

The current and potential use of artificial intelligence in FinTech

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Abstract

This study aimed to provide a qualitative review of the current and potential use of artificial intelligence (AI) in fintech. A brief search of the first three pages of Google Scholar using the topic as the search term yielded 16 relevant papers. These were discussed under the sections of current, potential and current & potential of AI in fintech. The results revealed that the growth of AI in fintech has been rapid as reflected in the global market sizes of both fintech and AI. Fintech firms have been using either or both data-first or AI-first approaches depending on what was required. Currently, AI is used for many fintech services. There is potential to extend them further and innovate services with new AI approaches. There are many challenges like risks, cybersecurity, data privacy protection, fraud prevention and sustainable microfinancing. Future research should address the gaps in our knowledge about AI in fintech services and barriers to reaching the potential for AI in fintech. One major limitation of this review is limiting the number of papers to 16 for a qualitative review.

Keywords: FinTech, artificial intelligence, machine learning, review

Introduction

Fintech, short for financial technology, is a term used to describe innovative and technology-driven companies that are transforming traditional banking and financial services through the use of technology. These companies provide services such as online banking, digital payments, peer-to-peer lending, crowdfunding, and robo-advisors.

Investopedia (Kagan, 2024) lists the activities of fintech firms as follows:

- The term “Fintech” is used for the integration of technology into offerings by financial services companies to improve their use and delivery to consumers.
- FinTech firms unbundle many offerings for customer firms and create new markets for them.
- Financial firms using fintech have expanded financial inclusion and use technology to cut down on operational costs.
- Fintech funding is increasing despite regulatory problems.
- Examples of fintech applications include robo-advisors, payment apps, peer-to-peer (P2P) lending apps, investment apps, and crypto apps, among others.

The most discussed and most funded fintech startups have some common characteristics. They challenge and eventually take over traditional financial services providers by being defter, serving an underserved segment of the population, or providing faster and better service. It is a disruptive technology against traditional ways of financial services.

In this qualitative review, the extent to which currently artificial intelligence (AI) is used in fintech and its potential is evaluated using published literature.

Methodology & Results

Methodology

Being a qualitative review, the review topic was used as the search term in Google Scholar to select 16 relevant papers. The results are described in the next section followed by a discussion of the findings and then conclusions derivable from the results and their discussion. Some suggestions for future research have been made and the review ends with some limitations of this review.

Results

Current

The historical trends of AI and fintech were traced by Kamuangu (2024) using a review of the literature. From 111.8 billion USD in 2016, the global fintech market size has grown to 297.1 billion USD in 2020 at a compounded annual growth rate of 28.3%. The AI market has grown from 1.9 billion USD in 2016 to 12 billion USD in 2020, a growth of 531%. Robotic process automation (RPA) has led to substantial cost reductions in workflow efficiency, NLP integration with customer interactions and fraud detection and prevention (99.5% accuracy). There were benefits from user-centric approaches for personalised services and navigating regulatory barriers. Some recommendations for future actions and research have been given.

According to Das (2019), the integration of artificial intelligence (AI) and machine learning (ML) into the finance industry highlights how financial problems are being reframed as pattern recognition challenges. By utilizing deep learning techniques, pricing models can be developed directly from market data without relying on traditional theoretical models like those used in option pricing. AI and ML technologies are increasingly employed in financial services, facilitating tasks such as payment processing, customer behaviour analysis, personalized financial advice, and customer service through chatbots. Additionally, AI applications extend to areas like peer-to-peer lending, hedge fund management, robo-advising for investments, digital payments, high-frequency trading automation, and text analysis. The impact on the job market is also discussed, pointing out that AI might predominantly affect high-end trading positions rather than low-end customer service roles.

Guo and Polak (2021) discussed AI applications in finance, especially during the COVID-19 pandemic in 2020. There is a need for an innovation regulatory framework at the regulation level and compulsory restrictive guidance and supervision for AI-based technology to allow sustainable growth to promote the accelerated growth of AI in finance. The AI in the financial industry focuses on “digitalization”, “onlineization”, “remoteization”, “visualization”, and “intelligence”, building a multi-functional, all-process end-to-end system based on data, enabling multi-user multi-terminal concurrent office, intelligently assisting in dealing with problems and giving solutions.

A web survey of 765 potential users of robo-advisor services by Belanche, et al. (2019) showed its adoption being influenced by consumers’ attitudes toward robo-advisors and mass media and interpersonal subjective norms. Perceived usefulness and attitude influenced only those who were familiar with robots. Subjective norms influenced those who had low familiarity with

robots. These results indicate that fintech firms should design their robo-advisors targeting a wide range of customers considering their relative familiarity with robots.

A review by Allen, et al. (2021) showed that AI can be applied to democratising credit access to unbanked and thin-file consumers around the globe. It can also serve the current consumers for faster services and greater transparency. Blockchain can disrupt financial systems and intermediation. Other applications are marketplace and peer-to-peer lending, credit scoring, alternative data, distributed ledger technologies, smart contracts, cryptocurrencies and initial coin offerings, central bank digital currency, robo-advising, quantitative investment and trading strategies, cybersecurity, identity theft, cloud computing, use of big data, identity and fraud detection, anti-money laundering, Know Your Customers, natural language processing, regtech, insuretech, sandboxes and fintech regulations.

Fintech solutions use big data analytics, artificial intelligence and blockchain technologies at a rapid rate. These new technologies are changing the nature of the financial industry. They create many opportunities offering more inclusive access to financial services. However, there are many risks to the use of these technologies for fintech solutions. These risks may affect consumer protection and financial stability. Some of these risks are underestimation of creditworthiness, market risk noncompliance, fraud detection, and cyber-attacks. To improve the competitiveness of fintech, there is a need for a risk management framework. There is also a need to advise on the methods to identify opportunities for innovations like reg-tech and sup-tech solutions. To achieve them, there is a need for focused international research activity, coordinated at the level of a highly reputed open-access system (Giudici, 2018).

The growth of Fintech in India had challenges and opportunities due to high penetration, demographic dividend and connectivity to modern and affordable technology, low smartphone rates, and public policies like Digital India and Make in India, noted (Gupta, et al., 2021).

Potential

According to Deshpande (2020) the long-term trends in the use of AI for fintech are towards long-term structural changes to the financial aspects of the economy, and potential growth in the use of personalised AI platforms along with the rise of RegTech. This includes algorithmic regulation of Fintech.

A review and case study methodology involving interviews with six business leaders by Ashta and Herrmann (2021) revealed that the top three future priorities to use AI in fintech may be for risk management, customer targeting and engagement. AI may help in these efforts through big data analytics to cut costs, reduce risks and increase customisation. Cost-cutting induces mergers to build larger platforms of customers. However, this strategy will be short-lived because customers are looking for specialised expertise from focused fintech. Microfinance markets in developing countries are taking time to show results. However, social data are being used to assess credit scores for lending. Although it is now more or less clear in what way AI works, it is relatively unclear in what ways it does not work in fintech. Further research is needed on the maturity of auto AI/ML tools, unbiased training of data, explicability, management and performance monitoring of AI models and the perpetual privacy issues. The AI's power is in reaching managerial blind spots like unknown knowns and unknown unknowns. The current uses of AI in fintech include back-office functions, fraud prevention, value chains, investment sector, portfolio management, risk management, sentiment analysis, microfinancing, ESG investment, crowdlending and financial literacy to the illiterate poor. The uncertainties and risks are due to

the lack of AI skills. Fears of AI replacing human jobs are now giving way to recognising the need to train employees on AI skills.

There is great potential for the combination of AI and blockchain for developing new financial service models enabled by digitalisation. AI and Blockchain increase banking services, lending efficiency, collection and payment competency and asset management. Cryptocurrencies are encountering challenges of cybersecurity, mining, privacy, anonymity, and regulations (Hosen, et al., 2022).

Current and Potential

Based on a survey of 150 participants and analysis of secondary data, Zhang, et al. (2021) observed that AI was used by 81% of incumbent financial institutions and fintech firms each. AI was implemented to a greater extent by fintech firms for the generation of new revenue potential through new products and processes, process reengineering, customer service, client acquisition and risk management. More fintech firms believed that they were in line or ahead of competitors or market leaders than incumbent firms. A higher percentage of incumbents believed that they were behind competitors. Reinforced learning, partly autonomous AI for decision-making and fully autonomous AI and use of cloud computing were higher for fintech firms than for incumbents. With the high impact of AI, its importance was high to very high in the case of fintech firms. For fintech firms, increases in profitability, differentiation, agility, leanness and transparency were higher than for incumbents. Fintech firms believed that AI would lead to job losses in the short, medium and long term periods. Quality of data, access to talents, trust and user adoption of AI, systemic bias, cost of hardware and software and market uncertainty were the hurdles felt by fintech firms to a greater extent than incumbents. The competitive threat of technology was low to moderate for both fintech and incumbent firms.

Go, et al. (2020) studied the trends in the application of AI in the financial industry using news data over the last three years of 2017 to 2019 to predict new opportunities in the financial area with technologies in AI. Text mining and social network analysis were used to analyse news data containing AI applications in the financial industry. Network analysis on text from news was used for the analysis and modelling to obtain major keywords of current and future trends. The trend was an initial awareness followed by accelerated innovation in banks and customers in financial areas using AI and investment leaders changing the AI application from government to business. The introduction of AI in the financial sector led to positive impacts. The authors predicted AI-used accelerated innovation over the next five years. AI will be used for social network analysis by more diverse commercial sites in the financial industry. Customers are increasingly being provided with more and more content-based financial services. Hence, AI-based transaction channels will be combined with the current economic systems to satisfy customer needs soon.

New financial service providers, the fintech firms, have grown rapidly due to technological advancements in the financial sector to launch technology-based financial services and improve customer experience. Despite its promising role in providing safer, faster, and cheaper financial services for customers, some challenges remain in the application of fintech. There are many innovation opportunities to offer financial services considering rapidly changing customers' preferences and habits regarding new technologies in the financial sector (Taherdoost, 2023).

The monetary authorities need to play a critical role in the policies and initiatives to modernise the financial system. This includes research and the potential issuance of central bank digital

currency. These authorities should play these roles while trying to achieve their core objectives of preserving monetary and financial stability. AI has an important role in the development of fintech. A fintech SWOT analysis was done to support these observations. Risk-based thinking is offered as a solution to the potential opportunities and threats. Cyber risk is a newly emerging risk in the fintech landscape of the current turbulent and uncertain period (Vučinić & Luburić, 2022). The fintech SWOT analysis of the authors is presented in Figure 1. Although AI is used in the components of strengths and opportunities, it is given as a component of opportunities. Failure to find AI solutions for weaknesses and threats will fail the fintech to provide the intended services.

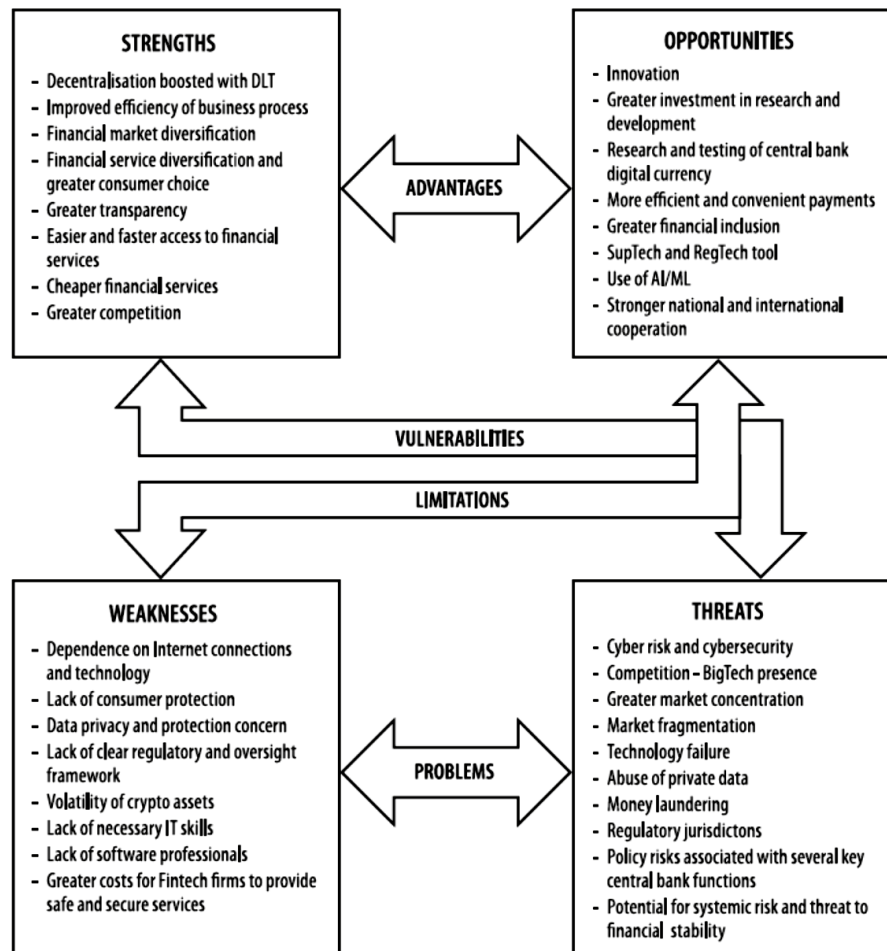


Figure 1 Fintech SWOT analysis (Vučinić & Luburić, 2022).

Using secondary data on active fintech SMEs with actual or potential AI applications, interviews with key stakeholders, and practitioners' forums, Cubric and Li (2024) observed data-first and AI-first approaches used by them. From a contingency perspective, these two approaches were expanded into four development process configurations, contingent on the business development stage, reliance on 3rd party platforms, availability of high volumes of data, investment level, organisational agility, and level of novelty. These patterns can be used by fintech SMEs to effectively leverage AI for innovation. A theoretical framework was proposed for the use of AI

in fintech SME innovations. Researchers can use the framework to study the mechanisms of technological innovations. The AI pathway to innovation is provided in Figure 2.

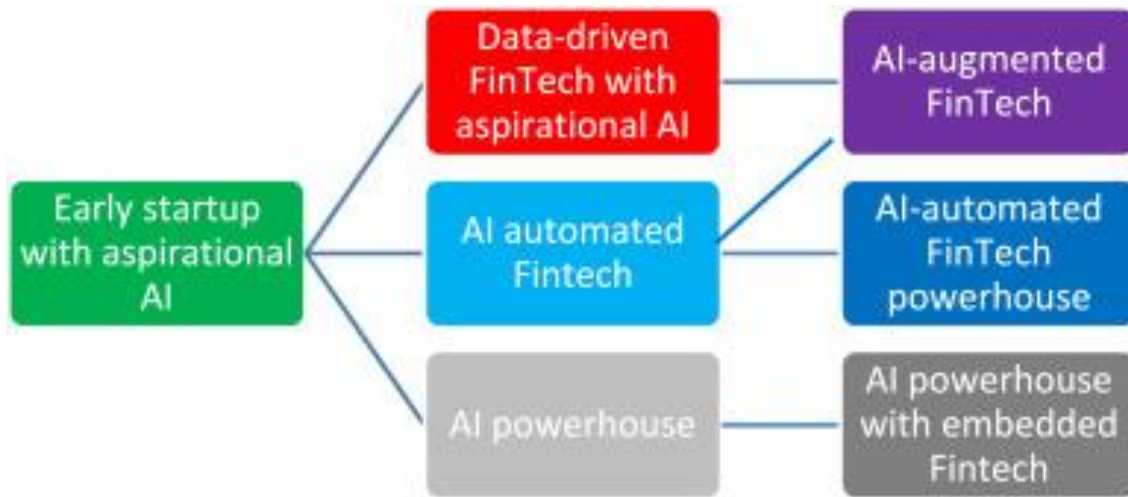


Figure 2 AI for Innovation pathway (Cubric & Li, 2024).

The theoretical model for technological innovation model is given in Figure 3.

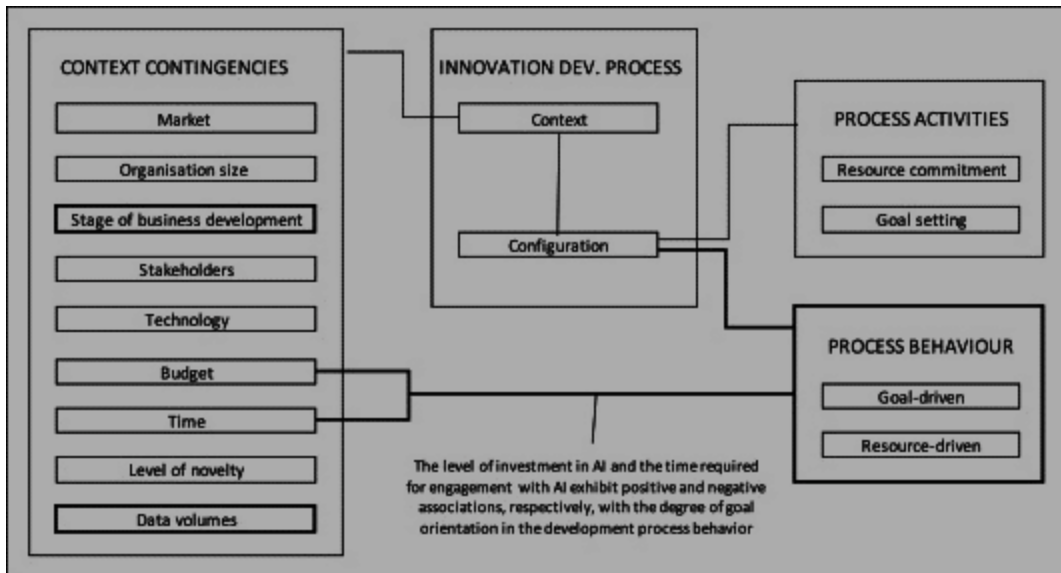


Figure 3 Theoretical model for technological innovation development process (Cubric & Li, 2024).

The paper by Palle (2022) discussed the convergence and future scope of cloud computing, AI, and blockchain technology in driving transformations and innovations within the fintech industry. These technologies are important in the financial sector, and they have radical transformation potential. Cloud computing can be applied in the banking sector, in the forms of public cloud, private cloud, hybrid cloud, and community cloud. AI technology impacts intelligent economic investments like automated trading, forecasting analytics, and robotic financial consultants. Blockchain technology can be used for smart contracts, enduring record-keeping, and decentralised finance. AI, cloud computing, and blockchain technology may be increasingly adopted for growth in these areas. The challenges and risks are cybersecurity

concerns and the need for proper resources and capabilities. The importance of AI technology in the finance sector is explained in Figure 4.

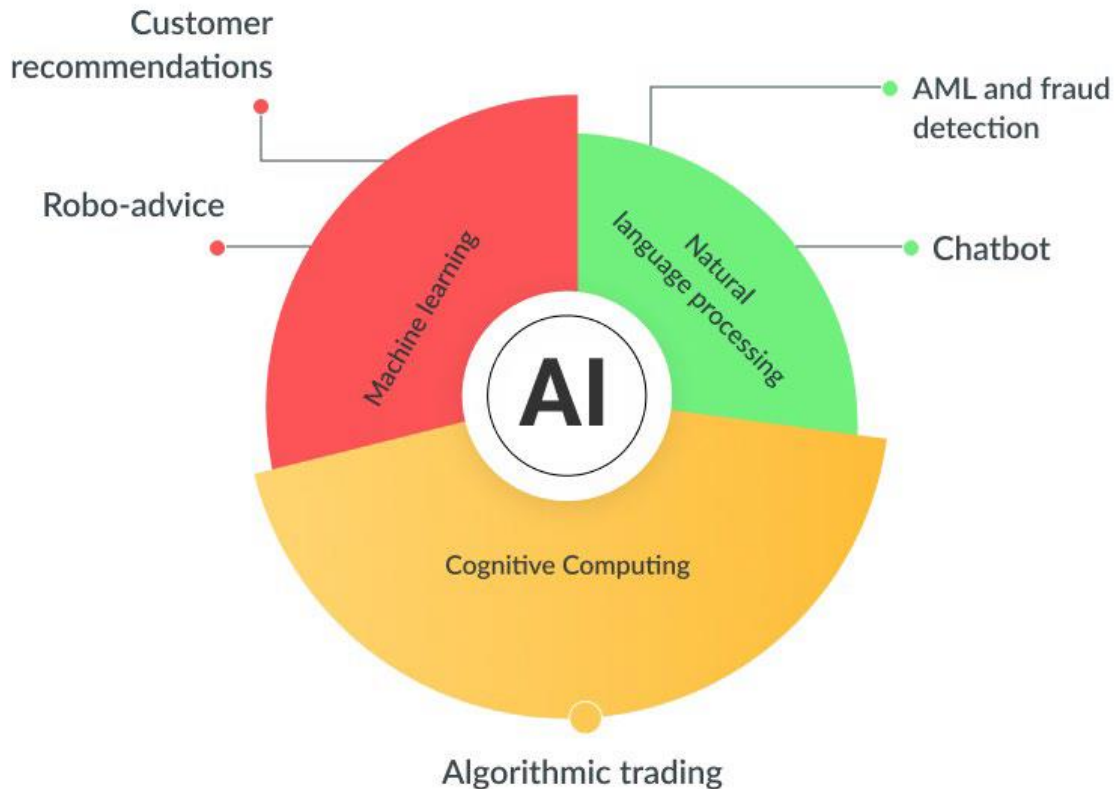


Figure 4 Importance of AI technology in the finance sector (Palle, 2022).

Discussion

Out of 16 papers reviewed, seven were on current trends, three were on potential and six were on current and potential of AI in fintech. AI in fintech can be categorised into data-first and AI-first approaches.

The current trends are pricing models, payment processing, customer behaviour analysis, personalized financial advice, customer service through chatbots, peer-to-peer lending, hedge fund management, robo-advising for investments, digital payments, high-frequency trading automation, and text analysis, democratising credit access to unbanked and thin-file consumers, marketplace lending, credit scoring, alternative data, quantitative investment and trading strategies, cybersecurity, identity theft, cloud computing, use of big data, identity and fraud detection, anti-money laundering, Know Your Customers, regtech, insuretech, sandboxes and fintech regulations, back-office functions, fraud prevention, value chains, investment sector, portfolio management, risk management, sentiment analysis, microfinancing, ESG investment, crowdlending and financial literacy to the illiterate poor and increase of various efficiencies. The historical trend was an initial awareness followed by accelerated innovation in banks and customers in financial areas using AI and investment leaders changing the AI application from government to business. AI-used accelerated innovation will increase over the next five years. AI

will be used for social network analysis to a greater extent in the financial industry. Customers will be increasingly provided with more content-based financial services. Thus, AI-based transaction channels will be combined with the current economic systems to satisfy customer needs.

These AI applications can be categorised as “digitalization”, “onlineization”, “remoteization”, “visualization”, and “intelligence”, building a multi-functional, all-process end-to-end system based on data, enabling multi-user multi-terminal concurrent office, intelligently assisting in dealing with problems and giving solutions. Some risks identified are underestimation of creditworthiness, market risk noncompliance, fraud detection, and cyber-attacks. AI might predominantly affect high-end trading positions rather than low-end customer service roles.

The potential avenues of AI applications in fintech are long-term structural changes to the financial aspects of the economy and potential growth in the use of personalised AI platforms along with the rise of RegTech, for risk management, customer targeting and engagement, microfinance, AI in combination with blockchain benefits, new financial service models enabled by digitalisation, There are potential areas for the better performance of fintech with more AI applications compared to incumbents, more innovation opportunities, issuance of central bank digital currencies, risk-based thinking to address potential threats, AI pathway for innovation among fintech SMEs, AI, cloud computing, and blockchain technology may be increasingly adopted in future.

Topics requiring further studies are what way AI does not work in fintech, the maturity of auto AI/ML tools, unbiased training of data, explicability, management and performance monitoring of AI models and the perpetual privacy issues.

Conclusions

The growth of AI in fintech has been rapid as reflected in the global market sizes of both fintech and AI. Fintech firms have been using either or both data-first or AI-first approaches depending on what was required.

Currently, AI is used for many fintech services. There is potential to extend them further and innovate new services with new AI approaches. There are many challenges like risks, cybersecurity, data privacy protection, fraud prevention and sustainable microfinancing.

Future research should address the gaps in our knowledge about AI in fintech services and barriers to reaching the potential for AI in fintech.

One major limitation of this study is limiting the number of papers to 16 for a qualitative review. However, this was the objective of this study. More detailed, systematic review may be done in future.

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