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The Impact of Artificial Intelligence Applications on Improving Investment Performance: Evidence from Developing Markets

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ABSTRACT

Objective: *This paper investigates the relation among the artificial intelligence (AI) and investment performance in developing country namely Malaysia. AI supports the accuracy and speed of risk administration and investment tools and proposals for powerful prediction, nevertheless it does not change human knowledge.* ***Method:*** *This study used 118 Malaysian firms from 2019 to 2024 as a developing market, used OLS as the regression method, and used secondary data from DataStream and annual reports.* ***Results:*** *The results found a positively and significantly association among AI and investment performance. Contributing to the development of AI to attract more foreign direct investment by supporting the business sector and identifying promising opportunities.* ***Novelty:*** *This study analyzes the development of AI, a key driver of financial activity in Malaysian markets, through a simple technological tool. AI drives innovation and improves financial market performance. It is a strategic tool that can drive financial excellence in an exceptionally dynamic context, particularly in developing markets.*

INTRODUCTION

Given the transformations characterizing the fourth industrial revolution and the global trend of leveraging artificial intelligence (AI) to address challenges across sectors, developing institutions must keep pace with technological development to sustain growth and competitiveness. AI adoption has therefore become an important strategic issue for organizations seeking to improve information processing, decision quality, and organizational performance [1].

This study examines the influence of AI on investment performance by considering the application of AI technologies to financial decision-making, analytics, and risk management. Prior studies show that AI-based transformation can create business value, improve financial performance, and strengthen decision support when organizations possess adequate data, governance, and complementary capabilities [2]–[4]. At the same time, AI adoption introduces challenges related to data quality, transparency, security, ethics, and regulatory oversight [1]. These issues are particularly important in financial management, where automated outputs can influence capital allocation and risk exposure [5].

AI accelerates financial analysis by processing large volumes of structured and unstructured information in near real time. Although generative AI and other advanced technologies have attracted substantial interest in financial markets, practical adoption

in investment management remains uneven and continues to require human judgment and institutional controls [6], [7].

The modern financial system has undergone fundamental technological change, with AI becoming an increasingly important tool for prediction, classification, portfolio analysis, and risk assessment. As the volume and complexity of financial data exceed the capacity of conventional manual analysis, AI can support investors in identifying patterns and relationships that may otherwise remain difficult to detect [8].

In developing markets, these capabilities are particularly relevant because information asymmetry, fragmented data, and uneven analytical capacity can constrain investment decisions. AI-based tools can help transform dispersed information into forward-looking insights, improve enterprise productivity, and support the identification of investment opportunities [9], [10].

The core question of this study is: to what extent can investment in AI applications provide empirically valid evidence of improved investment performance in a developing-market setting? Despite rapid technological advances, concerns remain regarding the quality, reliability, and organizational value of AI-generated information [2]. Accordingly, the study asks whether AI can improve investment performance and support additional returns in resource-constrained environments.

Therefore, this study has three main objectives: to identify key AI applications relevant to investment management, including machine learning and predictive analytics; to analyze the association between AI application and investment performance; and to clarify how firms can build mechanisms that support superior performance before and during AI adoption. The study addresses the gap between technological capability and practical investment outcomes by providing empirical evidence from Malaysian listed firms [2].

This paper is considered for its logically rigorous construction, theoretical rigor, and clear definition of the objectives and issues. AI plays a essential role in grawing markets, increasing transparency, and unlocking potential information. These markets offer chances for investors who leverage progressive analytical tools to make competitive products.

Artificial intelligence is increasingly embedded in financial trading, forecasting, portfolio management, risk assessment, and investment decision support. A systematic review of 143 studies found that financial-market research uses a wide range of AI techniques, with deep learning among the most frequently applied approaches and with stock, foreign-exchange, and cryptocurrency markets receiving substantial attention [11]. This evidence suggests that AI is no longer limited to operational automation; it is increasingly used to extract signals from complex financial data and support investment decisions.

The Efficient Market Hypothesis (EMH) provides a useful theoretical foundation for understanding the potential role of AI in investment performance. Under the EMH, asset prices incorporate available information, so the speed and quality with which investors obtain and process information affect market efficiency. AI can strengthen this

information-processing function by combining large datasets, detecting nonlinear relationships, and producing forecasts more rapidly than conventional analytical approaches. International evidence shows that machine-learning models can identify return predictability across markets, although translating statistical predictability into consistently profitable strategies remains challenging [12].

At the firm level, AI-driven decision-making can also create performance benefits when technological resources are converted into organizational capabilities. Empirical evidence indicates that big-data-powered AI strengthens AI-driven decision-making and that AI-driven decision-making is positively associated with firm performance [13]. In capital markets, AI may improve efficiency through faster portfolio rebalancing, richer information processing, and more sophisticated trading strategies; however, these same mechanisms may increase trading intensity and amplify volatility during periods of market stress [14]. Consequently, the investment value of AI should be evaluated together with governance, risk controls, data quality, and human oversight.

Recent literature further emphasizes that the effect of AI on investment management is multidimensional. A comprehensive review of investment-management research identifies applications in portfolio optimization, market forecasting, robo-advisory, risk management, fraud detection, regulatory compliance, and strategic investment decision-making, while also highlighting explainability, adoption barriers, and ethical governance as unresolved issues [15]. Cross-country evidence additionally suggests that AI investment can positively affect financial-market development and that the institutional and regulatory environment can shape the magnitude of this effect [16]. These findings are consistent with earlier studies showing positive links between AI-based transformation, disclosure, productivity, and organizational performance [2], [3], [9].

Despite the growing literature, empirical evidence remains comparatively limited for firm-level investment performance in developing markets, where digital infrastructure, data availability, institutional readiness, and technological maturity may differ from those of advanced economies. Malaysia provides a relevant setting for testing whether AI application is associated with measurable investment outcomes after controlling for firm characteristics. Based on the theoretical argument and prior empirical findings, the study proposes the following hypothesis: H1. AI is significantly and positively associated with the investment performance of Malaysian companies.

RESEARCH METHOD

This study uses data from the DataStream database from 2019 to 2024. The 2019 data was chosen because companies listed on the Bursa Malaysia stock exchange that year documented a more diverse range of operational and production activities. The study sample includes 118 companies listed on the Bursa Malaysia from 2019 to 2024. This study uses Stata software to analyze the data and test the connection among AI and investment performance. Investment performance, measured by Return on Investment

(ROI), is calculated as investment gain on initial investment multiplied by 100%. Correct AI is measured using an index between 0 and 1, where 1 indicates disclosure, and 0 indicates non-disclosure. "Firm age is measured as the natural logarithm of years since inception". "The natural logarithm of total assets indicates firm size". "Firm profitability is measured using return on equity (ROE), calculated as follows: ROE = Net Profit / Shareholders' Equity". The relationship between AI and investment performance is shown in the figure1, and Table 1 lists the variables and their metrics.

This research employs analytical methods and descriptive, depend on a analysis of present analysis and literature of data associated to the request of AI in the investment field. As well as incorporates quantitative approaches, utilizing financial data from the stock exchange in Bursa Malaysia to estimate AI effect on the investment performance.

Table 1. Variable's measurements

Variables	Acronyms	Operationalization
Investment performance	INVP	$ROI = \frac{\text{Investment Gain}}{\text{Initial Investment}} \times 100$
Artificial intelligence	AI	"AI is measured utilising an index with a scale of 0 to 1, where a score of 1 is for information disclosure, and 0 for "non-disclosure".
Firm age	FAGE	Company age "is measured as the log of the number of years since establishment".
Firm size	FSIZE	Company size (SIZE) is most commonly measured employing the natural logarithm of total assets**.**
Firm profitability	FROF	"Return on equity (ROE) = net Income/shareholders' equity".

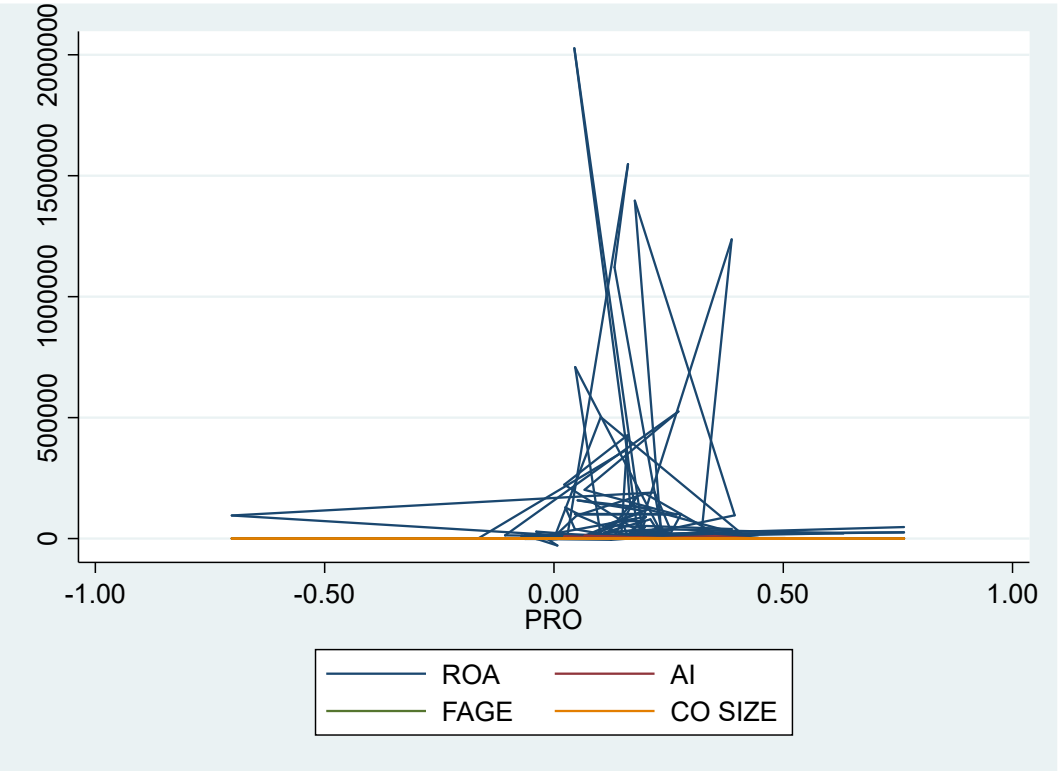


Figure 1. shows the AI and investment performance percentages, as well as the control variables.

The model tests the association between AI and investment performance in developing markets. This research used "ordinary least squares" (OLS) as a regression method and used STATA to test the results. "This research assumed the results by employing this model to enhance their comparability to those of additional evaluations. The model under explains the connection."

$$ROI_{it} = \beta 0 + \beta 1\ AI_{it} + \beta 2\ FSIZE_{it} + \beta 3\ FAGE_{it} + \beta 4\ FPRO_{it} + \varepsilon$$

RESULTS AND DISCUSSION

Results

Statistical Description of Study Variables

The descriptive analysis provides a preliminary overview of the data used to study the influence of AI applications on improving investment performance in developing markets. This is achieved by calculating a set of statistical indicators, most importantly the arithmetic mean, maximum, minimum, and standard deviation. These indicators help identify variable levels and the extent of their dispersion and variation among companies and markets during the study period from 2019 to 2024. The applications of AI, and the investment performance. Control variables as well as impact the association among AI and investment performance, for example firm size, firm profitability, and firm age.

The applications of AI variable measure the level of AI request practice the companies in their financial activities, investme., and operational. "The arithmetic mean of this variable supports limitthe ratio of companies utilising AI "applications" within the sample. For instance, if the mean for AI is 4.995 with a max of 11.437 and a min of 0.97, this indicates a substantial share of firms utilize applications of AI.

Investment Performance as a dependent variable represents the extent to which a company achieves appropriate returns relative to its level of risk. It can be measured using several financial and investment indicators, such as return on investment (ROI). Investment performance has a mean of 11.698, with a minimum of -2.862 and a maximum of 20.269. The descriptive analysis is expected to reveal differences in investment performance levels between companies that utilize AI applications and those that do not. This can be further tested using inferential tests and regression models. Table 2 presents the descriptive analysis.

Table 2. Shows The Descriptive Test

Variable	Obs	Mean	Std. Dev.	Min	Max
ROI	118	11.698	3.120	-2.862	20.269
AI	118	4.995	1.680	0.97	11.437
FAGE	118	16.947	13.582	1	88
FSIZE	118	12.264	1.697	8.614	17.432
FPRO	118	0.346	2.152	-0.702	23.164

Stata 2019 statistical software was used to examine the variables. The mean firm age is 16.947. The mean firm size is 12.264, with a minimum of 8.614 and a maximum of 17.432. Firm profitability has a mean of 0.346, with a minimum of -0.702 and a maximum of 23.164. Table 2 reports the results.

Table 3. shows the correlation analysis.

Variables	ROI	AI	FAGE	FSIZE	PRO
ROI	1				
AI	0.012***	1			
FAGE	0.146	-0.003***	1		
FSIZE	0.679	0.088**	0.358	1	
PRO	0.019	-0.032	0.138	0.097*	1

Correlation testing was used to analyze the association among applications of AI and companies' investment performance in Malaysia. The test aimed to locate the direction and strength of the connection among the AI applications, and the investment performance, as measured by ROI. In this study, a positive association among AI and investment performance shows that increased use of AI applications is associated with higher investment performance. The FAGE, FSIZE, and FPRO showed positive and significant correlations with investment performance. The correlation analysis provides

a preliminary suggestion of the positive link among application of AI and investment performance.

Multicollinearity Test

Multicollinearity was assessed using the variance inflation factor (VIF). Following the conventional rule that serious multicollinearity may be indicated by a VIF above 10, all variables in this study remain below the threshold [17]. Table 4 presents the VIF results.

Table 4. The VIF percentage

Variable	VIF	Tolerance Value
AI	1.01	0.991
FAGE	1.17	0.856
FSIZE	1.16	0.861
FPRO	1.03	0.969
Mean VIF	1.09	

Regression test

Regression analysis tests the impact of applications of AI on the investment performance of firms in Malaysia. Unlike correlation testing, which measures the direction and strength of the association among variables, regression analysis tests the statistical impact on investment performance while accounting for control variables.

In this study, investment performance is measured using ROI, while AI application is the main independent variable. The regression model can be expressed as: where is the partial influence of AI applications on investment performance after controlling for other variables. A positive value of indicates a positive influence of AI on investment performance (t.stat=0.920, sig=0.0360), while firm age shows a negative connection with investment performance. Firm size and firm profitability are positively related to investment performance. Table 5 presents the regression test.

Table 5. shows the regression test

ROI	t.stat	Sig
AI	0.920	0.0360
FAGE	-1.400	0.0163
FSIZE	9.610	0.000
FPRO	-0.490	0.0628
Constants	-8.940	0.000
Sample	118	
R-squred	47.69%	
Adjusted R-squared	45.79%	
f-value	25.07	

Discussion

The results of this study provide empirical evidence that artificial intelligence (AI) applications are positively associated with investment performance among Malaysian firms. The regression analysis shows that AI has a positive and statistically significant relationship with return on investment (ROI), with a t-statistic of 0.920 and a significance value of 0.0360. This finding supports the proposed hypothesis that greater adoption of AI is associated with improved investment performance in Malaysian companies. The correlation analysis also indicates a positive, although relatively weak, association between AI and ROI, suggesting that AI contributes to investment outcomes but operates alongside other firm-specific and market-related factors.

The positive effect of AI can be explained by its capacity to process large volumes of financial and operational information, support predictive analysis, improve investment decision-making, and facilitate risk assessment. These capabilities are particularly relevant in developing markets, where information asymmetry, uneven technological infrastructure, and differences in market efficiency can restrict the quality and speed of conventional investment analysis. The literature review in this study similarly emphasizes that AI can improve information efficiency by collecting, processing, and analyzing large amounts of information more rapidly, thereby helping investors recognize patterns and make more informed decisions. However, the effectiveness of these applications remains dependent on technological maturity, data quality, infrastructure, and appropriate governance mechanisms.

The findings concerning the control variables further demonstrate that investment performance is not determined by AI adoption alone. Firm age shows a negative relationship with investment performance in the regression model, while firm size exhibits a strong positive association. Firm profitability, with a significance value of 0.0628, does not reach the conventional 5% significance level. These findings indicate that organizational characteristics should be considered when evaluating the contribution of AI to investment outcomes. The model explains approximately 47.69% of the variation in investment performance, with an adjusted R-squared of 45.79% and an F-value of 25.07, indicating that the explanatory variables collectively account for a meaningful proportion of differences in ROI across the sampled firms.

Overall, the findings reinforce the view that AI should be considered a strategic decision-support mechanism rather than a substitute for human financial judgment. Its contribution to investment performance appears to arise from improving information processing, forecasting, resource allocation, and risk management. Nevertheless, the benefits may be less pronounced in developing markets where digital infrastructure and institutional readiness remain uneven. Therefore, firms seeking to obtain greater investment benefits from AI need not only technological adoption but also reliable financial data, skilled human resources, appropriate risk controls, and governance frameworks that support transparent and responsible AI use.

CONCLUSION

Fundamental Finding: The study results demonstrate a positive link among AI and investment performance in Malaysia as a developing market. This indicates that the widespread adoption and application of AI technologies contribute to improved market efficiency and investment outcomes. This correlation stems from AI's ability to process bige amounts of quickly, enhancing the accuracy and data accurately, and investment trend predictions, facilitating decision-making, and optimizing resource allocation and risk management. Furthermore, recent data show that using machine learning techniques to predict developing market stock market returns is highly profitable. **Implication:** Encourage financial and investment institutions in developing markets to use AI applications for data analysis, return forecasting, risk assessment, and investment decision support. Investing in digital infrastructure and developing financial databases is crucial, as data reliability and availability are key to reliable AI models. Establish a clear regulatory and legislative framework for AI applications in the financial sector, covering data protection, transparency, cybersecurity, and algorithmic decision-making mechanisms. Supervise and manage risk, and regularly test the accuracy of models to address crises and sudden market volatility. Enhance the financial expertise and technical skills of financial institution employees by training them in AI, machine learning, and data analytics. Avoid relying on AI-generated investment decisions; instead, use it as a tool to support financial and economic analysis and human judgment. When utilising "computational financial algorithms", specifically when considering basic decisions, address deficiencies while sustaining proper human oversight, and prioritize market fairness. Recent research shows that successful AI in developing economies based on not only on the technology itself but as well on the readiness of institutions, human capital, and infrastructure, and. **Limitation:** This correlation is less pronounced in developing markets due to limitations such as low market efficiency and inadequate infrastructure. **Future Research:** Encourage academic and financial institutions to conduct more applied research on AI impacts in developing markets, paying attention to differences between countries and financial sectors. AI can expand beyond forecasting returns to consist the tiered portfolio administration, news and information analysis, risk exposure, and classifying inconsist trends. Make Comparsion between the developed and developing markets to determine how the success applications of AI differ with technological, changes in financial, and institutional expansion levels.

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