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Empowering SME Potential: How AI Information Quality Fuels Market Orientation Success in the Digital Age

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Abstract

Small and medium enterprises (SMEs) face increasing pressure to leverage data for agile decision-making in today's competitive landscape. Existing market orientation frameworks, while valuable, often fail to capture the dynamic and rapidly changing market conditions that artificial intelligence (AI)-powered real-time insights can provide, creating a critical gap in understanding how SMEs can effectively integrate AI to enhance MO and drive performance. This study addresses this gap by exploring the moderating role of AI information quality on the relationship between MO and SME performance among 130 Malaysian SMEs actively using AI. Specifically, we examine how the accuracy and currency of AI-driven data influence the impact of customer orientation, competitor orientation, and inter-functional coordination on SME performance. Our findings reveal that high-quality AI information significantly amplifies the positive effects of both customer and competitor orientation on SME performance. This suggests that AI, combined with high-quality data, empowers SMEs with enhanced customer insights and competitive intelligence, leading to improved strategic adaptation and performance outcomes. These findings offer valuable implications for SMEs globally, suggesting that investments in high-quality AI-driven data and its integration with MO strategies can lead to significant performance gains across diverse markets. Furthermore, these findings inform policymakers on strategies to support SME growth in the digital economy by promoting AI adoption and data literacy initiatives.

Keywords Artificial intelligence · Market orientation · Customer orientation · Competitor orientation · Inter-functional coordination · Business performance

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Introduction

Small and medium enterprises (SMEs) are crucial drivers of global economic growth, contributing significantly to innovation, job creation, and GDP. However, these businesses face numerous challenges, particularly in developing economies. These challenges include fluctuating raw material costs, inconsistent global demand, currency volatility, skills shortages, increasing regulatory burdens, low productivity, and tight profit margins, all of which constrain SME growth and competitiveness (Kindström et al., 2022; Lin et al., 2021). While these challenges are global, their impact can be particularly acute in developing economies where SMEs often form the backbone of the economy, as seen in Malaysia, where they represent 97.4% of businesses, 48.2% of employment, and 38.4% of GDP. Many SMEs in such economies, including Malaysia, still rely heavily on manual labour due to limited automation, further exacerbating these challenges.

In today's increasingly competitive global marketplace, cultivating a market-oriented culture—one that effectively translates market information into superior customer value (Narver & Slater, 1990) is essential for sustained SME success (Kaushik & Dangwal, 2023; Wasim et al., 2024). However, the exponential growth of data, often referred to as the "data deluge", presents a significant hurdle (Mikalef et al., 2021). This data explosion, while offering the potential for valuable customer insights and informed strategic decision-making, poses a significant challenge for many SMEs worldwide. Resource-constrained environments, often prevalent in developing economies, can further exacerbate this challenge, as SMEs may lack the infrastructure and expertise to effectively process and interpret this information (Majeed et al., 2024; Verma et al., 2021). This data overload can lead to missed opportunities, misinformed decisions, and, ultimately, hinder performance globally.

The rise of data-driven decision-making and rapidly evolving market dynamics are challenging the efficacy of traditional market orientation frameworks for SMEs internationally. While market orientation remains a key driver of performance, existing research suggests its traditional form may not adequately address the multifaceted nature of performance in today's digital landscape (Wilson & Liguori, 2023). This challenge is amplified for SMEs globally, and particularly in developing countries, where resource constraints and a lack of understanding regarding data analytics can hinder the effective integration of information with market orientation strategies (Wasim et al., 2024). This underscores the need for updated frameworks that empower SMEs to leverage data analytics for enhanced market insights and agility in the global marketplace.

Artificial intelligence (AI) offers transformative potential for SMEs globally, promising to enhance market orientation through automated data collection and analysis, identification of valuable customer insights, and facilitation of agile responses to market dynamics (Ajer et al., 2023; Raji et al., 2024; Wang et al., 2022). While global interest in AI integration within SME operations is growing, empirical research exploring its business value, particularly in developing economies, remains nascent (Mikalef et al., 2021; Schwaeke et al., 2024). The existing literature predominantly examines the independent effects of various

aspects of AI adoption on performance outcomes, often overlooking the crucial role of AI-derived information quality (Nguyen & Malik, 2022). This oversight is significant, as effective market orientation relies heavily on accurate and timely insights. High-quality AI-generated information can amplify the benefits of AI adoption for SMEs worldwide, while poor-quality information, often stemming from data bias or algorithmic flaws, can lead to suboptimal decision-making and hinder performance (Nguyen et al., 2022; Prentice & Nguyen, 2020). Therefore, understanding the mechanisms through which AI information quality influences market orientation is crucial for realising the full potential of AI in SMEs globally. However, the influence of AI information quality on the market orientation-SME performance relationship remains empirically unexplored, particularly in developing economies.

This study addresses this critical gap by investigating the following key research question: How can market orientation be enhanced by integrating AI-driven practices, with a specific emphasis on AI information quality, to improve SME performance in developing economies? Focusing specifically on Malaysia as a representative developing economy, this research aims to provide valuable insights for both academics and practitioners seeking to leverage the power of AI for enhanced SME competitiveness in the digital age. The findings will contribute to a deeper theoretical understanding of market orientation in the age of AI and offer practical guidance for SMEs in developing economies seeking to effectively integrate AI into their operations. The Malaysian context offers a valuable case study due to the significant contribution of SMEs to the national economy and the ongoing efforts to promote digitalisation within the SME sector.

Literature Review

AI in Malaysia

The adoption of AI is rapidly transforming the global business landscape, with SMEs increasingly recognising its potential to enhance efficiency, decision-making, and innovation. Numerous studies have highlighted the critical drivers and benefits of AI adoption across various contexts (Mikalef et al., 2020; Qin et al., 2024; Zong & Guan, 2024), emphasising its capacity to revolutionise operations and unlock new growth opportunities. While this global wave of AI adoption provides a valuable foundation, it is crucial to recognise that the successful implementation of AI is often shaped by contextual factors. Government policies, industry structures, and cultural attitudes towards technology all play a significant role in determining the trajectory of AI adoption within a specific nation or region (Schwaeke et al., 2024). Therefore, examining AI adoption through a geographically focused lens can offer valuable insights not fully captured in broader global studies.

Malaysia presents itself as an ideal case study for understanding AI adoption in SMEs within a rapidly developing economy. The Malaysian government has proactively positioned AI as a central pillar in its national digital transformation strategy, recognising its potential to drive economic growth and enhance national competitiveness. This commitment is evident in Malaysia's National Artificial Intelligence Roadmap 2021–2025, which

aims to establish the country as a regional hub for AI development. This framework prioritises nurturing AI talent, driving research and development, and fostering public–private partnerships. To support these goals, the government is actively investing in AI research grants, providing tax incentives for AI-driven businesses, and collaborating with international organisations such as Microsoft, Intel, and Huawei to facilitate technology transfer (Bernama, 2022; Borneo Post, 2020).

Furthermore, Malaysia boasts a high level of digital readiness, providing fertile ground for AI adoption. According to research conducted by Oxford Insights in 2023, Malaysia's government AI readiness stood at 79.99%, data infrastructure readiness at 72%, and total AI readiness at 68.71% (Bernama, 2024). This places Malaysia ahead of other ASEAN countries, except Singapore, and marks an improvement from the 29th position in 2022 to 23rd in 2023. This robust digital infrastructure, coupled with a vibrant SME sector eager to embrace new technologies, makes Malaysia a compelling case study to explore the unique factors influencing AI adoption and its subsequent impact on SME growth and competitiveness.

Market Orientation and Business Performance

In today's increasingly competitive and dynamic business landscape, SMEs face mounting pressure to adapt and innovate to survive. A robust body of research suggests that adopting a market-oriented approach can be a key driver of success for SMEs (Akanpaaba et al., 2023; Kaushik & Dangwal, 2023; Özgül et al., 2023; Wasim et al., 2024). Market orientation, as defined by Narver and Slater (1990), represents a strategic approach where organisations cultivate a culture that prioritises the creation of superior customer value as a pathway to enhanced business performance. This concept emphasises a multifaceted approach where businesses prioritise understanding their customers, analysing their competitors, and fostering internal collaboration (Farooq & Vij, 2022; Ngo, 2023; Slater & Narver, 2000).

For SMEs operating in dynamic and competitive markets, a customer-centric approach is paramount (Abdulsamad et al., 2021; Alhakimi & Mahmoud, 2020). By deeply understanding and effectively responding to customer needs, preferences, and expectations, SMEs can cultivate loyalty, leading to repeat business and positive word-of-mouth referrals—both essential for long-term growth (Domi et al., 2020; Vidal et al., 2024). Moreover, customer orientation enables SMEs to identify new market opportunities and adapt rapidly to changing market conditions, strengthening their competitiveness and overall performance (D'souza et al., 2022; Kamarulzaman et al., 2023).

However, a sole focus on customers is insufficient for sustained success. SMEs must also cultivate a strong competitor orientation, enabling them to proactively analyse rival strategies, anticipate market shifts, and identify opportunities for differentiation (Ali et al., 2020; Stocker & Várkonyi, 2022). As researchers like Schulze et al. (2022) suggest, this proactive approach helps mitigate risks and maintain a competitive edge in a constantly evolving marketplace.

Finally, effective market orientation relies on strong inter-functional coordination within SMEs. By fostering a collaborative environment where departments work cohesively, businesses can streamline operations, optimise resource allocation, and

present a unified and customer-centric approach (Ajer et al., 2023; Hassen & Singh, 2020; Puspaningrum, 2020). This internal synergy is crucial for achieving both high levels of customer satisfaction and sustainable business growth (Wasim et al., 2024). Based on these arguments, the following hypotheses were developed:

H1: There is a positive relationship between customer orientation and business performance.
H2: There is a positive relationship between competitor orientation and business performance.
H3: There is a positive relationship between inter-functional coordination and business performance.

Moderating Roles of AI Information Quality

The advent of AI has ushered in a new era for SMEs, offering unprecedented opportunities for growth and competitive advantage (De Simone et al., 2023; Lahamid et al., 2023). However, the mere adoption of AI does not guarantee success; its effectiveness is heavily dependent on the quality of the information it generates (Ingrams et al., 2022; Parycek et al., 2024). AI readiness, as Bettoni et al. (2021) highlight, requires SMEs to overcome barriers such as resource constraints, lack of technical expertise, and governance challenges. Tailored frameworks for improving AI readiness can empower SMEs to harness AI's potential strategically. This aligns with Meramveliotakis and Manioudis's (2021) findings that digital transformation, underpinned by AI, can mitigate SMEs' structural challenges and enable them to contribute more effectively to economic growth.

Market orientation, a multifaceted construct encompassing customer orientation, competitor orientation, and inter-functional coordination, plays a crucial role in determining SME performance (Schulze et al., 2022; Vidal et al., 2024; Wasim et al., 2024). The quality of information derived from AI systems, particularly its accuracy and currency, significantly moderates and amplifies the impact of market orientation on SME success. By providing access to reliable, timely, and relevant market insights, AI empowers SMEs to make more informed decisions, enhance their agility in responding to market changes, and bolster the effectiveness of their market orientation strategies (Nguyen et al., 2022; Prentice & Nguyen, 2020).

In today's competitive landscape, AI serves as an enabler of customer orientation by analysing vast datasets to deliver actionable insights on customer behaviours, preferences, and emerging trends (Raji et al., 2024). This capability allows SMEs to develop highly tailored products and services, resulting in greater customer satisfaction and loyalty (Hsu & Lin, 2023; Jiang et al., 2022). High-quality AI information acts as a moderator, amplifying the relationship between customer orientation and business performance by ensuring that customer-related decisions are based on timely and accurate data. For example, AI systems can recommend personalised product bundles based on purchase history or provide instant

support through sophisticated chatbots, enhancing both customer experience and satisfaction (Drydakis, 2022; Wang et al., 2022; Zong & Guan, 2024).

Similarly, AI enhances competitor orientation by streamlining the process of analysing competitor activities, such as pricing strategies, marketing campaigns, and product innovations. Traditionally, this task was resource-intensive, often limiting SMEs' ability to compete effectively. However, AI-driven insights allow SMEs to gain real-time, high-quality competitive intelligence, enabling them to identify market gaps and adapt to changing dynamics swiftly (Loureiro et al., 2021; Wamba, 2022). The moderating role of AI information quality is particularly pronounced here, as it ensures the data used for competitor analysis is accurate, current, and relevant, empowering SMEs to develop proactive and robust strategies (Bharadiya, 2023; Ruiz-Real et al., 2021).

Furthermore, AI's ability to serve as a centralised intelligence hub significantly enhances inter-functional coordination within SMEs. By breaking down silos and enabling seamless data sharing across departments, AI facilitates a unified understanding of business priorities (Chowdhury et al., 2022; Kase et al., 2022). For instance, AI platforms can synchronise marketing campaigns with production schedules, ensuring resource alignment and operational efficiency (Olan et al., 2022; Spring et al., 2022). However, the moderating role of AI information quality is contingent on the organisation's ability to integrate and leverage these insights effectively. High-quality AI information ensures that inter-departmental decisions are based on accurate and up-to-date data, leading to more coordinated and impactful actions.

Building on this theoretical foundation, we propose the following hypotheses to examine the moderating role of AI information quality in enhancing the relationship between market orientation and SME performance:

H4: AI information quality positively moderates the relationship between customer orientation and business performance.
H5: AI information quality positively moderates the relationship between competitor orientation and business performance.
H6: AI information quality positively moderates the relationship between inter-functional coordination and business performance.

Conceptual Model

Grounded in the resource-based view (RBV) of the firm (Barney, 1991; Grant, 1991; Peteraf, 1993), this study posits that sustainable competitive advantage for SMEs hinges on possessing resources that are valuable, rare, inimitable, and non-substitutable (Hsu & Lin, 2023; Li et al., 2024). We argue that high-quality, AI-driven insights can function as such a resource, strengthening an SME's capacity to effectively execute customer-oriented, competitor-oriented, and inter-functional coordination strategies (Krakowski et al., 2023; Raji et al., 2024; Spring et al., 2022). Specifically, AI capabilities, when developed and deployed strategically, can enable SMEs to enhance firm value, establish rarity, increase inimitability, and reduce

substitutability by providing timely, accurate, and non-substitutable market insights, optimising resource allocation, and improving operational efficiency. This enhanced ability to anticipate and respond to market needs, fuelled by strategically developed AI capabilities, can translate into increased firm value and superior business performance, particularly when compared to competitors lacking similar capabilities (Chowdhury et al., 2022; Kase et al., 2022).

As illustrated in Fig. 1, this study conceptualises market orientation as a multidimensional construct comprising customer orientation, competitor orientation, and inter-functional coordination. Business performance is operationalised through a range of key metrics, including customer satisfaction, customer growth, employee satisfaction, product quality, and organisational reputation. We propose that AI information quality, characterised by accuracy and currency, moderates the positive relationships between market orientation and business performance. This highlights the critical role of AI in empowering SMEs to achieve and sustain a competitive advantage in today's dynamic market environment.

Methodology

This quantitative study investigates the influence of AI information on market orientation and business performance among SMEs in Sarawak, Malaysia. Sarawak's selection was strategic, given its robust digital economy initiatives, exemplified by the Sarawak Digital Economy Blueprint 2030 and SME Digitalisation Initiatives, coupled with its diverse SME landscape. This setting offers a representative sample of SMEs at various digital adoption stages, enabling a focused examination of AI adoption within a digitally transforming economy. The findings contribute insights

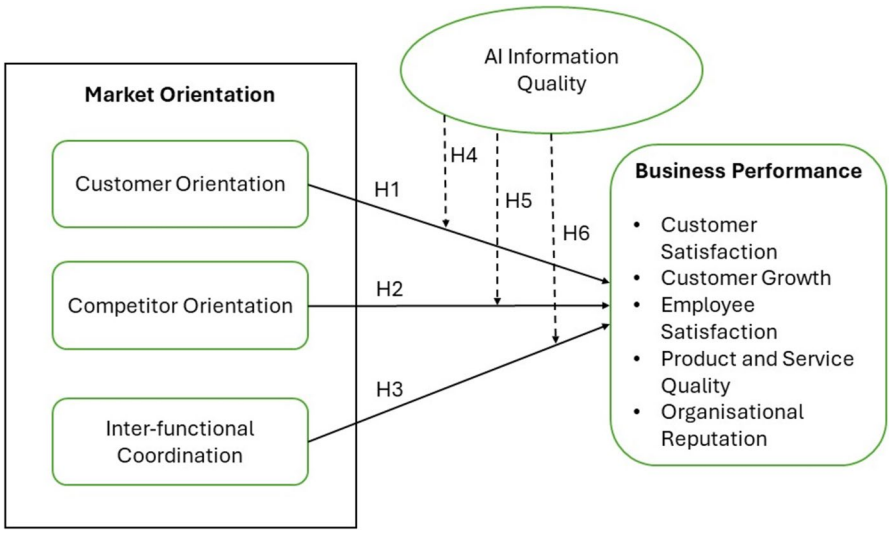

Fig. 1 The conceptual model

relevant to other developing economies undergoing similar digital transformations. Moreover, Sarawak's diverse SME landscape facilitates exploration of how AI information quality affects market orientation across different sectors and levels of technological maturity.

A survey methodology was employed, with the sample drawn from SME Corporation Malaysia's SME Directory. Following SME Corporation Malaysia's latest definition, manufacturing SMEs were defined as those with a sales turnover below RM50 million or fewer than 200 full-time employees, while SMEs in services and other sectors were defined as those with a sales turnover below RM20 million or fewer than 75 full-time employees. A simple random sampling method ensured each eligible SME had an equal opportunity for inclusion, minimising selection bias.

The survey instrument was meticulously designed to measure SMEs' perceptions and practices related to AI, market orientation, AI information quality, and business performance. This research drew upon established scales from prior research to ensure the reliability and validity of its measurements. Market orientation was assessed using the widely recognised MKTOR scale developed by Narver and Slater (1990), as cited in Bamfo and Kraa (2019). This scale comprises three dimensions to capture a comprehensive view of market orientation: customer orientation (four items focusing on understanding customer needs and preferences), competitor orientation (four items emphasising awareness and analysis of competitor activities), and inter-functional coordination (five items measuring the degree of collaboration and information sharing among different departments to achieve market-oriented goals). The AI information quality scale developed by Nguyen and Malik (2022) was used to evaluate the perceived quality of information generated by AI, assessing aspects like accuracy, relevance, and timeliness. Both market orientation and AI information quality were measured using a 7-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree").

To evaluate business performance, the study employed five performance indicators developed by Prieto and Revilla (2006): customer satisfaction, customer growth, employee satisfaction, product and service quality, and organisational reputation. Each performance measure was assessed using a 5-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree"). A detailed list of the survey questions is provided in Table 6 in the Appendix. The survey targeted key decision-makers (CEOs, presidents, chairpersons, managing directors, or managers directly involved in strategy, spending, and AI implementation) due to their comprehensive understanding of organisational operations and the potential impact of AI. A pre-test with ten SMEs (excluded from the final sample) refined the survey questions, ensuring clarity and enhancing respondent comprehension. Feedback from the pre-test informed improvements to wording, instructions, and overall survey effectiveness.

Rigorous data collection protocols ensured data quality and reliability. Research officers and enumerators received comprehensive training on research objectives, questionnaire content, and data collection procedures. During site visits, the research team explained the study's purpose, obtained informed consent, distributed questionnaires, and provided support and clarification. To minimise response bias and encourage honest responses, confidentiality and anonymity were assured, clear instructions were provided, and different Likert scales were used

to capture nuanced perspectives (Podsakoff et al., 2003). Common method bias was addressed by calculating the full collinearity variance inflation factor for all variables, as recommended by Kock and Lynn (2012). The VIF values consistently remained below the threshold of 5, indicating no significant common method bias (Kock, 2017).

Results

Descriptive Analysis

The survey yielded a strong response, with 332 out of 515 distributed questionnaires returned, resulting in a robust 64.5% response rate. The final sample comprised 130 SMEs currently using AI, 114 SMEs considering AI adoption, and 88 SMEs with no plans for AI adoption (see Table 1). Overall, 84.9% of respondents reported being aware of AI, while 64.8% believed that AI presents more opportunities than risks. However, among those not using AI, the primary reasons cited included a perceived lack of need (63.6%), concerns about high setup and maintenance costs (28.4%), and a lack of internal expertise (8%). For the purpose of this study, only the 130 SMEs currently using AI were included in the final analysis. With 130 SMEs reporting AI usage, the sample size exceeded the minimum requirement determined by G*Power analysis. This analysis indicated a need for at least 103 samples to achieve a statistical power of 0.80 at a significance level of $\alpha = 0.05$, ensuring the research is adequately powered to represent the population.

Table 1 SME perceptions of AI

	Respondents ($N = 332$)	Percentage (%)
Have you ever heard of Artificial Intelligence (AI)?		
Yes	282	84.9
No	50	15.1
Do you consider there are more opportunities or risks related to AI?		
More opportunities	215	64.8
More risks	46	13.9
Don't know	71	21.4
Are you using AI in your company/business?		
I am using AI	130	39.2
I am considering using AI	114	34.3
I have no plan to use AI	88	26.5
If not, what are the main reasons for not using AI?		
No need	56	63.6
High set-up and maintenance costs	25	28.4
Lack of internal expertise	7	8

Table 2 outlines the demographic characteristics of the 130 SMEs using AI in the study. Most respondents held senior positions within their companies, with nearly 37.7% being senior officers or executives and 26.9% being managers. The industry distribution showed significant representation from sectors such as food & beverages (16.9%) and retail (16.2%), while the majority of companies had 5 to 30 employees (60%) and had been in operation for more than 6 years (64.6%). These characteristics reflect a diverse sample in terms of both leadership roles and industry sectors.

Assessment of the Measurement Model

Prior to hypothesis testing, the reliability and validity of the constructs and measures within the model were rigorously evaluated using WarpPLS software (version 8.0), which applies Partial Least Squares Structural Equation Modeling (PLS-SEM). This estimation technique was chosen due to its ability to handle small sample sizes and its robustness in analysing complex models with

Table 2 Demographic characteristics of respondents

Demographic profile	Category	Respondents ($N=130$)	Percentage (%)
Position	Director/Owner	20	15.4
	Senior Manager	26	20.0
	Manager	35	26.9
	Senior Officer/Executive	49	37.7
Industry	Agriculture	4	3.1
	Manufacturing	13	10.8
	Construction	17	13.1
	Wholesale	14	10.8
	Retail	21	16.2
	Electronics	6	4.6
	Food and Beverages	22	16.9
	Accommodation	6	4.6
	Transport & Storage	8	6.2
	Art & Entertainment	10	7.7
	Real Estate	4	3.1
	Healthcare	4	3.1
Years of operation	Less than 5 years	22	16.9
	6 to 10 years	53	40.8
	11 to 15 years	24	18.5
	16 years or more	31	23.8
Number of employees	5 to 30	78	60
	31 to 75	42	32.3
	76 to 200	10	7.7

latent variables (Hair et al., 2014). Factor loadings represent indicator reliability, where higher loadings indicate stronger correlations between the indicator and its corresponding latent construct. Table 3 reveals that all factor loadings achieved the recommended 0.5 threshold (Chin, 1998; Hair et al., 2010), except for AI2, which exhibited a substantially lower loading of 0.231. Consequently, AI2 was excluded from subsequent analysis. The reliability and internal consistency of the constructs were evaluated using both composite reliability (CR) and Cronbach's alpha. As indicated in Table 3, the CR and Cronbach's alpha values for each construct surpassed the minimum acceptable level of 0.70 while remaining below the upper limit of 0.95 (Hair et al., 2021). This finding confirms that the measurement model exhibits satisfactory reliability and internal consistency.

Convergent validity, which assesses the extent to which a measure correlates with other measures of the same construct, was evaluated using average variance extracted (AVE) values. Our analysis revealed that the AVE values for all constructs surpassed the recommended threshold of 0.50 (Hair et al., 2021), providing strong evidence of convergent validity. This indicates that the indicators used in the study effectively capture the shared variance within their respective constructs.

Table 3 Summary of construct reliability and validity

Construct	No. of Items	Items deleted	Items	Loadings	AVE	CR	Cronbach's alpha
Customer orientation	4	None	CO1	0.746	0.664	0.887	0.829
			CO2	0.881			
			CO3	0.842			
			CO4	0.783			
Competitor orientation	4	None	COM1	0.818	0.729	0.915	0.876
			COM2	0.873			
			COM3	0.886			
			COM4	0.837			
Inter-functional Coordination	4	None	IFC1	0.700	0.632	0.895	0.853
			IFC2	0.804			
			IFC3	0.853			
			IFC4	0.835			
			IFC5	0.773			
AI information quality	6	1	AI1	0.704	0.596	0.880	0.828
			AI3	0.754			
			AI4	0.835			
			AI5	0.849			
			AI6	0.706			
Business performance	5	None	BP1	0.780	0.598	0.881	0.830
			BP2	0.691			
			BP3	0.781			
			BP4	0.848			
			BP5	0.757			

Discriminant validity, on the other hand, ensures each construct is more closely related to its own measures than to those of other constructs in the model (Hair et al., 2021). Following the recommendations of Henseler et al. (2015), we assessed discriminant validity using the heterotrait-monotrait ratio of correlations (HTMT). As depicted in Table 4, all HTMT values fell well below the 0.90 threshold recommended by Ringle et al. (2023), ranging from 0.407 to 0.835. These findings provide robust evidence confirming the establishment of discriminant validity among the study's constructs, indicating that each construct is empirically distinct from the others.

Assessment of the Structural Model

As presented in Table 5, the structural model exhibited satisfactory explanatory power, accounting for 40% of the variance in business performance ($R^2 = 0.40$). The analysis yielded strong support for both Hypotheses 1 and 2, indicating statistically significant positive associations between market orientation dimensions and business performance. Specifically, both customer orientation ($\beta = 0.191$, $p < 0.05$) and competitor orientation ($\beta = 0.211$, $p < 0.01$) exhibited positive associations with business performance. Similarly, Hypothesis 3, proposing a positive link between inter-functional coordination and business performance, was strongly supported ($\beta = 0.387$, $p < 0.001$).

The moderation analysis revealed that AI information quality significantly influenced the relationships between certain market orientation dimensions and business performance. Specifically, the positive effects of both customer orientation ($\beta = 0.176$, $p < 0.05$) and competitor orientation ($\beta = 0.256$, $p < 0.01$) on business performance were amplified when AI information quality was high. Figures 2 and 3 illustrate these moderating effects. However, the moderating effect of AI information quality on the relationship between inter-functional coordination and business performance was not statistically significant ($\beta = -0.124$, $p = 0.074$).

Discussion

This study investigated the impact of market-oriented strategies on SME performance, with a specific focus on the moderating role of AI information quality. In line with the research objectives, the findings reaffirm the centrality of

Table 4 HTMT ratios

	1	2	3	4	5
1. Customer Orientation					
2. Competitor Orientation	0.715				
3.Inter-functional Coordination	0.774	0.835			
4. Business Performance	0.711	0.694	0.792		
5. AI Information Quality	0.411	0.407	0.551	0.602	

Note: Good if < 0.90, Best if < 0.85

Table 5 Summary of path coefficients and hypotheses testing

	Relationship	*β*	Std error	*p*-value	Decision	f^2
H1	Customer Orientation—> Business Performance	0.191	0.084	0.012*	Supported	0.114
H2	Competitor Orientation—> Business Performance	0.211	0.083	0.006**	Supported	0.130
H3	Inter-functional Coordination—> Business Performance	0.387	0.080	< 0.001**	Supported	0.262
H4	AI*Customer Orientation—> Business Performance	0.176	0.084	0.019*	Supported	0.064
H5	AI*Competitor Orientation—> Business Performance	0.256	0.083	0.001**	Supported	0.072
H6	AI*Inter-functional Coordination—> Business Performance	−0.124	0.085	0.074	Not supported	0.032

*$p < 0.05$, **$p < 0.01$

market orientation to SME success, underscoring the positive effects of customer orientation, competitor orientation, and inter-functional coordination on performance (e.g. Ajer et al., 2023; Kamarulzaman et al., 2023; Schulze et al., 2022). Importantly, this research contributes novel insights by exploring how high-quality AI information enhances these relationships in the context of a data-driven business environment.

As hypothesised, high-quality AI information amplifies the positive impact of customer and competitor orientations on SME performance. This aligns with emerging scholarship highlighting AI's ability to revolutionise customer relationship management and sharpen competitive strategies (Raji et al., 2024; Wamba, 2022). Specifically, AI enables SMEs to analyse customer data for enhanced personalisation and targeting, fostering stronger customer loyalty and satisfaction (Chaturvedi & Verma, 2023; Hsu & Lin, 2023). Simultaneously, AI-driven competitor analysis equips SMEs with real-time insights into market trends and rival strategies, enabling timely and agile responses to shifting conditions (Krakowski et al., 2023; Zong & Guan, 2024). These findings underscore the strategic importance of high-quality AI information in enhancing externally focused market strategies. By leveraging AI, SMEs can achieve greater precision in understanding customer needs and anticipating competitor moves, which are critical to sustaining competitive advantage in dynamic markets. This research thus reinforces the transformative potential of AI as an enabler of market orientation.

Contrary to expectations and prior research (Olan et al., 2022; Spring et al., 2022), this study found no evidence that AI information quality moderates the relationship between inter-functional coordination and SME performance. This unexpected result suggests that inter-functional coordination may depend more on internal organisational factors, such as culture, communication, and collaboration, rather than external data quality. While AI-powered platforms can facilitate information sharing, their effectiveness hinges on factors such as employee

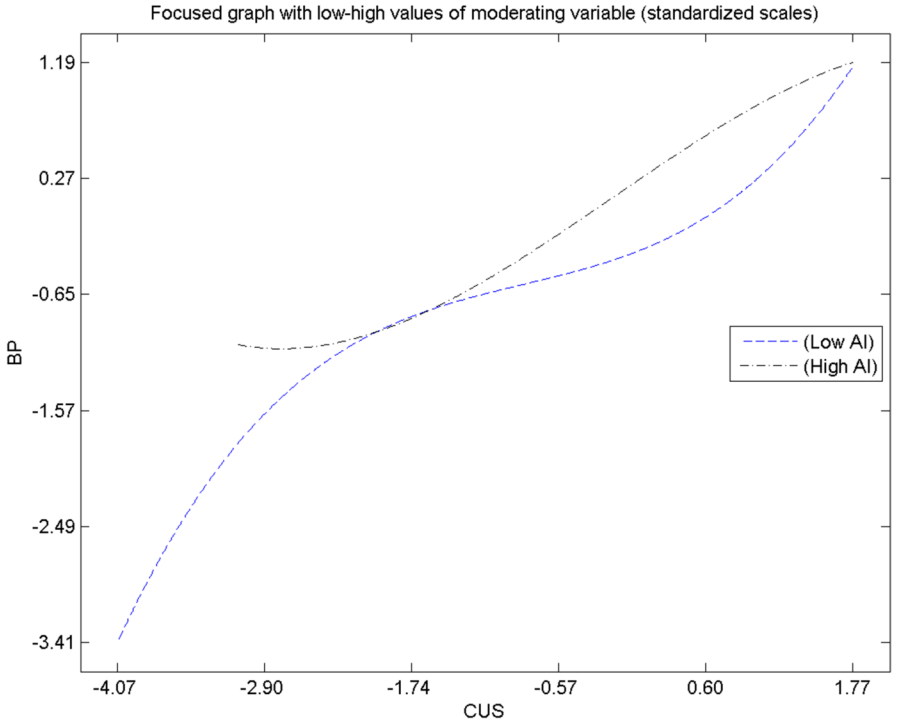

Fig. 2 Moderating effect of AI information quality on the relationship between customer orientation and business performance

training, adoption rates, and organisational readiness. The skills gap in Malaysia is a significant barrier to maximising the potential of AI in this area, with only 20% of companies providing AI training compared to a global average of 32% (Kamaruddin, 2024). Without adequate skills and infrastructure, SMEs are less likely to leverage AI insights effectively, particularly for enhancing collaboration. Future research should investigate how SMEs can address these barriers, examining the role of organisational culture and training in supporting AI integration for inter-functional processes.

Implications

This study provides critical insights into the transformative role of AI in enhancing SME performance, particularly through its moderating effects on market orientation dimensions, namely customer orientation, competitor orientation, and inter-functional coordination. The findings underscore the potential of high-quality AI information to drive superior business outcomes by enabling SMEs to make more informed and agile decisions in dynamic market environments. However, for SMEs

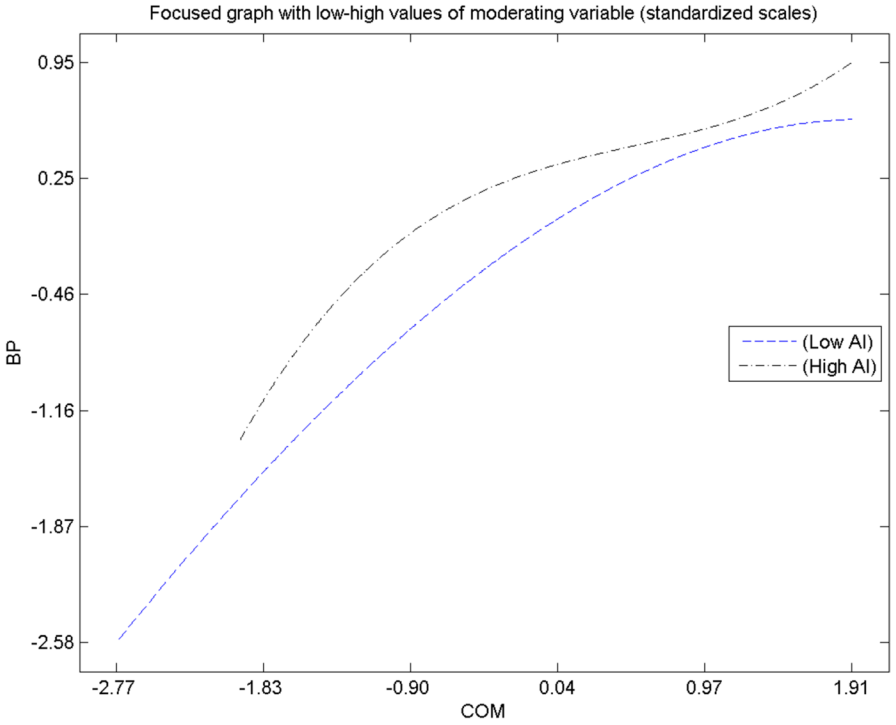

Fig. 3 Moderating effect of AI information quality on the relationship between competitor orientation and business performance

to fully capitalise on AI's transformative potential, a series of practical and structural considerations must be addressed.

From a practical standpoint, the findings emphasise that simply adopting AI is insufficient; rather, its integration must be strategically aligned with the organisation's broader objectives. SMEs must prioritise access to affordable and scalable AI technologies that can be incrementally implemented to mitigate risks associated with resource constraints. Additionally, the importance of employee training and digital literacy cannot be overstated. Empowering employees to interpret and utilise AI-driven insights effectively is essential for SMEs to optimise customer engagement, refine competitive strategies, and foster cross-functional collaboration. Furthermore, the establishment of robust data governance frameworks is critical to ensuring the reliability, accuracy, and relevance of AI-derived information, minimising the risks of poor decision-making based on flawed or outdated data.

At a broader level, this study contributes to the theoretical understanding of AI's role within the RBV of the firm. By conceptualising high-quality AI information as a valuable and inimitable resource, this research extends the RBV to the digital age, illustrating how AI capabilities can drive sustainable competitive advantage in SMEs. The study highlights the need for future research

to further explore the complex interplay between AI readiness, organisational culture, and innovation capacity, particularly in diverse economic and technological contexts. Such investigations could provide deeper insights into the conditions under which AI adoption maximises organisational outcomes.

The study also reveals the structural limitations that constrain AI integration in resource-constrained SMEs. Financial constraints, lack of technical expertise, inadequate infrastructure, and resistance to change remain pervasive barriers that hinder the widespread adoption of AI. Policymakers and industry stakeholders must recognise that effective AI adoption requires systemic support. Governments should implement targeted initiatives, such as financial subsidies, tax incentives, and grants, to alleviate the financial burden of AI adoption for SMEs. In parallel, the development of digital infrastructure, particularly in underserved regions, is necessary to ensure equitable access to AI technologies. Industry leaders and technology providers should focus on developing user-friendly AI solutions that require minimal technical expertise, allowing SMEs to integrate these systems without extensive training or costly investments in infrastructure.

Limitations and Future Research

This study provides valuable insights into the relationship between market orientation, AI information quality, and SME performance, but it is important to acknowledge its limitations. The sample of 130 Malaysian SMEs, while representative of the target population, limits the generalisability of findings to other contexts. Future research should replicate this study in different settings, such as developed economies or industries with varying technological adoption rates, to assess the cross-cultural and cross-industry validity of the observed relationships. For example, comparing the impact of AI information quality on SMEs in the manufacturing sector versus the service sector could reveal valuable insights. On the other hand, the cross-sectional nature of this study restricts our ability to draw causal inferences and observe long-term effects. Longitudinal studies tracking the impact of AI information quality on SME performance over time are crucial for understanding the evolving dynamics of this relationship. Such studies could also explore how the effects of AI information quality change as SMEs gain more experience with AI technologies. Finally, qualitative approaches, such as in-depth case studies of SMEs successfully leveraging AI, could offer rich insights into the practical challenges and opportunities associated with AI implementation and management. These qualitative studies could explore the organisational factors, processes, and strategies that contribute to successful AI adoption and utilisation within SMEs. By addressing these limitations, future research can build upon the foundation laid by this study and contribute to a more nuanced and generalizable understanding of AI's role in driving SME performance.

Appendix

Table 6 The measurement items

Factor	Item
Market orientation	CO1: We have a strong commitment to our customers
	CO2: We encourage customer comments and complaints
	CO3: We assess customer satisfaction on a regular basis
	CO4: After-sales service is an important part of our business strategy
	COM1: We regularly monitor our competitors' marketing efforts
	COM2: We frequently collect information on our competitors
	COM3: We often discuss competitors' actions
	COM4: We are aware competitors will want to take our customers
	IFC1: Market information is shared inside our company
	IFC2: There is involvement of all employees in preparing in planning
	IFC3: We do a good job integrating the activities inside our company
	IFC4: We regularly have meetings to discuss market trends and developments
	IFC5: All the department function well to promote growth of the business
AI information quality	AI1: AI tools produce correct information
	AI2: There are a few errors in the information I obtain from AI tools
	AI3: The information provided by AI tools is accurate
	AI4: AI tools provide me with the most recent information
	AI5: AI tools produce the most current information
	AI6: The information from AI tools is always up to date
Business performance	BP1: My company has higher level of customer satisfaction than its competitors
	BP2: My company has higher growth in number of customers than its competitors
	BP3: My company has higher level of employee satisfaction than its competitors
	BP4: My company has better quality in products and services than its competitors
	BP5: My company's reputation is better than its competitors

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May Chiun Lo: conceptualization, methodology, data analysis, supervision, validation, writing—review and editing.

Abang Azlan Mohamad: conceptualization, methodology, data collection, validation, writing—review and editing.

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Declarations

Ethics Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Consent to Participate Not applicable.

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