ARTIFICIAL INTELLIGENCE (AI) TRANSFORMING THE FINANCIAL SECTOR OPERATIONS

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ABSTRACT

Objective: The study aims to explore the potential of artificial intelligence (AI) in enhancing operations within the financial sector. The primary focus is on identifying functions that could be improved through the adoption of AI technologies.

Method: The research methodology involves a comprehensive review of existing literature and research on AI applications in the financial sector. The study examines various dimensions where AI can enhance financial operations and proposes a conceptual framework based on the findings.

Results: The study finds that AI significantly impacts several areas of the financial sector, including algorithmic trading, fraud detection, customer service through chatbots, cybersecurity, and accounting. AI enhances predictive analysis, improves service quality, enables rapid and automated decision-making, and provides real-time customer insights. Furthermore, AI's role in cybersecurity and fraud detection is crucial for maintaining compliance and protecting sensitive information.

Conclusions: AI transforms financial sector operations by improving efficiency, accuracy, and customer satisfaction. The adoption of AI technologies supports better governance practices, enhances the social aspect of customer interactions, and indirectly contributes to environmental sustainability through improved operational efficiency. These findings underscore the importance of integrating AI in financial operations to achieve sustainable development goals.

Keywords: Artificial Intelligence, Financial Sector, Governance, Customer Experience, Cybersecurity

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Introduction

Technology is an indelible part of our day-to-day lives. Artificial Intelligence (AI) is one such technology (Joska Junior, Bertoldi, Santos & Belli, 2023) which is transforming the entire usage of data and machines. The increased growth and yielding of greater results due to usage of this technology by more and more industries have caught the attention of the financial sector as well. Deep Learning (DL), Machine Learning (ML), big data, Natural Language Generation (NLG), and Natural Language Processing (NLP) has made it possible to imitate human intelligence where learning (Gowda, 2023) and self-correction are key to a successful implementation (Binner et al, 2004). It has become easily accessible for businesses to now possess the resources and means to incorporate AI and hire professionals, irrespective of their size. AI can imitate prior actions devoid of any new intervention. ML captures data and algorithms and applies it to new backgrounds and patterns with no additional programming. DL is a sophisticated extension of ML that uses algorithms necessary to measure the extent of an action and substantial volume of data. Such data can be cointegrated for the system to learn on its own and develop further. Also, NLP and NLG pertain to text reading, analysis, and extraction. Different variations of AI can be applied in financial sector to assist better client outcome and customer experience as well as competitiveness.

Global tech companies such as Alibaba, Google, Facebook, Amazon, and Tencent are looking into the usage of AI and spending significant amount for AI R&D. Due to rapid and continuous developments in AI, it is pertinent that the firms remain updated on technology in order to gain competitive advantage. The new era of digitalisation has enabled the customers with wider choices and so traditional firms need to keep with the pace by adopting a more customer and client-centric approach. Integrating AI will enrich customer experience and optimise impact of financial decisions with augmented recommendations. ML combined with behavioural economics enable to personalise customer individual earnings and spending for optimum results along with proper wealth management.

The global advancement towards sustainable development has mandated the use of novel technological strategies to secure a competitive advantage in the market specifically in the areas of accounting, customer relations, e-commerce, marketing, human resources (Lampou, 2023), and manufacturing (Akpan, Soopramanien and Kwak, 2020). The trend to make use of digitized technologies like artificial intelligence, E-commerce, social commerce,

etc. has become the go-to strategy. This in turn drives business growth through collaboration with new business partners, improves sales and increases customer satisfaction globally. Besides, the Covid-19 pandemic has provided boost to the understanding that one needs to have alternative sources of income, thereby mobilising individual savings directed towards investment in financial sectors. Moreover, it is estimated that around 70% of businesses will turn to AI for better business performance by 2030 (Fonseka, Jaharadak and Raman, 2022).

The literature in AI and financial sector is relatively limited. Though a few articles incorporate some aspects of e-commerce in business, this research aims at the specific usage of AI to develop the financial sector. Based on the background and literature, the paper examines the modes through which AI can influence the financial sector operations. It also tries to explore the dimensions of various operations that may enhance the AI adoption in the finance sector.

Research Methodology

This review article undertakes studying prevailing literature on the usage of artificial intelligence in financial sector. Moreover, the dimension that can facilitate their operations by the use of AI are also explored. Further, the obtained information from various research studies is analysed, and a conceptual framework is proposed.

Literature Review

Business gains a competitive advantage via using cutting-edge technology but it has also redefined their survival strategies owing to the pandemic and climate change. The urgency of technology has never been felt more intensely in every commercial and non-commercial way. Technologies in the context of customer relationship management and virtual reality, along with Internet of Things (IoT) has considerably reduced the operational costs for business (Akpan, Soopramanien and Kwak, 2020). Predictive and visual analytics and big data have enabled the complex business decision more smoothly. Moreover, the digitization of businesses has touched every field, and the financial sector should also not be left behind since there lies a huge advantage in terms of business growth, productivity, and technological competitiveness by integrating advanced AI systems into their work environment and processes (Jain, 2022).

Influence of AI on financial sector operations

The finance sector spends humongous amount towards AI-enabled services and the adoption rate is speedily increasing. Initially it was used by Hedge funds and high-frequency (HFT) trading entities, but over the years different applications have penetrated diverse pockets in the financial industry including banks, insurance companies, regulators, and different FinTech platforms (Citibank, 2018). The most relevant AI include algorithmic trading, portfolio composition and optimisation, robotic advisory services, virtual customer assistants, market analysis, and other types of analysis with huge amount of data.

Algorithmic Trading

Algorithmic trading (AT) also called "Automated Trading System", has become one of the main players in the global financial markets. AT executes complex AI systems enable speedy trade. HFT and computers generates 50-70% of all trades in equity markets and 60% of futures trades (Seth, 2019). AT are in vogue since these programs are capable of executing trades at the optimum price and have comparably lower system errors and high probability of rational decision making. It enables processing of tons of data at a go and simultaneously observing multiple markets instantaneously. The research paper "The High-Frequency Trading Arms Race: Frequent Batch Auctions as a Market Response", unveils the prospects of HTF algorithms to spot minor changes and capitalize on these micro changes (Budish, Cramton & Shim, 2015). Hendershott and Riordan (2013) stress the provision of a stabler market with AT and Menkveld (2014) indicates the provision for further reduction of trading costs. AT strategies include 'news reader', 'pattern recognition', 'signal processing' and 'market sentiment'. However, AT is not devoid of flaws and has been blamed several times for the "Flash Crash" at the S&P 500 in May 2010 when the index dropped more than 7% before bouncing back. This crash has been known for being the first market crash due to new automated trading (Mitchell, 2019). Dietvorst et al (2014) witnessed that participants were mostly willing to use AT without human intervention to alter the algorithms.

Fraud Detection and Compliance

Banks in US spend nearly $70 billion annually on compliance in order to get rid of being fined heavily for not stopping fraud or illegal financing (Chinner, 2018). They are now incorporating AI strategies as compliance to make the operations more efficient. McAfee has assessed the cost of cybercrimes stand around 600$ billion on an annual basis and the most popular one is credit card fraud. Banks today efficiently handle credit card transactions based on previous data, algorithm training and back testing. The AI applications enable flag transactions and categorise risk into different groups for deeper scrutiny into the required transactions (Van Liebergen, 2017). Various financial entities have understood the need of AI to detect fraud and are implementing the same. For instance, Mastercard uses their application named "Decision Intelligence" to see patterns from historical usage of their cards to create a "standard transaction", post which Mastercard makes comparison of every transaction from new customers against their standard transaction. The Javelin Strategy Report (2015) found that any transaction that is declined wrongly acts as a big threat to financial sector and such "false positive" so-declined transactions sum up to $118 billion in retail losses.

Chatbots and Robotic Advisory Services

Financial entities with large client base finds implementation of AI-based systems very resourceful and hence implementing powered services such as chatbots to bring about efficiency in their client-interaction processes. These chatbots interfaces swiftly handle thousands of clients with high grade of user experience at cheap costs. Juniper Research study observed that chatbots are helping banks to save 4 minutes in handling each customer on an average and thereby economizing labour cost (Medium, 2019). Chatbot uses NLP and ML algorithms which extends personalized conversational system. Robotic advisory are algorithms written to find the best portfolio for a customer based on the user's risk tolerance and goals.

Banks and insurance industries are more inclined towards usage of chatbots to an extent that it has become an industry standard. Some studies revealed that millennials choose to relate with those entities using AI rather than one-to-one conversation in a physical setting. On average only 12% preferred talking to a person (Mubarak, 2019). Tin the present world, there exists a wide variety of AI applications which upgrade the provision of services in the

financial sector. Clerkie is one such robotic advisory applications enabled with smartphones that assists users in managing their money and savings (Clerkie, 2019).

JP Morgan`s "COiN" is another AI application which reviews documents and makes data extraction faster than a human. Rohner and Uhl (2017) segregated three advantages with robotic advisory into three categories – (i) accessing and rebalancing of investment strategies, (ii) cost efficiency regarding diversified asset allocation and (iii) behavioural biases. They observed robotic advisory applications could minimize costs up to 4.4% annually when compared to traditional investment advice.

Cyber Security

Cyber security and protection of data are vital since they alleviate the risk of losing sensitive data. As per 2014 CNBC report, the global economy is allegedly losing US $400 million each year because of cybercrimes (Thompson, 2014). Employing a enhanced cyber security network with the aid of AI can protect against cyber threats and locate newer malwares. Traditional cyber security systems make use of progressive threat prevention to identify and protect against cyber-attacks. However, till date over 968 million malwares have been created, up from 845 million in 2018 (AV Test, 2019). AI apps can show malicious files, and simultaneously be trained to evaluate and identify micro-behaviour of ransomware attacks. NLP uses AI technology to scan and garner significant information from diverse texts, data, and websites thereby mitigating the risk of irregularities, cyber-attacks and enriching prevention strategies. Analysing this further, information risks are calculated, timescales are identified and insightful data is harvested for accurate predictions. Hence, AI usage in this regard can save entities with proper prediction and preparational power, infrastructures and sensitive information. Use of AI provides flexibility to the operations of the entity and makes the cyber security system more agile and dynamic.

Accounting and Auditing

The development in data analytics and AI has brought about a fundamental change in the operations of accounting and auditing. Auditing is suitable for AI-enabled applications and business analytics since there are quite many challenges to implement volumes of structured as well as unstructured data so that insights can be gained into financial and non-financial performance of entities. Auditing is inherently structured and repetitive and fusion with AI can

mechanise these operations. AI can be used to automatically code account entries and to develop and improve fraud detection models by creating sophisticated ML code. As for the audit sector, there are more advanced AI technology such as DL that can analyse both structured and unstructured data in order to assemble reports or predict precise forecasts.

The range of data DL can scan is very immense and can include anything from social media posts, audio files, conference calls, and emails. By implementing AI in accounting and audit one can review contracts more thoroughly by allowing a larger amount of data to be scanned. EY and other companies are actually using this technology today for reading and extracting information from different lease contracts, making it much more efficient and faster than a manual assessment (Boillet, 2018). By making it possible for auditors and accountants to use these analytical tools, one can optimize time and hence, having more time to make human judgements to analyse the data. Furthermore, it also enables them to interact better with CFOs, audit committees, company boards, and ask better questions in order to deliver a product for the client that is overall better. Last but not least, this whole shift of technology in the audit and accounting sector may also contribute to making the future in these sectors more exciting and appealing.

Other Usage of AI

AI has been integrated within the banking and insurance industry when it comes to approving loans, talk to customers, assessing risk, and manage assets. There are also other applications of AI in financial services one of them being recruitment processes. AI systems which use ML algorithms are now able to recruit new people as well as the new company director based on sophisticated algorithms (Forbes, 2018). These algorithms quickly assess qualifications, merits, and traits based on provided resume or data. This process is both time saving for the recruiting company as well as being an ethical approach (Kronivets, Yakovenko, Tymoshenko, Ilnytskyi, Iasechko & Iasechko, 2023) that leaves out potential biases towards gender, ethnicity, and race. Whereas candidates are strictly chosen based on their qualifications. When it comes to selecting company directors, Weisbach et al. (2019) found that ML could predict the success of a new director. Directors that were predicted to perform poorly by the algorithms ended up performing worse than the directors that were predicted to perform well. Also, business proposals are something very important in finance (Forbes, 2018). Automatization of business proposals allow for a more thoroughly process where one

is reviewing terms and conditions as well as valuations. Further, one can paint a quick picture about contractors' historical performance, asset pricing, risk exposure and expected profitability relative to the proposed business agreement one has derived. This allows for a more transparent situation where companies and clients get much more efficiency in a process that is very often time consuming and complex. Cutting expensive costs in this area, may make the whole business proposal more profitable than initially expected.

Table 1 Evidence in support of AI influencing financial sector operations

Sl.No	Author(s)	Dimensions
1.	Veerla (2021)	Predictive analysis and modelling
2.	(Castelli, Manzoni, & Popovic, 2016)	Effective service quality
3.	Jabłonska and Pólkowski (2017)	Rapid and automated decision making
4.	OECD (2021)	Enhance customer experience by deploying augmented reality (AR), click prediction systems through machine learning personalized by utilizing big data
5.	Drydakis (2022)	Facilitates HR activities, offers cashflow forecasting, reduces business risks
6.	Davenport et al. (2019)	AI influences business models, customer service options, and sales processes
7.	Campbell et al. (2020)	provides service assistance while interacting with customers, assists in determining optimal promotions
8.	Lu et al. (2022)	Real-time customer insights, business risk reduction, demand forecasting, process improvement and optimization, product and service innovations
9.	Wewege (2017)	Improvements in earnings

Analysis

AI-based processes could significantly influence an organization's operational performance as they provide highly interactive, flexible, and adaptive solutions depending on customers' needs and needs (Kose and Sert, 2017). AI is more versatile and can be deployed in almost any field. AI's s impact on the financial services is essential across two main areas, which are the interactional and conversational layer between the consumer and the firm as well as

from internally; and dealing with processes that require humans - essentially an activity that can replace humans using algorithms that can learn (King, 2018). This evidences that AI affect noteworthy the bank customers experience. Apart from this, AI delves into the ancillary activities which enhance the customer's experience and also provides a better and clearer vision to the operational aspects of the financial sector. Figure 1 depicts prominent operational dimensions impacted by usage of AI in financial sector.
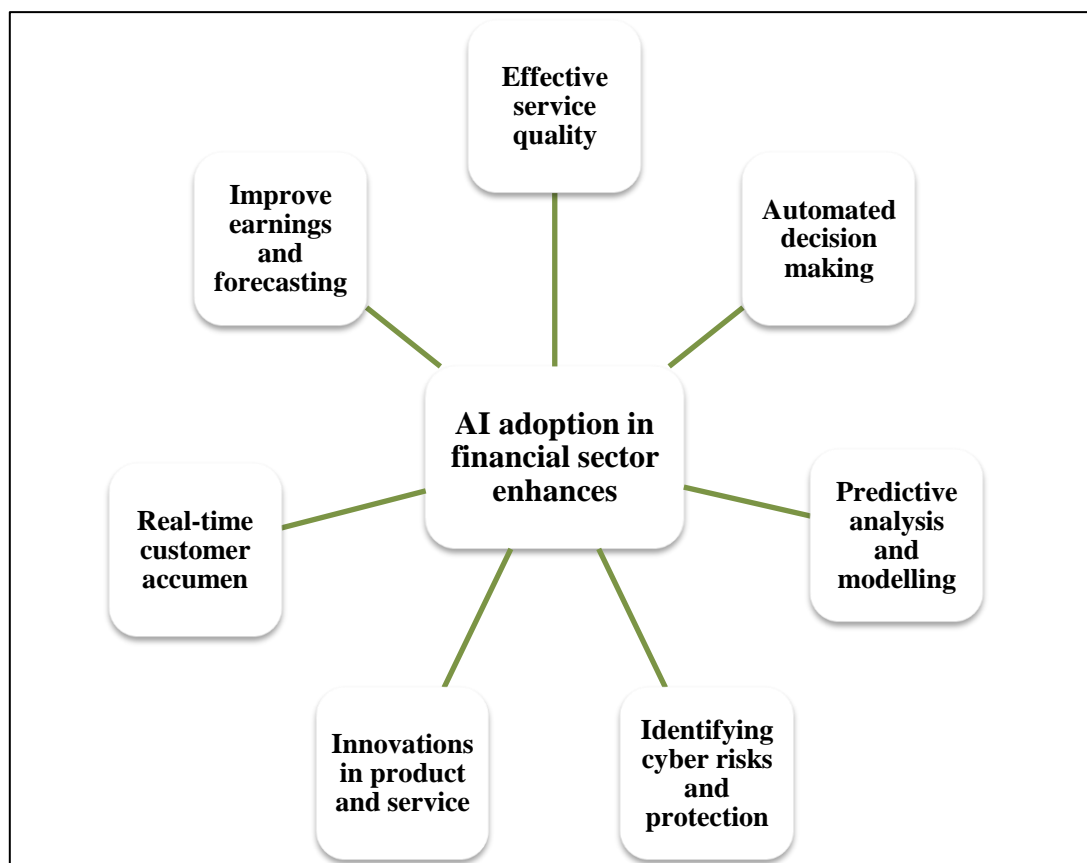

Figure 1 Dimensions of operational performance improved by using AI

Conclusion

AI is still in the developing stage and its futuristic application in the financial sector has much to do with. The adoption of innovative technologies would aid the financial sector in achieving its scope and improve their survival rate by improving their performance. In this regard, the present study tries to consolidate the developing body of knowledge regarding the role of AI in transforming the financial sector. Moreover, AI can improve communications with the client base and entities can benefit from large amounts of complex data (Silva, Noronha & Ferraro, 2023) by analysing to find patterns or connections that may be difficult for humans.

Besides, it helps take precise and be calculated investment decisions and warding off fraud and credit risk. All these applications are just a small fraction of AI's possibilities. AI enabled application usage in the financial sector improves their operations through predictive analysis and modelling while providing improved and effective service quality (Somani, 2023). It can easily provide real time customer insights to further product and service innovations. In the current complex and ever-changing world of technological aids, automated decision making and identification of cyber risks and protection from the same has become a persisting issue. With rapid developments happening, immersion of technology (Silva & Janes, 2023) will be witnessed more in finance, which will herald several challenges - legal, ethical, economic, and social barriers (Rybalko, 2024). However, in order to achieve mass adoption, humans have to evolve as well with the evolution of technology. This study provides a conceptual framework in the financial sector/industry and the embracing of AI. Though more empirical evidence on how AI can improve operational performance is essential, this review article could be used as a background and starting point for future research.

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