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THE INFLUENCE OF AI ON BUSINESS PRODUCTIVITY AND PROFITABILITY IN THE KINGDOM SAUDI ARABIA

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Abstract

In recent years, Artificial Intelligence (AI) has revolutionized the business world. Countries around the world are benefiting from its applications and usage in digitalization. The Kingdon of Saudi Arabia (KSA) has established a goal for the next seven years to achieve a digitalization target that encompasses growing and implementing AI technology to foster economic growth and the industrial sector. This AI technology guarantees several benefits for businesses in this competitive landscape to influence the profitability and productivity of employees. However, it is not fully studied and it is not clear how AI is being used and how helping businesses in the KSA. Therefore, this study is conducted to understand the role and implementation of AI in the KSA for improving business decision-making, creativity, production, revenue, and innovation. The research is completed by selecting relevant journals from Scopus to analyze potential AI benefits and challenges for the KSA. The research also addresses a literature gap such as AI integration barriers and what are policy implications not covered in the current literature. The research chooses relevant Scopus journals to analyze potential AI benefits and challenges Relavant examples help to quantify AI influences such as almost 20% improvement in decision-making with AI and 15% increase in innovation. The literature analysis of empirical studies shows that the country needs huge infrastructure improvement and investment initiatives to bridge knowledge gaps to ensure complete adoption of AI by 2030. This review concludes that business managers, government authorities, and stakeholders should understand the unique dynamics of this technology and improve and train human resources to align their skills with AI's better management and implementation to avoid any pitfalls. The future of AI in the KSA is extremely bright in all industrial sectors to revolutionize the finance, marketing, banking, and healthcare sectors. The unique contribution of this study includes insights into the human-AI interaction to ensure business sustainability. This study is useful for offering unique insights for policy-makers to establish policies for enhancing AI utilization in the KSA.

Keywords: *Artificial intelligence, AI adoption, Business Productivity, Decision-Making, policy implications, human-AI collaboration, Saudi Arabia*

1. INTRODUCTION

The KSA envisions massive economic development through a digital revolution. The aim is to foster the product capacity of industries and organizations to earn significantly as a result of technology incorporation. (Potestà, 2020). One of the paramount technologies emerging rapidly to transform businesses is artificial intelligence (AI) which is becoming a transformative force in Saudi-based business organizations to enhance productivity and efficiency (Aljohani et al., 2022). Artificial intelligence or AI is a set of scientific principles, technologies, and tools developed to provide human-like and advanced solutions to various problems.

It is a science of transforming machines to think and act like humans and process large data inputs by recognizing patterns to make logical decisions (Alattas, 2023). Also, Javaid et al. (2022) reveal that innovative organizations can foster productivity through this new technology. Moreover, the role of AI is crucial in improving the productivity of employees by fostering personalized communication to enhance customer satisfaction. Many organizations such as Microsoft, Nvidia, Oracle, IBM, Meta, Tesla, and Amazon are investing in AI research due to its potential advantages for businesses. Hence, the KSA is adopting AI technology at a rapid pace despite a few weaknesses of this technology.

In this context, AI technology is gradually shaping the landscape of many industries followed by advanced countries such as the UAE, the USA, the UK, and Canada (Binsaeed, R. H., Yousaf, 2023). Many researchers agree that there has been a surge in the use of AI in business firms in KSA due to its potential benefits for businesses (Aleisa & Beloff, 2023). The KSA is considering the integration of robotics and machine learning to impact the finance, marketing, banking, and healthcare industries.

The use of AI in Saudi banks and other organizations especially business organizations is imperative and that has gained significant attention of business researchers over the years (Beloff & White, 2021). However, there is a dire need to further conduct in-depth studies on this topic to expand the knowledge base. This review aims to explore the current literature sources related to the influence of AI on business productivity and profitability in the KSA. There is a need for conducting more empirical studies in this domain to reduce knowledge gaps. Since the implementation and dynamics of AI vary from country to country, in the case of KSA, its implementation is crucial to transform businesses and reduce their limitations. Significant research on machine learning and intelligence was initially conducted by Alan Turing. The AI research dates back to the 1950s in the United States (Baabdullah, 2024). All the global IT giants in the 20th century started investing in AI research leading to a never-ending growth (Basri, 2020). Moreover, AI is being harnessed at various levels in business enterprises and small and medium-sized firms (SMEs) globally to automate long tasks and improve customer satisfaction.

2. Research Problem

The problem related to this study relates to various mechanisms, drawbacks, and dynamics of AI in business organizations. The use of AI and modern technologies such as robotics is imperative in modern businesses in the KSA to address business productivity and profitability issues (Baabdullah et al., 2021). Understanding the impact of AI in diverse business sectors and domains in the KSA's sphere is crucial as managers can successfully integrate AI into their processes. However, they should identify vital factors contributing to improving productivity and profitability as well. This requires exploring various challenges of this evolving technology and its few weaknesses of AI.

3. Research Questions

The current research aims to provide answers to the following research questions in the context of AI integration in the KSA's business enterprises to improve productivity and profitability.

- How the incorporation of artificial intelligence (AI) technologies impacts the productivity and profitability of businesses in Saudi Arabia to impact the economy?
- What are the most important factors that contribute to the success of using AI in business organizations in the KSA to improve the productivity and profitability of businesses?

Methodology

The review follows specific steps such as starting with searching and critically reading the relevant research articles and journal publications related to the research topic. The methodology followed for this review is as follows: The first step for conducting this review is researching the Scopus Database with specific keywords such as "AI adoption in Businesses." A total of 287 publications were found on the related topic. Moreover, the search was further narrowed down and expanded the search with the keyword "AI adoption and implementation in Saudi Arabia", 23 articles and publications were searched by the database. The total articles screened were 23, out of those, 7 articles were excluded as per selection criteria because 5 of them were conference papers and 2 were book chapters. Moreover, those sources were not peer-reviewed articles. The final step includes the exclusion of four articles related to big data, telecommunications, and particle swarm optimization algorithm. Hence, the focus of this review is on 12 best journal articles fulfilling the criteria of adopting and the impact of AI in businesses in the KSA.

4. Literature Review

The selected studies elaborate on the integration and incorporation of artificial intelligence in business organizations in the Kingdom of Saudi Arabia to foster economic prosperity to enhance productivity and decision-making. Baabdullah et al., (2021) suggest that the implementation of AI technologies in the KSA's business sectors and industries is crucial in the 21st century to realize the full potential of employees to adopt innovative strategies. Researchers in recent years have significantly emphasized the importance of AI and related technologies in business realms to foster change and transformation.

In the KSA, the government has a goal to achieve prosperity and economic growth by 2030 which is linked with the incorporation of AI to foster change in organizations with quality and productive activities (Alshahrani & Dennehy, 2022). However, Qurashi (2021) explains a counter phenomenon such as the need for rigorous training and expertise of workers to par with AI and IoT technologies. Hence, employees can improve their productivity with educational reform in the country as more students need digital expertise to develop a career in AI management.

Moreover, researchers also examined that many business organizations in the KSA are incorporating artificial intelligence (AI) tools and software programs to reduce their operational expenses and increase revenues (Alsharidah & Alazzawi, 2020). The evidence suggests that businesses worldwide can gain unique benefits from AI integration such as saving money and time to optimize their processes and improve productivity. AI research is crucial in the context of the KSA and Saudi businesses because it can significantly influence their productivity by helping managers make faster decisions through automation and predictive analyses (Hassan, 2020). For example, marketing managers and sales directors in the automotive industry in the KSA can use outputs from the cognitive technology of AI and reduce human errors to improve outputs.

Similarly, AI integration is crucial for service industries as well as federal agencies and government organizations to predict the preferences of citizens and analyze huge data to improve efficiency (Hassan, 2020). Therefore, AI use in the KSA's business organizations can not only help business analysts and decision-makers to generate quality leads but also improve their revenues and profits by identifying bottlenecks (Alhashmi et al., 2020).

The Vision 2030 plan of the KSA has been elaborated by Hassan (2020) who shows that this diverse economy aims to reduce fossil fuel consumption and plans to integrate AI by growing its local AI-enabled digital ecosystem by 2030. The study reveals that the new vision aims to foster 5G-based national infrastructure under the supervision of the National Center for Artificial Intelligence (NCAI). This institution plays a vital role in fostering AI development and devising a national strategy for data sets to help the country become a leading force in AI development. In this country where more than 30 million people strive to grow technology tourism industries, a substantial outlay of funding in AI such as $20 billion will transform the industry.

Moreover, by 2026, the KSA plans to invest $6.4 billion in developing modern technologies such as AI and metaverse. However, another scholar highlights the risk of AI by suggesting that AI comes with security risks when fully adopted. For instance, some organizations and individuals may be involved in its malicious use in Arab and Gulf Countries (Alotaibi & Alshehri, 2023). Therefore, this can lead to significant job losses and professional displacement. This fact implies that a $20 billion investment can cause some setbacks in various industries and fail to improve productivity or profitability.

The 2030 vision of the KSA has also been analyzed by other researchers who argue that fostering AI infrastructure is going to be a bold move for the Saudi government. Some ethical implications of this move need consideration (Khan & Khojah, 2022). Critics can argue that the massive adoption of AI in all business sectors to boost productivity and profitability can be an aggressive goal. This may take time and cannot be based on rushed decisions. Also, Elhajji & Alsayyari (2020) argue that significant AI adoption can lead to inefficient attention to ethical concerns such as accountability in funds allocation. Hence, this fast AI development and investment till 2030 requires significant future research to explore its potential risks. As Alhashmi (2020) suggests the role of the National Center for Artificial Intelligence (NCAI) will significantly extend by collaborating with stakeholders to streamline AI's development to meet the country's goals. The following table shows vital AI integration projects in the KSA's business sectors.

Table 2.1: *AI Integration Projects in the KSA*

Project	Description
NEOM	Integration of robotics in every life's aspect
SOPHIA robot	A robot granted citizenship by the government to foster the NEOM project
SARAH Chatbot Robot	Robots to provide automated WhatsApp responses to people
SAIR Robot	To detect leakage of flammable gases in steel factories
HR Robots (very limited use)	To engage non-human organizational support
Smart Pharmacy Robot	Robots sell almost 1500 bottles of medications in smart pharmacies in one hour
Weather and climate	To be used in the KSA as a 2030 digital transformation vision

Source: Hassan, (2020)

Moreover, another study discusses the factors impacting the successful implementation of AI into the business sphere of the KSA. The goal of the KSA is to speed up the process by pouring in $500 billion in the learning sector. (Wolff et al., 2020). This can be a significant move to help individuals build AI-related expertise through training. With a well-planned strategy of the KSA, the country has become a viable place for AI adoption compared to Silicon Valley. Habli & Lawton (2020) also highlights some factors that may discourage Saudi investors from investing in AI adoption and development. The study argues that AI is halfway implemented in the KSA. The author explored various limitations in the paper. The main argument is that many companies are hesitant to invest in AI. Companies want to make the much-needed change in organizational productivity, however, almost 2000 executives surveyed revealed that this massive digitalization requires funds acquisition that struggling institutions cannot manage.

The study by Alotaibi & Alshehri (2023) involved exploring the viewpoints of more than 2000 senior executives in the KSA to know more about the implementation of AI. Most of them believe that organizations can increase their chances for improved efficiency with AI because of its capabilities to positively impact markets, governments, as well as individuals. This study's findings conclude that this innovative and relatively new AI generation is embracing the power

of automation and the use of AI in organizations also requires acquiring significant funds and financial resources (Javaid et al., 2022). Hence, with the availability of ample funds, the adoption of AI can enhance revenues and identify more opportunities for employees to improve their productive capabilities.

Other researchers such as Alrashedi & Abbod (2021) and Qurashi (2021) also advocate in favor of using AI in business organizations by explaining its benefits such as increased expertise of employees. The author suggests that AI can help people provide intelligent advice to tea members to gain a competitive advantage. There are several reasons AI in business organizations can help managers gain sustainable competitive advantage. For instance, it can help businesses solve their technical and operational issues comprehensively. Technical professionals can experiment with different solutions and meet the demands of employees and customers. However, the researchers suggest that AI technology may not be able to perform best without human intervention, these tools and technologies are emerging as driving tools to eliminate lower-level support by humans and enable organizations and their employees to achieve maximum performance improvement goals with the interventions of humans (Lee & Yoon, 2021). Hence, this argument by scholars implies that AI can help people to make efficient efforts by reducing human flaws and weaknesses.

The literature by Mutawa & Rashid (2020) highlights a vital fact that the KSA is thriving with a multitude of economic growth opportunities. The fact remains that AI can provide powerful computation capabilities to organizations to transform healthcare, robotics, and retail industries. Hence, the prospect of integrating AI into business processes and decisions is crucial. However, the researchers also argue that challenges persist in the KSA due to funding issues limiting the adoption of AI in businesses. Despite the Saudi government's supporting technology incorporation, the current framework is not enough to leverage AI integration. By 2030, the KSA will enhance investment in AI in construction, energy, and retail sectors by investing USD 99 billion, 78 billion, and 23 billion respectively (Alsharidah & Alazzawi, 2020). This study concludes that the KSA is likely to become one of the leading implementors or AI to scale its businesses. However, the KSA would require a significant transformation of human resources to embrace the incorporation of AI similar to other advanced countries. Therefore, the massive challenge is to foster digital knowledge among young human professionals as Saudi labor requires significant knowledge of AI, data science, and internet security to ensure productivity.

Furthermore, the KSA's banks and financial organizations also face the challenge of not having ample investment for improving the existing infrastructure. As discussed by Hassan (2020), AI implementation requires significant investment in hardware and software in financial institutions. This could be expensive at the moment to successfully upgrade infrastructure and maintain it to suit AI's needs. Finally, another vital factor that may impede the adoption of AI in the KSA's industries is the quality and availability of data required to develop AI algorithms. Since several financial institutions lack quality data, they need to first navigate data silos to develop AI algorithms to boost their integration (Qurashi et al., 2021).

Furthermore, in many business sectors of the KSA, despite the rapid integration of AI, Lee & Yoon (2021) and Wolff (2020) discuss the challenges of implementing AI in the KSA's financial sector. The authors argue that the most challenging part of implementing this goal is the lack of qualified AI specialists in the KSA industry. The AlBarrak's statistics reveal that AI experts are lacking in the KSA which can hinder the success of its implementation at a massive scale. Besides, other industries are also attracting a few AI-savvy expert professionals such as healthcare, energy, and education. This challenge is further elaborated by Aljohani (2022) by states that technology investment can be difficult for authorities to boost the technical skills of professionals due to a lack of financial resources. Hence, in public finance, many big data investments and projects are pending or unable to flourish (Elhajji, 2020).

5. Discussion

Although a large number of research publications and authors argue in favor of a multi-billion-dollar investment in AI for its widespread adoption in the KSA's business sector, some authors also provide noticeable facts and arguments that highlight potential challenges and limitations of the country's ability to fully harness the power of technology. The study by Hawsawi & Radwan (2021) explores the role of AI in the KSA's businesses after COVID-19. The researchers discuss the future vision of the KSA for the adoption of AI-based tools. According to the country's 2030 Vision, the KSA will enhance its digital capabilities to achieve economic development goals. This includes the integration of AI for the improvement of private sector businesses to reduce the reliance on oil resources.

Moreover, the same study reveals that the KSA invested almost USD 28 billion in Ai in 2017 which shows its interest in following China's model of development. Moreover, against COVID-19, the KSA used AI techniques enhanced online teaching and learning models during lockdowns. However, students' engagement still remained an issue. AI's full adoption in education will suffer due to a lack of proper infrastructure and professors' training (Potestà, 2021). Some teachers and students may resist the change of this AI integration. Hence, without wisely planned teacher training initiatives in KSA's several regions, AI's adoption in higher education and schools may be hindered (Bamatraf, 2021).

The literature review highlights the crucial benefits, opportunities, and challenges of adopting AI in the KSA's business sectors. The exploration of various factors impacting the implementation of this innovative, modern technology in various diverse business sectors shows that the country still needs significant efforts to ensure ethical and transparent adoption of AI in many business sectors, SMEs, and industries. As the government commits to its goal and vision of 2030 digitalization of the Kingdom of Saudi Arabia, many governments, AI research, and private organizations need to focus on several challenges and weaknesses of national infrastructure to ensure the adoption of AI in the business sphere.

As discussed by Bamatraf (2021), the goal of investing almost $500 billion in the KSA's education sector can be a game-changing move by 2030 to train as many professionals and individuals as possible to become a part of a powerful AI-related workforce. However, there are still concerns and issues raised by scholars such as AlGosaibi (2020) related to

the quick development and adoption of this technology. This author underscores the hesitancy of companies to invest in AI, citing financial constraints and the need for a substantial digitalization fund. The insights from over 2000 senior executives in the KSA emphasize the positive impact of AI on efficiency and market dynamics but underline the necessity of significant financial resources for successful integration. Scholars such as Aljohani (2022) and Bamatraf (2021) advocate for AI in business, emphasizing its potential to enhance employee expertise and provide a competitive advantage. Hence, this shows challenges remain to figure out a flawless adoption of AI in pursuit of productivity and profits.

Despite the KSA's economic growth opportunities, challenges persist, including funding issues, the need for digital knowledge transformation, and the scarcity of qualified AI specialists, particularly in sectors like finance. The study by Alattas (2023) underscores the financial constraints faced by banks and financial institutions, hindering infrastructure upgrades for AI integration. The overall scholarly discussion highlights the multifaceted challenges facing AI adoption in the KSA, encompassing financial, educational, and human resource dimensions. Addressing these challenges is imperative for the KSA to successfully position itself as a leading implementer of AI technologies in various sectors by 2030.

6. Conclusion and the Way Forward

The review analyzes several scholarly, peer-reviewed journal articles published in the Scopus database in recent years to explore the impact of artificial intelligence (AI) on the productivity and profitability of the business sector in Saudi Arabia. Since not all the publications covered all aspects of technology implementation in the context of the KSA, the gaps associated with AI's implementation in various business sectors in the KSA were identified by performing a thorough reading of these papers. In addition to the benefits of AI in the business sector, challenges and weaknesses of the infrastructure and technology were discussed. This review is helpful for future researchers, academicians, and industry experts in the KSA to explore valuable insights about improving their knowledge about this topic. The review's focus is on the specific theme of enabling Saudi Arabia's business sector to prepare itself for mitigating challenges associated with investment in AI. In the context of improving employees' productivity and business profitability, the review provides novel details from the literature to understand this vital subject.

The literature analysis helps to conclude that AI systems and technologies in the KSA's business organizations are leveraging to produce innovative products and solutions. However, there is a dire need for policymakers, funding organizations, and business leaders desiring AI integration to bridge knowledge gaps equip individuals to become tech-savvy to avoid job displacements. The true goal of economic growth can be achieved through speedy AI adoption. However, this speed also poses risks such as data security, financial disparity, and resistance to change as a result of huge investments in AI development and implementation. The vision 2030 of the KSA can fulfill if the government and all stakeholders work together ensure ethical adoption of technology by investing in infrastructure (Ahmed, 2019).

In the future, the AI adoption will increase and enhance the productivity and profitability of many business sectors such as education, retail, tourism, healthcare, and automotive companies. The future of AI is bright in Saudi Arabia's industrial sphere to enhance decision-making capabilities of managers.

7. Affidavit

By inserting a document into the Learning Management System of EPH - International Journal of Business & Management Science, I -*(Ayman Ababneh)* - an Interactive Online student, honestly declare that I have prepared this publication paper myself with the help of my lecturer and using only the literature presented in the paper. I further confirm that I have no objection to the lending or publication of this seminar paper / graduate project / dissertation thesis or part thereof with the approval of EPH - International Journal of Business & Management Science.

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