Is AI use growing in the financial sector?

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How can AI change banking and what will this mean for supervision?

Artificial Intelligence and Machine Learning (AI/ML) will fundamentally change the financial sector in the medium term. AI/ML may undermine one of the foundations of banking business: banks' privileged access to their customers' financial and risk information. In that respect, AI is comparable to financial innovation in the nineties: Whereas derivative instruments have made local risk globally tradeable, AI/ML makes banks' specific local information substitutable and therefore globally accessible and processable.

At the same time, AI/ML offers many opportunities to banks as well as to their new competitors: it enables the financial industry to exploit masses of information in order to improve their risk management and decision-making processes. Therefore, banks are encouraged to use AI/ML where this leads to improved service to their clients and better risk management, or, in a word: more effective and efficient banking operations.

However, a lesson from the past is that innovation unfolds its benefits only if its major implications are well understood. By construction, in AI systems there exists a strong nonlinear relationship between their input and output. This, along with tremendously increased computing power, is what makes them successful: a huge amount of data can be processed quickly, and its inherent information extracted. However, this feature also marks the flip side of the coin: it is hard to understand their "reasoning". Morever, the sheer amount of data utilised raises ethical questions about its rightful usage.

The application of AI/ML can create considerable risks for banks as well. It is often difficult to know (i) how reliable the inferred relationship between input and output is and (ii) which causality exists between them. This is called the explanatory gap of AI. There are many situations where the explanatory gap does not matter. In those cases, all we need to know is that AI works as expected, and that, if it stops working as expected, this can be detected and fixed quickly. In such cases, we will not need specific regulatory safeguards.

Supervisors have a task when the outcome of an AI/ML method is critical for the functioning of internal controls, for compliance with external requirements or for banks' relationship with their customers or counterparties. In these cases, banks have to fulfil requirements for their AI/ML methods similar to those for any other quantitative model used in risk management: sound modelling practices, reliable processes surrounding the methods, rigid and effective validation, and appropriate management of the inherent model risk.

In a nutshell, the supervisory approach should be to look first at the scope of application of an AI/ML system. If an AI/ML application turns out to have a severe impact on informed decision-making, sound risk management, or otherwise a bank's fundamental functions, supervisory action will clearly be required. The aim is to keep operational risk reasonably contained.

Therefore, both supervisors and banks face challenges and opportunities alike. Supervisors have to adjust their approaches and skills to escort the introduction of AI/ML in banking. Banks have to give supervisors sound explanations of what their AI/ML systems actually do, as well as to what end. ●

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The European approach to Artificial Intelligence in Fintech: current efforts and ambitions

There are prominent synergies between Artificial Intelligence (AI) and the financial services sector as emerging technologies rapidly extend their impact on the financial industry. This reality is reflected in and addressed by the European Commission's new Digital Strategy (2020), the European Data Strategy (2020), the White Paper On Artificial Intelligence - A European approach to excellence and trust (2020), the SME Strategy (2020), the eIDAS Regulation, Payment Services Directive 2 as well as non-legislative financial services initiatives such as the FinTech Action Plan (2018).

In the financial sector, AI solutions are already being used to enable personalisation of financial services and products, ▶

better anti-fraud protection, and faster and more reliable credit assessment. The 2020 Digital Strategy lays out the ambition to create a new regulatory and policy framework for digital finance addressing crypto assets, cyber resilience, as well as a strategy for an integrated pan-European digital payment infrastructure. These efforts are part of a broader EU objective to deepen the Single Market for digital financial services and promoting a data-driven financial sector in the EU, in which AI will play a critical role.

Europe is well-positioned to tap into the potential of AI by capitalising on Europe's competitive industrial and professional markets, including financial services, and its digital innovation and research capacities. At the same time, building an ecosystem of trust is essential. A European approach to AI should ensure that machine-based learning technologies are human-centric, ethical, sustainable and respect fundamental rights and values.

It is important to recognize that while AI can do much good, including by providing better access to finance, reduce costs, and increase efficiency, it can also have negative impacts. It is therefore imperative to mitigate unintended consequences, in particular the risks of data bias, which may arise in the financial services and other sectors. The integrity of the data is paramount, as is the design of AI applications with fundamental rights protections in mind (especially personal data and privacy protection, and non-discrimination).

The Commission is addressing these challenges through a variety of efforts and initiatives, including providing guidance in its AI strategy (2018), Coordinated Plan with the Member States, the Guidelines on Trustworthy AI published by the High-Level Expert Group (2019), and most recently the Commission White Paper on Artificial Intelligence (2020).

For any future EU regulatory framework on AI it will be important that it strikes the right balance. It would need to be effective to ensure the protection of fundamental rights and consumer protection, while encouraging innovation and investment in AI and not imposing a disproportionate burden on developers or business.

A relevant approach in ensuring the protection of fundamental rights and consumer protection is that of regulatory sandboxes. In the SME Strategy for a Digital and Sustainable Europe, it was stated, 'The Commission will encourage Member States to develop proposals for regulatory sandboxes by launching a pilot.' Regulatory sandboxes in the financial services area give opportunities to firms to live test applications, pursuant based on a specific testing plan agreed and monitored by a dedicated function of the competent authority, such as innovative financial products, financial services or business models. Another pertinent and related approach is that of innovation hubs. Innovation hubs provide a dedicated point of contact for firms to ask questions to competent authorities on FinTech related issues and to seek non-binding guidance on regulatory and supervisory expectations, including licensing requirements.

As foreseen in the FinTech Action Plan, the Commission has set up a EU Fintech Lab. The EU FinTech Lab provides a regulators forum to discuss regulatory and supervisory issues regarding new technological applications that are on the market with experts. The Lab has met four times so far (1x cloud, 2x artificial intelligence, 1x RegTech/SupTech), the last time in December 2019 (on AI). ●

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Promoting responsible innovation in finance through AI multipronged evaluation

Increasing technicity

Supervisors' technical expertise needs to follow market innovations in AI. Ideally, it would mirror - both in breadth and in depth - the tradecraft of those implementing the systems: just like supervisors hired statisticians to master the intricacies of internal models developed for banks by quants, their staff should include AI experts.

We propose grounding AI evaluation on four pillars: performance (minimizing prediction errors), fairness (yielding decisions, which do not discriminate against individuals or groups), stability over time, and explainability. The latter is particularly prevalent nowadays due to the regulatory context but also as an ethical duty. This implies being able to "open the black box" enclosing any algorithm whose output directly impacts individuals. Thus, the supervisory method itself should evolve: supervision must become more technically-oriented and cross-disciplinary.

As for fairness, the world we live in is full of biases. Those biases are by definition reflected in – and often reinforced by – ML algorithms. The emerging research domain of bias mitigation aims to alleviate discriminatory and unethical outcomes from their output. At any rate, algorithms and data must be evaluated hand-in-hand. Hence, a proposed dual approach to empirical evaluation of AI, based on challenger models and benchmark datasets, will be subjected by the ACPR to feedback from a public consultation.

AI supervision has much to gain from defining methodological best practices, which would cover the entire lifecycle of AI, from data preprocessing and model selection through industrialization to stability issues.

Promoting responsible innovation

On the other hand, the speed of AI adoption in finance should not be overstated: few ML (Machine Learning) algorithms are in production, and those few are rarely the more advanced kind, especially in highly regulated domains or client-facing tasks. Reasons for excessive caution in AI implementation include its operational and compliance risks. ▶

Indeed, as AI strives by nature towards autonomy, the most prevalent threat beyond generic cybersecurity and ML-specific threats is a loss of control, whether by dearth of skills or inappropriate oversight.

Supervisors should thus encourage the positive effects of its widespread usage. Hence one of our key missions: to foster responsible innovation – in other words remove undue obstacles and ensure proper interpretation of the regulation, while also ensuring proper risk management and customer protection.

Co-designing supervisory technology

ACPR SupTech strategy builds around mastering AI technology, which enables us to dialogue with the marketplace, anticipate emerging risks, and enhance our own methods and technologies.

We rely heavily on networking for this: bilateral exchanges with national, European, or international authorities and working groups. Such dialogue may result in proposals for regulatory amendments, but also in more technical deliverables, such as data exchange protocols or software code sharing: for example, pseudonymization (a common GDPR requirement) benefits from all financial supervisors contributing their country- and language-specific expertise. ●

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AI – managing the future for firms and regulators

Artificial intelligence (AI) has increasingly been used in financial services over recent years. At the FCA, we are considering how we can design a regulatory framework that ensures sufficient oversight, manages the trade-offs firms may need to make, and allows consumers to benefit from the efficiencies AI can bring.

An optimal regime should avoid being tied down to specific technologies. We believe that an outcomes-based and principles-based approach is more conducive to regulating areas that are rapidly evolving. Few of our rules are technology-specific. Detailed and overly prescriptive rules run the risk of becoming quickly out of date and of stifling desirable innovation which can benefit markets and consumers.

Accountability is key when we consider how firms should manage their application of AI. We believe human beings should remain responsible, and accountable, for the technology they use. In the UK, our Senior Managers and Certification Regime is designed to achieve this. But what does accountability look like in the world of AI deployment? As AI technology applications become increasingly advanced and complex, there may be fewer experts who truly understand them. There is also a risk of growing divergence between the experts and senior managers. Senior managers will need to address this.

Effective accountability should support more transparent and explainable use of AI. The use of AI may force firms and regulators to make new types of trade-offs. For example, it can allow more data to be considered in a consumer's credit application, or help provide consumers with products suited to their needs, but it can also incorporate errors and amplify biases. Firms should manage such risks effectively and be clear with consumers about how their data are used. We are currently running a research project with the Alan Turing Institute in the UK to consider how AI could improve outcomes for consumers and support regulatory initiatives.

Machine learning and other AI applications can also be used by malicious actors; for example, to facilitate cyberattacks or financial crimes that spread quickly, are difficult to detect, and cause damage. Firms need to ensure that they are operationally resilient, are vigilant against financial crimes, and can prevent, respond to, and recover from such incidents. Some firms are already using machine learning to combat cyberattacks and money laundering.

The FCA is exploring how we can utilise machine learning to support us in carrying out conduct and prudential regulation. We are investing to become an even more data-driven regulator, enhancing our ability to monitor, predict and respond to firm and market issues. With the Bank of England, we are also setting up a joint AI Forum to gather industry views and share information on safe adoption and usage of AI in financial services and in regulation.

We remain committed to working with international regulators and standard-setting bodies to support an approach to AI that promotes the interests of consumers and is fit for purpose in a fast-changing world. ●

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Promoting responsible Artificial Intelligence in insurance

As a representative of Assicurazioni Generali, I recently had the privilege of participating in the Geneva Association Working Group on how to promote the responsible adoption of Artificial Intelligence in the industry. I would refer to them as those intelligent systems that automize routine tasks or assist human decision-making along the entire value chain. Such systems may combine new types of learning algorithms with the analysis of data from new types of data sources, such as online media data and IoT data. Natural language processing is surely an AI revolution for the industry: it enables intelligent systems to 'talk' and interact with humans, and Insurers are increasingly using chatbots that can identify and respond to ordinary customer queries that are available 24/7.

While working in Europ Assistance some years ago, we pioneered the use of natural language processing for the delivery of Motor Assistance and towing services in Europe: by establishing a chatbot to manage ordinary assistance request calls, we succeeded ▶

▶ in improving customer service and responsiveness of the call center operations, whilst preserving operational efficiency. Computer Vision technology is also an AI application that can materially improve how Insurers manage claims with faster and more accurate responses: intelligent systems can detect and recognize objects in pictures, extract related information and provide guidance on the claims management. Such an approach is present tense in some markets, especially in the Motor Other Damage servicing.

In addition to such cases, intelligent systems can detect patterns and correlations in complex data in ways never thought possible before, and set the basis for analytical tasks such as classification, regression and clustering that are crucial in the insurance business model. Compared to traditional modelling that generally relies on linear models, intelligent systems have the potential to provide more complex non-linear relationships between variables and consequently better risk modelling. The Geneva Association working group identified three socio-economic benefits of AI:

- Expand the scope of risk pooling, by extending coverages to new and previously uninsured customer segments, and by widening the range of risks for which insurance is available
- Reduce the cost of risk pooling, by decreasing the cost of the value chain through automation of specific activities, reduction of moral hazards and adverse selection
- Mitigate and prevent risks by better modelling and enabling predictive capabilities that can avoid or reduce losses.

However, in all contexts AI is based on data, and data represents the key factor that allows intelligent systems to consequently progress. Insurers need to master data and earn customer trust to utilize their data in to maximize the benefits of AI. To gain such trust is crucial to clarify AI benefits, provide undisputed value to customers and manage data responsibly. In order to achieve customer confidence and reap maximum benefits from AI, Insurers should adopt clear guidelines on how to implant intelligent systems in their value chain, and how to appropriately make use of its capabilities. In conclusion, Internal guidelines and policies play an important role in raising the awareness of the benefit–risk trade-offs in the use of AI in insurance.

From a regulatory perspective, the definition of ethical principles for the use of such technologies can be a key initial step in supporting both technological progress and the industry evolution. Such principles would also be guiding stars for other technologies that will arise in the future, and pose similar benefit-risk trade-offs. (Reference: The Geneva Association - Promoting Responsible Artificial Intelligence in Insurance, January 2020). ●

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Basel IV, Common Data Standards and Artificial Intelligence

Artificial intelligence (AI) and machine learning (ML) in the RegTech industry are disrupting regulatory compliance. By creating a common data standard, RegTech companies can leverage AI and ML tools to perform analysis on standardised data to spot discrepancies faster and more accurately. Where regulation was previously a cost centre for financial institutions, compliance functions can now create value by cutting costs and producing highly accurate data that financial institutions can then use to make strategic business decisions. Institutions that employ such software are already enjoying cost savings, whilst investors, the public and supervisors can benefit from standardised, highly accurate regulatory submissions.

The Basel Accords provide a good example of the benefits of standardisation in regulation and compliance. With Basel III, the Basel Committee on Banking Supervision (BCBS) introduced new capital, liquidity, and leverage requirements following the financial crisis of 2007/2008. For most financial institutions, this meant significant added expenses on consultants, manual processes, and contractors who were hired to cope with regulatory demands. The manual processes and disparity among contractors' approaches resulted in discrepancies in compliance with Basel III among financial institutions. To address this, the BCBS introduced Basel IV in 2017 to restrict the use of internal models for calculating capital at financial institutions. Standardisation was the ultimate objective.

The RegTech industry can help financial institutions capitalise on increased standardisation in financial regulation. It can transform financial institutions' disparate data through a common data standard into an easily machine-readable format. AI and ML advancements can then use this data to produce the highly accurate regulatory submissions that the BCBS were after with the introduction of Basel IV. The

RegTech industry's ability to leverage AI and ML is the best way of achieving uniformly high standards in capital, liquidity, and leverage, and ensuring a stable and secure financial services industry that is effectively supervised. Those financial institutions that entrust their compliance to the RegTech industry can set precedent for RegTech innovation and compliance in the years to come. ●