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Business Performance in Fishing SMEs through Artificial Intelligence Adoption: The Mediating Roles of Relative Advantage and Compatibility

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ABSTRACT

This study develops a conceptual framework to explain how artificial intelligence (AI) adoption influences business performance in fishing small and medium-sized enterprises (SMEs) through the mediating roles of perceived relative advantage and compatibility. Drawing primarily on Diffusion of Innovation (DOI) theory and complementary perspectives from digital transformation and SME performance literature, the paper argues that AI does not directly enhance performance unless it is perceived by owner-managers as both beneficial and compatible with existing operational routines, resource constraints, and skill bases. By focusing on fishing SMEs as a traditional and under-researched industry context, the study extends AI adoption research beyond technology-intensive sectors and highlights the importance of adoption readiness and fit in realizing performance outcomes. The paper further discusses theoretical, managerial, and policy implications, emphasizing strategic AI decision-making, phased investment approaches, and the role of digital inclusion and capacity-building initiatives. Finally, directions for future research are proposed, including the use of structural equation modeling, mixed-method designs, and longitudinal studies to empirically validate the proposed mediation framework. Overall, the study contributes to AI adoption and SME performance literature by offering a context-sensitive explanation of sustainable digital transformation in fishing SMEs.

KEYWORDS: Artificial intelligence adoption, Fishing SMEs, Relative advantage, Compatibility, Business performance, Diffusion of Innovation, Digital transformation

I. INTRODUCTION

The rapid advancement of digital technologies has transformed the competitive landscape for small and medium-sized enterprises (SMEs), compelling firms across both high-technology and traditional industries to reconsider how value is created and sustained. Among these technologies, artificial intelligence (AI) has emerged as a pivotal enabler of data-driven decision-making, operational efficiency, and market responsiveness. While AI adoption has been widely examined in manufacturing, finance, and high-tech sectors, its role in traditional and resource-constrained industries, such as fishing SMEs, remains underexplored. This study seeks to address this gap by developing a conceptual framework that explains how AI adoption influences business performance in fishing SMEs through the mediating roles of perceived relative advantage and compatibility.

Digital transformation has become a central strategic priority for SMEs seeking to enhance resilience and competitiveness in increasingly volatile markets. Recent studies highlight that AI technologies—ranging from predictive analytics and machine learning to intelligent decision-support systems—offer

SMEs opportunities to optimize operations, improve forecasting accuracy, and strengthen customer engagement (Raisch & Krakowski, 2021; Dwivedi et al., 2023). However, unlike large enterprises, SMEs often face constraints related to financial resources, digital skills, and organizational readiness, making AI adoption a complex strategic decision rather than a purely technological one (Ghobakhloo et al., 2022).

Within this broader digital transformation agenda, fishing SMEs occupy a strategically important position in coastal economies and the emerging blue economy, contributing to food security, employment, and regional development. In countries such as Malaysia, fishing SMEs play a vital socio-economic role but are simultaneously exposed to challenges such as fluctuating demand, environmental uncertainty, supply chain inefficiencies, and rising operational costs (OECD, 2021; FAO, 2022). These pressures have intensified interest in digital solutions that can enhance productivity and sustainability.

Emerging evidence suggests that AI applications are increasingly relevant to fishing-related activities, including catch prediction, route optimization, cold-chain logistics management, quality control, and market price forecasting (Bahamon et al., 2022; Xu et al., 2023). Despite these technological possibilities, adoption among fishing SMEs remains uneven, raising important questions about how innovation characteristics are perceived and translated into tangible performance outcomes.

Although AI has been widely promoted as a driver of SME competitiveness, persistent performance challenges continue to characterize many traditional SMEs, including fishing enterprises. These challenges include low productivity growth, vulnerability to market shocks, limited scalability, and dependence on informal decision-making processes (Ghobakhloo & Ching, 2022). While AI holds the potential to mitigate some of these issues, empirical evidence indicates that AI adoption among SMEs is uneven, fragmented, and often limited in scope (Zhang et al., 2022; Badghish et al., 2024).

A key reason for this uneven adoption lies in how SME owner-managers perceive AI technologies. Innovation adoption research suggests that technologies are more likely to be adopted when they are perceived as offering clear advantages over existing practices and when they are compatible with existing values, routines, and capabilities (Rogers, 2003; Schwaeke et al., 2025). However, current AI–SME literature often treats adoption as a binary decision or focuses on organizational readiness, while offering limited conceptual integration between AI adoption attributes and business performance outcomes, particularly in traditional industries.

As a result, there is a lack of coherent conceptual frameworks explaining how and why perceptions of AI translate into improved business performance in fishing SMEs. Addressing this gap requires a theory-driven approach that explicitly links innovation attributes to performance through the adoption mechanism.

Research Objectives

i. To conceptually explain how AI adoption influences business performance in fishing SMEs.
ii. To examine the mediating roles of perceived relative advantage and compatibility in the relationship between AI adoption and business performance.
iii. To develop an integrative conceptual framework that captures the unique characteristics and constraints of fishing SMEs within a developing-economy context.

By focusing on mediation rather than direct effects alone, the study aims to provide a more nuanced explanation of AI-driven value creation in traditional SMEs.

This study offers several important contributions. From a theoretical perspective, it extends AI adoption research by integrating Diffusion of Innovation (DOI) theory with SME performance literature, emphasizing adoption attributes as mechanisms rather than static predictors. In doing so, it responds to recent calls for more process-oriented and context-sensitive models of digital transformation in SMEs (Vial, 2021; Dwivedi et al., 2023).

From a managerial perspective, the framework provides practical insights for fishing SME owner-managers by highlighting the importance of evaluating AI investments based on perceived value and operational fit rather than technological novelty alone. This perspective supports more informed and strategic AI decision-making in resource-constrained environments.

Finally, from a policy perspective, the study contributes to discussions on digital inclusion and SME development, particularly within traditional sectors often overlooked in national digital strategies. By identifying key perceptual and compatibility barriers, the framework can inform targeted capacity-building initiatives and AI readiness programs aimed at enhancing the digital competitiveness of fishing SMEs (OECD, 2021; Government of Malaysia, 2021).

II. LITERATURE REVIEW

A. Artificial Intelligence Adoption in SMEs

Artificial intelligence adoption refers to the organizational decision to acquire, integrate, and deploy AI-based technologies to support or enhance business processes and decision-making. In the context of SMEs, AI technologies commonly include machine learning algorithms, predictive analytics, computer vision, natural language processing, and intelligent decision-support systems that assist in forecasting, optimization, and automation (Raisch & Krakowski, 2021; Dwivedi et al., 2021). Unlike large enterprises, SMEs typically adopt AI in modular and application-specific forms rather than as enterprise-wide systems, reflecting resource constraints and limited technological expertise (Wamba et al., 2021).

It is important to distinguish between AI adoption and AI usage intensity. AI adoption denotes the initial acceptance and implementation of AI solutions, whereas usage intensity captures the depth, breadth, and frequency with which AI is embedded into daily operations (Soomro et al., 2025). Recent studies emphasize that performance benefits are unlikely to materialize from symbolic or superficial adoption alone; rather, value creation depends on meaningful and sustained use of AI across relevant business functions (Schwaeke et al., 2025). This distinction is particularly salient for SMEs, where adoption decisions are often owner-manager driven and shaped by perceived feasibility rather than long-term strategic planning.

Business performance in SMEs is a multidimensional construct encompassing both financial and non-financial outcomes. Financial indicators typically include profitability, revenue growth, cost efficiency, and cash flow stability, while non-financial indicators capture operational efficiency, customer satisfaction, market access, and long-term competitiveness (Gupta et al., 2022). In fishing SMEs, performance is additionally influenced by environmental uncertainty, seasonality, supply-chain volatility, and regulatory pressures related to sustainability and resource management.

Operational efficiency is a central performance concern for fishing SMEs, as margins are often thin and costs related to fuel, storage, logistics, and spoilage are high. AI-enabled forecasting and optimization tools have been conceptually linked to improvements in route planning, demand prediction, inventory management, and pricing accuracy, thereby enhancing efficiency and reducing waste (Badghish et al., 2024). Beyond efficiency, AI adoption may support sustainability outcomes by enabling better resource utilization and compliance with environmental standards, which in turn can improve market access and legitimacy in increasingly sustainability-conscious markets (OECD, 2023).

Fishing SMEs represent a traditional industry context characterized by labor-intensive operations, strong reliance on experiential knowledge, and deeply embedded routines. Such firms often face significant resource constraints, including limited financial capital, inadequate digital infrastructure, and shortages of skilled personnel capable of managing advanced technologies (Cooke et al., 2023). These constraints shape technology adoption behavior and differentiate fishing SMEs from digitally native or high-technology enterprises.

Technological readiness among fishing SMEs is typically uneven, with many firms still relying on manual record-keeping, informal decision-making, and fragmented information systems. Recent research highlights persistent digital capability gaps in traditional SMEs, which hinder their ability to recognize, assimilate, and exploit advanced technologies such as AI (Zhai et al., 2022). Consequently, adoption decisions are heavily influenced by perceived simplicity, compatibility with existing practices, and trust in technology providers rather than abstract notions of innovation leadership.

B. Theoretical Foundations

This study draws on established theories of innovation adoption and strategic management to ground the proposed framework.

Diffusion of Innovation (DOI) theory explains how, why, and at what rate new technologies are adopted within social systems. Central to DOI are innovation attributes that shape adoption decisions, including relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Recent studies reaffirm the relevance of DOI for contemporary digital technologies, including AI, particularly in SME contexts where adoption decisions are perception-driven (Almaiah et al., 2022).

Among these attributes, relative advantage and compatibility are consistently identified as the most influential determinants of adoption. Relative advantage refers to the degree to which an innovation is perceived as superior to existing solutions, while compatibility reflects the alignment of the innovation with existing values, experiences, and operational practices (Badghish et al., 2024). In traditional SMEs, these attributes are especially salient because firms are risk-averse and sensitive to disruptions of established routines.

The Resource-Based View conceptualizes firm performance as a function of valuable, rare, inimitable, and non-substitutable resources and capabilities. From an RBV perspective, AI adoption can be understood as a strategic capability that enhances information processing, decision quality, and operational coordination (Mikalef et al., 2021). However, AI itself does not guarantee competitive advantage; rather, performance outcomes depend on how effectively AI is integrated with complementary resources such as human skills, organizational processes, and data governance structures.

Recent literature emphasizes that SMEs can leverage AI as a capability-enhancing resource when adoption is aligned with strategic objectives and operational realities (Soomro et al., 2025). This view supports the mediating role of AI adoption in translating perceived innovation attributes into performance outcomes.

The Technology–Organization–Environment (TOE) framework provides an additional lens for understanding AI adoption by highlighting the influence of organizational readiness and environmental pressures. Organizational factors include firm size, managerial support, and technological competence, while environmental factors encompass competitive pressure, regulatory support, and access to external expertise (Zhu & Kraemer, 2005; updated applications in Zhai et al., 2022).

In the context of fishing SMEs, environmental influences such as government digitalization initiatives, sustainability regulations, and market competition can either facilitate or constrain AI adoption. TOE thus complements DOI by contextualizing adoption decisions within broader institutional and market environments.

C. Perceived Relative Advantage of AI

Perceived relative advantage reflects the extent to which AI is viewed as delivering tangible benefits over existing practices. In fishing SMEs, such advantages include cost reduction through optimized fuel use, improved productivity via automation, enhanced decision accuracy through predictive analytics, and better risk management through real-time data analysis (Dwivedi et al., 2021; Badghish et al., 2024). These benefits are particularly attractive in volatile operating environments where uncertainty and resource wastage are prevalent.

AI-enabled demand forecasting and price optimization further strengthen the perceived economic value of adoption by reducing mismatch between supply and market demand. When these benefits are visible and credible, owner-managers are more likely to view AI as a necessary investment rather than an optional innovation.

Relative advantage is a primary driver of AI adoption decisions in SMEs because it directly influences perceived return on investment. Recent empirical and conceptual studies demonstrate that SMEs are more willing to adopt AI when benefits are clearly linked to performance improvement and competitive positioning (Wamba et al., 2021; Soomro et al., 2025). In fishing SMEs, where capital is scarce, the perception that AI can deliver immediate operational gains is critical for overcoming adoption resistance.

D. Compatibility of AI with Fishing SME Operation

Compatibility refers to the degree to which AI aligns with existing workflows, skills, and organizational values. In traditional SMEs, compatibility encompasses not only technical fit but also cultural and cognitive fit, including the extent to which AI supports experiential knowledge rather than replacing it (Zhai et al., 2022).

Low compatibility increases perceived complexity and implementation risk, reducing adoption readiness. Conversely, AI solutions that integrate smoothly with existing routines and require minimal disruption are more likely to be accepted. Learning capability and openness to change further moderate the compatibility–adoption relationship, especially in owner-managed firms where decision authority is centralized (Cooke et al., 2023).

E. AI Adoption and Business Performance

Conceptually, AI adoption enhances business performance by improving efficiency, profitability, and responsiveness. AI enables faster and more accurate decision-making, reduces operational waste, and supports proactive market strategies, all of which are essential for SME competitiveness in uncertain environments (Mikalef et al., 2021; Badghish et al., 2024).

This study posits that relative advantage and compatibility influence business performance indirectly through AI adoption. When AI is perceived as beneficial and compatible, SMEs are more likely to adopt and effectively use it, thereby realizing performance gains. Conversely, weak perceptions of advantage or poor compatibility limit adoption depth and dilute performance outcomes. This mediating logic integrates DOI and RBV perspectives by linking perception-based adoption drivers with capability-based performance outcomes.

III. METHODOLOGY

F. Artificial Intelligence Adoption in SMEs

Artificial intelligence (AI) adoption in SMEs refers to the organizational decision to implement AI-based technologies that enable data-driven automation, prediction, and decision-making across business functions. In the SME context, AI applications typically include machine learning algorithms, predictive analytics, computer vision, and intelligent decision-support systems embedded within operational or managerial processes (Raisch & Krakowski, 2021; Dwivedi et al., 2021). Unlike large corporations, SMEs often adopt modular or cloud-based AI solutions due to limited financial and technical resources.

It is important to distinguish between AI adoption and AI usage intensity. AI adoption reflects the initial acceptance and implementation of AI technologies, whereas usage intensity captures the depth, frequency, and scope of AI utilization within organizational activities (Soomro et al., 2025). Prior

research suggests that performance benefits are more closely associated with effective adoption and integration rather than mere technological availability (Badghish et al., 2024). This distinction is particularly relevant for fishing SMEs, where partial or superficial adoption may not translate into meaningful performance improvements.

Business performance in SMEs is a multidimensional construct encompassing both financial and non-financial outcomes. Financial indicators commonly include profitability, revenue growth, and cost efficiency, while non-financial indicators capture market responsiveness, customer satisfaction, operational flexibility, and long-term sustainability (Reymen et al., 2021; Soto-Acosta, 2023).

In fishing SMEs, performance is strongly influenced by operational efficiency, resource utilization, and access to markets. AI enabled tools can support performance by improving demand forecasting, optimizing logistics and cold-chain management, and enhancing pricing and inventory decisions (Soomro et al., 2025). Additionally, sustainability-related outcomes—such as reduced waste, improved catch planning, and compliance with environmental regulations—are increasingly recognized as critical dimensions of performance in the fisheries sector (FAO, 2022). Thus, this study conceptualizes business performance as a holistic outcome that integrates economic viability, operational effectiveness, and adaptive capacity.

Fishing SMEs represent a traditional industry context characterized by strong reliance on experiential knowledge, established routines, and resource-constrained operations. These firms often face limitations in capital availability, skilled labor, and digital infrastructure, which constrain their capacity to experiment with advanced technologies such as AI (OECD, 2021; Soto-Acosta, 2023).

Technological readiness among fishing SMEs is typically uneven, with significant gaps in digital literacy, data availability, and system integration. Such gaps heighten the importance of innovation attributes that emphasize fit and perceived usefulness rather than technological sophistication alone. Consequently, the adoption of AI in fishing SMEs is likely to be shaped by pragmatic considerations related to compatibility with existing practices and demonstrable relative advantage over traditional methods.

G. Theoretical Foundations

This study draws on established innovation and strategic management theories to ground the proposed framework and explain the mechanisms linking AI adoption to business performance.

Diffusion of Innovation (DOI) theory explains how and why innovations are adopted based on perceived attributes such as relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Recent research confirms the continued relevance of DOI in explaining digital and AI adoption decisions in SMEs (Schwaeke et al., 2025).

Within this framework, relative advantage refers to the degree to which AI is perceived as superior to existing practices, while compatibility reflects the extent to which AI aligns with existing values, workflows, and skills. Empirical studies consistently identify these two attributes as central determinants of AI and digital technology adoption, particularly in traditional and resource-constrained industries (Badghish et al., 2024; Muhammad et al., 2025). Accordingly, DOI provides a robust theoretical lens for examining AI adoption in fishing SMEs.

The Resource-Based View (RBV) conceptualizes firm performance as a function of valuable, rare, inimitable, and non-substitutable resources and capabilities. In this perspective, AI adoption constitutes a strategic capability when it is effectively integrated with organizational processes and managerial competencies (Kraus et al., 2022).

For fishing SMEs, AI does not generate performance benefits automatically; rather, value is created through the deployment of AI-enabled capabilities that enhance decision quality, efficiency, and adaptability. Recent studies emphasize that digital technologies contribute to SME performance only when aligned with complementary resources such as skills, routines, and organizational learning (Soto-Acosta, 2023). Thus, RBV supports the view that AI adoption mediates the relationship between innovation perceptions and business performance.

The Technology–Organization–Environment (TOE) framework provides an additional contextual lens by highlighting the role of organizational readiness and environmental pressures in shaping technology adoption decisions (Tornatzky & Fleischer, 1990). Recent SME research applies TOE to explain AI adoption by emphasizing technological infrastructure, managerial support, regulatory conditions, and market competition (Badghish et al., 2024).

In fishing SMEs, environmental factors such as regulatory requirements, supply-chain volatility, and market access can significantly influence the perceived feasibility and desirability of AI adoption. The TOE perspective therefore complements DOI and RBV by situating adoption decisions within broader organizational and environmental conditions.

H. Perceived Relative Advantage of AI

Perceived relative advantage reflects the extent to which AI is believed to offer superior outcomes compared to traditional decision-making and operational methods. In fishing SMEs, such advantages may include cost reduction, improved productivity, enhanced decision accuracy, and better risk management through predictive analytics and demand forecasting (Dwivedi et al., 2021; Soomro et al., 2025).

Given the uncertainty inherent in fishing activities such as fluctuating demand, weather conditions, and price volatility AI's ability to process real-time data and generate predictive insights may be particularly

salient. However, these advantages must be perceived as tangible and accessible by owner-managers to influence adoption decisions.

From a DOI perspective, innovations perceived to deliver clear and observable benefits are more likely to be adopted. Recent empirical evidence confirms that perceived relative advantage is a dominant predictor of AI adoption in SMEs, as it shapes expectations regarding performance improvement and competitive positioning (Badghish et al., 2024; Muhammad et al., 2025). For fishing SMEs, owner-managers play a central role in evaluating these benefits, making their perceptions critical to adoption outcomes.

I. Compatibility of AI with Fishing SME Operations

Compatibility refers to the degree to which AI technologies align with existing operational processes, skills, and organizational values. In traditional SMEs, compatibility is often more influential than technological sophistication, as misalignment can increase perceived risk and resistance to change (Schwaeke et al., 2025).

For fishing SMEs, compatibility encompasses fit with daily routines, ease of integration with existing tools, and alignment with experiential decision-making practices. AI solutions that require extensive restructuring or specialized expertise may be perceived as incompatible, thereby reducing adoption likelihood.

Compatibility also reflects organizational readiness for AI adoption, including learning capability and openness to change. Recent studies highlight that SMEs with higher absorptive capacity and learning orientation are better positioned to integrate AI into their operations (Kraus et al., 2022; Soto-Acosta, 2023). In traditional industries, gradual learning and incremental integration are particularly important for overcoming resistance and ensuring sustainable adoption.

J. AI Adoption and Business Performance

AI adoption is theorized to enhance business performance by improving efficiency, profitability, and market responsiveness. Empirical research increasingly supports the view that AI-enabled SMEs achieve superior performance outcomes when AI is effectively embedded in operational and strategic processes (Soomro et al., 2025; Muhammad et al., 2025).

Integrating DOI and RBV perspectives, this study conceptualizes AI adoption as a mediating mechanism linking innovation attributes to performance outcomes. Specifically, perceived relative advantage and compatibility influence the likelihood and quality of AI adoption, which in turn enables performance improvements. This mediation logic clarifies how innovation perceptions are transformed into tangible business value, particularly in traditional SME contexts where adoption decisions are highly selective and resource-sensitive.

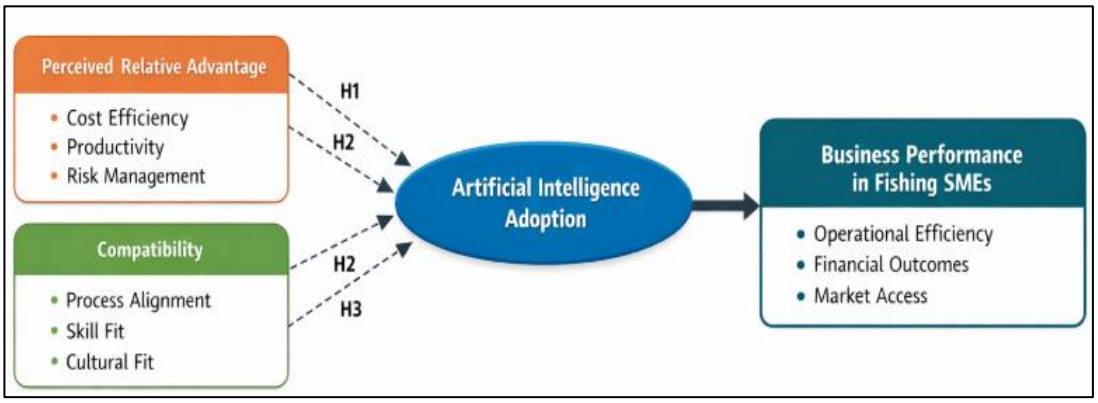

Figure 1. Conceptual Framework

IV. DISCUSSION AND CONCLUSION

K. Theoretical Implications

This study extends DOI theory by applying its core innovation attributes relative advantage and compatibility—to AI adoption in fishing SMEs, a context that has received limited theoretical attention. While DOI has been widely applied to general ICT and digital innovation adoption, AI represents a more complex and capability-intensive innovation that requires data availability, skill development, and process reconfiguration (Dwivedi et al., 2021; Vrontis et al., 2022). By positioning AI adoption as contingent upon both perceived benefits and operational fit, this study demonstrates DOI's continued relevance while adapting it to the realities of advanced digital technologies in traditional industries.

A second theoretical contribution lies in clarifying the mediation mechanism linking innovation attributes to performance outcomes. Rather than assuming a direct relationship between perceived innovation attributes and performance, this framework conceptualizes AI adoption as the critical intervening mechanism through which relative advantage and compatibility translate into tangible business outcomes. Recent research emphasizes that digital technologies enhance performance only when effectively adopted and embedded into organizational routines (Agarwal et al., 2021; Rialti et al., 2022). This mediation logic strengthens AI adoption literature by integrating DOI theory with performance-oriented perspectives such as the resource-based view, thereby offering a more coherent explanation of value creation in SMEs.

L. Managerial Implications

For fishing SME owner-managers, the framework highlights the importance of approaching AI adoption as a strategic decision rather than a purely technological one. Managers should evaluate AI initiatives based on clear perceptions of relative advantage, such as improvements in demand forecasting, route optimization, pricing decisions, and supply-chain coordination. Prior studies show that when SME owners perceive digital technologies as offering concrete and observable benefits, adoption likelihood increases significantly (Badghish et al., 2024; Maroufkhani et al., 2022).

The findings further suggest that AI investments should be prioritized according to organizational readiness and compatibility with existing processes. Fishing SMEs often operate with limited financial and human resources; therefore, adopting AI solutions that align with current workflows, skill levels, and data practices reduces implementation risk and increases the probability of performance gains (Rialti et al., 2022; Wamba et al., 2021). A phased adoption strategy beginning with low-complexity AI applications and scaling gradually can help SME owners balance innovation with operational stability.

M. Policy Implications

At the policy level, this study underscores the need for digital inclusion strategies that address structural barriers faced by traditional SMEs in adopting AI. Governments and development agencies should focus on reducing access gaps related to digital infrastructure, financing, and advisory support. Recent policy-oriented research emphasizes that inclusive digital ecosystems are essential for enabling SMEs to benefit from advanced technologies such as AI (OECD, 2021; World Bank, 2022).

In addition, capacity-building initiatives are critical for improving AI readiness among fishing SMEs. Training programs that enhance digital literacy, data management skills, and technology awareness can improve compatibility perceptions and lower resistance to adoption. National AI and digital transformation policies increasingly recognize that skill development and ecosystem partnerships are as important as financial incentives in fostering sustainable technology adoption (UNIDO, 2022; Malaysian Government, 2021).

N. Limitations and Future Research Directions

As a conceptual study, this paper does not empirically test the proposed relationships or estimate their relative strengths. The framework focuses on two DOI attributes relative advantage and compatibility—and therefore does not capture other potentially influential factors such as complexity, trialability, organizational readiness, or environmental pressure.

Future studies are encouraged to empirically validate the proposed mediation model using quantitative and qualitative approaches. Empirical evidence is necessary to assess the robustness, generalizability, and contextual sensitivity of the framework across different SME segments.

Survey-based structural equation modeling (SEM) is particularly suitable for testing mediation effects and validating measurement models (Hair et al., 2021). Mixed-method designs, combining surveys with qualitative interviews, can provide deeper insights into compatibility challenges and contextual constraints faced by fishing SMEs. Additionally, longitudinal or time-lagged designs would strengthen causal inference by capturing the dynamic nature of AI adoption and performance outcomes over time (Podsakoff et al., 2021; Zyphur et al., 2023).

O. Conclusion

This study proposes a conceptual framework explaining how AI adoption enhances business performance in fishing SMEs through the mediating roles of perceived relative advantage and compatibility. The central insight is that AI adoption in traditional SMEs is not driven solely by technological availability but by managers' perceptions of value and fit within existing organizational routines.

The paper contributes to AI adoption and SME performance literature by extending DOI theory to advanced digital technologies, clarifying mediation pathways to performance outcomes, and offering a context-sensitive perspective on digital transformation in traditional industries. In conclusion, sustainable digital transformation in fishing SMEs requires coordinated efforts from managers and policymakers to ensure that AI solutions are not only innovative but also accessible, compatible, and strategically aligned with SME capabilities.

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