

Artificial Intelligence Adoption for Small, Medium and Micro-sized Enterprises in Developing Countries: A Scoping Review

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ARTICLE INFO

ABSTRACT

Received: 30 Dec 2024

Revised: 19 Feb 2025

Accepted: 27 Feb 2025

Introduction: Artificial Intelligence (AI) is a transformative force in the Fourth Industrial Revolution; driving innovation and digital transformation across diverse sectors worldwide. For small enterprises in developing countries, AI adoption promises enhanced competitiveness, operational efficiency and customer engagement. Despite its potential, AI adoption rates remain low, limiting growth and sustainability.

Objectives: This study aims to explore the current status of AI adoption in developing countries by identifying key enablers and benefits, analysing barriers and challenges, and examining implementation strategies that facilitate effective AI adoption.

Methods: The study adopted a scoping review approach. Articles from online databases including ResearchGate, Google Scholar, Emerald Journal, Scopus and ScienceDirect ranging from the years 2021 to 2025, were used. The review analysis was performed using the PRISMA framework on 29 selected articles.

Results: The findings indicate that although AI adoption offers notable benefits including improved operational efficiency, enhanced decision-making abilities, and enriched customer and user experiences, its successful implementation depends on factors such as strong leadership and organizational support, robust technical infrastructure, and adequate knowledge and skills. Despite these potential benefits, small enterprises continue to face significant challenges, including limited expertise, financial constraints, and insufficient infrastructure. The literature recommends enhancing AI adoption through capacity building via education and training, infrastructure investment, and collaborative partnerships. It also emphasizes the need for clear policies and a phased approach to ensure sustainable integration of AI technologies.

Conclusions: The adoption of artificial intelligence by small enterprises is shaped by multiple factors that influence both implementation and operations. While AI offers significant benefits across sectors, technical and non-technical challenges remain. For effective and sustainable adoption, small enterprises must align AI with their capabilities and collaborative efforts among government and industry.

Keywords: Artificial Intelligence; small enterprises; SMME; digital technologies; digital transformation; technology adoption; AI Adoption; developing countries

INTRODUCTION

Artificial Intelligence (AI) serves as a crucial technology in the Fourth Industrial Revolution (4IR), driving major changes across various sectors. [1, p. 1] note that the discipline of artificial intelligence integrates scientific and engineering concepts to develop systems that demonstrate intelligent behaviour similar to that of humans. It plays a

crucial role in enabling and driving digital transformation, which is now widely recognised as a critical component for progress across in developing countries. While regions such as Europe and Asia lead in AI adoption, developing countries must actively pursue digital transformation to fully harness the benefits of artificial intelligence [2, p. 7].

Small enterprises serve as an essential pillar for economic stability, job creation, innovation, and social development. It is a national priority to support and cultivate these enterprises to tackle unemployment and encourage sustainable economic growth. In South Africa, small enterprises make up approximately 91% of formal businesses in the country and contribute about 34% to the national GDP. They are vital for fulfilling the National Development Plan's goal of creating 11 million jobs by 2030 [3].

[4, p. 3] highlights the significant benefits of AI in the construction industry, such as saving time and optimising production. By adopting AI-driven solutions, construction professionals can enhance productivity, reduce costs, improve worksite safety, strengthen risk management, and improve project quality. Additionally, the adoption of AI into mental health services may help address issues related to stigma and accessibility. AI-powered chatbots can support digital mental health solutions, particularly in regions where traditional mental health services are limited [5, p. 2]. This sector-specific focus highlights the diverse potential of AI to enhance the competitiveness of small, medium and micro-sized businesses in various fields.

Organisations of all sizes are recognising that AI tools can contribute to operational efficiency, especially in enhancing customer experience; however, they have not yet succeeded in maximising the potential benefits [6, p. 2]. Small, medium and micro-sized businesses often hesitate to embrace digital transformation because they lack awareness of the digital tools tailored to their industry [7], [8]. This hesitation stems from several obstacles they face, including a lack of IT infrastructure, high costs [9, p. 7] and insufficient skills [10], [11].

While the interest of Artificial Intelligence (AI) among small enterprises is on the rise, its adoption varies, with both notable successes and substantial challenges. Studies show that small, medium and micro-sized businesses demonstrate a relatively high rate of innovation, exhibiting the highest innovation levels across all business size categories [12, p. 11].

Despite promising findings regarding AI adoption among small, medium and micro-sized businesses, several knowledge gaps remain. Existing research indicates that AI adoption dynamics differs significantly between small and medium enterprises and larger, well-established enterprises, with findings often fragmented and lacking consistency [6, p. 11]. A more comprehensive understanding of the factors influencing AI adoption, along with its associated benefits, is needed. Additionally, further research is required to investigate context-specific challenges and barriers, which could inform tailored strategies to enhance AI adoption and its impact across various industries. This underscores the necessity for a systematic synthesis of the available evidence.

OBJECTIVES

The study aims to explore the current state of AI adoption by small enterprises in developing countries. Its objectives are: (1) To conduct mapping research on the adoption of artificial intelligence in small enterprises within developing countries, (2) to identify the key enablers of AI adoption and the associated benefits, (3) to analyse the barriers and challenges that hinder its adoption and to examine implementation strategies that can ease and support effective AI Adoption.

METHODS

A scoping review provides a comprehensive overview of the existing literature, emphasising the breadth of available evidence rather than addressing narrowly focused research questions. This study employed scoping review approach to explore the factors, benefits, challenges/barriers, and implementation strategies for AI adoption within the context of developing countries. This review was carried out following the PRISMA statement, which offers updated recommendations for reporting systematic reviews. The Preferred Reporting Items for Systematic (PRISMA) framework provides a structured, rigorous, transparent, and standardised approach to synthesise existing knowledge [13, p. 2].

Eligibility criteria

Scoping reviews utilize the PCC (Population, Concept, and Context) framework to establish a well-defined and organized foundation for determining the review's scope and emphasis [14, p. 4]. In this study, the PCC framework was employed to guide the identification of key elements relevant to the topic, with the elements detailed in Table 1 below.

Population (P)	Small, Medium and Micro-sized enterprises
Concept (C)	Adoption of artificial intelligence technologies
Context (C)	Business and technology environment across all relevant sectors/industries in developing countries.

Table 1: PCC Elements (Researcher)

Information sources

It is important for the researcher to carefully choose and record the sources of information utilized in their review and ensure that their work remain transparent and can be reproduced by others. This is crucial not only for the review's credibility but also for future studies that might expand on these findings [15, p. 7].

To locate the appropriate articles for the review, a comprehensive search was conducted across several electronic databases, including ResearchGate, Google Scholar, Emerald Journal, Scopus and ScienceDirect. These databases were selected because they encompass peer-reviewed research and are predominantly used by researchers from various disciplines.

Search Strategy

It is important for the researcher to carefully choose and record the sources of information utilised in their review and ensure that their work remain transparent and can be reproduced by others. This is crucial not only for the review's credibility but also for future studies that might expand on these findings [15, p. 7]. Failing to thoroughly search relevant sources can result in missing critical studies, which leads to biased or incomplete outcomes. The search was conducted focusing solely on journal and conference papers. Due to their low impact and quality, seminars and proceedings were not considered [1, p. 3]. The criteria for screening the identified articles were established using the PRISMA framework. Table 1 outlines the inclusion and exclusion criteria used for selecting articles in the study.

Inclusions criteria	Exclusions criteria
Articles published between 2021 and 2025.	Articles published before 2021.
Peer-reviewed journal articles and conference papers.	Non-peer-reviewed materials and grey literature.
Articles published only in English language.	Articles published in non-English language.
Studies that focus on AI adoption in developing countries.	Studies outside the geographic focus or unrelated to AI adoption in developing countries.
Qualitative, quantitative, mixed-methods	Theoretical only paper without empirical grounding.

Table 2: Inclusion and exclusion criteria (Researcher)

The full search strategy used in this review is detailed below for reproducibility:

Full search strategy:

- Database: ScienceDirect
- Date searched: June 2025
- Search String Used:

("Artificial Intelligence" OR "AI") AND ("adoption" OR "implementation") AND ("small enterprises" OR "SMME" OR "SME") AND ("Digital transformation" OR "digital technologies") AND ("developing countries").

Search development and execution:

- The search strategy was developed and executed by the reviewer responsible for this analysis.
- The review was carried out by a single individual, no formal peer review of the search was conducted; however, an iterative refinement to the strategy was continuously performed.

Search limitations and filters applied:

- Language: English-language publications only, due to limited translation resources.
- Publication date: Limited to studies published between 2021 to 2025, to capture recent developments in AI adoption.
- Publication type: Peer-reviewed journal articles, conference papers
- Rationale: These filters were applied to maintain the relevance, manageability and quality of the studies selected.

Selection of articles

The success of scoping reviews is heavily dependent on the comprehensiveness of the database searches and the subsequent screening of articles. Missing pertinent articles during these vital stages may introduce bias, while including inconsistent studies might lead to misleading and incorrect conclusions [16, p. 2]. This study adopted PRISMA's structured approach to conducting systematic reviews through four key stages: identification, screening, eligibility, and inclusion. The PRISMA statement provides guidelines for reporting systematic reviews in a clear and comprehensive manner [17, p. 1]. All eligible articles were carefully reviewed, and all references related to AI adoption were extracted and compiled. The data were recorded in a Microsoft Excel spreadsheet.

To avoid duplicate articles, during the screening phase the collected data was imported into Zotero for duplicate removal. The criteria for inclusion and exclusion, as shown in Table 2, were applied to screen the titles and abstracts of the articles to identify relevant articles. Full texts were then obtained and evaluated for their relevance and quality. Additional screening excluded articles that failed to meet the specific eligibility criteria, such as incorrect content or not clear study objective, resulting in a final selection of articles for detailed analysis.

Data handling

Following the identification of relevant articles, a standardised data charting form was developed to systematically extract relevant information from each included source of evidence. A data charting table was created in Microsoft Excel to record study characteristics and capture information on enablers, barriers/ challenges, benefits, and implementation strategies related to the adoption of artificial intelligence in small enterprises. The table was continuously updated and refined to ensure comprehensive and relevant data capture across all included studies.

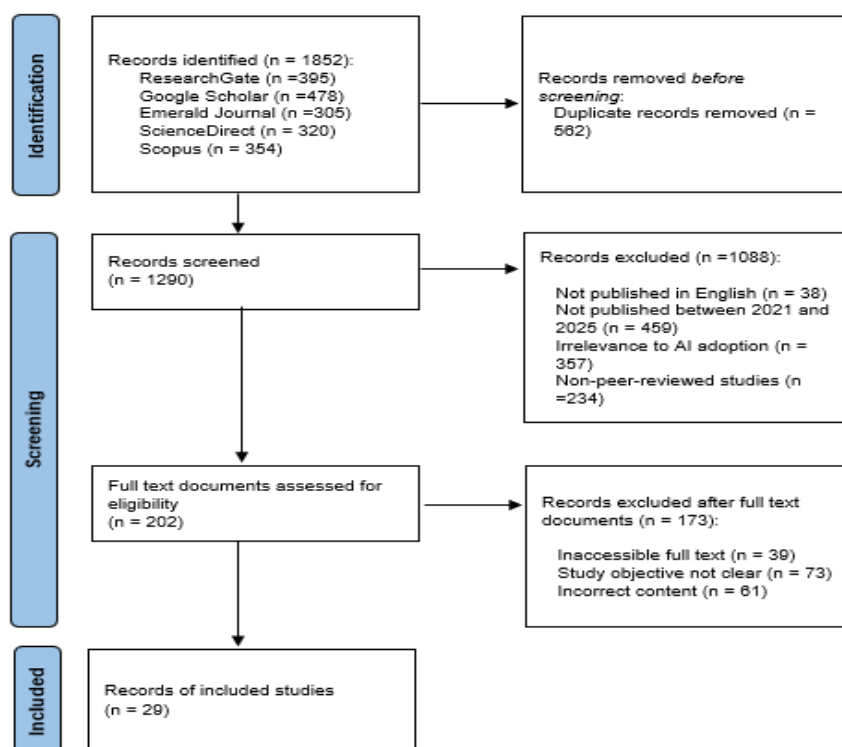
The data was analysed to identify patterns by grouping findings into themes such as factors, barriers/challenges, and benefits of AI adoption. This thematic categorisation helped to reveal common trends. The results were summarised in a clear narrative that emphasised the main findings. Furthermore, visual aids such as charts were employed to improve clarity and aid comprehension, effectively addressing the review questions and offering a thorough overview of the evidence.

For PRISMA led scoping review, critical appraisal is essential to ensure reliability and validity of the chosen studies [18, p. 1]. The Joanna Briggs Institute (JBI) Critical Appraisal Tool was utilised based on its alignment with the objectives of this review. These tool systematically and transparently assessed the trustworthiness, methodological quality, and relevance of the sources of evidence included. These tool systematically and transparently assessed the trustworthiness, methodological quality, and relevance of the sources of evidence included. The reviewer utilised the relevant JBI checklist for each included study. Each checklist item was assessed using a standardised response of "Yes," "No," or "Unclear," in accordance with the eight key JBI criteria. Microsoft Excel was used to record the information.

RESULTS

Initially, 1852 records were identified. After eliminating 562 duplicates, 1290 unique records remained for screening. The titles and abstracts were reviewed to filter out studies that did not align with the inclusion criteria, leading to the exclusion of 1088 records due to irrelevance, non-English language, and more. The remaining 202 articles were then evaluated in full text for eligibility.

During full-screening phase, 173 articles were excluded for reasons including the study objective not clear, incorrect content and inaccessible full text. The selection process is depicted in Figure 1, which outlines the number of records identified, screened, excluded, and included, along with the reasons for exclusions at each step. The final selection of total of 29 articles met the all the set criteria, representing the most appropriate, recent, and methodologically robust studies, offering a thorough understanding of AI adoption in small enterprises. Figure 1 presents the results of the database search as a PRISMA flowchart.



Source: Page MJ, et al. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Figure 1: Flowchart for selecting article (Researcher)

Table 3 provides the characteristics of each evidence source, listing the data elements charted for analysis along with relevant citations.

Source #	Year	Research method	Region	Sector	Type of Publication	Citation
1	2024	Quantitative	South Africa	Financial Services	Journal Article	[19]
2	2024	Quantitative	Jordanian	Mixed	Journal Article	[9]
3	2022	Quantitative	United States	Financial Services	Journal Article	[20]
4	2023	Quantitative	Indonesia	Financial Services	Journal Article	[21]

5	2023	Quantitative	Germany	Mixed	Journal article	[22]
6	2021	Qualitative	Germany	Manufacturing	Conference Paper	[23]
7	2023	Quantitative	South Africa	Mixed	Journal article	[7]
8	2022	Qualitative	South Africa	Mixed	Conference paper	[24]
9	2024	Mixed method	South Africa	Mixed	Journal article	[25]
10	2025	Qualitative	Sub-Saharan Africa	Health	Journal Article	[26]
11	2024	Mixed method	India	Agriculture	Conference paper	[27]
12	2024	Qualitative	India	Sales	Conference paper	[11]
13	2025	Qualitative	Finland	Consultancy services	Conference paper	[28]
14	2024	Quantitative	Indonesia	Higher Education	Journal article	[29]
15	2025	Quantitative	Nepal	E-commerce	Conference paper	[30]
16	2024	Mixed method	South Africa	Information Technology	Journal article	[31]
17	2024	Mixed method	South Africa	Government	Journal article	[32]
18	2025	Qualitative	Morocco	Construction	Journal article	[4]
19	2025	Qualitative	South Africa	Supply Chain	Journal article	[33]
20	2025	Qualitative	South Africa	Mixed	Journal article	[34]
21	2024	Qualitative	South Africa	Mixed	Journal article	[35]
22	2025	Quantitative	South Africa	Manufacturing	Journal article	[36]
23	2024	Quantitative	South Africa	Marketing	Journal article	[37]
24	2024	Qualitative	South Africa	Supply Chain	Journal article	[10]
25	2024	Quantitative	South Africa	E-commerce	Journal article	[38]
26	2025	Quantitative	Jordanian	Information Technology	Journal article	[39]
27	2025	Quantitative	UAE	Government	Journal article	[40]
28	2025	Quantitative	Ukraine	Accounting and Auditing	Journal article	[8]
29	2025	Quantitative	China	Mixed	Journal article	[41]

Table 3: Characteristics of selected sources (Researcher)

The selected sources were critically appraised, as shown in Table 4.

Author(s) & year	Criterion 1: Were the criteria for inclusion in the sample clearly defined?	Criterion 2: Were the study subjects and the setting described in detail?	Criterion 3: Was the exposure measured in a valid and reliable way?	Criterion 4: Were objective, standard criteria used for measurement of the condition?	Criterion 5: Were confounding factors identified?	Criterion 6: Were strategies to deal with confounding factors stated?	Criterion 7: Were the outcomes measured in a valid and reliable way?	Criterion 8: Was appropriate statistical analysis used?
[19]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
[9]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
[20]	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes
[21]	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes
[22]	Yes	Yes	Yes	Yes	Unclear	Unclear	Yes	Yes
[23]	Yes	Yes	Yes	Unclear	Unclear	No	Yes	Unclear
[7]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[24]	Yes	Yes	Unclear	Yes	Yes	No	Yes	No
[25]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[26]	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	No
[27]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[11]	Yes	Yes	Yes	Yes	Unclear	No	Yes	No
[28]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[29]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[30]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes

[31]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Unclear
[32]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[4]	Yes	Yes	Yes	Yes	Unclear	No	Yes	No
[33]	Yes	Yes	Yes	Yes	Unclear	No	Yes	No
[34]	Yes	Yes	Yes	Yes	Unclear	No	Yes	No
[35]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[36]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[37]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[10]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[38]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[39]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[40]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[8]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes
[41]	Yes	Yes	Yes	Yes	Unclear	No	Yes	Yes

Table 4: JBI appraissal results (Researcher)

All studies clearly outlined their criteria for inclusion and provided detailed descriptions of the study participants and environments. The measurement of exposure and outcomes was conducted with validity and reliability across all studies, reflecting strong data collection and analysis methods. However, confounding factors were often insufficient; only five out of 29 studies identified them, and just two reported strategies to manage them. Overall, the results show that the selected studies meet the established quality criteria.

The selected articles were published between 2021 and 2025, highlighting AI as an evolving topic. The peak in publications occurred in 2024, with a total of 12 articles, while 2021 had the least, indicating the initial stages of AI adoption (see Figure 2).

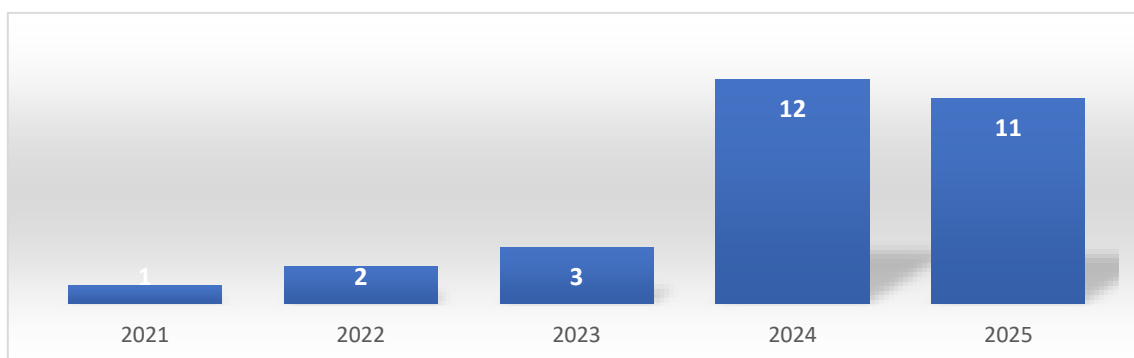


Figure 2: Number of articles per year (researcher)

Of the 29 selected for analysis, 23 were journal articles, making up approximately 79% of the study (see Figure 3).

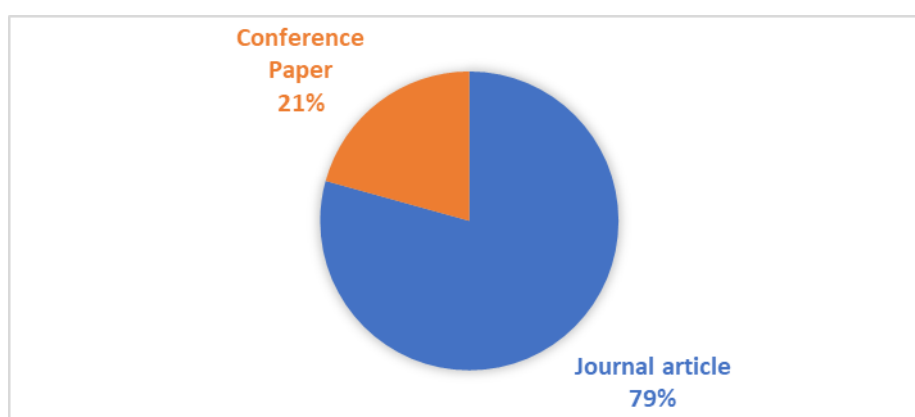


Figure 3: Publication Type (researcher)

Figure 4 illustrates the research methods utilized in these publications, showing that quantitative methods was the most frequently used method.

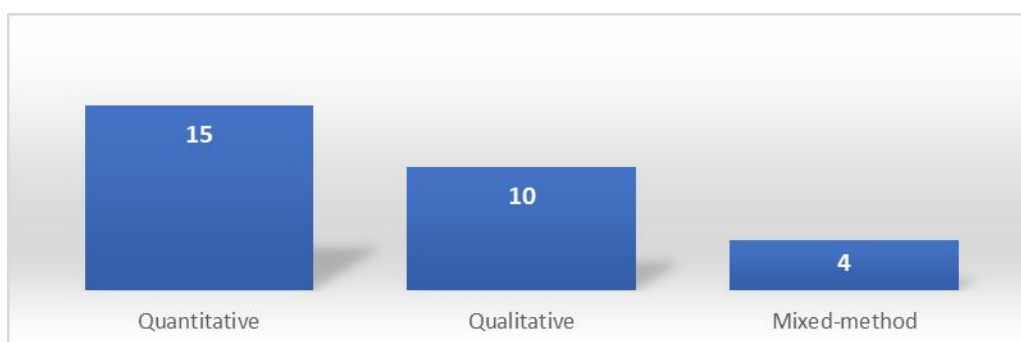


Figure 4: Articles Research Method (Researcher)

The reviews emphasised that AI adoption in small enterprises is influenced by robust IT infrastructure, visionary leadership, and supportive regulatory frameworks. These factors are further reinforced by sufficient funding, continuous training, and favourable consumer perceptions.

AI offers several benefits to organisations, including improved efficiency, increased productivity, and improved decision-making. These are also linked to greater customer satisfaction, reduced operational costs, and expanded opportunities for innovation and job creation.

Despite the benefits of AI, its adoption is not without challenges. Skills shortages, high implementation costs, and infrastructure limitations are the most persistent barriers. Additional concerns involve unclear strategic direction,

data privacy issues, resistance to change, and difficulties in system integration. These factors are often interrelated and demand comprehensive, coordinated solutions.

The reviews recommended strategies that involve allocating resources to education and training, supporting innovation, improving regulatory systems, and obtaining government support. Additionally, cross-sector collaboration and building trust are crucial for the successful and sustainable integration of AI.

The adoption of AI is influenced by several key elements. Influencing factors serve as positive drivers that facilitate the adoption of AI, while challenges and barriers acts as obstacles that hinder its progress. Successful AI adoption leads to several benefits including increased efficiency, productivity, and innovation. To strengthen and improve AI adoption, specific recommendations are proposed to address and mitigate the existing challenges and barriers. Implementing these recommendations is crucial for overcoming obstacles, thereby establishing a continuous improvement cycle sustains and advances AI adoption. The concept map of the findings is illustrated on figure 5.

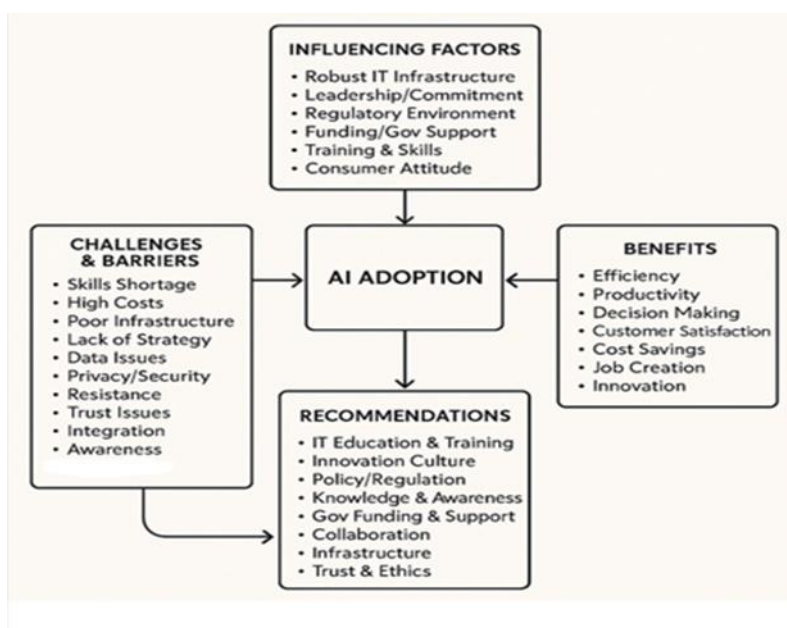


Figure 5: Concept map of the findings (researcher)

The analysis identified findings relevant to the review questions, as shown in table 5.

Review Objective	Key points
RO1: Influencing Factors	Robust IT infrastructure leadership, regulation, skills, funding, government support, training, consumer attitude
RO2: Benefits	Efficiency, productivity, decision-making, customer satisfaction, cost savings, job creation, innovation, accuracy
RO3: Challenges/Barriers	Skills shortage, high costs, poor infrastructure, lack of strategy, data issues, privacy/security, resistance, trust, integration, awareness
RO4: Implementation strategies	Training and education, infrastructure and financial Support, policy and governance, cross-sector collaboration, change management and trust building.

Table 5: Studies findings (researcher)

Ethical considerations

This study is based entirely on existing published research and does not involve primary data collection from human participants or animals. As such, ethical approval from a research ethics committee was not required. All sources included in the review were properly cited to acknowledge original authorship and intellectual property. The selection

and analysis of studies were conducted objectively and transparently, following established guidelines to minimise bias and ensure reproducibility.

DISCUSSION

The analysis of 29 research studies explored artificial intelligence adoption across multiple industries, providing an overview of the factors, benefits, challenges/barriers, and recommendations that affect how organisations implement AI technology. The investigation covered a wide range of sectors such as financial services, manufacturing, healthcare, agriculture, construction, e-commerce, government, and mixed domains, establishing a strong foundation for understanding how AI was being integrated into diverse operational environments. The results revealed common themes for successful AI adoption in organisations of various sectors.

Key enablers driving AI adoption

Effective leadership and organizational support are essential for the successful adoption of AI, with management's dedication being crucial. Numerous studies emphasized the importance of strong executive sponsorship and visible leadership support to advance AI initiatives [9], [11], [19], [29], [31], [33], [34], [41].

Well-established policy frameworks and governance structures further guide these initiatives, ensuring their alignment with the organization's overall objectives. Supportive leadership creates an environment where AI projects are actively promoted and prioritized by senior management.

Equally important to successful AI adoption are an organisation's technical infrastructure and capabilities, as emphasised by [20], [31], [33], [36], [41]. A robust IT infrastructure provides an essential technological foundation for deploying and scaling AI solutions effectively. Access to advanced tools and platforms enables the teams to experiment, develop, and implement AI technologies efficiently. Moreover, technical skills such as expertise in relevant software and hardware, are crucial for maintaining and advancing AI initiatives.

Lastly, the development of human capital is fundamental to AI success, with education and training programs providing employees with the knowledge and skills needed to work effectively with AI systems as discussed by [9], [19]. Comprehensive workforce preparation ensures adaptability at all staff levels, and continuous skill development encourages ongoing innovation, allowing organizations to stay competitive as AI technologies evolve.

Primary benefits identified

The organisations could gain numerous AI-driven advantages through successful adoption of AI. One of the key benefits is operational efficiency, as studies in various sectors consistently highlighted increases in productivity, streamlined processes, and overall improved efficiency [11], [22], [30], [32], [35], [37], [39], [40].

Additionally, AI significantly enhances decision-making capabilities. Studies by [10], [26], [30], [32], [39] outlined that AI systems optimise resource allocation, improve accuracy, and enable more informed data-driven decision processes.

Numerous studies [29], [30], [34], [38], [40] have demonstrated that the AI technology has a significant impact on customer and user experience by enabling personalised interactions, boosting customer engagement, and enhancing service quality. Finally, AI is recognised as a critical driver of competitive advantage, through enabling organisations to differentiate themselves and strengthening their market position through innovation and improved operations, as noted by [10], [11], [33], [34], [35], [37], [38].

Significant barriers and challenges

The research reveals consistent patterns of implementation challenges and barriers that organizations face in the adoption of AI technologies. Financial constraints emerge as a major barrier, as evidenced by studies from [7], [9], [9], [21], [22], [34], highlighting both high initial investment costs and ongoing operational expenses associated with AI adoption. Skills and knowledge gaps represent another critical barrier as noted by [10], [23], [24], [25], [31], [32] organizations struggle to recruit and develop personnel with the necessary AI expertise and technical competencies.

Technical and infrastructure limitations, such as inadequate technological foundations, poor data quality, and connectivity issues also undermine successful AI deployment as emphasised in studies by [8], [24], [25], [27], [32], [36]. Moreover, organisational resistance remains a significant challenge, including reluctance to embrace change [11], [33], [35], risk aversion [7], and insufficient trust in AI systems [11], [30] all of which hinder the successful implementation.

Finally, data and privacy concerns, including issues of data security, privacy protection obligations, and ethical considerations, are frequently identified as significant challenges hindering AI adoption [8], [22], [29], [30], [32], [35].

Strategic recommendations

Many studies highlight the importance of capacity building and education, recommending training programs, skills development initiatives, and awareness campaigns to improve AI literacy within organisations.

[28], [32], [34] emphasised the importance of partnership and collaboration, advocating for the use of public-private partnerships and external expertise to effectively address implementation challenges. Infrastructure investment remains a key recommendation, with numerous researchers emphasising the necessity of significant funding in digital infrastructure, modernisation of legacy systems, and development of technical capabilities to facilitate effective AI adoption.

The importance of developing comprehensive policies and frameworks is also evident, as highlighted by [10], [27], [32], [33], [34] who advocated for well-defined regulatory guidelines and effective government support mechanisms. Furthermore, a phased implementation approach is commonly recommended, as it will enable organisations to strategically adopt AI in stages rather than undergoing an immediate, comprehensive transformation. This method allows for incremental development of AI capabilities.

Limitations

This study focused exclusively on peer-reviewed papers published from 2021 to 2025, sourced from popular online databases including ResearchGate, Google Scholar, Emerald Journal, Scopus and ScienceDirect. This narrow focus may lead to publication bias, as studies reporting significant findings are more likely to be published than those with non-significant or null results. Future research may consider additional databases, which might potentially provide a broader and more diverse range of findings.

This study employed a targeted search strategy; therefore, the outcome of the selected publications was influenced by the search strings, exclusion criteria used and might result in the exclusion of relevant literature. Therefore, it is important to interpret the findings of this study with caution. However, important insights have been identified that can help improve AI adoption not only within South Africa, but also in other developing countries facing similar AI adoption challenges.

Recommendations

Future research should prioritise the assessment of digital infrastructure and accessibility as a foundational component for AI adoption in small enterprises within developing countries. This includes evaluating challenges such as high internet costs, inconsistent power supply, and unreliable internet connectivity. Understanding these infrastructural dynamics is critical to identifying gaps that hinder technological progress.

Additionally, research should investigate how public-private partnerships can improve access to crucial technologies, particularly in under-resourced regions. These collaborations can enable resource sharing, reduce implementation costs, and accelerate the deployment of AI solutions. Ultimately, such partnerships can enable small enterprises to participate more effectively in the digital economy by bridging technological gaps and fostering inclusive innovation.

Conclusion

The adoption of artificial intelligence is influenced by various factors that impact the implementation process and affect how small, medium and micro-sized businesses function within an evolving business landscape. The literature on the benefits of artificial intelligence underscores its ability to enhance efficiency, competitiveness, customer

experience, and sustainability across various sectors, including finance, marketing, and human resource management.

There are several challenges involved in implementing AI, including both technical and non-technical issues. Overcoming these challenges will require collaboration among government, industry, and academic sectors to enable effective utilisation of AI, both within South Africa and in other developing economies with similar contexts.

For small enterprises; the adoption of AI should be aligned with their objectives and capabilities, as fragmented or uncoordinated efforts may not achieve the desired outcomes. Additionally, small enterprises need to adopt and adapt AI technology to stay relevant, efficient, and accountable when serving the public. In developing countries, there is a need for specific policies that foster AI understanding, reduce adoption costs, and ensure equitable access to advanced technology.

Further research should focus on empirical validation, stakeholder engagement, and sector-specific implementation models to better understand and facilitate AI readiness and impact.

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