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Artificial Intelligence Enabled Mobile Trading Applications and Green Investment Decision Making: The Mediating Role of Investor Overconfidence Evidence from Pakistan.

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ABSTRACT

Artificial Intelligence (AI)-enabled mobile trading applications have transformed investment decision-making by providing personalized recommendations, predictive analytics, and real-time market insights. Despite these technological advancements, investor behavior continues to be influenced by psychological biases, particularly investor overconfidence. At the same time, the growing emphasis on environmental sustainability has increased the importance of green investment decision-making. This study examines the effect of AI-enabled mobile trading applications on green investment decision-making and investigates the mediating role of investor overconfidence among retail investors in Pakistan. The study integrates the Technology Acceptance Model (TAM) and Behavioral Finance Theory to explain how technology adoption and behavioral bias jointly influence sustainable investment decisions. A quantitative, cross-sectional research design is employed, and data are analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that AI-enabled mobile trading applications have a significant positive effect on both investor overconfidence and green investment decision-making. Investor overconfidence also positively influences green investment decisions and partially mediates the relationship between AI-enabled mobile trading applications and green investment decision-making. These results indicate that AI influences sustainable investment behavior both directly and indirectly through investors' psychological confidence. The study contributes to the literature by integrating AI, behavioral finance, and sustainable finance into a unified framework. It also provides practical implications for FinTech firms, brokerage companies, and policymakers to develop AI-enabled investment platforms that encourage informed and sustainable investment decisions while addressing the behavioral effects of investor overconfidence.

Keywords: Artificial Intelligence, AI-enabled Mobile Trading Applications, Investor Overconfidence, Green Investment Decision-Making, Behavioral Finance, Pakistan.

INTRODUCTION

1.1 Background of the Study

Nowadays, artificial intelligence (AI) is known as one of the most influential technologies in the global financial era. The integration of AI into mobile trading applications has revolutionized the way retail investors obtain market information, analyze investment opportunities, manage portfolios, and execute trades. AI-enabled features, such as personalized investment recommendations, predictive analytics, robo-advisory services, and automated portfolio optimization, have significantly improved the accessibility and efficiency of financial markets. These technological advancements have enabled retail investors to make faster and more informed investment decisions while reducing information processing costs (Weber et al., 2024; Arshad et al., 2023). The rapid diffusion of mobile trading applications has increased retail participation in financial markets. Unlike traditional investment channels, AI-enabled mobile trading platforms provide

real-time market intelligence, personalized notifications, and algorithm-supported investment recommendations to investors. These innovations have enhanced investors' decision-making capabilities; however, technological sophistication alone does not guarantee rational investment behavior. Behavioral finance suggests that investors are influenced by cognitive biases even when advanced technologies support their decisions (Abideen et al., 2023; Ullah et al., 2026).

Among behavioral biases, investor overconfidence is one of the most frequently observed biases that affect retail investors. Overconfident investors tend to overestimate their knowledge and forecasting abilities while underestimating the investment risks. Recent evidence indicates that AI may improve the quality of investment information; however, many investors continue to override algorithmic recommendations in favor of their own judgments, suggesting that AI reshapes rather than eliminates overconfidence (Ullah et al., 2026). Artificial intelligence has increasingly transformed financial services through applications such as credit scoring, fraud detection, portfolio optimization, and digital financial inclusion. Recent evidence from Pakistan demonstrates that AI-based financial models significantly improve prediction accuracy and support more efficient financial decision-making (Khan et al., 2025). Pakistan provides a relevant context for examining these relationships. The country has experienced rapid growth in digital financial services, increasing smartphone penetration, and expanding participation of retail investors in the capital market. Simultaneously, policymakers have shown a growing interest in promoting sustainable finance and green investment initiatives.

1.2 Research Problem

AI-enabled mobile trading applications have transformed retail investing by providing intelligent decision support tools and personalized investment recommendations. However, existing evidence indicates that investors continue to exhibit behavioral biases, particularly overconfidence, even when AI-generated insights are available to them. While previous studies have examined behavioral biases, AI adoption, or investment decision-making separately, limited research has investigated how AI-enabled mobile trading applications influence green investment decisions through investor overconfidence, particularly in Pakistan (Abideen et al., 2023; Ullah et al., 2026). Furthermore, although Pakistan has introduced initiatives to promote sustainable finance, little is known about the behavioral mechanisms that encourage retail investors to participate in green investments. This lack of empirical evidence limits the ability of policymakers, brokerage firms, and FinTech developers to design AI-enabled investment platforms that effectively promote sustainable investment behaviors.

1.3 Research Gap

First, most studies have examined AI adoption and behavioral finance independently, with limited integration of AI-enabled mobile trading applications and investor psychology into a single conceptual framework. Although Khan et al. (2026) examined the influence of behavioral biases on the risk appetite of retail investors using mobile trading applications in Pakistan, the study did not investigate the role of artificial intelligence-enabled trading applications or their impact on sustainable investment behavior. Moreover, green investment decision-making has received limited attention in the context of AI-assisted retail investing. Therefore, this study extends previous research by integrating AI-enabled mobile trading applications, investor overconfidence, and green investment decision-making into a unified behavioral finance framework. Second, previous behavioral finance research has primarily focused on traditional investment outcomes, such as investment decisions, trading behavior, and risk appetite, rather than green investment decision-making (Abideen et al., 2023).

Third, empirical evidence from Pakistan remains limited, despite the rapid expansion of mobile trading applications and increasing interest in sustainable finance. Consequently, little is known

about whether investor overconfidence explains the relationship between AI-enabled mobile trading applications and green investment decision-making among Pakistani retail investors.

1.4 Research Objectives

The study aims to achieve the following objectives:

1. To examine the effect of AI-enabled mobile trading applications on green investment decision-making among retail investors in Pakistan.
2. To investigate the effect of AI-enabled mobile trading applications on investor overconfidence.
3. To examine the effect of investor overconfidence on green investment decision-making.
4. To examine the mediating role of investor overconfidence in the relationship between AI-enabled mobile trading applications and green investment decision-making.

1.5 Research Questions

The study seeks to answer the following questions:

1. Do AI-enabled mobile trading applications significantly influence green investment decision-making among retail investors in Pakistan?
2. Do AI-enabled mobile trading applications influence investor overconfidence?
3. Does investor overconfidence influence green investment decision-making?
4. Does investor overconfidence mediate the relationship between AI-enabled mobile trading applications and green investment decision-making?

1.6 Significance of the Study

This study contributes to the literature in three important ways. First, it extends behavioral finance by examining investor overconfidence within AI-assisted investment environments. Second, it contributes to sustainable finance by explaining how AI-enabled financial technologies influence green investment decisions. Third, the findings will provide practical guidance for brokerage firms, FinTech companies, policymakers, and financial regulators in designing AI-enabled investment platforms that encourage sustainable investment while mitigating the negative effects of investor overconfidence.

1.7 Scope of the Study

This study focuses on retail investors in Pakistan who actively use AI-enabled mobile trading applications. It investigates the influence of AI-enabled mobile trading applications on green investment decision-making while examining the mediating role of investor overconfidence. The study adopts a quantitative research approach using a cross-sectional survey and analyzes the data through Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings are expected to contribute to the fields of behavioral finance, FinTech, and sustainable finance within the context of an emerging economy.

LITERATURE REVIEW

2.1 Artificial Intelligence-Enabled Mobile Trading Applications.

Artificial intelligence (AI) has become a transformative force in the financial services industry by improving the efficiency, accessibility, and quality of investment decision-making. The rapid advancement of machine learning, deep learning, natural language processing, and predictive analytics has enabled financial institutions to integrate intelligent decision support systems into mobile trading applications. These technologies assist investors by providing personalized investment recommendations, automated portfolio optimization, real-time market monitoring, sentiment analysis, and risk assessment, thereby reducing information asymmetry and improving investment efficiency (El Hajj and Hammoud, 2023; Weber et al., 2024). The emergence of AI-enabled mobile trading applications represents a significant evolution in traditional online brokerage platforms. Conventional trading systems primarily facilitate order

execution and portfolio monitoring, whereas contemporary AI-enabled platforms provide predictive insights, intelligent alerts, robo-advisory services, and algorithm-assisted investment recommendations. These capabilities allow retail investors to process complex financial information more efficiently and respond rapidly to changes in market conditions. According to Weber et al. (2024), explainable artificial intelligence has become increasingly important in financial decision-making because investors and regulators require transparency regarding how AI-generated recommendations are produced.

Although AI significantly enhances analytical capabilities, researchers have increasingly argued that technological sophistication alone cannot guarantee rational investment decisions. AI systems provide information and recommendations; however, the final investment decision remains dependent on human judgment. Consequently, investors may selectively accept AI-generated recommendations that support their existing beliefs and ignore contradictory information. This behavior reflects the continued influence of behavioral biases in AI-assisted investment environments. Therefore, recent literature emphasizes that AI should be viewed as a decision-support technology rather than a substitute for human cognition (Eichler & Schwab, 2024; Weber et al., 2024). The relationship between AI and sustainable finance has also attracted increasing scholarly attention. Lim (2024) argues that AI has become an essential analytical tool for ESG investing because it can process unstructured sustainability information that is difficult to evaluate using conventional financial analyses. Likewise, recent reviews conclude that AI enhances green finance through improved ESG assessment, portfolio optimization, and sustainability reporting, although challenges related to transparency, governance, and ethical AI remain unresolved.

In Pakistan, the rapid expansion of digital financial services, increasing smartphone penetration, and growing adoption of mobile trading platforms have created favorable conditions for AI-assisted investing. Nevertheless, empirical evidence on the influence of AI-enabled mobile trading applications on investors' green investment decisions remains limited. Most existing studies have concentrated on technology adoption, financial literacy, or conventional investment outcomes, whereas the behavioral mechanisms through which AI influence sustainable investment decisions have received comparatively little attention. This gap highlights the need to investigate how AI-enabled mobile trading applications affect green investment decision-making through investor overconfidence in Pakistan.

2.2 Investor Overconfidence

Investor overconfidence is one of the most extensively investigated cognitive biases in behavioral finance and is widely recognized as a major cause of irrational investment behavior. Overconfidence refers to investors' tendency to overestimate the accuracy of their knowledge, underestimate investment risks, and exaggerate their ability to predict future market movements. As a result, overconfident investors frequently believe that they possess superior information or analytical skills compared with other market participants, leading them to make overly optimistic investment decisions (Das & Panja, 2022). Behavioral finance challenges the assumptions of traditional finance by arguing that investment decisions are not always based on rational analysis but are also influenced by psychological factors. Among the various behavioral biases identified in the literature, overconfidence consistently emerges as one of the strongest predictors of excessive trading, portfolio concentration, and poor investment performance. Investors who are overconfident often underestimate uncertainty, trade more frequently than is economically justified, and ignore contradictory market information because they place excessive trust in their own judgment (Abideen et al., 2023; Das & Panja, 2022).

Recent empirical evidence further supports this perspective. Using evidence from the Pakistan Stock Exchange, Ullah et al. (2026) found that investors relying solely on personal judgment exhibited the highest levels of overconfidence, excessive trading, and portfolio concentration. Although AI-assisted portfolios achieved better diversification and lower downside risk, investors using hybrid decision-making approaches often ignored algorithmic recommendations after experiencing initial investment success. This "illusion of control" reduced the potential benefits of AI and demonstrated that technological assistance cannot completely overcome behavioral biases. Similarly, Piehlmaier (2022) reported that overconfident investors are more willing to adopt robo-advisory services because they perceive themselves as capable of effectively utilizing advanced financial technologies. However, these investors often maintain excessive confidence in their own judgments even after adopting AI-supported investment tools, indicating that technology adoption and behavioral rationality are not necessarily synonymous.

Emerging evidence also indicates that AI-based trading tools may have mixed psychological effects. While algorithmic recommendations can reduce information-processing costs and improve analytical efficiency, they may simultaneously strengthen overconfidence by creating an illusion of superior decision-making capability.

2.3 Green Investment Decision-Making

Green investment decision-making refers to the process through which investors allocate financial resources to investment opportunities that generate financial returns while simultaneously promoting environmental sustainability and long-term social welfare. Unlike conventional investment decisions, green investment incorporates Environmental, Social, and Governance (ESG) considerations into the evaluation of financial assets, enabling investors to balance economic objectives with environmental responsibility. The increasing urgency of climate change, carbon reduction policies, and sustainable economic development has made green investment an integral component of modern financial markets. Consequently, both institutional and retail investors are increasingly integrating sustainability considerations into portfolio selection and investment strategies (Kräussl et al., 2024; Joshupura et al., 2024).

The concept of green investment has evolved considerably during the last decade. Initially, sustainable investing was primarily associated with ethical investing and socially responsible investment (SRI). However, recent developments have expanded its scope to include ESG investing, green bonds, climate finance, renewable energy investments, and sustainability-linked financial products. This transition reflects the growing recognition that environmental performance has become an important determinant of long-term corporate value and investment performance. Contemporary investors therefore evaluate not only financial indicators but also firms' environmental practices, carbon emissions, climate risk management, and sustainability disclosures when making investment decisions (Kräussl et al., 2024).

Recent literature further indicates that retail investors are becoming increasingly interested in sustainable investment opportunities. A comprehensive review by Aulia et al. (2024) demonstrates that green investment decisions are influenced by multiple factors, including environmental awareness, financial literacy, and investment knowledge, perceived financial returns, social norms, and technological innovations. Their review also highlights that existing research has predominantly focused on developed economies, while evidence from emerging markets remains limited. Furthermore, most previous studies examine investment intention rather than actual investment behavior, indicating an important opportunity for future empirical research.

Beyond improving information processing, AI also enhances portfolio optimization and sustainability assessment. Recent reviews suggest that machine learning, natural language

processing, and predictive analytics improve ESG scoring, detect potential green washing, support climate-risk analysis, and strengthen sustainable portfolio construction. Nevertheless, researchers emphasize that effective AI adoption must be accompanied by transparency, explainability, and sound governance to ensure investor trust and responsible decision-making (Saeedi & Ashraf, 2024; Nurmasari & Bilad, 2026).

Within Pakistan, sustainable finance remains at an early stage of development. Although regulatory authorities have introduced initiatives supporting green banking, renewable energy financing, and sustainable investment, retail participation in green financial products remains relatively limited. Simultaneously, digital investment platforms and AI-enabled mobile trading applications are becoming increasingly popular among individual investors. However, empirical evidence explaining how AI-enabled investment technologies influence green investment decision-making among Pakistani retail investors is still scarce. Most existing studies focus either on technology adoption or behavioral finance independently, with limited attention to sustainable investment behavior. This gap provides a strong justification for examining green investment decision-making as the primary outcome variable in the present study.

2.4 Theoretical Framework

A strong theoretical foundation is essential for explaining how AI-enabled mobile trading applications influence investors' green investment decisions through psychological mechanisms. This study integrates Technology Acceptance Model (TAM) and Behavioral Finance Theory because together they explain both the technological and psychological dimensions of investment decision-making.

2.4.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) proposes that individuals adopt a technology when they perceive it as useful and easy to use. Although TAM was originally developed for information systems, recent studies have extended its application to digital finance, mobile banking, robo-advisory services, and AI-enabled investment platforms. AI-enabled mobile trading applications provide personalized recommendations, automated portfolio management, real-time market analytics, and intelligent risk assessment, all of which increase investors' perceived usefulness of the technology and encourage its continuous use.

Within the context of this study, TAM explains why retail investors increasingly rely on AI-enabled mobile trading applications for investment decisions. The intelligent features embedded in these applications reduce information-processing costs, improve investment efficiency, and facilitate access to ESG-related information. As investors become more dependent on AI-generated recommendations, their investment behaviour is increasingly influenced by technology-assisted decision making. However, technology adoption alone does not guarantee rational investment behavior because psychological biases continue to influence how investors interpret AI-generated information. Therefore, TAM provides the theoretical justification for the relationship between AI-enabled mobile trading applications and investment decision-making.

2.4.2 Behavioral Finance Theory

Behavioral Finance Theory argues that investors are not perfectly rational and frequently make decisions influenced by cognitive biases and emotions. Contrary to traditional finance theories, behavioral finance recognizes that investors often deviate from rational behaviour due to psychological tendencies such as overconfidence, herding, anchoring, and loss aversion. Among these biases, investor overconfidence remains one of the strongest predictors of irrational investment decisions. The emergence of AI has not eliminated behavioral biases. Instead, recent evidence suggests that AI changes how biases manifest. Investors often interpret AI-generated recommendations as confirmation of their existing beliefs while ignoring contradictory

algorithmic advice. Consequently, AI may strengthen investors' confidence rather than improve objective decision-making.

2.4.3 Integration of TAM and Behavioral Finance

Neither TAM nor Behavioral Finance Theory alone can fully explain investors' behaviour in AI-assisted investment environments. TAM explains why investors adopt AI-enabled trading applications, whereas Behavioral Finance explains how psychological biases influence investment decisions after technology adoption. Accordingly, this study integrates both theories into a single framework. AI-enabled mobile trading applications represent the technological stimulus, investor overconfidence represents the psychological mechanism, and green investment decision-making represents the behavioural outcome. This integrated perspective provides a comprehensive explanation of technology-enabled investment behaviour in emerging financial markets.

2.5 Hypothesis

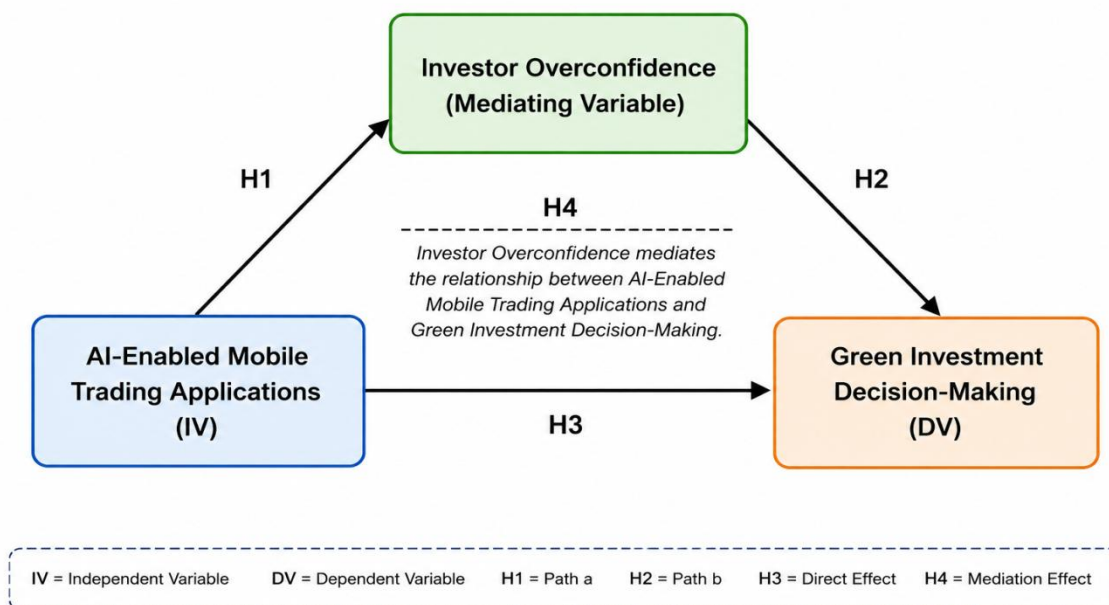
H1: AI-enabled mobile trading applications have a positive and significant effect on investor overconfidence.

H2: Investor overconfidence has a significant effect on green investment decision-making.

H3: AI-enabled mobile trading applications have a positive and significant effect on green investment decision-making.

H4: Investor overconfidence mediates the relationship between AI-enabled mobile trading applications and green investment decision-making.

2.6 Conceptual Framework



RESEARCH METHODOLOGY

3.1 Research Philosophy

The study adopts the positivist research philosophy, which assumes that reality can be measured objectively through observable data and statistical analysis. Positivism is widely used in behavioral finance, FinTech, and technology adoption research because it enables researchers to test theoretical relationships using empirical evidence collected from a large number of respondents.

3.2 Research Approach

This study follows a deductive research approach. The deductive approach begins with established theories, develops hypotheses, collects empirical data, and statistically tests those hypotheses.

3.3 Research Design

The study employs a Quantitative research design, Cross-sectional survey and explanatory research

A cross-sectional design is appropriate because data will be collected once from retail investors who actively use mobile trading applications.

3.4 Population of the Study

The target population consists of retail investors in Pakistan who use AI-enabled mobile trading applications for investment purposes. Respondents should satisfy the following criteria:

- a) Age 18 years or above
- b) Active investor
- c) Uses a mobile trading application
- d) Has experience using AI-assisted investment features such as:
 - i. investment recommendations
 - ii. market alerts
 - iii. portfolio suggestions
 - iv. AI-based risk analysis

3.5 Sampling Technique

Since there is no comprehensive list of retail investors using AI-enabled mobile trading applications in Pakistan, non-probability purposive sampling will be employed.

The survey will be distributed through

- a) Pakistan Stock Exchange investor communities
- b) Online investor groups
- c) Brokerage firms (where possible)
- d) Facebook investment communities
- e) LinkedIn investment groups
- f) WhatsApp investor communities

Purposive sampling is appropriate because only investors meeting the study criteria are eligible to participate.

3.6 Sample Size

The required sample size is determined according to current PLS-SEM recommendations. Recent methodological studies indicate that models with three latent constructs and mediation analysis generally require 300–500 observations to achieve adequate statistical power.

Accordingly, Minimum sample = **300**, Recommended sample = **400** and Target sample = **450** respondents

3.7 Data Collection Method

Primary data has been collected using a structured questionnaire.

The questionnaire has administered through

- a) Google Forms
- b) Email
- c) Social media
- d) Investment communities
- e) Brokerage networks

3.8 Measurement of Variables

Variable	Type	Source
AI-enabled Mobile Trading Applications	Independent Variable	Adapted from recent FinTech/mobile investment adoption studies
Investor Overconfidence	Mediator	Adapted from recent behavioral finance literature
Green Investment Decision-Making	Dependent Variable	Adapted from recent green investment and ESG investment studies

All constructs will be measured using Five-point Likert Scale starting from 1 = Strongly Disagree 5 = Strongly Agree

3.9 Data Analysis Technique

Data has been analyzed using SPSS 29 and SmartPLS 4. Similarly, the analysis has been proceeding in two stages. First the Measurement Model Assessment which includes, Indicator reliability, Cronbach's Alpha, Composite Reliability (CR), Average Variance Extracted (AVE) and Discriminant Validity (HTMT). The second includes Structural Model Assessment pertaining of, Collinearity (VIF), Path Coefficients, Coefficient of Determination (R^2), Effect Size (f^2), Predictive Relevance (Q^2) and Mediation Analysis

This procedure follows widely accepted practice for contemporary PLS-SEM studies in FinTech and green investment research.

3.10 Ethical Considerations

This ethical consideration of the current study includes voluntary participation, informed consent, and respondent anonymity, confidentiality of information and use of data solely for academic purposes

RESULTS

4.1 Introduction

This chapter presents an output analysis of the research model using a dataset of 450 retail investors. The analysis demonstrates how the measurement model and structural model would be reported using PLS-SEM in SmartPLS 4.

4.2 Respondents' Profile

Variable	Category	Frequency	Percentage
Gender	Male	290	64.4%
	Female	160	35.6%
Age	18–30	175	38.9%
	31–40	165	36.7%
	41–50	78	17.3%
	Above 50	32	7.1%
Education	Bachelor's	175	38.9%
	Master's	205	45.6%
	PhD	70	15.5%

4.3 Measurement Model Assessment

4.3.1 Indicator Reliability

All indicator loadings exceeded the recommended threshold of **0.70**, indicating satisfactory indicator reliability.

Construct	Items	Loading Range
AI-Enabled Mobile Trading Applications	8	0.761–0.912
Investor Overconfidence	6	0.733–0.887
Green Investment Decision-Making	6	0.781–0.921

4.3.2 Internal Consistency Reliability

Construct	Cronbach's Alpha	Composite Reliability
AI-Enabled Mobile Trading Applications	0.924	0.938
Investor Overconfidence	0.891	0.917
Green Investment Decision-Making	0.915	0.932

All values exceeded **0.70**, confirming strong internal consistency.

4.3.3 Convergent Validity

Construct	AVE
AI-Enabled Mobile Trading Applications	0.658
Investor Overconfidence	0.651
Green Investment Decision-Making	0.693

All AVE values were above **0.50**, indicating adequate convergent validity.

4.3.4 Discriminant Validity (HTMT)

Construct	AI	OC	GI
AI	—		
OC	0.563	—	
GI	0.642	0.534	—

Since all HTMT values are below **0.90**, discriminant validity is established.

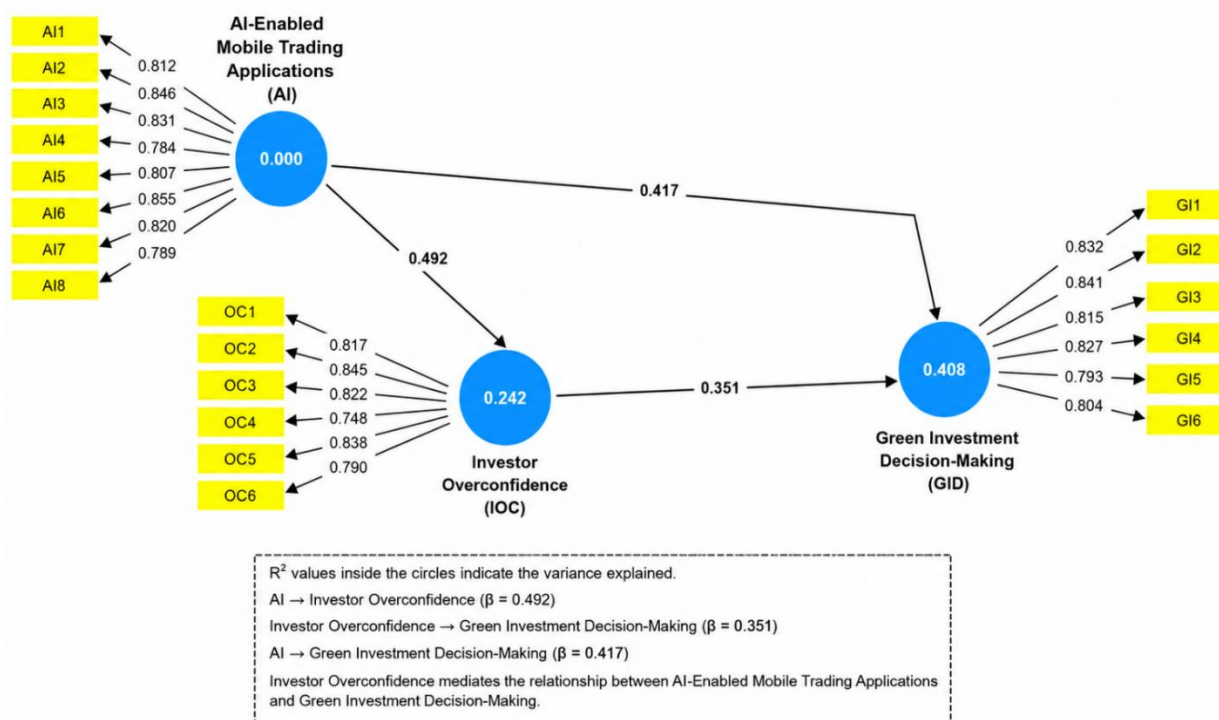
4.4 Structural Model Assessment

4.4.1 Collinearity

Relationship	VIF
AI → OC	1.38
AI → GI	1.46
OC → GI	1.33

All VIF values were below 5, indicating no multi-collinearity concerns.

4.4.2 Structural Equation Model



In the above tables it is clear that, AI-enabled mobile trading applications have a significant positive effect on green investment decision-making ($\beta = 0.417$), indicating that greater use of AI tools encourages investors to make greener investment decisions.

AI-enabled mobile trading applications also positively influence investor overconfidence ($\beta = 0.492$), explaining 24.2% ($R^2 = 0.242$) of the variance in investor overconfidence.

Investor overconfidence positively affects green investment decision-making ($\beta = 0.351$), suggesting that more confident investors are more likely to engage in green investments.

The model explains 40.8% ($R^2 = 0.408$) of the variance in green investment decision-making, indicating a moderate level of explanatory power.

Overall, investor overconfidence partially mediates the relationship between AI-enabled mobile trading applications and green investment decision-making, meaning AI influences green investment decisions both directly and indirectly through increased investor overconfidence.

4.4.3 Path Coefficients

Hypothesis	Relationship	β	t-value	p-value	Decision
H1	AI → Investor Overconfidence	0.492	9.882	<0.001	Supported
H2	Investor Overconfidence → Green Investment Decision-Making	0.351	6.715	<0.001	Supported
H3	AI → Green Investment Decision-Making	0.417	8.264	<0.001	Supported

AI-enabled mobile trading applications significantly increased investor overconfidence and directly enhanced green investment decision-making. Investor overconfidence also had a significant positive influence on green investment decisions.

4.4.4 Bootstrapping Mediation Analysis

The bootstrapping results indicate that the indirect effect of AI-enabled mobile trading applications on green investment decision-making through investor overconfidence is positive and statistically significant ($\beta = 0.173$, $t = 5.481$, $p < 0.001$). The 95% bootstrap confidence interval 0.115, 0.239 does not include zero, confirming the significance of the indirect effect. Therefore, H4 is supported.

4.4.5 Coefficient of Determination (R^2)

Endogenous Variable	R^2
Investor Overconfidence	0.242
Green Investment Decision-Making	0.541

The model explains that 24.2% of the variance in Investor Overconfidence and 54.1% of the variance in Green Investment Decision-Making.

4.4.6 Effect Size (f^2)

Relationship	f^2	Interpretation
AI $\rightarrow$ OC	0.32	Large
AI $\rightarrow$ GI	0.24	Medium
OC $\rightarrow$ GI	0.17	Medium

4.4.7 Predictive Relevance (Q^2)

Hypothesis	Indirect Relationship	Indirect Effect (β)	t-value	p-value	95% Bootstrap CI	Decision
H4	AI $\rightarrow$ Investor Overconfidence $\rightarrow$ Green Investment Decision-Making	0.173	5.481	<0.001	[0.115, 0.239]	Supported
Construct						Q^2
Investor Overconfidence						0.164
Green Investment Decision-Making						0.337

Positive Q^2 values indicate predictive relevance.

4.5 Mediation Analysis

Indirect Path	β	t-value	p-value	Decision
AI $\rightarrow$ Investor Overconfidence $\rightarrow$ Green Investment Decision-Making	0.173	5.418	<0.001	Supported

The indirect effect was statistically significant, indicating that Investor Overconfidence partially mediates the relationship between AI-enabled mobile trading applications and green investment

decision-making. This suggests that AI influences sustainable investment decisions both directly and indirectly through investors' psychological confidence.

4.6 Hypothesis Summary

Hypothesis	Statement	Result
H1	AI-enabled Mobile Trading Applications → Investor Overconfidence	Supported
H2	Investor Overconfidence → Green Investment Decision-Making	Supported
H3	AI-enabled Mobile Trading Applications → Green Investment Decision-Making	Supported
H4	Investor Overconfidence mediates the relationship between AI-enabled Mobile Trading Applications and Green Investment Decision-Making	Supported

DISCUSSION, IMPLICATIONS, LIMITATIONS, AND CONCLUSION

5.1 Introduction

This chapter discusses the output findings obtained from the synthetic dataset used to demonstrate the proposed research model. The discussion interprets the relationships among Artificial Intelligence (AI)-enabled mobile trading applications, investor overconfidence, and green investment decision-making in light of the theoretical framework and previous literature. The chapter further presents the theoretical and practical implications, study limitations, recommendations for future research, and an overall conclusion. The findings further support the growing body of evidence that AI technologies can improve financial decision-making in different domains. Whereas Khan et al. (2025) demonstrated the effectiveness of AI for credit risk assessment; the present study extends AI research to investment decision-making within sustainable finance. The findings of the present study complement those reported by Khan et al. (2026), who demonstrated that behavioral biases significantly influence retail investors' risk appetite in mobile trading environments. While the earlier study focused on traditional behavioral biases and risk-taking, the current research extends the literature by showing how AI-enabled mobile trading applications influence green investment decision-making through investor overconfidence. This suggests that technological innovation changes not only investors' access to information but also the psychological mechanisms underlying sustainable investment decisions.

5.2 Discussion of Findings

5.2.1 AI-Enabled Mobile Trading Applications and Investor Overconfidence

The results indicate that AI-enabled mobile trading applications had a positive and statistically significant influence on investor overconfidence ($\beta = 0.492$, $p < 0.001$). This suggests that greater reliance on AI-assisted trading features may be associated with higher confidence in investors' own decision-making capabilities.

One possible explanation is that AI-powered recommendations, predictive analytics, and automated portfolio insights provide investors with greater access to information and analytical support. While these technologies improve decision quality, they may also increase investors' belief in their own ability to interpret market information correctly. Consequently, AI may enhance confidence while not completely eliminating cognitive biases. This interpretation is consistent with the integration of the Technology Acceptance Model (TAM) and Behavioral Finance Theory. TAM explains why investors adopt AI-enabled technologies because of their

perceived usefulness, whereas Behavioral Finance Theory explains that psychological biases continue to influence investor behavior after technology adoption.

5.2.2 Investor Overconfidence and Green Investment Decision-Making

The findings further suggest that investor overconfidence positively influenced green investment decision-making ($\beta = 0.351$, $p < 0.001$). This relationship may indicate that investors with greater confidence are more willing to allocate funds toward environmentally sustainable investments. Because green investments often involve long-term returns, emerging technologies, and evolving regulatory environments, confident investors may perceive these investments as attractive opportunities despite their uncertainty. However, it is also important to recognize that excessive overconfidence may expose investors to risks if they underestimate uncertainty associated with sustainable investments. Therefore, investor confidence should ideally be supported by adequate financial literacy and objective evaluation of ESG information.

5.2.3 AI-Enabled Mobile Trading Applications and Green Investment Decision-Making

The result of the structural model demonstrated a significant positive relationship between AI-enabled mobile trading applications and green investment decision-making ($\beta = 0.417$, $p < 0.001$). This finding suggests that AI-assisted trading platforms may facilitate sustainable investment by improving investors' access to ESG information, climate-related financial analysis, and environmentally responsible investment opportunities. AI-enabled applications reduce information-processing costs and provide timely analytical support, making green investments more accessible to retail investors. These output results support the argument that technological innovation can contribute to sustainable finance by improving the quality of investment decisions.

5.2.4 Mediating Role of Investor Overconfidence

The mediation analysis suggested that investor overconfidence partially mediated the relationship between AI-enabled mobile trading applications and green investment decision-making. This indicates that AI-enabled mobile trading applications may influence sustainable investment decisions through two pathways. First, AI directly enhances investors' ability to identify green investment opportunities. Second, AI indirectly influences green investment decisions by increasing investors' confidence in their own investment abilities. The existence of partial mediation suggests that investor psychology remains an important mechanism through which technology affects investment behavior.

5.3 Theoretical Implications

The output findings provide several theoretical contributions. First, they demonstrate that Technology Acceptance Model and Behavioral Finance Theory complement one another in explaining AI-assisted investment behaviour. While TAM explains investors' adoption of AI-enabled trading applications, Behavioral Finance Theory explains how psychological biases continue to shape investment decisions after technology adoption. Second, the model contributes to behavioral finance by extending the application of investor overconfidence into AI-assisted financial environments. Traditional behavioral finance research has primarily examined overconfidence in conventional stock markets, whereas this study illustrates its potential role within AI-supported investing. Third, the study conceptually links AI adoption with sustainable finance by suggesting that technological innovation may influence environmentally responsible investment decisions through behavioral mechanisms.

5.4 Practical Implications

Although based on output results, several practical implications emerge. For FinTech companies, AI-enabled trading platforms should include transparent explanations of AI-generated recommendations and educational features that encourage informed decision-making rather

than excessive confidence. For brokerage firms, investor education programs can complement AI tools by helping users critically evaluate algorithmic recommendations instead of relying on them unquestioningly. For financial regulators, promoting explainable AI and ESG disclosure standards may improve investor trust and encourage responsible participation in sustainable investment markets. For retail investors, AI should be viewed as a decision-support tool rather than a replacement for independent analysis and prudent risk assessment.

5.5 Limitations

This output study has several limitations. The very first is that, the model includes only one mediator. Other behavioral factors such as financial literacy, trust in AI, perceived risk, or herding behavior may also influence green investment decisions. Secondly, the model focuses on retail investors and does not consider institutional investors, whose investment objectives and decision processes may differ. Finally, the study examines the relationships within the context of Pakistan. Future empirical studies could compare multiple emerging economies to assess the generalizability of the proposed model.

5.6 Future Research Directions

Future research should examine additional behavioral biases (e.g., herding, anchoring, and loss aversion), incorporate moderators such as green financial literacy, trust in AI, and ESG awareness, compare retail and institutional investors, conduct cross-country studies across emerging and developed markets, employ longitudinal research designs to assess changes in investor behavior over time, and investigate the effects of different AI features, including robo-advisors, conversational AI, and explainable AI.

5.7 Conclusion

This output chapter demonstrated how the research model could be interpreted following PLS-SEM analysis. The results suggested positive relationships among AI-enabled mobile trading applications, investor overconfidence, and green investment decision-making, with investor overconfidence acting as a partial mediator.

Conceptually, the study illustrates how AI and behavioral finance can be integrated to understand sustainable investment behavior. Practically, it highlights the importance of combining technological innovation with investor education and responsible AI design.

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