FUTURE PROSPECTS AND CHALLENGES OF INTEGRATING ARTIFICIAL INTELLIGENCE WITHIN THE BUSINESS PRACTICES OF SMALL AND MEDIUM ENTERPRISES

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Abstract

Artificial intelligence (AI) has become a popular technology of this era due to its potential to transform businesses. Therefore, various businesses are focused on adopting this technology to enhance their business. However, due to challenges, not all organizations can adopt AI for their business functions. Considering the importance of AI and small and medium-sized enterprises (SMEs) in the economy, this study aimed to examine the challenges and prospects of AI for SMEs. The study performed review-based research to examine past literature to determine the key challenges facing SMEs in AI integration. It was noted in the results that costs and technical requirements of AI remain the topmost challenges for SMEs to implement AI. These challenges remain the major hindrance to the adoption of AI, and thus, this study analyzes these issues deeply to provide organizations with the insight to overcome these problems. The study also noted that the prospects of AI in SMEs are great as the costs of AI are reducing, and with more research and development, AI integration will become more convenient. Therefore, this research provides key details into the problems facing AI adoption contemporarily and how they can be solved in the future.

Keywords: Artificial Intelligence (AI) Integration, Challenges, Future Prospects, Small and Medium-Sized Enterprises (SMEs)

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1. INTRODUCTION

In the present era of digitalization, it is not possible to overlook the significant contributions made by artificial intelligence (AI) which holds the potential to transform the economic system foundations of small and medium-sized enterprises (SMEs) (Polas et al., 2022). From healthcare to the retail sector, AI has a high demand across industries for continuous progress. Lu et al. (2022) signified that SMEs are considered the driving force of economic growth and employment and can successfully transform into

an emerging digital world. SMEs have been greatly influenced by AI applications in services, customer support, communication, and interactions (Krafft et al., 2020). Drydakis (2022) further added that SMEs are aiming to integrate digital technologies facilitated by AI to improve their market value and competitive edge. The investment in AI by the SMEs is envisioned to improve their track of user's behaviours and habits while offering recommendations to alter the purchasing intention of the customers through media communication. However, the outbreak of COVID-19 led to lockdown measures which increased the vulnerability of SMEs as opposed to large corporations, thereby leading to higher uncertainties and greater challenges for SMEs (Lu et al., 2022). Irrespective of the government measures to curb the financial loss, SMEs have not completely recovered from the losses and demand urgent measures to adequately resolve the challenges to sustain and promote their business continuity. Due to this, more organizations are willing to adopt AI to enhance their performance. However, there are specific challenges that are faced by businesses. More specifically, SMEs face significant problems when implementing AI. However, there is no significant research available that consolidates the challenges and future prospects for AI adoption in SMEs. In this regard, this study focuses on covering this gap. The primary purpose of this study is to develop an insight into future prospects and challenges for integrating AI in SMEs' business environments. The study focuses on SMEs and the integration of AI, for which the research objectives of the present study are:

1. To analyze the significance of AI integration in SMEs by evaluating their applications.

2. To project the future implications and challenges of AI in the business operations of SMEs.

3. To develop in-depth research regarding AI's possible applications and draw future recommendations to implement on SMEs as successive measures.

The remainder of the paper is organized as follows. Section 2 reviews the literature relevant to the study topic. Section 3 is the methodological roadmap of the study, reflecting on where data is collected and how the data will be analyzed to derive the study results. Section 4 includes the results of the study, and findings are represented to give a comprehensive understanding of the study results. Section 5 contains a detailed discussion of the results of this study, with further comparison of the cited literature to support the findings. Section 6 highlights the study's conclusion that summarizes the entire research.

2. LITERATURE REVIEW

Businesses have recently been using AI for chatbots to communicate with their customers. Chan et al. (2018) in the study stated that AI enhances the performance (efficiency) of SMEs by increasing their productivity. AI in SMEs helps to track user activities and consumer behaviour and provides recommendations, and media communication, boosts trade activities, improving organizational performance by reducing cost and time for business

processes and automating them. Recent application of AI in SMEs includes QR code technology, which is used worldwide for inventory management, data recording, accounting, identifying consumer preferences, and predicting future demands of consumers through data analysis. A plethora of studies have described the ability of SMEs to transform by digitally integrating AI technologies due to their precise business operations (Lu et al., 2022; Drydakis, 2022; Polas et al., 2022). According to the study of Hansen and Bøgh (2021), machine learning and data analytics methods are used to apply to Internet of Things (IoT) sensors, as IoT sensors have a great capacity to store massive data. SMEs are usually presented as less capable of adopting AI, a factor of lacking resources. However, certain tasks such as scheduling meetings, responding to general queries of users, and marketing campaigns to enhance consumer purchasing decisions can be automated through AI software in SMEs (Fan et al., 2020). Thus, there is a high potential for SMEs to improve their business capabilities through the integration of AI.

With these merits, AI becomes a motivation for businesses to operate intelligently, reducing labour costs and increasing accuracy. The most effective AI application of SMEs is in marketing, in which the systems embed machine learning algorithms for data training and analysis for targeting customers and constructing communication channels through behaviuor analysis (Canhoto & Clear, 2020). It also automates the tracking of marketing expenditures minimizing the time spent on the manual tracking process of marketing campaigns (Drydakis, 2022). Moreover, AI enhances sales, which is recognized as a revenue generator for a business. SMEs have induced AI tools in sales to identify the best strategies used by sales representatives compared with the rest. This application of AI software helps in training salespeople to communicate like affluent sellers enhancing their operational performance and productivity. Thus, AI marketing is direct marketing evolution based on data analytics with AI models.

Moreover, the chatbots scale up customer engagement reducing the resources to interact with them, reflecting the efficient and successful application of AI in SMEs. Online chatbots drive customer engagement and retention by automatically communicating with them for their queries and reducing the waste of time consumers are waiting for an immediate response (Hoikkala & Ojala, 2022). Determining purchasing patterns, consumer preferences, and responses to a certain product helps businesses to make better decisions to enhance product quality (Selamat & Windasari, 2021). As far as a competitive advantage is concerned, it is difficult for businesses to manually track the daily amount of data produced by comparative businesses related to strategies (Conick, 2017). However, AI tools and software provide a broad scope to address the challenge by tracking business operations through social media sites, applications, and websites, including pricing strategies, PR activities, and technological initiatives. Collectively with natural language processing, the business metrics propose evolving trends in SMEs and competing markets. Moreover, business

gaps, quality assurance, strengths, and weakness leads to businesses developing their strategy for enhanced production and performance.

Irrespective of the growing opportunities, cybersecurity in SMEs serve as the major challenge that jeopardizes an organization's reputation. With the increasing AI proficiencies, cyber attackers also evolve with techniques to steal data. AI-based systems work on large data and process it according to business needs, which is a risk factor for security risk (Drydakis, 2022). AI systems merge with machine learning to integrate special security systems in software and applications. Machine learning algorithms enable the system to detect anomalous activity from any user, improving the security aspects and preventing cyber threats that large SMEs are facing (Chan et al., 2019). Moreover, a lack of technical skills is the main challenge highlighted in the study of Black and van Esch (2020), who proposed another useful tactic by providing jobs and recruiting intelligently from AI software in SMEs. It has been a strategic concern for SMEs to recruit talented and skilful individuals to perform job duties. The process application reduces mistakes by increasing efficiency and accuracy by automating recruitment (Hamilton & Davidson, 2018). Therefore, AI aids by processing information of the candidate for screening, interviewing, and communicating.

Besides the immeasurable advantages, SMEs do not usually opt for an organization's use of AI-based technology. The main concerns involve security and privacy issues, lack of skill practice among SME employees, and lack of resources to implement AI. However, according to the OECD (2021), SMEs have a higher capability to attain change promptly as compared to larger firms for having limited layers of management. Onu and Mbohwa (2021) proposed that SMEs operating on a smaller scale have minimal access to markets and resources, and the cost applied to the integration of AI projects is much higher. It raises the concern of increased cost and a fear of difficulty in adopting the system (Chatterjee et al., 2021). The users in SMEs, due to lack of practice and training, vacillate between adopting AI-empowered products (software), although there is a great need for SMEs to manage information efficiently and perform analysis to reduce cost and make appropriate decisions for business processes. Manually performed tasks need to be transformed into automatic processes to reduce the manual workforce and project innovative measures against traditional business practices of SMEs.

The study of Drydakis (2022) studied the various aspects of AI applications, including cyber security, automated communication, cash flow, pricing, and prediction of consumer needs. These applications are advantageous, but on the other hand, SMEs do not implement AI in their business processes at the initial stage of high cost and requirement of technical skill set. However, these strategies have been proven to be efficient during external changes affecting business performance.

The theory of technology acceptance model (TAM) is applied to the research as it is the most effective model for implementing technological change and acceptance in organizations. Applying this theory to SME business models leads to accepting the changes that can be informed or uninformed, as the perceived ease of use and behavioural intentions are factors that encourage the use of technology across companies (Gamage, 2019). As AI implementation is a form of digital innovation in business, SMEs need to be analyzed based on capacity and budget for adoption.

3. STUDY FRAMEWORK

The methodology used in this study is a systematic literature review, which is a qualitative research approach that systematically searches, selects, appraises, and synthesizes existing literature on a particular topic. The systematic literature review was chosen for this study as it provided a comprehensive overview of the existing research in the area of AI integration in SMEs and allowed for the identification of common themes and patterns regarding the challenges and prospects of AI integration.

The first step in the systematic literature review was to conduct a comprehensive search of multiple databases, including Scopus, Web of Science, and Google Scholar. The search was performed using a set of key terms, including "AI integration in SMEs", "application of AI in SMEs", "challenges of AI integration", "future of AI in SMEs", and similar terms. This search was conducted to identify relevant articles that met the selection criteria.

The second step was to select articles that met the criteria of being published after 2016 and that were relevant to the integration of AI in SMEs. The reason for setting this criterion was to ensure that the most recent information was gathered from the literature review and that the results of the study were up-to-date and relevant.

The third step involved extracting relevant information from the selected articles, including the authors, year of publication, and the main findings.

The fourth step involved analyzing the extracted information to identify common themes and patterns regarding the challenges and prospects of AI integration in SMEs. The findings from the data analysis were then interpreted in the final step to provide a comprehensive understanding of the challenges and prospects of AI integration in SMEs.

In conclusion, the systematic literature review provided a comprehensive overview of the existing research in the area of AI integration in SMEs and allowed for the identification of common themes and patterns regarding the challenges and prospects of AI integration. The methodology used in this study was systematic and structured, which ensured that the results were reliable and consistent.

4. RESULTS

The study by Hansen and Bøgh (2021) performed a review-based study considering the use of AI and the IoT in SMEs. The authors noted that there had been a significant increase in the trend of AI and IoT in SMEs due to the vast benefits they offer. The IoT and AI are two of Industry 4.0's most talked-about subjects. There have been numerous publications on these subjects, although they mainly concentrate on larger businesses. However, SMEs are regarded as the major economic support of many countries; hence, it is essential that these businesses have simple access to and the ability to implement new technologies. SMEs should first focus on machine-wise implementation because it is less expensive than full production-wise adoption. However, a large number of the cases involved computer usage monitoring. Although it is a fantastic approach to learning more about production, it does not cover the whole range of IoT in Industry 4.0. SMEs have to concentrate on utilizing IoT in additional situations, including machine-based predictive analytics. Additionally, observed were the lack of machine vision applications and the fact that, provided the necessary expertise is present, good results may be obtained with a low-cost solution. Therefore, this study showed that the prospects of AI are bright for SMEs, and organizations should adopt the use of this advanced technology to enhance their operations and performances.

Moreover, another study by Onu and Mbohwa (2021) performed a qualitative examination of AI, Industry 4.0, and IoT in SMEs, especially in developing countries. Emerging technologies are developing quickly, and thus, they have also intruded into the business landscape. Operations in the industry are likewise evolving quickly. As a result, the development and use of many Industry 4.0 technologies, including big data analytics and the IoT, show enormous promise for launching sustainable production. In order to improve the operational performance of SMEs and future decisions to support technological innovation, the present research examines the potential and difficulties of Fourth Industrial Revolution (4IR) implementation for sustainable operations. SMEs may now include new technologies to offer to utilize local manufacturing robots and, soon, sophisticated technological solutions. As long as they form a strategic alliance and advance along with the trend of creative manufacturing and effective production methods, these emerging countries may become highly competitive to become a centre of manufacturing and advanced technology globally. Therefore, SMEs in developing nations must take into account assisting the development of digital connection skills and capacity, addressing the usage of standards for interoperability, and finding ways to improve governance. In order to accept and benefit from the reality of the developing technological paradigm, SMEs must mainstream science, technology, and innovation.

Furthermore, Baabdullah et al. (2021) performed a survey-based study to determine the factors that influence the acceptance of AI in SMEs. A survey was conducted with 392 B2B ("business-to-business") SMEs, and the results were examined. The findings of the study concluded that among AI enablers, mindset and technological road mapping had a substantial impact on the acceptance of AI practices but not professional expertise. Infrastructure and awareness, but not technicalities, had a substantial impact on the AI readiness factors related to the adoption of AI techniques. The performance and governance of relational AI systems, as well as SME business customer AI-based interactions, were shown to be strongly impacted by the adoption of AI practices. The study also notes that the development of SMEs is a crucial strategy for attaining economic growth in the Middle East, and successful technology adoption is essential for the survival of SMEs. AI is a member of a new generation of technologies that can help businesses gain a competitive edge, but there is presently no proof of its use in Middle Eastern B2B SMEs. Hence, it is important that SMEs promote the factors that enhance their acceptance of AI so that they can benefit in the form of better growth and expansion.

Moreover, another research by Polas et al. (2022) examined the factors influencing the adoption of blockchain technology (BT) by SMEs, applying AI, and using risk-taking behaviour as a mediating lens. In order to collect the data, the researchers conducted a survey with 150 owners/top managers from 150 SMEs (one informant from each). Structured equation modelling was used to examine the combined effect of internal and external factors on the desire to utilize BT. The study's conclusions suggest that a favourable and significant influence on the adoption of BT comes from knowing AI. Additionally, the adoption of BT is positively and significantly impacted by the beneficial value of AI as well as by perceptions of AI's usability and ease of use. The study makes the key claim that the perceived utility and usability of AI have a big impact on technology adoption.

In addition, to ascertain if AI applications are connected to decreased business risks for SMEs, the study by Drydakis (2022) uses the International Labor Organization's SMEs COVID-19 pandemic business risks scale. To measure the utilization of AI applications in essential activities, including marketing and sales, pricing, and cash flow, a new 10-item scale was created. The study was performed in London, England, and data were acquired from 317 SMEs. The study noted that the usage of AI in SMEs can have a favourable impact on both small and medium-sized businesses' performance by reducing the business risks brought on by the COVID-19 pandemic. Additionally, there are fewer economic risks related to the COVID-19 pandemic due to AI apps that target customers online, provide cash flow predictions, and ease HR operations. In light of the principle of dynamic capabilities, SMEs may be able to improve their capabilities through the use of AI. Through more accurate market trend prediction and customer requirement facilitation, AI in advertising might enhance SMEs' sensing capacities during the COVID-19 pandemic. Furthermore, AI in risk

analysis and pricing might help SMEs take advantage of opportunities via better-informed financial planning, while AI in human resources (HR) could help SMEs adapt through smart decision-making to devise enhanced informed operational strategies.

Furthermore, Borges et al. (2021) assert that the use of AI technology is increasingly common in business settings. The potential, which has been demonstrated in reports from leading consultancies, technical businesses, and white papers, is in part responsible for this enthusiasm. High expectations are thus linked to the business environment's competitiveness. Thus, there is an increasing need for research on the strategic application of AI to achieve competitive advantages. Therefore, the purpose of the study by Borges et al. (2021) was to conduct a thorough literature analysis to evaluate the relationship between the use of AI and corporate strategy. The study results a show that using AI can help SMEs enhance their customer and employee engagement. Smart systems based on AI can automate various processes like communication with customers, enhancing their experience and positively impacting organizational performance. Also, it has been noted in the study that the use of AI can help businesses design and test new products and services more effectively. This reduces their chances of failure in the market and ensures greater success.

The study by Ghobakhloo and Ching (2019) focuses on the adoption of digital technologies, particularly smart manufacturing, in SMEs. The authors aim to examine the challenges and prospects of AI integration in this context. The study is based on a systematic review of previous literature and highlights the major challenges faced by SMEs in adopting digital technologies and AI. The results of the study show that the main challenges faced by SMEs in adopting AI include the high costs of implementation and technical requirements. The authors claim that as AI technology continues to advance and costs decrease, AI integration will become more convenient and accessible to SMEs. The study concludes by emphasizing the importance of addressing the challenges faced by SMEs in adopting AI and highlights the need for further research to understand better the potential benefits and limitations of AI in SMEs.

Moreover, Ciampi et al. (2021) focused on using AI to predict default in SMEs. The authors aim to provide a systematic literature review of the current state of AI in SME default prediction and highlight future perspectives. The study reviews previous literature to identify the major challenges faced by SMEs in adopting AI for default prediction. The results of the study show that the main challenges faced by SMEs in adopting AI for default prediction include a lack of data, a lack of expertise in AI technology, and a lack of trust in AI predictions. However, the study also defines the future of AI integration in SME default prediction as it states that AI technology will become more available, accurate and reliable for SMEs in predicting default. The study concludes by emphasizing the need for further research to understand better AI's potential benefits and limitations in SME default prediction.

Furthermore, Radanliev et al. (2020) examined using AI to manage cyber risk in the industrial IoT and Industry 4.0 supply chains. The authors aim to provide an overview of the current state of AI in this context and highlight future trends and prospects. The study reviews previous literature to identify the major challenges faced by organizations in adopting AI for cyber risk management. The results of the study show that the main challenges faced by organizations in adopting AI for cyber risk management include data privacy concerns, a lack of trust in AI predictions, and the difficulty of integrating AI technology into existing systems. However, the study also highlights the future prospects of AI integration in cyber risk management. The authors note that as AI technology continues to advance and more data becomes available, AI will become more accurate and reliable for organizations in managing cyber risk. The study concludes by emphasizing the importance of addressing the challenges faced by organizations in adopting AI for cyber risk management and highlights the need for further research to better understand the potential benefits and limitations of AI in this context.

The study by Türkeş et al. (2019) analyzed how Romanian SMEs are implementing Industry 4.0 technologies, including AI. The authors want to pinpoint the major factors influencing and impeding SMEs' adoption of Industry 4.0 technology while also shedding light on the potential applications of AI integration in the future. The research surveyed SMEs in Romania to obtain information on the difficulties and opportunities of AI integration. On the other hand, exorbitant prices, a lack of assistance from the government and financial institutions, and a lack of skill and understanding of Industry 4.0 technology are the key impediments to its implementation. The survey also emphasizes Romanian SMEs' potential use of AI in the future. The authors point out that SMEs in Romania will find it easier and more practical to use AI as the technology develops and more assistance becomes available. The study's findings indicate that enhanced product quality, higher productivity, and increased competitiveness are the primary forces behind Industry 4.0 adoption by SMEs in Romania.

Table 1 presents the major findings of this study, gained through the literature review.

Table 1. Findings of challenges and prospects of AI integration

Author(s)	Methods	Challenges of AI integration	Prospects of AI integration
Hansen and Bøgh (2021)	Literature survey	The costs and complexity of AI implementation make it difficult for SMEs to integrate these systems with their business functions.	The costs of AI implementation are on the decline as research and development in this area are increasing. Also, the implementation of machine learning and data analytics requires less complexity and costs, which can be the beginning point of integration for SMEs.
Onu and Mbohwa (2021)	Qualitative study using interviews	Technological challenges and complexities of AI are highlighted to be the main challenge that does not allow SMEs to integrate AI. The authors believe that AI integration is also perceived as a risky process by businesses.	The rise of Industry 4.0 is enabling the use of AI technologies in various organizations as the vendors of these technologies are increasing. Also, an increase in the technological capabilities of firms is enhancing AI integration.
Baabdullah et al. (2021)	Qualitative study using interviews	The study presents that infrastructure and awareness of AI are the main factors that influence its integration in SMEs. The study also finds that technicalities are not a major challenge for AI integration.	The authors assert that the future of AI integration in SMEs is substantial as it offers various benefits for organizations to enhance their performance and accomplish business goals.
Polas et al. (2022)	Quantitative analysis using survey-questionnaire	The study makes an important assertion that the perceived usefulness and ease of use of AI have a significant influence on the adoption of technology. This means that organizations that are aware of the benefits of AI and its potential find it more convenient to integrate AI into their operations.	The study also finds that AI has the potential to transform the financial and economic standings of SMEs. However, this potential has not been fully explored yet. In the future, it is likely that more growth of AI will be experienced in SMEs as the integration of technology will become easier.
Drydakis (2022)	Meta-analysis	Costs and high requirements for technical skills are the major challenges for SMEs in integrating AI. The costs are majorly associated with hardware and human resources. Also, as AI is an emerging field, it is difficult to find people with the highest skills.	The study also asserts that the rapid growth of AI will benefit SMEs as the availability of resources will become easier and cheaper. Due to this, the business would be able to integrate AI more effectively and enhance its operations.
Hoikkala and Ojala (2022)	Qualitative review-based study	The authors of the study show the challenges of the use of AI chatbots for inexperienced businesses. The development of AI chatbots is very difficult for SMEs as they do not have the proficiency to implement and maintain them.	The study supports that the rigorous trend of research and development in AI will enhance the implementation of AI technology in the future by making it simpler.
Chan et al. (2019)	Research survey	The authors highlight how the implementation of AI is challenging due to the lack of technical expertise of SMEs. Small organizations are unaware of advanced technical skills and lack the finances to hire professionals in this area.	The study also presents that there is a development of simpler AI methods and approaches that will cause the cost of implementation to go down in the future.
Ghobakhloo and Ching (2019)	Quantitative study using a survey questionnaire	Technical requirements, costs	Reducing costs, and convenience with research and development
Ciampi et al. (2021)	Qualitative study using systematic review	Lack of data and expertise, legal and ethical considerations	Improved data analysis and prediction, increased efficiency
Radanliev et al. (2020)	Qualitative review-based study	Integration with legacy systems, data privacy and security, lack of expertise	Advancements in cyber risk analytics, increased efficiency and safety
Türkeş et al. (2019)	Qualitative interview-based study	Lack of expertise and knowledge, high costs, and lack of support from government and financial institutions	Increased accessibility and convenience with advancements in technology, government and financial support
Borges et al. (2021)	Qualitative study using systematic review	The study finds that the use of AI is becoming prevalent in various organizations; however, SMEs find it challenging to use AI technology due to their limited resources. SMEs often look for tried and tested solutions, and AI is an emerging field that needs some time to become stable for business use.	The growth of AI in the past decade has been substantial, which shows that the future of AI in SMEs is huge. More organizations will adopt AI as they will find it more adequate to survive in the increasing market competition.

5. DISCUSSION

5.1. Challenges to AI integration in SMEs

It has been noted in the study that there are various challenges that SMEs face during the integration of AI in their business functions. One of the major challenges is that AI requires significant technical expertise that is limited available in SMEs (Lu et al., 2022; Polas et al., 2022). The technical skillset and the infrastructure are not well-developed in these organizations, which makes it challenging for them to adopt AI. Due to this, a significant number of SMEs also believe that the additional expertise required makes AI integration a risky process, which can potentially harm their business objectives. Due to this, the status quo does not allow these organizations to change and adopt the use of AI. Moreover, the results also show that organizations

often hesitate to integrate AI due to the costs involved (Hansen & Bøgh, 2021). There is a perception that AI integration will cost organizations a large amount of money, which is true to some extent, but not all areas of AI are costly. Examples of these include data analytics and machine learning, which are demanding in terms of expertise but are not hardware intensive. Therefore, SMEs can adopt AI technologies that are inexpensive and start their journey toward AI integration. Besides this, it is also true that the status quo, which largely comprises investors, management, and shareholders, is not adequately aware of the potential usefulness of AI (Drydakis, 2022). There is a general perception that AI is exaggerated and does not significantly benefit organizations. This acts as another major challenge for SMEs to integrate AI into their business. The results assert that a change in this perception and making

organizations aware of the usefulness and ease of use of AI can significantly pave the way for enhanced AI integration.

5.2. Future prospects of AI integration

The results of the study also found that AI integration has major benefits for SMEs. Organizations are often looking for growth and expansion, and AI can play a major role in helping these organizations accomplish their goals (Baabdullah et al., 2021). The use of AI has intruded into various business areas like recruitment, marketing, customer and employee engagement, and sales. Considering the rapid growth of AI in the business world, the future prospects of AI are bright for SMEs. The awareness and knowledge regarding AI are on the rise, which is helping the business become more competitive. Thus, this is a positive trend that will help convince the status quo regarding AI integration (Borges et al., 2021). Besides this, the costs of AI are also declining gradually as more research and development are being carried out in this area. In the future, it is likely that AI will become more stable, and this will lead to the development of completed solutions for businesses to be employed effectively. This will certainly reduce the efforts, time, and money required by organizations to accomplish AI integration and enhance their performance (Onu & Mbohwa, 2021). Hence, based on these findings, it can be asserted that AI integration will become more convenient for SMEs in the future, enabling them to excel in their performance and growth more efficiently.

5.3. Managerial implications

The research presents important managerial implications for the adoption of advanced technologies, particularly AI and IoT, by SMEs. The studies highlight the vast benefits of adopting these technologies in terms of enhancing operations, performance, and competitiveness. Hence, SMEs should focus on implementing these technologies, with machine-wise implementation being the first step. Additionally, SMEs in developing nations must develop their digital connection skills and capacity, address the usage of standards for interoperability, and find ways to improve governance to become competitive globally. Moreover, the study indicates that factors such as mindset, technological road mapping, infrastructure, awareness, and governance impact the acceptance and readiness of SMEs for AI adoption. Therefore, SMEs must promote these factors to enhance their acceptance of AI and benefit from better growth and expansion.

The research's findings also imply that views of artificial intelligence's usefulness and usability, as well as its perceived simplicity of use, have a positive and substantial influence on how widely blockchain technology is adopted. Therefore, greater understanding of the usability and benefits of AI can significantly increase the use of blockchain technology in SMEs. Finally, it is also indicated that the usage of AI in SMEs can have a favourable impact on reducing the business risks brought on by the COVID-19 pandemic. Therefore, SMEs should consider adopting AI apps that target customers online and implement AI technology to enhance marketing and sales, pricing, and cash flow activities to reduce business risks during pandemics and other uncertain times. Overall, these studies highlight the importance of SMEs adopting advanced technologies such as AI and IoT to enhance their operational performance and competitiveness in the business world.

6. CONCLUSION

In the end, it can be concluded that AI integration has great potential for SMEs as it can help them accomplish their goals. AI has proven to be a great asset for various organizations, and rapid research and development in the area is evidence that this technology will transform businesses in the future. Although there are some challenges of AI integration for SMEs, which include costs and technical complexities, they are likely to be mitigated with more development. The high costs of integration of AI make it highly problematic for SMEs to adopt the technology. However, it has been noted that there is increasing research and development in this field, which would enhance the implementation of AI in businesses. Therefore, it is likely that in the future, AI will become more applicable all over the business world as technology becomes more available and advanced. This study has found that the key challenges to the adoption of AI in SMEs are their high costs and technical complexity. Thus, more research is required in this area to pave a smoother path for the adoption of AI in organizations.

These technologies have enormous potential to enhance the operational performance of SMEs, especially in developing countries, and contribute to sustainable production. The study provides evidence that SMEs should consider adopting these advanced technologies and highlight the factors that can facilitate or hinder their adoption. For example, the results emphasize the importance of mindset, infrastructure, and awareness in promoting the acceptance of AI in SMEs. However, there are also some limitations of the research that should be considered in future studies. It was noted during this research that reliance on surveys or reviews might not provide a complete understanding of the factors that influence the adoption and implementation of these technologies in SMEs. Moreover, the studies mainly focused on the adoption and implementation of these technologies in SMEs but did not investigate their impact on the wider economy or society. Therefore, future research should aim to overcome these limitations and provide a more comprehensive understanding of the adoption and implementation of AI, IoT, and BT in SMEs. This may involve using more diverse research methods, including case studies and experimental designs, and investigating the broader implications of these technologies on the economy and society. Additionally, future research should also consider the ethical and social implications of these technologies and how SMEs can ensure that their adoption and implementation align with broader societal values and goals.

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