It's not magic: Weighing the risks of AI in financial services

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Report overview

Read the full report, here

Artificial intelligence has enormous potential for financial services, but there are serious risks the industry must confront – including **ethical challenges, a skills gap, and market vulnerabilities.**

This report explores the problems that may arise as AI and machine learning (ML) become ubiquitous. It is informed by interviews with a wide range of AI and ML specialists, financial practitioners, risk managers and regulators. It finds that some of the risks are inherent in the new technologies and the methodologies used to implement them – collecting and processing data, developing and employing algorithms, and relying on their outputs. Others stem from a lack of human understanding or preparedness.

A report from the CSFI [highlights that] as artificial intelligence and machine learning is adopted across large swaths of banking — from lending to trading — there are not only risks in the technology itself. The way it is deployed, and overseen by senior executives and nonexecutives, is crucial.

Financial institutions might become over-reliant on AI specialists with highly technical skill sets that decision makers do not sufficiently understand," the CSFI report concludes. That board-level "skills gap", it warns, could amplify the interconnectedness of global finance and pose a "systemic threat" on a par with the 2008 financial crisis.

FT FINANCIAL TIMES

A new report from the CSFI casts a commendably sceptical eye over AI in finance and raises important questions about the risks. It points to the opacity and complexity of algorithms, the lack of human intervention and the danger that banks get sucked into an AI "arms race" in the scramble for advantage.

One paradox is that just as regulators are trying to introduce more personal accountability into the finance industry, AI is pushing in the opposite direction. Its algorithms are crunching so much data and sometimes moving so quickly that the human brain cannot encompass them, or not until it's too late. AI might easily amplify bubbles on the way up and crashes on the way down.

THE TIMES

Contact the authors

"AI is transforming financial services in fundamental ways and has many potential benefits, both in terms of efficiency and new capabilities. But there is nothing magical about it – and anyone who expects magic will be disappointed. In coming years, it will be increasingly common for financial practitioners to work alongside AI technologies. It is crucial that they – and particularly decision-makers – are able to critically evaluate these technologies. Increased reliance on AI will have consequences for consumers, institutions and the stability of the financial system, for better or worse."

Keyur Patel and Marshall Lincoln are co-founders of the Lucid Analytics Project, which conducts cross industry research into the responsible and effective use of AI.

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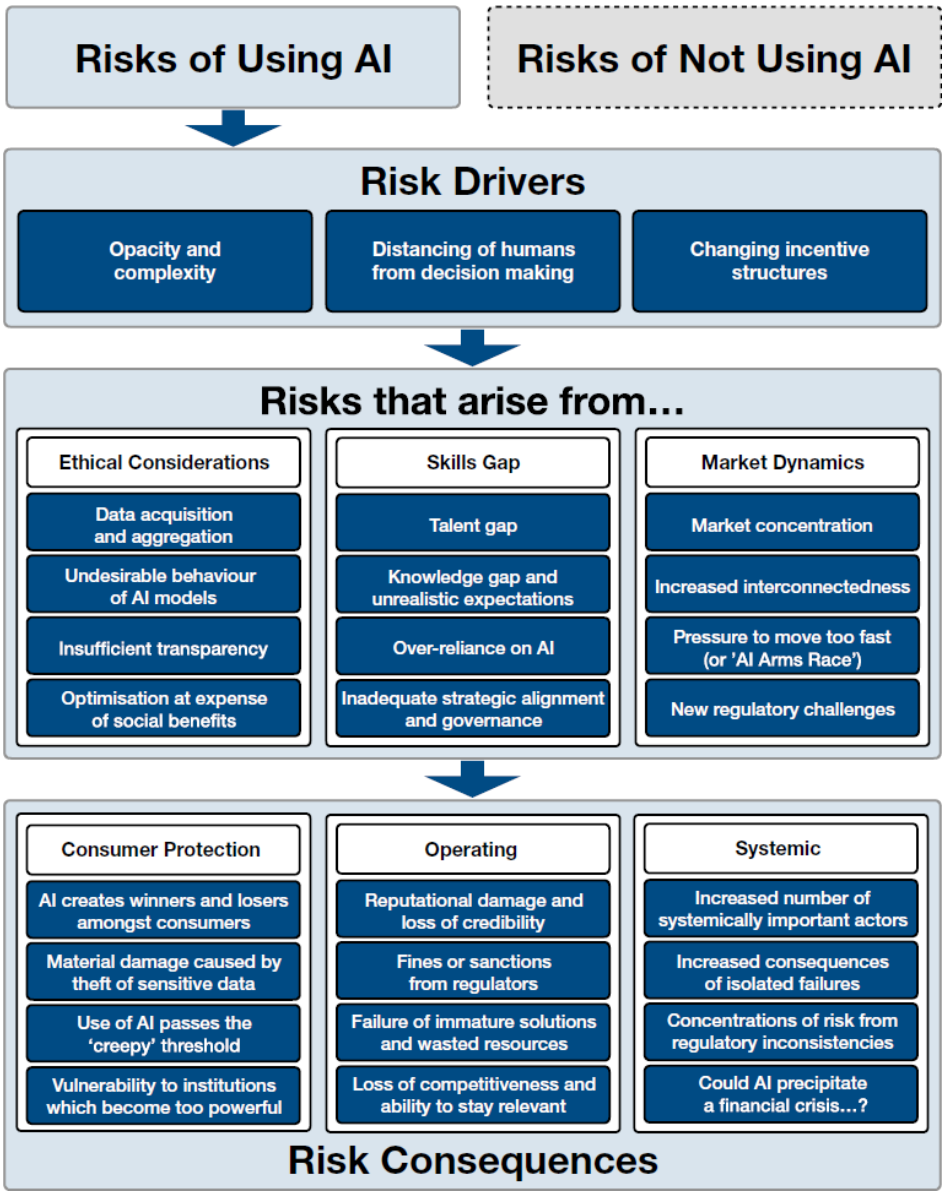
What are the risks?



Why is AI fundamentally different from other forms of automation?

Opacity and complexity: A trade-off at the heart of many AI models is that the more effective the algorithms, the more difficult they are to scrutinise.

Distancing of humans from decision making: AI is different because it enables many actions to be taken without explicit instructions from humans.

Changing incentive structures: The benefits to successful actors – and risks of getting left behind – create powerful incentives for firms to collect data and implement AI solutions faster than may be warranted.

New ethical challenges

- Data acquisition and aggregation: Using AI creates incentives for financial institutions to collect, aggregate and centralise data, increasing concerns about security and privacy.
- Perverse behaviour of AI models: AI models can lead to biases that are difficult to identify and root out. They can also perform poorly in previously unencountered situations.
- Insufficient transparency: The difficulty of understanding and explaining decisions made by AI could damage trust.
- Optimisation at the expense of social benefits: AI enables institutions to evaluate risks at a more granular level, which could disadvantage certain groups.

Skills gap

- Talent gap: There is a shortage of specialists who can design, develop, deploy, test and maintain AI systems.
- Knowledge gap & unrealistic expectations: AI systems could fail spectacularly if decision-makers do not set appropriate expectations or provide AI teams with the right resources.
- Over-reliance on AI: Resources could be wasted if AI is implemented 'for its own sake', or if the people reliant upon it are unable to interpret its outputs.
- Inadequate strategic alignment and governance: Institutions that implement AI without restructuring their organisational hierarchy expose themselves to risks from poor management.

Market dynamics

- Market concentration: AI may lead to further market concentration and barriers to entry since 'winners' benefit from economies of scale and powerful network effects.
- Increased interconnectedness: Use of AI might create new kinds of interconnectedness in financial markets.
- Pressure to move too fast: Pressure to deploy AI solutions quickly may lead to insufficient testing and an over-reliance on AI specialists.
- New regulatory challenges: AI poses new challenges for regulators because of its complexity, the ethical questions it raises and its potential to transform market structures.

Key messages from the report

ML models are just as fallible as rule-based ones.

- New ethical challenges include algorithmic biases that could lead to discriminatory practices. These biases can be extremely difficult to root out because ML excels at finding complex 'hidden' relationships in data.
- A purported benefit of AI is that it dispassionately draws conclusions from data, without prejudice. In practice, however, the beliefs and values of the people who build the models affect the outcomes.
- AI systems can perform poorly in previously unencountered situations – potentially amplifying the impact of "black swan" events.

ML-driven solutions may undermine social benefits.

- In insurance, greater risk differentiation could lead to high-risk individuals being priced out of the market, even though they may be the ones most in need of insurance.
- ML's ability to combine data on individuals from diverse sources might challenge our concept of fairness, as well as raising privacy concerns.
- More personalised financial products could come at the expense of price transparency.

AI could contribute to a future financial crisis.

- One trigger might be a particularly sharp "flash crash", where many interconnected AI trading programs react in the same way to some market event.
- A second might be an event that undermines public faith in the financial system, such as a coordinated cyber-attack crippling critical IT infrastructure.
- A third relates to financial institutions using AI for risk management. How will ML-powered models trained on data when market volatility was low react to extremely rare 'black swan' events?

A pronounced skills gap ratchets up the risks of AI implementation.

- Financial institutions might become dangerously over-reliant on specialists with highly technical skill sets that decision-makers do not sufficiently understand. There are parallels here with the industry's uncritical trust in quantitative analysts in the lead-up to the global financial crisis.
- There is a global shortage of people who can design, deploy and maintain AI systems. Hiring expert programmers who lack financial services knowledge increases the risk of poor outcomes.
- Decision makers at financial institutions typically do not know how AI works and fail to grasp its limitations. This could lead to inflated expectations and a failure to make effective use of the models' output, or to boards signing off on decisions without understanding the implications.
- Other managerial weaknesses might lead to a lack of accountability, the implementation of individual solutions that do not work together and expensive duplication of effort. It may take institutions longer to accomplish less at greater cost, and expose them to security and compliance risks.

The proliferation of AI could fundamentally change market dynamics

- 'Fintech' challengers that use AI most effectively could take advantage of data network effects to dominate markets. Even without explicit anti-competitive behaviour, this might make it difficult for others to compete effectively.
- AI could lead to new forms of interconnectedness in financial markets at the IT systems level, increasing the probability of flash crashes. Financial institutions could become over-dependent on a few third-party tech providers, making them vulnerable to single points of failure.
- Regulators will face new challenges in determining which institutions fall under the scope of financial services regulation, as more non-traditional firms challenge incumbents and lines between sectors become blurred. They must also protect competition in financial markets, while acknowledging that AI needs scale to be effective.

Outcomes depend upon humans, not machines

It is becoming increasingly common for financial practitioners to work with AI and ML. This means that they – and particularly decision-makers – must be able to critically evaluate these technologies. Their ubiquitous deployment will have consequences for consumers, institutions and the stability of the financial system. A decade after the global financial crisis, the world is still grappling with the ramifications of the industry's embrace of complex financial instruments. Any comparisons to be made with the impact of AI are speculative, but the parallels should not be dismissed out of hand.

"We hear a great deal about the opportunities opened up by AI and ML – and no one (sane) doubts their potential. But there is another side to the discussion, and it is one that is just as important. AI and ML are difficult – complex, opaque, hard for non-specialists to grasp. They may also lend themselves to anti-competitive market concentration – and they will certainly throw up a range of new challenges for incumbent and regulators. This report focusses on the skills gap, on ethical issues that are raised, on consumer protection and on systematic threats. It pulls together what I believe is the first comprehensive review of the problems that AI and ML may pose – while not ignoring the very considerable potential upside. It is a timely counterpoint to much of the AI boosterism about which we read so much."

Andrew Hilton,
Director, Centre for the Study of Financial Innovation

CSFI
Centre for the Study of Financial Innovation

"Digitisation has the potential to redefine the relationship between consumers and financial institutions. It is critical for the industry to identify not only the benefits associated with the use of Big Data and AI but above all the potential risks of these new technologies. In this context, the CSFI report is making an important contribution in introducing a framework which defines the main risk drivers (i.e. opacity and complexity, distancing of humans from decision making and changing incentive structures) and the key risks (i.e. new ethical challenges, skills gap and market dynamics) that might arise from the increasing use of AI in financial services."

Torben Thomsen
Chief Risk Officer for Reinsurance, Swiss Re

Swiss Re

"Keyur Patel and Marshall Lincoln provide a very clear introduction to the core concepts of AI, as it relates to financial services, and explore its benefits for the industry. They then provide a clear and balanced consideration of the potential risks that it brings. The result is a thorough and balanced review of the opportunities and risks that face us as we start to apply AI technology in financial services. It will generate thought-provoking discussion for those who are currently engaged in identifying the opportunities, understanding the risks and ultimately trying to deliver the benefits of this sophisticated technology in one of the world's most fast-moving and important industries."

Eoin Woods
Chief Technology Officer, Endava

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