

Investigating the Challenges and Opportunities of Implementing AI and Automation in Small Businesses

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Abstract

As artificial intelligence coupled with digital technologies vehemently redesigns the global business environment, small businesses experience unique opportunities and challenges different from those of bigger enterprises. Adopting the PRISMA guideline, this study systematically reviews the available literature to highlight the enablers and barriers of adopting automation and artificial intelligence in small enterprises. The findings of this study include key barriers such as organizational rigidity to change, insufficient financial resources and insufficient skilled personnel, among others. Although these challenges may sound extreme, it is essential to note that the potential of AI and its tools to improve customer engagement and operations is a globally acknowledged benefit. This study also found that these opportunities and challenges are diverse across the world, with each region experiencing its obstacles. This study concludes that although the implementation of AI and automation bears undeniable growth opportunities for small businesses globally, it also presents several challenges which call for multidimensional solutions and cross-border collaborations to help these firms overcome these challenges and cultivate potential opportunities. This research contributes to comprehending the digital evolution of small businesses, offering insights that can be useful to policymakers, industry leaders, and scholars who are interested in the relationship between digital technologies and businesses across the world's regions. The purpose of this research is to evaluate this existing gap by spotlighting the very available opportunities for artificial intelligence and automation in these small-scale businesses, discussing their challenges and benefits and

addressing their effect on business processes.

Keywords

Artificial Intelligence (AI), Automation, Machine Learning, Natural Language Processing, Efficiency, Small Businesses, Digitalization

1. Introduction

The swift growth of technology, mainly automation and artificial intelligence, is a revolutionary power in the landscape of both small and medium businesses, presenting them with tools to drive growth, smoothen operations and improve efficiency. According to Kumar *et al.* [1], the expeditious growth in Artificial Intelligence has triggered a worldwide revolution, mainly reshaping ways in which enterprises operate, grow and compete. Although large businesses mostly have the required resources to implement and maintain this technology smoothly, small businesses face a unique bunch of opportunities and barriers in their attempt to pull these kinds of developments.

Small businesses, which, according to Algan [2], fabricate the foundation of many economies, mostly lack access to sustainable resources and experience distinct challenges to implement automation and artificial intelligence, among other digital technologies. However, the capability for these businesses to leverage AI among other technologies is deep, presenting platforms for growth, competitiveness and efficiency.

1.1. Definition of AI and Automation

Artificial intelligence is an information communication technology that has the ability to perform operations independently. This technology also calls for human mental power to help with decision-making, the creation of greater efficiencies, and improved productivity. Kumar *et al.* [1] term artificial intelligence as the potential of a machine to think like humans and mimic human intelligence. Gil de Zúñiga [3], on the other hand, asserts that it is the ability of a machine to evaluate data accurately and draw insights from it to achieve set objectives. In their scientific research paper, Xu *et al.* [4] believe that artificial intelligence is a model that creates and implements algorithms and models that are able to execute tasks that mainly need human understanding, including decision-making, learning, problem-solving and reasoning.

On the other hand, Elhajjar *et al.* [5] define automation as the process of utilizing technology to execute tasks with minimal or no human intervention. It is a technology-fueled approach that proposes to smoothen procedures, improve efficiency and minimize human error. The Britannica dictionary defines automation as the application of machines and systems to processes once done by humans to tasks that would otherwise be impossible. In other words, the dictionary generally

defines automation as a technology that performs processes using programmed commands mixed with automatic feedback control to guarantee proper execution of the instructions.

AI and automation traverse a wide range of applications and sectors, from automating repetitive tasks to improving human abilities in intricate settings such as natural language processing, speech synthesis, image identification, decision making and processing [6]. In a business setting, the potential influence is big, impacting operations such as innovation activities, human resources, security and marketing, among others.

1.2. Importance of AI and Automation in Business Operations

Now that AI and automation have been defined, it is crucial to understand the reasons why these technologies are rapidly becoming important to small enterprises. According to Borah *et al.* [7], these technologies are becoming important to small businesses because they facilitate businesses to be relevant and successful in the rapidly changing marketplace. They do this by offering small businesses the equipment to smoothen operations, improve customer satisfaction and minimize costs [1] [8]. For example, AI-powered automation can assist small businesses in improving workflows by reducing the requirements to supply small businesses with the equipment to smoothen operations, permitting resources to be disseminated to higher-value risk activities [8]-[10]. This can be specifically useful for small businesses with little human workforce, helping them to attain more with the little they have.

Additionally, artificial intelligence sanctions small businesses to make decisions that are driven by data by evaluating big data sets to gather practical insights [7]; [11]. Some time back, these kinds of insights were mostly inaccessible to small-sized businesses due to the high costs related to data evaluation. Currently, artificial intelligence makes insights accessible to even small businesses to embrace the potentiality of data, helping them to understand customer needs better, make informed strategic decisions, and predict market trends.

On the other hand, automation enables repetitive tasks to be robotized, permitting employees to redirect their efforts and time to more strategic and intricate tasks that add value to the organization [9]. For instance, think of a small marketing agency that uses countless hours to manually compile records for its clients. By adopting an automated reporting system, the agency can provide extensive reports with a few clicks [10] [12]. This not only saves the agency time but also permits the employees to concentrate on client engagement and creative strategies, resulting in enhanced overall performance.

Moreover, automation can result in significant cost savings for not all but some small businesses. By minimizing the need for manual labour, enterprises can minimize their operational costs over a period of time. Also, automation reduces human error and the need to redo a certain task, further saving money and valuable resources [7]. Lastly, automation generates instantaneous analytics and data that

help small businesses make insightful decisions accurately and quickly [11]. Access to practical insights helps small businesses to adapt to market changes and make informed choices that fuel success.

1.3. Research Objectives and Significance of the Study

This research paper proposes to address numerous critical questions, including:

- i) What are the key challenges experienced by small businesses in deploying and adopting AI and automation globally?
- ii) What opportunities do automation and artificial intelligence present for small businesses globally?
- iii) Are these challenges and opportunities similar or different across the continent?
- iv) What is the future of artificial intelligence and automation in small enterprises?

By answering these questions, the research will snap a wide spectrum of insights and experiences, mirroring both local and global dynamics of AI and automation. The main aim of this research is to generate actionable suggestions for small businesses among other stakeholders, helping them overpower the intricacies of digital evolution and wholly leverage the capabilities of artificial intelligence and automation. By doing a comprehensive evaluation, this research will significantly add to a bigger comprehension of the global field of artificial intelligence and automation, providing a multidimensional view of ways in which small and medium businesses can survive the rapidly transitioning technological environment.

2. Research Methodology

Adopting the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA), this research highly depends on a systematic and comprehensive review of secondary data and available literature. The PRISMA framework will guarantee that the research methodologies used in this study are replicable and robust, improving the reliability and validity of the findings of this study.

2.1. Database Selection

The selection of fit and reliable academic databases to source relevant literature will be the opening step for this study. The key databases utilized throughout the study include JSTOR, Google Scholar, Scopus and IEEE Xplore. These databases are popular for their comprehensive collection of scholarly articles, reports and conference papers, generating way into quality research. The choice process for these databases is essential for gathering an extensive span of research on artificial intelligence and automation in small and medium businesses. Each of the listed databases provides distinctive benefits. For example, the IEEE Xplore database is mainly solid in content related to technology and engineering. Scopus offers an extensive view of multidimensional study. On the other hand, Google Scholar, preceded by its comprehensive coverage, guarantees that even prominent publi-

cations and grey literature are not ignored. Focusing on theoretical and historical perspectives, JSTOR brings depth to the review.

2.2. Keyword Identification

A particular group of keywords was written down to guarantee a relevant and focused search. These included phrases such as “Artificial intelligence in small businesses”, “Automation in small and medium enterprises”, “small and medium enterprises Challenges”, and “small and medium enterprises Opportunities.” The selection of these keywords was strategic, and the processes were used to capture an extensive span of articles relevant to the topic. The selected operative words covered technological facets, and the keyword search was done across all the listed databases to single out articles and resources that aligned with the study purpose, guaranteeing that the literature review process was deep and broad.

2.3. Screening and Selection

In a systematic literature review technique, there are two main elements, namely i) designing criteria for exclusion and inclusion of sources and ii) evaluation of the quality of the selected sources [6]. Following Ayinaddis’s [6] guidelines, the screening and selection processes observed the guidelines of the PRISMA framework, guaranteeing a transparent and systematic approach. The PRISMA framework also ensured that the research methods were methodologically sound and enabled tracking data processes at different phases for the review procedure. At the start, the keyword search outcomes were evaluated by reviewing abstracts and titles of articles to dispose of insignificant sources. This was an important phase as it helped reduce the number of possible articles to those that sounded more useful to research questions and objectives. The inclusion criteria were limited to articles written in English, directly pointed to the topic and not older than 5 years. This guaranteed that our study reflected on the current advancements in artificial intelligence and automation for small and medium enterprises, offering a relevant and timely view in a swiftly evolving field.

The inclusion vs exclusion criteria and the eligibility criteria resulted in a final sample of 73 scholarly articles, which were selected to conduct the literature review. **Figure 1** is a summary of the process.

2.4. Data Extraction and Synthesis

The screening and selection processes were followed by a systematic gathering of data, emphasizing key concerns such as challenges and opportunities across the continents. The data-gathering procedure was meticulously carried out, guaranteeing that all relevant info was extracted. The gathered data was then amalgamated to extensively review the influence and challenges of artificial intelligence and automation transformation of small and medium enterprises globally. This synthesis identified gaps, patterns and trends in the available data, adding to a broader comprehension of this topic.

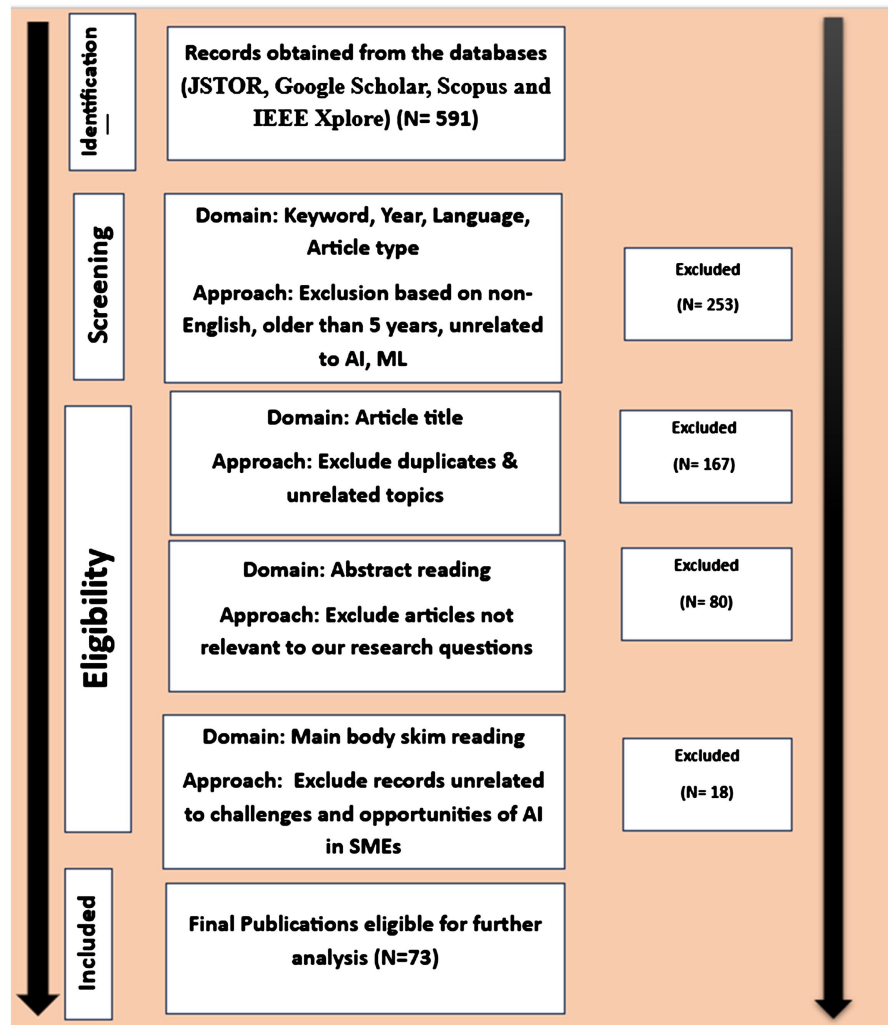


Figure 1. Study selection process (PRISMA flow diagram).

By reviewing and interpreting existing literature in a specific domain, these multidimensional methods offered reproducible, reliable and repeatable results. It puts vigorous techniques into action because it offers unbiased and reliable results, hence permitting an extensive synthesis of the existing evidence. The review process started with a definition of the research problem and objective. This was then followed by a literature search and article selection based on the PRISMA guidelines. Then, the extracted data was synthesized and analyzed. This was followed by a meaningful discussion and conclusions. **Figure 2** is a summary of the review process:

3. Literature Review

The implementation of AI and automation in small businesses is a trending research topic for both industries and learning institutions since the integration of artificial intelligence, among other technologies, guarantees improved competitiveness, revolutionizes productivity and maximizes innovation within a

business. Despite the benefits, adoption of these technologies becomes challenging due to regulatory, cultural, financial and technical concerns that are unique compared to those of larger firms, making the implementation process a demanding task for the businesses [13]. With an eye on the areas of concern brought out by the literature about the implementation of artificial intelligence and automation in small enterprises, this section singles out the main barriers and opportunities and integrates relevant studies to imply research directives for the future.

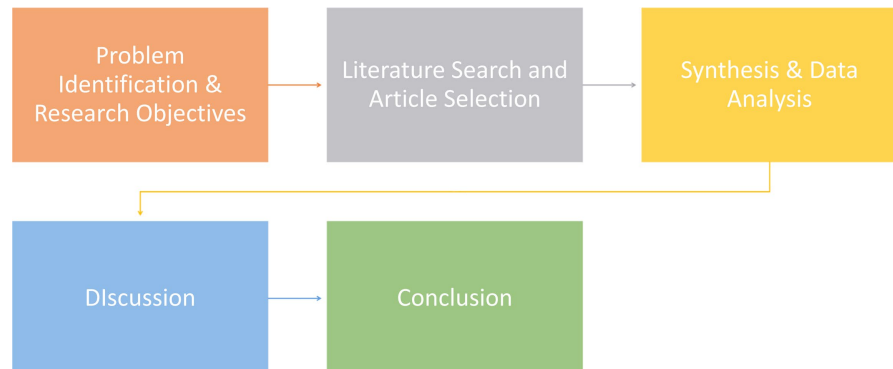


Figure 2. The review processes.

3.1. Challenges of Implementing AI and Automation in Small Businesses

3.1.1. Financial and Market Constraints

According to Baez & Igbekele [14], implementing any technology is directly linked to the business's resources. Overall, small and medium businesses have more hardships in accessing certain resources compared to larger businesses [15]. This is mostly due to the tighter budgets or limited access, in contrast to bigger business. These barriers their capabilities to invest in costly skilled personnel, hardware or software. In addition, AI and automation implementation calls for a long-term investment in the firm's expertise and exceptional infrastructure, which is challenging for some small businesses to deal with. Resultantly, many small businesses delay or even completely let go of the idea of implementing AI and automation solutions, making them miss out on the potential enhancements in competitiveness and operational efficiency.

Another main challenge is human resources. The lack of or insufficiency of personnel with appropriate AI, automation and business skills has proven to be a considerable barrier for all businesses [16]. According to Arakpogun *et al.* [17], this condition is even more challenging for small and medium businesses as large businesses offer high salaries to the limited available talent, drawing the most skilled workforce to themselves. The struggle to acquire and retain skilled talent is also caused by the insufficient training opportunities within these businesses. This challenge results in small businesses facing difficulties in successfully implementing AI systems. This results in reduced innovation capacity,

suboptimal use of tech and slower digital transformation compared to bigger businesses.

Market dimensions substantially affect the adoption of AI and automation in small and medium businesses [13] [15]. Omokhafe *et al.* [18] assert that small businesses operating in smaller markets may face minimal incentives to invest in automation and AI technologies due to lower possible returns on investment [17]. Also, operating within narrow niche markets with low transactions and a small customer base limit the data generated and the possible return on tech investments. Simultaneously, businesses operating in bigger markets may be presented with bigger opportunities to scale their tech investments and attain bigger economic benefits. This challenge barriers small businesses from utilizing digital tools, including AI and automation, that could improve their competitiveness and efficiency in the market since the costs of implementing and maintaining these tools outweigh the benefits.

3.1.2. Regulatory Concern

Moilanen & Laatikainen [19] mention that regulatory concerns can present substantial challenges to AI and automation adoption for small and medium enterprises since navigating intricate and evolving regulations may call for significant resources. These authors mention that in addition to a lack of expertise and financial constraints, regulatory constraints are a major pullback for small European businesses. Small and medium businesses may lack or have insufficient expertise or ability to ensure compliance with requirements such as AI and automation-specific requirements, data protection laws and industry standards. They mostly lack the legal resources and expertise to fully comprehend and comply with intricate regulations regarding evolving concerns such as data security, ethics and privacy. This possible legal risk of non-compliance and uncertainty may discourage investments in digital technologies, as it may expose them to possible legal penalties, destroying their reputations in case regulations are not adhered to. Saudi Arabian small businesses do not, however, face this challenge as they benefit from ample resources, the capability to train experts, and the support of their government.

Furthermore, ethical concerns also bear a heavy weight [17] [20]. The adoption of AI and automation can raise questions regarding fairness, transparency, and biases, which small businesses may find challenging to deal with. Many small enterprises do not have access to clear governance policies and ethical frameworks to guide the ethical use of AI and automation technologies. Ethical lapses can not only harm a business's reputation but also lead to customer distrust. This makes small businesses vigilant about introducing AI and automation to their operations so as not to risk the business's credibility.

Additionally, Artificial intelligence models can maximize the attack surface for cyber threats, but small businesses mostly lack powerful security infrastructure. The fear of cyber risks such as data breaches and intellectual property theft can

deter small businesses from implementing digital technologies such as AI since they may lack the resources to effectively prevent these threats.

3.1.3. Infrastructural and Technical Barrier

According to Omokhafa *et al.* [18], technical and infrastructural barriers substantially influence AI and automation implementation in small and medium businesses. One key challenge is the lack of accurate data. Small firms have limited or even no infrastructure for gathering, storing and handling data. They also may not track client operations and interactions in a systematic manner, resulting in outdated or incomplete datasets. AI and automation models depend on high-quality data to make reliable decisions, and inaccurate or incomplete data can prevent them from providing valuable insights. Furthermore, Lada *et al.* [20] and Ikpe [15] mention that limited access to relevant data sources limits the small businesses' capacity to train AI models, minimizing the applicability and effectiveness of AI solutions for their particular needs. In addition, many small businesses lack the necessary technical infrastructure, such as IT systems, hardware, and software, required to adopt and scale AI technologies. The absence of this infrastructure hinders their capability to operate effectively [17]. Without reliable data and infrastructure, artificial intelligence systems cannot effectively automate operations or generate useful insights. This reduces the investment value and narrows the businesses' ability to make insightful decisions and attain operational efficiency.

The intricacy of AI tech also presents a challenge. A study by Badghish and Soomro [21] mentions that intricacy can be a core challenge in the deployment of AI technology, given that technology comprises and blends heterogeneous computing and machine learning technologies and calls for insightful resources. Many small business owners do not have the required skills for this, and hiring experts can be financially unfeasible. This intricacy may result in poor adoption, underutilization of these tools or total avoidance of AI and its tools. Badghish and Soomro [21], however, revealed that, for small businesses in Saudi Arabia, the cost of adoption is not a barrier, insinuating that most small businesses have enough financial resources to invest in technology procedures such as AI and automation. Although small businesses in this country appear to have no monetary constraints, they tend to believe that AI technologies are not easy or simple to learn, despite the idea that they could blend well with their existing business activities and their business setups. According to Omokhafa *et al.* [18], the reason for this could be that innovation complements current organizational technologies and that the application of AI and automation, among other technologies, is not a single event; it can be described as a process of gathering knowledge and integration.

3.1.4. Lack of Organizational Support

An additional challenge is a lack of organizational support, which blocks the implementation of AI automation and digital technologies for small and medium

businesses. Some small businesses have an organizational culture and leadership that is resistant to innovation, and this can substantially impede artificial intelligence initiatives. According to Kumar *et al.* [16], organizational structure and leadership can block AI adoption and innovation by establishing rigid systems that discourage creativity and risk-taking; this suppresses employee empowerment and stifles knowledge sharing. This contributes to the lack of awareness of AI opportunities and a culture that is resistant to change.

According to Baez & Igbekele [14], the role of leadership is vital in the implementation of any technology in small and medium businesses. Research by Baez and Igbekele [14] showed that the journey of AI implementation is more likely to be in small businesses with innovative CEOs. Furthermore, the firm's management must be conversant with the new technology and comprehend why it needs to be adopted, as they are the top decision-makers. This idea is appraised by a study made by Luo *et al.* [22], who found that the enterprises that were most efficient in implementing digital technologies showed a strong relationship between the team and their top managers. According to these scholars, building a culture that embraces experimentation and tolerates failure is an important aspect of promoting innovation and recognizing the advantages of implementing AI and automation. This cultural transition can encourage employees to take the initiative and embrace new ideas, hence improving the firm's overall capacity for digital transformation.

Badghish & Soomro [21], in their research based on Saudi Arabian small businesses, hold that although some researchers hold that organizational support has a non-substantial relationship with AI implementation, this could not be true. Their research findings show that the management within Saudi small businesses hardly encourages the implementation of AI. This lack of organizational support for AI adoption is mainly due to factors such as long payback times, high costs and hardships in safeguarding intellectual property and high follow-up costs. These hardships prevent leaders from supporting AI projects from the start.

The same authors mention that sustainable human capital has a substantial influence on AI. This finding supports the findings of a study conducted by Luo *et al.* [22], a study that confirms that sustainable human capital positively influences the implementation of digital technologies such as AI and automation. The substantial relationship revealed in this research between the deployment of AI technologies and sustainable human capital is possible for a number of reasons [16]. To begin with, human capital is the number one crucial resource that substantially adds to the acceptance of such sustainable digital technologies. Badghish & Soomro's [21] research work shows that the Saudi workforce is well equipped with knowledge and skills, as substantial investment has been made in the advancement of people. However, the rigid organizational structure and leadership barriers prevent small businesses from leveraging the full potential of AI. **Figure 3** shows a summary of challenges of AI and Automation.

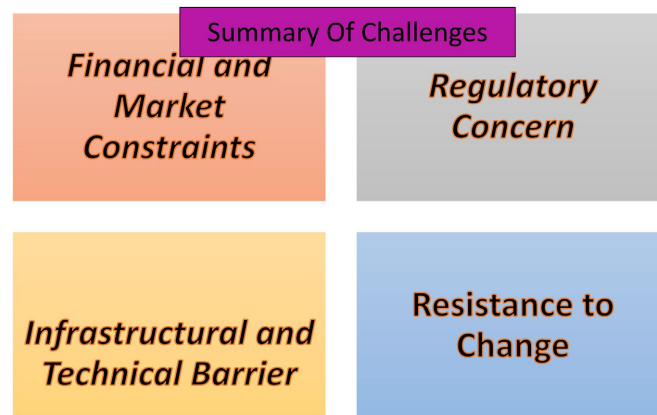


Figure 3. Summary of challenges of AI and automation adoption in small businesses.

3.2. Opportunities of AI and Automation for Small Businesses

3.2.1. Efficiency in Operation

According to Blahušiaková [23], Artificial intelligence and automation generate substantial opportunities for improving operational efficiency in small and medium businesses. Process automation, being one of the most influential benefits, permits businesses to smoothen repetitive tasks, minimize human error and free the human workforce for more complex tasks [24] [25]. This automation fuels productivity and minimizes operational costs [26] [27]. This makes it an exceptional asset for small and medium businesses working on a tight budget.

Another opportunity presented by AI and automation implementation is effective risk management; this leads to more successful operations by singling out possible risks in time, minimizing the possibility of losses or costly disruptions and optimizing decision-making [8] [26] [28]. Furthermore, artificial intelligence tools fasten procedures by optimizing workflows and enhancing decision-making processes (Borah *et al.*, 2022; Muminova *et al.*, 2024; Nascimento & Meirelles, 2022; Zavodna *et al.*, 2024). Machine learning and advanced analytics models can quickly evaluate vast data sets, generating insights that can be used by businesses to make insightful decisions more rapidly. This acceleration of procedures helps small businesses to react more swiftly to competitive pressures, market changes and customer needs, further improving their operational efficiency.

3.2.2. Scalability and Growth

Automation and AI, among other digital technologies, also present small and medium businesses with the tools to scale and grow their operations [7] [8]. According to Omokhafa *et al.* (2024) [18], scalability is a fundamental benefit, given that digital solutions can be easily expounded to host business growth without substantial additional investments. For example, cloud-based artificial intelligence models permit small businesses to scale their computing resources as their processing and data needs rise, guaranteeing they can deal with vast amounts of business activity.

In addition, AI drives new product enhancement by helping businesses create and innovate personalized solutions for their customers. Also, machine learning algorithms can evaluate customer preferences and behaviour, guiding small and medium businesses in developing services and goods that wholly address market demands [26] [29]. This ability fuels growth and helps small businesses to stay competitive in the ever-evolving markets.

3.2.3. Improved Customer Engagement

Digital technologies such as AI and automation substantially improve customer engagement, providing small businesses with the capacity to build more responsive and personalized customer experiences [7] [30]. According to an article by Goetz [12] and another one by Jain *et al.* [26], AI-fueled tools can evaluate customer data to comprehend customer preferences, permitting businesses to re-shape their communication and marketing strategies accordingly.

3.2.4. Improving Customer Experience

The role of AI and automation in customer experience is mainly centred around personalization, overall satisfaction and improved efficiency [23] [26] [31]. By utilizing natural language processes, automation and machine learning, AI helps small businesses comprehend customer needs, forecast behaviours, and generate seamless real-time support.

Still on the same, AI-based automated chat is helping small businesses engage their clients more efficiently and effectively [7] [10] [26]. Artificial intelligence technologies support small businesses in comprehending the needs of customers, recognizing their purchasing behaviour, and generating various types of relevant features and rewards [32] [33]. Small businesses have been using AI to solve customer questions very diligently by utilizing the database of customers' perceptions [34]. This way, AI helps small businesses respond to inquiries made by customers without wasting much time, improving customer satisfaction and increasing revenue.

3.2.5. Decision Making

Decision-making is a fundamental function of managerial people in any business [33]. According to Lu *et al.* [13] and Mantri & Mishra [11], businesses generate huge datasets using digital solutions; however, these solutions lack sufficient tools to review such massive data. AI has proven to have capabilities which can be leveraged to generate AI-based solutions that have been used by small businesses to analyze data and gather important info. This extracted information helps small businesses make informed decisions, giving them a competitive edge and dominance in the market.

3.2.6. Demand Forecasting and Predictive Analytics

The ability of artificial intelligence tools to analyze vast datasets allows for more accurate demand prediction [7] [11]. By effectively predicting customer demand, small businesses can reduce excess inventory, minimize stockouts and optimize

inventory levels. Also, through AI tools, predictive analysis helps in singling out trends and patterns that can be invisible to traditional analysis tools. This helps small businesses to make more informed decisions. **Figure 4** Challenges vs. Opportunities of AI on small businesses.

Citing from research by Crockett *et al.* [32], machine learning, a tool of AI, can draw from extensive knowledge bases, assisting in making more accurate predictions using its top-ranking abilities. Machine learning algorithms are trained at identifying crucial patterns and factors affecting the supply and demand chain, hence helping small businesses to make informed warehouse management and inventory decisions, which resultantly ensures efficiency. Lada *et al.* [20] assert that the efficiency and accuracy of machine learning are beyond manual data processing, a technique that consumes valuable time and resources that could be utilized in other important procedures.

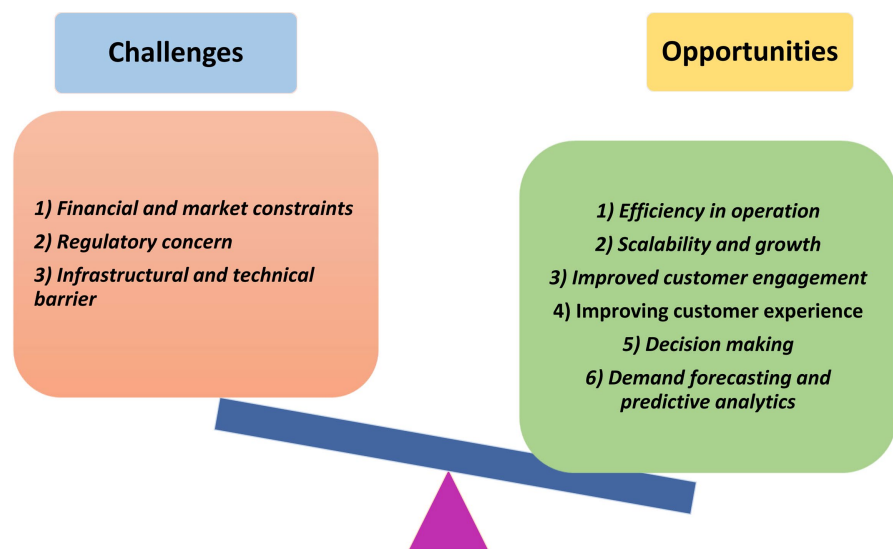


Figure 4. Challenges vs. opportunities of AI on small businesses.

4. Comparative Analysis of Small Businesses Across Continents

The challenges faced by small businesses in undeveloped countries such as Nigeria and sub-Saharan Africa are mostly financial concerns (resource constraints and the cost of implementation) [18] in addition to technology costs, expenses related to compliance, training, and maintenance burden small businesses in these regions. Another challenge is cultural and organizational barriers. According to Moilanen and Laatikainen [19], a lack of strategy and competencies, which are organizational and leadership concerns, has been known to trigger a lack of awareness and internal resistance. Another challenge is regulatory concerns, which create legal uncertainty, slow innovation and limit data access.

According to Omokhafa *et al.* [18], in Asia, Saudi Arabia and Malaysia, particularly, Saudi Arabia, which is a high-income country, is reported to have ad-

equate resources, as well as the ability to train experts and government ability to support the implementation of digital technologies such as AI and automation. Badghish & Soomro [21] mention that small businesses in Saudi Arabia benefit from their access to sustainable resources, the ability to train experts and effective government support, making the adoption of AI and automation easy. According to Lada *et al.* [20], financial constraints are a significant barrier for small businesses in Malaysia, given that it is a developing country. In addition to financial constraints, small businesses in Malaysia also face sustainability and perception of complexity, data accessibility issues, cultural barriers and regulatory concerns.

Surprisingly, small businesses in Europe, which is considered a developed continent, face barriers similar to those in most undeveloped countries, such as financial constraints and lack of technology infrastructure. European small businesses also face regulatory complexity, where strict data privacy laws, e.g. GDPR, slow innovation. Other challenges noted in this continent include inaccurate data, lack of expertise and an AI strategy.

A comparison of the AI and automation implementation opportunities across the world brings out different regional focuses. For instance, in Africa, key opportunities include innovation in product development, enhanced customer engagement, market expansion, improved operational efficiency and reduced costs. These benefits show how artificial intelligence can fuel cost savings, promote innovations and fuel market growth, fostering economic development in the region.

Europe, on the other hand, emphasizes enhanced operational efficiency, process automation, risk management, new product development and process acceleration [19]. The primary role of AI here is mainly to smoothen operations, improve risk management and support growth via improved innovation and automation, dealing with particular barriers experienced in a more developed technological ecosystem.

On the other hand, in Asia, enhanced customer engagement, operational efficiency, growth, and scalability are significant opportunities. Here, AI and automation are viewed as key enablers in improving customer interactions, optimizing operations, and fueling business expansion, mirroring the region's concentration on utilizing technology for efficiency and growth.

While AI's and automation's capability to improve customer engagement and operations is a worldwide recognized opportunity, Europe emphasizes automation and risk management. On the other hand, Africa and Asia focus on cost reduction, scalability and market expansion, mirroring their unique regional challenges and priorities.

5. Case Studies and Success Stories

5.1. Example 1: Small Business Implementing AI for Inventory Management

Brewed Awakening is a local coffee shop with several locations in Canada, one

being 1507 Winnipeg Street, Regina, Saskatchewan, Canada. Over time, managing inventory and forecasting what products to order for the week was becoming challenging [35]. The business mostly understocked some products and overstocked others, resulting in lost sales and waste. To solve this, the Brewed Awakening adopted AI-fueled inventory management, TradeGecko. This model evaluates past sales data and gives predictions for future demand depending on trends, patterns, seasonality, and local events, such as nearby festivals. The AI-driven inventory management model works by data collection and generating AI-fueled insights. The model gathers sales data from previous weeks and months and utilizes it to anticipate how many ingredients, for example, milk and coffee, will be needed. The model also generates suggestions for inventory orders, which helps to minimize waste and guarantees that the coffee shop does not run out of its high-demand products. Implementing this system has reduced the shop's waste rate by 15% and stockouts by 20%. Also, with the help of this AI-powered system, Brewed Awakening can plan ahead for peak and busy seasons and modify orders, accordingly, keeping their cabinets stocked without over-buying.

5.2. Example 2: Using AI and Automation to Personalize Marketing Campaigns

Another success story is that of PetPals, a small-only pet supply shop that sells toys, food and accessories for pets. Its office is located at Petpals (UK) Limited Basepoint, Caxton Close, East Portway, Andover, Hampshire, SP10 3FG, United Kingdom. This shop had a rising customer niche but strained on sending customized marketing texts that would wholly resonate with every client. Their emails were generic. Their click-through rates were low, too. To solve this challenge, the store adopted Mailchimp's AI-driven email automation tool, which categorizes their customer niche according to their purchase history and behaviour, permitting them to share personalized texts and product recommendations.

Mailchimp's AI-driven email automation tool collects data such as browsing behaviour, past purchases and abandoned cart items. Using this data, Ailchimp's AI builds a product recommendation that is designed for every customer. For instance, if a client purchased a new dog blanket, the AI tool may recommend matching dog beg, treats or toys. The pet store also automates AI-fueled campaigns by setting up automated email flows that share personalized offer emails at optimal times with the clients.

Resultantly, customized email led to a 35% increase in the opening rate and a 25% rise in sales. Additionally, customers started to participate more with the shop's content, resulting in better customer loyalty and repeat purchases.

5.3. Example 2: Using AI to Process Customer Feedback

Another example of a small business that has positively benefited from AI imple-

mentation is Fresh Foods Market. Fresh Foods Market is a small family-owned grocery shop that provides local organic produce. As the store attempted to enhance its customer experience, they were getting mixed feedback from surveys. Comprehending what their customer base wanted was consuming a lot of time. To solve this, the store implemented MonkeyLearn, an AI-driven text analysis tool, to process customer feedback from surveys and reviews.

Now, the shop collects customer feedback using online reviews, surveys, and emails, and MonkeyLearn utilizes natural language processing to evaluate the feedback and extract insight into product preferences, common themes, and sentiments. The tool then groups the feedback into negative, positive and neutral sentiments, and it spotlights particular points where the shop could improve. Through this, the store found out that their customers consistently wanted a wider dairy-free product selection. They quickly responded to this by raising their dairy-free options stock, and customer satisfaction rose by 20 per cent.

6. Overcoming AI Adoption Challenges

The adoption of AI has been shown to transform how small-sized businesses function, providing a competitive edge and improved efficiency [23]. However, the journey is mostly clouded with challenges, from financial budgets to ethical concerns. Below are some recommendations on how to navigate through these obstacles.

6.1. Navigating Financial Constraints

Financial resources are a common barrier for most small and medium-sized businesses [36]. To navigate through financial constraints, it is important to comprehend the AI investment landscape [13] [37]. Seeking partnerships and pursuing cost-effective open-source tools can assist in disseminating the financial struggle. The utility of artificial intelligence in improving business performance can mostly justify the initial investment, changing financial struggles to a worthy long-term asset. For example, businesses can minimize operating costs post-AI adoption by enhancing efficiency.

6.2. Building AI Technical Expertise

Although skills development in AI could be challenging, it is such a crucial step [37]. Small businesses can bridge the tech skills gap by investing in upskilling employees and providing AI training. Dedicated workshops and programs can gather in-house expertise. Collaborations with tech partners can also bring appropriate know-how to employees. Also, establishing an organizational structure and leadership that welcomes innovation and exploration would perhaps kill unawareness and change resistance.

6.3. Ethical Considerations and AI Governance

According to Tishtykbayeva *et al.* [37], AI's governance and ethical use are prac-

tical business prerequisites and philosophical concerns. While bias can dirty an organization's reputation, data privacy breaches may result in legal consequences. Small-sized businesses must, therefore, work on governance approaches that guarantee ethical use and respect for data protection laws. As mentioned by Jain *et al.* [26], embracing an ethical AI framework and setting clear policies form the foundation of accountable use of AI and its tools. Ciaran Connolly, founder of Profile Trees, once said, "Adapting AI is as much about ethics and governance as it is about innovation. The right framework not only protects but propels businesses forward by building trust in AI-powered operations."

7. Strategies for Successful AI Adoption in Small Businesses

Small and medium-sized businesses looking to leverage the power of AI must embark on a strategic journey. This journey involves choosing the right AI approach, building a reliable infrastructure and strategically allocating financial resources.

7.1. Implementing the Right AI Approach

When considering the implementation of AI within small and medium-sized organizations, starting with a strong approach is important [36]. This includes singling out procedures that could benefit from the AI applications. Real-life examples of AI adoption in small businesses reveal that a targeted strategy for choosing the right AI solutions can substantially enhance customer experience and operational efficiency [37]. Therefore, a successful AI adoption would include 1) identifying AI opportunities, which include reviewing business procedures and pinpointing areas that AI can improve, and 2) evaluating AI readiness, which includes assessing technical potentials and training staff with AI skills, considering external training such as AI training if need be.

7.2. AI Infrastructure and Platform Solutions

In their research work, Iyelolu *et al.* [38] mention that building the right infrastructure and choosing the most appropriate platform are vital steps in AI adoption. Small-sized businesses can harness the adaptability of services such as cloud computing, which offers cost-effective and scalable platforms. Mantri and Mishra [11] reveal the capability of utilizing small data sets effectively, negating the thought that only big data sets drive AI solutions.

To select the necessary platforms, small businesses should select an AI platform that is compatible with the existing systems and consider the scalability of the platform for future growth. To create the right infrastructure, small businesses should determine if the existing IT infrastructure supports the adoption of AI and upgrade models where needed to support the new tech.

7.3. Financial Resources Allocation for AI Implementation

Strategic allocation of financial resources is crucial for the effective implementa-

tion of AI in small-sized businesses [13] [38]. This is not only about capital investment but also budgeting for ongoing costs, such as employee training, maintenance, and updates. According to Perifanis & Kitsios [39], strategic budget management can make way for pilot initiatives or strategic AI initiatives vital for future business success.

Smart budget planning would include developing a clear budget for initial AI adoption and include costs for potential scalability, training and support [38]. Strategic financial planning would include exploring multiple funding options such as loans and grants, which is necessary, and monitoring AI investment returns against predefined metrics.

8. Future Implications and Opportunities

Eyeing the future, the existing literature reveals multiple trends that will redesign the future of AI and automation in small and medium businesses [40]-[42]. The coming out of cloud-based AI solutions is anticipated to lower the entry barriers, making advanced technology tools more available to small enterprises [43]. In addition, the rising focus on responsible AI, responsible automation and data ethics will trigger small businesses to implement systems that guarantee accountability and transparency in AI and automation deployment. As the business and technology fields evolve, ongoing research will be important to explore new opportunities and remit emerging challenges in the incorporation of AI and automation in small and medium businesses. The present literature has it that although the adoption of AI in small businesses bears substantial opportunities for increasing competitiveness via digital innovation, several challenges need to be addressed. By understanding the factors impacting AI implementation, the benefits of customer engagement, operational efficiency and data-fueled decision-making, small and medium businesses can equip themselves for success in rapidly competitive environments. Continued collaboration and research will play a pivotal role in promoting a supportive landscape for AI and automation integration, helping small businesses to flourish in the digital age.

8.1. Future Perspective

As AI and automation continue to evolve, their potential to change small businesses will substantially expand, reshaping the future ecosystem of business competitiveness and operations [8] [36]. A number of key developments and trends are likely to affect the ways in which small and medium businesses adopt AI into their operations, offering both challenges and opportunities.

8.1.1. Increased Accessibility of AI Technologies

The rising accessibility of AI and automation to small businesses is one of the most promising trends [40]. The escalation of cloud-based AI solutions has minimized the barriers to entry, permitting smaller enterprises to have access to

powerful tools that were initially only available to larger enterprises. As technology providers keep on offering user-friendly stages, small and medium businesses will find it less challenging to implement AI without significant upfront investments. This trend is anticipated to democratize AI and automation access, enabling more small organizations to utilize their capabilities for growth and innovation.

8.1.2. Growing Importance of Data Governance and Ethics

As small and medium businesses increasingly depend on AI and automation for customer engagement and decision-making, data governance and ethics will be on the front line [44]. Concerns about data security, privacy and algorithmic bias will call for the adoption of systems to ensure the responsible use of these technologies. Small and medium firms will have to prioritize accountability and transparency in their AI implementations, growing customer trust and guaranteeing compliance with regulatory standards. This emphasis on ethical tech practices will be crucial for sustainable growth and ensuring a positive business reputation.

8.1.3. Advancements in AI and Automation Technologies

The current advancements in AI and automation technologies, including computer vision, language processing and machine learning, will offer small businesses even more complex tools to improve their operations [44]. For example, advancements in AI-fueled analytics will help small businesses extract deeper insights from their data, driving more informed decision-making. In addition, advancements in automation tech will also permit these businesses to further smoothen their operations, minimizing operational costs and driving efficiency [8] [23]. As these technologies keep on advancing, small and medium businesses will need to stay agile and informed in implementing the latest advancements.

8.1.4. Collaboration and Ecosystem Development

The future will also witness a focus on collaboration among small businesses, tech providers and academic institutions to promote innovation. By building networks and partnerships, small businesses can access resources, share best practices and co-build AI solutions that address particular industry needs. Collaborative landscapes can also fuel the development of designed AI applications, guaranteeing that small businesses can effectively and sustainably leverage AI. This collaborative strategy will be crucial in overpowering the hardships related to AI adoption, mainly in resource-constrained environments.

8.1.5. Focus on Upskilling and Talent Development

With the rate at which AI is becoming an integral component of business operations, the demand for skilled personnel who can deploy and manage AI tech will go high. Small and medium businesses will be required to prioritize up-

skilling their workforce to guarantee they have the required expertise to harness AI successfully. Mantri & Mishra [11] mentions that training programs that emphasize digital skills, AI literacy and data analytics will be pivotal for helping employees to adapt to new tech. By investing in talent advancement, small businesses can gather a workforce that is equipped to fuel competitive advantage and innovation.

8.1.6. Personalization and Customer-Centric Strategies

Perifanis & Kitsios [39] assert that the future of AI and automation in small businesses will be highly characterized by an even bigger concentration on customer-centric and personalization approaches. As AI technologies become more developed, small and medium businesses will be able to generate highly designed experiences that relate to individual customers. By adopting AI and automation for improved customer insights, small and medium businesses can build customized marketing campaigns and product recommendations that promote loyalty and fuel sales [12]. This transformation towards customer-based operations will be vital for small businesses looking for unique features in competitive markets. The future of both AI and automation in small businesses is assured of substantial evolution fueled by developments in tech, maximizing accessibility and a growing focus on ethical practices.

As small businesses get through this ecosystem, they will have to prioritize collaboration, invest in talent advancement and embrace innovation to increase the benefits of AI. By doing this, small and medium businesses cannot only improve their customer engagement and operational efficiency but also build a competitive edge in a rapidly changing business ecosystem [23]. The effective integration of AI and automation will resultantly empower small businesses to do better in the digital era, bringing them out as innovative and agile leaders in their respective industries.

9. Conclusion and Recommendations

AI and automation present immense opportunities for small businesses, from improving efficiency, giving small businesses a competitive edge, aiding with marketing, saving on resources and time, to enhancing customer experience. However, challenges such as financial constraints, insufficient skilled personnel, regulatory concerns and rigid organizational structures, among others, must be addressed. By adopting a strategic approach, small businesses can leverage AI to drive growth, competitiveness, and long-term sustainability.

As small and medium businesses continuously embrace the capability of AI and automation tech, they are assured to reap significant benefits that can result in sustainable resilience and growth in a competitive environment. The findings of this study spotlighted that although AI and automation implementation can result in exceptional advancements in efficiency and productivity, small businesses must navigate through several challenges, such as financial barriers, tech-

nical limitations, and regulatory concerns. Addressing these constraints is vital for increasing the potential of AI and automation and guaranteeing accountable use of technology. Emphasizing transparency and data ethics will be important for compliance with regulatory frameworks and creating trust with stakeholders and customers.

The future of AI and automation in small businesses is characterized by developments in tech, maximized accessibility to AI tools, and a growing emphasis on knowledge sharing and partnership. By promoting collaboration with tech providers and investing in workforce development, small businesses can gather the skills needed to effectively harness AI.

By strategically leveraging AI and automation, small businesses can bring themselves out as agile competitors, resultantly contributing to economic development and growth. The journey towards AI and automation adoption is not just about technology adoption but also about redesigning organizational mindsets and cultures to embrace the responsibilities and opportunities that accompany digital innovation. As small and medium organizations embark on this journey, their dedication to continuous learning and ethical practices will play a vital role in designing a prosperous and sustainable future in the digital era.

Limitations and Avenues for Future Study

Like many other studies, this study had a set of limitations. For instance, this study exclusively relied on available literature and secondary data. Although its review approach permitted a broad analysis of the existing literature, it does not offer first-hand data on the topic. Future research should consider utilizing primary data collection. This will help validate findings, experience real-world opportunities and challenges, and generate more practical recommendations for AI and automation adoption. Also, while the systematic review was extensive, the database scope was limited to sources not older than five years. As a result, some relevant studies have been excluded due to the filtering process. In addition, the study only considered journal articles and case reports, removing book chapters among other grey literature documents. Lastly, the keywords utilized in the search strategy may have an impact on the count of sample records considered in this review. Future research should consider using text mining tools such as R-software to generate nuanced insights into the study. Despite the mentioned limitations, this research addressed essential research gaps in literature. A relevant idea that can help narrow the existing literature gap is conducting differentiated research on AI implementation among different small business size classifications, which include small, medium and micro.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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