

The Role of Artificial Intelligence in Enhancing the Management Information System Performance

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ABSTRACT

Objective: This study examines artificial intelligence (AI) in enhancing the management information system (MIS) performance in the Malaysian firms. **Method:** The study used a sample of 120 firm from the years 2020 to 2025, employing secondary data from annual reports and DataStream by employing OLS to examination the regression analysis. **Results:** This research confirmed that AI positively contributes to supporting the MIS performance by growing processing speed, information accuracy, and developing management decision-making, and raising the firm performance effectiveness, as well as bolstering firms' capability to answer to variations in the business environmental. **Novelty:** Recommends of this research raising firm investment in AI technologies and digital training employees, and infrastructure to utilize these technologies efficiently, and strengthening information safety and the data quality, thus sharing to enhanced MIS performance and the more effective attain of organizational objectives.

INTRODUCTION

The current business environment is radical transformations driven and experiencing rapid by the fourth manufacturing revolution and the associated unprecedented advances in artificial intelligence (AI) technologies. Among these changes, Management Information Systems (MIS) have grown beyond mere traditional calculation structures—whose purposes were once limited to storing accounting and gathering data and making static periodic reports to become the strategic engine and courage center upon which competitiveness and organizational sustainability depend in markets, advantages by raising difficulty and uncertainty [1], [2].

The research issue centers on investigative the magnitude and nature of the influence that AI acting as an independent variable has on improving and evolving the performance of MIS, which serve as the dependent variable. Despite raising spending on digitalization, several firms face a problem: the gap among the ability to leverage and owning technology it to develop the effectiveness of managerial "systems and decision-making [3]. Therefore, the important of this study lies in given a complete scientific perception that clarifies how inferential algorithmic abilities and forecasting translate into tangible developments in reply speed, the decrease of operational mistakes, and the quality of information outputs providing to senior administration. The primary goal of this paper is to investigate the effect of AI on enhancing the performance of MIS firms. Specifically, this research objective to test how AI shares to enhancing information

processing, improving the timeliness and accuracy of MIS, developing decision-making procedures, and raising the overall effectiveness and efficiency of MIS.

AI changes traditional MIS by automating problem accelerating information pipelines and workflows [4]. A literature review as a systematic recognized that AI incorporation attains a 66% decrease in data growing time, alongside a 29% rise in decision accurateness and a 20% decrease in operational costs [5]. Likewise, quantitative assessments of AI-developed digital information systems presented an operational effectiveness development of 23% and a 20% increase in system reliability [6]. In particular algorithmic automation, accounting subsystems improved model accuracy by 6% while decreasing latency by 9 milliseconds. Furthermore, to pure processing speed, AI-driven mechanism knowledge models support baseline system data integrity. Including enhance vector technologies and neural networks for automatic mistake exposure led to a 32% reduce in hidden mistakes and a 28% drop in matching entries. In initiative decision settings, hybrid AI frameworks participating rule-depend reason and deep learning created a 30% decrease in answer enhanced decision accuracy by 22% and latency [7].

The modeling of structural equation presents that improved decision ability directly facilitates the relation among overall firm performance and intelligent MIS adoption [5]. Merge forecast analytics raises competitive variation and organizational agility in volatile operational environments [8]. Eventually, attaining these increases needs matching algorithmic ability with deliberate data governance, system interoperability, and human-in-the-loop issues [9]. So, this research sheds light on linking the gap between AI and MIS performance.

Improving MIS performance through AI by some dimensions merge AI technologies into MIS influence performance index—both quantitative and qualitative and by several levels. Applied studies and field have determined four core determinates of this influence: quality and speed of management decision-making developing the "decision-making" process is the primary purpose of MIS. Through expert "systems" and machine learning algorithms, these systems have grown from merely making descriptive past reports on earlier events to providing prescriptive and predictive analytics regarding recommended actions and future consequences [10]. This allows managers to simulate numerous strategic scenarios, important shorten decision-making time, and reduce uncertainty, thereby supporting the suitability and accuracy of decisions made at senior administration levels.

Theoretical Basis clarifying the effect of AI on MIS "Performance", Understanding the true influence of AI on MIS involves foundation the examination in theories that address technology adoption instruments and frameworks as a robust scientific, the dimensions of firm success and competitive advantage, and human-system communication. This research draws upon four key, balancing theories that method the descriptive construction for the study's variables:

Technology Acceptance Model (TAM)

Davis [11], is one of the most recognized models of TAM, advanced by in MIS study. The model suggests that the employ of any new technology is identified by the operator's behavioral aim, which is in try shaped by two essential cognitive dimensions: Perceived Practicality and "Perceived" Ease of utilize (PEOU). In the situation of AI-developed MIS, TAM clarifies how the awareness between decision-makers and managers that AI instruments efficiently decrease the effort essential to examine make available reliable strategic visions (Perceived Usefulness), difficult data, joint with the systems' intelligent communicating interfaces and natural language processing abilities that reduce practical difficulty ("Perceived Ease of Usage") initiatives the firm to increase actual practice rates. This, in turn, has a straight positive link with improving the effectiveness of the management system as a entire [12].

Task-Technology Fit (TTF) Theory

Goodhue and Thompson [13] expressed the TTF theory depend on a essential evidence: developed technology does not essentially lead to enhanced performance without its abilities precisely align with the requirements and purposes of the mission's operators essential achieve. This theory is mainly important when functional to AI. Managerial errands differ widely, routine activities, ranging from structured, for instance financial reconciliation and data entry to strategic ones, unstructured, for example predicating crisis administration and market trends. Current studies [14] prove that understanding the positive effect of AI on MIS needs matching the correct AI instruments to the correct responsibilities. Practically, Robotic Process Automation (RPA) algorithms are better suitable for whereas forecast models and deep learning networks, organized responsibilities are allocated to difficult strategic responsibilities, thereby attaining the best level of "fit" that improves performance.

DeLone and McLean [15] presented a inclusive, multidimensional base for measuring IS success. The model classified six causally consistent dimensions: net profits, system employ, system quality, information quality, user satisfaction, and service quality. This model shows the instrument by which AI influences IS performance. AI improves system quality by enhancing stability, self-adaptability, and response speed; it elevates quality of information by provided that data categorized by real-time currency, proactive predictive abilities free, and high accuracy, from variations. This larger quality improvements reliance on the system and manager satisfaction, finally findings in firm net profits – such as improved decreased costs and productivity [16], [17].

Socio-Technical "Systems" Theory (STS) is based in the essential principle that firm involve of two interrelated subsystems: the practical system (software, algorithms, and hardware) and the community system (human resources, organizational structures, and culture). The theory emphasizes that performance effectiveness is not attained by practical superiority in separation, but relatively by the joint optimization of the people who operate it and technology.

In the situation of AI, this theory assistances avert the trap of technological determinism; It clarifies that improving the performance of MIS needs training personnel

and qualifying to handle AI productions, development a firm culture based in reforming workflows and data trust, so that AI accompaniments human expertise making increased intelligence relatively than replacement it in a argumentative method that initiations resistance to modification [18].

The important of this study is consequently the obvious from a firm's perception, which present a few about AI and MIS performance. So, this paper clarifies this investigation by test this connection by anticipated:

H1. The AI is positive association with MIS performance.

RESEARCH METHOD

The method this study depends on empirical test. It dealt with the AI, and the MIS performance. The sample of this research consist 120 firm in Malaysia from 2020 to 2025. Although a large number of firms were documented by the period of the study, a detailed "sample" was used relation than analytical all firm; this method object to approve the availability of reliable, whole, and reliable of secondary data for all variables of this study through the years under investigation. This paper uses regression by the OLS to investigation the "model" by employing STATA as a statistical software to examine the link among variables. The measurements of variables display in Table 1. the variables percentage from 2020 to 2025 shows in this figure 1.

Table 1. Measures of Variables

Variables	Acronyms	Operationalization
Management information system performance	MISP	MIS: Measures the practical performance of the MIS itself, including the reply time, reliability, usability, adaptability, and availability. 1. By information quality: focused on the content, relevance, completeness, timeliness, the system produces-its accuracy, and format. 2. Service Quality: Evaluates the improve create to users, for example the responsiveness of the IT service provider or department and reliability.
Artificial intelligence	AI	"AI is measured employing an index with a scale of 0 to 1, where a score of 1 is for information disclosure, and 0 for "non-disclosure".
Size Information technology	SIZEIT	SIZEIT=IT employees/Total employees ×100
Firm size	FSIZE	Firm size (SIZE) is most commonly measured using the natural logarithm of total assets.

Variables	Acronyms	Operationalization
Industry	IND	1 indicates manufacturing firm and 0 otherwise.

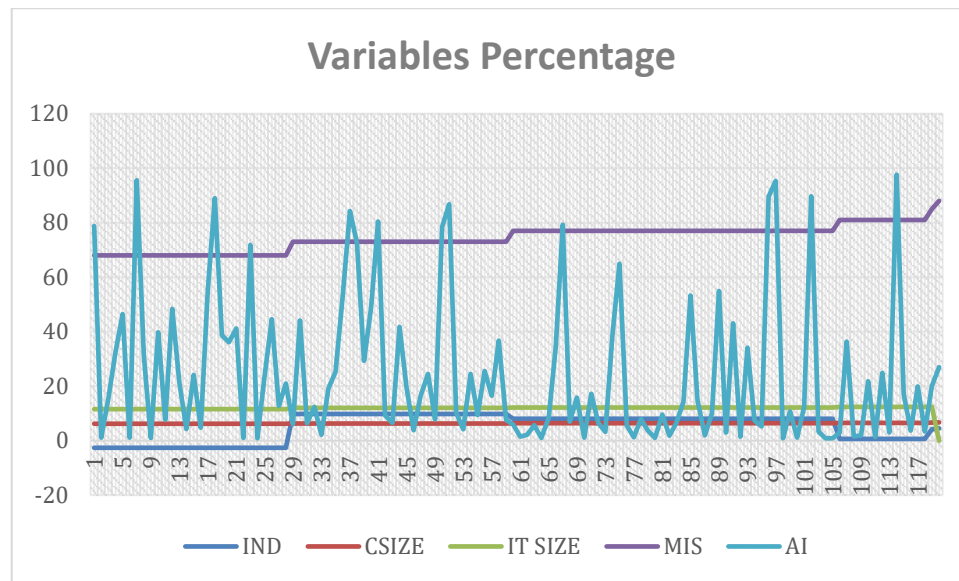


Figure 1. shows the variables percentage from 2020 to 2025

The model this study displays which is with the associating among two basic variables in order to display the influence of the AI as a first variable and MIS performance. this model of this study presents the regression test which shows the model of below clarifies the association.

$$MISP =_{it} \beta_0 + \beta_1 AI_{it} + \beta_2 SIZEIT_{it} + \beta_3 FSIZE_{it} + \beta_4 IND_{it} + \varepsilon$$

RESULTS AND DISCUSSION

Result

Descriptive statistics test

Table 2 display the descriptive of statistics of this study" investigation in the "sample" of 120 from 2020 to 2025. The MISP shows a mean a 74.458 with a min 68.000 and max 88.000. the AI presents with a mean 24.694 with a min 0.849 and max 97.600. The control variables displays the SIZEIT with a mean 11.927, the FSIZE with a mean 6.366, and IND 5.178.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
MISP	120	74.458	4.474	68.000	88.000
AI	120	24.694	26.949	0.849	97.600
SIZEIT	120	11.927	1.129	0.000	12.500

Variable	Obs	Mean	Std. Dev.	Min	Max
FSIZE	120	6.366	0.114	6.215	6.710
IND	120	5.178	5.030	-2.600	9.800

Correlation test

This research described in Table 3, the AI is negatively correlated with MISP. As well as the SIZEIT is negatively correlated with MISP. The FSIZE and IND displays a positive correlation with MISP. High expenses of AI application, expenses related with training staff can deplete available resources, grow infrastructure, and attaining technologies, thereby briefly limiting enhancements in MIS performance. Time essential to understand profits: Firm might requirement time to explain AI investments into tangible developments in MIS performance; therefore, a negative correlation might appear in the short run.

Table 3. Correlation test

Variables	MIS	AI	ITSIZE	CSIZE	BSECT
MIS	1.000				
AI	-0.190	1.000			
SIZEIT	-0.054	-0.050	1.000		
FSIZE	0.993	-0.193	-0.061	1.000	
IND	0.425	-0.076	0.161	0.324	1.000

Regression analysis

The consequences of this research for the model displays in the Table 4 reveal the consequences associating to AI which shows that has positively linked with MISP ($t=0.89$, $p\text{-value}=0.37$). The FSIZE and IND with MISP found a positive connection. As a consequence, "hypothesis" H1 which predictions that AI is positively associated to MISP. Although SIZEIT current a negative relation with MISP.

Table 4. Regression test

	MIS	t.stat	Sig
AI		0.89	0.37
SIZEIT		-5.12	0.00
FSIZE		29.90	0.00
IND		37.39	0.00
Constants		-19.80	0.00
Sample		120	
R-squared		99%	
Adjusted squared	R-	99%	
f-value		0.00	

Discussion

The consequences of this study show a positive association among AI and the performance of MIS, reflecting the important role AI plays in supporting the effectiveness and efficiency of these systems. This result can be qualified to the detail that applying AI technologies enhances accuracy, confirms the timely availability of related information, data processing speed, and developments management decision-making and the predicating of future trends. Additionally, these technologies help the mechanization of decrease human mistake, enhance the capability, and routine responsibilities of MIS to reply to variations in the corporate environment. This consequence makes even with studies confirming and theoretic perspectives that participating AI into firms raises synergy between data, administrative processes, and technology, thus positively effecting organizational performance effectiveness and information quality. Furthermore, the use of machine learning enables the removal of knowledge from large data, intelligent analytics and improving the strategic value of MIS and enhancing its ability to meet the requirements of administration at several levels. This interpretation is consistent with prior evidence that AI-supported MIS can improve business efficiency, decision support, and organizational management performance [4], [5], [7], [8].

Therefore, it can be determined that AI is a vital reason in developing MIS performance. Improved investment in AI requests, the advance of the provision of suitable technical structure and employees' digital assistances can share to attaining developed levels of effectiveness and efficiency. Nevertheless, understanding these profits based on the appropriateness of the requests employed, data quality, workforce capability, and the being of suitable AI governance rules. The consequences enhance the hypothesis of a positive connection among AI and the "performance" of MIS; AI shares to enhancing processing speed and information quality, in addition to developing administrative decisions, thus improving the general performance of these systems. The emphasis on data governance, workforce capability, and human-technology alignment is also consistent with socio-technical and performance-management perspectives [9], [18].

CONCLUSION

Fundamental Finding: This study consequences prove a positive relation between AI and the performance of MIS in Malaysian firms, representative that the acceptance of AI "technologies" shares to improving the effectiveness and efficiency of these systems. AI shares to enhancing processing speed and information accuracy thus allowing administration to create additional effective and efficient managerial decisions. The utilize of AI requests improves the capability of MIS to examine derive indicators and data that enhance the assessment of organizational performance, control, and planning. **Implication:** This positive association highlights the significant of investing in current digital technologies as a important feature in enhancing boosting the competitiveness and growth of firms. The findings emphasize the significant of participating AI with IT

substructure and a capable workforce to raise the application of technological abilities and expand MIS performance. The firms must raise investment in modern applications and AI technologies to improve MIS performance and enhance the quality of information providing to administration. Firms are motivated to participate AI technologies with present MIS to reduce mistakes, rise the effectiveness of management operations, and accelerate data processing. Arranging skill development in the utilize of AI requests, staff training, and data analysis to confirm the effective use of these technologies in enhancing management decision-making. In addition, Establishment privacy, data protection, and information security, while beginning clear rules for the utilize of AI and justifying connected risks. Forecasting assessing the performance of AI requests employing indicators that measure decision-making efficiency, processing speed, and information accuracy thus confirming ongoing enhancement in the performance of MIS. **Limitation:** This study is limited to a sample of 120 firms in Malaysia from 2020 to 2025 and relies on secondary data obtained from annual reports and DataStream. The analysis also depends on OLS regression to examine the association between AI and MIS performance, which limits the investigation to the variables and data available during the study period. **Future Research:** Motivating future studies to test the association among AI and the performance of MIS across several economic sectors, though accounting for features for instance the level of investment in information technology, industry nature, and firm size.

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