

A HUMAN-CENTRED DESIGN APPROACH TO DEVELOPING A RESPONSIBLE AI SYSTEM TO ASSIST STUDENTS AS INVESTORS IN CONDUCTING FINANCIAL EVALUATIONS OF PUBLIC COMPANIES IN THE STOCK MARKET

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Abstract: Rapid advancements in technology have significantly influenced decision-making across various sectors, including finance. Previous studies found that two of the most transformative technological innovations in the financial industry are the usage of computer systems by investors to automate stock trading and the reorganisation of financial markets. Most financial transactions are now conducted electronically, and the time it takes to settle stock trades has been reduced to just a few nanoseconds. The shift is especially noticeable with the rise of artificial intelligence (AI), which enables investors to analyse financial statements and the performance history of company leaders. This study argues that AI is gradually reshaping financial services, offering new opportunities for institutions to refine their decision-making, elevate customer experiences, and optimise operational efficiency. However, the convenience is accompanied by considerable risks. The use of AI in finance must be approached with care, as many novice investors are increasingly relying on AI to make decisions in the stock market. In some regions, financial institutions have developed guidelines for the use of AI. For instance, in Indonesia, the Financial Services Authority (OJK) has introduced a dedicated AI Governance framework for banks to ensure the ethical and responsible application of artificial intelligence. In this context, it is crucial for individuals, particularly novice investors, to have a comprehensive understanding of the responsibilities associated with utilising AI in the investment process.

Keywords: Finance, Artificial Intelligence, and Novice Investors.

1. Introduction

Artificial Intelligence (AI) systems have been increasingly developed to support decision-making in various fields. Financial investing is a complex area that requires the analysis and evaluation of large amounts of data about public companies to make informed decisions. Novice investors may face challenges due to limited knowledge and experience. Human-Centred Design (HCD) in AI focuses on creating AI technology that prioritises human needs, values, and capabilities. HCD ensures AI systems augment and support users, rather than replace them, by emphasising ethical use, transparency, fairness, and user involvement in the design process.

AI's role in assisting beginning investors, particularly college students aged 18-22, is to provide personalised financial coaching, real-time insights, and accessible ways to understand complex financial data. AI tools can analyse students' spending, savings patterns, and market trends, offering tailored recommendations and automated investment strategies. The tools also encourage interactive learning through gamification and simulations to improve financial literacy and confidence. Furthermore, AI can enhance financial security by detecting and preventing fraud, ensuring secure transactions. By combining Human-Centred Design (HCD) principles with AI capabilities, the system enables novice investors to make more informed and

responsible decisions in the stock market, while supporting their investment learning and growth.

As novice investors, students face difficulties in conducting accurate and comprehensive financial evaluations of public companies because they may lack the expertise to interpret complex financial data and reports. Furthermore, existing AI tools may not be intuitive, ethical, or specifically designed for their learning needs. There is also a risk of bias or a lack of transparency in current AI evaluation systems, which can lead to misleading information for users. Therefore, students need trustworthy and accessible AI assistance that aligns with their educational and investment goals. This situation raises the question of how to design and develop responsible, user-centred, ethically grounded, and practical AI systems to assist students in financial analysis and investment decisions in the stock market. The purpose of this research is to educate readers about the primary goals of developing a human-centred and responsible AI system for student investors. The goals include creating an AI assistant that supports students in understanding and evaluating the financial information of public companies. Another objective is to apply Human-Centred Design principles to ensure the AI system meets the needs of students, enhances their learning, and respects ethical considerations such as fairness, transparency, and privacy.

Furthermore, this study aims to enhance students' confidence and competence as investors by providing reliable, clear, and actionable financial insights through the use of AI. It also aims to promote responsible investment behaviour among student users by providing accessible and supportive AI tools that augment human judgment, rather than replace it, thereby ensuring students are empowered and well-informed in their investment decisions. In this study, the variables are very complex to test the feasibility of AI in meeting the investment needs of novice investors in evaluating the financial condition of companies. The dependent variable used is age (Usia), and the independent variables used are the Use of AI in Financial Analysis of Companies on the Stock Exchange (AFM) and Student Decision Accuracy (AKM).

2. Literature Review

Towards Algorithmic Justice: Human-Centred Approaches to Artificial Intelligence Design in the Financial Services Sector

The theory underlying this research on a Human-Centred Design Approach to Developing a Responsible AI System to Assist Students as Investors in Conducting Financial Evaluations of Public Companies draws from interdisciplinary studies in artificial intelligence applications in financial services. The swift advancement of AI has transformed traditional financial models by enhancing risk management, fraud detection, customer service, and investment management through automation and data analytics. Behavioural finance, information theory, and computational economics underpin AI methodologies in finance, where deep learning models excel at identifying market inefficiencies and behavioural biases.

Human-Centred AI theory emphasises creating AI tools that augment human capabilities by tailoring services to users' needs while ensuring fairness, transparency, and privacy. In finance, this means making AI systems explainable, ethical, and trustworthy to address bias and build user confidence. AI enables adaptive, personalised financial recommendations and education, thus enhancing users' literacy and decision-making skills. For novice investors, such as college students, responsible AI must deliver clear insights into complex financial data, foster understanding, and enable responsible investment behaviour. The integration of these theories stresses combining technical AI capabilities with ethical design and human factors to maximise benefits while minimising risks. This approach aligns with calls for AI systems that prioritise

users' learning and empowerment in financial evaluations, supporting practical, ethical, and effective AI tools for student investor assistance.

Human-Centred AI: Designing Empowered Intelligent Systems, Not Replace

The literature indicates that AI can effectively support novice investors, such as students, in analysing the financial conditions of companies in the stock market from an investment perspective. AI technologies have been integrated into financial services to provide personalised banking experiences, automate complex data analysis, and improve risk assessments, all of which contribute to financial process innovation. For example, AI-powered virtual financial assistants, automated transaction systems, sentiment analysis, and image recognition tools provide tailored and accessible guidance, enabling users to understand complex financial data and market behaviour with greater clarity and insight. AI's ability to predict credit risk and market trends through analytics enhances decision-making by providing actionable insights, which is crucial for novice investors who often lack the expertise to interpret financial reports independently. Furthermore, human-centred design principles emphasise creating AI tools that are ethical, transparent, and user-friendly, thereby fostering trust and confidence among young investors. By combining AI's computational power with a human-centred approach, these systems can augment students' financial literacy, empower responsible investment choices, and bridge the knowledge gap inherent in stock market participation. Thus, AI stands as a promising tool to assist students in conducting thorough financial evaluations of public companies, supporting their learning and investment journey in the stock market environment.

Artificial Intelligence in Financial Investment Risk and Future Challenges

Based on the systematic literature review in the journal "The Application of Artificial Intelligence in Mitigation of Financial Investment Risk and The Future Challenges Faced," artificial intelligence (AI) has been increasingly recognised as a transformative innovation in financial risk management. The review highlights that AI significantly enhances operational efficiency by automating the processing and analysis of vast financial datasets, thereby saving time and reducing human error. AI tools such as machine learning algorithms, predictive analytics, and natural language processing are instrumental in identifying risks earlier and more accurately, optimising decision-making in dynamic financial environments. These capacities support better financial performance and loss reduction, especially critical for novice investors who require reliable analytical support.

However, the review also identifies several challenges facing AI implementation, including the necessity for appropriate regulation, robust data protection measures, cybersecurity, and overcoming gaps in the technological expertise of financial professionals. Despite these challenges, AI applications such as robo-advisors, virtual financial assistants, and AI-driven credit risk assessment models democratise access to complex financial evaluations, making them more accessible to inexperienced investors like students. Embedding AI within a human-centred design framework ensures ethical use, transparency, and user engagement, all of which are essential for building trust and supporting informed investment decisions. Therefore, this literature highlights the importance of responsibly designed AI systems that enhance financial literacy and support novice investors in conducting thorough and responsible evaluations of public companies in the stock market.

3. Method

This research applied a Human-Centred Design (HCD) framework. It elucidates how responsibly developed AI systems may efficaciously assist college students, as novice investors, in conducting financial evaluations of publicly listed companies. The rapid evolution of artificial intelligence has profoundly transformed traditional financial paradigms by enhancing capabilities in risk management, fraud detection, customer service, and investment management through sophisticated automation and data analytics. Central to this discourse is the integration of domains such as behavioural finance, information theory, and computational economics with human-centred AI principles, which prioritise fairness, transparency, ethical rigour, and the cultivation of user trust.

Empirical findings from this research indicate that age does not serve as a significant predictor of students' utilisation of AI for financial analysis or the accuracy of their investment decisions. This observation highlights that demographic variables, such as age, have a lesser influence compared to the design quality and usability of AI tools. Consistent with the foundations of human-centred AI theory, AI systems must provide transparent, explainable, and ethically responsible insights tailored to novice investors, thereby empowering them to make well-informed and judicious financial decisions. Among the AI platforms employed by the respondents, Fiscal.ai, Fintool, and Kavout stand as prominent exemplars. Fiscal.ai facilitates natural language queries augmented by extensive historical financial data spanning over a decade, enabling users to attain a comprehensive understanding of financial statements. Fintool offers robust AI-driven equity research capabilities, synthesising data from regulatory filings and earnings calls to deliver actionable investment insights. Kavout employs advanced machine learning techniques to generate predictive scores, such as its proprietary "K Score," which assists users in portfolio construction and risk assessment by distilling complex financial data into accessible metrics. These tools exemplify how AI can democratise access to intricate financial information, rendering it comprehensible and practicable for student investors.

Although regression analyses revealed limited explanatory power regarding age, they simultaneously highlight the crucial role of AI in augmenting financial literacy and decision-making capacity among students. Notably, with only 55% of survey respondents having engaged in stock market investments, a significant opportunity emerges to harness human-centred AI to address knowledge deficits and stimulate participation. AI systems, exemplified by Fiscal.ai, Fintool, and Kavout, which marry technical sophistication with user-centric, ethical design, are optimally positioned to fulfil this educational mandate. In summary, this research substantiates the proposition that the development of responsible and human-centred AI tools is crucial for equipping emerging investors with inclusive and practical means of performing financial evaluations and making informed investment decisions. By prioritising user empowerment, transparency, and ethical considerations over reductive demographic assumptions, such AI systems have the potential to significantly enhance financial literacy and promote equitable access to investment opportunities among novice student investors. The present findings advocate for sustained investment and refinement in human-centred AI methodologies that seamlessly integrate advanced analytical capabilities with ethical and usability principles, thereby supporting the emergence of a more knowledgeable, confident, and financially astute generation of student investors.

4. Results and Discussion

This research utilised the results of data processing from a research survey conducted among 20 students majoring in economics and business from various universities, with an age range of 18 to 24 years.

Table 1. Model Summary

Model Summary					
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.307a	.094	-.012		1.247

a Predictors: (Constant), AKM, AFM
 b Dependent Variable: USIA

Sources: SPSS output

The regression model summary provides important information about the relationship between the independent variables—Use of AI in Financial Analysis of Companies on the Stock Exchange (AFM) and Student Decision Accuracy (AKM)—and the dependent variable, age (USIA). The model's multiple correlation coefficient (R) is 0.307, indicating a modest positive correlation between the combined predictors and age. The R-squared value of 0.094 indicates that approximately 9.4% of the variance in age can be explained by the combined effects of AFM and AKM. However, the adjusted R-squared is -0.012, which suggests the model does not improve prediction beyond what would be expected by chance when accounting for the number of predictors used—meaning the explanatory power is weak. The standard error of the estimate is 1.247, which measures the average distance that the observed values deviate from the regression line; a smaller standard error indicates a better fit. Overall, this table indicates that the model has limited effectiveness in predicting age based on these variables, which is common when the dependent variable, such as age, is not directly influenced by the chosen predictors.

In the context of AI assisting novice investors, the model implies that age is not a strong predictor of how students use AI tools for financial analysis or how accurately they make investment decisions. While the model's explanatory power regarding age is low, the role of AI in enhancing financial analysis remains significant in practical terms. By automating the complex analysis of financial reports, AI systems empower students, regardless of their age, to evaluate public companies more effectively, improving their investment decision-making process, even if their age itself is not a determining factor in this behaviour. This regression output suggests that factors beyond age better explain students' use of AI and decision accuracy. It underscores the importance of continuing to focus on human-centred AI design that accommodates diverse users to support financial literacy and investor competence optimally. This nuanced understanding from Table 1 helps set realistic expectations for model predictions and emphasises the practical utility of AI tools over demographic predictors.

Table 2. Result of the T-test

Coefficients ^a							
Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	20.003	2.060		9.709	.000		
AFM	1.169	.885	.486	1.320	.204	.393	2.544
AKM	-.868	.767	-.417	-1.132	.273	.393	2.544

a. Dependent Variable: USIA

Sources: SPSS output

The significance value (Sig.) in Table 2 indicates whether each independent variable in the regression model significantly predicts the dependent variable, age (USIA). The standard threshold used is 0.05; a Sig. A Value less than 0.05 means the variable has a statistically significant effect, while a value above 0.05 indicates it does not. For the constant term (intercept), the Sig. The value is 0.000, which is highly significant. It means the baseline age when all predictors are zero is reliably different from zero. However, for the independent variables, AFM (Use of AI in Financial Analysis) has a Sig. Value of 0.204, and AKM (Student Decision Accuracy) has a Sig. Value of 0.273. Both values exceed 0.05, indicating that neither AFM nor AKM has a significant effect on age in this model. Statistically, this means the null hypothesis—that the coefficients for AFM and AKM are equal to zero—cannot be rejected. Hence, their contributions to predicting age are not significant at the conventional 95% confidence level. In practical terms, the data does not support a meaningful linear relationship between either AI use or decision accuracy with age among the student investors sampled. This insignificance does not diminish the practical importance of AI in financial analysis but highlights that these variables do not explain age differences. It suggests that students of different ages may use AI and have decision accuracy in ways that are not distinctly different when analysed statistically. Therefore, age alone is not a significant factor in understanding how students engage with AI tools or make financial decisions in this context.

Data analysis indicates that age alone does not significantly impact how students interact with AI or make financial decisions in this context. This underscores the need to focus on human-centred AI design that accommodates diverse users, intending to support financial literacy and investor competency optimally. Nuanced insights from the data help establish realistic expectations for predictive models and highlight the practical utility of AI tools compared to simple demographic predictors such as age. This conclusion is directly related to the paper titled "A Human-Centred Design Approach to Developing Responsible AI Systems to Assist Student Investors in Financial Evaluation of Public Companies in the Capital Market." This research advocates designing AI systems that responsibly meet the needs of student investors by focusing on human diversity and usability, rather than demographic generalisations. By emphasising human-centred design, these systems can improve financial literacy and support more effective, informed investment decisions.

Therefore, these findings validate the paper's core hypothesis: responsible and human-centred AI design is crucial for developing practical and inclusive tools to assist students in financial evaluation and stock market investment.

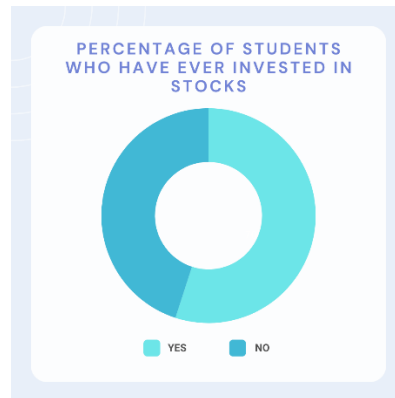


Figure 1: Percentage of Respondents' Interest in Stocks
Sources: Questionnaire Responses

In this study, only 55% of 20 student respondents had ever participated in the stock market, indicating a significantly low level of interest in entering the stock market. Therefore, the data analysis results show that while not all students actively invest in the stock market, there is a significant opportunity to increase their interest and understanding through the right approach, particularly with the support of a human-centred AI system. An AI system that is responsive to individual needs and able to present financial information in an easy-to-understand manner can be a crucial bridge for novice students to enter the world of investing with more confidence and information. In other words, the development of an inclusive and educational AI system is highly relevant to addressing low student participation in the stock market and strengthening their overall financial literacy.

Discussion

The analysis examines how Artificial Intelligence (AI) plays a dual role in the world of investing for college students just starting out. Tools like Fiscal.ai, Fintool, and Kavout offer powerful features that help turn complicated financial data into clear and valuable information for making investment choices. The platforms utilise advanced technologies, including natural language processing, machine learning, and predictive analysis, to help users comprehend financial reports, track market trends, and evaluate a company's performance. They also provide personalised advice and customised investment tips, which can significantly enhance students' understanding of financial matters and help them feel more confident and better equipped to make informed decisions when investing in the stock market. These AI tools are designed with people in mind, making sure they are fair, transparent, protect privacy, and give users control, which builds trust and helps students learn rather than just making decisions for them.

Nevertheless, focusing more on AI systems lead to several serious issues to be considered. New investors may become overly reliant on advice provided by AI without exercising critical thinking or questioning it. The risk is due to many AI algorithms that are not transparent or easy to understand. Their decision-making processes are often opaque, making it difficult for users to understand how or why certain conclusions are reached. This lack of transparency can make it more challenging to identify biases or mistakes in the AI, leading to poor investment decisions.

While the advanced technology used in AI platforms may pose challenges for students who lack financial or technical knowledge. Without proper education and clear explanations, these tools may not be accessible to everyone and could encourage people to use them without a thorough understanding of what they are doing. There are also significant ethical concerns

regarding data privacy and security, as these systems handle sensitive financial information. If AI is not designed carefully, its applications could exacerbate existing economic inequalities. If the biases are built into the system and influence who receives fair investment opportunities. Many college students are not very interested in the stock market due to some reasons. The finding shows that only about 55% of students surveyed actually participate the stock markets. The low rate is caused by several factors, including fear of financial loss, a lack of knowledge about investing, and cultural or psychological reasons from the market. In this situation, AI tools could help make the stock market more appealing. By utilising features such as games, practice trading environments, and personalised learning, AI can make financial education more engaging and easier to understand. These methods help people grasp complex financial ideas in a fun and safe way without facing real financial risks. Since AI can tailor its content to fit different learning styles and goals, it can be more engaging and relevant for a wide range of students. However, to truly make a difference, AI tools must be part of a broader effort in financial education. They should teach not just how to use AI, but also how to invest ethically, think long-term, and manage risks so that students can understand the stock market in a more comprehensive and meaningful way.

In conclusion, AI has both positive and challenging effects on college students who are investing. It has the potential to bring significant changes, but there are also important issues to consider. To utilise AI effectively, it is essential to adhere to Human-Centred Design principles that prioritise enhancing financial knowledge and facilitating students' access to information. At the same time, we must ensure that the use of AI is fair, transparent, and respects the rights and choices of users. AI can help students access better financial data and make more informed investment decisions. However, it also poses risks, including becoming overly reliant on it, the potential for unfair algorithms, and privacy concerns. It is also important to help students who are not involved in the stock market by using fun and tailored AI tools to teach them about investing. It will help them gain knowledge and develop responsible financial habits. As AI continues to develop, creating systems that are fair, practical, and ethical is crucial for providing students with the confidence, understanding, and ability to navigate the challenges of the financial markets. It requires ongoing work across various fields to integrate AI's strengths with effective teaching methods and ethical guidelines, ensuring that AI supports equal financial opportunities and does not lead to unintended risks or unfair advantages.

5. Conclusions

Artificial intelligence has the potential to significantly aid students in understanding financial issues and making informed investment choices. AI can transform complex financial information into easy-to-understand advice. Tools like Fiscal.ai, Fintool, and Kavout demonstrate how AI can offer personalised, real-time insights that help beginners navigate the stock market. To maximise AI, it is crucial to employ human-centred design. So, creating AI tools that are fair and clear gives users control. These design choices help build trust and ensure the AI supports—not replaces—human decisions. While age does not significantly impact AI performance, the design of AI and its ease of use can significantly impact student investment performance.

However, it is essential to exercise caution when relying too heavily on AI advice. Some AI systems are challenging to understand, which can hide biases or errors. Furthermore, protecting personal data and preventing unfair advantages for specific groups are key concerns. Currently, not many students are investing in the stock market. Therefore, using AI in creative ways—such as fun games, interactive exercises, and personalised learning—can help more students

become interested, feel confident, and stay engaged. To maximise the benefits of AI, these tools must be part of a broader financial education effort that teaches responsible investing, risk management, and future planning. Students should embrace AI as a useful tool, but they must also think critically and consider the ethical implications of their investment choices. Collaboration across disciplines will be crucial to creating fair, helpful, and trustworthy AI tools. These tools can help young investors better understand and engage with the financial world with greater confidence and skill.

This cross-disciplinary collaboration includes educational institutions that provide facilities for their students, such as STIESIA Surabaya, which has the Indonesia Stock Exchange Gallery (GIBEI) to facilitate students in exploring stock market investment. Furthermore, courses in investment analysis and portfolio management can serve as learning platforms for students to enhance their knowledge and interest in the stock market in this era of globalisation. This will serve as an example of human responsibility in the sustainable use of AI.

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References

- Abu Daqar, M. A. M., Arqawi, S., & Karsh, S. A. (2020). Fintech in the eyes of Millennials and Generation Z (the financial behaviour and Fintech perception). *Banks and Bank Systems*, 15(3), 20–28. [https://doi.org/10.21511/bbs.15\(3\).2020.03](https://doi.org/10.21511/bbs.15(3).2020.03)
- Apreal Marjorie Bisquera Silva, Gabrielle Mendoza Villena, Angel Ravarra Rabino, & Maria Cristina Flores Melo. (2024). Digital Financial Literacy and the Utilisation of Digital Financial Tools among College Students in Calapan City. *World Journal of Advanced Research and Reviews*, 24(3), 2431–2446. <https://doi.org/10.30574/wjarr.2024.24.3.3965>
- Auernhammer, J. (22 September 2020). Human-centred AI: The role of Human-centred Design Research in the development of AI. *DRS2020: Synergy*. <https://doi.org/10.21606/drs.2020.282>
- Clarence, J., & Pertiwi, D. (n.d.). *International Journal of Financial and Investment Studies (IJFIS) FINANCIAL MANAGEMENT BEHAVIOR AMONG STUDENTS: THE INFLUENCE OF DIGITAL FINANCIAL LITERACY*. <https://doi.org/10.9744/ijfis.2.1.9-16>
- Effiong Benjamin, U., Samuel, I., & Isaac, M. M. (n.d.). Implementation and Integration of Artificial Intelligence for Financial Process Innovation of Commercial Banks in Nigeria. In *Indonesian Annual Conference Series* (Vol. 3).
- Ethics And Artificial Intelligence In Investment Management Pl. Qualified Activity: Ethics And Artificial Intelligence In Investment Management: A Framework For Professionals. (2022). www.cfainstitute.org.
- Purwanto, A. N. I. (2025a). Human-Centred AI: Designing Intelligent Systems that Empower, Not Replace. *RIGGS: Journal of Artificial Intelligence and Digital Business*, 4(3), 3212–3221. <https://doi.org/10.31004/riggs.v4i3.2450>

- Purwanto, A. N. I. (2025b). Human-Centred AI: Designing Intelligent Systems that Empower, Not Replace. *RIGGS: Journal of Artificial Intelligence and Digital Business*, 4(3), 3212–3221. <https://doi.org/10.31004/riggs.v4i3.2450>
- RESPONSIBLE USE OF AI IN FINANCIAL SERVICES: BALANCING RISKS AND OPPORTUNITIES*. (2025). <https://www.ibm.com/think/topics/artificial-intelligence>
- Saputri, A. R., Rinofah, R., & Fuady, M. (2025). Emerging Trends and Bibliometric Analysis of AI Applications in Financial Services. *Economic Education Analysis Journal*, 14(1), 37–52. <https://doi.org/10.15294/eeaj.v14i1.18652>
- Towards Algorithmic Justice_ Human Centred Approaches to Artific.* (n.d.).