ISSN 2664-3995 (Print) & ISSN 2664-6757 (Online)
South Asian Research Journal of Business and Management
Abbreviated Key Title: South Asian Res J Bus Manag

| Volume-7 | Issue-4 | Jul-Aug- 2025 | **DOI: https://doi.org/10.36346/sarjbm.2025.v07i04.003**

Original Research Article

Exploring Adoption Challenges of Artificial Intelligence Applications in Sales Operations of Small and Medium Enterprises in Emerging Economies: A Study Based on Application of the Technology-Organization-Environment (TOE) Framework

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Article History
Received: 14.05.2025
Accepted: 19.06.2025
Published: 15.07.2025

Abstract: Artificial Intelligence (AI) in sales operations is revolutionizing the sales landscape across the globe by providing sophisticated analytics, automation, and improved customer engagement. However, the adoption of AI in Small and medium-sized enterprises (SMEs) is a significant challenge for the SMEs in emerging economies like Bangladesh due to limited resources, infrastructure constraints, and lack of technical expertise. Using the TOE framework, this paper explores the barriers hindering AI adoption in sales operations of Bangladeshi SMEs. Exploring technological, organizational, and environmental contexts, the research identifies significant barriers, including integration complexity, high implementation costs, and workforce skill gaps. Furthermore, the research studies how supplier readiness and competitive pressure drive AI adoption. The results inform small and medium-sized enterprises, policymakers, and technology providers regarding strategic steps that can facilitate AI adoption in resource-limited settings. Overcoming these obstacles allows SMEs to harness the power of AI to improve competitiveness, optimise sales processes, and increase business growth within emerging markets.

Keywords: Artificial Intelligence Adoption, Sales Operations Optimization, SME, Technology-Organization-Environment (TOE) Framework, Digital Transformation.

1. INTRODUCTION

Small and medium-sized enterprises play a pivotal role in the economic foundations of developing and emerging economies, accounting for up to 90% of business activity and 40% of GDP, respectively (Rafique & Mujawinkindi,2023). Businesses worldwide, including sales, are being transformed and advanced by artificial intelligence (AI). AI-powered solutions like predictive analytics, natural language processing, and automation bring about efficiencies, optimize decision-making, and improve customer interaction to the table. While big companies have rapidly integrated AI into their sales strategies, SMEs from emerging economies face challenges that slow down the AI adoption rates. AI solutions enable small and medium-sized enterprises (SMEs) to compete with large enterprises even with limited budgets and resources.

Insular traditional notions of the sales function have focused on it as a part of the marketing communications mix, governed by the marketing department, have morphed into well-oiled strategic sales organizations orchestrating intricate

customer portfolios and cross-functional teamwork. It is often assumed that sales now increasingly seen as a key element in marketing strategy. To navigate this evolution, key imperatives include involving sales in strategy, leveraging salesforce intelligence, fostering integration, practicing internal marketing, and aligning sales with business strategy. The marketing-sales interface also poses challenges requiring reconfiguration.

Although, SMEs are extremely important for the job industry and economic growth, they may not always possess the capability to effectively implement and use AI. Sales operations still rely heavily on legacy methods, restricting efficiency and scale. Barriers to overcoming adoption in these organizations include insufficient technical infrastructure, lack of funds, shortage of industry skills, and whether the market is ready. In this regard, the Technology-Organization-Environment (TOE) framework provides a structure for understanding some of these challenges by considering technological capabilities, organizational readiness, and environmental characteristics that may impact the adoption and integration of AI across the organization.

This study investigates the specific challenges faced by Bangladeshi SMEs in adopting AI in sales operations, isolating the key barriers. Each of these key factors could lead to efforts related to AI integration at SMEs in terms of strategies that will help the businesses, makers of policies, and technology providers to reach their respective goals in terms of activities concerning SMEs to enhance the competitiveness of SMEs along with operational performance.

The nature of AI technology, coupled with specific workforce and supplier limitations, also invite challenges in helping SMEs in emerging economies deploy AI as sales engineers. Few SMEs have the infrastructure for AI systems, and limited technical know-how and capacity act as further hurdles to deployment. The adaptation of AI extends beyond organizations' walls and internal capabilities to external stakeholders, such as market regulators and suppliers, who vary in terms of readiness and support, depending on the region.

This study is crucial to get an inkling about what these challenges are so that possible mechanisms can be constructed to induce AI adoption in SMEs. Against this backdrop, the study examines these challenges through the lens of the TOE framework, including the implications regarding how SMEs can overcome barriers and augment the adoption and assimilation of AI-powered sales solutions.

This study addresses a multitude of stakeholders. For SMEs, it serves as a high-level template of the types of barriers they need to overcome to drive operational efficiency and competitiveness. Regulators, for instance, might create education and funding initiatives to support the adoption of AI that specifically target problems identified in these findings. This will help tech providers to build and innovate low-cost AI applications tailored for SMEs in developing economies. Moreover, this study contributes to the literature on AI adoption in resource-constrained environments, allowing academics to consider digital transformation strategies for EM SMEs in future research.

2 LITERATURE BACKGROUND AND HYPOTHESES

2.1 Artificial Intelligence and Application

Artificial Intelligence refers critically to the implementation of computer systems to complete tasks usually necessitating human intelligence, including learning, problem-solving as well as decision-making (Government-University-Industry Research Roundtable *et al*., 2017). Artificial Intelligence refers to the method of designing machines that emulate human thinking, learning, and tasks that typically require human intelligence (G. Harkut & Kasat, 2019) This umbrella term covers various technologies, such as machine learning, deep learning, natural language processing, and robotics. AI systems process large data sets, identify patterns, and make decisions with limited human input, which can increase efficiency, precision, and productivity (Choi, 2023; Weber *et al*., 2022).

AI has applications across a number of industries. AI can be used for disease diagnosis, predicting patient outcomes, and personalized treatment development in healthcare (Chen & Decary, 2020). In the realm of finance, these AI algorithms identify fraudulent behavior, optimize trading strategies, and manage risk as well. AI can also revolutionize fields such as manufacturing through robotics and automation, allowing for more accuracy, greater speed, and cost savings (Bartram *et al*., 2020; Maple *et al*., 2023).

Additionally, artificial intelligence underpins virtual assistants, recommendation systems, and smart devices in the consumer industry, refining user engagement. Furthermore, AI is transforming transportation with self-driving cars and improving supply chain management in logistics (Pathmanaban *et al*., 2023; Yigitcanlar & Cugurullo, 2020).

AI, despite its promise, raises ethical issues such as job loss, data privacy, and bias in decision-making. While the ongoing evolution of AI brings forth its potential, so does the need for responsible implementation and regulation to harness its benefits with minimal risk (Dhirani *et al*., 2023; Wang, 2021).

2.2 Sales Operations in Small and Medium Enterprises (SMEs)

Small and Medium Enterprises usually follow a semi-formal process at their sales operations to manage and motivate their sales personnel. It often starts at identifying target markets and setting clear sales objectives. After this, SMEs will employ a sales strategy, often using Customer Relationship Management tools to track customer contacts and leads (Huong, 2023; V *et al*., 2018). The sales representative engages in prospecting activities, carefully selects the product to present during sales calls, meticulously prepares the sales presentation, identifies the decision-making authority, visits the designated account, and then assists the client in devising a strategic plan. Managing customer orders involves a range of actions related to processing and fulfilling orders. These actions include documenting orders, addressing missing orders, resolving shipment complications, accelerating order fulfilment, and managing backorders (Huong, 2023). Servicing the product involves technological procedures. These activities suggest the presence of a product with a certain level of complexity, potentially requiring maintenance and installation. The sales representative commonly tests the product, delivers it, trains customers on its usage, provides safety instructions, and procures accessories. Examples of such products include computer systems and industrial machines. Furthermore, implementing automation tools opens up data analytics to improve productivity, allowing SMEs to optimize their sales cycles, increase conversion, and enable sustainable growth. The process of collaborating with distributors primarily involves intermediaries, where the sales representative engages in product or service sales while cultivating relationships with distributors and ensuring the collection of outstanding accounts (Fatkullina & Beliaeva, 2021; Huong, 2023).

2.3 The Relationship of Artificial Intelligence to Business and Sales Operations

AI has taken its place in various aspects of business operations, in particular, in the area of sales. Machine learning, predictive analytics, and natural language processing technologies have changed how companies manage customer relationships, sales forecasting, and operational efficiencies. AI-based tools enable companies to ingest huge datasets, predict consumer behavior, automate routine tasks, and customize sales for individual customers, leading to higher revenue and happier customers (Abdulov, 2020; Brobbey *et al*., 2021; Hicham *et al*., 2023; Priyanka *et al*., 2023).

As for SMEs, artificial intelligence adoption can enable smaller enterprises to rival their larger counterparts by optimising the sales workflow in line with resource constraints. However, SMEs in developing countries face structural constraints that deter AI adoption. Compared with huge corporations that build the necessary AI-integrating infrastructures, small- and medium-sized enterprises (SMEs) generally lack essential financial, technical, and human resources for system integration. However, even though the potential value of AI in sales is well-known, the rollout of these technologies is inconsistent.

2.4 The Technology-Organization-Environment (TOE) Framework

The Technology-Organization-Environment framework is a conceptual framework, commonly used in information systems research, to describe the attributes that affect the adoption and use of innovative technology. This framework underlines the characteristics of the technology (the technology itself), the organizational context (where the technology is deployed), and the environmental conditions (where the organization finds itself). The TOE framework has been extensively discussed and tested as a theoretical construct for examining the interplay across technology, organization and environment in complex and various fields of technology acceptance and use in organization studies (Tornatzky & Fleischer, 1990).

The TOE framework consists of three factors: technological characteristics; organizational context; and external environmental factors. Thereby covering the technical features, intricacy, interoperability, and usability of the technology. Technological dimension: This dimension examines the functionality, complexity, compatibility and usability of the technology in question. The organizational level refers to specific internal characteristics of the adopting organization like size, structure, culture, and resources. The environmental facet focuses on the external environment the organization is engaging with, such as the market environment, regulatory environment and the socio-cultural environment (Awa *et al*., 2017; Oliveira & Martins, 2011).

The TOE framework offers a complete view of technology adoption and implementation, especially in terms of contextual factors, that can be contextualized in our examination of the challenges in adopting artificial intelligence in sales operations. By applying TOE framework, the study examines the breed of these factors in context of the adoption trends of AI in SME sales operations and further accentuates strategic measures for overcoming existing challenges.

2.5 SMEs Challenges in Adopting AI

2.5.1 Technological Barriers

AI solutions require an agile IT infrastructure and capability to integrate, which most SMEs in the developing world lack. Additionally, the cost of AI systems is a quandary that companies must invest on learning and proficiency (Davenport, 2021). This is huge problem for SMEs who are often resource constrained or lack the technical know-how (Marr, 2019).

2.5.2 Organizational Capability

The lack of AI talent expertise is a major barrier for SMEs. In fact, the majority of companies lack access to technical training programs, and it's not going to be easy to create a workforce prepared to adopt AI. And the by-product of such skills gap is the delay in the adoption of AI and the inefficient sales operations (Szedlak *et al*., 2020).

2.5.3 Environmental Readiness

AI usage is affected by the demand for AI-based providers. The problem particularly occurs especially with SMEs that aspire to adopt AI, for which they cannot find enough suppliers to provide affordable but scalable AI solutions, and result in a further stop in AI integration in the sales function (Szedlak *et al*., 2020).

2.6 AI Integration Opportunities

While small and medium enterprises (SMEs) are running into roadblocks adopting AI, there is opportunity for using AI for business growth, sales enablement and sales automation. In that AI presents an opportunity to reduce operational costs, improve customer targeting and enhance lead conversion. Furthermore, particularly when AI technologies are widely accessible and budget-friendly, SMEs can investigate methods of how to incorporate the use of AI in their sales tactics and how they can make their processes enable efficiency and appropriately scale (Lu *et al*., 2022).

The study discusses some of the challenges and opportunities while adopting AI for SME sales operations in an emerging economy. This study fills this gap by reviewing applications of AI using the TOE framework to describe the technological, organizational, and environmental aspects that prove to be barriers to AI adoption. Ultimately, the findings will help in creating strategic recommendations to promote AI adoption by SMEs first, and then digital transformation and competitive advantage in emerging markets.

3. METHODOLOGY

3.1 Procedures and Data Collection

In this study, researchers seek to assess the adoption barriers of AI in sales operations in SMEs. To fulfil the research objectives, a Sequential Explanatory Design using a mixed methods approach is adopted. This design enables a thorough analysis of the research topic by using both quantitative and qualitative methods. Data collected from a sample of small and medium enterprises (SMEs) using structured surveys following the Technology-Organization-Environment (TOE) framework, which covers the quantitative aspect of the study. The survey used mostly Likert-scale questions, which allows to see trends and factors associated with AI adoption in the sales operation.

Thereafter, a qualitative phase is done to throw light on the survey findings. Under this phase, semi-structured interviews, focus groups, and case studies are conducted with a subset of SMEs—aiming for an in-depth exploration of the barriers and challenges tied to AI adoption. With this mixed-method approach, the study maintains the rigour of quantitative analysis while also diving into the nuanced qualitative implications of AI adoption in SMEs.

Because these organisations are more likely to engage with AI technologies, the study emphasis on IT-based Small and Medium Enterprises (SMEs) in Bangladesh. Because the aim of this study is to gain insights into AI adoption barriers in the context of sales operations, the population studied are subject matter experts (SMEs) who have either expressed interest in using or are using AI applications.

Employees from the IT-based industry, such as sales, management, etc., make up the sample. This focused sampling methodology enables the researchers to identify challenges of relevance to AI adoption in IT-based sales environments. Surveying was conducted on staff to collect data, in which respondents were required to fill a questionnaire both for survey in person and fill online forms (Google Forms) on questionnaires. The researchers of this study collected data in October 2024, meaning the data is recent and relevant, representing AI utilization in SMEs sales operation in Bangladesh.

The research approach adopted falls in line with the philosophical tentacles of the study, rooted in an objective ontological perspective and a positivistic epistemological stance (Bryman & Bell, 2015). This research is therefore guided by the philosophical perspectives supporting the use of survey-based questionnaire and quantitative techniques. This resulted in unbiased and objective responses from participants according to a positivistic approach, given the nature of the questions asked. Methods were unbiased, and personal prejudice was not involved highlighting the technological, organizational, and environmental challenges and discovering possible AI applications in organizations. Therefore, the chosen methodology is coherent with the philosophical approach of the researchers.

In order to obtain robust result, purposive sampling technique is employed, selecting SMEs that either actively use AI or show an interest in AI adoption for sales. The minimum sample size was determined using G*Power program parameters effect size = 0.15; power level = 0.80; alpha = 0.05, yielding an optimal sample dimension of about 98

participants (Kang, 2021; Memon *et al*., 2020). This approach ensures a diverse yet manageable sample size while maintaining a high confidence level in the research findings. Demographic diversity of the respondents is presented in Table 1.

Data were collected through self-administered questionnaire in both printed format and online using Google Forms. This study collected response from 100 respondents from the targeted group. The response rate was 73.00%, which is within the acceptable range of 30% to 70%, usually reported in social sciences research, strengthening this study's validity (De Vaus & De Vaus, 2013).

The study follows a systematic data analysis process to extract meaningful insights from both quantitative and qualitative data. Cronbach's alpha was calculated ($\alpha = .932$) to assess the internal consistency and reliability of the survey items. Multiple data sources (survey, interviews, case studies) are used to validate findings and ensure a well-rounded analysis. Demographic analysis (Table 1) was conducted to profile respondents and ensure sample representativeness while descriptive statistics like mean and standard deviation (Table 2) provided insights into response clustering and overall trends in AI adoption challenges. Afterwards, Multivariate regression analysis is employed to assess the relationship between AI adoption barriers and SME readiness. Hypothesis testing is conducted to validate key assumptions related to AI adoption challenges.

By integrating both Descriptive and inferential statistical techniques, this study provides a holistic understanding of the barriers to AI adoption in SME sales operations.

3.5 Questionnaire Development and Data Collection

A five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), were utilized for all the constructs of the current study. The questionnaire consisted of a total of 32 Likert scale questions. Additionally, the questionnaire included 7 general questions about the respondents' age, education, and occupation, which provided valuable demographic insights.

In measuring the constructs, it was crucial to align the questions with the variables identified within the TOE framework (Technology-Organization-Environment) for understanding the adoption challenges of AI applications in sales operations for IT-based SMEs.

For this study, to measure the TOE variables, the scale of Assaye *et al*., (2024) were used with some modifications to match the context of AI adoption in sales operations.

The Technological Factors were measured with variables *Relative Advantage, Complexity, and Cost***.** Three items were used for each of the constructs. An example item to measure the Relative Advantage is: "AI applications provide a competitive edge in the market for our sales operations."

For Organization, constructs about the extent of *top management support*, *data resources*, and the *employees' capabilities* to effectively utilize AI technology were used. Again, three items were used for each of the constructs in measuring Organizational factors. A sample item to measure *Top Management Support* is: "Top management actively supports and promotes the adoption of AI applications in sales operations."

In the context of Environment, questions that probe *customer acceptance* of AI-driven sales interactions, the influence of *competitive pressures* on adopting AI, and *supplier acceptance* were used. A total of nine items were used to measure Environmental Factors. An example item to measure *Supplier Acceptance* is: "Suppliers are willing to collaborate with our organization in integrating AI applications into our supply chain and sales operations."

Based on the review of extant literature following hypothesis was taken for the study
H1: The Relative Advantage (RA) significantly impacts AI Adoption Challenges.
H2: The Complexity (COM) significantly impacts AI Adoption Challenges.
H3: The Cost (COS) significantly impacts on AI Adoption Challenges.
H4: The Top Management Support (TMS) significantly impacts on AI Adoption Challenges.
H5: The Data Resources (DR) significantly impacts on AI Adoption Challenges.
H6: The Employee Capability (EC) significantly impacts on AI Adoption Challenges.
H7: The Customer Acceptance (CA) significantly impacts on AI Adoption Challenges.
H8: The Competitive Pressure (CP) significantly impacts on AI Adoption Challenges.
H9: The Supplier Acceptance (CA) significantly impacts on AI Adoption Challenges.

4. RESULT AND DISCUSSION

4.1 Descriptive Statistics

Table 1 summarises the descriptive data of the 100 respondents that participated in this study.

Table 1: Demographic characteristics of the samples

Gender				
Male	**Female**		**Total**	
71	29		100	
Age				
21-30	31-40	41-50		Total
84	6	10		100
Working Experience				
Less than 2 years	**2-4 years**	**4-6 years**	**More than 6 years**	**Total**
67	25	7	1	100
Education				
Undergraduate	**Graduate**	**Postgraduate**		**Total**
7	77	16		100

Table 2: Mean, Standard Deviation (SD) of the variables

Variables	**Mean**	**Standard Deviation**
Relative Advantage	4.41	.484
Complexity	3.98	.616
Cost	3.64	.521
Top Management	4.03	.648
Data Resource	3.97	.668
Employee Capability	4.01	.655
Customer Acceptance	4.07	.600
Competitive Pressure	4.18	.613
Supplier Acceptance	4.12	.506
AI Adoption Challenge	4.09	.563

Table 3 presents the Pearson correlations between the independent and dependent variables. While there are many significant correlations between the variables, the values are generally below 0.7, thereby indicating that multicollinearity is not a problem (Gujarati & Porter, 2009).

The result of the multiple regression analysis examining the association between Technology-Organization-Environment with the help of predicting factors Relative Advantage, Complexity, and Cost for Technology; Top Management, Data Resource, and Employee Capability for Organization; and Customer Acceptance, Competitive Pressure, and Supplier Acceptance for Environment is presented in Table 5. These findings provide support for H_2, H_6, and H_9.

Table 3: Pearson correlation between variables

Variables	**RA**	**COM**	**COS**	**TMS**	**DR**	**EC**	**CA**	**CP**	**SA**	**AAC**
RA	-									
COM	.380	-								
COS	.393	.313	-							
TMS	.504	.439	.298	-						
DR	.395	.486	.355	.647	-					
EC	.383	.497	.303	.694	.672	-				
CA	.494	.464	.271	.542	.456	.603	-			
CP	.499	.453	.238	.560	.427	.504	.511	-		
SA	.399	.355	.248*	.471	.398	.527	.669	.629	-	
AAC	.466	.644	.310	.607	.560	.631	.685	.634	.520	-
Note: all correlations significant at the $p < 0.01$ (2-tailed).										

The dependent variable (AI Adoption Challenge) was regressed on predicting variables of RA, COM, COS, TMS, DR, EC, CA, CP, and SA. The independent variables significantly predict AAC, with $F(3, 96) = 16.703$, $p < .001$, which indicates that the nine factors under study, aggregately, have a significant impact on AI Adoption Challenge. Moreover, the $R^2 = .772$ depicts that the model explains 77.2% of the variance in AAC as shown in Table 4.

Table 4: Model summary

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.879	.772	.750	.2817
*Predictors: AI Adoption Challenges (Constant), Relative Advantage, Complexity, Cost, Top Management, Data Resource, Employee Capability, Customer Acceptance, Competitive Pressure, Suppliers Acceptance				

Table 5: Results of the multiple regression analysis of the relation between Technology-Organization-Environment (TOE) Framework with the Adoption Challenges of Artificial Intelligence

Hypotheses	Regression Weights	B	t	p-value
H_1	RA → AAC	.037	.488	.626
H_2	COM → AAC	.270	4.716	.001
H_3	COS → AAC	-.012	-.192	.848
H_4	TMS → AAC	.018	.258	.797
H_5	DR → AAC	-.009	-.138	.890
H_6	EC → AAC	.271	3.773	.001
H_7	CA → AAC	.058	.736	.464
H_8	CP → AAC	.047	.641	.523
H_9	SA → AAC	.400	4.989	.001
R^2	.772			
$F_{(3,96)}$	16.703			

4.2 The Association between Technology-Organization-Environment (TOE) Framework with the Adoption Challenges of Artificial Intelligence

Additionally, coefficients were further assessed to ascertain the influence of each of the factors on the criterion variable (AI Adoption Challenge). H2 evaluates whether Complexity (COM) significantly and positively affects AI adoption challenge (AAC). The results revealed that Complexity has a significant impact on AAC (B= 0.27, t = 4.716, p <.001). Hence, H2 was Supported. Again, H6 evaluates whether employee capability (EC) significantly and positively affects AAC. The results revealed that EC has a significant impact on AAC (B = 0.271, t = 3.773, p <.001). Hence, H6 was Supported. Likewise, H9 was supported as it evaluates whether Supplier acceptance (SA) significantly and positively affects AAC. The results revealed that SA have a significant impact on AAC (B= 0.4, t = 4.989, p <.001). The semi structured group interview with the owner/ manager of 5 SMEs also confirmed the findings of the quantitative results. The respondents highlighted the lack of skilled workforce to handle the complex AI adoption process along with increased cost as a major operational barrier in implementing AI in SME sales operation.

5. DISCUSSION AND CONCLUSION

The findings of study indicates that within the Technology-Organization-Environment framework are factors that significantly hinder the successful integration of AI in SME sales processes. The study's findings have significant implications for SME sales operations. SMEs should focus on factors like Supplier Acceptance, Employee Capability, and Complexity as they significantly impact AI Adoption Challenges. By investing in these areas, SMEs can leverage AI to enhance their competitive edge, streamline processes, train employees effectively, and foster supplier collaboration. A strategic, focused approach to AI adoption can create a more competitive, efficient, and technology-driven sales operation, positioning SMEs for growth and sustainability in the rapidly evolving business landscape.

Technological complexity, integration challenges, and cost concerns are identified as key barriers to the adoption of AI in SMEs according to the study. SMEs do not have the requisite IT infrastructure and technical skills needed for sophisticated deployment for AI. Sales tools powered by AI have hidden complexity that requires expertise that is often lacking in resource-strapped SME environments. Moreover, AI applications require significant initial investment and ongoing maintenance cost, which are major financial hurdles for small and medium-sized enterprises (SMEs) and thus prevent the adoption of these technologies. These understandings are consistent with prior literature highlighting complexity that stays as critical barriers to the execution of AI, especially for small and medium enterprises doing business in developing economies (Sundaram & Zeid, 2023; Tahsin *et al*., 2025).

Hypotheses that proved to be true were the significant role of complexity, employee skill, and acceptance by suppliers in the process of adopting AI. Nonetheless, these empirically-backed methods are the strongholds of a possible future in which AI becomes a strategic ally, augmenting the entrepreneurial spirit and competitiveness of SMEs in Bangladesh and ensuring their sustainability. For policymakers, entrepreneurs, and business executives, this paper paints a vision of exploiting the likely hurdles for AI adoption faced by SMEs while at the same time taking the lead in rewriting the landscape of a digitally disrupting world.

Real world impact of the findings can be observed for both SMEs and policymakers in Bangladesh. The insights can be used by SMEs to ensure organisational readiness, complexity management, workforce capabilities development and supplier collaboration, all of which are vital for successful adoption of AI. Policymakers will need to create an ecosystem that fosters innovation and collaboration. The curriculum of educational institutions must also adapt to prepare the graduates with the skills to face a technology-dominated future. AI's transformative potential underlines an imperative for innovation, collaboration, and adaptation, striving to seamlessly interlace it into the SME fabric of Bangladesh, ushering in a silver lining of technological adeptness and progress.

This study sheds valuable light on the adoption challenges of AI applications in sales operations for SMEs in Bangladesh, it is essential to acknowledge its limitations. One limitation lies in the geographical focus, as the research predominantly centers on Bangladesh, potentially limiting the generalizability of the findings to a broader international context. Additionally, the study primarily relies on quantitative methods, offering a numerical snapshot of the phenomenon. Incorporating qualitative approaches, such as in-depth interviews or case studies, could provide a more comprehensive understanding of the intricate dynamics involved in AI adoption. Furthermore, the research timeline constitutes another limitation; the rapidly evolving nature of technology implies that the challenges and opportunities in AI adoption might have transformed since the study's conclusion. In terms of future work, researchers could delve deeper into the specific challenges faced by SMEs in rural areas, exploring how unique contextual factors influence their AI adoption endeavors. Additionally, longitudinal studies could track the evolution of AI adoption challenges over time, providing insights into the dynamic nature of technology integration. Qualitative research methods, such as ethnographic studies, can offer a nuanced understanding of the organizational culture and employee perceptions, enriching the overall comprehension of AI adoption challenges. Furthermore, comparative studies across different industries or countries could offer valuable insights into the contextual variations of AI adoption hurdles. Lastly, exploring innovative solutions and best practices to address these challenges, perhaps through pilot intervention programs or action research initiatives, could pave the way for practical, real-world implementations, bridging the gap between research findings and actionable strategies for SMEs in Bangladesh and beyond.

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