Zhongguo Kuangye Daxue Xuebao
Journal of China University of Mining and Technology

2025 | Vol 30 | Issue 1 | Page 20-33
Journal Homepage: https://zkdx.ch/
DOI: 10.1654/zkdx.2025.30.1-3

Determining Factors Related to Artificial Intelligence Adoption among Small and Medium Size Businesses: A Systematic Literature Review

Ahmed Aish*
School of Business Management, Universiti Utara Malaysia, Sintok, Malaysia
*Corresponding author

Nor Azila Mohd Noor
School of Business Management, Universiti Utara Malaysia, Sintok, Malaysia

Abstract
This paper systematic literature review (SLR) investigates the factors influencing the adoption of Artificial Intelligence (AI) among small and medium-sized enterprises (SMEs). SMEs play a crucial role in global economic development but face significant barriers in implementing AI technologies due to limited resources, expertise, and organizational readiness. Drawing on 17 high-quality, peer-reviewed studies published between 2011 and 2024, this review identifies 14 critical factors grouped under four dimensions: technological, organizational, environmental, and human. Key determinants include perceived compatibility, management support, financial resources, vendor ecosystem, and leadership attitude. The study applies the Technology-Organization-Environment (TOE) framework, supported by the Diffusion of Innovation theory, to develop a conceptual model that explains AI adoption in SMEs. The findings provide actionable insights for policymakers and practitioners, highlighting strategies to overcome technological complexity, enhance training and development, and foster a supportive regulatory environment. This research contributes to the theoretical understanding of AI adoption while addressing the unique challenges faced by SMEs, particularly in developing economies. Future research should validate the proposed framework using empirical methods and explore additional dimensions that may impact AI integration.

Keywords
Artificial Intelligence (AI), SMEs, Technology-Organization-Environment (TOE), AI Adoption, Systematic Literature Review (SLR)

1. Introduction
Artificial intelligence (AI), a popular technology in recent years, has the potential to greatly assist and enhance small businesses by enabling them to make informed choices and improve operational efficiency. Nevertheless, small and medium-sized enterprises (SMEs) have several challenges and limitations in functioning and expansion. The SMEs sector plays a crucial role in employment creation and contributes significantly to global economic development, accounting for 90% of this increase (Al Khasawneh et al., 2021; Amoah et al., 2022). Nevertheless, SMEs have been somewhat sluggish in embracing AI compared to more prominent organizations, leading to heightened market competitiveness and innovation discrepancies. This review systematically analyzes factors influencing AI adoption within SMEs that would help practitioners and policymakers gain insights. Therefore, it is crucial to comprehend the distinctions between SMEs in terms of their challenges and their capacity to adopt AI.

This paper has provided a summary of different issues affecting the ability of SMEs to adopt AI. Practitioners and policymakers must comprehend their unique situations regarding the adoption of AI since they contribute significantly to the global economy by creating jobs, coming up with new ideas, and providing industrialization. A recent study indicates that enterprises' adoption and implementation of AI are influenced by technical proficiency, readiness for change, external influences, and regulatory frameworks. SMEs face challenges in adopting AI technologies due to limited resources and a lack of specialized knowledge. It is in contrast to other sectors, such as production, health, finance, and accountancy, which have been more successful in implementing AI worldwide (Rawashdeh et al., 2023; Petersson et al., 2022; Bahoo et al., 2024; Fu et al., 2021).

She et al. (2020) avowed that SMEs in developing countries are responsible for over 40% of the domestic income, implying that small-scale and medium-sized enterprises play a vital role in the world economy. These institutions significantly impact employment levels, poverty eradication, income generation, and provision of essential services to critical industries, creativity, entrepreneurship development, and rapid industrialization (Ahmad, 2020). Bughin et al.

(2017), in their study, have identified several factors that are highly significant when SMEs want to employ or integrate AI. These include the following: (a) The legislative environment and other environmental factors, (b) the level of preparedness within the organization; and (c) Technological support. Furthermore, SMEs have challenges due to resource constraints, limited access, and a deficiency in expertise, knowledge, and skills. For these reasons, SMEs prefer to reject AI-based solutions (Merkle et al., 2020).

The Stanford Institute for Human-Centered Artificial Intelligence poll in 2023 revealed that out of 1000 companies to which this question was put, approximately half had incorporated various AI technologies into their work. The statement also brings another vital truth: small and medium enterprises seek to incorporate such improved artificial intelligence in different business processes in today's world. This review is timely because of increased AI research and fast-paced digital transformation rates. Although large corporations have received substantial focus on AI adoption, a lack of systematic investigation focused on SMEs exists. Thus, because of the dynamic nature of AI and the unique problems SMEs face, it becomes necessary to begin new inquiries regarding factors affecting its adoption in this sector. This literature review aims to combine cutting-edge proof to develop suggestions that will suit small and medium enterprises even while closing the information gaps better.

Typically, there is a greater level of integration in large companies, whereby about 70% have employed AI technologies in their various functions (Deloitte, 2023). It demonstrates how much pointed-out assistance is required for small businesses to derive maximum benefit from the application of Artificial Intelligence. Hence, it is essential to investigate thoroughly the factors that influence the adoption of AI in SMEs for several reasons; understanding these factors would enable policymakers and business managers to develop targeted interventions that would promote the successful integration of this technology. On the other hand, knowing which barriers SMEs face would also help resolve them, thus leading to proper digital transformation across industries. In addition, examining the implications of AI implementation in smaller organizations could yield insights into its potential advantages, including increased productivity levels, improved decision-making skills, greater competitiveness, et cetera.

SMEs have embraced artificial intelligence, considering several factors that must be considered in research. Nevertheless, studies on the perception and prioritization of these aspects are scarce. This literature review examines empirical research conducted between 2011 and 2024 that investigates the adoption of artificial intelligence by SMEs concerning technology, organization, and environment (TOE). The framework is a tool for business managers to prioritize factors and theories, which would help them use AI much better. Additionally, it helps researchers and practitioners find their way through the thicket of theories.

It is crucial to examine the determinants of AI adoption in SMEs in detail; therefore, doing so is of utmost importance. In the first instance, pinpointing certain factors that could either promote or inhibit the use of AI is vital in helping policymakers and company managers formulate specific interventions and support frameworks that address the needs of SMEs. Targeted actions must be taken to adapt this kind of technology appropriately. In addition, it is equally vital to comprehend the constraints experienced by SMEs while migrating into artificial intelligence to address specific challenges and ensure that digitization is fair and inclusive among all groups (Kergroach, 2021). Shedding light on what happens when small to medium-sized businesses get artificial intelligence can give insights into how these organizations align their businesses with technological innovations. It has been associated with increased productivity, good decision-making ability, and enhanced competitiveness (Cortez et al., 2018).

Research suggests that SMEs consider different aspects before accepting artificial intelligence. According to Magaireah et al. (2019), specific indicators play a significant role in determining such decisions on AI among SMEs. Nevertheless, there has been little exploration into how these indicators rank and find their place in order of importance. The framework allows business persons to prioritize factors and theories effectively to use AI in their companies better. It focuses on contemporary developments regarding insights, constructs, examples, and significant issues in artificial intelligence alongside vital suggestions. In addition, it helps educators and practicing professionals understand the theoretical environment well (Alter, 2017).

This article discusses the effects of the various challenges that hinder the effective integration of artificial assistance in small and medium enterprises. It addresses questions such as: "What factors influence AI adoption in the SME sector?" and "What are the most relevant theories, frameworks, and models in the literature?" Additionally, this research seeks to augment scarce knowledge about AI in SMEs by comparing developing countries' artificial intelligence adoption progress with other parts of the globe. In particular, it answers the question, "What factors determine its usage by SMEs?" and "What are the most notable theories and models that relate to primary factors impacting AI adoption as per literature?"

Sections of this work are divided into seven distinct parts. The first section of the paper evaluates the literature on the usage of AI in developing countries during the last ten years. It gives a comprehensive outline of the research setting. Part two looks at how the research was done by outlining the method used and using a systematic literature review to determine the critical aspects. The paper's third section discusses the survey results in which these aspects are measured. Part four focuses on the construction of a concept that uses Technology-Organization-Environment TOE dimensions. Part five examines the theoretical foundation, whereas part six focuses on the practical consequences of the theory. In its seventh part, this report addresses the research limitations and offers recommendations for future investigations. The paper’s last section will succinctly examine the primary discoveries of the investigation.

2. Methodology

A systematic literature review (SLR) is a well-established methodology in scholarly research, designed to aggregate, evaluate, and synthesize existing empirical evidence on specific research questions. This methodology helps researchers gain a comprehensive understanding of a field by consolidating data from various studies and addressing both reliability and validity issues (Rocco et al., 2023; Salisu et al., 2021). As it organizes and critically analyzes published works, SLR uncovers gaps in current knowledge, guiding future research and identifying trends or shifts in academic inquiry (Xiao & Watson, 2019). Furthermore, SLR establishes a standardized approach to handling large volumes of research, ensuring that key works are cited, categorized, and synthesized following a structured protocol (Rocco et al., 2023).

For this research, a systematic qualitative review was selected. This approach is suitable because it focuses on evaluating the factors influencing AI adoption within SMEs, incorporating different theoretical models and empirical findings. The qualitative SLR allows for the synthesis of diverse types of empirical evidence and theoretical insights, which are critical when examining a dynamic topic like AI adoption, where various technological, organizational, and environmental aspects play a role (Xiao & Watson, 2019). Moreover, a structured protocol was followed as proposed by Manz (2019) and Xiao and Watson (2019), ensuring a systematic approach to data extraction and synthesis. This method also includes elements of expert evaluation, allowing for a rigorous review of findings and the identification of key factors influencing AI adoption within SMEs.

SLR has been widely discussed by various scholars across multiple disciplines. Kitchenham (2009), a leading figure in the development of SLR in software engineering, emphasizes the importance of SLR in providing reliable evidence to support decision-making, as it critically appraises studies, systematically identifies research gaps, and informs future research directions. Xiao and Watson (2019) further elaborate on its utility in systematically summarizing knowledge in a field by adhering to strict inclusion and exclusion criteria for studies, ensuring a transparent and replicable process. Rocco et al. (2023) and Salisu et al. (2021) highlight the growing importance of SLR in business and management fields, noting how it helps researchers generate robust findings and ensures the synthesis of high-quality data.

Thus, this research utilizes a comprehensive qualitative SLR methodology to assess the existing literature on AI adoption in SMEs, aiming to provide practical insights for practitioners and policymakers while identifying knowledge gaps for future exploration. The use of this methodology ensures a critical synthesis of data, alongside the integration of expert insights into the research framework. Hence, Performing an SLR was essential for this research since it encompassed an analytical study employing existing material while incorporating innovative aspects like instrumentation, among others. Figure one presents a graphical representation of using expert evaluation and SLR to create the research framework with the help of the SLR technique, which is explained further below.

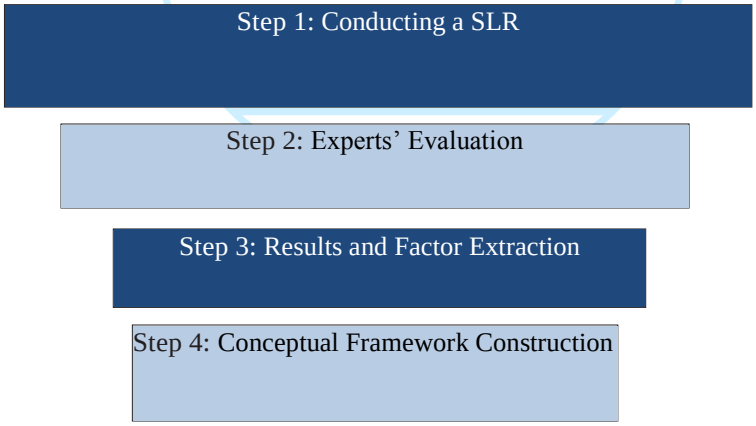

Fig. 1 SLR methodological steps followed.

2.1 Data Collection for SLR

Primary data sources for this research were from Scopus and WoS, two well-known databases that house many scholarly, peer-reviewed articles. The study started with using a collection of hand-picked keywords and search phrases, together and separately, with Boolean operators like "AND" and "OR." The advanced search included terms like "artificial intelligence adoption," "AI in SMEs," "artificial intelligence," and "factors influencing artificial intelligence.

2.2 Criteria for Inclusion

The articles identified for this review are carefully selected to provide substantial data that will be useful for its inclusion. Due to the increasing need for substantiated decision-making in these organizations, research into AI adoption has increased substantially. The review only comprises articles published from 2011 through to June 2024. Only articles indexed in WoS or Scopus were considered to ensure quality and domain relevance. All articles focus on AI studies and related systems covering business analytics. We only evaluated primary empirical investigations and conceptual frameworks that were authored and published in English. In addition, meta-analyses and systematic reviews had been included to provide a view of the entire area.

2.3 Extraction of Data

The data extraction process followed the structured guidelines proposed by Kitchenham (2009) for systematic literature reviews, ensuring a transparent and reproducible methodology. The process began with an extensive search to identify relevant articles, after which irrelevant studies were filtered out through a multi-step procedure. The first step involved reducing superfluous data by applying inclusion and exclusion criteria to filter out studies that did not meet the research objectives.

Step 1: A total of 663 articles were initially identified through keyword searches across various databases.

Step 2: After a careful review of titles and abstracts, 521 articles were deemed irrelevant and excluded.

Step 3: Of the remaining 142 articles, 92 were removed following a deeper evaluation, focusing on relevance to AI adoption in SMEs.

Step 4: The abstracts and full texts of the remaining 50 articles were then scrutinized, resulting in the exclusion of 5 additional papers that did not meet the quality criteria.

Step 5: Ultimately, 17 articles were selected based on rigorous quality assessments, adhering to the inclusion criteria, ensuring they aligned with the research focus on AI adoption.

This step-by-step process reflects Kitchenham's (2009) emphasis on a systematic approach to data reduction and selection. By narrowing the scope to high-quality studies indexed in Scopus and Web of Science, the review ensured consistency across the selected literature. The articles were categorized by their quality, and the key factors influencing AI adoption in SMEs were extracted and analyzed using tools like Microsoft Excel and Mendeley to streamline the open-coding process.

The criteria definitions and measuring items were compared across studies to confirm consistency in how AI adoption was approached. The study questions, goals, and theories employed by the selected papers were aligned, allowing for a more coherent synthesis of findings. In this way, the methodology not only followed best practices in systematic reviews but also provided a structured and reliable foundation for understanding the factors influencing AI adoption in SMEs.

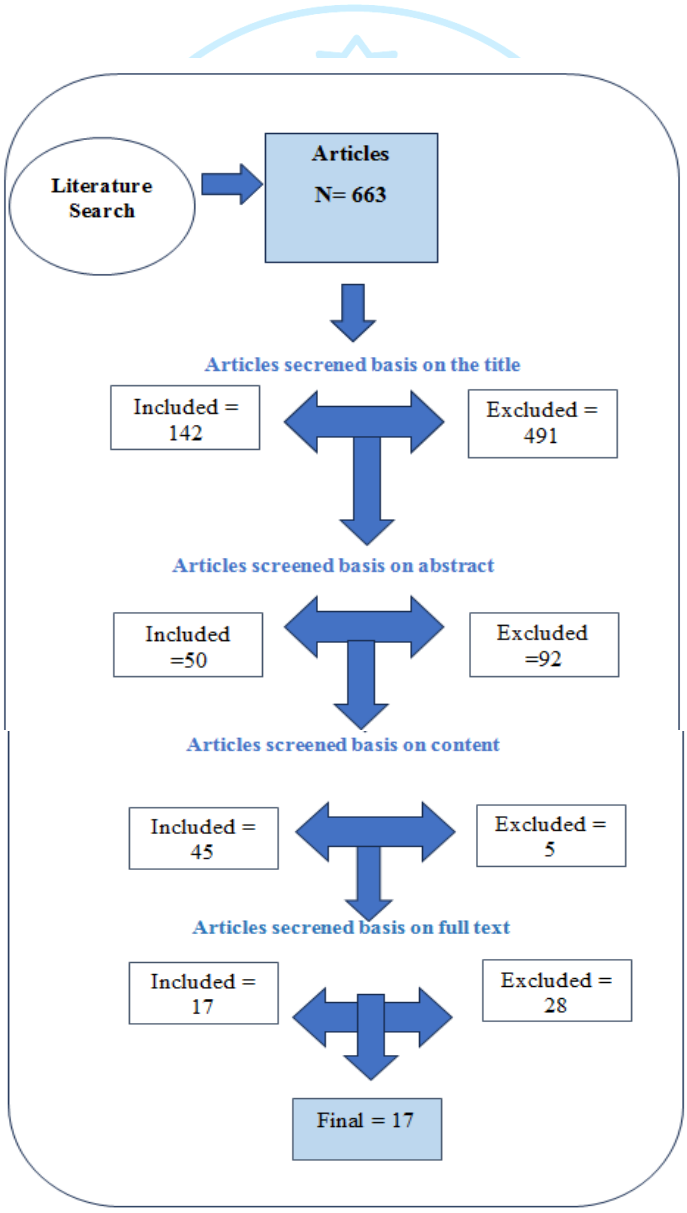

Fig. 2 Literature Search

Table 1 Results of the SLR

Database	Authors	No of Paper Selected	Type of paper
Elsevier	(Haftor et al., 2023; Siahaan & Tan, 2022; Vasseur et al., 2013)	3	SCOPUS & WoS
Inderscience	(Wang & Su, 2021; Li et al., 2020)	2	SCOPUS & WoS
Springer	(Parkinson et al., 2023; Sinha and Kumar, 2021; Wu et al., 2021)	5	SCOPUS & WoS
IEEE	(Santos et al., 2024; Barata et al., 2024; Le and Behl, 2024; Sharma et al., 2024; Khan et al., 2024; Gholizadeh et al., 2024; Crockett et al., 2023)	7	SCOPUS & WoS

2.4 Factors Extraction

The analysis examined 17 scholarly papers and identified 19 influential elements affecting the adoption of artificial intelligence (AI) in small and medium-sized enterprises (SMEs). Among these factors, the most notable were Perceived Compatibility, Technological Complexity, Trialability, Observability, and Management Support. Additionally, organizational factors such as Organizational Size, Financial Resources, and Organizational Culture played a significant role. Environmental influences, including Competitive Pressure, Regulatory Environment, and Vendor Support and Ecosystem, were also critical. Human-related factors like Employee Expertise and Skills, Training and Development, and Leadership Attitude further contributed to AI adoption (Bahoo et al., 2024; Rawashdeh et al., 2023).

On the other hand, five factors were excluded from the analysis based on their lack of significant impact in the reviewed studies: Perceived Security, IT Infrastructure, System Quality, and Social Influence (Santos et al., 2024; Ahmad et al., 2019). This exclusion was consistent with the findings of similar research studies, which emphasized that these factors do not universally hinder AI adoption in SMEs but may have context-specific relevance (Cruz-Jesus et al., 2019; Gholizadeh et al., 2024).

2.5 Expert's Evaluation

The specialists should be competent and honed enough not to cross the boundaries while manipulating computers. Dehghani et al. (2022) show that understanding critical aspects of technology adoption requires embracing academic expertise and individual integrity from the concerned professionals involved in this practice. This method has variously been applied to identify essential variables on information systems uptake irrespective of either developed or developing countries, as illustrated by Boonstra et al. (2014), Gagnon et al. (2012), Gruenhagen & Parker (2020), Hawash et al. (2020). Hence, the identified possible factors affecting AI adoption in SMEs were emailed to sixteen independent adjudicators from IT and business sectors for evaluation purposes. The experts were tasked with endorsing, suggesting additions, or removing any factors they felt were unnecessary.

The survey highlighted how the factor was to be defined and how accurate answers could be ensured. A survey with the experts occurred in May 2024, and the evaluation process was conducted online. A set of experts was asked to offer their ratings on the importance of various factors related to AI implementation in SMEs, and their identity was preserved anonymously. In data collection, a 5-point Likert scale was used where the respondents had options ranging from 1 (very low importance) to 5 (very high importance). To be included, each participant had at least three years of domain experience, a PhD degree, and one WoS or Scopus-indexed publication. From this process, 14 factors were retained for developing the research framework.

3. Results and Discussion

This section outlines the expert evaluation and SLR findings and discussions. See Table 2 for the results of the one-sample t-test conducted in SPSS on the data obtained from business and IT professionals. This test compares the average of an entire population (X) with the anticipated value (Xmean =4), which is generally regarded as a very high rank on a five-point Likert scale where one means "extremely insignificant" while five means "extremely important."

1. ***Included****:* A factor with a mean of more than four is considered necessary and significant.
2. ***Excluded****:* A factor with a mean of less than four is considered insignificant and does not affect decisions.

Experts deemed 14 of the 19 criteria essential, as seen in Table 2. It has been suggested that the overlap of three components, namely IT Infrastructure, system quality, social influence and perceived security, should be eliminated. The suggestion behind this proposal is to include the perspective of management and the acquisition and knowledge of staff in terms of how they influence the involvement of SMEs in embracing AI.

Table 2 Result of expert's evaluation

Factors	N	Mean	t	Sig. (2-tailed)	95% Confidence Interval of the Difference		Decision
					Lower	Upper	
Perceived Compatibility	16	4.600	4.573	.000	.319	.881	Accept
Data quality	16	3.800	4.000	.001	.247	.819	Reject
Technological complexity	16	4.332	4.000	.001	.247	.819	Accept

Trialability	16	4.665	5.291	.000	.396	.937	Accept
Observability	16	4.467	3.500	.004	.181	.753	Accept
Perceived security	16	3.933	−0.269	.792	−.599	.466	Reject
Management Support	16	5.000	3.055	.009	.119	.681	Accept
Organization size	16	4.600	2.646	.019	.063	.604	Accept
Financial Resources	16	4.733	6.205	.000	.480	.987	Accept
IT infrastructure,	16	4.333	4.000	.001	.247	.819	Reject
Organizational Culture	16	4.800	4.000	.001	.246	.819	Accept
System quality	16	3.867	−0.564	.582	−.640	.374	Reject
Competitive Pressure	16	4.532	4.000	.001	.247	.819	Accept
Regulatory government	16	4.533	4.000	.001	.247	.819	Accept
Vendor support and Ecosystem	16	4.533	3.055	.009	.119	.681	Accept
Social influence,	16	3.800	−0.899	.384	−.677	.277	Reject
Training and Development	16	4.600	2.646	.019	.063	.604	Accept
Employee Expertise and Skills	16	4.400	3.500	.004	.181	.753	Accept
Leadership Attitude	16	4.533	4.000	.001	.117	.681	Accept

4. Theories, Models, and Frameworks Used in AI Studies

A review of academic publications shows that many research studies have used theoretical frameworks. This research examines many established methodologies often used in studies to identify the specific personality qualities that impact SMEs success or failure when using AI. These methodologies include theories, models, and frameworks. Of these nine prominently discussed processes, the Technology-Organization-Environment (TOE) framework, Diffusion of Innovation (DOI) theory, and institutional theory are most frequently referenced. These include a carefully designed Information Systems (IS) adoption approach for small firms, among other options. Besides, The Unified Theory of Acceptance and Use of Technology (UTAUT), the Theory of Planned Behavior (TPB), the Resource-Based View (RBV), and the Technology Acceptance Model (TAM) are all components of the framework.

In addition, by considering a comprehensive framework that includes several ideas, investigators may understand how persons, organizations, and environments interact with the adoption and use of technology. Therefore, reviewing the relevant literature systematically and comprehensively, 14 critical factors were identified and then categorized into three dimensions based on the established TOE framework (Tornatzky & Fleischer, 1990) and the Information Systems adoption model for small businesses (Thong, 1999). The various dimensions of this classification enable a better understanding of how SMEs em brace artificial intelligence (AI). The different dimensions include:

- Technological Dimensions: Perceived Compatibility, Technological Complexity, Trialability, and Observability.
- Organizational Dimensions: Management Support, Organization Size, Financial Resources, and Organizational Culture.
- Environmental Dimensions: Competitive Pressure, Regulatory Government Support, Vendor Support, and Ecosystem.

Furthermore, the review underscores Human Factors—Employee Expertise and Skills, Training and Development, and Leadership Attitude—as critical factors in adopting AI within SMEs

5. Conceptual Framework Construction

This part clarifies the three classifications and gives the exact meanings of the key concepts required to build the theoretical framework.

5.1 Technology Characteristics

According to Stornelli et al. (2021), the ideas concerned with IT adoption have much to do with technology changes, which are discussed in great length. It is a process of incorporating new technologies that influence individuals and businesses from within and outside their boundaries (Khayer, Talukder, et al., 2020). Hossain and Azam (2023) state that the technical environment comprises necessary technologies from outside organizations, including those yet to be used. These new technological tools may stimulate innovation by showing what could be possible and how it can help companies grow or adapt to changes in what they produce (Blichfeldt & Faullant, 2021). Alternatively, the speed and scope of technology in organizations are determined by factors mentioned in a study by Szalavetz (2019).

The SLR and expert evaluations identified key factors consistent with Rogers' (2003) four technological factors: Perceived Compatibility, Technological Complexity, Trialability, and Observability (see Table 3 for definitions). Banapour et al. (2020) and Pipitwanichakarn and Wongtada (2019) confirmed that Rogers' (2003) Diffusion of Innovation (DOI) theory is often used to analyze how those technological aspects impact SMEs to adopt the technology. Similarly, other studies have relied on these dimensions to evaluate information technology adoption in different settings (Karunagaran et al., 2019; Khayer, Talukder, et al., 2020; Ma & Lee, 2019; Ahmad et al., 2019).

For example, by considering these factors, Ahmad et al. (2019) analyzed how small businesses in the UAE use social media. Recent research by Hiran and Henten (2020) on using cloud computing in Ethiopian education revealed

parallels with Korean agricultural methods, as noted by Yoon et al. (2020). Also, this study's results strongly agree with a review by Teixeira et al. (2018) on elements for making the marketing move. The benefit notion includes the characteristics of compatibility, complexity, observability, and trialability in many processes. Hameed and Counsell (2014) conducted a meta-analysis that provides evidence supporting this conclusion, demonstrating the predictive capability of these aspects in adopting information technology (IT) innovation.

This section advises how organizations should manage electronic information and data protection while keeping up with ever-changing technology. The technological aspect includes several aspects that influence the use of devices with several advantages. Research has shown (An and Wang 2010; Sittig et al. 2014) that business analytics play an essential role in providing infrastructural and technological support for managing information in a firm, especially if they are part of the business recovery strategy.

Table 3 Definitions of technological characteristics

Constructs	Description	Reference
Perceived Compatibility	The importance of the technology merging seamlessly into current organization workflow and matching up to the prior principles, cultural practices, backgrounds as well and requirements of future consumers	(Rogers, 1995).
Technological Complexity	An innovation is unusable at this stage. It measures how complicated emerging technologies like AI are judged to be.	(Rogers, 2003).
Trialability	It refers to an invention regarded as impossible to understand and apply. It is a degree to which current technologies, such as AI, are considered relatively complex to process and utilize.	(Rogers, 1995).
Observability	The prospect of monitoring both ingenuity and its ramifications is at hand. It predicts how many people can foresee the impact of technology acceptance before accepting it.	(McCann et al., 2014)

5.2 Organizational Characteristics

The acceptance of new ideas within an organization can be influenced by its structure and operations, as noted by Tornatzky and Fleischer (1990). Organizational internal factors play a crucial role in decision-making regarding technology adoption. As defined by Clohessy et al. (2019) and Ahmad et al. (2019), these organizational features include the size of the workforce, the amount of income, the degree of centralization and formalization, the hierarchy of management, and the availability of resources such as persons and networks. Existing research underlines the relevance of these elements in affecting the acceptance of technological advancements. This study focuses on essential organizational factors particular to small enterprises, including leadership quality, capacity to adopt new ideas, support from management, categorization as a small company, and resource sufficiency. For a complete summary of these factors, please refer to Table 4.

Table 4 Definitions of Organizational characteristics

Constructs	Description	Reference
Management Support	It refers to how senior management assists and encourages fostering innovation inside a corporation.	(Thong, & Yap, 1995).
Organizational size	Organizational size is often assessed based on the number of employees, the value of assets, and the amount of money a corporation generates. An organization's scale impacts its operations, such as technology adoption.	(Damanpour, 1992).
Financial Resources	It refers to a company's monetary assets to invest in different activities, such as adopting and implementing innovations. The money originates from several sources, like income, investments, or loans, and they are crucial for facilitating new initiatives, acquiring new technology, and maintaining seamless operations.	(Cooper, & Kleinschmidt, 1987).
Organizational Culture	The values, beliefs, norms, and practices that members of an organization share as part of a company or organization. This culture affects how employees relate with one another, make choices, and introduce innovations such as new technologies into their work environment.	(Schein, 1985).

5.3 Environmental Characteristics

Almost all available articles acknowledge that environmental characteristics are significant for accepting innovation. Technology-related literature supports such a notion (Damanpour & Schneider, 2006). In addition, it is essential to consider these aspects before technology implementation as they highly influence the success of innovation adoption. According to Awa et al. (2016), critical environmental factors that the TOE framework points out include the availability of technology service provider's industrial configuration and organizational adaptability.

A broader view of the environmental context is essential to understand how outside elements and mechanisms influence an organization's acceptance of new technologies like AI (Gutierrez et al., 2015; Taylor, 2019). Several studies have shown that environmental conditions are crucial in stimulating creativity. The report analyzes three key determinants influencing the use of AI in small and medium-sized enterprises: competitive pressure, regulatory oversight, and vendor support. The definitions of these factors may be found in Table 5.

Table 5 Definitions of Environmental characteristics

Constructs	Description	Reference
Competitive Pressure	An organization must adopt new technologies, strategies, or innovations to keep or enhance its position in the market as a rival dictates. Such pressures often lead organizations to improve efficiency, cut costs, and make better products or provide a higher quality service to remain competitive.	Cruz-Jesus et al., 2019), (Khayer, Jahan et al., 2020).
Regulatory governance	Regulatory governance is vital for every organization to comply with policies, rules, and enforcement mechanisms. This governance affects how organizations embrace new technologies or practices to meet legal and regulatory requirements.	(Levi-Faur, 2011).
Vendor Support and ecosystem	Supplier help and surroundings remain the aid and service suppliers provide to firms when they get and use new technologies or systems. Training must be provided with other support services like maintenance, repair, and upgrading to guarantee the correct use and succession of technology.	(Skafi et al., 2020), (Branco et al., 2019)

5.4 Human Factors Characteristics

The power of AI in SMEs is highly influenced by the capability to manage human components effectively. These issues entail employee competencies, expertise, training and development possibilities, and leadership mentality. On the one hand, employees' knowledge and abilities necessary for comprehending, applying, and properly taking advantage of AI techniques (Barney, 1991) indicate technical know-how among staff members. If such workers possess relevant skills, seamless integration of AI systems shall be achieved since they can handle problems related to implementing new technologies. Another element that should be addressed is intense training and development programs. Systematic training programs that embrace on-the-job training, workshops, and seminars ensure that employees acquire the requisite skills to adapt to AI technologies (Noe, 2010).

Employees are prepared to integrate new technologies and exploit them to the maximum; such programs guarantee this. In addition, the organizational leadership's mindset is fundamental. The leadership attitude encompasses the perspectives and approaches leaders adopt toward innovation and change, which can significantly influence organizational culture for AI adoption (Yukl 2013). Positive attitudes towards AI among leaders promote risk-taking and an innovative culture that favors successful implementations of artificial intelligence. Apart from saying that it is crucial to implement and incorporate AI technologies in SMEs, we can also say it hints that human resources should be invested in fully utilizing the benefits of AI.

Table 6 Definitions of Human Characteristics

Constructs	Description	Reference
Employee Expertise and Skills	Employees' skills, knowledge, and abilities are crucial for successfully understanding, applying, and using new technologies like AI. This factor is vital for an organization's ability to accept and use new tools effectively.	Lauzier, M., & Bilodeau Clarke, A. (2024).
Training and Development	Through educational programs and activities, it systematically develops employees' abilities, expertise, and skills. It comprises on-the-job training, seminars, workshops, and other learning chances created to increase staff productivity and enable them to use recently introduced technology and procedures.	(Noe, 2010).

Leadership Attitude	It refers to the mindset of leaders, perspectives, and approaches towards change, innovation, and implementation of new technologies in the organization. A practical leadership attitude includes being open to new ideas, accepting risk, and creating an appropriate environment for technological growth.	(Yukl, 2013).

5.5 Conceptual Framework

A conceptual framework elucidates the interrelations between various concepts among different scholars (Aziz et al., 2018). The work presented in this paper proposes multiple tactics that may be employed to promote machine-based intelligence adoption by institutionalized organizations operating at lower scales and sizes. It is based on well-defined principles, scientific analysis, and fundamental assumptions as described by (Morioka & Carvalho, 2016; Ngulube 2018). Key elements that promote its utilization include technological, organizational, environmental, human, and most importantly, user awareness and willingness. In addition, this study explains the forces that make small-scale businesses embrace AI.

Thus, this research merges the theories of Diffusion of Innovations (Rogers, 2003), 'IS adoption model for small firms (Thong, 1999), and 'Technology-Organization-Environment framework' (Tornatzky & Fleischer, 1990). All the internal and external technologies considered crucial for the company are encompassed within the technological framework. However, the organizational environment encompasses various aspects of a company, such as its size, level of centralization, complexity, and management structure. In addition, the corporate environmental context encompasses multiple entities such as suppliers, competitors, and the government (Zhu et al., 2002). The selected theoretical foundation for this study model is the TOE framework. This decision is based on multiple factors.

The strength of the TOE framework is that it considers several dimensions -technological, organizational, human, and environmental factors- and, therefore, provides an explanation model that is more comprehensive than the one based only on one element. Additionally, the TOE model is well known for its interactive approach, which points out that organizational changes result from an interaction between internal actors and the organization's unique characteristics (Hameed et al., 2012). This participatory viewpoint considers each element plus its connections inside a cohesive and adaptable paradigm, making it suitable for interpreting how people embrace technology and other fields like information systems or Artificial Intelligence (Molla & Licker, 2005).

As shown in Figure 3, the research framework comprises four consistent constructs: factors linked to technology, factors related to organizations, factors related to the environment, and factors connected to people. By forecasting and elaborating on key elements, the objective is to provide a framework predisposed to the application of artificial intelligence. The Technology-Organization-Environment (TOE) structure, the Diffusion of Innovation (DOI) theory, and the benefits of microenterprise information systems are the three ideas that serve as the foundation for this framework.

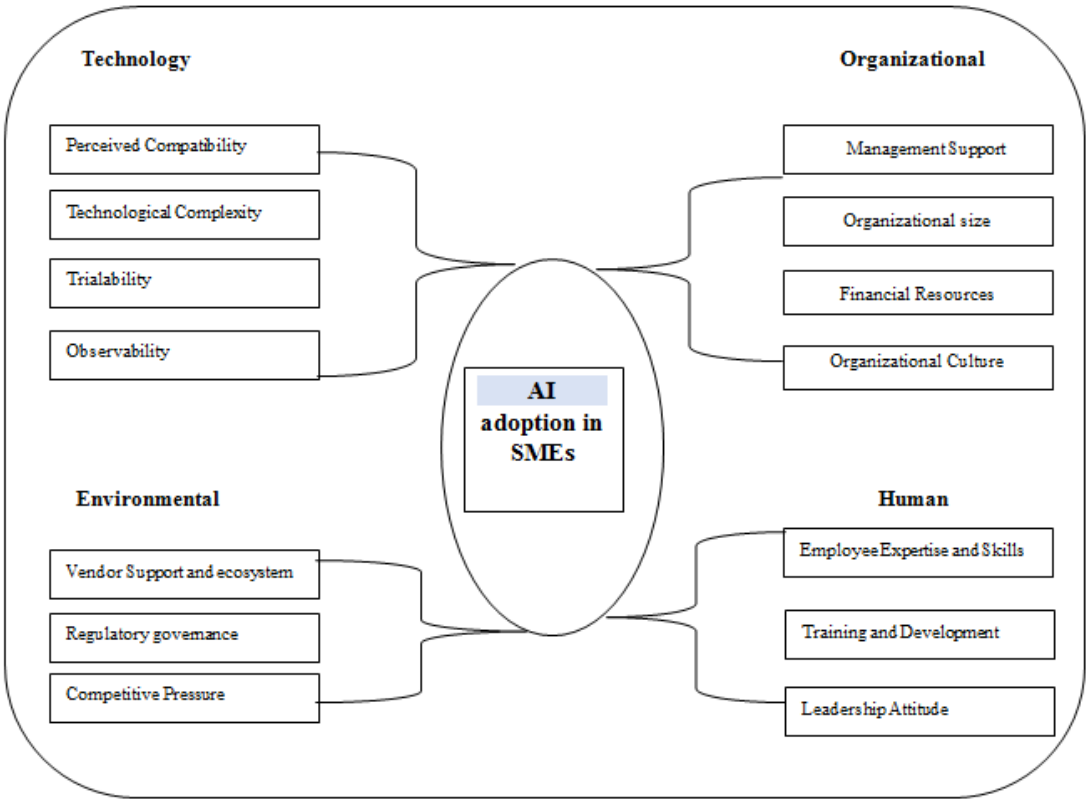

Fig. 3 Theoretical framework

6. Theory and Practical Implication

6.1 Theoretical Implications

Like water, there are no two similar streams of AI. The idea behind this framework put forth in this paper is to be able, accurately enough, to recognize factors leading to SMEs' successful embrace of AI, which would benefit the practitioners when integrating and taking on board AI technologies. This model has made considerable strides toward improving the theory of AI adoption while filling existing voids in research done on such matters (Ahmad et al., 2020). However, more refinement should be done so theoretically constructed knowledge could inform how it can best play out in practice. The research emphasizes the importance of integrating the TOE framework, DOI theory, and IS framework for small enterprises. A multidimensional model has more explanatory power than a single-factor approach.

The framework is meant to provide complete counsel on how small and middle-sized firms can use administration support, financial resources, and personnel skills to embrace AI to improve its theoretical implications. Moreover, the framework is proposed as a complete guide to applying administration support, financial resources, and personnel skills. Further, it should also present solutions for dealing with the challenges of complex technologies and regulatory compliance. The guidance can help decision-making in SMEs through a systematic approach to adopting AI technologies. So, their choices will be better understood, leading to optimized AI utilization. The theoretical foundation requires further development considering its relevance on the ground for small-scale industries, thus equipping them with pragmatic solutions that lead to sound choices in life's significant choices. An attempt to develop such a close relationship between theory and practice would ensure that what has been found out effectively leads towards the adoption of artificial intelligence as well as its usage within the actual world.

6.2 Practical Implications

The article portrays deeply researched theory of the vital determinants of AI use based on scientific and commercial resources. However, these variables may differ from one firm to another and their significance differs in different business contexts. Hence, it is important to grasp the distinctive components linked to the firm and industry to optimize AI program outcomes. A new study suggests that AI has significantly driven up market values in many areas, such as the retail sector, education, telecommunications, insurance, research and analysis, healthcare and supply chain operations.

The fundamental objective of this research project is to enhance the decision-making processes carried out in enterprises before using artificial intelligence. It will help policymakers and market analysts better understand some factors that ensure optimal AI integration. Major determinants like organization size and management support are essential for successfully adopting AI. Therefore, all these findings should be put into practice so managers can implement the required key steps carefully before leading effective development process management centered around them. When considering AI implementation, companies must consider the complexity and potential risks, especially environmental-related ones. This study aims to show how SMEs in developed countries can tackle issues associated with complexity and compatibility with AI firms and providers of cloud services.

7. Research Limitations and Future Research Guidelines

As with many inquiries, this analysis has limits. First, we examined the drivers theoretically, drawing on existing literature on SMEs in management and business. For example, it is essential to note that distinct industries may encounter different variables influencing the acceptability or adoption of AI technology under different conditions. Second, this study sought to identify significant factors that could shape organizations' conceptual decisions toward implementing AI. The findings are based on theoretical perspectives from earlier quantitative studies without any case studies addressing their practical applicability. Therefore, they need further validation through industry-specific case studies as they will give these insights more practical relevance in future work.

In addition, human judgment and difficulties in term definitions and text interpretations would embed potential biases despite attempts to maintain reliability. Consequently, these findings may reflect broader theoretical trends rather than specific phenomena. There appears to be a lack of research on the individual-level adoption of AI in the existing literature. Research in the future could aim to fill gaps in our knowledge of AI deployment by examining several theoretical frameworks, such as social cognitive theory, stakeholder theory, decision theory, and motivation theory. It may also be useful to look at Critical Success Factor (CSF) or Resource-Based View (RBV) theories to identify the key resources and competencies needed for AI projects to succeed.

Additionally, this inquiry extensively examined the fundamental factors in AI research. However, it was not concerned with the correlation between such determinants and their results, for example, decision effectiveness and reliability. A meta-analysis may further illuminate these relationships for an enhanced understanding of the issue. Moreover, statistical methods such as PLS-SEM or MCDM must be applied to validate the proposed model in this systematic literature review. It will thus lead to a better understanding of the primary factors influencing acceptance trends in AI. This research provides significant knowledge to enlighten scholars and practitioners attempting to address the issue of integrating AI into SMEs. Summarizing recent studies can provide a precise understanding in line with some emerging research queries proposed for a classification system. It also aids practitioners in evaluating their environments and identifying any possible difficulties with implementing artificial intelligence applying this approach.

8. Conclusion

Recent study has identified the primary motivations behind helping small and medium-sized firms comprehend and use AI. Based on a comprehensive review of seventeen research articles published from 2011 to 2024, it has been determined that fourteen aspects may be categorized into three primary groups: technical, organizational, individual, and environmental. The predominant body of research investigated in this study mainly concentrated on the field of business, with a significant number of AI investigations undertaken inside the banking and corporate sectors of economically disadvantaged countries. Therefore, more research must focus on using AI in SMEs in developing nations. Further empirical research should be undertaken to identify new variables that impact AI projects by using and augmenting existing models and theories. Several opportunities exist to verify and assess current theoretical frameworks and conceptual models using quantitative, qualitative, and mixed-method techniques. It would enable the development of enhanced models for further analysis.

8.1 Practical Recommendations

SMEs must allocate resources to implementing extensive training initiatives to improve staff proficiency in managing AI technology. It would guarantee a seamless incorporation of AI into their day-to-day business activities. Top management must be supportive and actively engaged in AI adoption efforts, providing necessary resources and setting clear implementation goals. There is no doubt that periodic analysis of market trends is vital to comprehend emerging patterns within AI development and, therefore, inform us of what could be improved on products and services offered by these firms. It is vital to have AI technologies that fit with the company's current systems and infrastructure to reduce complexity and enhance efficiency. Collaboration with service providers is recommended for ongoing technical assistance and training to ensure effective and sustainable use of new technologies. To sum up, SMEs must invest in human resources, technology, and other resources to adopt AI effectively, enabling them to stay competitive in the market and make significant profits.

References

1. Ahmad, N. N. (2020). The effectiveness of additional PRIHATIN SME economic stimulus package (PRIHATIN SME +) in Malaysia post-COVID-19 outbreak: A conceptual paper. Global Business, 12(4), 754–764. http://gbmrjournal.com/pdf/v12n4/V12N4- 73.pdf
2. Ahmad, S. Z., Abu Bakar, A. R., & Ahmad, N. (2019). Social media adoption and its impact on firm performance: The case of the UAE. International Journal of Entrepreneurial Behavior & Research, 25(1), 84–111. https://doi.org/10.1108/IJEBR-08-2017-0299
3. Ahmad, S., Miskon, S., Alkanhal, T. A., & Tlili, I. (2020). Modeling of business intelligence systems using the potential determinants and theories with the lens of individual, technological, organizational, and environmental contexts - a systematic literature review. *Applied Sciences (Switzerland)*, *10*(9), 1-23.
4. Al Khasawneh, M., Abuhashesh, M., Ahmad, A., Masa'deh, R., & Alshurideh, M. T. (2021). Customers online engagement with social media Influencers' content related to COVID 19. Studies in Systems, Decision and Control, 334, 385–404. https://doi.org/10.1007/978-3-030-67151-8_22.
5. Alter, S. (2017). Nothing is more practical than a good conceptual artifact . . . which may be a theory, framework, model, metaphor, paradigm or perhaps some other abstraction. Information Systems Journal, 27(5), 671–693. https://doi.org/10.1111/isj.12116
6. Awa, H. O., Ukoha, O., & Emecheta, B. C. (2016). Using T-O-E theoretical framework to study the adoption of ERP solution. Cogent Business and Management, 3(1), 1196571.https://doi.org/10.1080/23311975.2016.1196571
7. Bahoo, S., Cucculelli, M., Goga, X., & Mondolo, J. (2024). Artificial intelligence in finance: a comprehensive review through bibliometric and content analysis. *SN Business & Economics*, *4*(2), 23.
8. Baker, J. (2012). The technology–organization–environment framework. Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), Information systems theory: Explaining and predicting our digital society (Vol. 1, pp. 231–245). New York, NY: Springer. https://doi.org/10.1007/978-1-4419-6108-2.
9. Banapour, P., Yuh, B., Chenam, A., Shen, J. K., Ruel, N., Han, E. S., Kim, J. Y., Maghami, E. G., Pigazzi, A., Raz, D. J., Singh, G. P., Wakabayashi, M., Woo, Y., Fong, Y., & Lau, C. S. (2020). Readmission and complications after robotic surgery: Experience of 10,000 operations at a comprehensive cancer center. Journal of Robotic Surgery, 15(1), 0123456789. https://doi.org/10.1007/s11701-020-01077-4
10. Bauer, T., Turel, O., & Serenko, A. (2016). Organizational adoption of disruptive technologies: Theoretical foundations and implications for research and practice. Information & Management, 53(4), 444-453.
11. Boonstra, A., Versluis, A., & Vos, J. F. J. (2014). Implementing electronic health records in hospitals: A systematic literature review. BMC Health Services Research, 14(1), 1-24. https://doi.org/10.1186/1472- 6963-14-370
12. Branco, T., Bianchi, I., & De Sá-soares, F. (2019). Cloud computing adoption in the government sector in Brazil: An exploratory study with recommendations from IT Managers. Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 11484(LNCS), 162–175. https://doi.org/10.1007/978- 3-030-19223-5_12

13. Bughin, J., Hazan, E., Ramaswamy, S., Chui, M., Allas, T., Dahlström, P., & Henke, N. (2017). Artificial intelligence: The next digital frontier? McKinsey Global Institute.
14. Chesbrough, H., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. Industrial and Corporate Change, 11(3), 529-555.
15. Clohessy, T., Acton, T., & Rogers, N. (2019). Blockchain adoption: Technological, organizational and environmental considerations. H. Treiblmaier & R. Beck (Eds.), Business Transformation through Blockchain, Palgrave Macmillan, Cham (Vol. 1, pp. 47–76). https://doi.org/10.1007/978-3-319-98911-2
16. Cooper, R. G., & Kleinschmidt, E. J. (1987). New products: what separates winners from losers?. Journal of product innovation management, 4(3), 169-184.
17. Cortez, P., Moro, S., & Rita, P. (2018). How artificial intelligence is transforming the business world. Emerging Markets Finance and Trade, 54(13), 2969-2987.
18. Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: Empirical analysis building on the TOE framework. Computers in Industry, 109, 1–13.https://doi.org/10.1016/j.compind.2019.03.007
19. Damanpour, F. (1992). Organizational size and innovation. Organization studies, 13(3), 375-402.
20. Damanpour, F., & Schneider, M. (2006). Phases of the adoption of innovation in organizations: Effects of environment, organization and top managers. British Journal of Management, 17(3), 215–236. https://doi.org/10.1111/j.1467-8551.2006.00498.
21. Dirgiatmo, Y. (2015). Analysis of the potential use of social networking for the success of strategic business planning in small and medium-sized enterprises. Mediterranean Journal of Social Sciences, 6(2S2), 233–245. https://doi.org/10.5901/mjss.2015. v6n2s2p233.
22. Fu, H. P., Chang, T. H., Lin, S. W., Teng, Y. H., & Huang, Y. Z. (2023). Evaluation and adoption of artificial intelligence in the retail industry. *International Journal of Retail & Distribution Management*, *51*(6), 773-790.
23. Gagnon, M. P., Desmartis, M., Labrecque, M., Car, J., Pagliari, C., Pluye, P., Frémont, P., Gagnon, J., Tremblay, N., & Légaré, F. (2012). Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. Journal of Medical Systems, 36(1), 241–277. https://doi.org/10.1007/s10916-010-9473-4
24. Gholizadeh, R., Mansouri, R., & Khan, M. (2024). Factors influencing AI-driven business strategies in SMEs. Journal of Business Research, 158, 105-118.
25. Gruenhagen, J. H., & Parker, R. (2020). Factors driving or impeding the diffusion and adoption of innovation in mining: A systematic review of the literature. Resources Policy, 65, 101540. https://doi.org/10.1016/j.resourpol.2019.101540
26. Gutierrez, A., Boukrami, E., & Lumsden, R. (2015). Technological, organizational and environmental factors influencing managers' decision to adopt cloud computing in the UK. Journal of Enterprise Information Management, 28(6), 788–807. https:// doi.org/10.1108/JEIM-01-2015-0001
27. Hameed, M. A., & Counsell, S. (2014). Establishing relationships between innovation characteristics and it innovation adoption in organizations: A meta-analysis approach. International Journal of Innovation Management, 18(1), 1450007. https://doi.org/10.1142/S1363919614500078.
28. Hawash, B., Mokhtar, U. A., Yusof, Z. M., & Mukred, M. (2020). The adoption of electronic records management system (ERMS) in the Yemeni oil and gas sector: Influencing factors. Records Management Journal, 30 (1), 1–22. https://doi.org/10.1108/RMJ-03-2019-0010
29. Hiran, K. K., & Henten, A. (2020). An integrated TOE-DoI framework for cloud computing adoption in higher education: The case of Sub-Saharan Africa, Ethiopia. In M. Pant, T. K. Sharma, O. P. Verma, R. Singla, & A. Sikander (Eds.), Advances in intelligent systems and computing 1053 soft computing: Theories and applications (pp. 1281–1290). Springer Nature Singapore Pte Ltd.
30. Hossain, M. I., & Azam, M. S. (2023). The effects of technology, organization and environmental factors on small firm entry to electronic marketplace: a developing country perspective. International Journal of Electronic Business, 18(1), 77-107. https:// doi.org/10.3390/app10093208
31. Kagermann, H., Wahlster, W., & Helbig, J. (2019). Recommendations for implementing the strategic initiative INDUSTRIE 4.0: Final report of the Industrie 4.0 Working Group. Forschungsunion.
32. Karunagaran, S., Mathew, S. K., & Lehner, F. (2019). Differential cloud adoption: A comparative case study of large enterprises and SMEs in Germany. Information Systems Frontiers, 21(4), 861–875. https://doi.org/10.1007/s10796-017-9781-z
33. Khayer, A., Talukder, M. S., Bao, Y., & Hossain, M. N. (2020). Cloud computing adoption and its impact on SMEs' performance for cloud supported operations: A dual-stage analytical approach. Technology in Society, 60, 101225. https://doi.org/10.1016/j.techsoc.2019.101225
34. Kim, S. W., Kong, J. H., Lee, S. W., & Lee, S. (2022). Recent advances of artificial intelligence in manufacturing industrial sectors: A review. *International Journal of Precision Engineering and Manufacturing*, 1-19.

35. Kitchenham, B. (2009). Guidelines for performing systematic literature reviews in software engineering. Keele University and University of Durham.
36. Levi-Faur, D. (2011). Regulation and Regulatory Governance. In D. Levi-Faur (Ed.), Handbook on the Politics of Regulation (pp. 3-21). Edward Elgar Publishing.
37. Ma, L., & Lee, C. S. (2019). Investigating the adoption of MOOCs: A technology–user–environment perspective. Journal of Computer Assisted Learning, 35(1), 89–98. https://doi.org/10.1111/jcal.12314
38. Magaireah, A. I., HidayahSulaiman, H., & Ali, N. (2019). Identifying the most critical factors to business intelligence implementation success in the public sector organizations. The Journal of Social Sciences Research, 5(2), 450–462. https://doi.org/10.32861/jssr.52.450.462
39. Manz, F. (2019). Determinants of non-performing loans: What do we know? A systematic review and avenues for future research. In Management review quarterly (Vol. 69). https://doi.org/10.1007/s11301-019-00156-7
40. Merkle, J., Rice, M., & Johnson, M. (2020). Small business adoption of artificial intelligence. Journal of Small Business Strategy, 30(2), 65-80.
41. Mosweu, O., Bwalya, K., & Mutshewa, A. (2016). Examining factors affecting the adoption and usage of document workflow management system (DWMS) using the UTAUT model: Case of Botswana. Records Management Journal, 26(1), 38–67. https://doi.org/10.1108/RMJ-03-2015-0012
42. Mukred, M., Yusof, Z. M., Mokhtar, U. A., & Fauzi, F. (2019). Taxonomic framework for factors influencing ERMS adoption in organizations of higher professional education. Journal of Information Science, 45(2), 139–155. https://doi.org/10.1177/0165551518783133.
43. Noe, R. A. (2010). Employee Training and Development (5th ed.). McGraw-Hill/Irwin.
44. Okoli, C., & Schabram, K. (2010). Working papers on information Systems a guide to conducting a systematic literature review of information Systems research. Working Papers on Information Systems, 10(2010). https://doi.org/10.2139/ssrn.1954824
45. Okoli, C., & Schabram, K. (2010). Working papers on information Systems a guide to conducting a systematic literature review of information Systems research. Working Papers on Information Systems, 10(2010). https://doi.org/10.2139/ssrn.1954824
46. Pipitwanichakarn, T., & Wongtada, N. (2019). Leveraging the technology acceptance model for mobile commerce adoption under distinct stages of adoption: A case of micro businesses. Asia Pacific Journal of Marketing and Logistics, ahead-of-print(ahead–of– print). https://doi.org/10.1108/APJML-10-2018-0448
47. Rawashdeh, A., Bakhit, M., & Abaalkhail, L. (2023). Determinants of artificial intelligence adoption in SMEs: The mediating role of accounting automation. *International Journal of Data and Network Science*, *7*(1), 25-34.
48. Rocco, T. S., & Plakhotnik, M. S. (2023). Conducting Systematic Literature Reviews: Planning, Implementation, and Implications. Sage Publications.
49. Russell, S., & Norvig, P. (2022). Artificial intelligence: A modern approach (5th ed.). Pearson.
50. Salisu, I., Bin Mohd Sappri, M., Bin Omar, M. F., & Tan, A. W. K. (2021). The adoption of business intelligence systems in small and medium enterprises in the healthcare sector: A systematic literature review. Cogent Business & Management, 8(1). https://doi.org/10.1080/23311975.2021.1935663
51. Santos, S., Barata, R., & Silva, M. (2024). AI adoption in developing economies: Regulatory and technological barriers. IEEE Transactions on Engineering Management, 61(4), 525-535.
52. Schein, E. H. (1985). Organizational Culture and Leadership. Jossey-Bass.
53. Schneider, S., & Sunyaev, A. (2016). Determinant factors of cloud-sourcing decisions: Reflecting on the IT outsourcing literature in the era of cloud computing. Journal of Information Technology, 31(1), 1–31. https://doi.org/10.1057/jit.2014.25
54. She, Q., Yu, Y., & Wu, K. (2020). Is "born global" a viable market entry mode for the internationalization of SMEs? Evidence from China before COVID-19. Emerging Markets Finance and Trade, 56(15), 3599–3612. https://doi.org/10.1080/1540496X.2020.1854720.
55. Sittig, D. F., Gonzalez, D., & Singh, H. (2014). Contingency planning for electronic health record-based care continuity: A survey of recommended practices. International Journal of Medical Informatics, 83(11), 797–804. https://doi.org/10.1016/j.ijmedinf.2014.07. 007
56. Skafi, M., Yunis, M. M., & Zekri, A. (2020). Factors influencing SMEs' adoption of cloud computing services in Lebanon: An empirical analysis using TOE and contextual theory. IEEE Access, 8, 79169-79181.
57. Stanford Institute for Human-Centered Artificial Intelligence. (2023). *The AI index report 2023*. Stanford University. https://aiindex.stanford.edu/report/
58. Stornelli, A., Ozcan, S., & Simms, C. (2021). Advanced manufacturing technology adoption and innovation: A systematic literature review on barriers, enablers, and innovation types. Research Policy, 50(6), 104229.
59. Taylor, P. (2019). Information and Communication Technology (ICT) adoption by small and medium enterprises in developing countries: The effects of leader, organizational and International Journal of Economics, Commerce and VII (5),671–683. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3388391
60. Teixeira, S., Martins, J., Branco, F., Gonçalves, R., Au-YongOliveira, M., & Moreira, F. (2018). A theoretical analysis of digital marketing adoption by startups. J. Mejia, M. Muñoz, Á. Rocha, Y. Quiñonez, & J.

CalvoManzano (Eds.), Advances in intelligent systems and computing, Springer, Cham (Vol. 688, pp. 94–105). https://doi.org/10.1007/978-3-319-69341-5_9
61. Thong, J. Y. (1999). An integrated model of information systems adoption in small businesses. Journal of Management Information Systems, 15(4), 187–214. https://doi.org/10.1080/07421222.1999.11518227
62. Thong, J. Y., & Yap, C. S. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. Omega, 23(4), 429-442.
63. Tornatzky, L., & Fleischer, M. (1990). Processes of technological innovation. Lexington books.
64. Wang, H. C. (2014). Distinguishing the adoption of business intelligence systems from their implementation: The role of managers personality profiles. Behaviour and Information Technology, 33(10), 1082–1092. https://doi.org/10.1080/0144929X.2013.869260
65. Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. Journal of Planning Education and Research, 39(1), 93–112. https://doi.org/10.1177/0739456X1772397
66. Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. Journal of Planning Education and Research, 39(1), 93–112. https://doi.org/10.1177/0739456X17723971
67. Yeoh, W., & Popovic, A. (2016). Extending the understanding of critical success factors for implementing business intelligence systems William. Journal of the Association for Information Science and Technology, 67(1), 1–14. https://doi.org/10.1002/asi.
68. Yoon, C., Lim, D., & Park, C. (2020). Factors affecting adoption of smart farms: The case of Korea. Computers in Human Behavior, 108, 106309. https://doi.org/10.1016/j.chb.2020.106309