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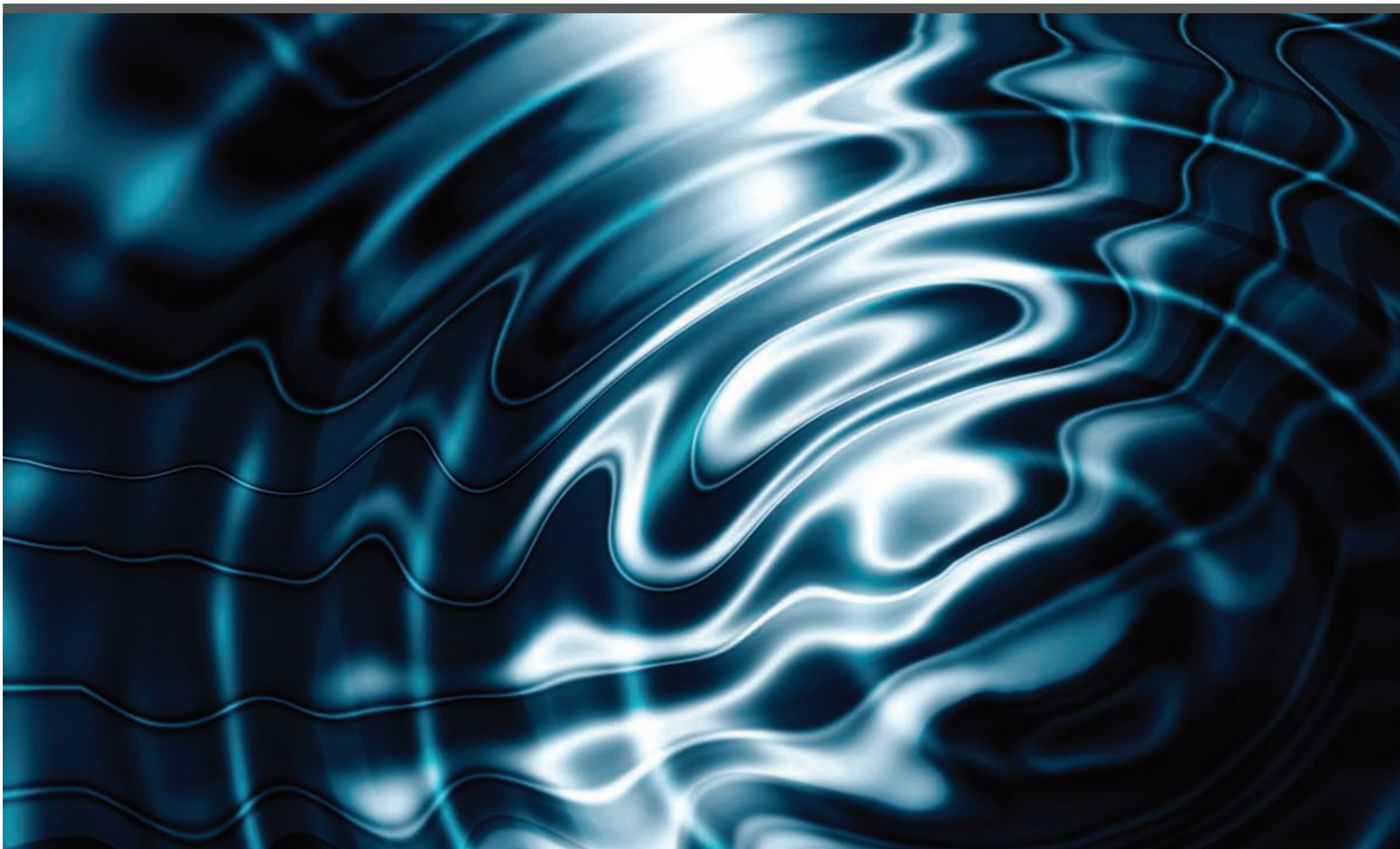
trading technologies for financial-market professionals

Liquidity & Electronic Trading
Special Report



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Olympic-sized pools

In this *Waters* special report examining liquidity in the markets, our roundtable feature asked a number of capital markets firms and service providers how they think regulatory changes intended to reshape market structure will in turn affect flows of liquidity. Their answers appear to point the way to one big pool in our future.

Executives from Fidelity and Goldman Sachs, when asked how the Securities and Exchange Commission (SEC)-proposed market structure changes and the European Commission's Markets in Financial Instruments Directive II (MiFID II) will change the flow of liquidity, indicated they believe fragmentation or tiering of markets is not on the horizon.

While more trades have gone to dark markets in the past two years and with the SEC's trade-at regulation on the way, paradoxically these capital markets executives see fragmentation of markets declining. As Mike Cashel of Fidelity Capital Markets says, "While fragmentation [now] may be at a peak, the markets today are more connected and consolidated from an access to liquidity point of view than they ever have been."

Still, even without fragmentation causing disadvantages for some market participants, we wondered if there might also be a divide between large firms that can build their own smart order-routers and smaller firms that use external order-routing providers. Smaller firms can buy into and leverage the tools of larger ones, Adam Mazur, global head of connectivity at Goldman Sachs Electronic Trading, tells us.

With interconnection of once-fragmented markets now well developed, and the interest of large firms in providing their advantages—for an affordable fee—to smaller firms, liquidity flows as freely as it ever has. That is also evident when, as Mazur observes, most remaining untapped liquidity is from existing sources rather than new discoveries. If liquidity is no longer fragmented or divided into a two-tier market, one can only conclude the markets have indeed become one giant free-flowing liquidity pool, regardless of how many pipes it takes to make it so. ■

Michael Shashoua, Deputy Editor

MarketAxess Goes Live with Preferred Stock Trading

Electronic fixed-income trading venue MarketAxess branched out into trading preferred stock in early May after two months of beta-testing the functionality.

"The market is opaque and illiquid, which makes a perfect recipe for electronic trading," says Kelley Millet, president of MarketAxess. "Keep in mind that although it's called 'preferred stock,' it trades like a debt-like instrument."

The new asset class trades using a protocol similar to the emerging market and high-yield instruments that have been trading on the MarketAxess platform for a number of years.

"It's simply a price-based request for quote (RFQ)," says Millet. "Instead of the bid being on a spread, it is actually traded on a price based on the number of shares—be it 25, 50 or 100 shares—rather than $1.5 million of GE, for example," says Millet.

Although the pre-trade activities on the platform remain mostly the same, MarketAxess needed to make some changes to its post-trade straight-through processing (STP).

Instinet Dives into Canadian Dark Pool Market with ICX, BLX

Electronic trading and agency-only brokerage services provider Instinet has launched Instinet Canada Cross (ICX), a non-displayed alternative trading system (ATS) that handles securities listed on the Toronto Stock Exchange (TSX).

ICX features order anonymity, minimum-size thresholds, targeted natural institutional order flow, and anti-gaming features, including volume triggers and mid-point pricing. The ATS offers two separate block-focused dark pools, a volume-weighted average price (VWAP) cross and BLX, an algorithm-friendly pool. The VWAP cross runs at 9:15 a.m. daily, locking in matches at the time they are made. The BLX pool accumulates orders until a variable volume threshold is met. Its anti-gaming features prevent pinging by information-seeking traders.

The TSX offers a VWAP order type in electronic form to facilitate the printing of a cross on the tape. TSX does not have minimum-size thresholds like BLX, according to Instinet. Anti-gaming features are only applicable to dealers' matching of orders, which is a different function than TSX performs, according to TSX.

Alpine Associates Implements Paladyne Suite

New Jersey-based hedge fund manager Alpine Associates Advisors has implemented Paladyne Systems' Paladyne Suite as its front- to back-office platform.

The firm will utilize the investment management services providers' platform, hosted by Paladyne ASP, for reference data management, reconciliation, reporting, electronic trading, order management, pre- or post-trade compliance, real-time P&L monitoring, and portfolio management.

Pico Picks Redline for Trading

Low-latency agency brokerage Pico Quantitative Trading has integrated Redline Trading Solutions' hardware-accelerated InRush ticker plant. This will allow it to support a new managed execution solution designed for Pico's multi-asset electronic trading clients, providing exchange co-location, market data, and order-routing connectivity. Officials say InRush enables the creation of full-depth, price-aggregated and composite order books with latency of less than five microseconds.

Exegy Expands Feed Handler Lineup

St. Louis, Mo.-based hardware ticker plant vendor Exegy is developing a range of new feed handlers in response to fragmentation in Canada and Asia-Pacific driving increased interest among high-frequency trading clients.

Exegy has begun developing a feed handler for full-depth market data from TMX Select—a new alternative trading system operated by TMX Group that is scheduled for launch in June—and plans to make the TMX Select feed handler available from the first day of the venue's launch to enable clients to begin processing the data immediately, says Jeff Wells, vice president of product marketing at Exegy.

Wells says client interest is being driven by fragmentation of the Canadian marketplace, which is forcing traders to keep track of multiple pools of liquidity, while also driving TMX as the primary exchange to innovate and adapt to new styles of trading by clients—for example, by using a price/time priority model for TMX Select and offering extended trading hours.

> "Client interest is being driven by fragmentation of the Canadian marketplace, which is forcing traders to keep track of multiple pools of liquidity.


Execute at the
Oasis

Batterymarch Rolls Out FlexTrader EMS

Batterymarch Financial Management, a global equity investment manager with approximately $23.5 billion under management, has deployed FlexTrade's FlexTrader execution management system (EMS).

According to Vijay Kedia, president and CEO of FlexTrade Systems, real-time analytics combining pre-trade, post-trade and market data at multiple levels of aggregation has become an indispensable part of the system's package for firms like Batterymarch, which trades equities, index and single-stock futures globally.

"We were looking for a state-of-the-art system to provide Batterymarch's trading desk with pre-trade decision support and real-time trade analytics along with post-trade reporting capabilities," says Dragan Skoko, director of trading at Batterymarch.

Misys Sophis Upgrades Value for Risk Management

Misys Sophis has launched version 4.2 of its Value solution. The upgrade will allow users to view portfolios through a single platform that is complete with cross-asset class coverage.

In addition to offering more asset classes, the product was also tweaked to include further pre-trade risk controls, liquidity risk management, and real-time VaR (Value-at-Risk) calculations.

FIS Ships Cleartrade Screens

Freight and commodity swaps brokerage Freight Investor Services is making Singapore-based commodity derivatives market Cleartrade Exchange's screen available for free to clients of its fertilizer swaps broking desk. The move is intended to increase transparency and liquidity in the fertilizer swaps market by providing an instant snapshot of market activity and bid/offer prices in the forward fertilizer market.

Gain Capital Unveils FX Prime Brokerage Services

New York-based Gain Capital, a provider of online trading services, has launched GTX Direct, a new prime brokerage service for its electronic communications network (ECN) aimed at institutional and high net-worth investors.

GTX Direct allows investors without an existing FX prime brokerage relationship to use Gain's central clearing facilities in order to access the liquidity available in the Gain GTX marketplace. Previously, only clients with existing bank FX prime brokerage relationships could access the best available pricing in the marketplace.

Gain GTX offers liquidity in more than 50 currency pairs, with precious metals to be added later this year, according to Gain Capital.

Forefactor Releases Canadian SOR Research

Canadian markets participants can now choose between market-based smart order routers (SORs) and their own SORs, thanks to changes to the order protection rule (OPR) that were made by the Ontario Securities Commission (OSC), according to analysts at industry research firm Forefactor in the firm's recent report, *Smart Order Routing in Canada—A Cog in the Best Execution Wheel*.

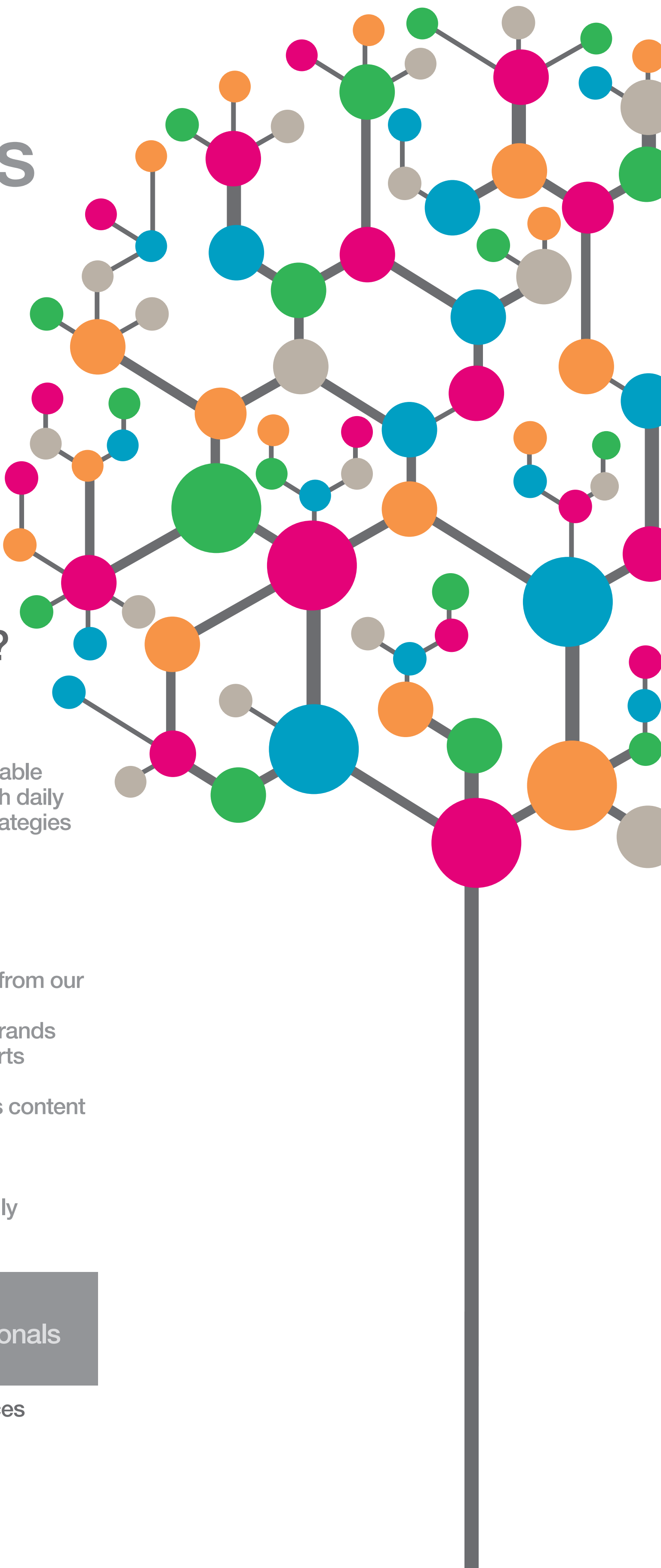
According to the report's author, Craig Geoffrey, a senior consultant at Forefactor, "Each [SOR] has its own advantages and disadvantages that will be more or less important depending on the pattern of trading that is being executed."

The report raises several issues, including routing to dark liquidity pools, and routing orders to foreign exchanges, namely those in the US that co-list the largest Canadian firms.

> "The main benefit [of the OPR] will be to aid smaller brokers in lowering their fixed technology costs, perhaps giving them a fighting chance." **Renée Colyer, Forefactor**

Although there are some exceptions to OPR obligations, the need for SORs in response to the amendment to the OSC's NI 23-101 regulation is clear, says Renée Colyer, founder and CEO of Forefactor.

"Unfortunately, the OPR is about five years too late. Its main purpose is to provide brokers with options so they can avoid the cost of connecting to multiple marketplaces and/or the need to purchase or build an SOR. The main benefit of the rule will be to aid smaller brokers in lowering their fixed technology costs, perhaps giving them a fighting chance," Colyer says.



Direct Edge Adds Dark Pools to Connect Edge

Exchange operator Direct Edge has added links to seven equities dark liquidity pools in the US by leveraging its Connect Edge network.

"Adding major dark pools to our destination venues is a logical extension of the Connect Edge value proposition, further enabling customers to control costs and maintain their competitiveness," says Kevin Carrai, head of connectivity services at Direct Edge.

The new connections include Barclays Capital's LX, Credit Suisse's Crossfinder, Getco Execution Services, Goldman Sachs' Sigma X, Knight Link, Knight Match, and LeveL ATS.

The exchange operator first launched Connect Edge in November 2010. The network service uses the exchange operator's existing intermarket connections to the other major exchanges, such as NYSE Euronext, Nasdaq OMX and the Bats exchanges, via Direct Edge's existing points of presence (PoPs) in Equinix's Secaucus, NJ, facility, the Telx facility in Clifton, NJ, and the Savvis datacenter in Weehawken, NJ.

ANZ Unveils First Derivatives for FX Data

ANZ Bank has rolled out Northern Ireland-based data technology vendor First Derivatives' Delta Stream market data capture and analytics tool to support its electronic foreign exchange trading business in Melbourne and Sydney.

The system, which is built on Kx Systems' kdb+ tick database, provides real-time and historical data across currencies, and allows users to access the analytics via a browser front-end or to feed the analytics directly into quantitative and algorithmic trading strategies.

Selerity Adds S&P Credit Events

Selerity, a provider of low-latency unstructured events data, has added credit-related announcements from Standard & Poor's to its feed of data for use in algorithmic trading systems, to appeal to a broader set of clients beyond its existing users with more data to incorporate into their risk management and trading strategies.

The vendor began to disseminate the data in April, and has seen a lot of interest among quantitative hedge funds, traders engaging in statistical arbitrage strategies, and automated market makers, in addition to its existing base of electronic event-driven traders, says Selerity founder and chief executive Ryan Terpstra.

Selerity captures credit event data—including changes in outlook and credit watch status for public companies, and developed and emerging sovereign nations—via a feed from S&P. "These are unexpected events, which can cause volatility swings and blindside traders, so being able to detect that information quickly and react to it programmatically is important," Terpstra says, citing a commodity sell-off following S&P's downgrade of Greece's sovereign debt in early May.

Thomson Reuters Integrates StreamBase CEP

Thomson Reuters announced in mid-May that it would roll out a suite of applications "powered by" StreamBase Systems' complex-event processing engine. This comes about as a result of the firm integrating the CEP engine with its Elektron global infrastructure to enable clients to access a managed CEP platform for high-frequency trading system development and execution that includes integration with real-time market data from Thomson Reuters and third-party content suppliers.

Fidessa Taps Equinix for Canada Data Hub

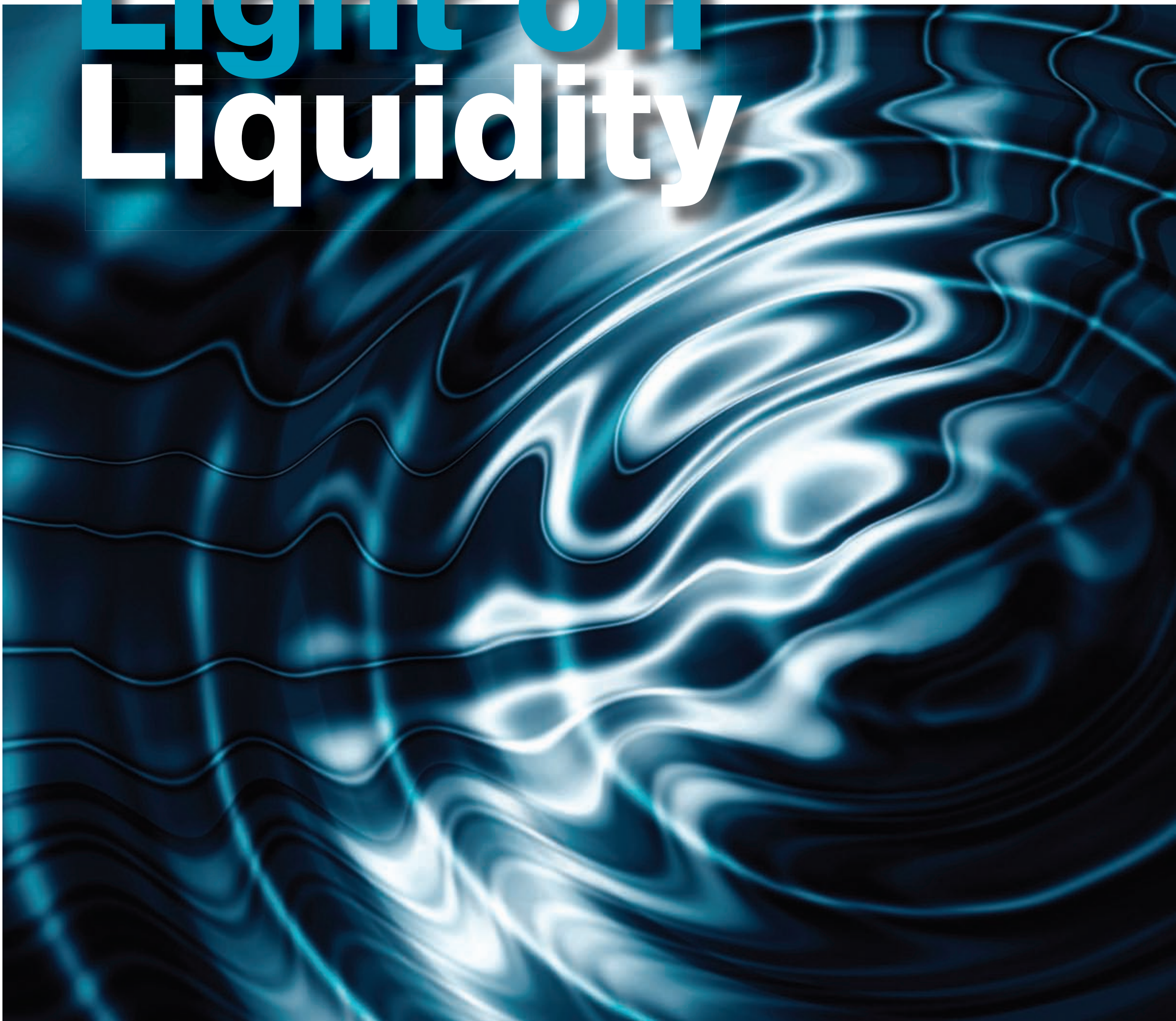
Market data and trading technology provider Fidessa is installing its Canadian trading platform at datacenter and hosting provider Equinix's Toronto facility, to serve as a connectivity hub for capturing and distributing data from Toronto's alternative trading systems to the vendor's local and global clients.

Fidessa established a presence at the TMX Group's co-location facility earlier this year for direct data and trading connectivity to the Toronto Stock Exchange, TSX Venture Exchange and Montreal Exchange. It expected the trading platform to go live before the end of last month within Equinix's TR1 Toronto facility at 151 Front Street for direct access to market data and trading on Alpha ATS, Chi-X Canada, Omega ATS and Pure Trading, says Martin Hakker, managing director of Fidessa Canada.

By running its services from both TMX's and Equinix's datacenters, Fidessa can allow clients to choose whether they want to be closer to the main exchange or to the ATSes and the telecommunications hub where circuits from the US terminate, Hakker says.

> "Clients can choose whether they want to be closer to the main exchange or to the ATSes and the telecommunications hub where circuits from the US terminate.

Light on Liquidity



In recent years, more and more liquidity is finding its way to dark and fragmented markets, possibly keeping the markets from becoming two-tiered, at least according to some major firms. Implementation of market structure changes by US and European regulators, especially the SEC's pending naked market access restrictions, are bound to cause the capital markets industry to make further adjustments to how it creates and responds to liquidity in the marketplace

Q How has sourcing electronic liquidity changed over the past two years?

Adam Mazur, co-head of business development, Goldman Sachs Electronic Trading: Fundamentally, the mechanism for sourcing liquidity has not changed much over the past two years. It's still very much a function of smart order-routing and algorithmic access. What has evolved is an increase in cross-connectivity between broker dark pools, resulting in less unique liquidity and performance, driven by order placement logic and analytics rather than access. The increased access to liquidity has coincided with a dramatic shift in algorithmic strategy usage from traditional benchmark strategies to liquidity-seeking algorithms. The increased focus on order placement logic has resulted in client-driven configurations such as BlockStrike that allow users to source liquidity in multiple non-displayed venues simultaneously. BlockStrike increases the likelihood of discovering "blocks," therefore resulting in an increase in the number of non-displayed block-size orders and executions in Sigma X and other venues.

Mike Cashel, senior vice president, and head of equity, Fidelity Capital Markets: Dark market share has gone from 18 to 33 percent in the past few years, driven by the advancement of broker routers, interconnectivity among participants, and liquidity providers competing off-exchange to get as close to the source of liquidity as possible. Access to a broad network of venues and the ability to process and react to execution data quickly has become vital to sourcing liquidity. At Fidelity, it's not just about sourcing liquidity, but sourcing quality liquidity. In a technologically advanced industry, real-time processing of data and liquidity management become crucial to defining the line between simply maximizing fill rates, and sourcing quality liquidity.

Mike Cashel
Fidelity

Adam Bennett, CEO, Hatstand: Algorithmic trading now represents the vast majority (over 80 percent) of the volume of trades at NYSE and LSE. The past two years has seen the introduction of liquidity-seeking algorithms that source liquidity in both lit and dark venues. These algorithms adapt to intraday market conditions and control how and when to access liquidity.

Per Lovén, head of international corporate strategy, Liquidnet: Sourcing liquidity has changed significantly, and we have seen a vast increase in the sheer range of liquidity venues and execution channels over the last few years. However, for the buy side, the more pertinent issue is flexibility, and having the chance to interact with liquidity in the way they want to, at any point in time.

Liquidnet provides this to our clients. Our members, who represent more than 630 of the world's asset management firms, have the choice to interact directly with other buy-side members and access the liquidity they need to execute their trades safely and efficiently. Our platform provides the quality and execution of trade which becomes increasingly relevant.

Joe Wald, managing director, Knight: We've seen a dramatic shift in liquidity sourcing over the past couple of years in response to two overarching trends—a changing landscape and increasing innovation. While there are instances of consolidation and attrition, more destinations across the US, Europe, Asia and the rest of the globe exist than ever before. As a broker-dealer trading on behalf of clients and providing them with market access technology, Knight has to connect to and source liquidity from an ever-increasing number of pools, both dark and lit. Make no mistake, while some of these destinations are new, many are quite meaningful in the quality and quantity of liquidity therein.

In addition to tackling fragmentation, the industry is continually striving to reduce latency and thereby increase order execution speeds. This highly competitive environment, where market participants race to liquidity destinations, requires a significant investment in infrastructure and connectivity supported by an extensive staff. Not all market participants have the resources.

Finally, these faster systems have given rise to high-frequency trading strategies. Regardless of whether you think high-frequency traders provide liquidity or negatively impact pricing, you still have to know how to interact with them. Unfortunately, many older order routing systems and liquidity sourcing techniques are no match for these high-speed market participants when it comes to tracking down the right liquidity across disparate pools.

David Morgan, marketing director, trading and client connectivity, SunGard Global Trading: For cash equities the answer varies greatly by geography. In the US, the main story has been about the continuing growth of dark liquidity and the explosion of high-frequency trading (HFT). The latter has delivered a new and high-capacity market-making mechanism. Market participants need to be aware that the HFT firms have different objectives to those of traditional market makers, and strategies increasingly need to be alive to the dangers of being "gamed" by these smarter and faster counterparties.

In Europe similar macro themes have been emerging following the introduction of MiFID in 2007. Increased fragmentation across market platforms—both lit and dark—have been a major challenge for all market participants. Changes have also been driven by volatility, the aggressive commercial terms offered by various new MTFs to attract liquidity, and by the responses of incumbent exchanges (including some significant platform performance upgrades). In Asia, we are seeing the first moves in similar directions with the launches of Chi-East and Chi-X Japan: there is still much to play for.

Q Considering the announced exchange acquisitions and the proposed trade-at regulations in the US, will the market experience more or less market fragmentation in the coming years?

Mazur: It's worth noting that trade-at is still only a topic of discussion to this point and that any exchange acquisitions would probably have some challenges to overcome. Exchange consolidation via acquisition would result in an immediate perception of reduced fragmentation, and there would be some hope that real reduction would occur with the books being merged. However, given the number of multi-book models within a single exchange that exist today, there's no guarantee. More often, the question is whether the US market is in fact fragmented at all. There's no debate that liquidity is distributed, but the proliferation of smart order-routing and the additive impact of cross-connectivity of dark pools and the uptake of liquidity-seeking strategies suggests that it is not particularly fragmented. An exchange acquisition and/or trade-at rule will not change that dynamic.

Cashel: Trade-at regulation is likely to drive volume into the displayed markets. While the number of dark pools may drop slightly, the number of exchanges and ECNs would likely increase as they vie for liquidity. While fragmentation in terms of the total number of liquidity pools may be at a peak, the markets today are more connected and consolidated from an access-to-liquidity point of view than they ever have been, due to the network effect. Exchanges and broker algorithms and routers are seamlessly integrated with one another's pools of liquidity. Even if liquidity resides in a single, non-displayed venue, today's market participants are well positioned to seek and find it in milliseconds.

Bennett: Looking at the European market, we see a mixture of consolidation (merger and acquisition across exchanges creating groups that operate different "brands" for different markets or products) and fragmentation. The fragmentation has been successful only when promoting real choice. On both sides of the Atlantic the clear aim of politicians and regulators to bring light to dark pool trading will also increase choice. Strong traditional players seek to expand their market share by acquisition; ultimately if the regulators make it profitable to operate a trading venue there will be more of them (the success of Multilateral Trading Facilities in Europe proves the point).

The EU is proactively endorsing fragmentation by promoting multiple types of trading venue and forcing operators to provide multiple choices to their clients as part of their best execution policy. Some players in the market operate more than one venue, giving a trader the choice of using at least one of the "brands" for a specific instrument that would not normally feature in the main brand. At the moment, the choice of liquidity pools for non-equity instruments is far more limited, but regulators are pushing to expand the level of multiplicity of trading venues currently available for non-equity financial instruments. It will be interesting to see how the market is going to respond in the next five years.

The North American market has seen different "local" players. Technology provides choice, given that it allows investors to trade electronically anywhere they like from wherever they are. Once again, non-equity instruments are much less fragmented, due to a limited choice of venue.

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Lovén: The probability of trade-at, the requirement of material price or size improvement to execute off of the exchange, is higher than ever before. This would have a huge impact on bank internalization engines and wholesalers that tend to execute orders that mirror the lit books in size and price. Some lit venues and those handling large orders could potentially benefit from this change in the market. This would undoubtedly be one of the biggest changes to the US equity market structure in many years, and institutional investors are likely to have differing views on this, largely depending on their workflow and fund size.

As for fragmentation, technology has arguably made the market more connected than ever before. For example, the exchanges landscape is clearly in a consolidation phase—and we will see a change in market structure as exchanges begin to realize they need to address the requirements of customers across the board, from individual to institutional investors.

Wald: Regulation and consolidation have been and always will be forces necessitating evolution in liquidity-sourcing strategies and technologies. Decimalization, Reg NMS, short-sale rule changes, circuit breakers—all of those developments required us to examine

> "There's no debate that liquidity is distributed, but the proliferation of smart order-routing and the additive impact of cross-connectivity of dark pools and the uptake of liquidity-seeking strategies suggests that it is not particularly fragmented."
> **Adam Mazur, Goldman Sachs**

our processes, determine a new strategy, adjust the technology accordingly, test with historical data and then roll that out as seamlessly as possible to our clients. Certainly, absorbing these changes is expensive and time-consuming. But each time we have to make the effort, we also see an opportunity to develop new and more effective ways to source liquidity.

Morgan: At the time of writing, uncertainty was hanging over the outcome of the current NYSE Euronext/Deutsche Börse/Nasdaq battle in the US. But assuming that these two central US markets continue to compete in some way, the main tension in the US will be one of lit versus dark markets. The debate over the SEC's proposed trade-at rule, which would impact in-house matching activities, will be heated and possibly prolonged: the regulator has other major issues on its plate with the Dodd-Frank Act.

We will see increasing market fragmentation: in Europe MiFID II and the new ESMA regulator are likely to force the pace in "laggard" areas where the original Directive is still not fully implemented. This will afford smaller and newer MTFs room to grow, as will dark trading (provided that MiFID II doesn't stop it in its tracks).

Some consolidation of European trading platforms is also possible: while the BATS acquisition of Chi-X Europe will still see the two platforms merging, questions remain over the viability of some of the smaller players. Exchange mergers, on the other hand, are less likely to have an impact on fragmentation—based on current transactions, their main goals seem to be more about ownership and share of rewards than about market structure.

Q Do you see a de facto two-tier market between those firms that build their own smart order-routers and those who need to rely on a third-party offering? How can the smaller firms level the playing field?

Mazur: There should and will continue to be the ability for firms to differentiate themselves from their competitors. Certainly, larger firms will leverage the advantages of scale and access to resources. However, this will not create a two-tiered marketplace. Smaller firms are increasingly leveraging the tools of larger ones. The infrastructure, economies of scale and exchange pricing tiers that bulge-bracket firms offer can help smaller firms achieve best execution while avoiding expensive build costs.

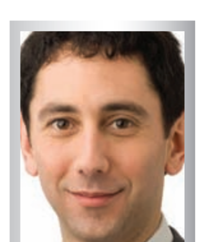
Cashel: Fidelity has made significant investments over the past several years to connect to as many venues as possible and build high-speed infrastructure that can source liquidity from over 45 venues on behalf of our clients. We believe providing options to access as many sources of liquidity as possible is paramount to helping our clients achieve their trading objectives. Our infrastructure, as well as that of others, is widely available to smaller firms at a fraction of the cost it would take to build their own. Many exchanges offer access to off-exchange liquidity centers as well.

Bennett: Those who can afford it build their own bespoke systems, while those who cannot (or do not want to go through the aggravation and the time to build them) buy them from a software provider. Does the buy versus build create a genuine two-tier system? In a fast-moving market, innovation is the key, and those who build are also free to innovate and therefore create a competitive advantage, while those who buy depend on business decisions made elsewhere, so they are likely to innovate at a slower pace and will therefore be playing catch-up. Changes due to new regulatory requirements will be implemented at the same speed. On the other hand, other changes—which will be a consequence of regulatory reshaping of the market or will be necessary to meet new requirements of the market (eg chasing liquidity among several venues and keeping track of different orders placed in different liquidity pools)—will not necessarily be implemented at the same speed, and that will create a two-tier system.

Lovén: Algorithmic trading and smart order routing go hand in hand, and we are seeing a commoditization of these offerings. An increasing number of firms are white-labeling these technologies, while other companies are building in-house capabilities which are then partly financed by selling to others. We believe one creates the most value by focusing on one's core strengths, and the concept of outsourcing technology or not is less relevant.

We specialize in sourcing liquidity and minimizing market impact for our customers, thus overall reducing trading costs. We develop a range of algorithms, primarily liquidity-seeking algorithms for trading large orders in dark environments. We leverage the unique value of our own liquidity pool, as well as external liquidity sources, and thereby create an unparalleled reach for our clients when executing their orders and minimize their footprint in the market.

Wald: As I mentioned, not all firms have the resources to build and staff an infrastructure capable of increasing execution speed and capacity requirements, absorbing regulatory and market structure changes, and ensuring the highest execution quality. However, firms like Knight specialize in this so that our clients don't have to. We trade on behalf of institutions and retail investors, and we provide technology straight to our institutional clients' desktops so that they can directly access multiple markets. This way, our clients



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can focus on their core offerings, from the portfolio management and investment process to capital markets and research, and leave the trading and trading technology to us.

Morgan: We don't see a hard divide between the builders and buyers of smart routers—builders have the advantage of complete control over their strategies and tactics, but the buyers can benefit from the vendor's domain expertise and ongoing maintenance.

There is, perhaps, more of a divide between the larger brokerage firms—both buyers and builders—and the smaller regional and specialist firms who find it difficult to meet the cost challenges involved. It's not just about the smart logic, but also about maintaining multiple market data, trading and clearing connections, and trade audit and transaction cost analysis. Fortunately, other answers are emerging—SunGard, for example, has evolved a Software-as-a-Service (SaaS) approach to the problem, allowing for more cost-effective trading at lower volumes and including provision of execution services for markets where the broker does not want to take up membership.

Q Are we seeing a generational change in trading systems? What are the new features that define the next generation of trading systems?

Mazur: I'm not sure it's a generational change—more like an ongoing evolution. Where previously access to liquidity was seen as the key benchmark, it has been augmented by the requirement to become faster, smarter, opportunistic, bespoke and risk-averse. This has manifested itself in many ways—the use of hardware-accelerated market data, co-location, incorporating increasingly sophisticated analytical inputs into order placement logic, and real-time client-specific configuration driving execution style. With the issues associated with the Flash Crash still fresh and the impending delivery of capabilities for compliance with SEC Rule 15c3-5 governing market access, all of the above are being delivered while protecting against fat-finger errors and unintended market impact consequences.

Cashel: Speed, analytics, and customization are essential in today's and tomorrow's trading systems. One size does not fit all for clients or symbols. Trading systems must provide customized tools that leverage high-speed infrastructure and real-time sophisticated analytics to achieve specific trading objectives even as market participants' behavior changes. Next-generation trading systems must continuously be fine-tuned to seek quality executions in order to consistently provide superior performance.

Bennett: Looking at trading systems available, most of the new features "harness" pure technology through trading rules and market data. Software providers of trading systems are also covering more financial instruments. The lesson of Flash Crash has been heard—if not learnt—and systems have started incorporating features that are trying to be one step ahead of any move by regulators to create specific rules operators will have to follow. Web delivery allows smaller players to access sophisticated trading software without the cost of building and supporting technology infrastructure.

The regulatory and political pressure toward more exchange trading of non-equity instruments has expanded the types of trading system. This points more toward an evolution than to a strong generational change. Ultimately technology and the need of big market players to be different from the herd will increase the pace of this evolution; a slower pace of regulatory change might allow disruptive technology to emerge again as a provider of competitive advantage.

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Lovén: In a competitive marketplace, trading systems need to constantly evolve. Having created the leading institutional platform, this is something we take seriously at Liquidnet. It is vital that the latest trading systems are flexible and shaped in accordance with customer demand. In the era of HFT, investors are more concerned than ever that systems are responsive and flexible, and that orders can be executed efficiently according to instructions. To ensure that we deliver the best results for institutional investors, we continue to make our own systems more customizable and versatile.

Wald: Trading technology has a short lifecycle, and it doesn't take long for it to become less effective as developments like high-frequency trading and fragmentation increasingly impact execution costs and, ultimately, returns. Our own next-generation algorithmic technology and approach, Order Awareness, allows for our algorithms like FAN to act with greater precision. For example, algorithms generally route orders to venues based on how these orders are moving through the marketplace. Order Awareness gathers feedback not only on the order being worked, but also on how other orders are responding to market conditions in real time. By applying this technology to the resident, deep liquidity within Knight, we are able to provide additional opportunities for price improvement—on average more than three basis points over the life of the trade—and reduced market impact.

Morgan: Generational change is probably too strong a term, but we are seeing extraordinarily rapid evolution. We're doing essentially the same things, but in more rapid and smarter ways. Examples include the emergence of complex-event processing in financial markets, of smart routers taking account of dark liquidity, and of super-fast gateways in co-location for high-frequency trading. Now, based partly on regulatory pressures, we're seeing the same ultra-low latency requirements being applied to pre-trade risk management, and with products like SunGard's Valdi Order Validator, there's plenty of scope for further developments along these lines—especially if we look at the global potential.

Q Are there new sources of liquidity on the horizon? If so, where could they be found?

Mazur: I don't think there are new sources of liquidity to be found as much as there are improved methods of liquidity discovery bringing more existing liquidity off the sidelines and into play. We encourage our clients to trade and meet their objectives while optimizing market impact and opportunity cost. Certainly an uptick in economic fortunes wouldn't hurt either.

Cashel: Our smart order-routing technology and algorithms have been built to adapt to a rapidly changing environment. We are constantly evaluating the market to incorporate new sources of liquidity.

Bennett: Proliferation of trading venues and regulatory and political push toward exchange trading will be the main factors in creating new sources of liquidity. Transparency regulations may make dark pools of liquidity more widely available but any new equity liquidity will mostly come from new markets and small companies. Non-equity financial instruments will create new liquidity, and the level of risk associated with the product being traded will be one of the main factors in the speed of proliferation.

Lovén: We believe one of the key ways to bring new sources of actionable liquidity is via an evolved market structure—through merging the institutional and retail models. An institutional market in partnership with the exchanges can help to create a better market structure for all, by marrying the price discovery, which the exchanges provide, with quantity discovery, which an institutional market offers. Working together, the two markets create a better market structure due to the fact that the institutions no longer have to suffer the inefficiencies and added cost of searching for liquidity in a retail venue. Similarly, the institutional investors have their own market where they can trade in larger sizes with other institutions while at the same time supplying liquidity and price improvement to the customers of the exchange.

An example of this would be the recent collaboration between Liquidnet and the SIX Swiss Exchange, in which Liquidnet will operate as the Swiss Stock Exchange's dark pool. The two separate but connecting execution venues will combine the latent liquidity in the Swiss Exchange with the liquidity in the institutional market, creating greater efficiency for institutional trading, while at the same time providing liquidity and price improvement to the other customers of the exchange. Ultimately, the partnership looks to create more liquidity in the Swiss market and also more opportunities for global institutions to more efficiently invest in Swiss stocks.

Wald: Yes, there will always be new pools and new innovations, because we're all competing for liquidity. And it's not just brand new participants entering the market, but, more often, additional liquidity pools from existing players with offerings beyond US equities. Knight has numerous ways to interact with liquidity, including our algorithms, undisplayed US and European equity liquidity in Knight Match, Knight Link and our institutional desk, plus industry-leading volume in our market-making engine, options market making and routing, as well as our currency and bond ECNs. But the challenge isn't just to find and get the most out of new sources of liquidity—it's equally challenging and necessary to find ways to optimize liquidity at long-standing destinations. If you or your trading partners aren't constantly looking to improve your interactions in the market, your execution quality may not be as high as it could be.

Morgan: Increasing HFT market making and proliferation of broker dark pools have created new liquidity. The markets now anxiously await the results of regulatory deliberations on both sides of the Atlantic to know whether this growth can continue or if it will be thrown into reverse. Optimists would say that dark pools in particular have further to go, if they can win the argument about their impact on public market price formation and volatility. There are also interesting market interconnection trends such as the links between multiple brokers' pools, and the deal recently struck between SIX Swiss Exchange and Liquidnet.

The development of public-book MTFs in Europe is incomplete—Equiduct's push toward a better platform for retail investors is one interesting current move that's attracting some success, while Quote MTF offers a new level of price competition. Ultimately all of these developments (with the obvious exception of the HFT arrivals) are more about changing liquidity patterns than they are about new sources. In established equity markets the latter are relatively hard to find, though there is always the hope of new developments stimulating larger retail flows in markets where these have traditionally been thin—as is the case for many in Europe, for example.

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