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## **TRANSFORMATION OF FINANCIAL SERVICES THROUGH ARTIFICIAL INTELLIGENCE IN INDIA**

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### **Abstract**

Artificial intelligence (AI) is impacting every sector of life to a very great extent. Financial service sector is one such sector which is changing due the influence of AI technology in this field and also this field will continue to change in future due to the effects of AI. This has led to making of the financial services sector more smart, more accessible and more user friendly. This article primarily focuses on the role played by the AI in bringing the transformations in the financial services sector in India. This article also brings out the challenges being faced in proper utilization of AI technology in the financial services sector by its users. The findings of this article are that AI has transformed fraud detection process, the working of credit reporting bureaus, credit risk management process, the management of portfolios, investment decision making and also the customer services provided by the financial organization to their customers. Also the challenges posed by the AI includes data privacy of the users, incomplete data to use tools and techniques related to AI, common sense situations not being properly interpreted, lack of trust of its users. These challenges are very necessary to be resolved properly.

### ➤ INTRODUCTION

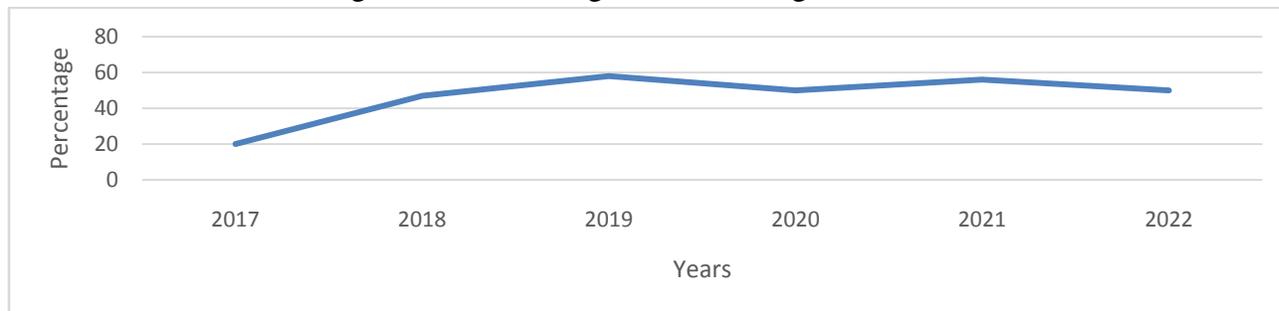
The use of AI is increasing in every sector of life. Finance is one such sector in which the role of AI is proliferating and it is also impacting the system of handling and managing financial security issues in the companies. The definitions of AI try to give us just a general idea of the term AI but there is no universal definition of AI. AI is the capability of computers to mimic human cognition, becoming able to learn, reason, understand, adapt, self-regulate and interact with the environment (Topol, 2019). A.I. is the theory and development of computer systems that can perform tasks that typically require human intelligence (Russell & Norvig, 2010). Now with more and more advancements the next generation of AI has also come. (Pan, 2006) defined AI 2.0 as a new generation of AI based on the novel information environment of major changes and the development of new goals.

The definitions of AI try to give us just a general idea of the term AI but there is no universal definition of AI. The term AI consists of a broad range of technologies which includes Machine learning (ML), Natural language processing (NLP), Computer Vision (CV) and Robotics Process Automation (Zheng et al., 2019). With the utilization of Artificial technology in the finance sector, a new field of study has got opened which is named as “FINANCIAL INTELLIGENCE”. The use of AI has made it possible to make complex decision in a simpler



way (Lepri, 2021).

Figure1: Business organisations using the AI



Source: (Chui et al., 2022)

Figure 1 shows a significant increase in the use of AI technology by the organisations in 2022 as compared to 2017. In 2017, 20% of the respondents reported about the adopting of AI by their organisations in at least one business area while in 2022, the figure is 50% of the respondents. Also as per the survey, there is increase in the number of respondents who reported that more than 5% of the digital budget of their organization went to AI (Chui et al., 2022).

The purpose of this paper is to check the transforming effects of AI on the financial services given by the financial institutions to their customers in India. This paper is divided into further sections, which includes Review of literature, Conceptual framework, Applications of AI in the field of financial services, Key Challenges, Conclusion.

## ➤ REVIEW OF LITERATURE

### 1. AI IN FRAUD DETECTION

There are several studies conducted in the field of fraud detection through AI. There is a evidence that non-financial risk factors and a rule-based system is helpful in decreasing the error rates through the usage of hybrid assessment method that mixes machine learning methods with the rule based systems (Song et al., 2014; Kim et al., 2020; Perols, 2011). Another study provides the evidence that a new fraud detection model using ensemble learning model has performed better than the two standard models in the fraud detection: Dechow et al. logistic regression model which is based on the financial ratios, and the Cecchini et al. support-vector-machine model along with financial kernel (Bao et al., 2020; Hajek & Henriques, 2017).

### 2. AI IN CREDIT RATING

The study of literature showed that applications of AI in the consumer finance sector in China and examined the applications of AI from the six perspectives which are: credit reporting, intelligent risk management, intelligent marketing, intelligent customer service, intelligent collection and intelligent regulation (Cheng, 2019; Chen & Wu, 2023). The decisions on the



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rating of the customers can be easily taken using the AI, machine learning and deep learning technologies and also blockchain technology lead to improvement in the process (Han et al., 2023; Cai, 2021). Through the use of AI technology it has been made possible to make complex and difficult decision in a simpler way (Lepri, 2021).

### 3. AI IN RISK MANAGEMENT

The study of literature has provided the insights on the applications of AI in the fields of wealth management, risk management, financial identity authentication, smart financial consulting, blockchain and also a research framework called FinBrain is also proposed and four issues are also summarized which are: explainable financial agents and causality, perception and prediction under uncertainty, risk-sensitive and robust decision-making, and multi-agent game and mechanism design (Zheng et al., 2019; Hoang & Wiegatz, 2023; Cai, 2021). A study to check how blockchain technology and AI will impact the accounting and auditing and how it can improve transparency and trust is conducted and found that blockchain is still in the early stage (Han et al., 2023; Cheng, 2019). Deep learning methods can be used to detect the suspicious transactions in the data related to the taxpayers (Wang et al., 2020).

### 4. AI IN INVESTMENT RELATED DECISION

The study of literature showed that models which are based on machine learning technology select those accounting variables as most important predictors which are a component of free cash flows and known predictors of stock returns (Amel-Zadeh et al., 2020; Cavus et al., 2021). In a study conducted applications of machine learning in the field of finance is identified and also three archetypes of applications are identified which are: the construction of superior and novel measures, reduction of prediction error in economic prediction problems and Extension of the existing econometric toolset (Hoang & Wiegatz, 2023; Cheng, 2019). There are the applications of AI in the fields of wealth management, risk management, financial identity authentication, smart financial consulting, blockchain (Han et al., 2023; Cai, 2021). The use of AI has made it possible to make complex decision in a simpler way (Zheng et al., 2019).

### 5. AI IN ENQUIRY BASED CUSTOMER SERVICES

The study of literature revealed how the inadequacy of the digital laws, trust, risk and facilitating conditions are the most dominant factors that affect the mobile banking growth and also identified the reasons of the customers for their non-usage of the new conduits using AI-based methods (Cavus et al., 2021). There are benefits machine learning models compared to that of the traditional methods and it also indicates that there is a huge scope of research on Machine learning in finance (Hoang & Wiegatz, 2023). More than 100 million users are the consumer base of chatbot and it has increased very rapidly (Seghier, 2023). AI as a

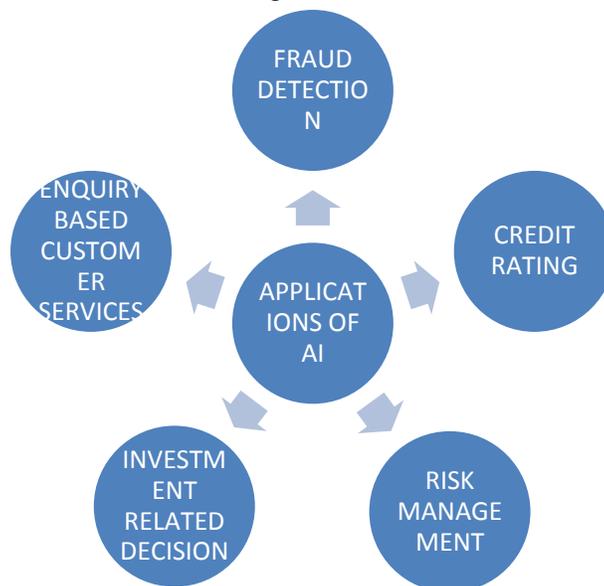
augmentation tool will help to increase and supplement the human capabilities only and will not be able replace them (Miller, 2018; Wilson & Daugherty, 2018).

As far as author know there is a research gap in the analysis of transforming effects of AI on the financial services sector in India. This paper explores the impact of AI on the financial services sector and provides great contributions in this field of study. This paper also finds the challenges being faced in the usage of AI in the financial services sector.

➤ **CONCEPTUAL FRAMEWORK**

There are various areas of financial service sector which are using the AI technology. The main areas where AI is being applied in the financial service sector are: fraud detection, credit rating, risk management, investment related decision and enquiry based customer services. It offers various advantages to its users as because of AI work can be completed in a very speedy manner. Also it allows the work to be completed with a great extent of accuracy.

Figure 2



➤ **APPLICATIONS OF AI IN THE FIELD OF FINANCIAL SERVICES**

1. **AI AND FRAUD DETECTION**

Financial crime is described as, “illegal acts committed by an individual or a group of individuals to obtain a financial or professional advantage. The principal motive in such crimes is economic gain (Chalapathy & Chawla, 2019).” It is committed using various hacking tools and techniques which have the ability to break the security procedures. Hence there is a requirement to use AI techniques to make financial systems more secure and to prevent happening of these types of financial crimes.



There has been slow increase of organisations who reported that they have started using AI to mitigate cyber security risk than for other purposes. In 2019 49% of the respondents positively responded to the use of AI, whereas in 2022 the figure was 51% (Chui et al., 2022).

Table 1: Comparison AI usage for Cyber security than for other purposes

Functions	2019 (% of respondents)	2022 (% of respondents)
Cyber security	49	51
Regulatory compliance	35	36
Individual privacy	30	28
Explainability	19	22
Reputation	19	22

Source: (Chui et al., 2022)

These techniques are used by various users such as fraud analysts, investigators, regulators, auditors, governing bodies to detect the frauds which take place in an organization. Fraud analysts uses human – in – the – loop method, which is helpful in checking of the results of the Machine Learning model related to the customs frauds (Kim et al., 2020).

## 2. AI AND CREDIT RATING

The consumer finance industry is heavily dependent on the scores given by the credit bureaus. This score helps the financial institutions to check whether the money lent to the borrower is safe or not. It also helps them in the determination of the amount of money to be lent to each of the borrowers.

In this digital era, the credit reporting sector is newly shaped. The technologies such big data, machine learning has allowed for the use of more sophisticated technologies, completing their tasks at a much faster speed, completion of tasks more effectively. Credit rating bureau collect information of users on various aspects and then extract various feature building models and then they credit a score to the users according to the model. One of the most successful credit reporting system in the USA is FICO score. The constituent elements of FICO score include payment history, amounts owed, length of credit history, credit mix, new credit (Cheng, 2019).

In India, there are four major credit bureaus which are: CIBIL, Equifax, Experian and CRIF high mark. The factors used while calculating CIBIL score are payment history, credit exposure, credit type and duration and other factors. The CIBIL score is a 3 digit number ranging from 300 to 900. The score of 900 is considered as highest, while the score of 300 is the least. The score of around 750 is considered as a good score to get the loan approved (CIBIL, 2017).



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### 3. AI AND RISK MANAGEMENT

The rise of AI has also impacted the risk management systems to a great extent. They have provided very effective solutions to the problems of risk management in the present era. For its effective working machines are firstly required to be fed up with a large amount of data. One of the biggest advantage of the machines that a large amount of data can be stored in them in very easy manner. This large amount of data helps them to easily identify the abnormalities, which provides the security to the users.

The broker dealer firms can check the credit worthiness of their clients using the models based on the AI. These models helps to utilize non -traditional information such as information about the credit worthiness of a client available through the social media. These models also utilize traditional information about the users which includes information such as financial position of the user, credit history of the user.

Table 2: Impact of AI in risk management area in comparison to other areas

Areas	Banking (in %)	Insurance (in %)
Risk management	29	56
Back office/ operations	52	78
Customer service	65	44
Fraud detection	31	56

Source: (Deloitte, 2018)

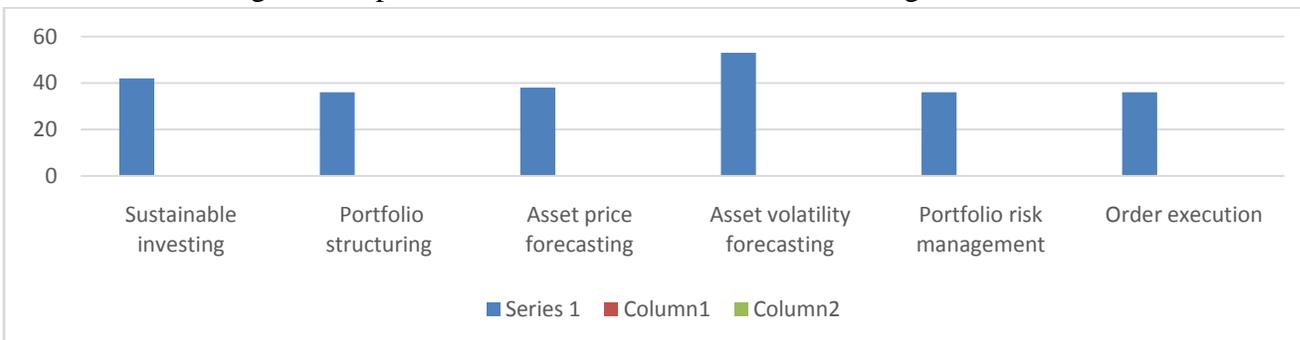
From the above, it can be seen that in banking sector impact of AI is less as compared to the insurance sector on risk management. In banking sector it is only 29%, whereas in insurance sector it is 56%. The customer service has the highest impact in banking sector which is 65% whereas this area has impact of 44% in insurance industry. The back office/ operations has the highest impact in insurance industry which is 78%, whereas in insurance industry this area has impact of 52%. In banking industry fraud detection has least impact of 31%, whereas this area has an impact of 56% in insurance sector.

### 4. AI AND INVESTMENT RELATED DECISION

AI has completely transformed the process of taking the investment decisions and also making of investments. With the use of AI portfolio can be managed in simple and easy way. Users can take decisions regarding which stock should be purchased and which stock should be sold out. AI has been able to predict the price movements among the shares. Algorithmic trading is also a emerging concept in this field. Figure 4 shows that asset volatility forecasting has the highest impact of 53%. The portfolio structuring, portfolio risk management and order execution has impact of 36% which is the least. The sustainable investing has an impact of 42%. The asset price forecasting has an impact of 38%.



Figure 3: Impact of AI on investment return in the long term



Source: (EY, 2021)

In the field of investment decisions, AI performs the functions of data analysis, prediction, risk management and optimizes the portfolio of the users. It is very useful for the broker firms to get information in depth about the customers, their preferences by using the data from wide range of sources which includes customer assets, emails, social media, browsing history. Through the determination of trends and patterns from the analysis of data, it also makes the predictions of the various price movements related to the shares and stocks and the helps to take the investment decisions.

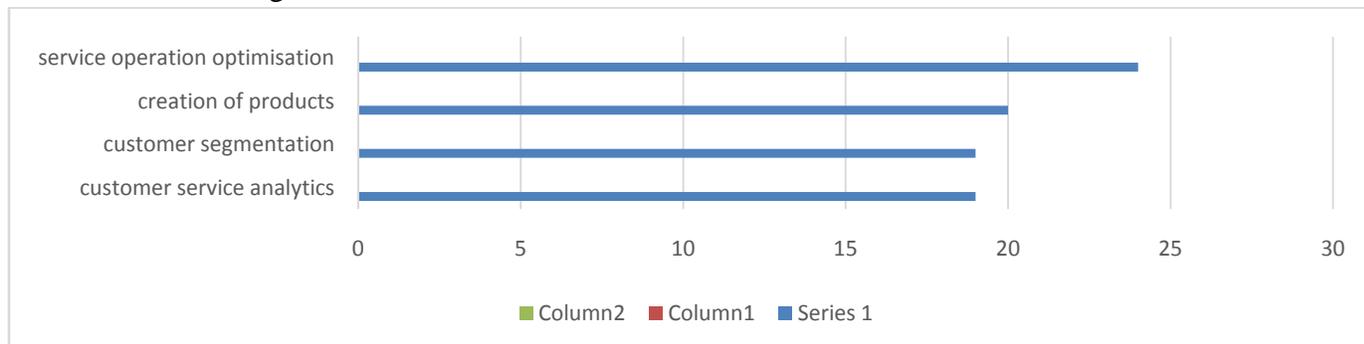
#### 5. AI AND ENQUIRY BASED CUSTOMER SERVICES

Many firms have started using chatbots which communicates with customers. Chatbots are the software applications that can mimic human conversations (Lin et al., 2023). The consumer base of chatbot has increased very rapidly and currently it has more than 100 million users (Seghier, 2023).

The use of AI provides a lot of benefits in the field of customer service. One of the main advantage of using chatbots is that they can provide the services to the customers 24\*7, which means that its services can be accessed at any point of time by the customers. They can provide their services to the customers tirelessly and they do not need any breaks during the work which is performed by them. Another advantage of them is that they can answer a large number of questions easily. This happens due to the fact that they are taught using large linguistic datasets (Van Dis, 2023).

From the figure below we can see that service operation optimization is the area in the customer services which is having highest use of AI of almost 24%. The area of creation of products has impact of 20%. The customer segmentation and customer service analytics both are having least impact of 19%.

Figure 4: Use of AI in different fields of customer service



Source: (Chui et al., 2022)

➤ **KEY CHALLENGES IN THE IMPLEMENTATION OF AI IN THE FINANCIAL SERVICE SECTOR**

**1. CHALLENGES OF AI IN FRAUD DETECTION**

The AI is posing the challenges in the detection of fraud. Fraud detection requires a large set of data. However sometimes the data available is not complete. The decisions are required to be made on the basis of this incomplete data, which decreases the accuracy and reliability of decisions. The model used by the researchers also posed a challenge to the researchers.

**2. CHALLENGES OF AI IN CREDIT RATING**

The use of AI has the limitation that it is not transparent. The users are sometimes not able to understand on what basis a particular credit score is awarded to them. They are not able to get the information about the algorithms used, basis of selection of models, criteria to provide weightage to components of score. It triggered new area called Explainable AI (Adadi& Berrada, 2018).

**3. CHALLENGES OF AI IN RISK MANAGEMENT**

The main challenges posed by the AI in the field of risk management is the data privacy. The data of the users should be kept confidential. Sometimes organizations are not able to keep the privacy of user data, which causes a feeling of distrust among its users. Another challenge in the implementation of AI is that its management of risk through the AI is a very costly process and also need skills and knowledge to use the AI technology.

**4. CHALLENGES OF AI IN INVESTMENT RELATED DECISION**

In the task of analysis of various investment opportunities, there is a requirement of large amount of data which poses a challenge to the researchers. Firstly to get such a large amount of data is itself a difficult task. Secondly there is a requirement to process and analyse such a large amount of data, which requires a lot of efforts on the part of the researchers.



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## 5. CHALLENGES OF AI IN ENQUIRY BASED CUSTOMER SERVICES

AI has undoubtedly opened a new stream of opportunities. Chat GPT has provided a lot of convenience to the customers. But it has made the people to lose their jobs because of which its implementation is resisted. Hence some researchers believed that AI should only be used as a augmentation tool rather than as automation tool. AI as a augmentation tool will help to increase and supplement the human capabilities only and will not be able replace them (Duan et al., 2019).

### ➤ CONCLUSION

AI is providing a lot of opportunities and solutions in this world of dynamism. It has made the task of data analysis a very easy process and also helped to make the financial systems of an organization secure. However, many concerns have also arisen due to AI. One of the biggest concern related to the use of AI is the privacy concern. To tackle this problem there is a need for the proper rules and regulations to regulate the privacy issues and also to prevent the cases of wrong use of data and to decrease the weaknesses in de – identification techniques (He et al., 2019). However, it must also be remembered that the excess protection of data has the ability to hamper the process of innovations which are required for the improvements in the health care systems (Price & Cohen, 2019).

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