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In spite of sensational headlines and hyped product announcements, technology disruption across industry sectors and society as a whole looks more like a process of iterative evolution than a revolutionary usurp.

Not that firms (or people) are passive subjects in technology-driven natural selection; the direction of change is determined by companies, consumers and technology leaders – the architects of an entirely non-natural selection process.

In this sector, one of the oldest and largest financial services firms is pouring significant resources into ensuring it is master of its own fate, and of Wall Street as a whole. Indeed, State Street Corporation’s current brand tagline is “225 years of evolution”.

From machine learning in the front office to blockchain in the back, the global financial services firm is pushing innovation in all directions

**BY CARLY MINSKY**

The company’s front-office investment services business, Global Exchange, is the primary playing field for the firm’s innovation strategy, and leaders at the firm are not keeping quiet about the strategic shift in priorities.

Chief executive Ron O’Hanley told the Financial Times last month that State Street is moving “from the middle office to the front office”.

He said: “It’s no longer enough just to say that we’re a great custodian or a great accountant. Now it is really around information and information management and data; how do I make it available and useful to [clients] in their investment process?”

**Investment insights**

Within State Street Global Exchange, the business splits into data provision, analytics, and investments insights, the last of which is quickly becoming an innovation lab, developing new products across traditional investment research, investable models, indices, interactive tools and alternative data.

Head of innovation for Global Exchange, J R Lowry – who oversees the investment insights business and is also the overall head of North America – tells HFM Technology: “My group tends to be where a lot of the new product development is going on – not all of it, but a lot of it.”

Within his group specifically and across the firm more generally, there’s a strong commitment to strategic partnerships and cross-division collaboration as the best way – perhaps the only viable way – to drive forward with new technologies and new resources. Specifically when it comes to alternative data sources, only a small proportion of the new products and services have been developed without partnering with external third parties.

A first foray into alternative data was back in 2011, through a partnership with PriceStats – a company formed by post-doctoral researchers at Massachusetts Institute of Technology to commercialise their method of calculating “high-frequency measures of inflation” from scraping price data for millions of items sold online.

“Those guys were into big data before it was called big data,” Lowry says.

Now, the State Street division has rounded out its alternative data service, designed to help the less data-driven firms – as opposed to big quant groups – integrate new information into their investment decision-making.

Since the alternative data marketplace is, by all accounts, still at an early stage, there’s a particular risk when firms buy data from new sources in a “crude” form.

Beyond identifying valuable information sources, advising clients on potential applications or use cases, the service also does the vital job of “really getting under the covers of the methodology, how they are gathering the data and what refinements they are making to the data”.

Lowry explains: “All data providers are doing some level of cleansing and normalising of the data. You have to understand that at a relatively detailed level, otherwise you
are buying a cruder signal.

“The idea of turning that crude signal into something more refined for an investment purpose is where a lot of the work is and that’s the part that probably hasn’t happened yet to the degree it should.”

Among the data products sourced and evaluated by the investment insights team are media sentiment metrics, internet search data, mobile phone location data and environmental, social and governance (ESG) indicators calculated from big data.

There’s still a long way to go, both in terms of State Street’s expansion into alternative data and the maturity of the alternative data market. But Global Exchange have been tasked with getting ahead of the trend.

“Clearly, if you are investment professional you have to look at this,” comments Lowry. “It is just a new source of information in an industry that is built on creating an information advantage.”

One of State Street’s own advantages is the hoard of market data the company sits on. For around a decade the insights team at Global Exchange have been exploring the potential to turn the firm’s fund administration data into an “alternative” data product modelling investor flows and investor behaviour.

The management of this project is more onerous than might be assumed, since the team have taken the view that it would not be appropriate to benefit commercially from client (i.e. asset and transaction) data without explicit consent from clients who have entrusted the company for record-keeping. This results in a heavy burden of consent management, in spite of the fact that using high-level trends based on data in totally anonymised or aggregate form does not obviously violate any legal or regulatory rules.

Aside from the extra workload, Lowry doesn’t think the consent requirement will be much of a barrier.

“We think our clients are actually very willing to provide consent for us to build this data into new products, because they recognise that at our scale, with $33trn in assets under administration, there aren’t a whole lot of other players in the industry that can see the breadth of what is going on out there that we can,” he adds.

**Information overload**

The team are also processing, analysing and packaging up new information sources in innovative ways, using techniques such as machine learning and natural language processing. A growing group of cognitive computing researchers based in Austin, Texas, supports the whole company in understanding and applying the potential for advanced technology which, unlike some machine learning methods, can work with symbolic, conceptual and contextual information, at least to the level of human intelligence.

State Street’s research management platform Quantextual is a product of applied cognitive techniques, fuelled by machine learning algorithms not only to tag incoming research but also to create curated recommendations of relevant research based on the user’s behaviour and profile.

Another new project is also on the way. A yet-to-launch new service for risk professionals at asset management firms mines a variety of data sources to automatically generate an overview of global geopolitical trends and how world events impact the user’s portfolio.

“Both of these products are designed to help our clients cope with the growing issue of information overload,” Lowry summarises.

Slightly confusingly, the data services under Global Exchange, and also under Lowry’s remit, have no direct relation to the alternative data and insights business.

Indirectly, the data group supports the investment insight team by providing services on the operational, data management side, which frees up State Street clients to explore the new tools and resources the insights team are selling.

Until State Street has evolved to provide a fully integrated, seamless, front-to-back service (more on that later), its innovations in the front, middle and back office remain separate, albeit overlapping and collaborative ventures.

### Hedge funds in mind

Over in State Street Global Markets division – its securities business – the securities finance team has hedge funds in mind when exploring innovation opportunities. As Nickolas Delikaris, global head of trading and algorithmic strategies, explains, alternative asset management firms have become a priority for the division since the enhanced custody service – which he describes as State Street’s prime brokerage platform – gained ground.

Two main projects are underway: developing a comprehensive securities finance research platform, leveraging artificial intelligence techniques, and a blockchain-based infrastructure project to generate a single consistent book of records. Both involve participation and contributions from other teams across the company. Delikaris works with Lowry on the research offering for securities finance, developing similar research products to those rolled out by Lowry’s investment insights team.

Although the initiative is “still in its infancy”, Delikaris is already confident that their approach, evaluating the applications of emerging technologies for enhanced custody, gives them “a slightly different slant to some of our competitors”.

Delikaris adds more weight to the idea that collaboration is the only way for the firm to future-proof itself in the face of technology evolution.

“We are starting to see this all over State Street,” he says. “Some of these technologies are rapidly changing in front of us and nobody can keep pace with all of it. So this idea
of partnerships is taking hold and I think State Street has done a really good job of harnessing that.”

The internal partnerships go towards “bridging the gaps” – both knowledge and skills gaps, and gaps between different business areas.

The key – to almost everything – according to Delikaris, is data. “The idea here is that data is the very foundation of how we are going to make decisions,” he says. “Everyone – not just us but extending across finance and across other industries – everyone is thinking about how to harness their data, how to make use of different forms of data, but ultimately: how to mix data in one common place and then start making decisions on top of that.”

For Delikaris, as for many others working on similar problems, “data in one common place” immediately sets the “blockchain potential” alarm going. On its operational applications for data management, his team collaborate with State Street Corporation’s chief technology architect Moiz Kohari, who runs the firm’s back office blockchain project, already past the proof of concept stage. But Delikaris’ ultimate aim is “one layer up the stack”: a real-time data-driven platform supporting faster and better trading decisions.

State Street’s proprietary “next generation” trading and analytics platform, developed by Delikaris and colleagues in enhanced custody but now extending across securities finance, offers this, but in order for it to be “extensible to new technologies”, blockchain infrastructure is the next step.

Frank D’Agnese, managing director and COO for securities finance, is involved on this front. His incentive, naturally for a chief operating officer, is to find new solutions for the operationally intensive securities lending business.

“All of us across the industry carry this large cost burden of this highly operationally intense process,” he explains. “If we could all share in a utility-like structure, that leveraged something like a blockchain technology to do many of those common tasks where there is no competitive advantage, in a cheaper way, just like any other industry utility it would be a large benefit not just to us but ultimately: how to mix data in one common place and then start making decisions on top of that.”

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Back to back

In spite of the expressed focus on front-office innovation, the most advanced initiative at the firm – both in terms of advanced technology and advanced stage – is in the realm of back-office operations.

Moiz Kohari runs a team working exclusively on evolving State Street’s own back-office systems using distributed ledger technology – specifically the Linux Foundation’s HyperLedger project. Many key concepts within HyperLedger, such as settlement finality, were contributed to the project by people now at State Street. The engineering portion of the team still works upstream on the HyperLedger project to create the fundamental software capabilities for a network of blockchain nodes, while expert business analysts explore use cases and design services and workflows.

Eventually the company’s custody, agency lending, enhanced custody and collateral management capabilities will be re-implemented on HyperLedger, and rolled out to clients after a process of thorough testing.

“The first step in providing DLT based services to our clients is to transform our internal environment to operate on top of a blockchain network,” explains Kohari. “Transformation has to start from our internal systems. Eventually most of the infrastructure will be replaced by this type of technology; we want to provide real-time services to our clients. But the timeframe for that total evolution is going to be significant; we will not be able to do all of that even within a 24 months period.”

To start with, the team has recreated the internal workflow on HyperLedger for client transactions, and completed a proof of concept. In the next 24 months, Kohari tells HFMTechnology, the team will look to provide middle and front office services on blockchain too.

“We hope that our clients will start to see some level of positive impact on critical services sooner rather than later, however we will not rush these products to market until we have absolute confidence that the new capabilities provide a higher and more secure level of service to our clients,” he adds.

Project Beacon

All of State Street’s divisions are contributing in some way to an ambitious innovation project: a seamless, front-to-back-office service, powered by a seamless, integrated data operation.

Launched in January 2016, Project Beacon – “a 10-year, billion-dollar effort to digitally interconnect all of the company’s systems” – is already halfway to completion. Once rolled out, the company’s global client data will pass all the way through the system without any human intervention, and create real-time data for clients on the other side.

The emphasis on a more holistic operation both requires and produces a cross-division working culture. J R Lowry sees his teams in Global Exchange as “beneficiaries of what the company is doing overall” to create good, clean data. Employees are encouraged to think creatively and work outside their usual remit, with more experienced employees running educational seminars.

In securities finance, 45 traders were sent to a data science camp, not necessarily for them to work as data scientists on a daily basis, but to support their innovation that fundamentally relies on data science techniques.

The excitement at the firm is palpable, and runs counter to what might be expected at a long-standing institution: resistance to change. “The reality is that change is a threat,” admits Frank D’Agnese. “But if anyone is going to be a threat to us it should be ourselves.”

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