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AI Opportunities for Emerging Businesses in Libya: Navigating Challenges for Success

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Abstract— **This research paper aims to investigate the potential contributions of Artificial Intelligence (AI) in fostering business development in emerging businesses within the Libyan context. By proposing various AI models and exploring their applications, this study seeks to provide insights into how AI can positively impact different aspects of business operations and strategies. For data collection and analysis, experts were selected to participate in this study to ensure a comprehensive understanding of how AI can positively impact different types of businesses in Libya. The primary data was collected through a combination of questionnaire and semi-structured interviews. The paper present a comprehensive analysis of the opportunities and challenges associated with AI adoption in Libya's emerging business sector, offering recommendations for leveraging AI technologies to enhance competitiveness, productivity, and innovation. This study contributes valuable insights to the literature on AI adoption in emerging business environments, offering a comprehensive analysis of the opportunities and challenges in Libya's emerging business landscape**

Key Words: **Artificial Intelligence, Emerging Businesses, Libya, Competitiveness, Critical factors**

I. INTRODUCTION

As AI continues to revolutionize industries worldwide, understanding its implications and potential applications becomes essential for businesses seeking sustainable growth and competitive advantage. Exploring the role of AI in driving business development in emerging businesses in Libya is of crucial importance in today's rapidly evolving technological landscape. For example, emerging businesses in Libya can leverage AI to optimize their operations, enhance customer experiences, and make data-driven decisions. However, this exploration is not without its challenges. Barriers such as a lack of awareness, cost constraints, data limitations, ethical considerations, talent gap, technical challenges, change management, regulatory frameworks, and trust issues must be addressed to ensure successful AI adoption and maximize its potential impact on business development in Libya. Thus, this study aims to focus on examining and analyzing the barriers to AI adoption in emerging businesses in Libya. By identifying and understanding these barriers, the aim is to generate a comprehensive model that can guide Libyan emerging businesses in successfully adopting AI technology. This model helps to provide insights and strategies to address the identified barriers, enabling businesses to navigate challenges related to AI and business development. Ultimately, the potential help that could be achieved through this study lies in empowering Libyan emerging businesses to harness the transformative power of AI, driving their growth, innovation, and competitiveness in the dynamic business landscape.

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II. BARRIERS TO AI ADOPTION IN EMERGING BUSINESS DEVELOPMENT

The adoption of artificial intelligence (AI) in emerging businesses is hindered by various barriers that must be addressed for successful implementation. The study [1] argue that without a clear understanding of AI concepts and applications, businesses may underestimate its benefits or struggle to identify relevant use cases. A study by [2] discovered that limited awareness and understanding were major barriers to AI adoption in small and medium-sized enterprises (SMEs). A case study conducted by [3] argue that technology and cost limitations present another significant challenge. Implementing AI technologies often requires substantial investments in infrastructure, software, and skilled personnel. Emerging businesses with limited financial resources may find it challenging to allocate funds for AI adoption. The study highlighted how cost constraints hindered the adoption of AI in a startup company, delaying their entry into the market. From the perspective of data and its importance, an investigation applied by [4] exposed that data limitations pose a significant barrier to AI adoption. The study indicated that many emerging businesses lack access to sufficient data or face challenges in data collection, cleaning, and management. The study stated that addressing data limitations may

require partnerships, data sharing agreements, or leveraging external data sources. In addition, the talent gap is another significant barrier, as finding skilled professionals with expertise in AI technologies and applications can be challenging. With the emerging of AI development and business application, personal skills and talent domain has been raised. Research explored by [5] discuss the demand for AI talent often exceeds the supply, making it difficult for emerging businesses to recruit and retain qualified individuals. The study stated that AI skills gap can be addressed through training programs, collaborations with academic institutions, or partnerships with AI service providers. However, technical challenges and integration complexities can also impede AI adoption. Integrating AI systems with existing infrastructure, legacy systems, or different data sources may require significant effort and technical expertise [6]. However, these factors have impact on the business culture and management. [7] argue that change management and resistance to AI adoption within business can hinder progress. It's indicated that employees may resist AI implementation due to fears of job displacement or unfamiliarity with new technologies. However, effective change management strategies, communication, and employee training are essential to overcome resistance and foster a culture of AI adoption. An investigation survey conducted by [8] on a requirement for building trust and gaining user acceptance of AI, the study indicated that the trust is a crucial for successful AI adoption. Users may be skeptical or wary of AI-driven products or services, particularly if they see a loss of control or potential privacy infringements. Demonstrating transparency, explaining the benefits, and addressing concerns can help establish trust and increase user acceptance.

Based on the above discussion, emerging businesses could face several barriers to AI adoption, including a lack of awareness and understanding, cost and resource constraints, data limitations, talent gap, technical challenges and integration complexities, change management and resistance, trust and user acceptance. Addressing these barriers is crucial for unlocking the potential of AI and fostering successful adoption in emerging business contexts. Table 1. Illustrate the potential barriers to AI adoption in emerging business development:

Table 1. The outlining potential barriers to AI adoption in emerging business development:

	Barrier	Description
1	Lack of Awareness and Understanding	Limited knowledge and understanding of AI concepts, benefits, and applications among business owners and decision-makers.
2	Cost and Resource Constraints	High initial investment and ongoing costs associated with AI implementation, including infrastructure, software, and skilled personnel.
3	Data Limitations	Insufficient or poor-quality data, lack of data infrastructure, and challenges in data collection, cleaning, and management.
4	Ethical and Legal Considerations	Concerns related to data privacy, security, bias, transparency, and compliance with legal and ethical standards in AI usage.
5	Talent Gap	Shortage of skilled professionals with expertise in AI technologies and applications, making it challenging to implement and manage AI systems.
6	Technical Challenges and Integration	Complexity of AI technologies, interoperability issues, integration with existing systems, and compatibility with legacy infrastructure.
7	Change Management and Resistance	Resistance to change, organizational inertia, and the need to retrain or upskill employees to adapt to new AI-driven processes.
8	Trust and User Acceptance	Lack of trust and acceptance among customers or end-users regarding AI-driven products, services, or decision-making systems.

III. THE AI -BUSINESS MODEL

An example of AI-Business Model roles is Identifying a specific business challenges or opportunities, is to analyses available data sources and identify relevant data for AI-driven solutions, evaluate required technologies, applications and tools that align with the identified business problem. In addition, the model could help to clarify the infrastructure and resource allocation by assess the necessary hardware, software, and cloud computing resources required for AI implementation. The AI-Business model provides potential help on a roadmap for scaling AI capabilities across the business. With all these elements, AI-Business model requires engage training and change management skills for upskilling opportunities for employees to adapt to AI-driven processes. It's noted that the specific details and components of an AI-business model may vary depending on the nature of the emerging business, services, and target market. The following figure (1) illustrates a model that emerges from the barriers discussed above.

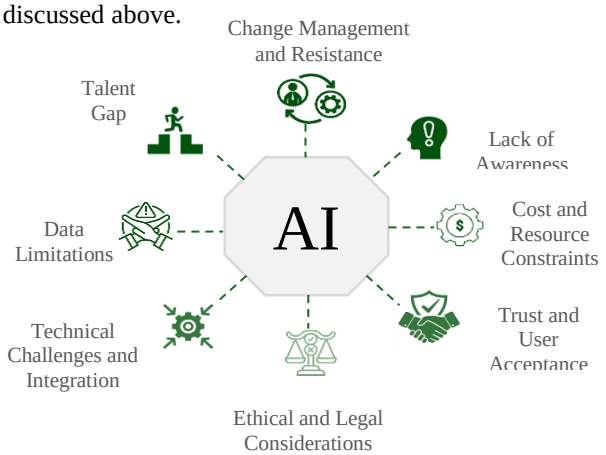

Figure. 1 The study's AI adoption model emerges from literature review for collected barriers

However, the barriers mentioned earlier in table (1) play a significant role in shaping the factors influence the role of AI in driving business development in emerging businesses in Libya. Forming a comprehensive model that illustrates how various factors impact the role of AI in emerging businesses in Libya can greatly enhance

understanding and facilitate effective decision-making. It illustrates the interplay between these barriers and their impact on AI adoption in driving emerging business development.

This model serves as a visual representation of the complex relationship and dependencies between the identified barriers and their influence on the successful implementation of AI technology in emerging business contexts. By visually representing the interplay between barriers, the model guide to provide a clear and structured framework. This approach simplifies the complexity of these factors, enabling businesses to identify specific areas of focus and develop targeted strategies to overcome barriers [9]. The lack of awareness and understanding of AI concepts and applications hinder the adoption and utilization of AI technologies in these businesses. Moreover, cost and resource constraints pose challenges in terms of investing in AI infrastructure and acquiring skilled personnel. Data limitations further impede the effective implementation of AI, as access to high- quality and relevant data is crucial for AI systems. Additionally, ethical and legal considerations need to be addressed to ensure compliance and gain trust in AI-driven solutions. Overcoming these barriers and leveraging AI technology effectively can help emerging businesses in Libya enhance their competitiveness, improve operational efficiency, and drive innovation in their respective industries.

The model introduces a valuable tool for stakeholders to understand the relationships between these factors and their collective influence on AI adoption, thus aiding in the successful implementation and adoption of AI in emerging business development in Libya.

IV. RESEARCH METHOD:

This study adopts a research design based on qualitative research approach, specifically utilizing case study methodology. The case study approach allows for an in-depth investigation of the potential contributions of Artificial Intelligence (AI) in fostering business development in emerging businesses within the Libyan context. By conducting multiple investigations, this research aims to provide a comprehensive analysis of the opportunities and challenges associated with AI adoption in Libya's emerging business sector. The selection of participants is based on criteria that reflect the emerging barriers on AI in emerging business in Libya. Experts were selected to participate in this study to ensure a comprehensive understanding of how AI can positively impact different types of businesses in Libya. For the data collection, a primary data was collected through a combination of questionnaire and semi-structured interviews. Interviews was conducted with key business owners who have experience and insights regarding AI adoption in their respective businesses to gain an understanding of how AI technologies are implemented and integrated into business operations, for the analysis of the collected data a thematic analysis was conducted. The analysis will involve organising and categorizing the data to extract meaningful insights and identify common challenges and opportunities associated with AI adoption.

V. FINDING AND DISCUSSION:

Based on the results collected from the participants, the analysis of findings will be explored the various factors and themes identified in relation to AI adoption in emerging businesses. It provides a comprehensive understanding of the challenges and opportunities faced by these emerging businesses in Libyan context and leveraging AI technology. Based on the collected data, the following critical factors are listed from the results of this study:

1. Lack of Awareness and Understanding:

The analysis revealed that there is a limited knowledge of AI concepts and applications among emerging businesses in Libya. Many participants expressed a lack of understanding of the potential benefits that AI can offer. Business owners and decision-makers were found to be generally unaware of the various applications and opportunities that AI can provide for their organizations.

2. *Cost and Resource Constraints:*

The findings indicate that high initial investment is a significant barrier to AI implementation. Participants expressed concerns about the substantial costs associated with acquiring the necessary infrastructure, software, and skilled personnel. Ongoing costs were also identified as a challenge, highlighting the need for continuous financial resources to support AI initiatives. Additionally, resource limitations were identified as a constraint, indicating that emerging business face difficulties in allocating resources for AI adoption.

3. *Data Limitations:*

The findings revealed that insufficient or poor-quality data is a prevalent challenge for emerging business. Participants cited difficulties in data collection, cleaning, and management processes, indicating a lack of strong data infrastructure. The availability of reliable and relevant data was identified as a crucial factor hindering successful AI implementation.

4. Talent Gap:

The results indicated a lack of skilled professionals in AI technologies. Participants expressed challenges in finding individuals with expertise in AI applications and the associated technologies. The lack of qualified personnel was identified as a major barrier to successfully implementing and managing AI systems within organizations.

5. Technical Challenges and Integration:

Participants identified technical challenges associated with AI adoption. The complexity of AI technologies was mentioned as a significant hurdle, requiring specialized knowledge and skills. Interoperability issues with existing systems and compatibility with legacy infrastructure were also identified as challenges, highlighting the need for seamless integration of AI technologies.

6. Change Management and Resistance:

Resistance to change was a common theme raised by participants. There was a recognition that introducing AI-driven processes requires significant changes within the business, including retraining or upskilling employees.

Overcoming resistance and effectively managing change were identified as critical factors in successful AI implementation.

7. Trust and User Acceptance:

The participants expressed concerns about the reliability and accuracy of AI systems, leading to hesitation in fully embracing AI-driven solutions. Building trust and ensuring user acceptance emerged as important considerations for their emerging business aiming to adopt AI technologies.

8. Ethical and Legal Considerations:

Surprisingly, the participants did not highlight ethical and legal considerations as a critical factor in AI adoption. This finding suggests a potential lack of knowledge and awareness among emerging businesses regarding the importance of addressing issues related to data privacy, security, transparency, and compliance with legal and ethical standards. This indicates the need for increased education and awareness initiatives to ensure businesses are well-informed about the potential ethical and legal implications of AI usage.

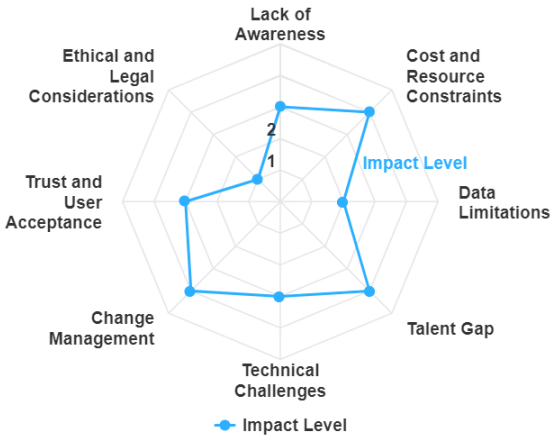

Figure.2 The impact of Critical Factors for AI Adoption in Emerging Businesses in Libya

The above chart illustrated the impact levels of critical factors for AI adoption in emerging businesses in Libya. Each factor is represented on the chart based on its impact level, ranging from 1 (lowest impact) to 5 (highest impact). The chart illustrates the interrelation between these factors, showcasing how they collectively influence the successful adoption of AI technologies in emerging businesses. For instance, the lack of awareness and understanding (e.g., Lack of Awareness) can lead to challenges in addressing technical complexities (e.g., Technical Challenges) and building trust and user acceptance (e.g., Trust and User Acceptance). Similarly, data limitations (e.g., Data Limitations) can impact the talent gap (e.g., Talent Gap) by hindering the availability of quality data for skilled professionals to work with. By visualizing the impact levels of these factors, stakeholders can identify the key areas that require attention and prioritize strategies to address the interconnected challenges in AI adoption. Understanding the relationships between these factors is crucial for developing comprehensive solutions that enhance the readiness of emerging businesses in Libya to leverage AI technologies effectively.

VI. CONCLUSION

The research outcomes underscore critical factors and themes essential for the successful integration of AI within emerging businesses in Libyan context. A key impediment identified is the lack of awareness and comprehension of AI concepts among business stakeholders, necessitating targeted efforts to enhance knowledge and understanding. By fostering awareness of AI's potential benefits, businesses can better grasp its value and identify suitable applications within their operations. This study contributes valuable insights to the literature on AI adoption in emerging business environments, offering a comprehensive analysis of the opportunities and challenges in Libya's emerging business landscape. The study provides actionable recommendations for businesses and policymakers seeking to leverage AI for business growth, competitiveness, and innovation. To effectively incorporate AI into their operations, emerging businesses in Libya are advised to integrate the identified factors into their strategic planning. Key focus areas include raising awareness, optimizing resource allocation, enhancing data infrastructure, bridging the talent gap, addressing technical obstacles, managing change, and prioritizing trust and user acceptance. By addressing these factors, businesses can unlock the transformative potential of AI, gaining a competitive advantage in their respective sectors. The research underscores the importance of heightened awareness and understanding of AI, addressing resource constraints, managing change effectively, and fostering trust and user acceptance. Governmental and private leaders in emerging business sectors in Libya should carefully consider these factors and themes when devising and executing AI initiatives to enhance the likelihood of successful adoption.

VII. LIMITATION

One limitation of this study is the reliance on self-reported data collected from the participants. The findings are based on the perspectives and experiences shared by the participants, which may be subject to individual biases and limited to their own knowledge and awareness. While efforts were made to ensure a diverse participant sample, the generalizability of the findings to all emerging businesses in Libya may be limited. Additionally, the study focused specifically on the perspectives of AI roles and its barriers in emerging businesses, and the findings may not fully capture the challenges and opportunities faced by larger, established companies. Future research could consider incorporating multiple data sources and expanding the scope to include a broader range of businesses to enhance the validity and generalizability of the findings

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