



Evaluating the Adoption of AI Systems and Technologies in Zimbabwean Businesses: Case of Masvingo Town

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ABSTRACT

Artificial intelligence is being adopted worldwide and is changing the industrial landscape. Supermarkets are not being left out. Tasks that previously needed human intelligence are now being performed by Artificial Intelligence using models and robots. The study evaluated the level of adoption of Artificial Intelligence by businesses in Zimbabwe to comprehend the present shape of AI adoption and its hindrances. The study investigated the Extent of Artificial Intelligence adoption assessing the level of adoption of Artificial Intelligence in various sectors of business in Zimbabwe. It will outline the major applications of Artificial Intelligence for example data analytics, automation, chat bots etc. It also assessed the potential benefits of using AI in business which included increased customer-supplier intimacy, reduced costs, increased efficiency and informed decision making. Challenges and obstacles hindering the rapid and widespread adoption of AI in Zimbabwean businesses were outlined and assessed. The study adopted a mixed research method which used quantitative and qualitative data collection techniques and analysis. Interviews and structured questionnaires were used to gather data. The population consisted of shop owners, managers, supervisors and operatives of supermarkets in Masvingo local business center. The study found out that the use of AI in businesses is on the down side at 29.55% where businesses using AI are focusing on the use of Enterprise Resource Planning Systems, Demand forecasting, chat bots, and online stores. The challenges cited by most businesses were lack of skilled personnel, infrastructure, financial capacity and awareness. The study recommends training of personnel, incorporating AI in business in the curriculum, enhancement of innovation culture, and financial capacitation of businesses.

Keywords: *Artificial Intelligence (AI), AI systems, AI technologies, AI Adoption*

INTRODUCTION

Artificial Intelligence (AI) is changing the world over. It has the potential to change industries across the whole world offering businesses the chance to increase operational efficiency, improved decision making and process automation. Doe (2022) notes that “AI has the potential to reshape industries and provide new opportunities for businesses across the globe”. As a result, the use of AI systems has become the major focus for businesses globally.

Zimbabwe is a developing country in the southern Africa. The landlocked country has come across notable economic hurdles such as hyperinflation, foreign currency shortages and infrastructural development constraints. In spite of these hurdles, Zimbabwe has a great potential for economic growth and technological advancement resulting in the importance of studying the adoption and use of AI in businesses.

When it comes to AI adoption and implementation, other African countries are also presented with challenges and opportunities. Besides Zimbabwe being rich in its natural resources it is faced with heavy challenges in embracing AI, but acknowledges it as a driver of economic growth and digitalization. Gwa gwa (2020) emphasizes that “the adoption of AI in developing countries like Zimbabwe can empower businesses and contribute to their competitiveness in the global market”. However, maneuvering the prospect of AI adoption in Zimbabwe asks for a better appreciation of the local context and its challenges.

Artificial Intelligence (AI) is a theory and development of computer systems to mimic human intelligence. This has been defined by several scholars as “the ability of a computer or a computer-controlled robot to perform tasks that are commonly associated with the intellectual processes characteristic of humans, such as the ability to reason”, Copeland (2024). Haenlein and Kaplan (2019), says artificial intelligence is “a branch of computer science dealing with the creation of intelligent agents, which are systems that can reason, learn and act autonomously”. Russell and Norvig (2003) also defines AI as “the intelligent agent’s ability to rationally act to achieve its goals”. AI has the power to revolutionize the retail sector in many ways, for example inventory management, demand



forecasting, chatbots and virtual assistants, personalization, loss prevention etc. According to Srivastava (2024), data analytics can be used to examine sales data and forecast future trends in demand. It helps organisations to revise their inventory levels avoiding stock outs and/or overstocking. Artificial intelligence can be used in pattern identification/recognition of customer buying behaviours and/or analyse sales data to predict demand of certain products. This has an influence on the stocking of the right products at the right time in the right quantities, Downi (2024). Hablin (2023) highlight that Chatbots and virtual assistants are a major characteristic of online stores. They provide 24/7 customer service answering frequently asked questions which can reduce on operational costs. Chatbots and virtual assistants can also recommend products to customers thus personalizing customer experience which enhance satisfaction. Using purchase history and browsing behavior, retailers can provide customized recommendations and targeted advertising (Tailoring Retail Experiences for Customers using AI Powered Personalization). Loss Prevention can be obtained through analyzing camera footage to identify suspicious activity can deter theft (Ai-Powered Cameraras: Revolutionizing Security and Business Performance, 2024)

The process of integrating AI into organizations has been explored by other researchers like (Chari et al., 2020) "The adoption of artificial intelligence (AI) technologies in organizations involves integrating them into existing workflows, processes, and decision-making structures."; (Brynjolfsson & McElroy, 2017) "AI adoption is the process by which firms begin to use AI-powered tools and technologies in their operations." and (Yoo et al., 2012): "AI adoption involves integrating AI-based systems into the organizational ecosystem, which requires changes in organizational structures, processes, and cultures." These gives the basis of this study.

Notable amounts of literature explains or outlines the challenges and opportunities encountered during AI adoption in African Countries. Mekonnen and Gerdes (2020) probes specific challenges to AI adoption in Ethiopia, highlighting the significance of relevant factors such as socio-economic, digital infrastructure and policy framework. They assert that an understanding of these related factors are important in the crafting of effective strategies for AI adoption and implementation in the country.

According to Jahan and Hossain (2019) the major barriers of adopting and implementing AI in Africa are issues to do with Technology gap, limited skilled personnel and lack of financial resources. To address these challenges an all-encompassing approach that include government involvement, capacity building and infrastructure investment should be considered.

Liyana et al. (2020) outline the opportunities of adopting AI in agriculture for developing countries. They focused on Sri-Lanka that adopted AI technologies and improved on crop yield prediction, pest detection and better management of agricultural resources. The major challenge encountered was limited data availability, lack of tailored systems to local farming practices and lack of awareness.

Challenges and opportunities of AI adoption can also be explored in the health care sector. This sector has implemented the use of AI in some of its operations. Nutanong and Kitiyadisai (2021), Outline the potential of AI to enhance healthcare service delivery in Africa. It facilitates diagnosis, treatment plan and resource allocation. The challenges encountered are lack or limited digital infrastructure, inadequate resources in the healthcare sector and limited data availability. The topic on the impact of adopting AI in local business operations in African countries is growing in literature. From the available literature there are arguments that help to shed light on the potential advantages and disadvantages of using AI.

Singh and Kaur (2019) Confirm that AI adoption in business improves operational precision, the process of decision making and cost saving. They highlighted AI-powered solutions such as chat bots used for customer service and predictive analysis. These have positive implications on businesses in developing countries. The AI technologies streamline operations, facilitate faster and reliable decision-making and resultantly improved business performance.

Mawani and Grover (2019) emphasized the significance of manpower development and capacity building for effective AI adoption. They outlined that funding human capital and digital literacy promotion are important in capitalizing the benefits of AI systems and technologies for local businesses to effectively encompass AI tools in their day-to-day operations and maximizing their potential impact.

AI integration in Zimbabwe faces several challenges such as limited access to important infrastructure such as reliable internet connections and constant power supply. These constitute notable obstacles to efficiently and effectively deploy the use of AI systems, (Moyo, 2020). Qualified personnel shortages further complicate the landscape (Chikwava, 2019). Policy framework and regulatory bodies also play a significant role in enabling and obstructing the acceptance of AI systems in business. Comprehensive laws and policies that talks to the ethical



considerations and privacy of data and security should be put in place as a matter of urgency. A supportive policy environment that encourages innovation, safeguards consumer rights, and promotes responsible AI deployment is vital for fostering AI adoption in business. Masuku (2024) reports that the government of Zimbabwe is in the process of formulating an AI policy through the Ministry of Information Communication Technology, Postal and Courier Services to support the country's digital transformation. This will show the readiness of Zimbabwe to digitalise. The laws and policies will guide how AI can be implemented in business. The above-mentioned challenges make it more critical to assess the present state of AI adoption in Zimbabwean Businesses and find ways of overcoming these challenges.

The study sought to evaluate the level of consciousness and understanding of AI amongst local businesses in Zimbabwe. It also explores the barriers to AI technology adoption by local businesses in Zimbabwe. It also explored the barriers to AI adoption by local businesses in Zimbabwe and appraise on the benefits and opportunities that AI adoption brings in business operations in Zimbabwe. The study examined the present state and level of adoption of AI through the identification of elements that affect adoption and analyzed the advantages and drawbacks faced by Zimbabwean businesses. This aimed to provide an appreciation to the stakeholders. The results of this study adds to the body of knowledge of the socio-economic, regulatory framework and technological factors that drive AI adoption. The study recommends and inform lawmakers, businesses and academics on the actions or approaches to promote the best ways of integrating AI systems and technologies in the country.

Mabotuwana (2017) examined the southern African perspective and highlighted that organizational culture, support from leadership and availability of data are key determinants in AI adoption. This analysis draws to the crafting of strategies and policies that address Zimbabwe's unique landscape.

METHODOLOGY

The main objective of the research was to evaluate the level of adoption of AI by Zimbabwean in business. The study used both descriptive and exploratory research design to evaluate AI adoption in Zimbabwean businesses. Quantitative research methods were used to gather numerical data on the nature of adoption and use of AI in business operations. The descriptive approach gave an in-depth account of how AI is being used and the challenges and opportunities in its adoption. It clearly showed the level of adoption of this technology in Zimbabwean businesses. The study population consisted of 11 supermarkets in Masvingo, according to the City of Masvingo licensing department (2023), with an average of one manager and two supervisors per supermarket. A stratified random sampling technique was employed selecting a minimum of two employees per supermarket that is a manager and supervisors. Employing a stratified random sampling technique ensured that the sample is more representative and each strata is represented proportionally within the sample (Saunders, Lewis and Driaan, 2019). For the quantitative study, the sample size was 30 as informed by the Krejcie and Morgan formula (1970). The instruments that were used in the study were structured questionnaires and interviews. Structured questionnaires were administered to 30 people from different departments of the eleven supermarkets and these were randomly chosen. Qualitative research method was also used to gather an understanding of how AI adoption is being perceived in the business world and what the business entities recommend. The exploratory approach seeks to understand the reasons for adoption and the obstacles hindering full AI adoption particularly in the Masvingo town businesses context. Eighteen managers/business owners and supervisors were interviewed. The participants were asked about their level of understanding of AI, the AI tools and software systems that they are using in their departments and the frequency of use. They were also asked about the challenges and opportunities they are getting from the use and implementation of AI tools and offered their recommendations. The data was analyzed using Microsoft Excel for descriptive (quantitative) data analysis for data visualization. The study's ethical considerations were to ensure respondents' confidentiality, anonymity and upholding voluntary participation.

RESULTS AND DISCUSSION/FINDINGS

Participants' level of understanding of AI

According to the statistical data gathered (Table 1), it shows that 56.7% which consists of the participants agreed that they understood what AI is in general which is a good starting point for them to explore more into the topic. 23.3 % of the participants have knowledge of AI however 16.7% are uncertain on whether they have the

knowledge of what is AI, finally a small portion which consist of 3.3% have no solid knowledge of the concept of AI. These results assume that most of the participants have a slight idea of Artificial Intelligence.

Table 1. AI Understanding of participants

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid strongly agree	17	56.7	56.7	56.7
agree	7	23.3	23.3	80.0
neutral	5	16.7	16.7	96.7
disagree	1	3.3	3.3	100.0
Total	30	100.0	100.0	

Software applications used by retail organisations

Figure1 below shows that 29.55% of the retail businesses uses AI (use of ERP, Demand forecasting, Chatbots and online stores) in some of their operations. The use of ERP, Chat bots, online store and demand forecasting employs the use of AI and machine learning. The level of use of such software is not fully implemented hence the users do not recognize that they use AI. The majority of the retail organisations are in the infant stages where they use standalone systems. It is only a matter of time, they will integrate them and employ AI and machine learning.

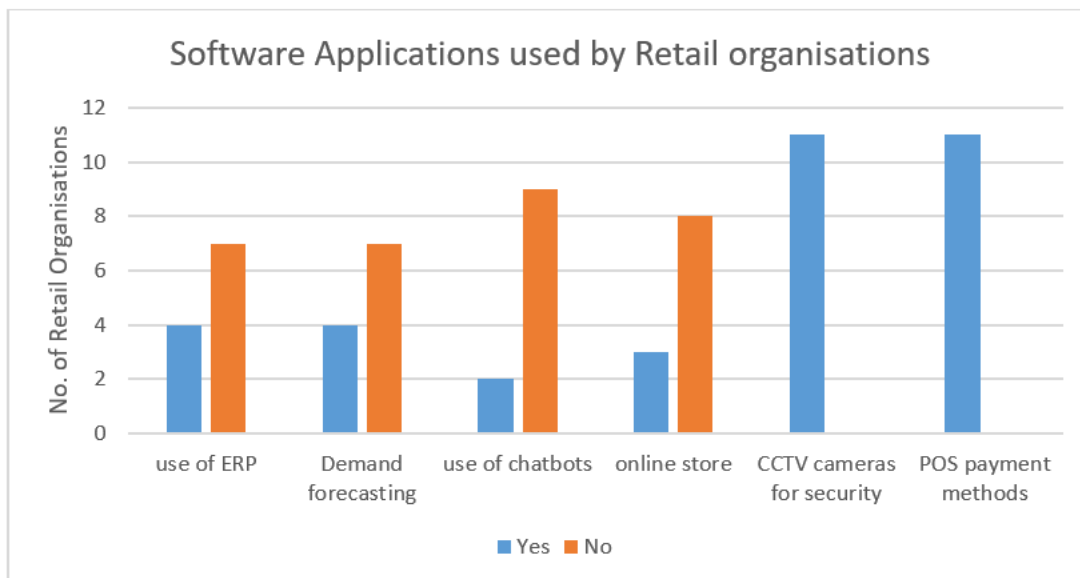


Figure 1. Software applications used by retail organizations

Factors affecting adoption of AI

Figure 2 below shows that most people agree that there is lack of expertise, lack of infrastructure and a also high cost of implementing AI are hindering the adoption of this technology. Scholars such as Brynjolfsson (2014) have discussed the concept of technological adoption and its impact on businesses. They argue that the adoption of new technologies, including AI, often faces significant challenges due to various factors. These factors may include a lack of awareness and understanding of AI’s potential benefits, concerns about the complexity and integration of AI systems, and uncertainty about the return on investment. However, in the Zimbabwean context it is mainly infrastructure, technical expertise and cost factors that have greater bearing in hindering the adoption of AI as evidenced by the findings of this study.

Furthermore, a study by Chikwa va (2019) investigated the barriers to AI adoption in organizations. Their findings revealed that companies often face obstacles such as a lack of AI-related skills and expertise within the workforce, limited resources for implementation, and concerns about the potential disruptions AI may bring to existing business processes. These barriers contribute to the hesitance or inability of companies to fully embrace AI technologies.

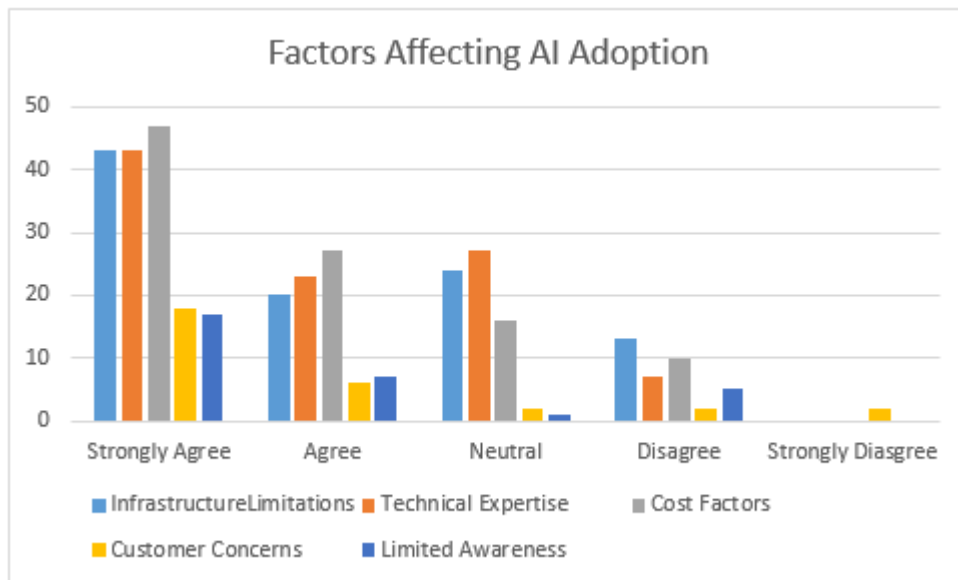


Figure 2. Factors affecting AI adoption

CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the key findings from the research are: A small percentage of businesses are using AI through the use of Enterprise Resource Planning Systems, Demand forecasting, chat bots, and online stores. Most of the businesses cited the lack of personnel, infrastructure, financial capacity and awareness as a major hindrance to AI adoption. The business organization have employed people with degrees which entails that they are more technically exposed and can easily embrace the use of AI technologies. However, there is need to train them so that they appreciate and gain knowledge on the use of AI. There is need to give them specialized skills so that the organizations can be ready for the use of AI technology. Lack of readiness or resistance to change within companies can hinder the adoption of AI.

The study recommends speeding up the development of the National AI strategy/policy that will guide and give a clear vision for the adoption of AI technologies in the business sector. Investments in AI technology and infrastructure should be prioritized by both the Government and the business owners. This includes high speed internet connectivity, computing devices and other AI technology resources. AI education and training should be promoted and prioritized. Collaborations between tertiary institutions and industries should be fostered so that the country gets AI skilled personnel to develop systems and use them. Businesses and government should embrace a Culture of Innovation. Fostering a culture of innovation encourages experimentation with AI technologies and continuous improvement.



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