A serial mediation model for investigating the intention to use algorithmic trading platforms among retail investors in India

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Abstract

Purpose – In developing nations, the utility and intention to use algorithmic trading (AT) platforms and financial services are predominantly reliant on investors' technological knowledge. This study aims to investigate the effect of investor awareness of AT (AAT), trust in AT (TAT) and acceptance of innovativeness (AOI) on intention to use the AT (IUAT) platforms among Indian investors.

Design/methodology/approach – The authors used a structured questionnaire with a five-point Likert scale to collect the data from 392 Indian retail investors through a purposeful sampling approach. And, the authors carried out structural equation modelling to analyse the serial mediation among the latent (independent) and observed (dependent) variables.

Findings – The findings suggest that investor awareness exerts a statistically significant and positive effect on the IUAT platforms. Additionally, TAT platforms and innovation acceptance, independently as well as mediator, significantly influences the usage decision of AT platforms among Indian investors.

Research limitations/implications – The findings on determinants of AT platform usage can guide investment regulators to promote technological awareness, build trust and provide a safe algorithmic trading environment for retail investors in India. The suggestions may take the edge off a few behavioural impediments among the investors w.r.t. AT platform usage.

Originality/value – Off the back of extensive literary exploration our field research is among the first that probes an intellectual discourse and documents the empirical evidence on linkages between investor AAT, TAT, AOI and the IUAT platforms in the Indian stock market.

Keywords Algorithmic trading, Awareness, Trust, Acceptance of innovativeness, Intention to use, Technology acceptance model, Serial mediation model

Paper type Research paper

1. Introduction

The exponential growth in the computing industry unwrapped the true potential of algorithmic trading (hereafter *AlgoTrading*) in investment and financing decisions. It

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prompts command on a set of predefined algorithms based on quantity, price and time (or *similar metrics*) to facilitate financial trading for investors. On March 30, 2012, the Securities and Exchange Board of India (SEBI, 2012) introduced guidelines on algorithmic trading (AT) in India, based on the suggestions put forth by the "Secondary Market Advisory Committee (SMAC)" and "Technical Advisory Committee (TAC)". Which defines AlgoTrading as "any order generated using automated execution logic". The prime aim to set forth the AT guidelines was to protect investors' interests and promote securities market development. From prior literature, it is evident that technological implementations are imperative for the progression of financial institutions (Nguyen Thanh *et al.*, 2024; Kumbhare, 2023; Ullah *et al.*, 2022; Dubey *et al.*, 2022; Albayati *et al.*, 2020). Apparently, it is just to say the least that AT platforms infuses speed and precision in trade execution with sparse errors and convenient solutions to complex trading strategies (Dananjayan *et al.*, 2023).

The academic odyssey on AlgoTrading so far crystalizes the causal link between buy-side AlgoTraders and market quality (Arumugam and Prasanna, 2021; Dubey *et al.*, 2017), harnessing technologies with AT strategies, robo-advisors and machine learning (Kumbhare, 2023; Taneja, 2018), efficiency of algorithmic trading in absorbing market shocks (such as *volatility, transaction velocity and human sentiments*) and predictive trading analytics. Furthermore, computing experts from various backgrounds converged their econometric calibre (Tabash *et al.*, 2024), machine learning know-how, deep learning and reinforcement learning to refine (*and leverage*) the algorithmic and high-frequency financial modelling (Kwon and Lee, 2023). In addition, few remarkable studies (Bhatia *et al.*, 2022; Lee, 2009) significantly contribute to academic literatures by examining the implication of extant theories pertinent to AlgoTrading for example utility theory and prospect theory effectively acknowledge the role of robo-advisors in wealth management and related decision, technology acceptance model (TAM) and theory of planned behaviour to predict investment patterns and intention to use AT platforms (IUAT). To uphold the significance of technological acclimatization in financial industry several authors (Albayati *et al.*, 2020; Hu *et al.*, 2019; Shahzad *et al.*, 2018; Belanche *et al.*, 2019; Alalwan *et al.*, 2017; Nugraha *et al.*, 2022; Ullah *et al.*, 2022; Lu *et al.*, 2005; Setiawan *et al.*, 2021) tried and tested TAM to interface the technological disruptions (*such as FinTech, blockchain technology, mobile banking* and *cryptocurrency*) and cognitive, behavioural and predictive patterns of customers (*and investors*). Although AlgoTrading is a worldwide practice but lack of research to encapsulate the investors sentiments and perspective towards AT platform insist market oriented approach (Dubey *et al.*, 2017). We contribute to existing literature in three ways; firstly, despite the existence of literature on comprehensive trading strategies and use of deep learning in investment decisions, research on the correlation between the IUAT, level of knowledge and cognitive constructs of algorithm among the investors is limited. Secondly, we added few constructs, such as awareness, perceived trustworthiness, regulatory support and interaction with technology, to our conceptual model, which gave new direction to our research exploration. Thirdly, we created and validated a scientific model that can be used by scholars/investors/regulators in investment industries to gain invaluable insights on impact of behavioural attributes on AT platform usage in India. Given that, we aim to fill the void of empirical evidence on this topic by investigating both the direct and indirect impacts of awareness of algorithmic trading (AAT) on IUAT, which mediated by trust in algorithmic trading platforms (TAT) and acceptance of innovativeness (AOI). The serial mediation also examines the effects of AAT on TAT, with AOI serving as a mediator in the linkage between TAT and IUAT, and TAT serving as a mediating variable in the link between investors' AAT and AOI. The study's outcomes will be

advantageous to SEBI, stock exchanges and brokers, by devising and executing efficacious policies and actions to foster the growth of AT platforms in India.

This article synthesizes the existing literature and builds hypotheses in conformity with logic in the Section 2. Furthermore, the scientific rigour (such as *sample selection, scale adoption and method*) applied in this study elucidated in Section 3. In Section 4, we present the data analysis and statistical inferences, and Section 5 captures and discusses the logical explanations on behavioural peculiarities of investors. Finally, Section 6 concludes our statistical observation, research remarks and probable research grounds for future scholars on AlgoTrading.

2. Theoretical underpinning and hypotheses development

2.1 AlgoTrading in India

The Credit Suisse's Advanced Execution Services introduced AT platform for Indian equities on June 22, 2009. While it took nearly a decade for algorithmic trading to account for three-fourths of all trades in the USA, India achieved this in less than five years. This rapid adoption raised concerns for regulatory authorities (such as *SEBI*) about the potential dangers of implementing automated strategies in investment platforms.

The studies carried out by Arumugam and Prasanna (2021) and Arumugam *et al.* (2023) observed the distinct effect of AlgoTrading (proprietary/buy-side/high frequency trader) and non-AlgoTrading on liquidity, quoted spread, realized spread, order placement, cancellation and volatility shocks. The investors/traders can reap the benefits of algorithmic trading through directional bets, portfolio maintenance, robust volatility estimates, monitoring order flow and real-time information (Dubey *et al.*, 2022).

In addition, algorithmic execution poses elevated benefits at the time of high volume and volatility by generating positive alpha from their liquidity supply and phasing out sentiments of traders (Bagate, 2023; Nawn and Raizada, 2022). According to Taneja (2018), irrespective of the worldwide phenomenon of AlgoTrading much emphasis is placed on ensuring fairness for small investors through regulatory intervention because of vital theft risks, copyright issues and algorithms confidentiality. In this regard, two circulars were issued by SEBI (2022) advising that investors must refrain from engaging in transactions with unlicensed platforms offering AlgoTrading services/strategies.

2.2 Technology acceptance model

The research discourse on individual perception towards technological disruptions and early adoption patterns was initiated by Davis (1989) which later named as TAM. Subsequently, a comprehensive deconstruction of eight *IT acceptance models* the TAM befitted the most (*for our study*) because inceptive narrative of model states that "if person believe that a particular system can improve his/her job productivity" *there is a highly likely chance of technology adoption* (Venkatesh *et al.*, 2003; Davis, 1989) by considering vital concepts such as perceived usefulness, ease of use and subjective norms.

The TAM is a widely used assessment tool to predict individuals' intention to use innovative technology. Later, Shahzad *et al.* (2018) and Albayati *et al.* (2020) argued that relying solely on TAM is not enough to examine intention to use all new technologies (for example, *blockchain and cryptocurrency*). In addition, few constructs such as awareness, perceived trustworthiness, regulatory support and TechIntract are equally important to ensure integration of inclusive technology in a dynamic business environment. Which gave new direction to our research exploration and conclusively embedded in our conceptual model (refer to Figure 1). Keeping in mind, the widespread acclaim and dependability of the TAM as evidenced by previous studies (Shachak *et al.*, 2019) it is imperative to acknowledge

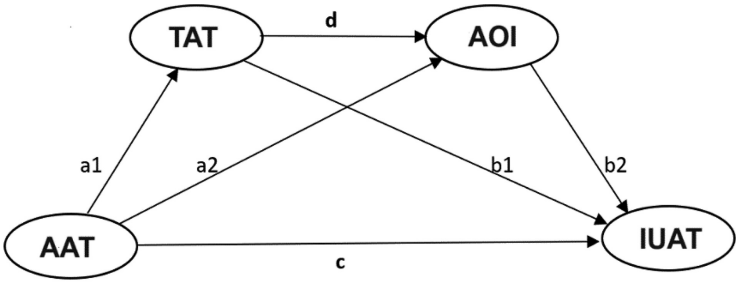


Figure 1.
Conceptual model proposed by authors

Notes: [+]AAT - awareness of AT platforms; TAT - trust in AT platforms; AOI - acceptance of innovativeness; IUAT - intention to use AT Platforms
Source: Computed by authors

that the TAM must be customized to suit the specific attributes of the present-day technology under consideration.

In this study, we used TAM as a fundamental concept (*but not limiting to original constructs*) and integrated critical factors (Billanes and Enevoldsen, 2021) such as awareness, trust and AOI (*which deemed necessary*) as determinants of IUAT platforms in India.

2.3 Awareness, acceptance of innovativeness and intention to use technology

It is evident from prior literature that to understand and adopt new technologies in finance and investment, few critical factors are paramount such as financial literacy, confidence-building and technological awareness (Al-Okaily *et al.*, 2020; Putri *et al.*, 2023; Wu and Peng, 2024). Furthermore, experience when referred as awareness, pertains to a customer's knowledge and familiarity with new technologies inculcates the acceptance, usage and intention to use technologies in businesses and society. The significance of awareness in creating trust and influencing adoption cannot be understated (Sampat *et al.*, 2024) because gaining comprehensive understanding of the technology can encourage individuals to use these technologies in finance and investment services (Aloudat *et al.*, 2014; Manrai and Gupta, 2023; Abbes *et al.*, 2024). A thorough understanding of a technology system can shape individual's perception and decision to adoption. Besides, if we delve deep, it is clearly indicated in prior studies that a lack of awareness impedes technology acceptance/adoption (Krishnaraju *et al.*, 2016; Shahzad *et al.*, 2018; Nambiar and Bolar, 2023) and discourage the technology integration in businesses. The information-sensitivity effect among the US AT-platform users indicates that the investors usually lean on AT platforms which eventually abridges their information-seeking behaviour w.r.t AT-targeted stocks (Zheng and Zhu, 2022).

The inceptive TAM majorly discusses the significance of perceived usefulness, perceived ease of use and subjective norms, but the rapid innovation compelled researchers to apply the extended TAM. So, we establish the following hypotheses to test the impact of awareness on acceptance and intention to use technologies.

H1. Investors' awareness significantly impact the trust in AT platforms.

H2. Investors' awareness significantly impact the acceptance of innovativeness of AT platforms.

H3. Investors' awareness significantly impact intention to use the AT Platform

2.4 Trust, acceptance of innovativeness and intention to use technology

In the FinTech industry, the degree of trust in services has a high effect on users' decision to use them (Hu *et al.*, 2019; Dianty and Faturohman, 2023; Xia *et al.*, 2023). The role of trust is even more critical in the financial services because of the involvement of huge money and data complexity. It is widely acknowledged that confidence in online trading services and degree of trust among the customers ensure that the service providers will stand beside their offerings (Lee, 2009; Kumari and Devi, 2023). However, creating a secure online stock trading platform that is entirely devoid of risk is much more challenging than simply offering benefits to customers. Trust serves as a vital cue through portfolio optimization, contract formation/automation, revamping online transaction and minimizing security risk which eventually influences investors' intention to engage in online trading and (Wicaksana and Rachman, 2003; Sathya, 2022; Schmidt-Kessen *et al.*, 2022; Jin, 2023) proposed that it should be included as a critical factor alongside TAM factors. In addition, few motivations based on the premise of precise inferences of predictive models also build trust among the investors (Hansen, 2021) and imbibe the innovation acceptance and IUAT platform. Thus, we attempt to test the following hypotheses to examine the impact of trust on acceptance and IUAT platforms.

H4. Investors' trust on AT platforms significantly impacts the acceptance of innovativeness.

H5. Investors' trust on AT platforms significantly impacts intention to use AT platforms.

2.5 Acceptance of innovativeness and intention to use technology

The extended TAM explained that perceived usefulness, perceived behavioural control, subjective norms and perceived risk (Zheng *et al.*, 2022) strongly influenced the intention to adopt rob-advisory among Malaysian retail investors. Prior studies showed that the significance of innovativeness not only limited to speed up the technological implementation, but it also constructs an optimistic view, users' confidence, utility of AI tools and decreases the associated risk (Seiler and Fanenbruck, 2021; Bharathi *et al.*, 2022). Subsequently, increase in innovativeness can motivate customers to use new technology and enhance their perception of hedonic benefits (Alalwan *et al.*, 2018). The relation between the adoption of technology and the acceptance of innovation, correlation has been extensively studied and its validity has been consistently confirmed (Nugraha *et al.*, 2022; Seiler and Fanenbruck, 2021; Dianty and Faturohman, 2023).

So, by keeping the previous literary establishment in mind, we propose the following hypotheses.

H6. Investors' acceptance of innovativeness significantly impact the intention to use AT Platforms.

2.6 Intention to use technology

The acceptance of new technology heavily relies on the significance of behavioural intention, which refers to the user's subjective likelihood of engaging in a certain action. Alalwan *et al.* (2017), Belanche *et al.* (2019) and Venkatesh *et al.* (2003) pinpoint that understanding customer's intent and willingness is vital in deciding whether or not an individual will adopt a new technology. The study conducted in Thailand

(Jantarakolica and Jantarakolica, 2018), Europe (Gsell, 2009) and Malaysia (Yi *et al.*, 2023) exhibits that the investors' prior experience with technology, financial knowledge, individual perspectives and trust are the major determinants for willingness to adopt robo-advisory and algorithm-based stock trading. Furthermore, Bharathi *et al.* (2022) and Bhatia *et al.* (2021) tried to encapsulate the Indian investors' perception by highlighting that the lack of trust drives negative influence and data security threats, behavioural biases, investors sentiments and cost-effectiveness are crucial to determine investors AOI and IUAT for AT platforms. Specifically, building upon the prior observation and extended TAM, we formulate the following hypotheses:

H7. Investors' AAT significantly impact TAT, which further significantly impact AOI.

H8. Investors' AAT significantly impact TAT, which further significantly impact IUAT.

H9. Investors' AAT significantly impact AOI, which further significantly impact IUAT.

H10. The effect of Investors' AAT on IUAT is significant through TAT and AOI.

We adopted the serial mediation model from Nagaraj (2021) as a prospective approach to investigate whether trust and AOI are sequentially interrelated or not.

3. Research methodology

3.1 Measures

This research encompassed several variables, to check the demographic profile of the investors, which included questions about their gender, age, highest educational qualification, occupation, monthly income, investing experience and products invested in, as well as their knowledge about algorithmic trading platforms (ATPs). To measure the implication of our conceptual model, we used the defined and validated scales such as AAT, TAT and AOI towards ATPs. We adopted the five-point Likert scale "from strongly disagree as 1 to strongly agree as 5" with slight changes in narratives (*without losing the essence*) from preceding literature such as awareness of financial technologies (Al-Okaily *et al.*, 2020; Shahzad *et al.*, 2018), trust in technologies (Wicaksana and Rachman, 2003; Alalwan *et al.*, 2018), AOI (Setiawan *et al.*, 2021; Alalwan *et al.*, 2018; Lu *et al.*, 2005) and intention to use (Venkatesh *et al.*, 2003; Alalwan *et al.*, 2018) technologies for financial and investment services.

Through an exhaustive literature review, we have become convinced that the existing scales do not define ATPs. Therefore, we adjusted the items to make them relevant to the context of intending to use ATPs in India. To check the content validity, 5 expert professionals evaluated the initial questionnaire.

3.2 Sample design

As algorithmic trading for retail investors is still at the nascent stage and less studied sector in India, so we collected primary data through an online and offline survey using a structured questionnaire. We used a purposive sampling technique and distributed over 460 questionnaires to the Indian investors who adopted the AT platforms for trading. After evaluating the data for incomplete responses, a final sample of 392 remained, which was ample for the structural equation modeling (SEM) empirical analysis.

4. Data analysis and results

4.1 Demographic characteristics of the sample

The demographic information of the respondents is gathered through a set of questions that ask about their gender, age (in years); highest educational qualification, occupation, monthly income, investing experience, products invested in and knowledge about ATPs, which is considered as one of the vital demographic characteristics and possesses a significant influence in investment decisions. Moreover, the selected demographic information essentially determines the distinct investment patterns notably in AlgoTrading (Zulkifli *et al.*, 2023). For Example, a specific age group (*to comprehend*), educational qualification of an individual (to *sense and seize technological leverage*) and individuals falls into certain income group (*for capital need*).

Out of 392 respondents, 81% are male, while 19% are female. The age group of 20–30 years is the most prevalent, with 60% of respondents belonging to this age range. A professional degree is the most common educational qualification, with 37% of respondents possessing one. The majority of respondents, at 59%, are employed in the private sector.

In terms of monthly income, 22% of respondents earn between Rs 60,001 and Rs 100,000. Around 28% of investors started investing before one to three years, and the majority of investors, i.e. 33%, prefer investing in shares. Seventy-eight per cent of investors are aware of the existence of ATPs in India. To ensure the validity of hypotheses, we examined the factor loadings and cross-loadings of the unique items as well as correlation among the items.

4.2 Validity and reliability

The data is suitable for detecting structure, as suggested by Kaiser-Meyer-Olkin measure and Bartlett's test results with a value of 0.894, which is greater than 0.80; Bartlett's p-value is 0.00, less than 0.05, showing high scale variance of more than 50% and strong correlation among the study variables. Additionally, the reliability test results were positive for all four constructs, with all Cronbach's alpha values exceeding 0.70 (refer to Table 1). These outcomes establish the authenticity of our concepts, measurement scale and discriminant validity in this context.

The factor loading of all items used to measure different constructs and it should be greater than 0.5 (Bhatia *et al.*, 2022). The results of the EFA, obtained through varimax rotation, for each of the 16 items indicated a significant influence from four factors. This was demonstrated by the positive factor loadings and values closer to 1 for each of the factors (Nagaraj, 2021). Table A1 shows that the inter-correlation between the four constructs are relatively high because the Cronbach's alpha's estimated to be ≈0.96 for AAT, ≈0.987 for TAT, ≈0.95 for AOI and IUAT which is close to 1 and ideal value to carry further analysis. We clustered the 16 items into 4 constructs in the basis of variances between the items. Also, the constructs in Table A1 reveal that the AAT factor correlates with transaction speed and

Table 1. Construct validity and multicollinearity of the measurement model

Factors	CR	AVE	MSV	MaxR(H)	AOI	IUAT	AAT	TAT
AOI	0.954	0.837	0.245	0.962	*0.915*			
IUAT	0.954	0.805	0.245	0.956	0.495	*0.897*		
AAT	0.969	0.887	0.298	0.972	0.331	0.407	*0.942*	
TAT	0.890	0.735	0.298	0.946	0.384	0.478	0.546	*0.858*

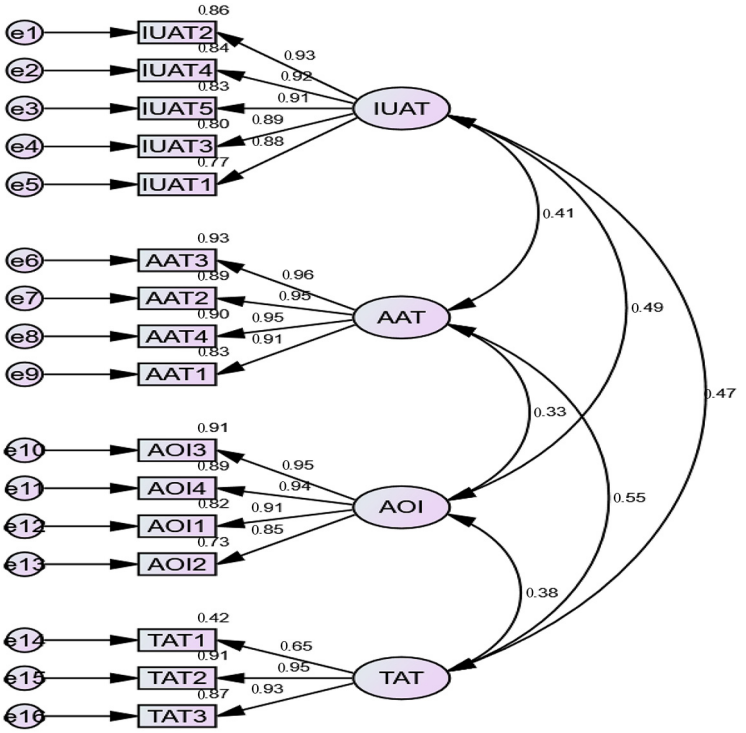
Source: Computed by authors

cost, automated checks on markets, data analytics and minimal risk. The second construct underlines the investors' exposure to sensitive information, stock pricing and psychological biases while using AT platforms. Furthermore, the third construct is highly correlated to AOI factors, for example digital transaction, purchase of new product and services and smartphone usage. Finally, fourth construct is correlated with IUAT platforms by leveraging financial knowledge, manageable trade portal, necessary regulatory intervention and robo-advisory for AlgoTrading.

4.3 Common method bias

After diligently assessing the suitability of the data, the authors executed a confirmatory factor analysis (CFA) using AMOS 21.0 to confirm the model fit of the constructs used for this study (Nagaraj, 2021). See Figure 2.

The analysis checked goodness of the fit by using multiple model-fit indices. Where, acceptable fit: $x2 = 242–406$, df = 96, comparative fit index = 0.98, goodness of fit index = 0.927, adjusted goodness of fit index = 0.897, normed fit index = 0.967, Tucker Lewis index = 0.975 and incremental fit index = 0.98 (refer to Table A2). To ensure convergent validity, a minimum average variance extracted (AVE) of 0.50 is necessary, as determined by the average variance extracted (Fornell and Larcker, 1981). The values of the four variables, as presented in Table 1, indicate that they have an AVE value above 0.70, thus demonstrating the construct validity of the model, which satisfies the criteria as given by



Source: Computed by authors

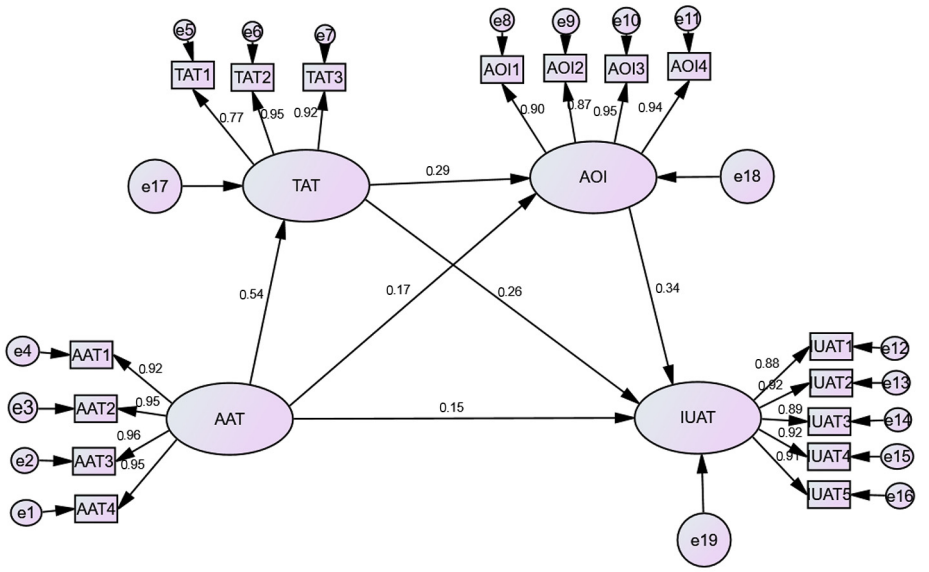
Figure 2.
Research outcome from confirmatory factor analysis

Babin *et al.* (2008). Furthermore, the values are greater than the squared correlation coefficient between factors, indicating discriminant validity. The root mean square error of approximation (RMSEA) is less than 0.08 (0.062), and the PClose value (0.019) is significant, which is <0.05 asserted by (Babin *et al.*, 2008) for the goodness of fit model.

4.4 Hypotheses testing

The results of the SEM analysis demonstrated a robust and positive correlation between AAT and IUAT, as evidenced by the standardized coefficients which indicated a direct and significant impact of AAT on IUAT (as shown in Figure 3). Similarly, TAT acting as the independent as well as dependent variable is significantly impacting IUAT. The same results can be seen for AOI, considering it as both, independent and dependent variable.

The study found that TAT and AOI acted as significant serial mediators in the relationship between AAT and IUAT. After examining the hypothesis, the researchers found a positive and strong direct standardized effect of AAT on TAT ($p < 0.001$, coefficient value = 0.54), as well as a significant relationship between TAT and AOI ($p < 0.001$, coefficient value = 0.17). The serial mediation of AAT was significant with a standard effect of 0.053, which partially mediates the relationship between AAT and IUAT. The findings suggest that AAT has a significant impact on IUAT, as researchers found a direct effect of 0.153. Consistent with the research results of (Shahzad *et al.*, 2018; Hu *et al.*, 2019; Mendoza-Tello *et al.*, 2018; Billanes and Enevoldsen, 2021; Nugraha *et al.*, 2022) the paper reveals that, at an individual level, TAT partially mediates the relationship between AAT and IUAT, with a mediating effect of 0.142. Furthermore, AOI also partially mediates this relationship, albeit at a weaker level, with a mediating effect of 0.059 ($p < 0.005$). Still, together they are significantly influencing IUAT through their perceived AAT (refer to Table 2). Awareness can influence attitude and intention to use (Billanes and Enevoldsen, 2021; Shahzad *et al.*,



Source: Computed by authors

Figure 3.
Research outcome from structural equation modelling

Hypothesis	Constructs	Standardised effects	*p*-value	*Status*
H1	AAT → TAT	0.543	0.001*	*Accepted*
H2	AAT → AOI	0.174	0.001*	*Accepted*
H3	AAT → IUAT	0.153	0.002*	*Accepted*
H4	TOA → AOI	0.288	0.001*	*Accepted*
H5	TOA → IUAT	0.261	0.001*	*Accepted*
H6	AOI → IUAT	0.339	0.001*	*Accepted*
H7	AAT → TAT → AOI	0.156	0.000*	*Accepted*
H8	AAT → TAT → IUAT	0.142	0.000*	*Accepted*
H9	AAT → AOI → IUAT	0.059	0.005*	*Accepted*
H10	AAT → TAT → AOI → IUAT	0.053	0.000*	*Accepted*

Notes: *Significant at $P < 0.01$, i.e. at a 95% level of the confidence interval
Source: Computed by authors

Table 2.
Results of the hypotheses testing

2018). The establishment of trust plays a crucial part for the acceptance as well as use of new technologies by fostering a favourable outlook among society (Billanes and Enevoldsen, 2021). The positive correlation between user innovation and technology adoption has been demonstrated in previous studies, resulting in the AOI as an attitude that produces new ideas (Nugraha *et al.*, 2022; Setiawan *et al.*, 2021).

5. Discussion

The results indicate that TAT and AOI are crucial and functional as both independent and mediating variables in shaping the role of AAT on IUAT platforms. As an independent factor, TAT has a positive relationship with AAT and IUAT. The significance of the study also relates to investor awareness and the IUAT platforms. As a mediating factor, TAT positively mediates the impact of AAT on AOI. The study also revealed the indirect impact of TAT on the IUAT mediated by AOI as well.

Our research outcome that trust (related to *client information, efficient pricing, manual biases*) and AOI (usage of *digital payments, AI-based tools*) significantly affect the relationship between investors' awareness and intention to use and it can be substantiated through findings from various studies (Arumugam *et al.*, 2023; Dubey *et al.*, 2022) where the advantages of AT platforms usage beheld by volatility shock absorption capacity, higher transaction velocity, better price discovery in stock market may frame the scientific basis for investors' confidence in AT platforms, AT adoption and intention to use. Also, the positive mediation effect of trust between awareness (on *transaction timings, automated checks on market conditions and back-tested historical and real-time data*) and acceptance of innovation can be justified if Internet of Things (IoT)-generated data pricing, asset management and trading timings in AT platforms are used by the investors (Chuang *et al.*, 2020). Moreover, the significance and mediation effect of AOI between trust and IUAT platforms attained by dismissing manual trading which may mislead the investors (Azzutti, 2022). In addition, to further strengthen the traders' and investors relationship w.r.t. AAT platforms and IUAT the effective forecasting, minimizing losses and strategic bid-ask framework deemed necessary in highly volatile stock market condition (Chakravarty and Pani, 2022; Salkar *et al.*, 2021). We observed that investor knowledge and awareness significantly impact the IUAT platforms and this influence is indirectly facilitated by trust and AOI. Apart from us, a noteworthy book review by Lee (2023) on algorithmic trading and quantitative strategies (Velu *et al.*, 2020) embodies the significance of information-effect on AlgoTrading, cognitive

biases, market attention and sentiment to trading. So, we suggest there is an urgent need for the establishment of a regulatory framework to foster innovation, implementation of educational and awareness-raising initiatives and to enhance trust in the technology, which will lead to an increase in the willingness of consumers to use ATPs.

5.1 Theoretical implications

The current study makes a valuable addition to the scarce literature on ATPs in India by offering a comprehensive insight into the factors that determine the propensity to use these financial services. We contribute to the existing academic literature on AlgoTrading in threefold, firstly, we tried and tested the use of algorithms in investment decisions, correlation between the IUAT, level of knowledge and cognitive constructs of investors. Secondly, we added constructs such as awareness, perceived trustworthiness, regulatory support and interaction with technology which paves novel direction for future studies. And finally, we create and validate a scientific model that can be used by scholars in finance and investment domain to map the investors' decision-making. The research calls for additional examination in ATPs in emerging economies. Additionally, the study's bibliography serves as a valuable resource for delving deeper into ATPs. It can function as a launching point for further exploration by researchers who require more information and areas that warrant more scrutiny. The researchers developed the proposed model by building upon the foundation of the traditional TAM, to address the lack of research on the intentions to use ATPs in India. The model can be further explored by either modifying or expanding it to a different cultural context.

5.2 Practical implications

The AlgoTraders can perceive the key components of behavioral and cognitive attributes from our study, which can further strengthen their relationship with the investors. In addition, by considering investors' faith in regulatory bodies, the SEBI should devise effective strategies to save investors from loft return promises from gullible traders and control these AlgoTraders/third-party service providers from bypassing the regulations pertinent to all registered investment advisors. To make it transparent, SEBI in 2024 asked the brokers to get fully aware of where the APIs are being used (i.e. *being used for AlgoTrading or manual trades*) while providing the APIs access to retail investors. Additionally, initiatives to increase awareness and knowledge are essential in emerging markets like India. The acceptance of innovative technologies also depends on factors such as investors' demographic profile, financial literacy and familiarity with technology. With the rise of automated trading platforms, it is essential that these services are impartial and conducive to the interests of retail investors. Educating investors on how to identify authentic platforms and software is essential to prevent fraud and protect small investors, which will eventually give an authentic customer base to the genuine AlgoTrading and strategy providers in India.

6. Conclusion

The significance of digitalization in the investment decision-making process for most investors is undeniable, but its availability is limited, leading to a reliance on unreliable sources, such as fake news and peer advice. We achieved the purpose of this study by exploring the use of algorithms in investment decisions and examining the correlation between the IUAT, the level of knowledge and the cognitive constructs of investors. And extended the TAM by adding constructs such as awareness, perceived trustworthiness, regulatory support and interaction with technology, which may pave a novel direction for

future studies in AlgoTrading. And finally, we validated the direct and indirect (*mediation*) effect of investors' behavioural attributes to adopt and usage of algorithms in stock trading. Influence of investor awareness of ATPs, including the intervening effects of trust and acceptance of innovation, on their intention to use these platforms. The findings show that in India, awareness, trust and acceptance of innovation exert a positive influence on the intention to use ATPs. The study's findings highlight the need for Indian individual investors to be made aware of ATPs to build confidence and trust, and for regulators, government, exchanges and brokers to develop strategies that emphasize on the benefits and risks of these platforms. Investor awareness plays a crucial role in shaping an individual's decision to use a platform, and trust and AOI are critical determinants of this impact.

Implementing new technologies can be a complex and costly process, and the unsuccessful outcome of several attempts can lead to substantial financial losses. Therefore, accurate forecasting of market needs is crucial. The goal of this study is to understand the motivations of individuals in India regarding the adoption of a new financial system that could increase trust in ATPs and provide incentives for retail investors to use these platforms.

6.1 Limitations and scope for future work

Potential for further research is there on algorithmic trading adoption. Firstly, the technology has not been widely accepted and its usage is still low, as customers have reservations about it. Additionally, the current study has not examined the influence of moderating factors such as age, gender, income and education on the intention to use ATPs. Investigating their influence in other developing countries is crucial and would provide significant findings.

Furthermore, the current study analyses the factors at the individual level and future studies should focus on institutional user perception towards ATPs in India, such as assessing the effects of perceived usefulness, technology competence and investor creativity. The study did not consider actual usage of the technology because we have not yet observed widespread adoption and usage.

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Further reading

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Appendix

Table A1. EFA loadings and reliability index of items of the four constructs

Constructs and their items		Factor loadings				Cronbach's alpha
	Awareness of AT platforms (AAT)					0.969
AAT1	Trades are timed correctly and reduce transaction costs	0.898				
AAT2	Keeps simultaneous automated checks on multiple market conditions	0.928				
AAT3	Algo-trading can be back-tested using available historical and real-time data	0.929				
AAT4	Reduced risk of manual errors while placing trades	0.915				
	Trust in AT platforms (TAT)					0.879
TAT1	I am willing to reveal sensitive personal information to them		0.855			
TAT2	Execute the trade at the perfect time and at the best possible price		0.847			
TAT3	Reduced risk of manual errors and biasness regarding emotional and psychological factors		0.776			
	Acceptance of innovativeness (AOI)					0.953
AOI1	I feel comfortable in making payments digitally instead of paying through cash			0.895		
AOI2	I regularly use new products and services available in the market			0.878		
AOI3	I am comfortable using a smartphone which is having the latest technology			0.910		
AOI4	I feel technology is easy to use and it helps me do my work quickly			0.903		
	Intention to use AT Platforms (IUAT)					0.958
IUAT1	Assuming that I am fully aware of algorithmic trading platforms, I would immediately use it				0.858	
IUAT2	I intend to use them only when a broker provides adequately designed platforms for trading				0.888	
IUAT3	I intend to use them only when the authorities announce clear regulatory measures				0.873	
IUAT4	I intend to use Algorithmic trading services rather than doing manual trading				0.885	
IUAT5	I intend to use a platform that provides me a combination of Algorithmic trading and Robo advisory services				0.874	

Source: Computed by author

Table A2.
Fit indices of the CFA model in the sample

Indices	Chi-Square (min)	df	CMIN/df	CFI	GFI	AGFI	NFI	TLI	IFI	RMSEA	PClose
Model fit	242.406	96	2.525	0.98	0.927	0.897	0.967	0.975	0.98	0.062	0.019

Source: Computed by authors

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