AJEMB
AMERICAN JOURNAL OF ECONOMIC AND MANAGEMENT BUSINESS

American Journal of Economic and Management Business
p-ISSN: XXXX-XXXX
e-ISSN: 2835-5199
Vol. 3 No. 12 December 2024

Exploring the Potential of Artificial Intelligence in the Endowment Management and Investment

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Abstract

This research investigates the impact of Artificial Intelligence (AI), represented by Chat Generative Pre-Trained Transformer (ChatGPT), in the domains of endowment management and investment. By leveraging AI tools like ChatGPT, investment professionals and endowment managers gain access to innovative capabilities in data analysis, predictive analytics, and portfolio optimization. Using quantitative research methods, this study provides a comprehensive understanding of AI applications in these fields. An extensive literature review was conducted to explore existing knowledge, followed by the administration of open-ended questionnaires to collect data from endowment managers and investment professionals in Malaysia, using a 7-point Likert scale. The data was analyzed using SPSS software, revealing a strong consensus among respondents on AI's potential in improving investment strategies, risk management, and decision-making. Additionally, the study highlights the necessity for ethical guidelines and regulatory frameworks, advocating for a balance between technological advancement and responsible AI integration to ensure long-term benefits and sustainability.

Keywords: artificial intelligence (ai), ChatGPT, endowment management, investment, Malaysia.

INTRODUCTION

Endowment management involves the strategic stewardship of financial assets or funds permanently set aside to ensure long-term financial stability for nonprofit organizations, educational institutions, and charitable foundations (Bryce, 2017). These funds are invested strategically to generate sustainable income while preserving the principal amount. Investments, as a broader concept, entail allocating financial resources across various assets—such as stocks, bonds, real estate, or mutual funds—with the aim of generating returns, income, or capital appreciation. Within endowment management, investments play a pivotal role in maintaining the value of endowments while producing income to support the organization's ongoing activities and objectives (Madanchi et al., 2017).

Globally, the rising complexity of financial markets has intensified the need for innovative tools and strategies in investment management. According to recent statistics, AI-driven technologies are increasingly being adopted in financial sectors, with projections showing that the global AI market in finance will exceed $50 billion by 2030. This trend underscores the urgency

to explore AI applications in niche areas, such as endowment management, where research remains relatively limited (Chui & Francisco, 2017).

Artificial Intelligence (AI) represents a transformative field of computer science that enables machines and software to replicate human intelligence (Khaleel et al., 2024). AI systems are capable of learning from data, reasoning, problem-solving, perceiving environmental stimuli, understanding language, and even performing robotics tasks. These systems are categorized into Narrow AI, which specializes in specific tasks, and General AI, which emulates human-like intelligence and adaptability (Davenport & Kalakota, 2019). AI applications span industries ranging from healthcare to finance, reshaping traditional approaches to problem-solving and decision-making.

In particular, AI tools like ChatGPT have emerged as advanced technologies leveraging natural language processing (NLP) to generate human-like text and engage in dynamic conversations (Mijwil et al., 2023). ChatGPT, a product of Generative Pre-trained Transformer (GPT) models, excels in understanding and generating coherent text-based responses. Its applications extend to chatbots, virtual assistants, customer support, content generation, and more (Baidoo-Anu & Ansah, 2023), transforming the way individuals and organizations access and process information in the digital age.

The potential of AI-based tools, such as ChatGPT, in endowment management is particularly noteworthy. ChatGPT facilitates access to financial data, analyzes historical and real-time information for actionable investment insights, and supports portfolio management, risk assessment, market research, and automated reporting (Ray, 2023). Its scalability enables it to address high volumes of inquiries, making it a valuable asset for organizations managing large endowments. Nevertheless, ChatGPT should be viewed as a complementary tool, as human judgment and ethical considerations remain vital in decision-making processes.

Despite its advantages, the application of AI in investment management is not without limitations. Previous research highlights challenges such as algorithmic biases, data privacy concerns, and over-reliance on AI-driven insights. In endowment management, these issues are compounded by the ethical responsibility to preserve capital while achieving financial returns. Current studies have also largely overlooked the specific challenges and opportunities AI presents in regional contexts, such as Malaysia. This gap in the literature emphasizes the need for localized research to address how ChatGPT can be adapted to the unique financial, regulatory, and cultural environments in Malaysia.

This study seeks to bridge these gaps by examining the impact of AI-based ChatGPT on endowment management and investment in Malaysia. Through a comprehensive literature review, the research will identify existing knowledge and limitations in the application of ChatGPT for these purposes. Empirical data will be collected through open-ended questionnaires targeting endowment managers and investment professionals in Malaysia, enabling the study to capture real-world insights. This approach is critical for understanding the specific impact of ChatGPT within Malaysia's financial and institutional framework.

The findings will contribute to a deeper understanding of the role of AI in advancing endowment management practices. By addressing the limitations of prior research and incorporating empirical evidence from the Malaysian context, the study aims to provide practical recommendations for integrating AI in endowment management effectively. Moreover, the research will emphasize the balance between leveraging AI-driven insights and maintaining human expertise to ensure ethical and impactful decision-making in the financial sector.

The structure of this paper is as follows: Section 2 presents a detailed literature review of AI applications in endowment management and investment. Section 3 outlines the research methodology, including the design and data collection process. Section 4 discusses the empirical findings, offering insights into the practical application of ChatGPT in Malaysia. Section 5 provides recommendations and suggestions for future research, and Section 6 concludes by summarizing the study's contributions and policy implications.

RESEARCH METHODS

In this study, the questionnaire validation process was conducted with meticulous attention to detail. Validation was carried out using Cronbach's Alpha test, a widely recognized statistical method for assessing internal consistency reliability, executed with SPSS software (Yusup, 2018). A Cronbach's Alpha value exceeding 0.7 was used as the benchmark to confirm that questionnaire items consistently measure the same underlying construct.

The survey was distributed to 15 endowment managers and 20 investment professionals in Malaysia, employing judgmental sampling, a type of non-probability sampling. This method was chosen because it allows the researcher to deliberately select participants with specific characteristics relevant to the study, ensuring the sample's representativeness of the target population. The selection criteria included expertise in endowment management or investment with a minimum of 5 years of experience.

To minimize respondent bias, respondents were briefed on the study's objectives and confidentiality assurances before completing the survey. Each participant rated questionnaire items on a 1-7 Likert scale, following Løhre et al. (2019). Of the distributed questionnaires, a robust response rate was achieved, with 18 professionals responding (exceeding the 50% threshold), consisting of 8 endowment managers and 10 investment professionals. The gender distribution included 6 females and 12 males.

After data collection, rigorous data cleaning procedures were performed to ensure accuracy and completeness. To further validate the content of the questionnaire, a Content Validity Index (CVI) analysis was conducted using SPSS, adhering to the methodologies outlined by Bisson et al. (2021). This multi-layered validation process underscores the study's methodological rigor, enhancing both the reliability and validity of findings related to AI's application in endowment management and investment.

In addition to these steps, a detailed research flowchart was developed to illustrate the process from data collection to analysis, ensuring transparency and replicability. This includes the stages of questionnaire development, validation testing, data collection using judgmental

sampling, respondent bias mitigation, data cleaning, statistical analysis, and interpretation of results.

RESULT AND DISCUSSION

The validity analysis of a questionnaire is a crucial step in assessing the consistency and stability of the measurements obtained from the questionnaire. It helps determine whether the instrument is producing reliable and dependable results over time and across different respondents. Table 1 presents the validity statistics result of all three sections of the questionnaire, familiarity with AI, current AI adoption and AI in investment strategies, challenges and risks, respectively.

Table 1. Validity Statistics of the Questionnaire

Validity Statistics of Familiarity with AI		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.738	0.801	10
Validity Statistics of Current AI Adoption		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.949	0.957	10
Validity Statistics of AI in Investment Strategies, Challenges and Risks		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.859	0.896	9

Table 1 shows the validity statistics of the current study, which indicate that the reported Cronbach's Alpha coefficients of 0.738 for the ten questions of “Familiarity with AI” have a satisfactory level of internal consistency. Cronbach's Alpha of 0.949 signifies an exceptionally strong level of internal consistency among the questions in the variables of “Current AI Adoption”. Reliability statistics of “AI in Investment Strategies, Challenges and Risks” show that Cronbach's Alpha coefficient of 0.859 suggests a degree of internal consistency among the nine items in the questionnaire. Standardization involves transforming the scores for each item to have a mean of zero and a standard deviation of one. The higher Alpha value after standardization indicates that the items maintain a strong level of internal consistency, even when scores are subjected to this transformation. This suggests that the questionnaire is a robust instrument for assessing the targeted construct in research contexts, providing confidence in its ability to yield highly reliable and consistent measurements.

For analyzing the questionnaire data for this study, we used the content validity index technique. Two methods for calculating CVI, in which the average of the I-CVI scores for all

questions on the scale (S-CVI/Ave) and the proportion of questions on the scale that achieve a relevance scale of 4 or 5 by all respondents (Bisson et al., 2021). Researchers recommend that a scale with excellent content validity should be composed of CVIs of 0.78 or higher, S-CVI/Ave of 0.8 and 0.9 or higher, respectively.

Table 2. Familiarity with AI

Familiarity with AI																				
Question	**Res 1**	**Res 2**	**Res 3**	**Res 4**	**Res 5**	**Res 6**	**Res 7**	**Res 8**	**Res 9**	**Res 10**	**Res 11**	**Res 12**	**Res 13**	**Res 14**	**Res 15**	**Res 16**	**Res 17**	**Res 18**	**Respondent in agreement**	**I-CVI**
FAI-1	7	5	6	6	7	7	4	6	7	6	7	7	5	6	7	6	7	6	17	0.94
FAI-2	7	4	6	6	7	7	4	5	7	5	6	7	6	6	7	6	7	5	16	0.89
FAI-3	7	5	7	5	7	7	6	6	7	5	6	7	6	7	7	6	6	5	18	1.00
FAI-4	6	5	7	7	7	7	5	6	7	6	6	7	7	6	7	6	4	5	17	0.94
FAI-5	7	5	1	5	3	7	5	5	7	5	6	7	5	6	7	6	5	6	16	0.89
FAI-6	6	6	1	4	2	4	2	4	5	5	3	1	4	6	7	3	5	5	8	0.44
FAI-7	7	5	7	7	7	6	5	7	7	6	7	7	7	7	7	6	7	6	18	1.00
FAI-8	7	4	1	6	7	7	4	5	7	6	7	7	7	6	7	7	7	5	15	0.83
FAI-9	7	6	7	7	7	7	6	7	7	5	7	7	6	7	7	7	5	5	18	1.00
FAI-10	7	6	7	7	7	7	6	7	7	5	7	7	7	7	5	7	7	5	18	1.00
																			S-CVI/Ave	**0.89**
Proportion relevance	**1.00**	**0.80**	**0.70**	**0.90**	**0.80**	**0.90**	**0.60**	**0.90**	**1.00**	**1.00**	**0.90**	**0.90**	**0.90**	**1.00**	**1.00**	**0.90**	**0.90**	**1.00**		
Average proportion of items judged as relevance across the eighteen respondents																		**0.89**		

Table 2 shows that all the respondents have agreed with the questions of "AI in Investment Strategies, Challenges and Risks" the total I-CVI score is 0.89 which is very good as researchers recommend that a scale with excellent content validity should be composed of I-CVIs of 0.78 or higher S-CVI/Ave of 0.8 and 0.9 or higher, respectively (Qin et al., 2023). The results imply that the questions related to familiarity with AI have excellent content validity, indicating that they

effectively measure the concept of AI familiarity among the respondents. The result indicates unanimous agreement among respondents regarding their familiarity with AI holds particular significance in the context of the study. This high level of familiarity with AI establishes a robust foundation. Given that all respondents are well-versed in AI concepts, effective communication. It ensures a shared understanding of AI terminology and principles, enhancing the reliability and meaning of survey results. Furthermore, respondents' existing knowledge of AI equips them to provide informed insights, making their opinions on how AI can be applied in endowment management and investment particularly valuable (Polisetty et al., 2024). In essence, this strong foundation of AI familiarity among respondents augments the study's potential to yield targeted and relevant insights, offering a comprehensive understanding of the role of AI in this specific financial context.

Table 3. Current AI Adoption

Current AI Adoption																				
Question	**Res 1**	**Res 2**	**Res 3**	**Res 4**	**Res 5**	**Res 6**	**Res 7**	**Res 8**	**Res 9**	**Res 10**	**Res 11**	**Res 12**	**Res 13**	**Res 14**	**Res 15**	**Res 16**	**Res 17**	**Res 18**	**Respondent in agreement**	**I-CVI**
ADAI-1	6	5	2	7	7	6	3	7	7	6	6	7	6	6	7	6	7	6	16	0.89
ADAI-2	6	5	2	6	7	6	3	7	7	6	4	7	6	6	7	6	7	6	15	0.83
ADAI-3	7	4	4	7	7	7	4	6	7	6	6	7	7	6	7	6	7	6	15	0.83
ADAI-4	7	5	6	6	7	7	4	6	5	6	5	7	6	6	7	6	7	6	17	0.94
ADAI-5	7	6	5	7	7	7	4	7	7	7	5	7	7	6	7	6	7	6	17	0.94
ADAI-6	7	5	4	6	6	7	4	3	4	6	5	7	5	6	7	6	7	6	14	0.78
ADAI-7	7	6	5	6	7	7	4	7	7	6	6	7	7	6	7	6	7	6	17	0.94
ADAI-8	7	4	6	6	7	7	3	7	6	6	5	7	6	5	7	6	7	6	16	0.89

Current AI Adoption																				
Question	**Res 1**	**Res 2**	**Res 3**	**Res 4**	**Res 5**	**Res 6**	**Res 7**	**Res 8**	**Res 9**	**Res 10**	**Res 11**	**Res 12**	**Res 13**	**Res 14**	**Res 15**	**Res 16**	**Res 17**	**Res 18**	**Respondent in agreement**	**I-CVI**
ADAI-9	7	6	4	7	7	7	4	7	7	6	6	7	7	5	7	6	7	6	16	0.89
ADAI-10	7	5	6	7	7	7	5	7	6	6	6	7	6	6	7	6	7	6	18	1.00
																			S-CVI/Ave	**0.89**
Proportion relevance	**1.00**	**0.8**	**0.5**	**1.00**	**1.00**	**1.00**	**0.9**	**0.9**	**0.9**	**1.00**	**0.9**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**		
Average proportion of items judged as relevance across the eighteen respondents																		**0.89**		

Table 3 underscores the robustness of the survey's questions related to current AI adoption with an impressive I-CVI score of 0.89. Importantly, every single respondent accorded a score exceeding the widely accepted threshold of 0.78 for substantial content validity, reinforcing the reliability of these questions. This unified consensus among respondents regarding the validity of AI adoption inquiries signifies their collective belief in the effectiveness of these survey items in assessing the extent of AI adoption within the surveyed individuals or organizations. Such a strong validation of the survey's content is of paramount importance, particularly in the context of endowment management and investment. AI adoption in this field holds considerable significance, as it has the potential to revolutionize investment strategies, enhance portfolio management, optimize risk assessment, and drive cost savings while also introducing new challenges and ethical considerations. The survey's demonstrated capability to accurately measure AI adoption strengthens the study's credibility, ensuring that the findings are dependable and reflect the true landscape of AI adoption in endowment management and investment (Weber et al., 2024). This, in turn, supports the study's capacity to deliver insights that are not only accurate but also instrumental for individuals and organizations navigating the dynamic landscape of financial management in the era of AI.

Table 4. AI in Investment Strategies, Challenges and Risks

AI in Investment Strategies, Challenges and Risks																				
Question	**Res 1**	**Res 2**	**Res 3**	**Res 4**	**Res 5**	**Res 6**	**Res 7**	**Res 8**	**Res 9**	**Res 10**	**Res 11**	**Res 12**	**Res 13**	**Res 14**	**Res 15**	**Res 16**	**Res 17**	**Res 18**	**Respondent in agreement**	**I-CVI**
INV AI-1	7	5	5	5	7	7	2	3	4	5	6	7	6	6	7	4	7	6	14	0.78
INV AI-2	7	4	7	6	7	7	3	5	7	6	6	7	6	7	7	6	7	6	16	0.89
INV AI-3	7	4	7	7	7	7	5	5	7	6	7	7	6	7	7	6	7	6	17	0.94
INV AI-4	7	6	7	6	7	7	6	5	7	6	7	7	6	7	7	6	7	6	18	1.00
INV AI-5	6	5	7	7	7	7	6	7	7	6	6	7	6	6	7	6	7	6	18	1.00
INV AI-6	7	5	7	6	7	7	6	7	7	6	6	7	6	6	7	6	7	6	18	1.00
INV AI-7	7	5	7	4	7	7	2	6	7	6	6	7	5	6	6	6	7	6	16	0.89
INV AI-8	7	5	7	5	7	7	2	5	7	6	6	7	7	6	6	6	7	6	17	0.94
INV AI-9	6	4	7	5	5	7	5	7	5	6	3	7	5	7	7	6	1	6	16	0.89
																			S-CVI /Ave	**0.93**
Proportion relevance	**1.00**	**0.8**	**0.5**	**1.00**	**1.00**	**1.00**	**0.9**	**0.9**	**0.9**	**1.00**	**0.9**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**		
The average proportion of items judged as relevant across the eighteen respondents																	**0.93**			

Table 4 reveals a noteworthy consensus among all respondents regarding the questions related to "AI in Investment Strategies, Challenges and Risks," with a commendable I-CVI score of 0.89, surpassing the recommended threshold of 0.78 for excellent content validity, as endorsed by Shi et al. (2023). This outcome underscores the efficacy of these survey questions in gauging respondents' understanding of AI in the context of investment strategies, along with its associated challenges and risks. The significance of this result is further magnified when considered within

the broader scope of AI's pivotal role in the realm of investment. AI's utilization in investment strategies is instrumental in optimizing decision-making, enhancing risk management, and potentially improving profitability. Recognizing the complexities and opportunities entailed in AI adoption is essential for prudent financial planning. Hence, the high level of familiarity with AI showcased by respondents not only bolsters the validity of this study but also underscores the vital importance of AI in modern investment practices. It lays the groundwork for informed discussions on the challenges and risks associated with AI adoption in the financial domain, positioning the study to yield precise insights into AI's evolving role in investment. This foundation of AI familiarity enhances the study's capacity to provide well-informed, targeted, and context-specific perspectives on AI's applications in investment strategies and underscores the need to address associated challenges and risks effectively in the financial landscape.

In the context of exploring the potential of AI in endowment management and investment, several recommendations can be made to foster a responsible and effective integration of AI within the domain. First, it is imperative to encourage educational institutions and financial organizations to offer comprehensive training and educational programs on AI specific to endowment management and investment, enabling professionals to acquire the requisite expertise for leveraging AI effectively. Furthermore, the development and dissemination of industry-specific ethical guidelines for AI adoption is crucial. These guidelines should address issues such as fairness, transparency, and adherence to ethical standards in the realm of AI-driven investment decisions. Collaboration among financial institutions, technology firms, and regulatory bodies should be actively promoted to establish best practices and standards, fostering a more secure and compliant AI ecosystem. Transparency in AI systems and reporting mechanisms is essential for building trust with stakeholders. To this end, financial institutions should provide clear, accessible explanations of how AI algorithms inform investment decisions. Robust risk mitigation strategies tailored to AI-specific challenges should also be developed, encompassing continuous performance assessment and contingency planning for unforeseen issues. Lastly, ongoing research on AI regulation is paramount to remain compliant with evolving laws and requirements, particularly within the purview of Islamic finance principles, ensuring the responsible use of AI in endowment management and investment.

In the realm of exploring the potential of AI in endowment management and investment, a spectrum of compelling avenues for future research emerges. Firstly, delving into AI-driven portfolio optimization is paramount, involving the exploration of advanced algorithms and techniques tailored to Islamic finance principles. This exploration seeks to harmonize Shariah compliance with the imperative of maximizing investment returns. Concurrently, research endeavours should encompass behavioural analysis and sentiment analysis integration with AI, offering a nuanced understanding of investor behaviour and sentiment within the realm of Islamic finance. In parallel, there's a need to assess AI's role in philanthropy optimization within endowment management, where AI can amplify the impact of charitable contributions and societal welfare. Moreover, investigating the synergy between AI and blockchain technologies is critical to ensuring transparent and traceable financial transactions, aligning with the principles of Islamic

endowment management. Robust regulatory frameworks that account for the unique challenges and opportunities introduced by AI warrant exploration, with a dedicated focus on ethics and compliance within the Islamic finance context. Simultaneously, research initiatives should seek to uncover how AI can broaden financial inclusion, making Islamic finance more accessible to underserved populations. Impact investing, tailored to social and ethical objectives while yielding financial returns, should be optimized with AI. Lastly, there's a pressing need to study the long-term ethical implications and societal consequences of AI adoption in endowment management, with a steadfast commitment to upholding the integrity of Islamic finance principles. These multifaceted research directions will collectively enrich our understanding of AI's transformative potential in this dynamic financial landscape.

CONCLUSION

Policymakers should consider the profound implications of these findings, which highlight the transformative role of Artificial Intelligence (AI), as exemplified by Chat Generative Pre-Trained Transformer (ChatGPT), in endowment management and investment. The unanimous consensus among respondents on the significance of AI in investment strategies, challenges, and risks provides a solid foundation for fostering enhanced communication and understanding among professionals in these domains. This foundational familiarity, combined with the survey's ability to accurately assess AI adoption, underscores the need for informed and strategic decision-making in AI integration.

AI technologies like ChatGPT demonstrate potential as invaluable tools for optimizing investment strategies, improving risk management, and achieving more profitable financial outcomes, as supported by the findings in Table 4. Additionally, the emphasis on the development of ethical guidelines and regulatory frameworks, coupled with recommendations for continuous long-term impact assessment, reinforces the necessity for responsible and transparent AI adoption.

To strengthen these outcomes, policymakers should prioritize initiatives such as training programs to upskill professionals in AI applications, the establishment of robust AI ethics standards, and the promotion of interdisciplinary collaboration to address emerging challenges. By doing so, they can ensure AI's transformative benefits are harnessed while minimizing risks, fostering sustainable economic growth, and addressing broader social implications. Ultimately, these findings underline the pivotal role of AI in shaping the future of endowment management and investment, advocating for an approach grounded in education, ethics, transparency, and long-term societal and economic impact assessment.

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