

Influence of Robo-Advisory on the Investment Decisions of Young Investors- Delhi- NCR Study

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Abstract

In the fast changing landscape of financial markets, artificial intelligence is making inroads into it. Artificial intelligence is a concept or technological advancement which aims to mirror intelligence exhibited by the human beings and executes all the jobs to the perfection. Financial or investment domain is not an exception to this. Newer technologies are making their way to the horizon like Large Language Models (LLMs) as they present themselves into innovative and interactive methods of extracting information for making informed investment decisions. Before making any investment decision one has to look at various aspects and pay attention to various reports and constantly monitor the changes in stock prices, which is a very difficult job every person can't claim to master this art, in this artificial intelligence comes to the rescue of such persons who can't perform such tasks carefully. The present study is an attempt in this regard and it consists of respondents who are living in Delhi national capital of India. Data was collected with the help of questionnaire and analyzed by employing multiple regression method to ascertain the

effect of artificial intelligence on investment decisions in addition to overconfidence bias which was another factor studied with artificial intelligence.

Keywords: Artificial Intelligence, Robo-Advisory, LLMs, Investment Decisions, Overconfidence Bias

Introduction

Artificial intelligence has become a new development that is pervasive in all aspects. Most of the tasks in daily routine now-a-days is performed to a great extent by the artificial intelligence as Alexa is doing all the household activities and managing all the appliances in the home of any individual. Financial sector is not unaffected by the advent of the artificial intelligence. This convergence of minds and machines have effected a momentous change in all the spheres of life. Human beings are prone to biases and ultimately they make inferior decisions and suffer losses. Artificial intelligence on the other hand is a software which does not rely on instincts and biases and very practical and takes very tough decisions without getting emotional (Jung et al., 2018, Ruhr, 2020).

Artificial intelligences analyzes the market condition comprehensively and suggest course of action or takes action pragmatically. In stock markets artificial intelligence is playing its role in the form of algorithm trading where with the help of intelligence algorithms investors take right decisions and executes many orders at a given point in time which gives them additional edge over other investors in the market. In many global institutions these changes have taken place and Bank of Tokyo and Bank of America are examples in this regard (Marinova et al., 2017) (Rosman, 2018)

Due to technology conventional methods of banking are facing stiff competition from new innovative methods of banking provided by new age fin-tech companies based on novel technologies and increasing the comfort and ease of customers and also shaking the very foundation of a business or sector. In current scenario financial landscape is undergoing transformation and that has facilitated the change in the approach of customers irrespective of the age group they belong to, as they adopt the new and transformational facility of digitization. In addition to this fin-tech companies are serving their customers 24*7 and creating an ecosystem of reliability and trust among them and they are not subject to regulatory compulsions unlike conventional banking companies. The robo-advisors in this scenario are helping investors to commit their funds in customized propositions and that takes place in a very simple manner.

In the age of novel technology people are always found doing their important work on smart phones and spending considerable time and fin-tech companies sensed the absence of such things or facilities in the banking or investment arena. Robo-advisors are a result of such concerted efforts of fin-tech companies to develop digital facilities for customers with smart technology and interactive too. A robo-advisor gathers information from the clients on regular basis pertaining to their financial condition and their financial goal and advise them accordingly (Yi et al., 2023). Evolution of robo-advisory is crucial to maintaining the transparency for ethical and round the clock functioning of the fin-tech companies and banking sector in general but its revolutionary nature has not resulted in full adoption by the masses. This reluctance on the part of customers can be attributed to the lack of knowledge about the concept of robo-advisors, lack of trust in an online platforms and quest for transparency which has resulted in asymmetry. Another interesting aspect associated with robo advisory is that as disposable income rises and it results in increase in volume of investment, investors to maximize their return seek help of personalized and dedicated services for wealth management and in the process come across Northey et al. (2022) but as other studies conducted in Scandinavian nations like Sweden, Norway, Finland people belonging to lower income they are actively using robo-advisory functions for wealth management and majority of them are females with less willingness to take risk Faradynawati et al. (2022). In today's scenario robo-advisors have totally changed the way investment services are offered and in a way disrupted the market (Laukkanen and Pasanen, 2008).

Large language models on the other hand is a new development in the domain of the technological advancements which help in the revolutionizing the financial behavior of investors. Earlier financial analysis was used to be done by the experts or analysts but with the advent of Large Language Models, a systemic change has occurred in which Large Language Models are performing financial analysis on the companies resulting in less errors. Expertise of Large Language Models lies in its ability to process and extract meaningful information from huge volumes of unstructured data. But application of Large Language Models in the financial sector is not without challenges as it requires integration with data sets, data training and concerns in relation to data privacy and security.

The research intends to study the understand the preferences of consumers in relation to robo-advisory with respect to investment decisions of retail investors in Indian financial environment and it also provides valuable insights into extent of adoption of robo-advisory in Indian financial landscape, identify those

factors which are going to result in faster adoption of robo-advisory by keeping in center the factors like perceived utility, external influence and internal influence.

Literature Review

The advent of robo advisory and artificial intelligence will transform the entire gamut of activities in financial sector and will have huge transformational value for all sectors cutting across all the dimensions of business sector (Acemoglu & Restrepo, 2017). On the other hand (Huang and Rust, 2018) emphasized upon the eventuality which is awaiting the mankind in case the artificial intelligence is properly implemented in the system and human being are no longer needed to work, they also anticipated that artificial intelligence will develop all abilities ranging from mechanical to intuitive intelligence.

Simultaneously researches were also focusing upon the challenges in the way of introduction of automation in the service sector, special emphasis was placed upon sectors where direct communication with consumers was needed. These researches noted that consumer interaction is going to be shaped profoundly with the introduction of artificial intelligence and will also change the consumer behavior in the market, but the level of adoption of technology in service sector will depend on the presence of humans and relative capacity of artificial intelligence to socialize with consumers on daily basis (Singh et al., 2017), (Han and Young, 2018), (Van Doorn et al., 2017), (Grewal et al., 2017), (Ji, 2017).

In totality, there is a huge realization among companies to introduce artificial intelligence in their operation as part of increasing efficiency and range of products. Management strategies adopted by their companies in relation to their operations also get a boost and passively increase competitive advantage of all the companies employing artificial intelligence.

Robo-advisors have been depicted as interactive and intelligent systems that are built on the foundations of information technology and helped consumers in taking crucial investment decisions (Jung et al., 2018). Initially these systems first gather information from consumers through questionnaire, on the basis of information provided by the consumers in the questionnaires, these systems start making recommendation to the consumers.

Robo-advisors present a range of benefits to the entire community of consumers, unlike human advisors they are always on service for the human beings, resulting in cost reduction on the part of companies and also helping consumer in seeking professional advice regarding diverse investment options in an efficient

manner and eliminating the scope of fraud which is always looming large in case of dealing with human advisors (Faubion, 2016), (Park et al., 2016). During the period 2019-22 assets managed by robo-advisors crossed \$880,000 million.

Apart from Robo-advisors one new technological development has taken place which is known as Large Language Models (LLMs), introduction of these sophisticated models have resulted in the way of interaction of companies with their clients and also augment efforts of companies in providing 24/7 services to the consumers and giving expert investment advice. Besides this LLMs are also extremely useful in conducting sentiment analysis by processing large datasets available on the internet and providing valuable information to the company about the prevailing trends in the market and facilitate better preparation on the part of company professionals (Kok et al., 2023), (Paul et al., 2023).

LLMs are also exhibiting their utility in the area of fraud detection as the traditional methods of stopping frauds are proving to be insufficient and LLMs are becoming a potent weapon to understand the modus operandi of the fraudsters and minimizing the damage to the unsuspecting customers (Ali et al., 2022)

Even though this concept is evoking huge interest, but some studies have pointed out the obstacles in the introduction of robo-advisors and found that corporate world is more interested in exploring the capabilities of artificial intelligence and its application in diverse areas whereas consumers are not ready to trust applications based on artificial intelligence due to security reasons. Customization is the unique advantage of robo-advisors identified by the studies in relation to investment management (Fallon and Scherer, 2017), studies have also found a correlation between increased usage of artificial intelligence and informed decision making (Henrich and Schwabe, 2018).

Considering freshness associated with the concept of robo-advisory in the process of investment management, there is lack of awareness about the key factors which determine the prospects for adoption of robo-advisory by the consumers, with help of robo-advisory the financial sector is making advisory services available to all the consumers for better decision making (Sironi, 2016).

The consumers' thoughts and perceptions are conditioned by the thought process of people who are close to the consumer. The societal behavior acts as a pressure for the consumer to adopt a technology or disapprove of it (Tayler and Todd, 1995), (Fishbein and Ajzen, 1975).

People with limited information and also facing the situation or spectre of a disruptive technology, as they lack relevant experience in the concerned field tend to behave like their relatives, peers, friends, basing their decisions on the experiences of others in order to enhance their assimilation in the society and appear modern in the eyes of others (Belanche et al., 2012).

In the area of finance there is considerable role played by the close social circle of an individual and the other non-human source of information like media and by this one can easily understand that consumers tend to gain some confirmation from others with respect to their decision. (Bhattacharjee, 2000) (Ryu, 2018).

Familiarity with any concept or new technology results in the adoption of that technology as that is going to enhance or decrease the willingness on the part of consumers to actually engage with the new technology in question. Same is the case with robo-advisors, in the 1980s and 90s all the banking jobs and investment management services were provided by the human resources of the concerned organization but now robo-advisors are playing that role with increased efficiency and professionalism but all the consumers are not welcoming of the new change and a substantial part of the population is not exhibiting faith in adopting robo-advisors for investment management and with different level of knowledge and familiarity one can sense the difference in the extent of adoption (Young et al., 2009) (Maenpaa et al., 2008) consumers with limited information about new technology will be more reliant on the experiences of others (Venkatesh and Davis, 2000).

Research Methodology and Hypothesis Formation

By examining the available research and literature in the public domain, questionnaire was modelled to address the basic requirements of the present research. First part of the questionnaire was related to the socio-economic profile of the respondents and the other two parts were dedicated to the core areas of the research like perceived trust, internal and external influence and intention to use in relation to robo-advisory. The question were designed with the help of Likert Scale.

Sample size of the present study was of 100 people and all of them were residing in Delhi as Delhi is the political and financial capital of India. People from diverse background participate in the financial activities taking place in the city resulting in diverse opinions making it a near-perfect fit for carrying out research.

Data collected in the study was analyzed with the help of SPSS software using Multiple Regression Methods to ascertain the influence of perceived trust, internal and external influence on intention to use robo advisory. To streamline the process of research following hypothesis were formed:

H01: Perceived trust does not share a significant relationship with intention to use robo-advisory services

H02: Internal influence does not share a significant relationship with intention to use robo-advisory services

H03: External influence does not share a significant relationship with intention to use robo-advisory services

Table 1: Demographic Profile

Variables	Category	Frequency	%
Gender	Male	54	54
	Female	46	46
Age	18-30	59	59
	31-45	29	29
	46-60	12	12
Marital Status	Unmarried	46	46
	Married	54	54
Education	School Education	11	11
	Graduation	44	44
	Post-Graduation	36	36
	Others	9	9
Occupation	Private Employees	43	43
	Public Employees	10	10
	Business	13	13
	Others	34	34
	<5 Lakhs	68	68

Income	5-10 Lakhs	25	25
	>10 Lakhs	7	7

Data Analysis

For the validity of a research model, all the variables in the research have to fulfill some norms to avoid lopsidedness and biasness. As the data was collected from 100 respondents, reliability of the data was judged with the help of SPSS. Acceptable value of a Cronbach Alpha test is 0.70 and a variable or construct must measure more than 0.70 Hair et al. (2006). Cronbach Alpha value more than 0.80 points towards the soundness of the constructs in terms of validity. The values attained by the constructs in the present study are in the range of 0.75-0.82

Table 2 : Reliability Analysis

Construct	No. of Items	Alpha (α)
Internal Influence	3	0.82
External Influence	3	0.75
Perceived Utility	3	0.82
Intention to Use	3	0.78

Data Analysis

Multiple Regression Analysis

Table 3: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.838 ^a	.702	.692	.47694

a. Predictors: (Constant), EF_1, PU_1, IF_1

Table 4: Anova

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	51.332	3	17.111	75.221	.000 ^b
Residual	21.838	96	.227		
Total	73.170	99			

a. Dependent Variable: IU_1

b. Predictors: (Constant), EF_1, PU_1, IF_1

Table 5: Coefficients

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.184	.295		-.623	.535
PU_1	.384	.086	.359	4.472	.000
IF_1	.290	.117	.225	2.482	.015
EF_1	.410	.078	.387	5.268	.000

a. Dependent Variable: IU_1

As can be observed in the results of the data analysis that independent variables have significantly affected the dependent variable $(3, 96) = 75.221, p < 0.01$ which is reflected by the effectiveness of the model. The model in the present study is able to reflect the variations in the dependent factor due to independent factors in the question, to the tune of 70 percent as reflected by the R^2 value of 0.70.

As we delve deeper into the individual role played by the independent factors in relation to the dependent factor we find that Hypotheses 1 examined the relation between perceived utility and intention to use robo-advisory and the results in the study throw up significant relation between the factors ($\beta = .384, t = 4.472, p = 0.00$) and clearly showcase that utility clearly shapes the usage behavior of the respondents in relation to the robo-advisory and Hypothesis 1 is rejected in view of the results. H_2 evaluates the relationship of advises of close relatives and family members and the adoption of robo-advisory services and intention to use it ($\beta = .290, t = 2.48, p = 0.015$) and clearly points out that views of immediate family members affects the perception of any person to use the robo-advisory services in a significant services. H_3 studied the impact of external influence on the intention to use robo-advisory services in the form of friends and peer circle and the results found a significant relation between the two ($\beta = .410, t = 5.268, p = 0.00$) and in a much profound manner than internal influence and shaped immensely the intention of the individual to use the robo-advisory services and the hypothesis is rejected.

Discussion and Conclusion

In the ongoing emergence of FinTech companies, robo-advisory services caught the attention of investors and individuals in general as robo-advisers rely only on artificial intelligence and their advent and usage is resulting in fast replacement of humans from this area. From a customer's perspective it is very essential to identify those factors which result in the adoption of robo-advisory services in the area of investment management and personal financial management. As this study noted that subjective norms and perceived utility are the factors which immensely influenced the decision to adopt or use robo-advisory services.

As the findings of the present study concluded that internal and external influence share a significant relation with the intention of usage of robo-advisory service and it is in conformity with the findings of other studies like (Fishbein and Ajzen, 1975) who have earlier concluded in their study that subjective

norms like internal and external influence, found to be impacting intention of consumers regarding adoption of robo-advisory or artificial intelligence in the domain of investment management.

On the other hand perceived utility was another factors which was studied in its impact on intention of consumer and it was also found to be sharing a significant relation with dependent variable in question, this relationship as thrown up by the findings is also consistent with previous studies' findings Hernandez et al., 2009 as it has also concluded that perceived utility as a factor not only contributes to the decision of individuals before the actual usage of the robo-advisory but even after using the services it positively conditions the mind of individual. As the millennium generation is actively involved in the financial decision-making this results also takes into account the advance exposure of the current generation to the artificial intelligence and their willingness to adopt robo-advisory services is reflected in the results or findings of the study.

As the major contribution of the research lies in divulging key aspects which can be focused upon by managers while introducing artificial intelligence in the form robo-advisory services, they will have to present robo-advisors in a way which is very user friendly so that consumer adoption process is simplified as due to simple interface there is higher possibility of consumers switching to robo-advisory services. Financial institutions need to organize conferences to interact with their customer base to spread awareness about the concept of robo-advisors so that subjective norms can also be managed which have found to be impacting ultimate decisions of consumers.

Limitations and Scope of Further Research

In the present study small sample size plays a inhibiting role in terms of generalization study for that similar studies with comparatively large sample size need to be carried out in adjoining big cities in other studies, People were not willing to share their personal details and were giving biased responses to the questions in the questionnaire.

The present study is going to be useful for the financial institutions to focus on those features which consumers attach a lot of importance and hence will result in enhanced customer adoption of robo-advisors in the area of investment management.

References

- 1) Acemoglu, D., & Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. *Journal of political economy*, 128(6), 2188-2244.
- 2) Bhattacharjee, A. (2000). Acceptance of e-commerce services: the case of electronic brokerages. *IEEE Transactions on systems, man, and cybernetics-Part A: Systems and humans*, 30(4), 411-420.
- 3) Faloon, M., & Scherer, B. (2017). Individualization of robo-advice. *The Journal of Wealth Management*, 20(1), 30.
- 4) Faradynawati, I. A. A., & Söderberg, I. L. (2022). Sustainable investment preferences among robo-advisor clients. *Sustainability*, 14(19), 12636.
- 5) Faubion, B. (2016). Effect of automated advising platforms on the financial advising market.
- 6) Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research.
- 7) Frankenfield, J. (2020). Cloud computing. *Investopedia*. Dostupno na: <https://www.investopedia.com/terms/c/cloud-computing.asp> [28. svibnja 2021.].
- 8) Gracia, D. B., Ariño, L. V. C., & Blasco, M. G. (2015). The effect of culture in forming e-loyalty intentions: A cross-cultural analysis between Argentina and Spain. *BRQ Business Research Quarterly*, 18(4), 275-292.
- 9) Grewal, D., Roggeveen, A.L. and Nordfält, J. (2017), "The future of retailing", *Journal of Retailing*, Vol. 93 No. 1, pp. 1-6.
- 10) Han, S., & Yang, H. (2018). Understanding adoption of intelligent personal assistants: A parasocial relationship perspective. *Industrial Management & Data Systems*, 118(3), 618-636.
- 11) Heinrich, P., & Schwabe, G. (2018). Facilitating informed decision-making in financial service encounters. *Business & Information Systems Engineering*, 60, 317-329.
- 12) Ji, M. (2017). Are robots good fiduciaries: regulating robo-advisors under the investment advisers act of 1940. *Colum. L. Rev.*, 117, 1543.
- 13) Laukkanen, T., & Pasanen, M. (2008). Mobile banking innovators and early adopters: How they differ from other online users?. *Journal of Financial Services Marketing*, 13, 86-94.
- 14) Mäenpää, K., Kale, S. H., Kuusela, H., & Mesiranta, N. (2008). Consumer perceptions of Internet banking in Finland: The moderating role of familiarity. *Journal of retailing and consumer services*, 15(4), 266-276.

- 15) Marinova, D., de Ruyter, K., Huang, M.H., Meuter, M.L. and Challagalla, G. (2017), "Getting smart: learning from technology-empowered frontline interactions", *Journal of Service Research*, Vol. 20No. 1, pp. 29-42.
- 16) Northey, G., Hunter, V., Mulcahy, R., Choong, K., & Mehmet, M. (2022). Man vs machine: how artificial intelligence in banking influences consumer belief in financial advice. *International Journal of Bank Marketing*, 40(6), 1182-1199.
- 17) Park, J. Y., Ryu, J. P., & Shin, H. J. (2016). Robo advisors for portfolio management. *Advanced Science and Technology Letters*, 141(1), 104-108.
- 18) Rosman, C. (2018). Mad about erica: Why a million people use Bank of America's chatbot. *American Banker*, 183, 114.
- 19) Ryu, H. S. (2018). What makes users willing or hesitant to use Fintech?: the moderating effect of user type. *Industrial Management & Data Systems*, 118(3), 541-569.
- 20) Singh, J., Brady, M., Arnold, T., & Brown, T. (2017). The emergent field of organizational frontlines. *Journal of Service Research*, 20(1), 3-11.
- 21) Sironi, P. (2016). *FinTech innovation: from robo-advisors to goal based investing and gamification*. John Wiley & Sons.
- 22) Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information systems research*, 6(2), 144-176.
- 23) Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, 46(2), 186-204.
- 24) Young, J. E., Hawkins, R., Sharlin, E., & Igarashi, T. (2009). Toward acceptable domestic robots: Applying insights from social psychology. *International Journal of Social Robotics*, 1, 95-108.
- 25) Koc, E., Hatipoglu, S., Kivrak, O., Celik, C., & Koc, K. (2023). Houston, we have a problem!: The use of ChatGPT in responding to customer complaints. *Technology in Society*, 74, 102333.
- 26) Paul, J., Ueno, A., & Dennis, C. (2023). ChatGPT and consumers: Benefits, pitfalls and future research agenda. *International Journal of Consumer Studies*, 47(4), 1213-1225.
- 27) Ali, A., Abd Razak, S., Othman, S. H., Eisa, T. A. E., Al-Dhaqm, A., Nasser, M., & Saif, A. (2022). Financial fraud detection based on machine learning: a systematic literature review. *Applied Sciences*, 12(19), 9637.

