WASP—HS

COMMUNITY REFERENCE MEETING: FINTECH

REPORT

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Introduction

Developments in Artificial Intelligence (AI) technologies are transforming financial products and services. Automated decision making plays an increasingly important role regarding the provision of financial services, fraud detection, and credit audits. At the same time, consumer finance providers are relying on conversational AI agents that can engage directly with customers, and perform algorithmic trading, including high-frequency algorithmic trading. These actions, and interactions, are shaping markets and policies. Thus, AI brings much promise to the financial sector but at the same time, the application of AI related to financial services is one that raises many questions in terms of societal impact, management, security, and regulation.

As in medicine and healthcare, the use of AI in the FinTech industry is characterized by the scale and the sensitivity of the available data. Financial institutions have access to a huge variety of data on persons, groups, and organizations. AI technology provides the possibility to analyze and make predictions at a scale that was not previously possible. However, great technology comes with great responsibility. To ensure that applications are just, fair, free of bias, respectful of privacy, including individual preferences and differences, access to such sensitive data also means susceptibility to malicious attacks, requiring strong cybersecurity measures in the FinTech industry.

The European Union recently introduced rules that will begin to shape the way AI is used, with a particular focus on the sector of financial services. These rules focus on the impact of AI on fundamental human rights, and on individual privacy and security, including the use of biometric data. These, and other changes, affect access and cost of capital for individuals and companies and will determine how financial institutions will take up AI technology. This process needs to be informed by a broad and multidisciplinary approach that combines technical and financial opportunities with positive impact on people, society, and the environment.

To this Community Reference Meeting (CRM), The Wallenberg Artificial Intelligence, Autonomous Systems and Software Program – Humanities and Society (WASP-HS) brought together Swedish researchers, practitioners, and other interested parties, to discuss how AI is being used in the financial sector in Sweden and how its impact on people and society can best be analyzed. The event started with a keynote by Nicolas Moch, Chief Information Officer at the Swedish bank Skandinaviska Enskilda Banken AB (SEB). Moch introduced current developments at the crossing between AI and finance and further brought up issues from automated trading to the ethics of AI-based decisions. Following the keynote, participants discussed, in smaller groups, how the development and use of AI is changing the financial sector. The discussions focused on the identification of primary positive and negative impacts, how accountability needs to be (re-)understood when financial transactions are mediated by algorithms, and the characteristics of radical change in the sector. Participants included researchers from Swedish universities, industry, national governments, as well as representatives of intergovernmental and international organizations.

The discussions during this CRM indicate that research and innovation is needed to:
- Increase the current level of trust on the current capabilities of AI technology,
- Address the ethical aspects related to the balance between personalization and privacy,
- Support the definition of clear regulatory regimens that support the uptake of technology in the sector, aligning ethical, societal, and business principles as well as requirements.

WASP-HS Community Reference Meetings (CRMs)
CRMs are aimed at helping public and private organizations in Sweden with challenges and questions regarding their interests, as well as developments within WASP-HS. This is done to identify opportunities for collaboration between different sectors.

Accountability in (and of) FinTech

Main Challenges

- Businesses in the financial sector are happy to use AI in their various FinTech applications, such as automated credit assessments in the processing of loan applications, although it may carry some risk to do so. Such individual business risks may add up to a potential systemic risk to the financial system. The objective of regulators and policymakers is to safeguard consumer protection, market integrity and safety in order to mitigate the emergence of systemic risks.
- There is a low level of trust in AI. As this may be partially due to limited knowledge of AI there is, as a consequence, a need to explain and to demonstrate the usefulness of AI-based FinTech. At the same time, it is important to prevent AI usage which is inadequate, or which furthers inequality and injustice in the financial system.
- There are no specific mechanisms of accountability that apply to FinTech. Rather, FinTech is encompassed by more general accountability structures, some of which apply to the "Fin" (financial) aspect courtesy of financial regulation, and others to the "Tech" (technology) aspect. These structures are very different and focus on very different issues. It is not always clear-cut which one should apply to a given situation.
- Advanced FinTech AI can have a form of independent agency. The pressing question in accountability will therefore be whether such agents can be held accountable in any meaningful way, or whether we should instead identify a principal (a human person or a business). Who should rightly be accountable for the actions of the AI?

Accountability is a multi-faceted relational concept, indicating that there is a party who can be held to account and another party who is able to hold the first to account. This situation can appear in a number of various contexts, for example in the political context, the media context, the legal context, and the business context.

For AI applications to be trustworthy and legitimate, it is crucial that there are structures of accountability in place. In other words, there must be ways of holding AI agents and/or AI principals to account. This also includes the common prerequisites for accountability, such as transparency – which is a well-known problem in AI – and effective supervision.

There is no specific accountability framework for FinTech, and an accountability framework for AI as such is only beginning to emerge, e.g. through the EU proposal for an Artificial Intelligence Act. Instead, FinTech is governed by parallel systems of very detailed financial regulation and ethics, e.g., incorporated in EU financial services legislation, and more fragmented technical regulation and ethics. There are also very specific regulatory and ethical challenges that have emerged through phenomena such as cryptocurrencies and decentralized finance.

FinTech and decentralized finance are part of a new situation for financial services regulation and supervision. For regulatory and supervisory structures to continue to be effective, thereby ensuring accountability in the interest of the general public, the regulatory perimeter and supervisory toolbox will need to be reviewed. For instance, they need ways of coping with the infamous "black box" of AI. An AI will, in accordance with its programming, identify circumstances and draw conclusions in ways that a human might not. This is part

and parcel of why AI is a useful complement to humans. Accountability, however, may presuppose (or is at least bolstered by) explainability, in the sense that a decision made can be challenged by reference to the reasons underlying the decision. A lack of explainability may consequently give rise to accountability problems.

In the general process of finding a regulatory approach to AI as such, the European Commission has tabled a proposal for a regulation that would pursue a risk-based approach, with particular requirements on providers and users of AI systems judged to pose high risk. Against the backdrop of FinTech, one question could be whether large scale use of AI systems that at individual level are not deemed to pose risk may give rise to systemic risk in the financial system. This concern needs to be balanced against the usefulness of AI-based FinTech.

Looking forward, it is important to find a consistent approach in regulation and policy, both new and old, so that the system of accountability in (and of) FinTech can fit together as a coherent whole. In such a coherent system, we should define boundaries for using AI to clarify the accountability and responsibility of AI agents and AI principals. From a business perspective, it is necessary to communicate to customers how to understand the structure of decision-making by AI. For example, to build trust in AI-based FinTech services, banks try to share their knowledge with clients by explaining what the model is saying.

In general, having basic knowledge of AI is a foundation for allowing AI to add value in its right place. The dissemination of such knowledge stands out as a common and pressing endeavour for all parts of society.

The Good and Bad of AI-Based FinTech

Main Challenges

- What is considered a "good" financial decision? Who decides about it and based on what premises? For instance: who will receive a loan and who will be declined a loan, and what is a good amount to save?
- What ethical values can and should we build in the objective function of an algorithm? Some examples are companies' profit, equal access to services, "good" financial decisions, and improving subjective financial well-being.
- How to close the privacy-personalization gap, i.e., the gap between expecting personalized services but objecting to personal data use?
- Is it ethical to expect customers to sell their personal data for a better "deal"? How can we make people more aware of this transaction without overloading them with information and without losing their trust?
- Currently, on the internet people are overwhelmed with cookie consents, GDPR consents, etc. People frequently "click them away" without much thought. Do people know that they share their personal data on the internet and what it implies? This is not as salient as sharing physical documents, so it is easy to be ignorant about it. How can companies increase transparency of personal data use?

What is considered a "good" financial decision should be first defined. One could think that a decision that maximizes benefits at minimum cost to the customer can be generally considered "good". However, what is considered a "good" financial decision vary across different individuals, decisions, individuals' financial situations, and needs making it one of the first challenges that financial service providers need to face.

In behavioral research one can distinguish three types of decision-makers: *homo economicus, homo heuristicus*, and *homo ignorans*, depending on the situation. Sometimes, people rationally weigh all the costs and benefits and take into account all information available to make the best decision, and in other cases they may make decisions based on intuitions, using rules of thumb rather than rational calculations. In addition, in a world with ever increasing amount of information, and with data flowing from different channels, some people are characterized as *homo ignorans* – actively or passively avoiding information, distorting information that threatens their worldview and their opinion, or even avoiding making decisions. People do that as they have a tendency to dislike hearing bad news, or because the information makes the world more complex and difficult to navigate. People show features of each of these types of decision-makers in different situations and they will thus need different types of advice depending on the context. This indicates that understanding the end users better, how they act, and how they feel about their own money, is the key to good FinTech.

This suggests that information used to train algorithms in FinTech should account for people's personal view of their financial situation, their financial well-being, and how it changes as they use companies' services. In fact,

businesses that focus less on raising their profits and more on the customer experience are more likely to succeed in the long term. In other words, the goal of financial services should be to improve people's subjective financial well-being. If customers are satisfied and experience better financial well-being, they will stay loyal to their financial service provider.

Another question is about ethical responsibility for business decisions. As we move away from face-to-face meetings at the banks, and focus on FinTech services, we can observe the lack of interpersonal component in the customer-to-business interactions, making it difficult to be empathetic at scale. This can cause a decrease in responsibility of financial employees for the decisions made, pushing the responsibility on to the algorithms. It is thus a difficult ethical decision for companies to choose how to weigh the input values: the objective of increasing profits and the objective of providing responsible financial services to all customers.

While understanding customers is the key to better services, it is also one of the main challenges of AI-assisted services, e.g., recommender systems. In a recent study researchers found that majority of individuals like personalized services, however they object using their personal data (Kozyreva et al. 2020). As the authors suggest, one of the reasons for this privacy-personalization gap can be due to lack of understanding how personalization works. However, this gap is also likely to be caused by lack of trust and lack of transparency. If customers do not understand whether, and how, their data is used, they are less likely to trust businesses. Trust can be maintained if the company is more pro-active and open with how the data will be used

and meets customer concerns before they arise. This is easier said than done: there is currently no good solution on how to communicate data usage with end users and how to ask them for data consent without overloading them with information that they will simply ignore if they cannot process it. The privacy-personalization gap can also be age dependent. Older customers interact with FinTech in different ways than younger customers and may find it more difficult to adapt to the shift from face-to-face interactions with a financial advisor to computer-generated recommendations. With time, the trust in FinTech companies may evolve naturally. This does not necessarily mean that algorithm-avoidance will simply disappear, but it may be caused by different factors in the future.

One of the features of transparency is to also show what the customers can gain from sharing their data. The companies should make customers aware that giving their personal data to FinTech institutions means better services for themselves. FinTech is different than social media and sharing private data may potentially give more value to customers in financial services than on social media platforms. However, this may also lead to problems where individuals who are financially vulnerable and concerned about sharing their personal data, have to do so in order to get a better financial deal. This is an important ethical problem that may lead to a non-democratic society. The FinTech industry should thus provide clear choices which the individuals can choose from regarding the use of their own data. The choices should not be shown in the form of a small print on multiple terms and conditions pages, but they should be presented in simple and understandable ways. This is naturally one of the greatest challenges for FinTech companies given that majority of people ignore cookies and similar information.

To summarize, transparency is needed as its absence may have an adverse effect on companies' bottom line through loss of customers due to lack of trust. However, this is one of the biggest challenges that FinTech is currently facing, as customers operate in a world full of diverse information that is simply not manageable to collect and process. In the face of information overload, individuals might become homo ignorance, making it more difficult to make informed decisions about whether, and how, their personal data is used, as well as understanding what their personal benefits from it are. In turn, this can lead to lack of trust and aversion to AI-assisted services and should therefore be one of the main priorities which the FinTech industry should tackle.

References:

Kozyreva, A., Herzog, S., Lorenz-Spreen, P., Hertwig, R., & Lewandowsky, S. (2020). Artificial intelligence in online environments: Representative survey of public attitudes in Germany. Berlin: Max Planck Institute for Human Development

Does AI Bring Radical Change to the FinTech Sector?

Main Challenges

- The issue of accessing and using data (unstructured and/or or uncertain quality) in AI-driven FinTech solutions
- Ensuring collaboration across departments and functions in incumbent firms to enable algorithmic innovation
- The uncertainty associated with regulatory requirements and changing market forces, notably the issue of opaque algorithms

We discuss whether and how AI is causing disruption to banking and FinTech, try and disentangle what is really new about AI in the context of FinTech, compared to conventional IT systems. Here, the general consensus is that AI does in fact constitute a qualitatively novel phenomenon in the sense that it provides genuinely new challenges and opportunities to actors in the FinTech, as well as the broader banking, sector.

A central issue in this regard is the foundational role that data plays in AI today. While structured data has been readily available for some time, unstructured data enables actors to derive radically novel insights. At the same time, unstructured data impose novel demands in terms of data preparation, management, and analysis. More research is needed to gain insights into how current and novel data can be integrated into existing knowledge bases and how these are best consolidated in the FinTech context. In this respect, internal coordination among not just IT functions and data scientists, but the entire organization, is required to leverage the potential in data. Organizations have made strides in building internal repositories consisting of past decisions and are actively working to enable a dynamic organizational memory as part of an enterprise-wide knowledge-management effort. This is intended to serve as the basis for machine learning-derived algorithms that can support decision-makers in their day-to-day activities. Here, studies could contribute novel insights in terms of how AI affects organizational memory, and the way knowledge is encoded, stored, and accessed.

On the note of collaboration, attitudes converged on AI being meant to serve as a complement, rather than a replacement of human beings. As AI is meant to create value for customers in the FinTech space, it is imperative that domain experts remain at the core of how algorithms are implemented and what problems are addressed with the technology. In particular, algorithms cannot replace interpersonal trust between leaders and colleagues, or financial institutions and their customers. This is especially important, given the black-box nature of many AI applications today, in cases where decisions relating to e.g., credit or insurance policies, need to be justified or explained to customers and regulators. Here,

it appears crucial for research to produce up-to-date and relevant insights into the ethical ramifications of black-box algorithms and the issue of consumer trust in algorithms as opposed to human service providers.

We explore how AI is affecting the wider banking landscape and whether AI is pushing the banking industry towards a more modular structure. While FinTech was widely expected to disrupt conventional banking through innovative applications of AI, we have rather seen the landscape move towards collaboration between incumbent and novel players. Hereby, established banks have benefitted from the innovative forces brought by AI-based entrants, while niche FinTech actors have partnered with legacy institutions that have the confidence and trust of clients. While speculations of a FinTech revolution have proven to be overblown, AI has nevertheless ushered in a new era in the banking sector, with unprecedented speed and personalization becoming a part of banking services today; especially owing to the emergence of open banking. Given these recent developments, these dynamics remain under-researched and are suited for further investigation in terms of the roles incumbents and novel entrants play in emergent FinTech ecosystems.

Looking towards the future, gradual movement along the same trajectory is a distinct possibility, where shared standards and open, or at least shared, data leads to a certain modularization that is nevertheless characterized by collaboration rather than competition among incumbents and novel entrants in emerging ecosystems driven by algorithms. An example could be that incumbent banks provide platforms or standards that serve as the foundation for niche players to provide innovative and highly individualized services to customers. While regulation such as GDPR and the proposed EU guidelines on AI could act as a countervailing force if they increase uncertainty, they can also spur innovation within a set of given guidelines that set the stage for future innovation in the FinTech domain. These regulatory trade-offs warrant future research both from a legal and an organizational perspective.

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The vision of the Wallenberg Artificial Intelligence, Autonomous Systems and Software Program – Humanities and Society (WASP-HS) is to realize excellent research and develop competence on the opportunities and challenges of artificial intelligence and autonomous systems with a strong investment in research in humanities and social science.

The WASP-HS program is planned to run 2019 – 2028 and will form an independent and parallel program to WASP, The Wallenberg Artificial Intelligence, Autonomous Systems and Software Program.

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