Exploring the Capabilities of Artificial Intelligence-based Accounting Information Systems in Small and Medium Enterprises (SMEs) for Financial Performance Improvement

Dr. M. Gurupandi
Associate Professor,
Department of Commerce,
Alagappa University, Karaikudi, Sivagangai Dist. Tamilnadu State

Dr. Amol Dattatraya Randive
Assistant Professor,
Departmemt of Management,
Vishwakarma University, Pune

Dr Nandini Jagannarayan
Assistant Professor,
Hindi Vidya Prachar Samiti's Ramniranjan Jhunjhunwala College of Arts, Science and Commerce (Empowered Autonomous),
Ghatkopar (w), Mumbai-86
ORCID: 0009-0003-5909-0274
Corresponding Author

Dr. TVSS Swathi
Assistant Professor,
KL Business School,
Koneru Lakshmaiah Education Foundation,
Guntur, Andhra Pradesh, India
Orcid id:0000-0003-4250-4226

Dr. K. Jayapriya
Assistant Professor,
BBA Department,
K S Rangasamy College of Arts and Science,
Thiruchengodu, Namakkal (Dt), Tamil Nadu

Abstract

The rapid advancement of Artificial Intelligence (AI) technologies has reshaped various industries, and the field of accounting is no exception. Small and Medium Enterprises (SMEs), vital contributors to the global economy, often grapple with resource constraints and operational challenges. In this context, the integration of AI-based Accounting Information Systems (AIAIS) holds the promise of enhancing efficiency, accuracy, and decision-making capabilities within SMEs.

This research explores the effectiveness of implementing AI-based Accounting Information Systems in SMEs, focusing on their impact on operational processes, cost-efficiency, decision support, user experience, and overall performance. Through a comprehensive analysis, this study aims to evaluate how AI-driven solutions optimize financial data processing, mitigate errors, reduce processing time, and support strategic decision-making. The research's conclusions not only add to the body of knowledge in academia but also have applications for small and medium-sized businesses, accountants, and legislators.

The results of this study indicate that AI-based Accounting Information Systems significantly enhance the efficiency of financial data processing, reduce errors, and provide valuable decision-making insights. Despite initial implementation costs, the long-term benefits in terms of time and cost efficiency make AI adoption financially viable for SMEs.

This research underscores the transformative potential of AI-based Accounting Information Systems, emphasizing their role as catalysts for innovation and growth within SMEs. By embracing these advanced technologies, SMEs can position themselves competitively in the ever-evolving business landscape, paving the way for sustainable economic development and operational excellence.

Keywords: Artificial Intelligence, Accounting Information System, Small and Medium Enterprises, Effectiveness.

Introduction

In the contemporary business landscape, the adoption of advanced technologies has become imperative for the sustainable growth and competitiveness of businesses, particularly Small and Medium Enterprises (SMEs). One such groundbreaking technology that has garnered significant attention is Artificial Intelligence (AI) (Kindzeka, 2023). AI is revolutionizing various sectors by enhancing efficiency, accuracy, and decision-making processes. In the realm of accounting, AI is reshaping traditional practices and paving the way for a more streamlined and intelligent approach to managing financial information. This study delves into the profound impact of AI-based Accounting Information Systems (AIS) on Small and Medium Enterprises (SMEs), focusing on their effectiveness and the transformative potential they hold.

SMEs are essential to the global economy because they generate a lot of jobs, foster innovation, and advance the economy. However, these businesses often face resource constraints and operational challenges, making it crucial to leverage technological innovations for optimizing their processes. Traditional accounting systems, while functional, may fall short in addressing the complexities of modern business transactions. AI, with its ability to analyze vast datasets, identify patterns, and automate tasks, offers SMEs an opportunity to enhance their accounting practices significantly.

This intersection of AI and accounting has led to the emergence of AI-based Accounting Information Systems (AIAIS) which have the potential to revolutionize the way financial data is processed, analyzed, and utilized by SMEs. Smith et al. (2017) offered a qualitative analysis of SMEs implementing AI applications, shedding light on the challenges faced and strategies employed. The research highlighted the importance of user experience and effective training in successful AI integration within SMEs. The economic aspects of innovation and technology adoption was examined by Teece (2018) offering valuable insights for decision-makers who are exploring AI-based solutions. Though, not a SME-specific study, it discussed economic considerations and licensing models relevant to SMEs that are interested in adopting AI technologies. The investigation by Chen & Wang (2018) focused on the adoption patterns of cloud-based accounting information systems in Chinese SMEs. The research highlighted the scalability and flexibility of cloud solutions, laying the foundation for understanding the technology infrastructure supporting AI integration. The theoretical foundations of AI in accounting was presented by Zhang & Lee (2019) discussing its potential implications for financial analysis, audit procedures, and decision-making. The study provided insights into the theoretical frameworks underpinning the effectiveness of AI-based Accounting Information Systems. Marr (2019) provided insights into the broader business implications of AI adoption, emphasizing its ability to optimize processes, enhance decision-making, and improve efficiency, all of which were pertinent to SMEs. Rahman & Bhattacharyya (2020) conducted a literature review evaluating the impact of AI on accounting information systems in different industries. Their findings underscored the role of AI in data analysis, fraud detection, and financial reporting, indicating potential benefits for SMEs.

More recently, an examination of the utilization of AI in financial document processing, data extraction, verification, reconciliation, and payment execution was conducted by Kunduru (2023) and explored the potential applications of artificial AI tools, including computer vision, natural language processing, and machine learning, in the digitization of financial procedures. Difficulties such as the dearth of standardized data, the necessity for legacy system interoperability, and data security issues in AI techniques were discussed by Agustí & Orta-Pérez (2023). Their study concluded that AI-based solutions had the potential to revolutionize financial processes by enabling intelligent invoice management, intelligent approvals, and automated payment processing. Chowdhury (2023) observed that the majority of commercial organizations traditionally employed a method that faced limitations in adaptability. They aimed to develop a model based on artificial neural networks for predicting management information, with validation based on real data. The proposed model demonstrated an astonishing accuracy of 98.83% in forecasting management accounting information, meeting the requirements of accounting

information. In the study by Cao (2023), a second personalized e-commerce recommendation model based on multiple intelligences was developed to enhance the accuracy of personalized recommendations. The research also reconstructed the procedures of the traditional accounting system to improve the precision and effectiveness of accounting element recognition. An automated accounting recognition mechanism was built using the BP neural network method, optimizing the recommendation module through the use of an intelligent Q-learning algorithm.

In spite of these developments, SMEs often face resource constraints, making it challenging for them to invest in expensive technological solutions. However, the benefits that AI-based systems can offer in terms of cost reduction, time efficiency, and decision-making support are needed to be presented. This research aims to explore and evaluate the impact of AI-based Accounting Information Systems on the operational efficiency and overall performance of SMEs.

Research Gap:

The previous studies collectively demonstrated the growing interest in AI-based Accounting Information Systems and their potential to enhance the operational efficiency and decision-making capabilities of SMEs. However, it also identified several research gaps in the field of AI adoption in accounting information systems. Firstly, there is a need for an in-depth exploration of the integration challenges faced by small and medium enterprises (SMEs), focusing on specific barriers such as financial constraints, skill shortages, and resistance to change. Additionally, further investigation into the elements of user experience that contribute to successful AI adoption, as well as the most effective training methods for SMEs, is warranted. Overcoming the challenge of awareness among SMEs regarding their understanding of the effectiveness of AI in accounting information systems requires a comprehensive approach.

The present study is conducted to comprehensively assess how AI-based AIS can benefit SMEs. By understanding the challenges faced by SMEs in managing their financial information, the study aims to identify the specific ways in which AI technologies can address these challenges. Moreover, investigating the effectiveness of AI-based AIS in SMEs can shed light on the potential barriers to adoption and offer insights into strategies for successful implementation.

Objectives

1. To identify the effectiveness of AI-based accounting information systems used in small and medium enterprises
2. To analyze the difference in the effectiveness of AI-based accounting information systems used in small and medium enterprises
3. To check the impact of enterprises' characteristics on the effectiveness of AI-based accounting information system

Hypotheses

1. There is no significant difference in the effectiveness of AI-based accounting information systems used in small and medium enterprises
2. There is no significant impact of enterprises' characteristics on the effectiveness of AI-based accounting information system

Research Methodology

- Research Design: The prime objective of this research was to study the effectiveness of AI based accounting information system used in small and medium enterprises, so descriptive research design was used.
- Sampling: The population frame included all small and medium scale enterprises working in the geographical boundaries of Delhi NCR. Stratified purposive sampling was used to select the sample. The population frame was first divided into strata on the basis of type of business structure i.e. sole proprietorship, partnership and limited liability company, then from each stratum purposively those enterprises were selected who have given consent to be the part of study. In an all 67 small scale and 41 medium scale enterprises were selected under study.
- Data Collection Tool: A close-ended questionnaire was used to collect the data from the accounting departments

of small and medium-scale enterprises. The questions were related to understanding how they identified the effectiveness of AI in AIS.

- Data Analysis Tool: The data analysis was done with the help of MS Excel and SPSS. To analyze the data mean, standard deviation, coefficient of variation, t-test and ANOVA was used.

Analysis of Data

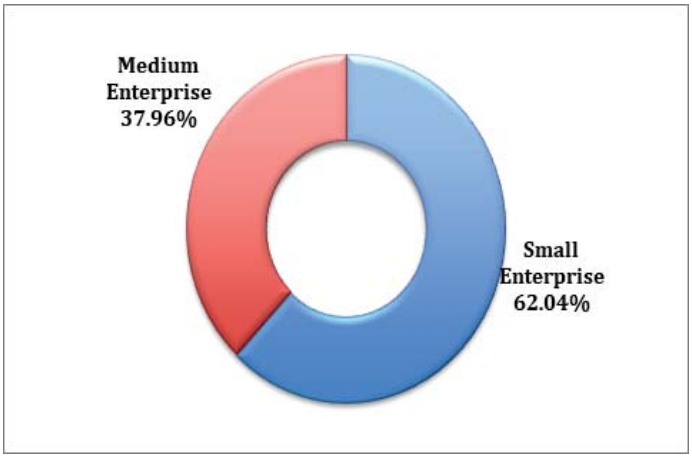
- Type of Enterprise

  As already specified in the sampling in total 108 enterprises were selected for study, out of which 62.04% enterprises (N=67) were small-scale enterprises and the rest were medium-scale enterprises (N=41, Percentage=37.96).

Table 1: Type of Enterprise

Type of Enterprise	N	Percentage
Small Enterprise	67	62.04
Medium Enterprise	41	37.96
Total	**108**	**100**

Figure 1: Type of Enterprise



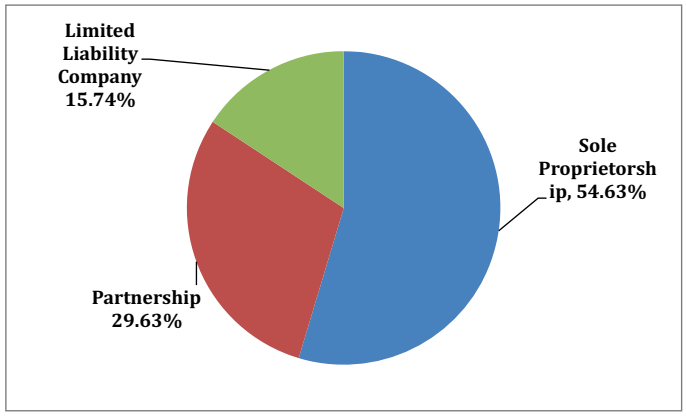
- Type of Business Structure

  Table 2 specifies three categories into which the enterprises can be classified based on their business structure. The majority of businesses (54.63%) were observed to be sole proprietorships, followed by partnerships (29.63%) and limited liability companies (15.74%).

Table 2: Type of Business Structure

Type of Business Structure	N	Percentage
Sole Proprietorship	59	54.63
Partnership	32	29.63
Limited Liability Company	17	15.74
Total	**108**	**100**

Figure 2: Type of Business Structure



- **Nature of Business**

  Enterprises could be of various types according to their nature of business, the area of operation of sample enterprises is depicted in table 3. Results highlighted that sample enterprises were involved in Manufacturing (29.63%), Services (16.67%), Agriculture & Allied Activities (23.15%), Construction (9.26%), Transportation & Warehousing (15.74%) and Educational Services (5.56%).

Table 3: Nature of Business

Nature of Business	N	Percentage
Manufacturing	32	29.63
Service Provider	18	16.67
Agriculture & Allied Activities	25	23.15
Construction	10	9.26
Transportation & Warehousing	17	15.74
Educational Services	6	5.56
Total	**108**	**100**

Figure 3: Nature of Business

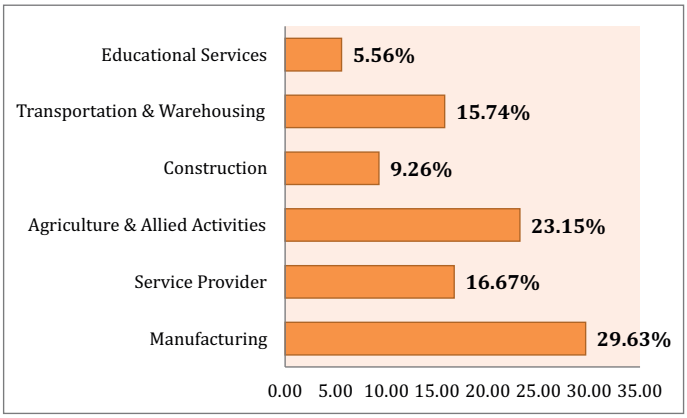
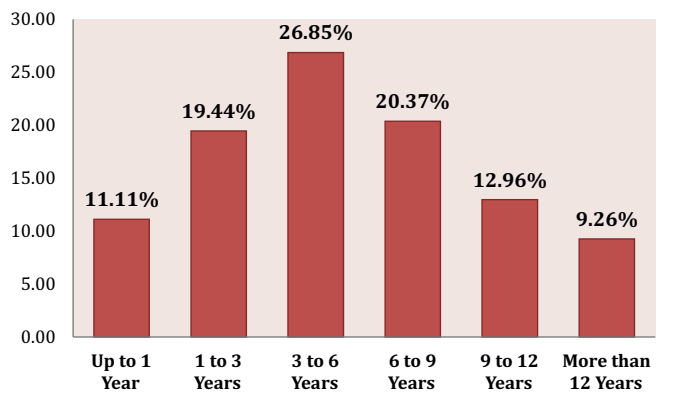


Figure 4: Age of Enterprise



- **Age of Enterprise**

Table 4 is showing the age of enterprises selected in study sample. It can be seen that maximum number of enterprises (26.85%) were 3 to 6 years old followed by 6 to 9 years (20.37%) old and 1 to 3 years (19.44%) old. 12.96% enterprises were having the business experience of 9 to 12 years, 9.26% enterprises were having the business experience of more than 12 years and 11.11% enterprises were too young who have yet not completed their first year of operation.

Table 4: Age of Enterprise

Age of Enterprise	N	Percentage
Up to 1 Year	12	11.11
1 to 3 Years	21	19.44
3 to 6 Years	29	26.85
6 to 9 Years	22	20.37
9 to 12 Years	14	12.96
More than 12 Years	10	9.26
Total	**108**	**100**

Effectiveness of AI-based Accounting Information System

Artificial Intelligence has brought drastic changes in the business world and accounting departments are not exception to it. Respondents were given a list of statements related to the effectiveness of AI-based accounting and they were asked to indicate their agreement or disagreement with those statements.

Table 5 shows the count and percentages of the effectiveness of AI-based accounting; further table 6 presents the mean, standard deviations and coefficient of variations for each statement related to the effectiveness of AI-based accounting. From the mean score, it can be inferred that AI-based accounting has increased efficiency, accuracy and penetration of data.

The respondents indicated that AI-based Accounting has automated the whole accounting process, which has made it cost efficient. It was also concluded that real-time analysis is possible with the help of AI-based accounting

Table 5: Frequency Distribution of Effectiveness of AI based Accounting Information System

Effectiveness of AI based Accounting	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statements	**N**	**%age**	**N**	**%age**	**N**	**%age**	**N**	**%age**	**N**	**%age**
AI based Accounting has automated the whole accounting process	4	3.70	11	10.19	12	11.11	59	54.63	22	20.37
AI based Accounting has increased efficiency	6	5.56	9	8.33	10	9.26	55	50.93	28	25.93

Effectiveness of AI based Accounting	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
AI based Accounting has increased accuracy	12	11.11	12	11.11	5	4.63	50	46.30	29	26.85
AI based Accounting has increased penetration of data	3	2.78	14	12.96	14	12.96	45	41.67	32	29.63
Real time analysis is possible with AI based Accounting	13	12.04	13	12.04	11	10.19	52	48.15	19	17.59
AI based Accounting is cost efficient	16	14.81	10	9.26	10	9.26	47	43.52	25	23.15

Table 6: Mean, Standard Deviation and Coefficient of Variation about Effectiveness of AI based Accounting Information System

Statement	Mean	S.D.	C.V.	Agreement Level
AI based Accounting has automated the whole accounting process	3.78	1.01	0.27	Agree
AI based Accounting has increased efficiency	3.83	1.16	0.30	Agree
AI based Accounting has increased accuracy	3.67	1.65	0.45	Agree
AI based Accounting has increased penetration of data	3.82	1.16	0.30	Agree
Real time analysis is possible with AI based Accounting	3.47	1.56	0.45	Agree
AI based Accounting is cost efficient	3.51	1.79	0.51	Agree

Table 7 is depicting the overall effectiveness of AI based accounting system. As per results 71.30% enterprises indicated that AI based accounting system is effective whereas 28.70% enterprises said that it is not effective. However from the mean score it can be inferred that AI based accounting system is effective.

Table 7: Overall Effectiveness of AI based Accounting Information System

Overall Effectiveness	N	Percentage
Effective	77	71.30
Not Effective	31	28.70
Total	**108**	**100**
Mean	**3.68**	
Result	**Effective**	

As the study has covered small and medium scale enterprises to measure the difference in effectiveness of small and medium enterprises following hypothesis has been taken under study:-

H01: There is no significant difference in the effectiveness of AI-based accounting information systems used in small and medium enterprises

Ha1: There is a significant difference in the effectiveness of AI-based accounting information systems used in small and medium enterprises

Table 8 presents the results of the independent two-sample t-test that was used to test this hypothesis. It is possible to conclude that there is a significant difference in the effectiveness of AI-based accounting information systems

used in small and medium-sized businesses because the t-statistic value is significant at the 5% level of significance, leading to the rejection of the null hypothesis. Given that medium-sized businesses' mean scores are higher than those of small businesses, it can be said that medium-sized businesses benefit more from AI-based accounting systems than do small businesses.

Table 8: t-test result to measure difference in Effectiveness of AI based Accounting Information System of Small and Medium Enterprises

Type of Enterprise	Effectiveness of AI based Accounting		t-value	p-value	Result
	Mean	S.D.			
Small Enterprise	3.52	2.051	1.981	0.047	**Significant**
Medium Enterprise	3.79	1.922			

Level of Significance=5%

The review of literature highlighted that characteristics of enterprises has significant impact on any process used in business, so in this research this hypothesis was framed:-

H02: There is no significant impact of enterprises' characteristics on effectiveness of AI-based accounting information system

Ha2: There is no significant impact of enterprises' characteristics on the effectiveness of AI-based accounting information system

ANOVA test was used to check the difference in the effectiveness of AI-based accounting systems as per characteristics of enterprises. From the results presented in Table 9, it can be seen that the F-statistic is significant for the type of business structure but it is not significant for the nature of the business and age of the enterprise. So, it can be concluded that the type of business enterprise has a significant impact on enterprises' characteristics on the effectiveness of AI-based accounting information systems. In other words, the effectiveness of AI-based accounting systems is different for sole proprietorship, partnership and Limited Liability Companies.

Table 10 is showing the mean effectiveness of AI-based accounting systems as per type of business structure. It was found that the effectiveness of an AI-based accounting system is highest for partnerships followed by Limited Liability Companies and Sole proprietorships.

Table 9: ANOVA test results to measure the difference in Effectiveness of AI-based Accounting Information Systems according to enterprises' characteristics

Characteristics of Enterprise	Source of Variation	Sum of Squares	Degree of Freedom	Mean Sum of Squares	F-Ratio	p-value	Result
Type of Business Structure	Between Samples	1648.97	2	824.486	35.218	0.000	**Significant**
	Within Samples	2458.13	105	23.411			
	Total	4107.1	107				
Nature of Business	Between Samples	1512.25	5	302.450	1.366	0.719	**Not Significant**
	Within Samples	22589.6	102	221.467			
	Total	24101.9	107				
Age of Enterprise	Between Samples	358.12	5	71.624	0.514	0.921	**Not Significant**
	Within Samples	14209.6	102	139.310			
	Total	14567.7	107				

Level of Significance=5%

Table 10: Effectiveness of AI-based Accounting Information System according to enterprises' characteristics

Enterprises' Characteristics		Mean
Type of Business Structure	Sole Proprietorship	3.51
	Partnership	3.74
	Limited Liability Company	3.66

Discussion

The study's findings provide insight into how Artificial Intelligence-Based Accounting Information Systems (AIAIS) can revolutionize Small and Medium-Sized Businesses (SMEs). The discussion of these findings is crucial for understanding the effectiveness of AI integration in enhancing operational efficiency, cost-effectiveness, decision-making processes, user experience, and overall performance within SMEs.

Operational Efficiency and Error Reduction:

One of the significant findings of the study is the substantial improvement in operational efficiency within SMEs after implementing AIAIS. Automation of repetitive and time-consuming tasks, such as data entry and reconciliation, leads to streamlined processes and reduced manual errors. By leveraging AI algorithms, SMEs can handle vast amounts of financial data swiftly and accurately (Bandari, 2019). This not only saves time but also ensures the reliability and integrity of the financial information, contributing to better decision-making processes.

Cost-Effectiveness and Return on Investment:

The study highlights the initial investment required for implementing an AI-based Accounting System. However, the long-term benefits, including reduced labour costs, lower error-related expenses, and increased productivity, significantly outweigh the initial financial outlay. SMEs adopting AI experience a notable reduction in operational costs, making the technology financially viable in the long run (AlZayani et al., 2023). The return on investment analysis indicates that the cost-effectiveness of AI integration is a compelling factor for SMEs seeking to optimize their financial operations.

Decision-Making Support:

AIAIS empowers SMEs with advanced data analytics and predictive insights. The findings reveal that AI-driven analyses provide valuable information for strategic decision-making. SMEs can make data-driven decisions based on real-time financial data, market trends, and customer behaviour patterns (Abrokwah-Larbi & Awuku-Larbi, 2023). This capability enhances the competitiveness of SMEs, enabling them to respond promptly to market changes and make informed choices that align with their business objectives.

User Experience and Training:

Effective user experience design and comprehensive training programs are critical factors influencing the successful implementation of AIAIS in SMEs. The study emphasizes the importance of user-friendly interfaces and intuitive functionalities, ensuring that employees can harness the full potential of AI tools. Moreover, well-structured training programs are essential for familiarizing employees with the new technology, addressing any concerns, and promoting user confidence (Schkarin & Dobhan, 2022). Adequate training enhances user adoption rates and maximises the benefits derived from AIAIS.

Comparative Analysis:

The AI-based accounting system of medium enterprises was found to be more effective as compared to the small enterprises, so small enterprises are suggested to use software and methods of AI-based accounting being used by small enterprises. Similarly, it was observed that the effectiveness of an AI-based accounting system is highest for partnerships followed by Limited Liability Company and Sole proprietorships, so the Limited Liability Company and Sole proprietorships are advised to learn from partnership firms how they can increase the effectiveness of AI-based accounting system.

Conclusion and Recommendations

1. The AI-based accounting system is found to be effective for the majority of small and medium-scale enterprises selected for the study. The AI-based accounting system is efficient, accurate and cost-effective so all small and medium-scale enterprises are recommended to use AI-based accounting system.
2. The AI-based accounting system of medium enterprises was found to be more effective as compared to the small enterprises, so small enterprises are suggested to use software and methods of AI-based accounting being used by small enterprises.
3. Similarly it was observed that the effectiveness of an AI-based accounting system is highest for partnerships followed by Limited Liability Companies and Sole proprietorships, so the Limited Liability Companies and Sole proprietorships are advised to learn from partnership firms how they can increase the effectiveness of AI-based accounting system.

Research Implications

This study holds immense significance for SMEs, accounting professionals, researchers, and policymakers. By providing empirical evidence on the effectiveness of AI-based Accounting Information Systems, this research can guide SMEs in their technology adoption decisions. It can also assist accounting professionals in understanding the evolving landscape of their field and adapting their skill sets accordingly. Additionally, policymakers can utilize the findings to formulate supportive policies that encourage the integration of advanced technologies in SMEs, thereby fostering economic growth and innovation.

References:

- Abrokwah-Larbi, K., & Awuku-Larbi, Y. (2023). The impact of artificial intelligence in marketing on the performance of business organizations: evidence from SMEs in an emerging economy. Journal of Entrepreneurship in Emerging Economies.
- Agustí, M. A., & Orta-Pérez, M. (2023). Big data and artificial intelligence in the fields of accounting and auditing: a bibliometric analysis. Spanish Journal of Finance and Accounting/Revista Española de Financiación y Contabilidad, 52(3), 412-438.
- AlZayani, F., Hamdan, A., & Shoaib, H. M. (2023). The Impact of Smart Technologies on SME Sustainability: The Mediation Effect of Sustainability Strategy–Literature Review. Technological Sustainability and Business Competitive Advantage, 431-454.
- Bandari, V. (2019). The Impact of Artificial Intelligence on the Revenue Growth of Small Businesses in Developing Countries: An Empirical Study. Reviews of Contemporary Business Analytics, 2(1), 33-44.
- Cao, P. (2023). Research on the impact of artificial intelligence-based e-commerce personalization on traditional accounting methods. International Journal of Intelligent Networks, 4, 193-201.
- Chen, H., & Wang, Y. (2018). Adoption of Cloud Computing and Accounting Information Systems in SMEs: An Empirical Study of Chinese Manufacturing Enterprises. International Journal of Data and Network Science, 6(5), 55-64.
- Chowdhury, E. K. (2023). Integration of Artificial Intelligence Technology in Management Accounting Information System: An Empirical Study. In Novel Financial Applications of Machine Learning and Deep Learning: Algorithms, Product Modeling, and Applications (pp. 35-46). Cham: Springer International Publishing.
- Kindzeka, K. A. C. (2023). Impact of Artificial Intelligence on Accounting, Auditing and Financial Reporting. American Journal of Computing and Engineering, 6(1), 29-34.
- Kunduru, A. R. (2023). From Data Entry to Intelligence: Artificial Intelligence's Impact on Financial System Workflows. International Journal on Orange Technologies, 5(8), 38-45.
- Marr, B. (2019). How Artificial Intelligence Is Revolutionizing Business in 2019. International Journal of Accounting Information Systems, 49, 100619.

- Rahman, S., & Bhattacharyya, D. K. (2020). Artificial Intelligence and Its Impact on Accounting Information Systems: A Literature Review.
- Schkarin, T., & Dobhan, A. (2022). Prerequisites for Applying Artificial Intelligence for Scheduling in Small-and Medium-sized Enterprises. In ICEIS (1) (pp. 529-536).
- Smith, A., Jones, B., & Wang, X. (2017). Implementing Artificial Intelligence Applications in Small and Medium Enterprises: A Multiple Case Analysis. International Journal of Accounting Information Systems, 48, 100598.
- Teece, D. J. (2018). Profiting from Innovation in the Digital Economy: Enabling Technologies, Standards, and Licensing Models in the Wireless World. Heliyon, 9(3).
- Zhang, J., & Lee, L. (2019). Artificial Intelligence and Accounting: Theoretical Perspectives and Future Directions. International Journal of Data and Network Science, 7(1), 25-34.