IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE (AI) AMONG SMALL AND MEDIUM ENTERPRISES (SMEs) IN ONDO CENTRAL, ONDO STATE

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Abstract

This study examines implementation of artificial intelligence (AI) in business among Small and Medium Enterprises (SMEs) in Ondo central. The purpose of the study was to examine challenges encountered by SMEs in implementing AI in business. Three research questions guided the study and no hypothesis were formulated. Descriptive survey research design was adopted for the study. The population of the study comprised of 150 managers and employees of small and medium enterprises in Ondo central. There was no sample since the population size was manageable. The instrument for data collection was a 23-items structured questionnaire titled: Implementation of AI among small and Medium Enterprises (SMEs) Questionnaire (IAISMESQ) and was validated by experts and was further subjected to internal consistency testing using Cronbach Alpha statistics which yielded a reliability coefficient of 0.74.The instrument was further administered to the respondents by the researchers.Mean and standard deviationwere employed to analyze the data gathered. Findings revealed that AI offers significant value to small, local and service industries by enhancing efficiency, improving customer experience and creating new business opportunities. Challenges such as lack of data privacy, high cost and lack of expertise were revealed. Coping strategies such as using low cost or open source AI tools, outsourcing AI implementation to service providers were also revealed. It was concluded that AI is a powerful tool for small businesses to thrive in competitive markets. It was therefore recommended that there is need for small and medium enterprises (SMEs) managers to work toward effective implementation of artificial intelligence (AI) into their business operation in order to foster economic growth and development.

Keywords: Artificial Intelligence (AI), Challenges, Coping Strategies, implementation and Small and Medium enterprises (SMEs).

Introduction

Small and medium enterprises have contributed in very important ways to Nigeria's economic development. SMEs play a pivotal role in economic growth, industrial output, and employment creation in a country. It is believed that SMEs are the backbone of the industrial and economic growth of a nation and also make a significant contribution to employment creation. SMEs have transformed to succeed in the emerging digital world (Chan, Morgan, et al., 2018; Chan, Teoh, et al., 2018; Ulas, 2019). Indeed, digital technologies aided by Artificial Intelligence (AI) have transformed the nature and scope of entrepreneurial activity in SMEs (Hansen & Bøgh,

2021; Ulas, 2019). Many individuals come in contact with AI in their day to day lives, whether it is known or not. A large majority of AI developments have been driven traditionally by the private sector, especially larger companies such as Amazon, Google, IBM, and Facebook Artificial intelligence (AI) have emerged as a transformative force in the business world, offering significant opportunities for innovation, efficiency and competitive advantages.

Artificial intelligence refers to the stimulation of human intelligence by machines, especially computer systems. It involves creating a system that can perform tasks that typically require human intelligence such as learning, reasoning, problem solving, perception and natural language processing. An AI system is comprised of three key elements: sensors, operational logic and actuators. Raw data from the environment is collected by sensors. Data is then processed according to a given set of objectives that are encoded into an operational logic. An AI model constitutes an important part of the operational logic as it reflects the environment and describes its structure and/or its internal dynamics.An AI model can be built based on knowledge and data generated by humans, automated tools, or a combination of both. Model inference shapes the model outcomes in the form of prediction, recommendations or decisions.

Businesses have recently been using AI for chatbots to communicate with their customers. Chan et al. (2018) in their 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 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 behaviour 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, cyber security 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).

Despite the promising benefits of AI, SMEs face several challenges to its effective implementation. Challenges such as lack of data culture, lack of awareness about what AI could bring, need for retraining managers and workers; high sunk costs for internalising AI, plus a need for engaging complementary investments; few evidence and little visibility on the returns on investment; and reputational and legal risks.

Moreover, lack of technical skills is the main challenge as highlighted in the study conducted by 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 skillful 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.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 this study 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.

Coping strategy refers to the methods or techniques individuals or groups use to manage stress, challenges or adversity. These strategies help people deal with difficult situations whether emotional, mental or physical. Copying strategies for the use of AI among SMEs can be tailored to address the specific challenges faced by local businesses in the following ways:

- Using Cloud based AI Solution: Leveraging cloud platform that offer AI-as-a-service can allow SMEs to implement AI solution without heavy infrastructure costs.
- SMEs can apply for government grants, loans or training programme designed to support digital transformation and AI adoption. Initiative from bodies like the Small and Medium Enterprises (SMEDAN) and Ondo State Ministry of Commerce, Industry and Cooperative may offer support.
- Collaborating with educational institution: SMEs can collaborate with these institutions for AI research, training or internships.
- Gradual adoption of AI in Specific use cases: Rather than adopting AI across operations, SMEs can start by using AI for small specific functions such as customer service automation, inventory management or financial forecasting. For example, a retail business in Ondo town begins by using AI chatbots to handle basic customers inquiries and then expands to AI-driven demand forecasting after seeing positive results.
- Using low cost or open source AI tools: SMEs can utilize open source AI services like TensonFlow, Hugging Face or low cost cloud AI services such as Google Cloud AI or to avoid expensive proprietary solutions. These tools offer robust AI capabilities at little or no cost.
- Outsourcing AI implementation to service providers: SMEs can partner with external consultants or tech companies that specialize in AI to implement AI solution tailored to their business needs.
- Accessing industry specific AI platforms: For example, Agric business can use AI tools for crop monitoring while retail businesses can use AI for sales forecasting and customer engagement.

Statement of the Problem

The rapid advancement of Artificial Intelligence (AI) technology has transformed business operation across countries and sectors such as improving operational efficiency, enhancing customers experiences and optimizing decision making. SMEs in Ondo central struggle to fully harness its advantages. The challenges they face include limited access to technical knowledge, inadequate infrastructure and data quality. These challenges limit SME's ability to leverage AI technologies which could otherwise serve as a catalyst for development and help them overcome traditional obstacles. The study therefore seeks to examine the challenges SMEs in Ondo Central face in the adoption and usage of AI and explore coping strategies that can help mitigate these

issues, ensuring that local businesses can benefit from the potentials of AI.Hence, the need for this study.

Purpose of the Study

The main purpose of this study was to assess the implementation of artificial intelligence among small and medium enterprises in Ondo central. Specifically, this study seeks:

1 To assess the benefits of using artificial intelligence in business.
2 ` To identify the challenges encountered in the implementation of artificial intelligence among small and medium enterprises in Ondo central.
3. To ascertain the coping strategies for effective implementation of artificial intelligence among SMEs in Ondo central.

Research Questions

The following research questions guided the study:

1. What are the benefits of using artificial intelligence in business?
2. What are the challenges encountered in the implementation of artificial intelligence by small and medium enterprises within Ondo central?
3. What are the coping strategies for effective implementation of artificial intelligence among SMEs in Ondo central?

Method

The study adopted a descriptive survey research design while the population consisted of small and medium enterprises (SMEs) within Ondo metropolis. Purposive sampling techniques were used to select 150 respondents. The instrument for data collection was a questionnaire titled: Implementation of Artificial Intelligence among Small and Medium Enterprises Questionnaire (IAISMESQ) and was validated by experts and further subjected to internal consistency testing using Cronbach Alpha statistics which yielded a reliability coefficient of 0.74.The instrument was further administered to the respondents by the researchers.Research questions one consists of ten items that measure benefits of using artificial intelligence in business while research question two consist of six items to ascertain some challenges encountered in the adoption of artificial intelligence and research questions three consist of seven items that measure coping strategies employed for effective implementation of AI. A four-point rating scale of strongly agree (SA) – 4, Agree (A) 2, Disagree (D) - 3 and Strongly Disagree – 1 was used. Mean and standard deviation were used to analyze questions one to three. Mean responses of 2.50 and above was considered as agree while any mean responses below 2.50 was considered as disagree.

Results

Research Question 1:What are the benefits of implementing artificial intelligence among small and medium enterprises?

Table 1: **Mean and standard deviation responses on the benefits of implementing artificial intelligence among small and medium enterprises.**

S/N	Items	Mean	SD	Remark
1	Fraud detection and security	3.89	0.96	Agree
2	Topersonalised customer experience	3.50	0.95	Agree
3	To target audience online	3.70	0.95	Agree
4	To offer immediate answers to customers	3.70	0.95	Agree

5	To offer cash flow forecasting	3.40	0.95	Agree
6	To collect information on other firms' (competitors) product assortments, i.e., pricing, offers, sales, and pubic relation activities	3.50	0.95	Agree
7	To combat fake product reviews	3.40	0.95	Agree
8	To protect data, customers' privacy and improve cyber security	3.40	0.95	Agree
9	Improved marketing and advertising	3.50	0.95	Agree
10	For recruitment and human resource activities	3.70	0.96	Agree
	Grand Mean	**3.57**		**Agree**

Source: Field Survey, 2024

The data in Table 1 reveal the mean and standard deviation of responses on the benefits of implementing artificial intelligence among small and medium enterprises. The table shows that the respondents claimed that artificial intelligent had helped them to detect fraud, enhance security, personalized customer experience, target audience online and offer immediate answers to customers This statement is supported by mean scores of 3.89, 3.50, 3.70 and 3.70 respectively. The responses also stated that offer cash flow forecasting, collect information on other firms' product assortments that is pricing, offers, sales and public relation activities are some of the benefits of implementing artificial intelligence. The mean score for these constructions was 3.40, 3.50 and 3.40 respectively. The respondents further stated that combat fake product reviews, protect data, customers' privacy and improve cyber security, marketing and advertising, recruitment and human resources activities are the benefit of effective implementation of artificial intelligence in business. These assertions were backed up by mean scores of 3.40, 3.40, 3.50 and 3.70 respectively. With a grand mean of 3.57 and standard deviation of 0.95, table 1 revealed that all the items were regarded as benefit of effective implementation of artificial intelligence by small and medium enterprises (SMEs) in Ondo central.

Research Question 2: What are the challenges encountered in the effective implementation of artificial intelligence by small and medium enterprises within Ondo central.

Table 2: Mean and standard deviation of responses on the challenges of effective implementation of artificial intelligence among small and medium enterprises.

S/N	Items	Mean	SD	Remark
11	Poor data quality	3.50	0.95	Agree
12	Inadequate data privacy and security	3.40	0.95	Agree
13	Lack of awarenessand readiness about what AI could bring	3.60	0.95	Agree
14	High costs and uncertainty about AI benefits	3.70	0.96	Agree
15	Shortage of skilled AI professionals	3.50	0.95	Agree
16	Technical complexities	3.50	0.96	Agree
	Grand Mean	**3.53**		**Agree**

Source: Field Survey, 2024

Table 2 shows that the mean on all the items from 11 – 25 on challenges of effective implementation of artificial intelligence by small and medium enterprises range between 3.70 - 3.40 which indicates that all the items hindered the adoption of artificial intelligence by small and medium enterprises. With a grand mean of 3.53, and standard deviation of 0.95, table 2 also

revealed that all the items were regarded as challenges encountered in the use of AI by SMEs in Ondo central.

Research Question 3: What are the coping strategies for effective implementation of artificial intelligence among SMEs in Ondo central?

Table 3: **Mean responses on the coping strategies for effective implementation of artificial intelligenceamong small and medium enterprises.**

S/N	Items	Mean	SD	Remark
17	Effective partnership with technology providers	3.20	0.96	Agree
18	Government grants and subsidies	3.40	0.95	Agree
19	Professional development and training	3.70	0.95	Agree
20	Collaborations with industry experts/educational institutions	3.60	0.96	Agree
21	Decision makers and managers have to be trained	3.40	0.96	Agree
22	Source external knowledge and technology solutions from knowledge markets	3.50	0.96	Agree
23	Sensitization in promoting the acceptance of AI in SMEs.	3.40	0.95	Agree
	Grand Mean	**3.46**		**Agree**

Field Survey, 2024

Data in Table 3 show that the respondents agree that all the items as strategies of improving challenges on effective implementation of artificial intelligence by small and medium enterprises with mean scores ranging from 3.20 to 3.70. This is because the mean scores was above 2.50 which is the cut off point. In addition, Table 3 with a grand mean of 3.46 indicated thatthe items are coping strategies for effectiveimplementation of artificial intelligence among small and medium enterprises (SMEs) in Ondo central.

Discussion of Findings

Table 1 revealed the benefits of application of AI in business which include automation of routine tasks, personalized customer experience, cost reduction, enhanced customer service, improved marketing and advertising. This finding supported the survey findings of Selamat and Windasari, (2021) which indicated that artificial intelligence helps in determining purchasing patterns, consumer preferences and businesses to make better decisions to enhance product quality.The findings of this study are consistent with that of Drydakis, (2022) which revealed that the status quo, which largely comprises investors, management, and shareholders, is not adequately aware of the potential usefulness of AI.

The findings in Table 2 showed that poor data quality, technical complexity, high cost and uncertainty about AI benefit are some of the challenges confronting SMEs in Ondo central. The finding corroborated the findings of Hansen and Bøgh, (2021) that 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. Finally, table 3 revealed coping strategies for the use of artificial intelligence by SMEs such as using cloud based AI solution, collaborating with educational institutions, professional development and training among others. The findings are in agreement with that of Becker and Schmid (2022) the

alignment between the corporate and IT strategies is a process of prolonged development and change that includes not only organizational strategy and IT strategy, as well business infrastructure and processes, and IT infrastructure and processes. In this case, the strategic usage of IT will allow the business to maintain developments in the competitive situation (Zaki, 2019).

Conclusion

Based on the findings of the study, it was concluded that AI can greatly benefits small, local and services industries by enhancing efficiency, personalized customer experiences, reducing costs and enabling better decision making. 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 While the initial investment in AI may be daunting, the long term benefit of automation, data driven insights and improved customer satisfaction make AI a powerful tool for small businesses to thrive in competitive markets.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. There is need for small and medium enterprises (SMEs) managers to work towards creating a smooth implementation of artificial intelligence (AI) into their business operation in order to foster economic growth and development.
2. State and local governments should also co-ordinate actions for reskilling SMEs managers and workers and ensure a participatory approach in redesigning work processes and training AI models.
3. SMEs or retailers can start by using AI chatbots for small specific functions such as customer service automation and inventory management.

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