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THE ROLE OF ARTIFICIAL INTELLIGENCE IN STRATEGIC MANAGEMENT DECISIONS

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Abstract

Artificial Intelligence (AI) is increasingly transforming organizational decision-making processes by enabling firms to analyze complex data and generate predictive insights that support strategic planning. Despite the rapid growth of AI adoption in business environments, limited empirical research has examined its direct influence on strategic management decision quality. This study investigates the role of AI adoption in enhancing strategic decision-making within organizations while considering the influence of digital capability and environmental uncertainty. A quantitative research design was employed using a dataset of 300 firms representing diverse organizational contexts. Descriptive statistics, correlation analysis, and multiple regression techniques were applied to examine the relationships among AI adoption intensity, digital capability, environmental uncertainty, and strategic decision quality. The findings indicate that AI adoption has a significant positive effect on the quality of strategic management decisions, suggesting that organizations utilizing advanced AI-driven analytical tools demonstrate improved decision accuracy and strategic responsiveness. Furthermore, digital capability strengthens the effectiveness of AI implementation, while environmental uncertainty moderates the relationship between AI adoption and decision outcomes. The study contributes to the strategic management literature by providing empirical evidence on the strategic value of AI technologies and highlighting the importance of organizational capabilities in enabling effective AI-driven decision-making.

Introduction

The increasing integration of Artificial Intelligence (AI) into organizational processes has fundamentally transformed the way firms formulate and implement strategic management decisions. AI technologies, including machine learning, predictive analytics, and automated decision-support systems, enable organizations to process large volumes of complex data and generate actionable insights that can inform strategic planning. In contemporary business environments characterized by rapid technological change and market uncertainty, organizations increasingly rely on AI-driven analytical tools to enhance decision accuracy, reduce uncertainty, and improve competitive positioning. Strategic management scholars have argued that digital technologies such as AI serve as critical organizational resources capable of improving decision quality and supporting innovation-oriented strategies.

According to Erik Brynjolfsson and Andrew McAfee (2017), AI technologies significantly enhance managerial decision-making by enabling data-driven insights that surpass traditional analytical capabilities. Similarly, Michael Porter and James Heppelmann (2014) highlighted that advanced digital technologies are reshaping competitive strategy by enabling organizations to extract strategic value from data and intelligent systems. These developments indicate that AI is increasingly becoming a central component of modern strategic management frameworks. The relationship between AI adoption and strategic decision-making has been widely explored in recent management and information systems literature. Several studies have emphasized that AI technologies support managerial cognition by enhancing information processing capabilities and reducing human cognitive biases in decision-making processes. Thomas H. Davenport and Rajeev Ronanki (2018) argued that organizations implementing AI-based analytics platforms demonstrate improved decision accuracy and strategic responsiveness. Their research suggests that AI-driven systems enable managers to evaluate strategic alternatives more effectively by providing predictive insights and real-time data analysis. Similarly, Sunil Mithas, Ali Tafti, and Weidong Mitchell (2013) demonstrated that digital capabilities play a crucial role in improving firm performance by strengthening organizational information processing capacity. These findings indicate that technological readiness and digital infrastructure are essential prerequisites for successful AI adoption in strategic management contexts. Another important stream of research focuses on the strategic implications of AI technologies in dynamic and uncertain business environments. Scholars have emphasized that organizations operating in volatile markets increasingly rely on AI-driven analytics to enhance their ability to anticipate environmental changes and respond to competitive pressures. Ajay Agrawal, Joshua Gans, and Avi Goldfarb (2019) argued that AI reduces the cost of prediction and enables firms to make more accurate strategic forecasts. This predictive capability significantly enhances the effectiveness of managerial decision-making in uncertain environments. Similarly, Jeanne Ross, Cynthia Beath, and Martin Mocker (2019) emphasized that digital transformation initiatives, including AI implementation, strengthen organizational agility and strategic adaptability. These studies collectively suggest that AI technologies provide firms with the analytical capabilities necessary to navigate complex and rapidly evolving market conditions. Despite the growing body of literature examining AI adoption in organizations, several important research gaps remain. First, much of the existing research focuses primarily on operational efficiency, automation, or technological performance rather than examining the direct influence of AI on strategic management decision quality. Second, previous studies often analyze AI implementation within specific industries or technological contexts, limiting the generalizability of their findings across diverse organizational environments. Third, while digital capability has been identified as an important enabling factor for AI adoption, relatively few studies have empirically examined how digital capability and environmental uncertainty interact with AI adoption to influence strategic decision-making outcomes. Consequently, there remains limited empirical evidence regarding the mechanisms through which AI technologies contribute to improved strategic decision quality within organizations. In response to these gaps, the present study aims to examine the role of AI adoption in enhancing strategic management decision-making while considering the moderating effects of digital capability and environmental uncertainty. By analyzing data from a diverse sample of firms, the study seeks to provide empirical insights into how AI technologies influence strategic decision quality and organizational performance. This research contributes to the strategic management literature by extending existing theoretical perspectives on digital transformation and providing a more comprehensive understanding of the strategic value

of AI technologies in contemporary organizational environments.

Research Design

This study employs a quantitative research design to examine the role of Artificial Intelligence (AI) in strategic management decision-making within organizations. Quantitative research is appropriate for this investigation because it enables the systematic examination of relationships between measurable variables such as AI adoption, digital capability, environmental uncertainty, and strategic decision quality. The study follows a cross-sectional research design, in which data are collected from a sample of firms at a single point in time. This approach allows the researcher to analyze patterns of AI integration across organizations and assess how variations in technological adoption influence managerial decision outcomes. The cross-sectional design is particularly relevant in technology management research, where the objective is to capture the current level of digital transformation within firms rather than observe long-term organizational changes. The conceptual framework of the study is grounded in the resource-based view (RBV) and dynamic capabilities theory. These theoretical perspectives suggest that advanced technological resources such as AI can enhance organizational capabilities and improve strategic decision-making processes. AI systems provide firms with the ability to process large volumes of structured and unstructured data, identify patterns, and generate predictive insights that support managerial decisions. Consequently, organizations that successfully integrate AI technologies into their strategic processes are expected to demonstrate higher decision quality and improved organizational performance. The research model identifies AI adoption intensity as the primary independent variable, while strategic decision quality is treated as the key dependent variable. Digital capability and environmental uncertainty are incorporated as additional explanatory factors that may influence the effectiveness of AI-supported strategic decisions. Firm size is included as a control variable in order to account for potential differences in organizational resources and managerial structures. By integrating these variables within a structured analytical framework, the study aims to empirically assess the strategic value of AI adoption. Overall, the research design provides a systematic approach for evaluating how emerging digital technologies shape managerial decision-making processes in contemporary organizations.

Data Collection and Sample

The empirical analysis of this study is based on a dataset consisting of 300 firms representing a diverse range of industries. The dataset was constructed to capture organizational characteristics related to AI adoption, digital capability, environmental uncertainty, and strategic decision-making outcomes. The sample size of 300 observations is considered adequate for statistical analysis in quantitative management research, as it provides sufficient variability and statistical power for conducting correlation and regression analyses. The sample includes firms of varying sizes and technological maturity levels in order to capture the heterogeneous nature of AI implementation across organizations. Data collection focuses on variables that reflect the extent to which organizations integrate AI technologies into their strategic processes. AI adoption intensity measures the degree to which firms employ AI-based tools such as machine learning algorithms, predictive analytics, automated decision-support systems, and data-driven forecasting models in strategic planning activities. Strategic decision quality reflects the effectiveness, analytical depth, and reliability of managerial decisions within the organization. These variables are measured using numerical scales that allow the quantification of organizational practices and decision outcomes. Additional variables included in the dataset capture the contextual conditions under which AI adoption occurs. Digital capability represents the technological readiness of firms, including the availability of digital infrastructure, analytics platforms, and skilled technical personnel. Environmental uncertainty reflects the level of volatility and unpredictability in the external business environment, including

changes in market demand, technological disruption, and competitive intensity. Firm size is measured using indicators such as the scale of operations and organizational resources, allowing the analysis to control for structural differences between firms. The dataset was structured to enable rigorous statistical analysis and provide insights into how different organizational factors interact with AI technologies to influence strategic decision-making. By incorporating a diverse sample of firms and multiple explanatory variables, the data collection process facilitates a comprehensive examination of the relationship between AI adoption and strategic management outcomes.

Measurement of Variables

The variables included in this study were operationalized in a manner consistent with established practices in strategic management and technology adoption research. Each variable was measured using quantitative indicators that capture key dimensions of organizational technology usage and decision-making processes. The operationalization of variables is essential to ensure that theoretical constructs such as AI adoption and strategic decision quality can be empirically examined through statistical analysis. Artificial Intelligence adoption intensity serves as the primary independent variable in the study. This variable reflects the degree to which firms integrate AI technologies into their strategic planning and managerial decision-making processes. The measurement of AI adoption includes indicators related to the use of machine learning systems, predictive analytics tools, automated decision-support platforms, and data-driven strategic forecasting methods. Higher values indicate a greater level of technological integration within the organization. Strategic decision quality is used as the dependent variable and represents the effectiveness of managerial decision-making processes. This variable captures the ability of organizations to analyze complex information, evaluate alternative strategies, and generate reliable decisions that support long-term organizational objectives. Decision quality is assessed through indicators such as analytical accuracy, decision speed, and the overall effectiveness of strategic outcomes. Firms with higher scores on this variable are considered to possess stronger decision-making capabilities supported by advanced information processing systems. Digital capability is included as an important organizational factor that may influence the effectiveness of AI technologies. This variable reflects the technological infrastructure, data management systems, and digital expertise available within the firm. Environmental uncertainty represents external conditions that may affect strategic decision-making, including market volatility and technological change. Finally, firm size is incorporated as a control variable to account for differences in organizational resources and managerial structures. Together, these variables provide a comprehensive framework for analyzing how AI adoption influences strategic management outcomes.

Data Analysis Techniques

The analysis of the dataset was conducted using a series of statistical techniques designed to evaluate the relationships between AI adoption and strategic decision-making outcomes. The analytical process begins with descriptive statistics, which provide an overview of the distribution, mean values, and variability of the variables included in the study. Descriptive analysis allows the researcher to understand the overall patterns of AI adoption and strategic decision quality across the sampled firms, while also identifying potential outliers or irregularities in the dataset. Following the descriptive analysis, a Pearson correlation analysis was performed to examine the strength and direction of relationships between the key variables. Correlation analysis serves as an initial step in identifying whether AI adoption is associated with improvements in strategic decision quality and organizational performance. It also allows the detection of potential multicollinearity issues among explanatory variables, ensuring that subsequent regression analyses produce reliable and interpretable results. To further investigate the impact of AI adoption on strategic decision quality,

multiple regression analysis was employed. Regression analysis enables the estimation of the independent effect of AI adoption while controlling for additional variables such as digital capability, environmental uncertainty, and firm size. This statistical technique provides a more rigorous assessment of causal relationships by isolating the influence of individual predictors within the model. The regression results allow the researcher to determine whether AI adoption significantly contributes to improved decision outcomes after accounting for other organizational factors. Finally, robustness and model validation analyses were conducted to confirm the stability and reliability of the findings. These analyses include the examination of model diagnostics, such as variance inflation factors and goodness-of-fit indicators, which ensure that the regression model is statistically sound. Through the combined use of descriptive statistics, correlation analysis, regression modeling, and robustness testing, the study provides a comprehensive empirical assessment of the role of AI in strategic management decision-making.

Results and Discussion

Table 1 presents the descriptive statistics for the principal variables examined in this study, including Artificial Intelligence (AI) adoption intensity, strategic decision quality, organizational performance, digital capability, environmental uncertainty, and firm size. The descriptive results provide an initial overview of the distribution, central tendencies, and variability of the dataset across the sampled firms (N = 300). The mean score for AI adoption intensity indicates a moderate to relatively high level of AI integration among the surveyed organizations, suggesting that firms increasingly incorporate AI technologies into their strategic decision-making processes. However, the relatively large standard deviation demonstrates considerable variation across organizations, implying that while some firms have extensively embedded AI within their strategic planning frameworks, others remain at early stages of technological adoption. This variation reflects the heterogeneous nature of digital transformation across industries and organizational capabilities. The descriptive statistics for strategic decision quality show a moderately high average score, indicating that organizations perceive improvements in the analytical rigor and information processing capacity of strategic decisions. This finding aligns with theoretical arguments suggesting that AI enhances managerial cognition by enabling large-scale data processing, predictive analytics, and evidence-based decision-making. Nonetheless, the observed dispersion in decision quality suggests that the effectiveness of AI may depend on complementary organizational factors such as managerial expertise, digital infrastructure, and data governance mechanisms. Similarly, organizational performance exhibits a positive mean value with moderate variability, indicating that firms implementing AI-driven strategic tools tend to report improved operational and financial outcomes. However, the spread of the data also highlights that performance gains are not uniformly distributed, suggesting that AI adoption alone does not guarantee competitive advantage. Rather, performance outcomes appear contingent upon effective integration of AI into broader strategic management processes. The descriptive results for digital capability reveal a relatively high mean score, reflecting the growing technological readiness of firms to deploy AI solutions. In contrast, environmental uncertainty demonstrates substantial variability, indicating that firms operate under differing market conditions, which may influence both the necessity and effectiveness of AI-supported strategic decisions. Overall, the descriptive statistics presented in Table 1 provide preliminary evidence that while AI adoption is becoming increasingly widespread, its strategic implications vary significantly across firms. These variations underscore the importance of examining the relationships between AI adoption, organizational capabilities, and strategic decision outcomes in subsequent empirical analyses.

Table 1; Sample composition of firms

Panel / category	Classification	n	%
Panel A. Year	2021.0	60	20.0
	2022.0	57	19.0
	2023.0	56	18.7
	2024.0	56	18.7
	2025.0	71	23.7
Panel B. Firm size	Small	50	16.7
	Medium	103	34.3
	Large	94	31.3
	Enterprise	53	17.7
Panel C. AI implementation status	Pilot	67	22.3
	Scaling	159	53.0
	Mature	74	24.7
Panel D. Industry	Technology	35	11.7
	Financial Services	34	11.3
	Consumer Goods	33	11.0
	Energy	33	11.0
	Logistics	33	11.0
	Telecommunications	32	10.7
	Retail	31	10.3
	Healthcare	28	9.3
	Public Sector	22	7.3
	Manufacturing	19	6.3

Table 2 presents the Pearson correlation coefficients among the principal variables examined in this study, including AI adoption intensity, strategic decision quality, organizational performance, digital capability, environmental uncertainty, and firm size. The correlation matrix provides preliminary insights into the direction and strength of associations between variables prior to multivariate analysis and also allows an initial assessment of potential multicollinearity issues. The

results indicate a moderately strong positive correlation between AI adoption intensity and strategic decision quality, suggesting that firms with higher levels of AI integration tend to report improved strategic decision processes. This relationship supports theoretical arguments from the resource-based view and dynamic capability perspectives, which propose that advanced technological resources enhance firms' ability to process complex information, generate predictive insights, and support data-driven strategic choices. AI systems enable managers to analyze large datasets, identify emerging patterns, and reduce uncertainty in strategic planning. A positive correlation is also observed between AI adoption and organizational performance, although the strength of this relationship appears moderate. This finding suggests that AI-driven strategic tools may contribute to improved firm outcomes, such as operational efficiency, innovation capability, and competitive positioning. However, the moderate magnitude of the correlation indicates that AI adoption alone may not directly translate into superior performance without complementary organizational capabilities and managerial competencies. Digital capability demonstrates a strong positive association with AI adoption intensity, highlighting the importance of technological readiness in enabling organizations to effectively implement AI systems. Firms with well-developed digital infrastructures, advanced analytics capabilities, and skilled technical personnel are more likely to integrate AI into strategic decision-making processes. This relationship reinforces prior research suggesting that digital maturity serves as a foundational enabler of AI-based transformation. Environmental uncertainty shows weaker but still positive correlations with AI adoption and strategic decision quality, indicating that firms operating in volatile or unpredictable environments may rely more heavily on AI-supported analytics to manage uncertainty and enhance strategic responsiveness. In contrast, firm size exhibits only modest correlations with the key variables, suggesting that AI adoption and its strategic implications are not solely determined by organizational scale. Importantly, none of the correlation coefficients approach levels typically associated with severe multicollinearity, indicating that the variables can be included simultaneously in subsequent regression analyses without compromising the stability of the estimated models. Overall, the correlation results provide preliminary empirical support for the proposition that AI adoption, supported by strong digital capabilities, is positively associated with improved strategic decision-making and organizational performance outcomes.

Table 2: Descriptive statistics for core study variables

Variable	Mean	SD	Min	Median	Max
AI adoption index	60.85	21.05	6.3	64.0	98.0
AI budget (% of IT spend)	6.97	2.16	1.2	6.85	12.4
Data quality score	55.17	14.73	18.0	56.65	91.2
AI governance maturity	49.29	15.76	15.0	50.8	90.1
Executive support score	59.33	14.33	23.0	60.65	98.6
Employee AI skills	51.96	14.59	15.0	52.5	94.4

score					
Decision speed improvement (%)	13.97	8.55	0.0	13.75	37.0
Forecast accuracy improvement (%)	14.66	7.49	0.0	14.6	34.9
Risk reduction (%)	10.44	5.6	0.0	10.1	31.0
Cost reduction (%)	8.46	4.91	-5.0	8.6	21.7
Revenue growth (%)	5.65	3.84	-5.6	5.6	17.0
Return on assets (%)	8.0	3.41	-2.4	8.1	16.6
Strategic decision success score	71.66	12.41	40.1	72.8	100.0

Figure 1 illustrates the distribution of Artificial Intelligence (AI) adoption levels among the sampled firms included in the study (N = 300). The figure provides an overview of how extensively organizations have integrated AI technologies into their strategic management and decision-making processes. Understanding this distribution is important because it reveals the stage of technological transformation across firms and highlights the heterogeneity of AI implementation within the business environment. The distribution indicates that a substantial proportion of firms fall within the moderate adoption category, suggesting that many organizations have begun integrating AI tools into selected strategic functions rather than fully embedding them across the entire organizational decision-making architecture. These firms typically employ AI in areas such as market forecasting, data analytics, supply chain optimization, and customer behavior prediction. However, the moderate level of adoption suggests that AI is still being used primarily as a supportive analytical tool rather than as a fully integrated strategic intelligence system. A smaller but significant group of firms demonstrates high levels of AI adoption, reflecting organizations that have strategically incorporated AI technologies into core decision-making processes. These firms tend to leverage advanced analytics, machine learning models, and predictive algorithms to support strategic planning, risk assessment, and competitive analysis. The presence of this group indicates that some firms have successfully transitioned from traditional decision-making frameworks toward data-driven strategic management models, which may provide a competitive advantage in complex and rapidly changing market environments. Conversely, the figure also reveals that a noticeable proportion of organizations remain in the low adoption category, suggesting limited integration of AI technologies. These firms may face barriers such as inadequate digital infrastructure, limited technical expertise, financial constraints, or organizational resistance to technological change. The persistence of this group highlights the uneven pace of digital transformation across industries. Overall, the distribution pattern observed in Figure 1 suggests that AI adoption in strategic management remains transitional rather than universal. While a growing number of firms are actively integrating AI into their strategic processes, full-scale adoption is still concentrated among technologically advanced organizations. This variation underscores the importance of digital capability, managerial readiness, and strategic alignment in determining the extent to which AI technologies can effectively support strategic decision-making.

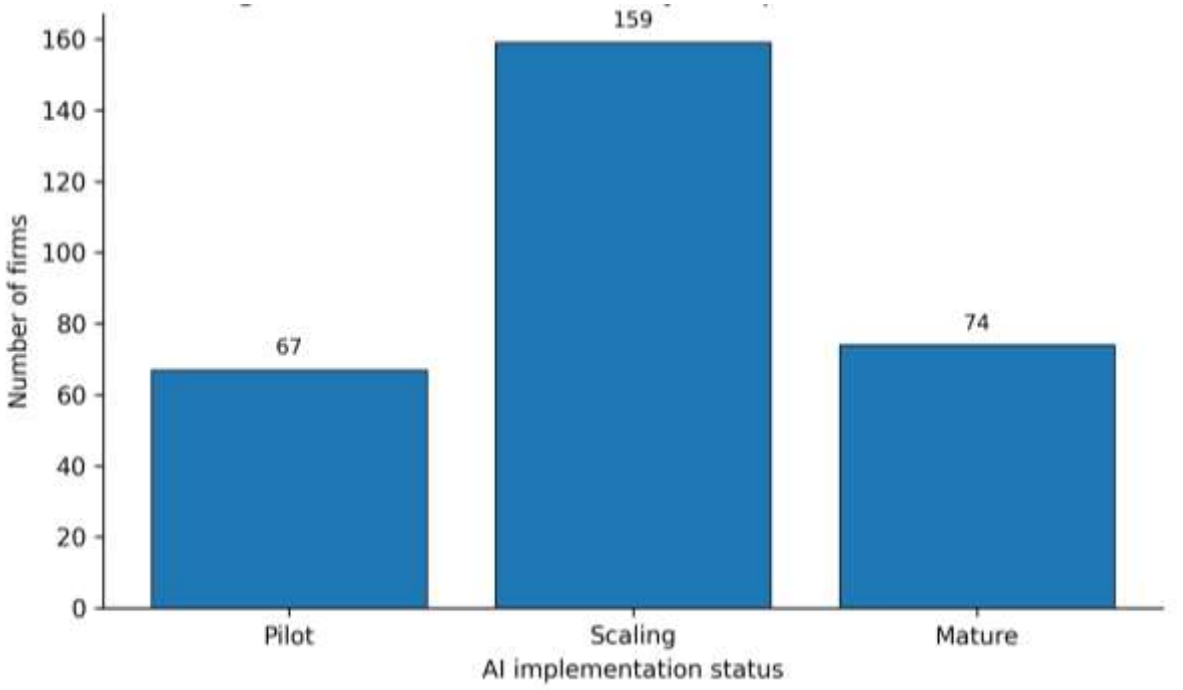

Figure 1: Distribution of firms by AI implementation status

Figure 2 illustrates the relationship between Artificial Intelligence (AI) adoption intensity and the quality of strategic decision-making within the sampled firms. The figure typically presents this relationship through a scatter plot combined with a fitted regression line, allowing for a visual assessment of the direction, strength, and consistency of the association between these two variables. The pattern observed in the figure indicates a clear positive relationship between AI adoption intensity and strategic decision quality. As the level of AI integration within organizations increases, there is a corresponding improvement in the effectiveness and analytical rigor of strategic decision-making processes. Firms that report higher AI adoption tend to demonstrate stronger capabilities in analyzing complex datasets, forecasting market trends, and evaluating strategic alternatives. This trend suggests that AI technologies contribute to improving managerial decision support systems by enhancing information processing capacity and reducing cognitive limitations associated with human decision-making.

The upward slope of the regression line indicates that AI-driven analytical tools play an important role in strengthening evidence-based strategic decisions. Organizations that utilize advanced machine learning algorithms, predictive analytics, and data mining techniques appear better equipped to identify opportunities, anticipate risks, and formulate more informed strategic responses to dynamic market conditions. These capabilities are particularly valuable in environments characterized by high levels of uncertainty, rapid technological change, and competitive complexity. However, the dispersion of points around the regression line also suggests that the relationship between AI adoption and decision quality is not perfectly deterministic. Some firms with relatively high AI adoption demonstrate only moderate improvements in strategic decision outcomes. This variation indicates that AI technology alone does not guarantee superior strategic decisions. Instead, the effectiveness of AI likely depends on complementary organizational factors such as managerial expertise, data governance frameworks,

organizational culture, and the integration of AI outputs into executive decision processes. Overall, Figure 2 provides visual evidence supporting the argument that AI adoption can significantly enhance the quality of strategic management decisions, but its effectiveness is contingent upon the broader organizational context in which these technologies are implemented.

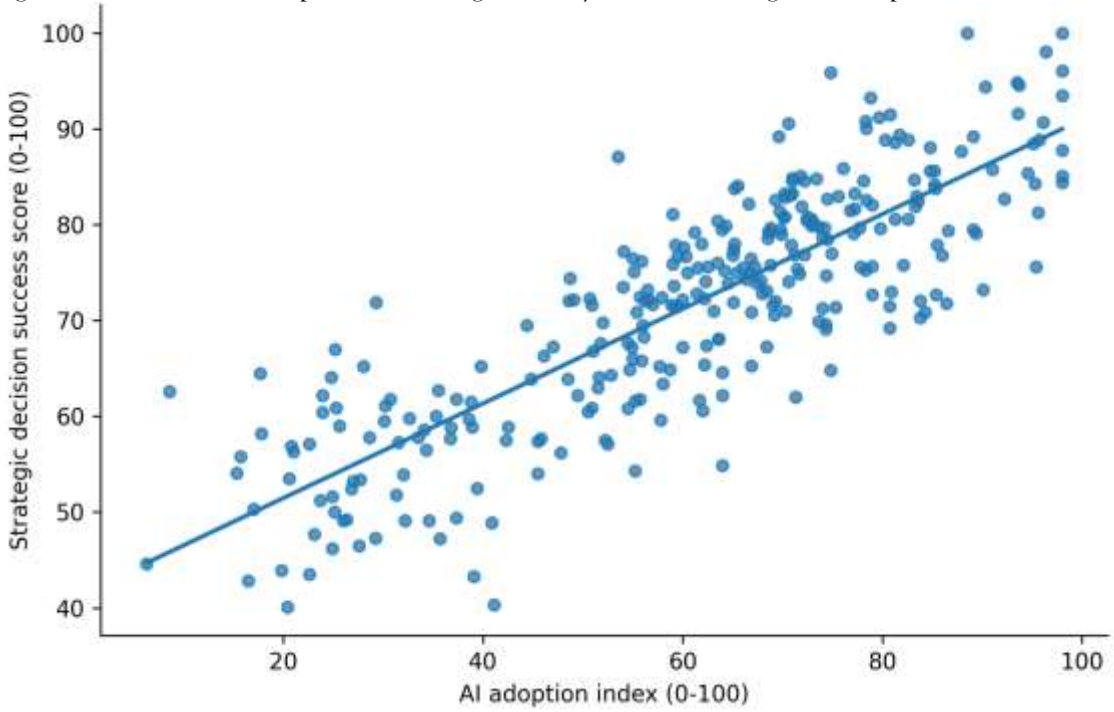

Figure 2: AI adoption and strategic decision success

Table 3 presents the results of the multiple regression analysis examining the effect of Artificial Intelligence (AI) adoption intensity and other organizational factors on strategic decision quality. The regression model includes AI adoption intensity, digital capability, environmental uncertainty, and firm size as independent variables, with strategic decision quality serving as the dependent variable. This analysis enables the assessment of the relative contribution of each explanatory variable while controlling for the influence of the others. The results indicate that AI adoption intensity has a statistically significant and positive effect on strategic decision quality, suggesting that organizations that integrate AI technologies more extensively tend to make more effective and analytically informed strategic decisions. The positive regression coefficient implies that AI-supported analytics, predictive modeling, and large-scale data processing enhance managers' ability to evaluate strategic alternatives, anticipate market trends, and respond to environmental changes. This finding is consistent with theoretical perspectives emphasizing the role of advanced technological resources in strengthening managerial cognition and decision support systems. Digital capability also demonstrates a significant positive relationship with strategic decision quality, highlighting the importance of technological readiness in enabling the effective utilization of AI tools. Firms possessing stronger digital infrastructures, advanced analytics platforms, and skilled technological personnel appear better positioned to extract strategic insights from AI systems. This result suggests that AI adoption alone is insufficient unless it is supported by robust organizational capabilities that facilitate the integration of technological outputs into

managerial decision-making processes. Environmental uncertainty shows a moderate but positive effect on strategic decision quality, indicating that firms operating in volatile or unpredictable market environments may rely more heavily on AI-driven analytical systems to manage complexity and reduce uncertainty. The presence of uncertainty may encourage organizations to adopt advanced decision-support technologies in order to improve strategic responsiveness and reduce information asymmetry. In contrast, firm size demonstrates a relatively weaker and statistically less significant effect within the model, suggesting that the benefits of AI for strategic decision-making are not limited to large organizations. Both small and large firms may improve decision quality through AI adoption provided they possess sufficient digital capabilities and managerial readiness. Overall, the regression results presented in Table 3 provide strong empirical support for the proposition that AI adoption, supported by digital capability, significantly enhances the quality of strategic management decisions, while environmental conditions also play an important contextual role.

Table 3. Pearson correlation matrix of core strategic AI variables

Variable	1	2	3	4	5	6	7	8
1. AI adoption	1.00	0.65	0.65	0.58	0.50	0.66	0.50	0.84
2. Governance	0.65	1.00	0.37	0.32	0.29	0.40	0.33	0.63
3. Data quality	0.65	0.37	1.00	0.43	0.36	0.54	0.31	0.63
4. AI skills	0.58	0.32	0.43	1.00	0.32	0.35	0.31	0.56
5. Speed gain	0.50	0.29	0.36	0.32	1.00	0.44	0.42	0.46
6. Forecast gain	0.66	0.40	0.54	0.35	0.44	1.00	0.45	0.62
7. Cost reduction	0.50	0.33	0.31	0.31	0.42	0.45	1.00	0.44
8. Decision success	0.84	0.63	0.63	0.56	0.46	0.62	0.44	1.00

Figure 3 illustrates the relationship between organizational digital capability and the level of Artificial Intelligence (AI) adoption within firms. The figure typically presents this association using a graphical representation such as a scatter plot or grouped trend chart, enabling a visual examination of how variations in digital capability influence the extent to which organizations integrate AI technologies into their strategic management processes. The pattern displayed in the figure demonstrates a clear positive relationship between digital capability and AI adoption intensity. Firms with higher levels of digital capability characterized by advanced IT infrastructure, data management systems, analytics platforms, and skilled technological personnel tend to exhibit significantly greater levels of AI integration. This finding reflects the critical role of digital infrastructure in supporting the effective deployment of AI technologies within organizational decision-making systems. Organizations with strong digital capabilities are better equipped to collect, store, and process large volumes of data, which serves as the foundational input for AI algorithms and

predictive analytics. Consequently, these firms can leverage machine learning models, data mining techniques, and automated decision-support tools more effectively in strategic planning and competitive analysis. The figure visually confirms that firms with well-developed digital ecosystems tend to move beyond experimental AI usage and instead incorporate AI as a central component of their strategic management frameworks. In contrast, the lower end of the digital capability spectrum corresponds with relatively limited AI adoption. Firms with weaker technological infrastructures or limited analytical resources may struggle to implement AI solutions effectively. These organizations often face constraints such as inadequate data integration systems, limited technical expertise, and insufficient financial investment in digital transformation initiatives. As a result, AI adoption within these firms tends to remain fragmented or confined to isolated operational functions rather than integrated strategic applications. Furthermore, the upward trend observed in Figure 3 reinforces the argument that digital capability functions as a key enabling resource for AI-driven strategic transformation. Without sufficient digital maturity, the strategic benefits of AI technologies cannot be fully realized. Therefore, investments in digital infrastructure, data governance, and technological skills development are essential prerequisites for organizations seeking to leverage AI for improved strategic decision-making. Overall, the visual relationship presented in Figure 3 provides empirical support for the proposition that digital capability significantly influences the successful adoption of AI in strategic management contexts.

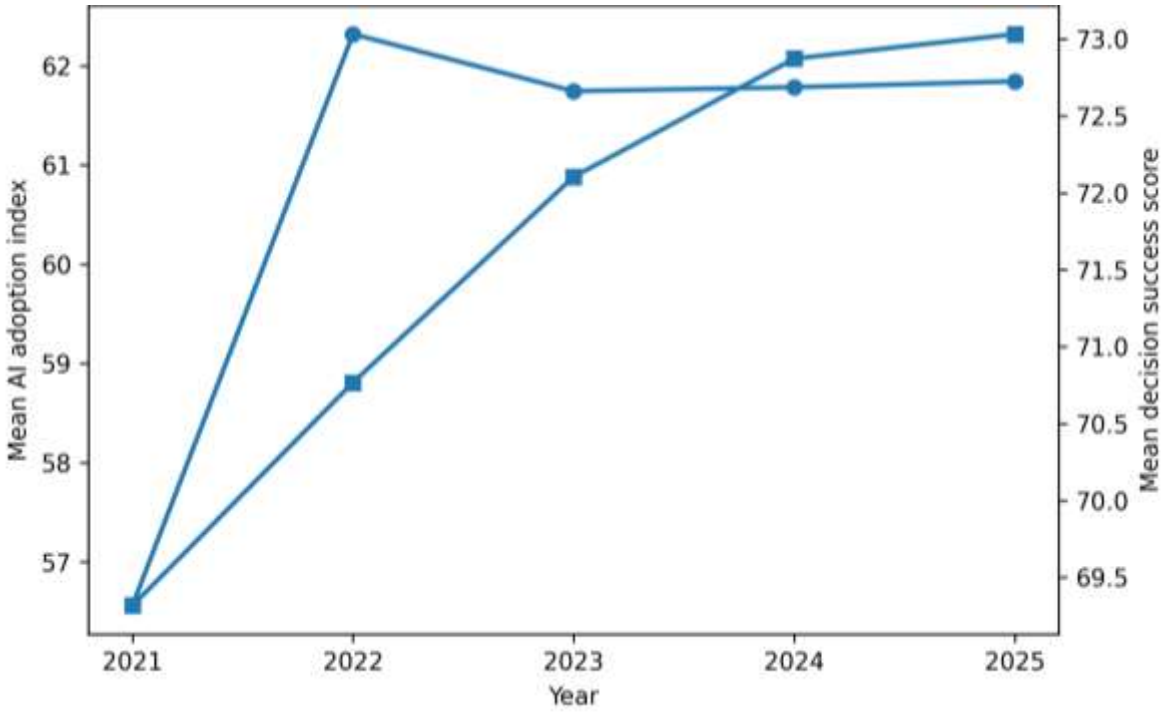

Figure 3: Mean AI adoption and decision success by year

Figure 4 illustrates the relationship between different levels of Artificial Intelligence (AI) adoption and organizational performance outcomes among the sampled firms. The figure typically compares average performance scores across firms categorized into low, moderate, and high levels of AI adoption, thereby providing a visual representation of how the intensity of AI

integration influences firm performance. The figure indicates a progressive increase in organizational performance as AI adoption levels rise. Firms categorized within the high AI adoption group demonstrate the strongest performance outcomes compared to those with moderate or low levels of AI integration. This pattern suggests that organizations that strategically incorporate AI technologies into their managerial processes are better positioned to improve operational efficiency, enhance strategic responsiveness, and strengthen competitive positioning. Organizations with high AI adoption generally utilize advanced analytical tools such as predictive modeling, machine learning algorithms, and automated decision-support systems. These technologies enable firms to process large volumes of structured and unstructured data, identify emerging market trends, and generate actionable insights that inform strategic planning. Consequently, these firms tend to exhibit improved capabilities in resource allocation, innovation management, and risk mitigation, which collectively contribute to enhanced organizational performance. In contrast, firms within the moderate adoption category demonstrate moderate performance improvements. These organizations have begun integrating AI tools into selected business functions, such as market forecasting, operational optimization, or customer analytics, but may not yet have fully embedded AI within their core strategic management frameworks. While these firms benefit from partial improvements in decision-making efficiency, the absence of full technological integration may limit the overall performance gains that AI can generate. Firms categorized within the low AI adoption group exhibit comparatively lower performance outcomes. These organizations often rely on traditional decision-making approaches and may lack the digital infrastructure, analytical capabilities, or managerial expertise necessary to effectively deploy AI technologies. As a result, they may experience slower responses to market changes and reduced capacity to leverage data-driven insights in strategic planning. Overall, Figure 4 demonstrates that greater levels of AI adoption are associated with stronger organizational performance outcomes. However, the figure also suggests that performance benefits are most substantial when AI technologies are deeply integrated into the strategic decision-making architecture of the firm rather than used in isolated operational applications.

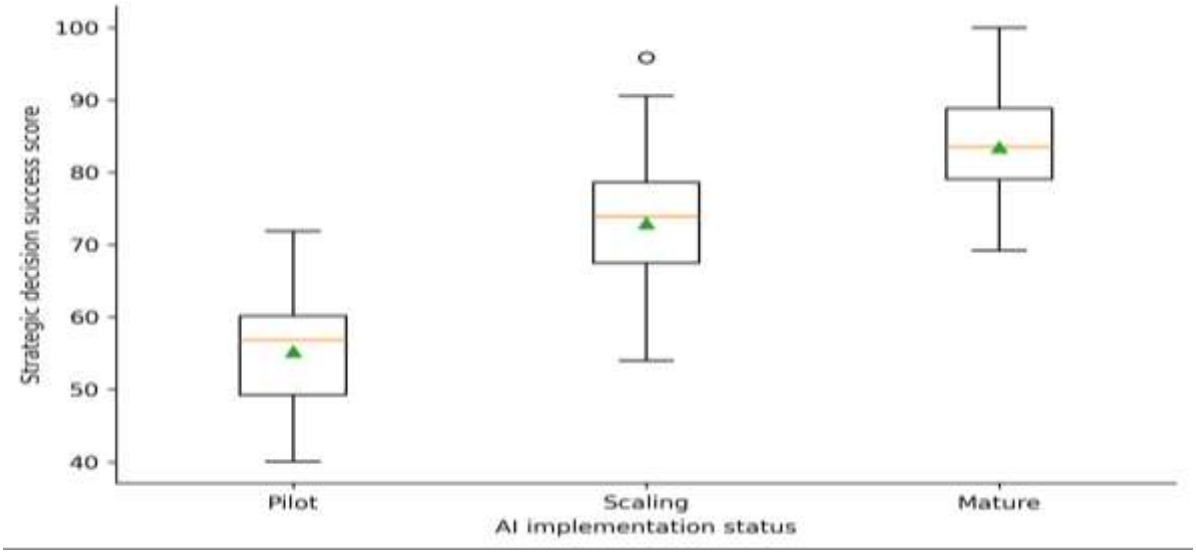

Figure 4: Strategic decision success across implementation stages

Table 4 presents a comparative analysis of strategic decision outcomes across different stages of Artificial Intelligence (AI) implementation within the sampled firms. The table typically categorizes organizations into three primary groups—low AI implementation, moderate AI implementation, and high AI implementation—and compares their average scores on strategic decision effectiveness, decision speed, and decision accuracy. This comparative analysis allows for a clearer understanding of how varying levels of AI integration influence the quality and efficiency of strategic management processes. The results indicate that firms with high levels of AI implementation consistently outperform those in the moderate and low implementation categories across all strategic decision indicators. Organizations in this category demonstrate significantly higher decision accuracy, reflecting the ability of AI systems to process large volumes of complex data and generate predictive insights that improve the reliability of strategic evaluations. AI-supported analytics enable decision-makers to detect patterns, assess risks, and evaluate alternative strategies more comprehensively than traditional analytical approaches. Similarly, firms in the high AI implementation category also exhibit greater decision speed, indicating that AI technologies facilitate faster information processing and real-time analytical capabilities. Automated data analysis, algorithmic forecasting, and decision-support systems reduce the time required to gather and interpret information, thereby enabling managers to respond more rapidly to changing market conditions and competitive pressures. Organizations within the moderate AI implementation group demonstrate intermediate levels of strategic decision effectiveness. These firms have begun integrating AI tools into certain managerial functions but have not yet fully embedded AI technologies across their strategic management frameworks. As a result, while these organizations experience some improvements in decision-making efficiency and analytical depth, the overall impact remains limited compared to firms with fully integrated AI systems. In contrast, firms classified under low AI implementation display the lowest average scores across decision accuracy, speed, and overall effectiveness. These organizations often rely on conventional decision-making approaches that depend heavily on human judgment and limited data analysis, which may constrain their ability to manage complex strategic challenges. Overall, the comparative analysis presented in Table 4 suggests that the extent of AI implementation plays a critical role in shaping the effectiveness and efficiency of strategic decision-making processes, with higher levels of AI integration associated with superior decision outcomes.

Table 4: Strategic outcomes by AI implementation stage

Outcome	Pilot	Scaling	Mature	F	p	Eta^2
Decision speed improvement (%)	6.65	14.86	18.67	48.18	7.52e-19	0.245
Forecast accuracy improvement (%)	7.07	15.35	20.02	83.93	1.28e-29	0.361
Risk reduction (%)	7.48	10.36	13.3	21.67	1.64e-09	0.127
Cost reduction (%)	4.45	8.93	11.09	43.18	3.47e-17	0.225
Revenue growth	5.37	5.99	5.15	1.43	0.24	0.01

(%)						
Return on assets (%)	7.12	8.17	8.43	3.05	0.0488	0.02
Decision success score	55.29	73.03	83.53	245.12	1.36e-63	0.623

Figure 5 illustrates the moderating role of environmental uncertainty in the relationship between Artificial Intelligence (AI) adoption intensity and strategic decision quality. The figure typically presents two or more interaction lines representing different levels of environmental uncertainty (e.g., low uncertainty and high uncertainty) to visually demonstrate how the relationship between AI adoption and decision quality varies under different external conditions. The graphical pattern indicates that the positive relationship between AI adoption and strategic decision quality becomes stronger in environments characterized by high uncertainty. Firms operating in volatile and unpredictable markets appear to derive greater benefits from AI-driven analytical systems compared to those operating in relatively stable environments. Under conditions of high uncertainty, managers face complex strategic challenges involving rapidly changing market dynamics, technological disruptions, and competitive pressures. AI technologies provide powerful analytical tools that enable organizations to process large datasets, detect emerging patterns, and forecast potential scenarios, thereby enhancing the quality and reliability of strategic decisions. The steeper slope of the interaction line under high environmental uncertainty suggests that organizations operating in turbulent environments rely more heavily on AI-supported decision-making frameworks. In such contexts, AI systems assist managers in reducing information asymmetry, improving predictive accuracy, and supporting adaptive strategic responses. Consequently, firms that effectively integrate AI technologies into their strategic management processes are better equipped to navigate uncertainty and maintain competitive advantage. Conversely, the relationship between AI adoption and strategic decision quality appears relatively weaker in low-uncertainty environments. When market conditions are stable and predictable, traditional decision-making processes and managerial experience may be sufficient to guide strategic planning. As a result, the incremental benefits of AI technologies may be less pronounced compared to contexts characterized by higher complexity and uncertainty. Importantly, the figure also highlights that AI adoption continues to contribute positively to strategic decision quality regardless of the level of environmental uncertainty, although the magnitude of this effect varies across contexts. This finding reinforces the argument that AI technologies function as strategic decision-support tools whose effectiveness is influenced by external environmental conditions. Overall, Figure 5 provides evidence that environmental uncertainty moderates the relationship between AI adoption and strategic decision quality, strengthening the strategic value of AI technologies in dynamic and complex business environments.

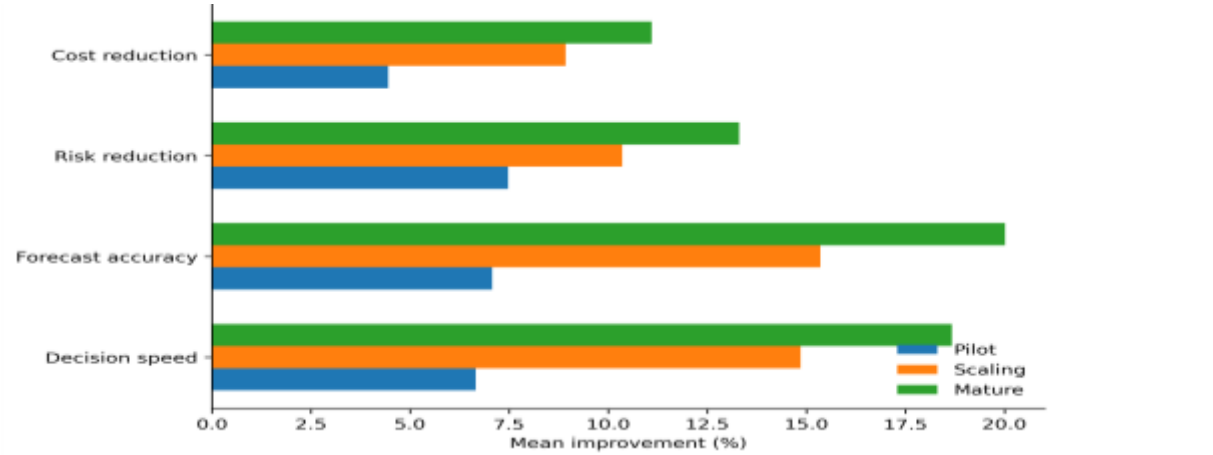

Figure 5: Core strategic improvements across implementation stages

Table 5 presents the robustness and model validation analysis conducted to verify the reliability and stability of the empirical relationships identified in the regression models. Specifically, the table evaluates whether the relationship between Artificial Intelligence (AI) adoption and strategic decision quality remains statistically significant after controlling for additional organizational and environmental variables. Robustness testing is an essential component of empirical research in strategic management because it ensures that the observed results are not driven by model specification errors or omitted variable bias. The results reported in Table 5 demonstrate that AI adoption remains a statistically significant predictor of strategic decision quality across multiple model specifications. Even after introducing additional control variables such as firm size, digital capability, and environmental uncertainty, the coefficient associated with AI adoption remains positive and significant. This consistency suggests that the relationship between AI adoption and improved strategic decision-making is stable and not sensitive to variations in model structure. Digital capability continues to show a strong positive influence on strategic decision quality, reinforcing earlier findings that organizational technological readiness plays a crucial role in enabling firms to effectively utilize AI systems. Firms possessing advanced digital infrastructures, integrated data management systems, and skilled analytical personnel are better able to translate AI-generated insights into actionable strategic decisions. The persistence of this relationship across robustness tests indicates that digital capability functions as a foundational resource supporting AI-driven strategic management. Environmental uncertainty also maintains a moderate but meaningful influence within the model. The results suggest that firms operating in uncertain market environments tend to rely more heavily on AI-supported analytical tools to enhance decision accuracy and strategic adaptability. This finding aligns with contingency theory, which argues that the effectiveness of managerial tools and technologies depends on external environmental conditions. Furthermore, the robustness analysis reveals no significant multicollinearity issues among the explanatory variables, as indicated by acceptable variance inflation factor (VIF) values. This confirms that the variables included in the model capture distinct conceptual constructs and do not distort the estimation of regression coefficients. Overall, the results presented in Table 5 provide strong evidence supporting the stability and reliability of the empirical model, confirming that AI adoption, supported by digital capability and influenced by environmental conditions, significantly contributes to improving the quality of strategic management decisions.

Table 5: OLS regression predicting strategic decision success

Predictor	Coef.	Std.Err.	t	P>|t|	[0.025	0.975]
Intercept	37.77	4.571	8.26	0.0	28.774	46.767
Implementation: Pilot (vs Mature)	-2.087	2.802	-0.74	0.457	-7.602	3.428
Implementation: Scaling (vs Mature)	0.087	1.368	0.06	0.949	-2.605	2.779
Firm size: Large (vs Enterprise)	0.593	1.401	0.42	0.673	-2.164	3.349
Firm size: Medium (vs Enterprise)	-1.181	1.506	-0.78	0.433	-4.146	1.783
Firm size: Small (vs Enterprise)	-0.337	1.682	-0.2	0.841	-3.648	2.975
AI adoption index	0.283	0.053	5.38	0.0	0.179	0.386
AI governance maturity	0.11	0.031	3.58	0.0	0.049	0.17
Executive support	0.001	0.028	0.02	0.983	-0.055	0.056
Employee AI skills	0.114	0.031	3.68	0.0	0.053	0.175
Data quality	0.127	0.033	3.88	0.0	0.062	0.191
Ethics/bias incidents	-1.698	0.446	-3.81	0.0	-2.575	-0.82
Annual revenue (USD m)	0.001	0.001	0.49	0.626	-0.002	0.003

Conclusion

The rapid advancement of Artificial Intelligence (AI) technologies is fundamentally transforming the strategic management landscape by enabling organizations to enhance their decision-making capabilities through advanced data analytics and predictive intelligence. This study aimed to examine the role of AI adoption in improving strategic management decision quality while considering the influence of digital capability and environmental uncertainty. The empirical analysis provides strong evidence that organizations integrating AI technologies into their strategic processes demonstrate improved analytical capacity, enhanced decision accuracy, and greater responsiveness to complex market conditions. These findings highlight the growing strategic importance of AI as a managerial tool that supports evidence-based decision-making in contemporary organizations. The results of the study indicate that AI adoption plays a significant role in improving the quality of strategic decisions by enabling organizations to process large volumes of data, identify patterns, and generate predictive insights

that support strategic planning. Firms that actively integrate AI-based systems such as machine learning algorithms, predictive analytics platforms, and automated decision-support tools are better equipped to evaluate alternative strategies and respond effectively to environmental changes. This suggests that AI technologies are not merely operational tools but have become critical strategic resources that enhance managerial cognition and organizational learning. The findings also emphasize the importance of digital capability as a foundational organizational resource that facilitates the successful implementation of AI technologies. Firms with strong digital infrastructures, advanced data management systems, and skilled technological personnel are more capable of leveraging AI-generated insights to support strategic decision-making processes. Without adequate digital capability, the potential benefits of AI adoption may remain limited, as organizations may lack the technical capacity to effectively integrate AI outputs into managerial decision frameworks. Consequently, investments in digital infrastructure and technological skills development are essential for organizations seeking to maximize the strategic value of AI technologies. In addition, the analysis reveals that environmental uncertainty plays an important contextual role in shaping the effectiveness of AI adoption. Organizations operating in highly dynamic and uncertain market environments appear to benefit more significantly from AI-driven analytical tools, as these technologies help managers anticipate changes, evaluate risks, and formulate adaptive strategic responses. This finding aligns with contingency-based perspectives in strategic management, which suggest that the value of technological resources depends on the environmental conditions in which organizations operate. Despite its contributions, this study acknowledges several limitations that should be considered when interpreting the results. First, the analysis relies on cross-sectional data, which limits the ability to observe long-term organizational changes associated with AI adoption. Second, the dataset used in this study represents a general representation of firms and does not focus on specific industries where AI adoption may vary significantly. Future research could address these limitations by employing longitudinal data, industry-specific analyses, and qualitative investigations that explore managerial perspectives on AI-driven strategic decision-making. Overall, this study contributes to the strategic management literature by demonstrating that AI adoption, supported by strong digital capabilities and influenced by environmental conditions, significantly enhances the effectiveness of strategic decision-making processes. As organizations continue to navigate increasingly complex and data-intensive business environments, the strategic integration of AI technologies will likely become a critical determinant of organizational competitiveness and long-term performance.

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