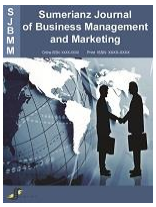
Sumerianz Journal of Business Management and Marketing, 2024, Vol. 7, No. 2, pp. 19-27
ISSN(e): 2617-0175, ISSN(p): 2617-1724
Website: https://www.sumerianz.com
DOI: https://doi.org/10.47752/sjbmm.72.19.27



Original Article Open Access

How Convenient are Artificial Intelligence and Machine Learning for Adoption among SMEs? Developing Countries Perspective

Tomasi Mutya *
Faculty of Management, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu-603203, India
Email: tm6215@srmist.edu.in

Ilankadhir M.
Faculty of Management, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu-603203, India

Article History

Received: 5 April, 2024

Revised: 10 June, 2024

Accepted: 20 June 2024

Published: 25 June 2024

How to Cite

Tomasi Mutya and Ilankadhir M. (2024). How Convenient are Artificial Intelligence and Machine Learning for Adoption among SMEs? Developing Countries Perspective. *Sumerianz Journal of Business Management and Marketing*, 7(2): 19-27.

Abstract

Artificial intelligence (AI) and machine learning (ML) technologies are crucial for small and medium enterprises (SMEs) to improve business operations in an easy, cost-efficient, and effective form. As a result, we explore the convenience dimensions that impact AI and ML adoption intention among SMEs in Uganda, a developing country. 248 respondents were involved. The results show that transaction, access, possession/post-possession, and search convenience impact SMEs' intention to adopt AI and ML. However, evaluation convenience had no significant influence. Additionally, AI and ML adoption intentions among SMEs impact AI and ML adoption. Thus, our study contributes to AI and ML, convenience, SME literature, and practical applications for owners and managers of SMEs in developing countries.

Keywords: Artificial intelligence; Machine learning; Convenience factors; Small and medium enterprises; Developing countries.

1. Introduction

Advancements in technology have transformed business operations. This shift is attributed to emerging technologies such as artificial intelligence (AI) and machine learning (ML). These technologies automate activities and mimic human thinking (Chang *et al.*, 2024; Herath and Mittal, 2022). Computers self-learn and perform tasks based on data patterns without human intervention (Nafizah *et al.*, 2024). AI and ML algorithms are indispensable tools for organisations seeking to streamline operations and execute targeted marketing strategies (Al Wael *et al.*, 2024; Pillai *et al.*, 2024). By analysing consumer data, businesses can gain valuable insights into customer behaviour and preferences (Clay *et al.*, 2024; Kuleto *et al.*, 2021). This allows informed decision-making based on assessed risks and anticipated future revenues. Automating risk assessment procedures can enhance security and reduce the incidence of fraud, thereby improving overall risk management (El Hajj and Hammoud, 2023). Moreover, AI and ML have the potential to inspire innovation by uncovering new pathways for growth and identifying emerging trends that can inform fresh business strategies (Nafizah *et al.*, 2024). The market for AI and ML is expected to reach 1.8 trillion U.S. dollars by 2030 (Statista, 2024). As a result, 80% of large corporations have already adopted AI and ML (Chang *et al.*, 2024). Similarly, SMEs use AI and ML for business operations (Nafizah *et al.*, 2024).

The World Bank reported 332.99 million SMEs globally in 2021, making up 90% of businesses (World Bank, 2022). SMEs play a transformative role in developing countries' economies. For example, Uganda's 1.1 million SMEs contribute 80% to the country's Gross Domestic Product and 90% of private business (UNCTAD, 2022). Despite SMEs making up a significant portion of companies, their awareness of how convenient innovative technologies like AI and ML are is limited (Nafizah *et al.*, 2024). This has resulted in lower AI and ML adoption among SMEs in Uganda. Yet, studies by Gladysz *et al.* (2023) and Krah *et al.* (2024) revealed that SMEs can achieve operational convenience by utilising AI and ML technologies.

Convenience in the AI and ML context refers to the ease of innovation, managing data, completing tasks, receiving prompt feedback, implementing new ideas, and providing customers with products and services based on timely data (Kumar et al., 2024). Additionally, AI and ML aid SMEs in addressing customer concerns around the clock through chatbots (Pillai *et al.*, 2024). Research has shown that the convenience of accessing, searching, evaluating, transacting, and possessing/post-possessing is crucial in the adoption of novel technology (Jebarajakirthy and Shankar, 2021; Lina et al., 2023; Tomasi and Ilankadhir, 2024a).

Here we show how each factor of online convenience impacts AI and ML adoption intention among SME entrepreneurs. Previous studies have focused on factors like technology stressors and emotional reactions (Chang *et al.*, 2024), perceived usefulness and organisational culture (Al Wael *et al.*, 2024), perceived intelligence and risk (Pillai *et al.*, 2024), innovation (Cioffi *et al.*, 2020; McElheran *et al.*, 2024), knowledge and attitudes (Kuleto *et al.*, 2021), and technology skills (Nafizah *et al.*, 2024). However, Wong *et al.* (2024) study stands out as it examines the impact of convenience on AI and ML adoption. Nonetheless, their study did not delve into the role of each dimension of convenience, which our study aims to address.

Additionally, existing studies originate from major emerging and developed economies like China (Chang *et al.*, 2024; Wong *et al.*, 2024), India (Kumar *et al.*, 2023; Nawaz *et al.*, 2024; Pillai *et al.*, 2024), the United Kingdom (Nafizah *et al.*, 2024), and the United States (McElheran *et al.*, 2024). While Al Wael *et al.* (2024) study focused on Kuwait and AI among public accountants, limited research exists among SMEs in low-income countries like Uganda. Moreover, Prior research has investigated the elements of convenience within online purchasing and retail. Lina *et al.* (2023); Vandana *et al.* (2023); Duarte *et al.* (2018); Zeqiri *et al.* (2023); Deshwal *et al.* (2024), mobile banking (Jebarajakirthy and Shankar, 2021; Shankar and Rishi, 2020; Tomasi and Ilankadhir, 2024a), and electronic information resources (Kumar *et al.*, 2023).

The originality of this study is established by exploring each convenience factor in the context of AI and ML adoption among SMEs in a developing country like Uganda. On that note, we indicate to SME owners, managers, and policymakers in developing countries the value of AI and ML in transforming businesses. The study employs the S-O-R model (stimulus-organism-response) to investigate the impact of each online convenience dimension as stimuli that AI and ML adoption intention. The study considers SMEs' intention to adopt AI and ML as the organism and their adoption of AI and ML as the response.

2. Literature Review

2.1. Artificial Intelligence, Machine Learning, and SMEs

Artificial intelligence is a subfield of computer science that involves training computers to imitate human thinking and behaviour. Automated data systems perform tasks and enable quick decision-making (Herath and Mittal, 2022). Machine learning is a specialised area within the study of artificial intelligence, computers autonomously self-learn from patterns in data and carry out tasks without human involvement (Nafizah *et al.*, 2024). AI algorithms encompass a range of techniques such as bio-inspired neural networks, genetic algorithms, swarm intelligence, natural language processing, image and video processing, and cognitive computing. The algorithms adapt and develop according to the aims and characteristics of the data. For example, natural language processing and machine learning methods facilitate robots to understand human language and function autonomously (Grover *et al.*, 2022). AI and ML algorithms offer a chance for businesses to manage complex challenges and large amounts of data. Technologies autonomously learn and adapt, improving data analysis among SMEs (Clay *et al.*, 2024; Tomasi and Ilankadhir, 2024b). SMEs can enhance operational efficiency, increase customer happiness, and optimise marketing tactics through the analysis of consumer data (Al Wael *et al.*, 2024). Kuleto *et al.* (2021), argued that such insights help understand consumer behaviour, and make informed decisions.

Implementing automated risk assessment techniques helps SMEs improve security and avoid fraud (El Hajj and Hammoud, 2023). AI and ML stimulate innovation by forecasting potential growth and developing patterns in businesses (Nafizah *et al.*, 2024; Pillai *et al.*, 2024). However, the realisation of these advantages relies on the ease and efficiency of AI and ML technologies (Clay *et al.*, 2024). Therefore, integrating such mechanisms into operations transforms SMEs (Kuleto *et al.*, 2021; Tomasi, 2020). SMEs comprise 90% of businesses (World Bank, 2019), playing a crucial role in economies, especially in poor nations like Uganda, where their 1.1 million SMEs contribute 80% of the country's Gross Domestic Product and 90% of private business (UNCTAD, 2022). Technology adoption remains limited in low-income countries (Mutya and Josephine, 2018; Tomasi and Ilankadhir, 2024a), which hampers the widespread use of AI and ML. Yet, advanced technology can reach and serve SMEs easily, quickly, and efficiently (Lina *et al.*, 2023), especially in remote or hard-to-reach areas (Shankar and Rishi, 2020). Gladysz *et al.* (2023), argue that SMEs should embrace AI and ML developers for operational convenience. Thus, it is important to understand how the convenience factors impact the intentions of SMEs in Uganda to adopt AI and ML, despite the government's low score of 32.66% on the AI and ML readiness index (Government AI readiness index, 2022).

2.2. Online Convenience

Convenience refers to the ease of enabling users to obtain and use a service (Lina *et al.*, 2023; Shankar and Rishi, 2020). Users spend less time and effort utilising a service anywhere. Previous studies have found convenience to have a significantly positive effect on consumers' intention to adopt new technology (Duarte *et al.*, 2018; Jebarajakirthy and Shankar, 2021; Lina *et al.*, 2023; Shankar and Rishi, 2020; Tomasi and Ilankadhir, 2024a). The convenience associated with AI and ML has attracted the attention of corporate organisations. Notably, there is a significant investment in software and employee training to provide efficient and effective digital services. SMEs

also consider AI and ML characteristics such as time-saving, mobility, ease, and efficiency to be important aspects of business progress (Clay *et al.*, 2024; Deshwal *et al.*, 2024; Mutya, 2018; Vandana *et al.*, 2023; Zeqiri *et al.*, 2023). Although the debate on convenience is ongoing, there seems to be a growing consensus on the key dimensions (Kumar *et al.*, 2023). Prior research has placed significant emphasis on the transaction, access, evaluation, search, and possession/post-possession convenience as the main factors (Jebarajakirthy and Shankar, 2021; Kumar *et al.*, 2023; Lina *et al.*, 2023; Shankar and Rishi, 2020; Tomasi and Ilankadhir, 2024a). Search and possession convenience are closely linked to consumption, while access, evaluation, and post-possession convenience are linked to continued usage.

2.3. Theoretical Background

This study uses the stimulus-organism-response (S-O-R) model to explain the impact of environmental signals on an individual's behaviour. Mehrabian and Russell (1974) defined stimulus as the external signal impacting behaviour, while organism as the internal state of individual reaction to the stimulus. Technology is an external factor that initiates reactions and changes in behaviour. Thus, the S-O-R model is applicable in studying the online convenience factors and AI and ML adoption intention. Antecedent research has utilised the S-O-R framework to understand technology adoption (Lina *et al.*, 2023; Shankar and Rishi, 2020; Tomasi and Ilankadhir, 2024a). Access, search, transaction, evaluation, and possession/post-possession convenience when using AI and ML creates a user-friendly and efficient environment, enabling SMEs to use these services effortlessly and promptly, regardless of time and location. Hence, ease and accessibility to information act as catalysts that impact SMEs' intentions (organisms) to adopt AI and ML (reaction).

2.4. Hypothesis Development

Access convenience in the context of AI and ML refers to the ease and speed with which data can be obtained within an organisation (Kumar *et al.*, 2023). With the help of AI and ML algorithms, users can access efficiently processed data. This can aid SMEs in streamlining their operations, enhancing customer satisfaction, generating predictive insights, and executing targeted marketing strategies (Al Wael *et al.*, 2024; Pillai *et al.*, 2024). AI and ML analyse consumer data swiftly, enabling businesses to access reliable data and gain valuable insights (Kuleto *et al.*, 2021). For instance, ChatGPT and chatbots ensure that customers receive a prompt response to any questions they may have. Hence, dependable and timely access to processed data from any location and at any time motivates SMEs to adopt AI and ML. Consequently, we propose the hypothesis that:

H1: Access convenience impacts AI and ML adoption intention among SMEs.

According to Kumar *et al.* (2023), search convenience is the ease and efficiency of gathering information about a product or service. Research has shown that search convenience positively influences technology adoption (Kumar *et al.*, 2023; Lina *et al.*, 2023). With AI and ML's ability to mimic user interests and provide relevant information without human intervention (Herath and Mittal, 2022), the search process is accelerated for SMEs seeking information before making decisions. This innovation in search convenience uncovers new pathways for SME growth and identifies emerging trends that can inform fresh business strategies (Nafizah *et al.*, 2024). Therefore, we propose the hypothesis that:

H2: Search convenience impacts AI and ML adoption intention among SMEs.

The concept of evaluation convenience in the context of AI and ML refers to the ease of understanding available product and service descriptions based on readily available reliable data (Kumar *et al.*, 2023; Lina *et al.*, 2023; Tomasi and Ilankadhir, 2024a). According to Duarte *et al.* (2018) and Shankar and Rishi (2020), consumers value evaluation convenience for technology adoption. Lina *et al.* (2023), research showed that evaluation convenience can facilitate the adoption of new technology. In AI and ML, users benefit from data presentations from different sources and multiple versions. For instance, AI and ML offer automated risk assessments from data sets that deliver results quickly, enabling timely security evaluations (El Hajj and Hammoud, 2023). Therefore, we hypothesise that:

H3: Evaluation convenience impacts AI and ML adoption intentions among SMEs.

Transaction convenience refers to the ease and speed at which consumers can carry out or modify transactions based on available data (Kumar *et al.*, 2023). Thanks to AI and ML algorithms, data is processed according to the user's expectations, which saves time and effort. Prior research has found that transaction convenience has a positive impact on the intention to adopt technology (Duarte *et al.*, 2018; Jebarajakirthy and Shankar, 2021; Kumar *et al.*, 2023; Lina *et al.*, 2023; Shankar and Rishi, 2020; Tomasi and Ilankadhir, 2024a). By quickly analysing consumer data, SMEs can acquire valuable insights into customer behaviour and preferences on time (Clay *et al.*, 2024; Kuleto *et al.*, 2021). As a result, SMEs are better equipped to make informed decisions and anticipate future revenues. Therefore, we hypothesise that:

H4: Transaction convenience impacts AI and ML adoption intention among SMEs.

Possession/post-possession convenience relates to the time and effort consumers perceive they need to invest in obtaining desired products and services (Kumar *et al.*, 2023). Previous studies indicate that possession/post-possession convenience has a positive influence on the users' intention to adopt technology (Duarte *et al.*, 2018; Jebarajakirthy and Shankar, 2021; Kumar *et al.*, 2023; Lina *et al.*, 2023; Shankar and Rishi, 2020; Tomasi and Ilankadhir, 2024a). Thanks to AI and ML algorithms, users can access desired data with minimal effort and time expenditure (Chang *et al.*, 2024). Customer dissatisfaction with the provided data is addressed with other versions immediately upon request. For example, chatbots and chatGPT provide real-time responses. Thus, SMEs can leverage these algorithms to easily obtain data, streamline operations, and generate predictive insights (Al Wael *et al.*, 2024; Pillai *et al.*, 2024). Therefore, our hypothesis is that:

H5: Possession/post-possession convenience impacts AI and ML adoption intention among SMEs.

According to the S-O-R model, convenience boosts customers' intentions to adopt technology resulting in actual adoption. Shankar and Rishi (2020) and Kumar *et al.* (2023) indicate that adopting digital products and services is tied to customers' intentions. Jebarajakirthy and Shankar (2021) and Tomasi and Ilankadhir (2024a), also noted customers' intentions to adopt technology impact actual adoption. According to this study, the convenience provided by AI and ML enables SMEs' AI and ML adoption intentions. Based on such discussion, we propose the hypothesis that:

H6: Strong intentions to adopt AI and ML impact adoption among SMEs.

3. Methodology

In this study, we investigate the impact of each convenience factor on AI and ML adoption intentions among SMEs in a developing country through a quantitative approach. According to Krah *et al.* (2024), this approach enables researchers to collect data from many respondents. The study uses a descriptive survey design, with a printed questionnaire consisting of two sections: demographic data and study constructs.

The constructs included 22 items adapted and modified from previous studies to fit the study's purpose. Items for access convenience (Jebarajakirthy and Shankar, 2021; Lina *et al.*, 2023), search convenience (Lina *et al.*, 2023), evaluation convenience (Jebarajakirthy and Shankar, 2021; Kumar *et al.*, 2023), transaction convenience (Duarte *et al.*, 2018; Kumar *et al.*, 2023), and possession/post-possession convenience (Kumar *et al.*, 2023; Tomasi and Ilankadhir, 2024a), AI and ML adoption intention (Kumar *et al.*, 2023), and AI and ML adoption (Al Wael *et al.*, 2024; Pillai *et al.*, 2024). The items were scored on a Likert-scale structure (Strongly agree 5, agree 4, neutral 3, disagree 2, strongly disagree 1).

The study collected data from two districts in Uganda, namely Wakiso District in central Uganda and Mbale District in Eastern Uganda. These districts have been identified as high-technology usage areas and have witnessed a rapid increase in SMEs (Uganda Investment Authority, 2022).

The study used purposive and snowball sampling techniques to identify respondents. According to Valerio *et al.* (2016), purposive and snowball sampling techniques enable more participation. Additionally, the intended respondents can be reached. The study included owners and managers of SMEs, and data was collected over a period spanning from November 10, 2023, to March 25, 2024. Out of 305 questionnaires distributed, 248 responses were deemed valid, representing an impressive 81% response rate (Shankar and Rishi, 2020). Structural equation modelling (AMOS 23) was used for data analysis. According to Jebarajakirthy and Shankar (2021), Structural equation modelling (AMOS 23) has a strong predictive power.

The Cronbach alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE) were computed to determine the reliability and validity of the data. The square root of Average Variance Extracted (AVE) was calculated to check discriminant validity. Additionally, correlation coefficients were calculated to check multi-collinearity in the data.

4. Results

Table-1. Demographic distribution (N = 248)

Category	Number	Percentage	Cumulative %
Gender; Female	131	47.2	47.2
Male	117	52.8	100
Age; 20-30 years	47	19	19
30-40	113	45.6	64.5
40-50	61	24.6	89.1
50-60	22	8.9	98
60 and above	05	2.0	100
Education; Primary	17	6.9	6.9
Secondary	70	28.2	35.1
Tertiary	36	14.5	49.6
University	135	50.4	100
Experience; Below 5 years	106	42.7	42.7
5-10	87	35.1	77.8
10-15	42	16.9	94.8
15-20	08	3.2	98
20 and above	05	2.0	100
Location; Rural	67	27	27
Semi-urban	94	38	65
Urban	87	35	100

The data presented in Table 1 shows a balanced gender representation in SMEs, with 47.2% females and 52.8% males. The age distribution showed that 19% of participants were 20-30 years old, 45.6% were 30-40, 24.6% were 40-50, 8.9% were 50- 60, and 2% were above 60. furthermore, the education level of participants showed that all were literate and could understand AI and ML, with 6.9% possessing primary education, 28.2% secondary education, 14.5% tertiary education, and 50.4% having university education. Additionally, most participants

possessed less than 10 years of experience, with 42.7% less than 5 years, 35.1% 5–10 years, and 16.9% 10–15 years of experience. As such, the study observed a youthful population involved in SMEs. Geographically, the study had a relatively fair distribution of SMEs, with 27% located in rural, 38% in semi-urban, and 35% in urban areas.

Table-2. Reliability and Validity

Construct	item	FL	AVE	CR	α
Access-Convenience	I can use AI and ML services at any time.	0.901	0.772	0.910	0.961
	I can use AI and ML services anywhere.	0.866			
	I can always access AI and ML data.	0.869			
Search-Convenience	It is easy to navigate AI and ML.	0.840	0.750	0.900	0.907
	I can find what I want on time.	0.893			
	I can get useful data.	0.865			
Evaluation-Convenience	AI and ML provide service details	0.864	0.811	0.928	0.931
	Sufficient information is available to identify data from different industries.	0.933			
	AI and ML provide images and the interface is interactive.	0.903			
Transaction-Convenience	I can complete data collection easily with AI and ML.	0.799	0.658	0.852	0.865
	It takes me a short time to collect data.	0.768			
	I always feel safe providing my data over AI and ML.	0.863			
Possession/post-possession-convenience	It takes a short time to get the data I want.	0.851	0.719	0.911	0.881
	It takes less effort to get the data I want.	0.857			
	Any after-data collection problems are quickly resolved.	0.843			
	Failed transactions can easily be resolved.	0.841			
AI and ML adoption intentions	I intend to use AI and ML in the future.	0.864	0.695	0.872	0.882
	I expect that I will use AI and ML in the future.	0.830			
	I plan to use AI and ML applications in the future.	0.806			
AI and ML adoption	I will continue to avail services over AI and ML for data collection.	0.761	0.611	0.825	0.884
	I prefer to use AI and ML for data collection.	0.765			
	I will use AI and ML more often for data collection.	0.818			

CMIN (1.369), CFI (0.984), RMSEA (0.039), TLI (0.980), RMR (0.036), NFI (0.943), and GFI (0.917).

Table-3. Correlation matrix

	1	2	3	4	5	6	7
Access Convenience (1)	.879[b]						
Search Convenience (2)	.394**	.866[b]					
Evaluation Convenience (3)	-.072	-.034	.900[b]				
Transaction Convenience (4)	.437**	.355**	.025	.811[b]			
Benefit/Post-Benefit Convenience (5)	.497**	.376**	-.003	.572**	.848[b]		
AI and ML Adoption Intention (6)	.615**	.449**	.021	.634**	.756**	.834[b]	
AI and ML Adoption (7)	.501**	.407**	-.064	.522**	.583**	.758**	.782[b]

∗∗ Correlation is significant at p<0.01. [b is] the square root of the average variance extracted.

Table-4. Path coefficients

	coefficients	Remarks
Access Convenience → AI and ML Adoption Intention	0.215	Supported
Search Convenience → AI, and ML Adoption Intention	0.098	Supported
Evaluation Convenience → AI and ML Adoption Intention	0.022	Not-supported
Transaction Convenience → AI and ML Adoption Intention	0.236	Supported
Possession/Post-possession Convenience → AI and ML Adoption Intention	0.520	Supported
AI and ML Adoption Intentions → AI and ML Adoption	0.869	Supported
AI and ML Adoption Intention R^2	0.790	
AI and ML Adoption R^2	0.756	

CMIN (1.567), CFI (0.976), RMSEA (0.048), TLI (0.969), RMR (0.045), NFI (0.936), and GFI (0.912).

4.1. Measurement Model Analysis

To determine if the observed variables reliably indicate the research constructs, AMOS 23 was used for confirmatory factor analysis. Search, transaction, evaluation, access convenience, possession/post-possession convenience, AI and ML adoption intention, and AI and ML adoption models were measured. The results in Table 2 show acceptable α>0.7, CMIN (1.369) less than 3, GFI (0.917), NFI (0.943), CFI (0.984), and TLI (0.980) are greater than 0.900 as recommended (Hair *et al.*, 2020; West *et al.*, 2023). Additionally, RMR (0.036) and RMSEA (0.039) are less than 0.08, satisfying the recommended guidelines for scale reliability (Goretzko *et al.*, 2024). Furthermore, Table 2 results also revealed CR > 0.7 and AVE > 0.5, which fulfil the recommended guidelines for convergent validity (Hair *et al.*, 2021). Table 3 results show that the square root of AVE is greater than each construct correlation coefficient. This supports discriminant validity. Similarly, construct correlation coefficient values ranged from -0.003 to 0.758, suggesting the absence of multi-collinearity (Hair *et al.*, 2020).

4.2. Path Analysis

We used the structural equation model AMOS 23 to assess how each convenience factor impacts AI and ML adoption intention and how this intention affects AI and ML adoption. Our path analysis results show excellent fit indexes: CMIN (1.567) less than 3 as recommended, NFI (0.936), GFI (0.912), CFI (0.976), and TLI (0.969) all greater than 0.900, which meets the recommended guidelines (Hair *et al.*, 2021; Sarstedt *et al.*, 2023). Moreover, the RMR (0.045) and RMSEA (0.048) are less than 0.08, satisfying the recommended guidelines for scale reliability (Goretzko *et al.*, 2024; West *et al.*, 2023). The results presented in Table 4 demonstrate that access (H1) (β=0.215, p<.01), search (H2) (β=0.98, p<.05), transaction (H4) (β=0.236, p<.01), and possession/post-possession (H5) (β=0.520, p<.001) all have a significant positive impact on AI and ML adoption intention. Therefore, hypotheses H1, H2, H4, and H5 were supported. However, evaluation (H3) (β=0.022, p>.05) was found to have an insignificant impact on AI and ML adoption intention, and hypothesis H3 was not supported. Additionally, AI and ML adoption intention (H6) (β=0.869, p<.001) had a significant impact on AI and ML adoption, and hypothesis H6 was supported. Furthermore, the R2 value for AI and ML adoption intention was 0.79, and 0.756 for AI and ML adoption. The study model explained 79% of the variations in AI and ML adoption intention and 75.6% in AI and ML adoption.

5. Discussion

Today, in the business landscape dynamic, AI and ML have become crucial tools for growth. SMEs are no exception. This study delved into the impact of each convenience factor on AI and ML adoption intention among SMEs in Uganda. The study found evaluation, access, transaction, search, and possession/post-possession as the major reported factors of convenience (Jebarajakirthy and Shankar, 2021; Kumar *et al.*, 2023; Lina *et al.*, 2023; Tomasi and Ilankadhir, 2024a). While previous studies have explored these factors in retail shopping, mobile banking, and electronic information resources, this study is unique in examining convenience factors in the context of AI and ML adoption among SMEs in a developing country like Uganda. Shedding light on how convenience affects countries with a limited understanding of modern technology among SMEs is critical.

The results show that access, search, transaction, and possession/post-possession convenience significantly impact SMEs' intention to adopt AI and ML. evaluation convenience was found to be insignificant. These findings are consistent with those of Kumar *et al.* (2023). According to this study, the convenience of possession/post-possession has the greatest impact on SMEs' intention to adopt AI and ML, followed by transaction, access, and search convenience. Essentially, SMEs care about the time and effort required to obtain the necessary data. For example, if an AI or ML user is not certified with the provided data, other versions can be promptly provided upon request. This finding aligns with Lina *et al.* (2023); Kumar *et al.* (2023) and Tomasi and Ilankadhir (2024a). With transaction convenience, SMEs are concerned with how easily and quickly AI and ML algorithms can perform or alter data processing to save time and effort for SMEs. Access convenience is important to SMEs because they prefer quick and efficient access to processed data, which can help streamline operations and generate predictive insights (Pillai *et al.*, 2024).

Similarly, search convenience is important because AI and ML algorithms enable SMEs to seek information before making decisions. This innovation in search convenience opens up new pathways for SME growth and easily identifies emerging trends that can inform fresh business strategies. These findings align with Tomasi and Ilankadhir (2024a) who found convenience crucial for developing countries with low levels of advanced technology. On that note, SMEs in developing countries should collaborate with AI and ML developers for operational convenience (Gladysz *et al.*, 2023). According to the World Bank (2022), numerous SMEs in low-income countries are relatively unaware of the potential convenience advanced technologies such as AI and ML offer to enhance their overall performance. Yet, incorporating AI and ML among SMEs in Uganda has transformed the sector. Such technologies may contribute to the optimisation of business operations by leveraging cutting-edge technologies, thereby enabling SMEs to be competitive in a rapidly evolving market.

On the other hand, the study showed that evaluation convenience has an insignificant impact on SMEs' intentions to adopt AI and ML. While these technologies emulate human thought processes, it is challenging to meet exact expectations that may influence the evaluation process. Additionally, users may not conduct thorough data searches, which can adversely affect AI and ML data processing and user evaluation. As a result, the convenience of SMEs supports quick and easy analysis with the available data (Kumar *et al.*, 2023). Therefore, factors such as possession/post-possession, search, access, and transaction convenience are critical in promoting AI and ML adoption among SMEs in developing countries like Uganda.

5.1. Theoretical and Managerial Implications

This study stands out for its unique focus on convenience factors for AI and ML adoption among SMEs in Uganda, a developing country. Prior research on this topic has explored factors such as technology stressors, perceived usefulness, culture, risk, innovation, knowledge, and attitudes. Additionally, previous studies on convenience have been conducted in developed and emerging economies like India, China, the UK, and the US, and with topics such as online shopping, mobile banking, and electronic information resources. By exploring convenience factors on AI and ML adoption among SMEs in a developing country, this study offers a fresh perspective on advanced technologies among SMEs. Thus, contributing to the existing literature (Kumar *et al.*, 2023; McElheran *et al.*, 2024; Nafizah *et al.*, 2024; Nawaz *et al.*, 2024; Pillai *et al.*, 2024; Tomasi and Ilankadhir, 2024a).

Practically, this innovative study offers SME owners and managers the ability to serve their target customers through easily accessible and quickly obtained data via AI and ML. By leveraging these technologies, SMEs in low-income countries can revolutionise their operations, enhance customer satisfaction, efficiently predict target markets, and make informed decisions in a fraction of the time. This approach enables SME managers to improve risk assessment and foster innovation in emerging trends, ultimately keeping them competitive in a rapidly evolving market. To achieve these benefits, SMEs should collaborate with AI and ML developers and train employees to strengthen data processing and improve convenience factors like search, access, transaction, and possession/post-possession. SMEs invest in AI and ML tools to experience convenient business operations. Additionally, SMEs should ensure updated AI and ML tools to enable transaction, Search, possession/post-possession, and access convenience. Furthermore, AI and ML developers should provide customised AI and ML tools that are cost-effective and efficient to meet SME operations. In doing so, SMEs conduct convenient data processing, streamline operations, and predictive markets. Critical and in-depth data search is necessary if evaluation convenience is to be achieved among SMEs in developing countries. Therefore, SME owners and managers in developing countries like Uganda need AI and ML to guarantee convenient reliable data to enable informed decisions and open new pathways for growth.

5.2. Limitations and Areas of Future Research

The SME landscape is constantly changing with the emergence of new technologies daily (Gladysz *et al.*, 2023). While this study was conducted through a cross-sectional survey, AI and ML adoption among SMEs is dynamic. It's important to note that these findings may not account for shifts in SME behaviour over time. Also, the study drew from a relatively small sample size of 248 Ugandan participants, even though there are many AI and ML users in the country. Additionally, the study was conducted in the context of SMEs, which might limit its generalizability. However, future researchers should consider conducting longitudinal studies to identify potential cause-and-effect relationships. They could also benefit from using larger sample sizes and conducting comparative analyses. In this study, convenience was the primary factor, but other factors, such as perceived utilitarian and hedonic values, may influence SMEs' adoption of AI and ML. Future research can explore these factors in greater detail. Nonetheless, given the limited research on the convenience of adopting AI and ML for SMEs in developing countries like Uganda, this study makes a valuable contribution to the field.

6. Conclusion

Investing in AI and ML has the potential to completely transform the way SMEs function and provide services to their customers. This study highlights the convenience of AI and ML and urges SMEs to consider integrating these technologies into their operations to remain competitive and flourish in today's business environment. By leveraging AI and ML algorithms to analyse data, SMEs can experience unparalleled ease in accessing, possessing, transacting, and searching for information. This, in turn, can revolutionise their operations, elevate customer satisfaction, accurately predict target markets, mitigate risks, and make informed decisions efficiently.

References

Al Wael, H., Abdallah, W., Ghura, H. and Buallay, A. (2024). Factors influencing artificial intelligence adoption in the accounting profession: the case of public sector in Kuwait. *Competitiveness Review: An International Business Journal*, 34(1): 3-27. Available: https://doi.org/10.1108/CR-09-2022-0137

Chang, P. C., Zhang, W., Cai, Q. and Guo, H. (2024). Does ai-driven technostress promote or hinder employees' artificial intelligence adoption intention? A moderated mediation model of affective reactions and technical self-efficacy. *Psychology Research and Behavior Management*: 413-27. Available: https://www.tandfonline.com/doi/full/10.2147/PRBM.S441444

Cioffi, R., Travaglioni, M., Piscitelli, G., Petrillo, A. and De Felice, F. (2020). Artificial intelligence and machine learning applications in smart production: Progress, trends, and directions. *Sustainability*, 12(2): 492. Available: https://doi.org/10.3390/su12020492

Clay, D. E., Brugler, S. and Joshi, B. (2024). Will artificial intelligence and machine learning change agriculture: A special issue. *Agronomy Journal*: Available: https://doi.org/10.1002/agj2.21555

Deshwal, P., Prakash, S. and Agrawal, I. (2024). The impact of online shopping convenience on satisfaction, loyalty, and word-of-mouth in Indian context. *International Journal of Business and Globalisation*, 36(1): 27-38. Available: https://doi.org/10.1504/IJBG.2024.136002

Duarte, P., e Silva, S. C. and Ferreira, M. B. (2018). How convenient is it? Delivering online shopping convenience to enhance customer satisfaction and encourage e-WOM. *Journal of Retailing and Consumer Services*, 44: 161-69. Available: https://doi.org/10.1016/j.jretconser.2018.06.007

El Hajj, M. and Hammoud, J. (2023). Unveiling the influence of artificial intelligence and machine learning on financial markets: A comprehensive analysis of ai applications in trading, risk management, and financial operations. *Journal of Risk and Financial Management*, 16(10): 434. Available: https://doi.org/10.3390/jrfm16100434

Gladysz, B., Matteri, D., Ejsmont, K., Corti, D., Bettoni, A. and Guerra, R. H. (2023). Platform-based support for AI uptake by SMEs: guidelines to design service bundles. *Central European Management Journal*, 31(4): 463-78. Available: https://doi.org/10.1108/CEMJ-08-2022-0096

Goretzko, D., Siemund, K. and Sterner, P. (2024). Evaluating model fit of measurement models in confirmatory factor analysis. *Educational and Psychological Measurement*, 84(1): 123-44. Available: https://doi.org/10.1177/00131644231163813

Government AI readiness index (2022). Available: https://www.unido.org/sites/default/files/files/2023-1/Government_AI_Readiness_2022_FV.pdf

Grover, P., Kar, A. K. and Dwivedi, Y. K. (2022). Understanding artificial intelligence adoption in operations management: insights from the review of academic literature and social media discussions. *Annals of Operations Research*, 308(1): 177-213. Available: https://link.springer.com/article/10.1007/s10479-020-03683-9

Hair, J. J. F., Howard, M. C. and Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of business research*, 109: 101-10. Available: https://doi.org/10.1016/j.jbusres.2019.11.069

Hair, J. J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., Ray, S. and Ray, S. (2021). An introduction to structural equation modeling. Partial least squares structural equation modeling (PLS-SEM) using R: a workbook. 1-29. Available: https://link.springer.com/chapter/10.1007/978-3-030-80519-7_1

Herath, H. M. K. K. M. B. and Mittal, M. (2022). Adoption of artificial intelligence in smart cities: A comprehensive review. *International Journal of Information Management Data Insights*, 2(1): 100076. Available: https://doi.org/10.1016/j.jjimei.2022.100076

Jebarajakirthy, C. and Shankar, A. (2021). Impact of online convenience on mobile banking adoption intention: A moderated mediation approach. *Journal of Retailing and Consumer Services*, 58: 102323. Available: https://doi.org/10.1016/j.jretconser.2020.102323

Krah, R., Tetteh, L. A., Boateng, A. and Amankwa, R. F. (2024). Financial technology adoption among small and medium enterprises in Ghana. *Cogent Business and Management*, 11(1): 2321786. Available: https://doi.org/10.1080/23311975.2024.2321786

Kuleto, V., Ilić, M., Dumangiu, M., Ranković, M., Martins, O. M., Păun, D. and Mihoreanu, L. (2021). Exploring opportunities and challenges of artificial intelligence and machine learning in higher education institutions. *Sustainability*, 13(18): 10424. Available: https://doi.org/10.3390/su131810424

Kumar, S., Kumar, V., Vandana, M. and Batra, D. (2023). Impact of online service convenience on adoption of electronic information resources. *International Journal of Information Science and Management (IJISM)*, 21(4): 131-47. Available: https://doi.org/10.22034/ijism.2023.1977863.0

Lina, Y., Hou, D. and Ali, S. (2023). Impact of online convenience on generation Z online impulsive buying behavior: The moderating role of social media celebrity. *Frontiers in Psychology*, 13: 951249. Available: https://doi.org/10.3389/fpsyg.2022.951249

McElheran, K., Li, J. F., Brynjolfsson, E., Kroff, Z., Dinlersoz, E., Foster, L. and Zolas, N. (2024). AI adoption in America: Who, what, and where. *Journal of Economics and Management Strategy*: Available: https://doi.org/10.1111/jems.12576

Mutya, T. (2018). Cost control: A fundamental tool towards organisation performance. *Journal of Accounting and Marketing*, 7(3): 2-11. Available: https://doi.org/10.4172/2168-9601.1000283

Mutya, T. and Josephine, A. (2018). Financial management a wheel to financial performance of local governments in uganda: A case study of tororo municipal council. *Journal of Business and Financial Affairs*, 7(2): 2167-0234. Available: https://doi.org/10.4172/2167-0234.1000330

Nafizah, U. Y., Roper, S. and Mole, K. (2024). Estimating the innovation benefits of first-mover and second-mover strategies when micro-businesses adopt artificial intelligence and machine learning. *Small Business Economics*, 62(1): 411-34. Available: https://link.springer.com/article/10.1007/s11187-023-00779-x

Nawaz, N., Arunachalam, H., Pathi, B. K. and Gajenderan, V. (2024). The adoption of artificial intelligence in human resources management practices. *International Journal of Information Management Data Insights*, 4(1): 100208. Available: https://doi.org/10.1016/j.jjimei.2023.100208

Pillai, R., Ghanghorkar, Y., Sivathanu, B., Algharabat, R. and Rana, N. P. (2024). Adoption of artificial intelligence (AI) based employee experience (EEX) chatbots. *Information Technology and People*, 37(1): 449-78. Available: https://doi.org/10.1108/ITP-04-2022-0287

Sarstedt, M., Hair Jr, J. F. and Ringle, C. M. (2023). PLS-SEM: indeed a silver bullet–retrospective observations and recent advances. *Journal of Marketing Theory and Practice*, 31(3): 261-75. Available: https://doi.org/10.1080/10696679.2022.2056488

Shankar, A. and Rishi, B. (2020). Convenience matters in mobile banking adoption intention? *Australasian Marketing Journal (AMJ)*, 28(4): 273-85. Available: https://doi.org/10.1016/j.ausmj.2020.06.008

Tomasi, M. (2020). Perspective of financial literacy on agribusiness performance in uganda; a close look at farmers' attitude and social media platforms. Available: https://doi.org/10.36348/sjbms.2020.v05i01.010

Tomasi, M. and Ilankadhir, M. (2024a). Determinants of digital insurance adoption among micro-entrepreneurs in Uganda. *Financial Engineering,* 2: 104-15. Available: https://doi.org/10.37394/232032.2024.2.9

Tomasi, M. and Ilankadhir, M. (2024b). Mobile Banking Adoption: A Closer Look at the Role of Online Convenience Dimensions. Int. *Journal of Business Science and Applied Management,* 19(1): Available: https://www.business-and-management.org/library/2024/19_1--47-58-Tomasi,M.pdf

UNCTAD (2022). Support Uganda to develop a national strategy to boost entrepreneurship Available: https://unctad.org/news/unctad-supports-uganda-develop-national-strategy-boost-entrepreneurship

Valerio, M. A., Rodriguez, N., Winkler, P., Lopez, J., Dennison, M., Liang, Y. and Turner, B. J. (2016). Comparing two sampling methods to engage hard-to-reach communities in research priority setting. *BMC medical research methodology,* 16: 1-11. Available: https://link.springer.com/article/10.1186/s12874-016-0242-z

Vandana, V., Kumar, S., Kumar, V. and Goyal, P. (2023). Investigating the Impact of Online Service Convenience on Customer Engagement, Attitude and Intention to Use Food Delivery Apps. *International Journal on Food System Dynamics,* 14(3): 331-44. Available: https://doi.org/10.18461/ijfsd.v14i3.G6

West, S. G., Wu, W., McNeish, D. and Savord, A. (2023). Model fit in structural equation modeling. *Handbook of Structural Equation Modeling,* 2: 184-205. Available: https://books.google.co.in

Wong, B. K. M., Vengusamy, S. and Bastrygina, T. (2024). *Healthcare digital transformation through the adoption of artificial intelligence. In Artificial Intelligence, big data, blockchain and 5G for the digital transformation of the healthcare industry.* Academic Press. 87-110. https://doi.org/10.1016/B978-0-443-21598-8.00014-2

World Bank (2019). Small and medium enterprises (smes) finance. Available: https://www.worldbank.org/en/topic/smefinance

World Bank (2022). Financial services in a digital era for developing countries. Available: https://www.worldbank.org

Zeqiri, J., Ramadani, V. and Aloulou, W. J. (2023). The effect of perceived convenience and perceived value on intention to repurchase in online shopping: the mediating effect of e-WOM and trust. *Economic Research-Ekonomska Istraživanja,* 36(3): Available: https://doi.org/10.1080/1331677X.2022.2153721