFX, it is yet another example of a scalable solution we have created with Integral to significantly improve the trading experience for our clients. Stay tuned for the next update.

HS: What steps are you taking to facilitate access to TrueFX and what factors are likely to influence its growth over the next few years?

We are taking every step to make sure the venue is accessible to any institution that wants to trade FX. This means we will continue to strategically invest in TrueFX, so users can benefit from the workflow efficiencies and low-cost trading environment. At the moment we are looking at how we can integrate more forms of connectivity into the network, with the option for a user to integrate the service into any environment they require - spanning both institutional and retail connections.
We're also looking to add significantly more capacity to the network, so as we expand our partnerships to include the widest array of clearing members, we will be able to serve any part of the FX market wanting to participate.

HS: All in all why is TrueFX so transformational for the buyside?

Simply put, TrueFX significantly cuts the costs of trading FX and makes trading directly with the leading automated market makers accessible to anyone that wants it. For the first time, users have access to low cost credit intermediation combined with a fully integrated and free technology and trading offering. All this makes it possible for the market to open up and for any user to access primary sources of liquidity directly.

Of course, these types of services have been available as bundled offerings for some time. In recent years though, what's happened is the market is now ready for innovation and wants access at a fair price. With the motivation of independent providers - like Jefferies and Integral - we can make simple yet powerful concepts like TrueFX a reality at an extremely low cost. It's like when the phone industry was democratised by removing the excessively high costs and tariffs that were previously a foregone conclusion. That's what we're trying to achieve with TrueFX and it appears the FX market is now ready to adopt a new model.

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How does trading infrastructure achieve ultra-low latency?

By Robert Anderson, Director of Sales, Exegy

Robert Anderson

Latency has been a hot topic in financial markets since the rise of high-frequency trading in the early 2000s. Low latency has been replaced with ultra-low latency (ULL) in liquid markets as technology has slashed tick-to-trade latencies below one microsecond. While many vendors outline how their products contribute to a faster trade, connecting all the pieces for a comprehensive trading infrastructure requires great technical expertise within your firm. So, we've outlined common technology, networking, and trading strategy decisions needed to achieve ultra-low latency.

HOW TRADING STRATEGY IMPACTS ULTRA-LOW LATENCY

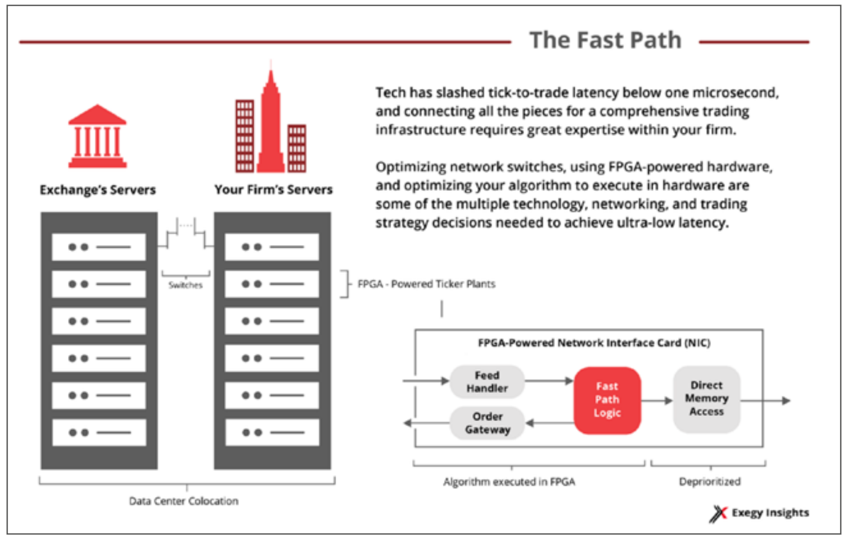
Latency of a trading strategy is dependent on a firm's specific algorithms. However, some general decisions around trading strategies will help you acknowledge how latency-dependent the algorithms are, and whether ultra-low latency is worth the infrastructure investment required. Latency-sensitive strategies are those in which faster trades provide more alpha but gains still can be made without ultra-low latency. Frequently, these are multi-market strategies, where fragmentation makes it impractical to carry out ultra-low latency with each exchange. Here, latency can be reduced through networking decisions, such as choosing microwave connections between data centers to edge out traders relying on fiber-optic cable. The latency from data normalization and order routing increases with market fragmentation due to the increased complexity of feeds. Competing in a fragmented market requires sufficient capacity, so a ticker plant with high throughput becomes an important part of your plans. Latency-dependent strategies–those in which the loss of nanoseconds threatens a trade's profitable execution–are the ones that necessitate ultra-low latency. They're most achievable in single-market situations, where you can optimize every step of the tick-to-trade loop between your trading infrastructure and the exchange. An example might be a futures strategy on one of the CME Group's exchanges, which make up the majority of trading volume in the US futures market. An awareness of the difference between latency sensitivity and latency dependence helps a firm determine what type of networking and infrastructure decisions need to be made to accomplish its trading strategies.

ULL NETWORKING THROUGHOUT THE INFRASTRUCTURE

Latency can be defined as the time interval between any two points in a trading infrastructure. Yet, the tick-to-trade latency–the time difference between the order reaching the exchange and the market data that triggers it–is essential to creating an architecture with a trade lifecycle under one microsecond. Focusing on this latency measure requires understanding the networking between your hardware and that of the exchange with which you're trading.

The typical but expensive requirement for ULL is co-location and market data feeds directly from the exchanges.

How does trading infrastructure achieve ultra-low latency?



The ultimate limit of latency in data transmission is the speed of light, and the distance data packets travel correlates directly with time. Therefore, firms elect to co-locate their rack space in the same data centers as exchanges and cross-connect cables to minimize physical transmission distance. Market data feeds direct from exchanges—as opposed to consolidated feeds from the SIPs or a third-party vendor—prevent added latency caused by processing those consolidated feeds.

In addition to direct feeds and co-location with exchanges, ultra-low latent networks must consider the network switches at each point in the trading infrastructure. Switches are hops data makes as it bridges devices in a network, and they are a focus in optimizing tick-to-trade latency. Each hop accounts for approximately 100 nanoseconds, although technology is making inroads here. New hardware can reduce latency by up to 50%. To reduce switches, market data teams opt to connect directly to an exchange's port instead of an intermediary hosting provider. The fees for a direct connection add up: The CME Group charges $12,000 per month (plus a $2,000 one-time fee) for client-managed connectivity to the CME Globex platform at its co-location center in Aurora, Ill., making it a six-figure annual investment to secure the lowest possible latencies.

ULTRA-LOW LATENT TRADING TECHNOLOGY

Application-specific hardware is the foundation of attaining ULL, and while many vendors provide piecemeal components, there are a few standard elements to build upon.

For the tick-to-trade infrastructure, field-programmable gate arrays (FPGAs) have become a common baseline for ULL as an improvement over software running on commodity servers. FPGAs define steps in the trading process mechanically through logic gates, rather than through a list of software instructions, resulting in higher, more consistent speeds, even in periods of high volume.

In addition to FPGAs, ticker plant hardware has increased processing speed and processor count to optimize the loading and ordering of data packets. Network bursts on volatile trading days can cause serialization or queueing latency that may erode or eliminate a profitable trade. Many firms seek packet burst data, like that found on Market Data Peaks, to estimate needed network capacity and processing power. Ultimately, it's critical for ultra-low latency traders to ensure a tick-to-trade system can consume, process, and complete the logic of a trade at the same rate the market is moving.

Throughout the tick-to-trade lifecycle, there are steps that might be de-prioritized or removed in the chase for the fastest order. For trading applications that depend on ULL infrastructures, algorithms may execute entirely within an FPGA device. Further, proprietary traders may run their execution management system (EMS) concurrently with order execution, forgoing pre-trade risk assessments and margin requirements checks to assure lowest possible latency. While this option only applies to firms that aren't liable to customers' standards or execution compliance, it does heighten risk for the firm. Also, exchanges increasingly require certain pre-trade risk checks.

There are many ways to decrease trading latency, but when it comes to ultra-low latency, all enhancements are crucial. This results in high capital expenses for technology and recurring fees for priority access to market data. For the market makers and proprietary traders who make the investment, the impact is evident.

Ticker plant hardware has increased processing speed and processor count to optimize the loading and ordering of data packets

Machine learning stirs up competition in FX Algo Trading

Though capital markets firms have been adopting artificial intelligence and machine learning to train algorithms for equity trading, recently this trend has expanded to foreign exchange. Ivy Schmerken, Editorial Director at Flextrade Systems, has written widely about this topic and we asked her to revisit it for e-Forex.

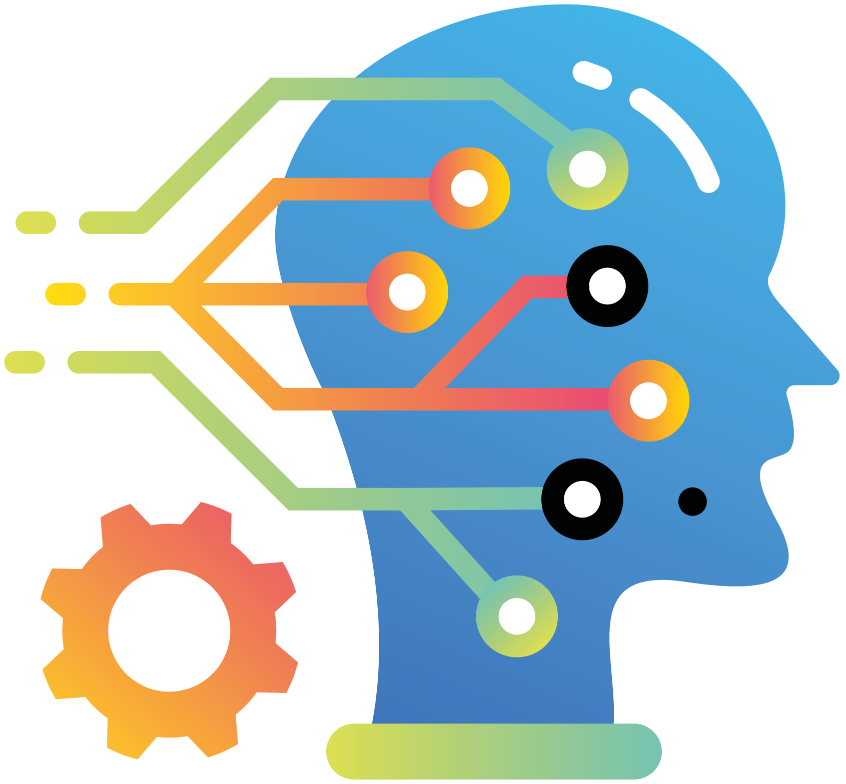

Ivy Schmerken

By crunching vast quantities of data by computer, machine learning algorithms can identify hidden patterns in past data and learn to forecast stock market returns or FX currency pairs. Large banks have been investing millions into advanced technologies such as AI and machine learning to capture a bigger share of the algo trading market.

JP Morgan developed a new algorithm dubbed DNA – or Deep Neural Network for Algo Execution to merge what a multitude of algos do into a single strategy, allowing the framework to decide how a client's order should be executed, reported Reuters in "How to train your machine: JP Morgan FX algos learn to trade better."

"DNA is an optimization feature that leverages simulated data from various types of market conditions to select the best order placement and execution style designed to minimize market impact," said Chi Nzelu, Head of Macro eCommerce on Aug. 8 2019 in a post on JP Morgan's web site.

"What we have done is establish a neural network using a machine learning technique which determines how to place the order, at what price and execution style," JP Morgan's Nzelu told Reuters. To create an algorithm that is an enhancement



By using deep pools of data that simulate multiple market scenarios reinforcement learning trains the algo to learn from the actions it takes

for certain existing strategies, the strategists behind DNA used reinforcement learning, a subset of machine learning, to assess the performance of individual order placement choices. By using deep pools of data that simulate multiple market scenarios reinforcement learning trains the algo to learn from the actions it takes.

According to the bank, this is a fundamental shift from early generation algos, which were primarily built off human-based programming or rule-base executions.

"Machine learning is a natural next step of algorithmic trading because machine learning identifies patterns and behaviors in historical data and learns from it," said Robert Hegarty, managing partner, Hegarty Group, a consultancy focusing on financial services, technology, data, and AI/ machine learning.

While traditional algorithms are created by programmers and quant strategists, these algorithms based on if/then rules do not learn on their own; they need to be updated. "With machine learning, you turn it over to the machine to learn the best trading patterns and update the algorithms automatically, with no human intervention," said Hegarty. "That's the big differentiator."

The evolution of machine learning is migrating from equities to other liquid asset classes. "Machine learning is following a very similar path to electronification of markets and the advent of algorithmic trading," said Hegarty. "If you look at the path of electronic markets, it has started in equities and moved over to FX and on-the-run Treasury bonds. Now with machine learning, it's very much the same," he said.

Any market that has a lot of liquidity, publicly available data, and the need for speed and a way to profit from that, is a ripe candidate for electronic trading, algorithmic trading, and now AI, said Hegarty.

For instance, JP Morgan's DNA has been implemented for trading highly liquid G-7 currencies, such as the dollar, euro, and Sterling, where the algo has access to data on thousands of past trades.

As the largest and most liquid asset class, about 78% of volume in FX is traded electronically, slightly down from a high of 79% in 2017, according to research firm Greenwich Associates. Banks are using machine learning to improve the performance of algorithms they develop for asset managers and hedge fund clients.

A recent study of the global foreign exchange market showed that FX algo usage has been slower to gain traction than in other asset classes. Only 37 percent of buy siders use FX algorithms, and this accounted for about 22 percent of the volumes conducted by FX, according to Greenwich.

ML ADAPTS TO VOLATILE MARKETS

The momentum behind machine learning is getting more attention with the volatility caused by the global pandemic. Experts suggest that models built with machine learning are faster, more complex, and can adjust to extreme events, such as surge in volatility precipitated by the COVID-19 outbreak.

"It's about building a trading venue that can adapt to a changing environment," said Roman Ginis, CEO of Imperative Execution, a startup which launched IntelligentCross, the first AI-enabled alternative trading system for equities in 2018.
After each trade, the ATS — which matches orders at discrete times, microseconds to milliseconds apart —

The concept of a broker-neutral randomization tool is not new. But prior to the Algo Wheel, such "switchers" and "allocators" lacked the "big data" analytics.

measures how much the price moved and incorporates it as a data point into its AI system. It then recalibrates the match times to keep the price movement as close to zero as possible, while maximizing liquidity.

During the height of the pandemic in March, the combination of AI and machine learning enabled IntelligentCross to handle the explosion in volatility and volumes.

For example, when volatility increases, order patience decreases – the faster the market moves the less time orders tend to rest. "IntelligentCross adapts to order rates and order patience, Venues that don't or can't adapt, exhibit worse performance when the environment changes: they either manifest worse market impact, or worse liquidity," said Ginis.

Alistair Cree

Major banks serving as electronic market makers are utilizing machine learning to carry on dealing in volatile FX markets.

When currency markets struggled with flash crashes in 2018, precipitated by algorithms that shut down as volatility spiked, UBS used machine learning technology to continue dealing, reported Reuters.

UBS Orca-Direct learns in real time by using historical trading data to find the best available liquidity for the bank's clients when volatility increases, wrote Reuters in "UBS looks to machine learning to plug FX liquidity gaps." Introduced to a limited set of clients in 2018, ORCA-Direct helped volumes in the bank's algorithmic FX business double in 2018, and earned UBS the ranking of fastest-growing FX algo broker by market share from the second to the fourth quarter from Boston Consulting Group and benchmark firm Expand, according to Reuters.

But traditional investment banks are not the only ones diving into AI and machine learning. Fintech providers are investing in these advanced technologies to optimize their processes.

ALGO WHEELS AND ML

One of the use cases for machine learning in trading is making transaction cost analysis (TCA) actionable for the buy side by assessing the performance of different broker algorithms. For example, reinforcement learning is used by FlexTrade within its algo wheel to help the wheel adapt over time based on the results of the data that the algo wheel generates, said Alistair Cree, Product Manager for TCA, Analytics and Algo Wheels at FlexTrade.

To illustrate the point, say a buy-side firm traded 50% of its orders with broker A and 50% with broker B and received some performance data back. "One of the problems encountered when running an algo wheel is deciding on how to re-weight the wheel based on the performance of the different destinations and the number of orders in your data set."

Historically, the approach was to do nothing and then take one big leap and reweight the wheel, said Cree. ` "Reinforcement learning will say, given the performance of these two destinations and given the amount of data it has, it needs to re-weight by this small amount. Because that entire solution is entirely automated, you can make, many small incremental steps, rather than doing nothing and then taking one giant leap," said Cree.

"Rather than spending three-to-six months just collecting data, and not using any of the data that you have to improve performance you're able to improve performance continuously over that period," said Cree.

Major banks serving as electronic market makers are utilizing machine learning to carry on dealing in volatile FX markets

CLOUD-BASED ECOSYSTEM

Now machine learning's momentum has a lot to do with technology advancements in GPUs (graphic processing units), parallel processing, and big data. "This reflects the convergence of cloud capability, the proliferation of data and the advances in AI and machine learning models," said Hegarty.

Today the tools are readily available. Amazon, Google, and Microsoft have "fantastic cloud-based platforms for training machine-learning models that can be rented for a fraction of the cost of building it out in-house," said Roman Ginis of Imperative Execution. There are hundreds of open-source machine learning models, like Google's TensorFlow and eXtreme Gradient (XG) Boost, which are all built so solve slightly different problems, depending on the types, whether it's a classification or regression problem, or whether supervised, unsupervised or reinforcement learning best suits the use case, said Hegarty. Each of these models are built to handle different problem solving, he said.

Some firms have developed artificial neural networks, a regression model, which like the human brain, receives data inputs and sends data outputs across many nodes, said Michael Mollemans, Research Principal at Chartis Research. Those nodes have extra layers of variables and coefficients which keep updating as the data comes in, said Mollemans. JP Morgan's DNA is one type of artificial neural network, motivated by biological neural networks of the human brain. "They are capable of modeling complex non-linear relationships with little restriction in the inputs, which is useful when trading to model reality because relationships in real life are often complicated," stated Sam Nian, a Lead Strategist in the DNA initiative.

Banks are also competing with nimble startups that have backgrounds in quantitative trading and machine learning. Boston-based A.I. Capital Management is using an AI-generated trading approach based on deep reinforcement learning to trade the major FX US dollar (USD) currency pairs. Working on the AlphaFX project since 2016, the firm's founders were inspired by Google DeepMind's AlphaGo project, which is a deep reinforcement learning agent that beats human Go world champions. Deep reinforcement learning combines a deep neural network with a reinforcement learning algorithm, according to the firm. This turns sequential tasks into a Markov process whereby the AI agent interacts with the environment via action, getting rewards, improving on its future actions to reach a better environment. In a video on its web site, the firm shows how its AI trader learns to trade EUR/USD before and after 1 million steps of trading. Before the training, the agent is randomly placing trades and losing money; after the agent is trained on 1 million steps, it learns to trade intelligently, and its total reward is positive.

But AI-enabled financial algos need to be complex to perform well and are not necessarily intuitive to understand. One of the biggest challenges is that the AI-trained algos tend to perform well on "in sample" anonymous test data, only to find their predictability doesn't hold up when fed the real world, out of sample data, wrote Mollemans. This can happen due to overfitting the model's variables to the data. Quants at A.I. Capital Management say they built their product Alpha FX A.I. on institutional ECNs and achieved "great" out-of-sample risk-adjusted returns for the past five years across 26 currency pairs. Now the firm is scaling its trading effort to create a fund.

While machine learning and AI are making inroads into currency markets, this is only the beginning of an evolving process. If anything, machine learning will become more pervasive on trading desks as firms build algos that learn from their own actions. One of the challenges is explaining these strategies to the institutional clients and gaining acceptance, while assuring them that humans are still in charge.

When, not if – we will see more electronic platforms and increasing institutional demand for digital assets

Even allowing for a certain amount of hype, there is plenty of evidence that institutions are showing increasing interest in investing in digital assets. As yet however, the e-infrastructure to support them is fragmented and imperfect. Richard Willsher investigates.

In its "Institutional Investors Digital Asset Survey" published in June, Fidelity Digital Assets (FDA) reported on the views of 774 investors' preferences and behaviour towards digital assets. Roughly half were European and half in the United States. This cohort was made up of high-net-worth individuals, financial advisors, family offices, crypto hedge and venture funds, traditional hedge funds, endowments and foundations. Of these, 36 per cent currently invest in digital assets, 60 per cent have a neutral or positive perception of them and 80 per cent "find something appealing about digital assets."

"We started to see a broadening of user profiles through 2018 and into 2019," explains FDA's Head of Sales and Marketing, Christine Sandler. "We've seen continued adoption across the full spectrum of institutional participants. Even at the most conservative end of that spectrum, we're seeing activity from pensions and endowments as well. The profile of investors is very diverse and the activity continues to be quite strong." Ms. Sandler notes that the entire market capitalisation of digital assets as yet amounts to around USD350 billion globally. Moreover, Bitcoin is the runaway leader in terms of preferred assets. She adds that both the market cap and the range of available digital assets are expected to increase as the ecosystem matures.

WHY DIGITAL ASSETS?

One of the key appeals of such assets is that they're digital from the outset. They emerge from and live in the digital world. Post-covid, it is pretty clear to anyone who's worked remotely from their employer's place of work or used Zoom that the move from analogue to digital is wholesale across business and investment activity.

The FDA survey found that lack of correlation with other assets classes, exposure to innovative technology and "high potential upside" were attractions in a virtually zero per cent interest rate environment. Another appeal to the less regulated, more adventurous investor was the lack of control by central banks and regulatory authorities. This however is a two-edged argument, as we shall see.

Further evidence to support FDA's optimistic findings is available from several sources. Grayscale Investments describes itself as "the world's largest digital currency asset manager, with more than $4.0 billion in assets under management as of June 30, 2020." Its Q2 2020 "Digital Asset Investment

"We started to see a broadening of user profiles through 2018 and into 2019. We've seen continued adoption across the full spectrum of institutional participants."

Current Exposure and Channels for Exposure
36% of institutional investors surveyed **currently invest in digital assets**.

Perception of Digital Assets
Almost **60%** of all investors surveyed have a **neutral or positive perception** toward digital assets.

Appeal of Digital Assets
Almost **80%** of investors find something appealing about digital assets. The most appealing characteristics are the lack of correlation with other asset classes, exposure to an innovative technology play and high potential upside.

Obstacles to Investment
The most common obstacles to digital asset adoption are **price volatility**, concerns around **market manipulation** and **lack of fundamentals** to gauge appropriate value.

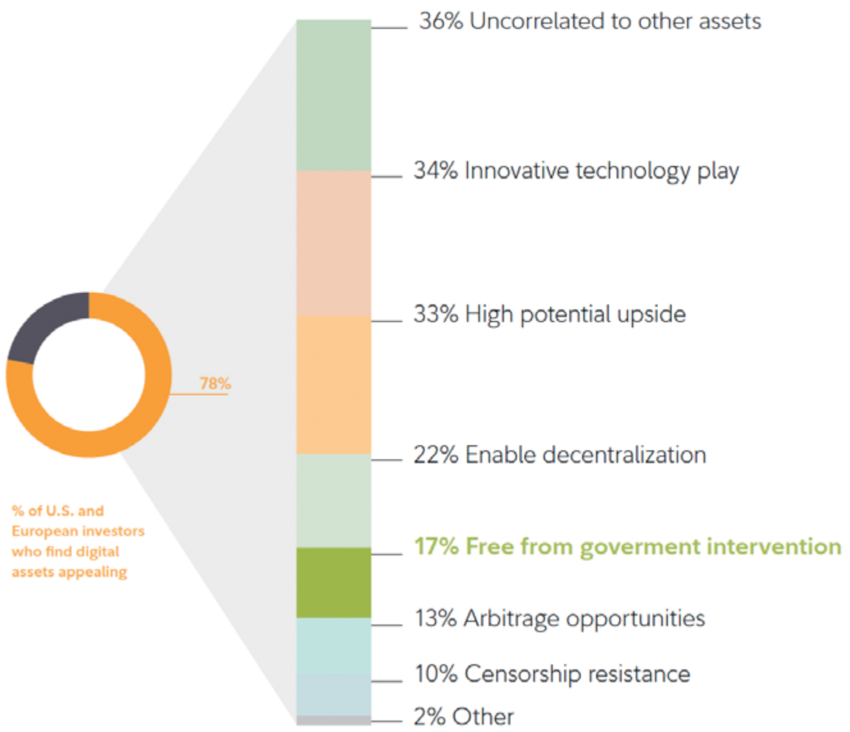
Categorization of Digital Assets
More than 6 out of 10 investors feel digital assets have a place in portfolios. Almost 40% of investors believe digital assets belong in the alternative asset class. 20% of investors believe digital assets belong in an independent asset class.

Digital Asset Investment Products
More than **80%** of investors indicated they would be **interested in institutional investment products** that hold digital assets.

Key highlights from Fidelity Digital Assets (FDA) Institutional Investors Digital Asset Survey

When, not if – we will see more electronic platforms and increasing institutional demand for digital assets

APPEAL OF DIGITAL ASSETS



Data taken from FDA Institutional Investors Digital Asset Survey

Report's" key numbers were that: "For the first time, inflows into Grayscale products over a 6-month period crossed the $1 billion threshold, demonstrating sustained demand for digital asset exposure despite a backdrop characterized by economic uncertainty." And "Cumulative investment across the Grayscale family of products since inception has reached $2.6 billion. Grayscale Bitcoin Trust and Grayscale Ethereum Trust both experienced record quarterly inflows of $751.1 million and $135.2 million, respectively."

Among more conservative voices State Street Corporation's wide-ranging December 2019 survey of US asset managers and owners concluded that "Digital assets continue to come a long way in gaining credibility among institutions, with only six per cent of survey respondents reporting that they have no digital assets-related investments and no plans to invest in the next year." "Our definition of digital assets is pretty much anything that would trade on a distributed ledger," explains Nadine Chakar, State Streets Boston-based Head of Global Markets. "What we're seeing is a massive, massive spike of some of the largest global investors coming to us. But," she cautions, "it's still very nascent. They want to talk about tokenisation. They want to talk about launching new products, ETPs obviously, whether they're backed either by Bitcoin or other currencies.

I can't tell you how many presentations we're doing to large sovereign wealth funds and insurance companies. But they're doing proofs of concepts, and although we're happy to engage with them, there's a lot that needs to happen to make it efficient as an institutional investor. Don't forget, we all have shared responsibilities as well. So, it's still nascent, but I think there's an incredible amount of activity and work that's happening for institutions like ours, to our clients, to build the right infrastructure."

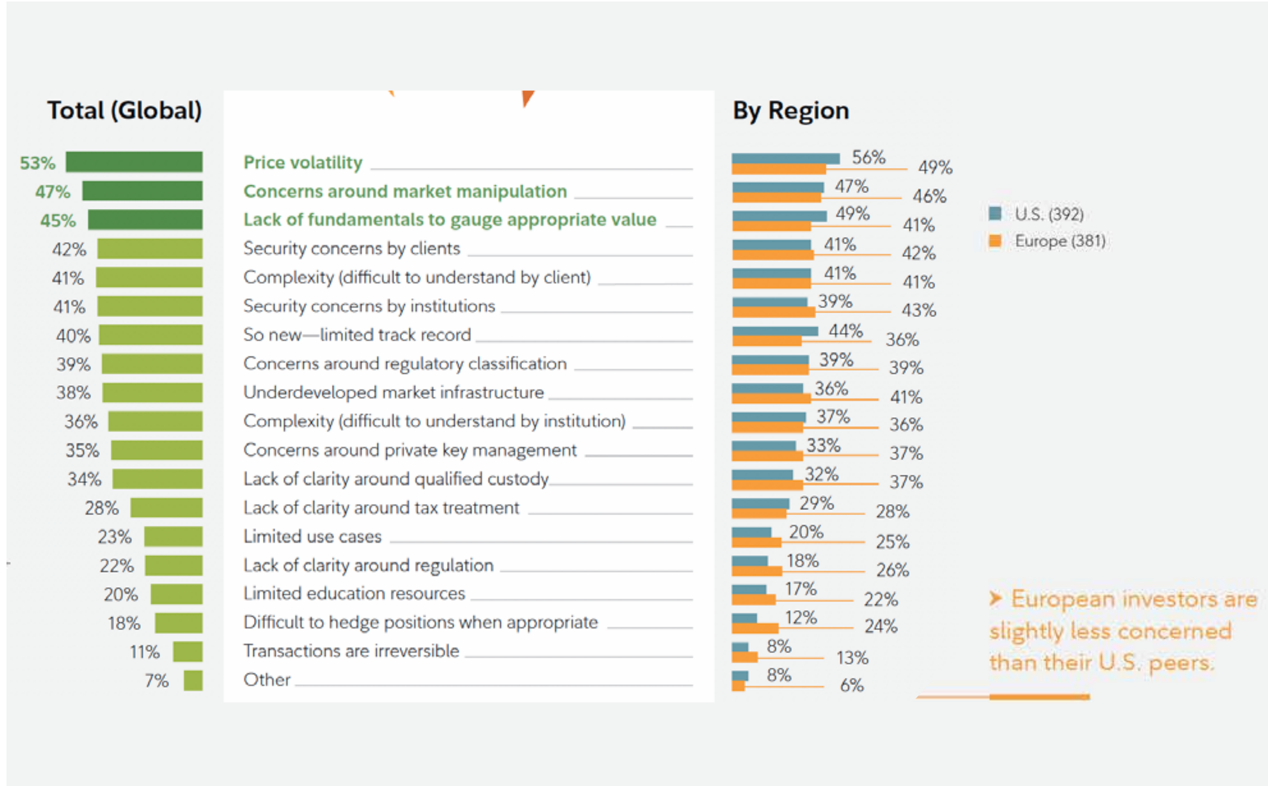
REGULATION AND INFRASTRUCTURE

Although unregulated digital assets may appeal to some sectors of the market, regulatory approval, discipline or least direction is essential to large, highly regulated, fiduciary institutions. "We're working with the SEC," explains Ms. Chakar, "but we haven't really seen anything to give us guidance on moving forward."

It's a developing story for sure. As yet the SEC in the US, the FCA in London nor any other major financial services regulator has pinned clear direction to its mast. Regulation is a key piece of infrastructure without which institutions stand to risk sanction and reputation.

Meanwhile there are a great many exchanges that offer to assist investors to trade digital assets. The market is highly fragmented and some of these may fail and others be consolidated. At the same time investors are at different stages along the learning curve when it comes to understanding distributed ledger, "blockchain" technology that underpins the digital assets trading environment.

"The financial industry is in a constant state of transformation," explains Hu Liang, Co-Founder and CEO of Omniex, a San Francisco based digital asset trading platform. "What we knew as brick-and-mortar finance before the Internet is nearly non-existent today. I believe the impact of digital assets is on a similar scale. Whether we're talking



Obstacles to investment - Data taken from FDA Institutional Investors Digital Asset Survey

about the underlying blockchain and distributed ledger technology or the actual investable tokens themselves such as Bitcoin or Ethereum, the possibilities are ample."

"At Omniex," he continues, "Our approach is to build a platform that looks and feels familiar to institutional investors so they don't have to climb a steep learning curve. At the same time, we want the platform to be resting on the latest technologies so it can scale and perform well into the future. This is what we have done for crypto with the Omniex Edge platform. We have PMS, OMS and EMS functionalities that users are familiar with, layered on a familiar GUI and the dependable FIX API. We also connected it to dozens of crypto exchanges and OTC venues to provide access to deep liquidity and an assortment of assets."

Hu Liang concedes that regarding digital assets as mainstream is, as yet "premature." And for institutional investors to step out of line with their peers and place significant amounts of their clients' money into

Hu Liang

"With the underlying technology of blockchain and distributed ledger playing out their course, I'm a firm believer that five years from now crypto and blockchain will be part of our daily investment lexicon."

digital assets is a big ask. However, blockchain adoption as a secure means to transparently record transactions between counterparties looks like being the important first step towards the development of a market that exists purely within the blockchain environment. "If I had the chance to leave the reader with only one thought," says Hu Liang, "it's that digital assets are here to stay. Despite the unrealized hype of 2015 and the crypto bubble of 2017, it's not going away. So don't treat it as a fad. Learn the underlying values and understand how it's different from today's model and how it compliments financial transformation."

This view is echoed by State Street's Nadine Chaker. "It's a matter of when and not if, but a lot needs to happen before we can get there," she says. "From an infrastructure perspective, you still need to open accounts everywhere. So, I think there is work that we need to do as an industry. But it's the chicken and egg. Do you make the investments now, or do you wait to get more legal and regulatory clarity? We would want to see a much, much reduced number of exchanges that are out there.

In my opinion, I'd like to see more instant settlement-type of activities, because there's no reason why you couldn't settle in real time. And I think that would then help investors to be able to get in there with efficiency. You allow them to spend less of their capital, and you create liquidity.

These are some of the pre-conditions that need to emerge before you could see really robust players like ourselves and others provide e-trading platforms for our clients. It will happen, there's no doubt about it. I think in meantime the central banks need to get their heads around this. You need a regulatory and legal framework to operate in."

BUILD IT AND THEY'LL COME

As if to take up the challenge suggested by Ms. Chakar, Fidelity has established itself as a committed, institutional digital asset trading venue, as Christine Sandler explains. "There's the concept of counter-party risk. When we designed our system, we considered some of the frictions that institutions face with adopting or transacting in digital assets. We've created a network of liquidity providers and exchanges and our clients transact through us as a single, trusted counter-party. Clients put in orders, we attempt to match them against other orders that are in the system, and if there is no match available, we leverage smart order routing technology and access a fully vetted network of liquidity providers. This gives our clients access to multiple pools of liquidity through us acting as the central counter-party. As our platform grows, we expect to see more natural matching and we will continue to expand on the functionality of our platform, including, for example, algorithms, so that clients can begin to time-slice across a period of time."

Nadine Chakar

I'd like to see more instant settlement-type of activities, because there's no reason why you couldn't settle in real time.

As more institutions begin to adopt digital asset strategies, there will be the demand for transparency and for more robust data tools, both in terms of analytics and in terms of trading interfaces. Christine Sandler says that the demand for an ecosystem is beginning to pick up and those players that are coming are likely familiar both foreign exchange and equities, and so they'll demand infrastructural standards.

Another key piece of infrastructure is also being provided by exchange group CME. Its Bitcoin futures and options on futures offers scope to hedge Bitcoin exposure. At the same time its CME CF cryptocurrency reference rates and real time indices also add a base of data to support trading and investment.

Piece by piece the infrastructure elements familiar to investors in other asset classes are beginning to underpin digital assets. This seems to support the now widely held view among those we spoke to for this article that digital asset investment will happen on much larger scale in due course. How long it will take is anyone's guess.

Hu Liang sees the pace gathering. "Due to the pandemic, global quantitative easing efforts are further accelerating the recognition that an inflation-protected asset class has a place on the global stage next to gold. Furthermore, regulatory regimes around the world are looking at digital currency initiatives backed by central banks. With the underlying technology of blockchain and distributed ledger playing out their course, I'm a firm believer that five years from now crypto and blockchain will be part of our daily investment lexicon."

"I think five years is probably right," says State Street Nadine Chakar. "It may be before that. My guess is that it's going to be a slow churn until we get something [in the way regulatory guidance] and then once we get it, it will float. The good thing about the technology we have today, is that it will allow us to build systems that are much faster than we've done with the previous generations of trading platforms."

Slowly, steps are being taken to ramp up the security, trade execution, workflow capabilities and other key features and functionality that e-trading platforms need to provide in order to cater for the needs of institutional clients. Research suggests that these clients are finding the prospect appealing. However, for some, like eyeing a Ferrari in the showroom, fancying a spin is still a rather different thing than paying the money and driving it away.

Decentralized Liquidity is the backbone of DeFi

By Steven McKie CEO and Matthew Prewitt cryptoeconomic advisor at Amentum Capital


Steven McKie


Matthew Prewitt

Algorithmic-based smart contract liquidity pools such as Ethereum's Uniswap, or privacy-focused, off-chain decentralized exchanges such as Starkware's StarkDEX are just two examples of projects leading the charge. Inbound/outbound liquidity is essential for the creation and growth of financial markets. Price discovery, and the ability to move in and out of trade positions, whether they're from a big institutional firm, or a small-time trader, remains key if crypto is to reach maturity; where its aggregate daily volume could sustain at levels comparable to the legacy financial system.

It is not exactly a secret that the blockchain and cryptocurrency industries have a liquidity problem. Large trades in all but the most popular assets move the market to an alarming degree. This volatility then causes a cascade of ills.

First, it decreases the credibility of the markets due to the reality or appearance of manipulation.

Second, it makes people nervous about holding assets, meaning that applications dependent on low volatility have trouble getting off the ground.

Third, it harms the viability of decentralized exchanges and other decentralized token economies because insofar as they depend on slow mainnets, they lag badly behind the price information available on faster, more efficient centralized exchanges.

Decentralized payments are just one piece of the puzzle of what it really means to be decentralized, as you'll also need the assistance of decentralized liquidity to build and extend additional functional financial layers on top of your blockchain-related protocol/application. Liquidity is king, and it can make or break your protocol if you cannot rally sufficient liquidity to aid in your project's growth and enable the use cases you sought out to provide your end-users.

With the proliferation of decentralized lending, borrowing, and more, the current decentralized landscape appears to be grasping the basic essentials necessary for the financial instruments we've grown familiar with in traditional legacy markets (Compound Finance is but one example). To better understand where we're at, let's first go deeper into what solutions the industry has concocted thus far.

LIQUIDITY POOLS

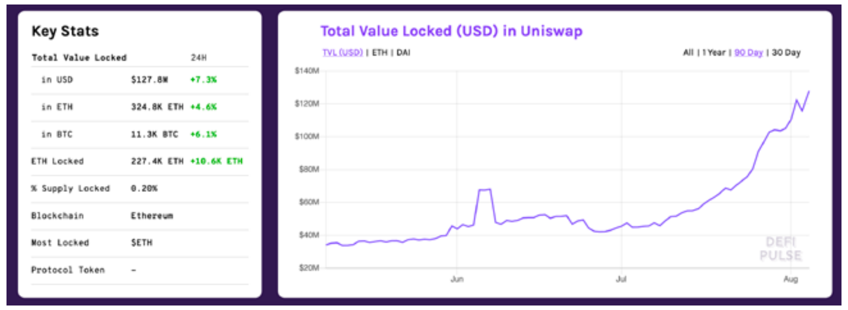
To begin, liquidity pools could help address a key problem faced by new token-based projects: the need to arduously bootstrap a liquidity-providing network before the project has real utility. Liquidity pools can mitigate this by providing a unique, less-speculative reason for people to hold tokens that do not have a large user base yet (i.e., to provide liquidity for a fee).

Moreover, the existence of decentralized liquidity pools provides added reassurance to large investors in young projects who do not want to get stuck trying to unload their tokens in an illiquid market. The pools thus function somewhat like insurance for token holders (we'll cover this idea more below).

Second, liquidity pools should be considered an impressive achievement in decentralized institution-building. Liquidity has long been a central concern, not only for cryptocurrency and blockchain projects, but for financial markets in general. It is a prerequisite for the growth of a whole range of other institutions, financial and otherwise. And, decentralized liquidity provisioning is emerging through a mechanism that does not exist in traditional financial markets — automated smart contracts. This is a totally new vector of provisioning liquidity, which opens up the possibility of broader, more competitive involvement in market-making. Liquidity pools are thus a bellwether of maturation for decentralized cryptocurrency markets.

The total quantity of liquidity in these decentralized pools remains small by the standards of conventional markets (which can trade daily with volumes exceeding hundreds of billions in USD), but it is growing at a fairly impressive pace.

Here is an accounting of the total USD value locked in Uniswap contracts,



The total USD value locked in Uniswap contracts, from https://defipulse.com/uniswap.

from https://defipulse.com/uniswap:

It is also worth taking a closer look at a few of the leading liquidity pool providers. Their mechanics vary, and are not always terribly straightforward. However, they represent important opportunities for investors to analyze. And if they continue to grow, they could alter the calculus for large investors interested in cryptocurrency markets but concerned about liquidity risks.

UNISWAP

Uniswap has emerged as a leader in the decentralized liquidity space. Their contracts are simply pools of 50% ETH and 50% some target asset. Traders buy either asset directly from the contract, causing the prices to move algorithmically. When differences emerge between the algorithmically-determined price offered by the contract and the market price, arbitrageurs close the gap. Anyone can replenish liquidity in the contracts by contributing an equal amount of ETH and the target asset. Doing so entitles them to a pro-rata share of the trading fees (0.3% per trade) that accumulate in the contract.

BANCOR

Bancor built the first meaningful decentralized liquidity solution. However, it has been losing ground because it suffers from several technical disadvantages, and is also dependent on its own token (making its solution less elegant than Uniswap's architecture).

The biggest problem faced by liquidity suppliers to pools like Uniswap is the risk of major relative price movements between the paired assets; if the price of an asset in a trading pair surged suddenly, it could cause a ripple effect of negative counter-trades from a lack of proper liquidity. It is therefore ideal to supply liquidity in terms of a stable asset, instead of a volatile one like ETH. This problem is exacerbated by Bancor's dependence on its native token, BNT, which is even less stable/liquid than ETH, while also adding the complexity of another abstracted token to maintain.

Moreover, transactions on Bancor are structured in such a way that they can incur high gas fees, and they are not presently planning to utilize layer 2 scaling technologies to alleviate those pains.

Bancor is working to address these issues instead by introducing a new stablecoin to replace BNT as the basis of its liquidity pools, as well as a few other upgrades. It remains to be seen whether the effort will succeed. It would appear though that an algorithmic approach such as Uniswap, paired with a tightly-coupled asset like ETH or another ETH-built stablecoin, is probably the best approach until further improvements emerge in the industry.

BALANCER

Balancer is only a whitepaper for now. But it details a protocol that would allow people to easily instantiate new liquidity pools, backed by larger, more flexible sets of assets, with more precisely calibrated algorithmic incentives and user-determined transactions. If it takes off, it could encourage much broader participation in providing liquidity.

CONVEXITY

Described in a recent whitepaper, the Convexity Protocol may turn out to be an important accelerant of decentralized liquidity provision. By allowing anyone to easily write collateralized options contracts, and sell those contracts in the form of an ERC20 token (oTokens), it will allow more sophisticated forms of hedging to occur without an intermediating institution. While the Convexity Protocol could have a nearly infinite range of possible uses, one of the most obvious is as liquidity insurance. Would-be liquidity providers in new markets will have a bit less to fear when they can use relatively stable assets as their base pair, insuring against collapses in the liquidity of their target market. Obviously, there is no free lunch. In a sense, it is possible to think of Convexity Protocol as "spreading" risk from riskier markets into more stable ones. Nonetheless, if the fundamentals of participation continue to improve, tools such as this could speed the arrival of meaningful decentralized liquidity in a wider range of assets.

UNIPIG AND STARKDEX

It is important to notice the connection between liquidity and network capacity/throughput. The inability of the main Ethereum chain to rapidly settle high volumes of transactions is a fundamental impediment to liquidity providers, because the ability to quickly remove liquidity is a driver of willingness to provide liquidity in the first place. (For a deeper dive into the nuances of this dynamic, take a look at the CFTC's report about the 2010 "Flash Crash").

Therefore, one of the most important fronts in the battle to unlock decentralized liquidity is the development of Layer-2 and off-chain solutions for the rapid settlement of a high volume of trades. Two of the most interesting projects in this space are Unipig and StarkDEX. They both promise vastly increased network capacity and execution time, but take different routes to get there.

Unipig, currently live in demo form, allows transactions to be posted in real time and high volume to aggregators running fully functional Uniswap contracts, which are then "rolled up" and posted to the main chain. Parties' trust in the veracity of these aggregators' reporting is backed by a bond that dishonest aggregators stand to lose. This is a simple scaling solution whose success with real money at stake will depend upon effective auditing of aggregators. We suspect that the Unipig team will get the auditing and verification mechanisms right, but there is still some uncertainty about whether large institutional players will ever feel comfortable supplying liquidity through this channel. Still, we think their approach of scaling Uniswap via layer 2 technologies and optimistic roll-ups remains one of the most adept approaches yet seen; without the use of SNARKs/STARKs, more developers will be able to learn how to utilize their setup more quickly.

StarkDEX, on the other hand, uses state-of-the-art cryptographic STARK proofs to take on-chain transactions, process them off-chain, and then batch them back on-chain in order to increase throughput. The challenges of this method are purely technical, rather than social, as with Unipig (where you just have to get others to supply more liquidity over time). Running on testnet it appears to increase transaction volumes by more than 100x versus the main chain, with correspondingly decreased gas costs.

It is not obvious to us how the trade timing constraints it imposes will interact with the needs of major liquidity providers, or how quickly their solution will be adopted by other major players. That said, it is a very promising step towards orders-of-magnitude better throughput and major new opportunities for decentralized liquidity provision, and could likely play a pivotal role in the creation of scalable dark pools — with few or no trust assumptions

It is not exactly a secret that the blockchain and cryptocurrency industries have a liquidity problem

THE LIQUIDITY BACKBONE

Plenty of parties have tried (and will continue to try) to "shortcut" the liquidity problem by providing liquidity from some concentrated or centralized venue. But this only highlights the deep connection between liquidity and the decentralization ethos itself. Any financial system is, in a sense, only as decentralized as the sources of its liquidity. After all, if there are no central banks, but instead a handful of whales acting as central banks, what exactly has improved?

When provided from a wide range of parties whose behavior is deeply uncorrelated, liquidity is fundamentally more robust: it is less likely to evaporate in a crisis and more indicative of a healthy market. Therefore the health of DeFi is largely identical to the health of decentralized liquidity venues. We are excited to see so many great teams attacking this key problem and striving to unlock a new phase of maturity and innovation in the space.

How to adapt and scale your brokerage business

By Tom Higgins, CEO of Gold-i

Tom Higgins

So things are ticking along quite nicely, and you are making money each month, but you feel in your bones that something is missing. Only a true entrepreneur would be mad enough to start their own business and live a life of uncertainty, risk, and, sometimes, reward.

What could be missing? Growth and diversification!

Albert Einstein famously said...
"If you always do what you always did, you will always get what you always got"
but Albert is wrong.

What he says only holds if the world around you does not change. If regulators don't muck around with leverage. If viruses don't jump from bats to pangolins to humans. If oil prices don't go negative. If volatility doesn't go to the stars and back. If Royals stop being Royal. If celebrities become politicians. If, if, if. As businesses, we need to change all the time, standing still is going backwards, so what should you do?

Well, I recommend a good dose of diversification to protect you from the bevy of black swans waiting around the river bend. If you can add more asset classes, types of clients, or new geographical regions, you have a better chance of staying alive and, dare I say it... growing.

You need to be brave, and you will make some horrible mistakes, but fear not! Mistakes are just nature's way of helping you learn. Be bold, and think the unthinkable, and some amazing ideas will emerge.

I would personally recommend that you have 3 or 4 new initiatives in the wings at any one time, with someone tasked to take each one and flesh it out. Some will wither on the vine; some will grow but then be proved to be rubbish, and some will be absolute gems. All this brave talk then but...

WHAT SHOULD A RETAIL FX BROKER DO?

I am going to help you here with a starter list, to get your creative juices flowing.

1. Target 3 sets of clients (retail, professional and money managers)
2. Add some more Liquidity Providers to get better pricing across the larger asset class ranges - they are not all good at everything
3. Add index CFDs, commodities, bullion and major cryptos
4. Employ a Business Intelligence tool to look deeply into your client activity. How much are you losing and how much more could you make with better A/B book modelling? Are latency traders taking you to the cleaners?
5. Review your technology partners. Are they as flexible and supportive as you need them to be?
6. Are there other parts of the World that you could easily sell into?
7. What new trends are showing green shoots? Social, sentiment, copy trading, algo trading, correlations, etc.

TARGET MONEY MANAGERS AND ATTRACT PROFESSIONAL TRADERS

By integrating a Multi-Account Manager (MAM) into your MetaTrader software, you can grow your brokerage by targeting money managers and attracting professional traders. Maybe you have been anticipating developing your very own customisable solution to grow your business and client base? This may seem like a great idea; however, it could set you up for failure in the long run.

1. It can be a waste of valuable time and money to create proprietary software that has already been mastered by SaaS vendors over years of development.
2. Research, development and testing

Retail traders are now looking to trade new and exciting asset classes

could drastically slow down your time to market but rushing these steps could cause multiple problems down the track - the typical tortoise and hare scenario.

3. All that hard work, time and money does not stop once you have finalised your product; future development and innovation will continuously need to be made.

Fortunately, there is no need to spend all this valuable time and money, when you can easily partner with reliable technology software providers who have done all the hard work for you! Choosing a white label solution such as Gold-i MAM Pro will address the above issues whilst helping to grow your client base - a win, win? Building your own software may give you full control of its user interface, but don't forget white label solutions are easily customisable to make the product look like your own brand. By using a white label software solution, you have the time and money to focus on growing your business. Doing what you do best, ensuring your clients are happy.

HOW TO UP YOUR LIQUIDITY MANAGEMENT GAME

Diversifying your liquidity management is one of many ways you can do so.

But why? Retail traders have started to get a wondering eye and are now looking to trade new and exciting asset classes such as cryptocurrencies. That's where you come in. In order to stay competitive, diversification is necessary as it will enable you to gain more clients, take more deposits and see increased trading activity.

Traders want to be able to trade multi-asset markets easily, using only one solution - one broker. This is important to consider, as if they can't get access to the asset classes they want through your business, then they will most probably be on the lookout for another provider that meets their needs. So, how does becoming a multi-asset Liquidity Provider help grow your brokerage? Giving traders the capability to invest in multiple asset classes is a great way to diversify and grow your brokerage and therefore you need to be able to consume liquidity from multiple providers. Increasing the number of Liquidity Providers not only helps you differentiate but also gives you a much tighter spread allowing you to aggregate feeds to obtain a Best Bid or Offer. You will also benefit from better pricing across the larger asset class ranges. As I always say, LPs "are not all good at everything."

Business Intelligence tools can provide you with invaluable live data and up-to-date key metrics

HOW MANY LIQUIDITY PROVIDERS SHOULD YOU SELECT?

There isn't a definitive answer as it depends massively on your strategy. However, the most important consideration is for you to match your Liquidity Providers to the specific requirements of your brokerage – e.g. selecting specialist Liquidity Providers for each individual market (FX, cryptocurrencies and CFDs) as, for example, some Liquidity Providers may have better prices on metals, whereas others could focus on major asset classes or exotics.

to offer FIX connectivity to their full range of markets - which is a far cry from FX Liquidity Providers who fall over themselves to take a broker's trades. But fear not!

Brokers no longer need to rely on Liquidity Providers' connectivity to distribute liquidity globally. There are reliable technology solutions on the market to enable you to take access a vast range of Liquidity Providers that offer high quality, competitively priced liquidity across multiple asset classes.

BUSINESS INTELLIGENCE TOOLS

When running a brokerage, it's easy to apply Pareto's Law and assume that 80% of your clients lose money and 20% make money. But do the following questions cross your mind?

- How much are you actually losing?
- Are scalpers and latency traders taking you to the cleaners?

By using a Business Intelligence tool, you can delve deeply into all your clients' trading activity by managing your exposure risk and Profit/Loss. But are they worth the money?

Business Intelligence tools can provide you with invaluable live data and up-to-date key metrics. No matter how much in-house work you have put into them, Excel spreadsheets are not an efficient way to manage your risk. The function of spreadsheets makes them incapable of providing the complete set of data that Business Intelligence tools can:

What information are you missing out on?
How could this information impact your trading operations?

Your spreadsheet doesn't understand scalping and can't help to identify where toxic trades are coming from. With a Business Intelligence tool that is developed specifically for your needs, you can see whether your company is sending toxic flow to Liquidity Providers and drill down into live data to get a thorough understanding of where you are currently making money and where you could be increasing your profits.

HOW TO GET STARTED

We recommend you look at 5 must-have components in a Business Intelligence tool comparison:

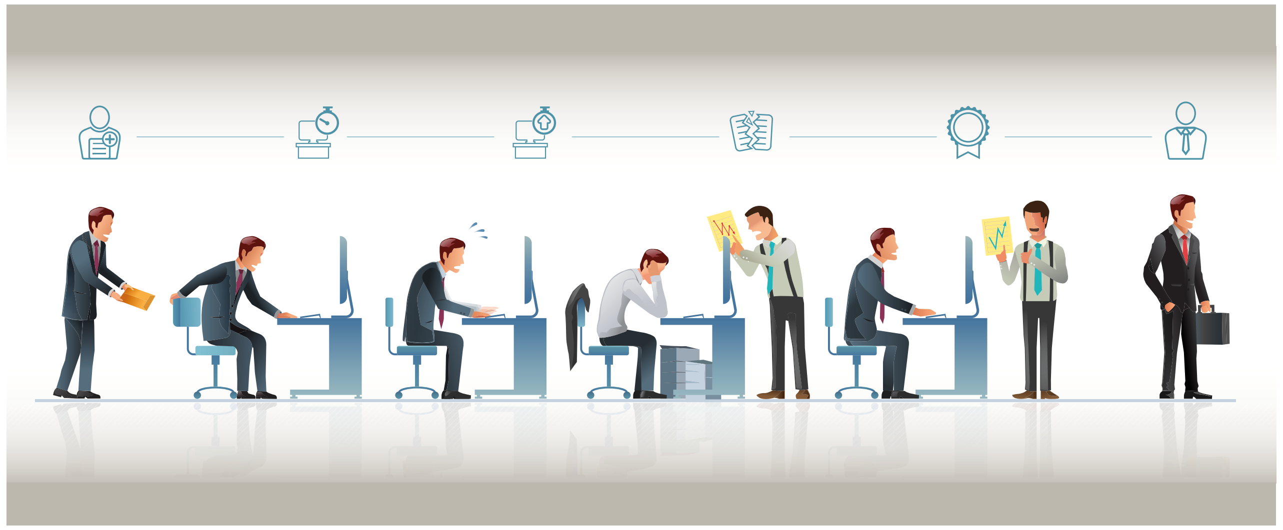
1. Flexibility
2. Simplicity
3. Responsiveness
4. Specific tailoring to FX Brokers' needs
5. Easy setup and integration

Not only are the components of your chosen software important, but the actual software provider is too. Ask yourself the following:

1. Are they a reputable vendor?
2. Do they offer a strong level of support across all time-zones?
3. What is the total cost of running the software?
4. Are they a breeze to work with?

If you are looking to scale your brokerage, you need to maximise your profitability. To do that, you need to fully understand your numbers in a real-time view, down to every single one of your clients and trades. The Gold-i Visual Edge Business Intelligence tool and risk management software first launched in 2015 is a good example of a solution that is now available to assist in this process. Providing brokers and their dealing desks with real-time risk monitoring, exposure tracking, Profit/Loss analysis and historical A book/B book what-if analysis, Visual Edge can save brokerages thousands of dollars in trading operations by understanding and visualising their data clearly.

Business Intelligence tools will provide you with 3 major benefits; a greater understanding of your risk and exposure, the ability to optimise your profits, and a simple way to meet regulatory reports. Delve deeper and you will never look back.



As businesses, we need to change all the time, standing still is going backwards

Singapore
A fast-changing FX landscape

By Matthew Lempriere, Head of Asia Pacific and UK, BSO

Matthew Lempriere

It is now almost a year since the Bank for International Settlements (BIS) published its Triennial Central Bank Survey on Foreign Exchange turnover, which showed that Singapore had retained its position in third place behind London and New York, slightly ahead of Hong Kong SAR.

Since BIS's previous report was released in 2016, the Monetary Authority of Singapore (MAS) has done much to further its aim of establishing Singapore as the leading FX trading hub in the region. Through a range of incentives, it has steadily lured an increasing number of banks, brokers, liquidity providers (LPs) and trading platforms to the city state.

FIRST MOVERS

A particular area of focus for MAS has been supporting first movers in primary inter-dealer platforms, multi-dealer platforms and FX liquidity venues to set up their matching, pricing and trading engines in Singapore.

The approach seems to be paying off. In the last few months, the list of major banks launching new electronic trading platforms located in Singapore has grown significantly, with announcements coming thick and fast from the likes of Standard Chartered, JP Morgan Chase, BNY Mellon, Citi, BNP and UBS.

But it's not just the banks who have been making the move to Singapore. XTX, the largest liquidity provider globally in FX spot/forwards (Euromoney, 2019), was one of the first non-bank LPs to announce that they were building a pricing and trading engine at Equinix's SG1 facility, in 2018. And in March of this year, Equinix further announced that a number of additional companies, including Euronext FX, Lucera, Orient Futures and Spark Systems amongst others, also now host their FX trading platforms at Equinix's data centres in Singapore.

Decisions like these are not taken lightly, so there are undoubtedly significant opportunities that these firms, and others, are looking to capitalise upon by making Singapore the centre of their regional FX electronic trading activities.

REDUCING LATENCY

A major factor behind all of this is the reduction of trading latency. Although Singapore has a higher daily FX turnover than Japan, Tokyo remains one of the three key FX trading centres globally (along with New York and London). But routing trades from Singapore via Tokyo incurs a round-trip latency of 70-80 milliseconds, whereas routing directly to a matching engine in Singapore can reduce latency to the point where it is negligible. This factor alone is likely to draw more high frequency trading (HFT) firms and hedge funds to Singapore, once a critical mass of liquidity providers, brokers and trading platform providers has been established.

For any firm looking to take advantage of the growing opportunities that the Singapore FX market offers, having the right infrastructure and fast, reliable, flexible connectivity in place is crucial, not only to Tokyo, New York and London, but also to other trading centres around the world, particularly Southeast Asian nations, where rising trade is driving a need for more sophisticated FX instruments and facilities. So it is essential to work with a specialised infrastructure and connectivity provider who can facilitate all of this.

The FX market in Singapore is evolving rapidly and these are exciting times. Perhaps it is not surprising that as recently as June 2020, Singapore Exchange (SGX) announced its intention to buy an additional 80% stake in FX trading platform BidFX - which has seen record trading volumes in recent quarters - for $128 million.

There will no doubt be further interesting announcements as this dynamic market grows.