



ARTIFICIAL INTELLIGENCE AND BIG DATA: A STUDY ON PREDICTIVE ANALYTICS IN FINANCIAL SECTOR

Economics

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ABSTRACT

Artificial Intelligence (AI) as a scientific advancement is changing the world in unprecedented ways and redefining almost all fields of human endeavour. AI is a set of techniques that allows us to analyze data and make inferences, predictions, and, in general, make better decisions. Machine learning is a subset of AI that is capable of continually learning on its own. Understanding how AI and machine learning are changing the field is essential to set the right priorities and addressing existing issues that allow economics to be considered as a true science. When AI comes to predicting economic conditions, the only certainty is uncertainty. AI-powered predictive analytics can overcome some of the challenges present in the economic forecasting. By implementing AI techniques in behavioral economics, economists will be able to more precisely estimate the impact of human perceptions and behavior on the actual state of affairs. The use of predictive analytics combines classical statistical analysis and the new world of AI. We might even predict changes in supply and demand to implement necessary changes in order to avoid economic downturns. All connected devices are pumping out oceans of data about real-time economic activities, demands and desire. The objective of the present study is to analyze the growth of financial technologies (FINTECH) in terms of Venture Capital and R&D Expenditure in AI. A predictive model employed to know the determinants of Fintech and found that R&D Expenditure and Venture Capital in AI have positive impact on Financial Development.

KEYWORDS

Artificial Intelligence, Predictive Analytics, Financial Development

INTRODUCTION

Artificial intelligence has become a real game changer inside the planet of finance. AI system can examine millions and billions of data points, and spot patterns and trends that people may miss, and even predict future patterns. Computing, in conjunction with tongue method, can even be accustomed to turn out as conversational trees that enable customers' converse and perform specific actions, whether by chat or by voice application. The foremost unremarkably used AI technologies are: robotic technique automation for structured operational tasks (36%); virtual assistants or conversational interfaces for customer service divisions (32%); and machine learning techniques to watch fraud and support underwriting and risk management (25%) and other segments (7%). The AI used in the financial services include Credit Choices, Risk Management, Fraud Bar, Customised Banking, and Automation etc.

Predictive Analytics to Prescriptive Analytics

Both predictive and prescriptive analytics are advanced forms of analytics that have a role to play in business intelligence. When the two are combined with machine learning, data mining and modelling, a company can make game-changing decisions. Both are equally and independently important to achieve better business outcomes.

Predictive analytics is applied to a wide range of business strategies and continues to play a vital role in advertising and marketing recommendation engines. These insights provide business executives and managers with the decision-making tools they need to achieve different goals like manufacturing optimization, revenue forecasting, cross-selling and up-selling opportunities. **Prescriptive analytics** eliminates the immediate uncertainty that comes with changing conditions. That's why it's utilized to increase efficiency, improve productivity, mitigate risk and enhance customer loyalty

Review of Literature

Kanjil (2018) analysed on the development and implications of AI in financial world and found that AI involves two basic ideas; studying the thought process of human beings, and dealing with representing those process via machines. By the use of AI in different sectors it has been predicted that AI has greatest impact by 2020, both in banking and financial sectors.

Minzhen (2019) found that man-made consciousness innovation carries gigantic change to the whole monetary industry, which makes a progression of inventive monetary administrations such as wise expert, clever loaning, observing and cautioning, and insightful client support as times required. Similarly, **Ana** (2019) assessed Artificial Insight in monetary administrations and stated that man-made consciousness instruments have heightened of late in all areas of the

economy owing, among different variables, to the developing volume of advanced information and higher computational limit.

Haitian (2020) studied the applications of man-made brainpower in monetary administration choices and asserted that Artificial Intelligence (AI), beyond a couple of years, made numerous, indications of progress and have empowered the production of expert financing applications, which would, maybe, upset the money business.

Rafee and Arif (2020) focused on the impact of intelligence techniques in banks at Bangalore. To measure the impact, the study took top 10 leading banks in Bangalore and found that private banks are using various artificial intelligence services for the customer benefit and the result from the study also suggested that customers expected more commitment from representatives towards the banks.

Vivek and Prafulla (2021) observed that Artificial Intelligence has carried an extraordinary change to the monetary area by giving different freedoms to customised administrations by decreasing expenses and growing new models of business. The gigantic changes have been gotten monetary area through innovation of man-made reasoning that made a scope of creative monetary administrations such as savvy advisor, keen loaning, checking, and cautioning, just as insightful client administration.

According to **Carlo** (2021) artificial intelligence will help financial services by improving efficiency, new data information advisory, management services, risk mitigation and many private firms are spending on research and development to launch AI in every sector of financial market.

Statement of the Research Problem

By implementing AI techniques in behavioural economics, economists are able to more precisely estimate the impact of human perceptions and behaviour on the actual state of affairs. The use of predictive analytics combines classical statistical analysis and the new world of AI. In the realm of financial analytics, the intrusion of AI has a high potential because all connected devices are pumping out oceans of data about real-time economic activities.

Properly harnessed, that data could mimic the efficacy of predictive analytics in finance. Hence, the present study

Objective

1. To find out the factors determining the growth of financial technologies (FINTECH)

Methodology

The study is based on secondary data collected from World Bank and OECD Reports, RBI Bulletin and statista. The period of study is 10 years i.e. from 2010-11 to 2019-2020. The collected data were analysed by using trend analysis and a regression model.

Predictive Econometric Model

A predictive model that employed to find out the determinants of growth of fintech

$$Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + u$$

Y_t = Growth rate of Fintech

β_0 = Intercept

$\beta_1, \beta_2, \beta_3, \beta_4$ = Coefficients

X_1 = Cash flow

X_2 = Remittances

X_3 = Venture Capital in AI

X_4 = R&D Expenditure on AI

u = error term

RESULTS AND DISCUSSION

The data taken from the World Bank Global Development report a table has been prepared to highlight the amount spent on the selected parameters (Table 1). It was found that the growth rate of inflow was negative for three years (2015, 2016, and 2020). The growth in international remittances, together with those to developing countries, sharply decreased in 2015 and 2016 because of weak economic process in Europe, deterioration of the Russian economy and also the depreciation of the monetary unit, Ruble.

Table 1 Financial Inflows and FINTECH Funding Amount

Year	Inflows (billion \$)	Inflow of Remittance	Venture Capital Investment in AI	R&D Expenditure on AI	FINTECH Funding amount (billion \$)
2010	420.1	53.48	0.42	280	5
2011	469.9 (10.59)	62.499 (14.43)	0.35 (8.70)	300 (6.67)	4.39 (-13.90)
2012	494.2 (4.92)	68.82 (9.18)	1.5 (69.33)	600 (50.00)	4.62 (4.98)
2013	524.1 (5.72)	69.97 (1.64)	5 (70.00)	900 (33.33)	12.4 (62.74)
2014	562 (6.73)	70.389 (.60)	13 (61.54)	1000 (10.00)	16.8 (26.19)
2015	555.9 (-1.1)	68.91 (-2.15)	25 (48.00)	1100 (9.09)	42.4 (60.38)
2016	547.1 (-1.61)	62.744 (-9.83)	45 (44.44)	1600 (31.25)	37 (-14.59)
2017	588.6 (7.06)	68.967 (9.02)	73 (38.36)	1870 (14.44)	39 (5.13)
2018	634.5 (7.23)	78.79 (12.47)	235 (68.94)	1800 (-3.89)	73.3 (46.79)
2019	654.2 (3.01)	83.332 (5.45)	270 (12.96)	2950 (38.98)	78.3 (6.39)
2020	648.6 (-0.86)	83.149 (-0.22)	175 (-54.29)	3100 (4.84)	22 (-255.91)

Source: World Bank, Global Development Data (2020)

Note: Figures in Parenthesis are Annual Growth Rate (AGR)

Predicted Growth of Financial Services

Trend line analysis is used in order to predict the inflow of remittances in 2030, and it was found that the growth of remittance is likely to increase to \$883.83 billion. The linear upward sloping trend line implies a positive growth in financial services. This, therefore, reveals that in future the world economy grows and financial inclusion improves due to increase in inflow by 26.61% in 2030.

Expected Inflow of Remittances

From the trend analysis it has been found that the growth of remittances is likely to increase to \$104.4504 billion in 2030. The linear upward sloping trend line reveals that there will be an increase in future inflow. It is disclosed that in future the world economy grows and financial inclusion improves due to increase in inflow by 20.39%. Financial services remittances are the flagship products, attracting and incentivizing a wider customer base to use other financial services, therefore, improvement in remittance inflow leads to growth and development of financial services.

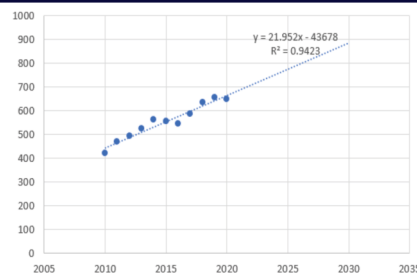


Figure 1 Trend Line of Predicted Growth of Financial Inflows

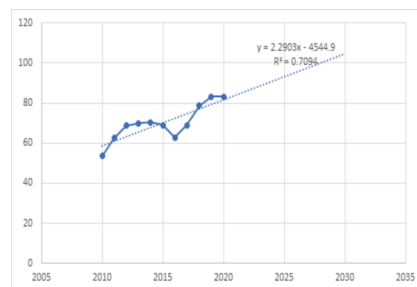


Figure 2 Trend Line of Predicted Growth of Remittances

Research and Development Expenditure on AI

Artificial intelligence is a general-purpose technology that is seeing uptake in many industries such as finance and insurance. India is spending on researching on AI in financial services before implementing further in order to make the process more efficient and accurate. AI related technological development represents an emerging growth and in this field of financial services they research on discovery of new technology, on Patents and Trademarks. It is found that the expenditure tends to increase until 2017 to \$1870 million, but by 2018 the expenditure reduced on research study in India by \$1800 million.

The Result of Predictive Analytics

The results of the predictive model are given below Model 1: OLS, using observations 2010-2020 (T = 11) Dependent variable: FINTECH Funding

	Coefficient	Std. Error	t-ratio	p-value
const	-63.0735	62.1469	-1.015	0.3493
Financial Inflows (X1)	0.510005	0.175949	2.899	0.0274
Remittance (X2)	-2.56446	1.07068	-2.395	0.0536
Venture Capital Investment (X3)	0.250543	0.0748768	3.346	0.0155
RD Expenditure (X4)	0.0203582	0.0103958	1.958	0.0179

Out of the four variables selected, it was found that three variables namely financial inflow (X1), Venture Capital Investment (X3) and R&D Expenditure (X4) significantly determined the FINTECH funding.

CONCLUSION

The results of predictive econometric model clearly revealed the influence of R&D expenditure on the application of AI in financial services. In the current scenario, the challenging task is the decipher of big data and applying the results in the spheres of decision making. Further, both predictive analytics and prescriptive analytics should be employed to get insights as well as to optimise the decision-making power.

Hence, FINTECH funding assumes greater significance and the efforts, both by the State and by the Private sector, should be channelised towards this to not only reap the benefits of application of AI but also to be future ready.

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