AI and ML applications in finance

1. AI and ML market trends and use cases

1.1 AI use in financial services

An industry representative stated that artificial intelligence (AI) is now widely used by banks with many live use cases that add value in different ways. There has been a great deal of positive impact of AI use for banking activities in areas such as market making, the identification of fraud and financial crime, risk and pricing calculations and the management of banks' balance sheets. AI also enhances banks' ability to service clients with an improved understanding and even prediction of their interests and needs. Natural language processing (NLP) also helps to communicate with clients more quickly and more effectively in many areas. There have moreover been huge benefits to the bottom line of banks from the use of AI that supports intelligent automation, enhancements in reconciliation processes and more generally the ability to digitise at scale. A condition however for realising these benefits is a thoughtful implementation of AI and an embedding of ethical principles.

A regulator stated that surveys conducted by the UK FCA together with the Bank of England show that the use of ML is expected to triple over the next three years in the banking and insurance sectors. AI can help to solve many issues in the consumer area. As citizens need to take more responsibility for their future financial wellbeing, healthcare and pensions, AI-based robo-advice and financial planning solutions can be very helpful in providing advice in a cost-effective way.

1.2 AI use to support financial regulation and supervision

An industry representative stated that AI and ML (machine learning) can also support regulatory and supervisory activities in a very effective way. Regtech companies have been using NLP for some time for translating regulation into code and ML for automating regulatory reporting processes as far as possible.

A regulator agreed that there are many applications of AI and NLP in the supervisory space and further investment is needed in that respect. The UK FCA is using AI to scan 100,000 websites every day and identify the main potential problems in terms of consumer harm. AI is also used to accelerate investigations in the context of the most complex enforcement cases that often require a massive amount of digital data to be interrogated. In the area of financial crime, AI also helps to track criminals more efficiently. At the same time, criminals are also avid users of AI technology, which requires supervisors to stay ahead of the curve.

An official stated that suptech is a very interesting area of application of AI that is also being experimented in the US. US financial regulators are all in the process of deploying suptech solutions to enhance oversight capabilities and that trend is due to accelerate. Suptech is a new word, but not a new concept however. The CFTC in particular has been using data analytics and ML for a long time to support its mission, e.g. to detect market manipulation and to support surveillance and enforcement efforts. The CFTC is currently also developing an analytics toolkit leveraging AI and deploying a new cloud-based architecture, which combined with advancements in AI and ML tools, aims to achieve more accurate, efficient and consistent data reporting. The CFTC is also looking at using NLP to convert regulatory reports that come in many different formats into structured data that will support better oversight of markets..

1.3 Future prospects of AI and issues to further consider

An official observed that while there are some very promising use cases of AI for improving customer service, it is the more internal facing uses of AI that are probably going to see the most continued deployment in the coming years in the financial sector, as they can provide the most immediate value – e.g. using AI to automate risk management processes, regulatory compliance processes, and different operational and back office processes .There are concerns that with AI, machines may eventually overtake humans, but whilst AI may automate and replace some jobs, it cannot wholly replace human judgment and remains an additional tool that humans can use to expand their capabilities. There is however a need to use AI appropriately and responsibly. Regulators will need to ensure that adequate supervision is applied to AI, including generative AI, just as it is for financial services activities. This may go beyond the supervision of risk management processes and guidelines and also include aspects such as the supervision of the personnel in charge of supervising AI systems. A public representative agreed that the aim with AI and ML should not be to totally replace human labour, but to supplement human activity.

An industry representative explained that 20 or 30 years ago it was possible for supervisors to understand what was happening at financial institutions with some fairly basic calculations of liquidity and capital ratios based on available financial data and some qualitative assessments of activities and risks. Nowadays financial activities have become much more complex and the amount of data produced has exploded and has become unmanageable, making the supervision of most activities in a traditional 'back-of-the-envelope' way practically impossible. AI and ML can really add value in this perspective, supporting efficient data collection and data analytics and helping

with the identification of potential outliers and risks. There is however the need to still have critical judgement about the data produced and the operational management of the firm supervised in a more traditional way. In the case of SVB (Silicon Bank Valley), which recently failed, much of the data that could have surfaced out the problems was already publicly available and had been communicated to supervisors. What was lacking was the critical thinking and assessment of the supervisors around the data produced. The industry speaker also emphasized the importance for supervisors of understanding the potential impact of AI on bank customer behaviour, as the technology and use cases evolve. In the future, AI based alerts about the health of a bank may trigger a bank run much faster than at present. Those issues need to be considered from a supervisory perspective, with the ability for supervisors to intervene immediately when that kind of behaviour is observed.

Concerning generative AI, the industry speaker considered that this new generation of AI offers very interesting opportunities, particularly when it comes to customer support chat boxes, and can be helpful to customers in this regard, but it does not provide significant added value for all activities. For example, financial regulation turns out to be still too complex to use ChatGPT effectively for regtech or suptech applications.

A regulator observed that some of the challenges related to AI implementation, such as the legacy systems of financial institutions are traditional ones, but others are more specific. AI poses important ethical challenges in relation to customers. Financial institutions are also faced with a shortage of skills and possible dependency issues when working with third party providers. Some of which are very advanced tech firms, investing tens of billions of dollars in order to keep an edge on data analytics and the most advanced AI applications.

2. Regulatory approach to AI

2.1 Issues and principles that need considering in AI legislation

The chair questioned the panellists about how to strike a right balance with AI legislation between enabling innovation and dealing with risk and protecting consumers.

An official stated that there is no guarantee that new technologies such as AI will follow Isaac Asimov's 1942 Three Laws of Robotics by default[1], especially the Zeroth Law: A robot may not harm humanity, or, by inaction, allow humanity to come to harm. To uphold those laws, it will take careful observation, foresight, and nimbleness from policymakers and regulators.

A regulator emphasised the importance of ensuring that humans continue to take responsibility when AI-based systems are being used. Transparency is also needed around the way in which algorithms are being utilised and whether it is fair and respects privacy. Although AI algorithms such as those used in the context of robo-advice may be broadly right 99% of the time, there are times when they get it wrong. A new type of framework will be needed to allow such cases to be dealt with. In addition, AI is an area where challenges are growing for the financial regulatory community, because, particularly with generative AI, far deeper cooperation with other regulators will be needed. The FCA has set up a forum in the UK to really deepen the work conducted in this area.

An industry representative observed that AI, including generative AI has much potential, but is a complex area. There is a need to use AI in an ethical way based on adequate principles and product reviews in all sectors, but more particularly in regulated industries. Sundar Pichai, the CEO of Google, recently stated that AI is too important not to regulate and not to regulate well. Many jurisdictions are considering AI regulation and the EU has been at the forefront of this effort with the AI Act. In terms of process, there is the need for a collective approach to the legislation in this area including a wide range of stakeholders such as governments, academia, and companies. In terms of content, the objective is calibrating the way in which AI is used in order to maximise its advantages for society, while avoiding adverse effects for humanity.

The industry speaker suggested that there are three main issues to consider to help address these challenges in terms of legislation. The first is to ensure that there is parity between AI and non-AI systems in the way they are considered. Considering specific use cases and the risks they pose is the right way to think about this, because not all AI applications are highly risky. Secondly, there is a need to leverage existing rules to the fullest extent possible. When assessing the standards needed for AI, there are very few cases where new specific rules are needed, except possibly for high risk applications, for which there need to be proportionate safeguards in place. Thirdly, an international perspective must be taken. Many different countries around the world are looking to Europe to see how a regulatory framework for AI can work so Europe should set a great example in this area. Care needs to be taken in particular to avoid adopting a one-size-fits-all approach to AI, which may lead to accidentally regulating aspects that relate to research for example. The source code needs to be protected and it is important to refrain from unnecessary restrictions.

A second industry representative explained that, in 2020, HSBC had released principles for the ethical use of AI, with a focus on detecting and mitigating bias, respecting the privacy of customers and staff, being transparent with customers, employees and shareholders, and also ensuring appropriate levels of explainability, transparency and accountability. With

1. The Three Laws of Robotics are a set of rules devised by science fiction author Isaac Asimov. (i) A robot may not injure a human being or, through inaction, allow a human being to come to harm; (ii) A robot must obey the orders given it by human beings except where such orders would conflict with the First Law; (iii) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

the advent of a new era of generative AI, allowing more powerful automation and a greater ability to operate at scale, more of the same issues can be expected. A thoughtful approach is needed about embedding the guardrails and the ethical principles needed to manage the risks posed by these new developments. A close interaction will be needed between the industry and regulators in this perspective.

Wherever possible, regulation should focus on outcomes, the industry speaker believed, rather than prescribing how to get to those outcomes, as this may allow the achievement of a better balance between innovation and risk mitigation objectives. It is also important to make sure that the AI regulation is well targeted, focusing on what is truly believed to be AI and the novel risks of opacity and complexity associated with that, rather than tackling issues raised by more traditional data analytics and statistical models.

An official observed that when standards such as ethical standards are developed at industry level, there is no reason for the regulator to try to impose additional requirements if the standards are appropriate.

2.2 The European AI and Data Acts

When it comes to the AI Act specifically, it is necessary to remember that financial services are already highly regulated, an industry speaker emphasized, which means that many issues addressed in the AI Act are already covered in the EU financial services acquis. In addition, most financial services AI use cases are not considered to fall into the high risk category. However, it is necessary to adopt a more outcomes-based approach to AI legislation, because many of the models that might fall into so-called high-risk areas are not necessarily high-risk in themselves. A really granular assessment of the risks, of the mitigating factors and the likelihood of these scenarios occurring is needed.

A public representative stressed that, in addition to the AI Act, data regulations, such as the Data Act, need to be considered. Data is a challenging area to regulate, but it is of crucial importance, because data is the critical raw material for AI and digitalisation. The consumer protection aspects need to be considered, as well as the opportunities from a greater use of data. Accountability and transparency are important in this area, as well as privacy and security with increasing cyber-risks. Users must have access to the information about how their data is being used, shared and implemented in all AI-based applications and algorithms in particular. The Data Act is important because it sets a certain number of ground rules such as assigning an economic value to data, which should contribute to increase awareness about its importance. The Data Act also empowers consumers, giving them control over their personal data and the data they have generated using financial services for example and also giving them the power to decide how this data should be used and whether and with whom it should be shared. This greater control by the consumer should open the way to a wider use and sharing of data, which is likely to help create more innovative and tailor-made products, providing consumers with new opportunities and more choice. The public representative added that the Data Act also applies to businesses and should lead to an improvement of the level playing field for SMEs in terms of access to data and the ability for these smaller players to leverage their data to enhance innovation.

An official stated that the AI and Data Acts are two key regulatory frameworks for fostering the digitalisation of financial services in the EU. Since fundamental rights are already included in financial regulations to a certain extent, these frameworks do not cover areas that are totally new. It is now up to the European Parliament to have its say on the AI Act. Customer consent is essential for the development of AI and also for new developments such as open finance. One of the solutions for ensuring consumer consent and checking how the data is being processed, by whom and in which way is implementing an EU digital ID. This has implications in different areas including open finance and Decentralized Finance (DeFi). However, to enforce an EU digital ID there is a need for interoperable standards. The Data Act is quite a broad platform covering different industrial sectors that all have their own data standards and APIs. The question is what should be the best interoperability standard for data-based solutions to work across industries. At this stage it is not clear whether much progress is being made in this important area.

2.3 Regulatory approaches to AI in the UK and US

A regulator stated that the UK FCA is approaching digital finance regulation in a technology neutral and a principles and outcomes-based way. The UK government set out its approach to the regulation of AI in a recent white paper. The intention at this stage is not to propose a cross-economy regulation, but to put forward some recommendations that may be taken up by sectoral regulators for developing regulations in their own domain. Close attention is paid to the OECD AI principles around safety, security, transparency, explicability, fairness, and accountability.

An official explained that there are many different initiatives concerning AI in the US but these are convergent. Given some of the legacy issues in the US around disparate impact on vulnerable populations and discriminatory practices, much focus is given on the client facing applications of AI and ML in the policy approach to AI. The main focus is on bias risks and ethics in AI, particularly concerning credit underwriting and scoring activities. The priority in the US is exploring ways to ensure responsible AI with adequate fairness, accountability and transparency in AI-driven decision-making processes concerning clients. There is on-going work on these issues led by the National Artificial Intelligence Initiative Office, which recently published some guidelines for AI. The National Institute of Standards and Technology also issued in January 2023 the version 1.0 of its AI risk management framework. The financial regulators are also working on these issues. For example the CFTC is currently exploring how responsible AI and ethics in AI can be applied by exchanges and financial services providers. US regulators already have broad capabilities that allow them to oversee customer-facing activities, therefore their focus is on operational risk management requirements, including model risk management and third-party risk management, to ensure the effective

oversight of AI applications. More broadly, concerning digital financial services, work is being done on digital engagement practices with targeted examinations performed by the FINRA, SEC and the CFPB looking at how to prevent algorithmic bias and automated valuation models and checking whether data privacy controls and policies are in place, as well as algorithmic transparency and cybersecurity.

3. Data standardisation and quality issues

An industry representative stated that more effort has to be made in terms of public and private collaboration to improve data quality and standardisation, which remain a major obstacle to the adoption of AI and ML in an effective way. Data quality in financial services is insufficient with simply not enough clean data to train AI models at a time when AI models, including generative AI, are requiring an increasing amount of data to be trained in the traditional way. The way models can be trained also needs to be optimised looking at specific use cases and better capitalising on different approaches such as unsupervised, supervised, and even reinforced training of the models. For addressing that, an effective cooperation is needed between the private and public sectors. The availability of data scientist skills is also an increasing issue for improving data quality and appropriately training AI and ML models.

An official stressed the importance of interoperability when defining data and API standards. In the process of defining its standards, the EU should consider building on standards used at the international level.