Assessing the Impact of Communicative Artificial Intelligence Based Accounting Information Systems on Small and Medium Enterprises

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Abstract

Recent breakthroughs in deep learning have led to the development of cutting-edge industrial applications of Communicative Artificial Intelligence (AI), making it indispensable for businesses aiming to maintain a competitive edge. Consequently, artificial intelligence is no longer exclusive to large corporations; it now impacts businesses of all sizes, including small and medium-sized enterprises (SMEs), serving as a tool for command in the production and communication of crucial business aspects. This article delves into the extent of Communicative AI adoption by SMEs in Indonesia, shedding light on issues related to implementing industrial AI applications. To achieve this, a sample of SMEs participated in a structured online survey. Currently, AI adoption among SMEs in Indonesia is minimal. The reluctance is primarily attributed to high costs, extended duration, and inherent risks of developing proprietary applications. Instead, SMEs are heavily relying on AI-as-a-service and other cloud-based solutions. Various factors contribute to businesses' hesitancy. The slow progress in SME implementation indicates misunderstandings related to data and a lack of knowledge, influencing how these enterprises perceive the obstacles they encounter.

Keywords: Artificial Intelligence, Digitalization, SMEs.

1 Introduction

The term 'Artificial Intelligence' was initially coined by John McCarthy in 1955 (Rajaraman, 2014). Significant advancements and widespread use of this technology did not occur until 2012. More companies are digitizing and automating various back-office activities, spanning accounting, human resources, and inventory management. Artificial Intelligence (AI) is pivotal in business operations, from processing and communicating massive datasets to offering guidance to upper-level managers and executives in decision-making processes. As we enter the second decade of this century, AI's continuous improvement and development are anticipated, emphasizing the importance of organizations being prepared for the opportunities and threats it brings (Neha et al., 2023). This article explores AI's application and potential effects on management accounting procedures in businesses, specifically focusing on the substantial benefits that small and medium-sized businesses (SMEs) can derive from adopting an effective communicative accounting system.

The exponential growth of Information Technology (IT) has the potential to reshape communication dynamics in the commercial world, necessitating adaptation to new communication means, including

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the use of AI. This transformation has already occurred in the accounting and business industries. The future success of every industry, regardless of size, hinges critically on developing and adopting a communicative accounting system, even if it is a basic one (Rybakovas and Žigienė, 2021). Adopting such a system, with its ability to automatically sort entries, allows accountants and owners to allocate more time to strategic planning and decision-making, easing communication procedures within the company.

This shift has prompted many decision-makers to utilize computerized decision support systems, leveraging the availability of vast historical data and the substantial growth in computer processing capacity. Since the turn of the century, increased competition has driven organizations to embrace cutting-edge technological solutions, including computerizing processes and financial records (Ing et al., 2020; Wang et al., 2020; Mehta and Shorey, 2020). Despite the recognition of its relevance by many SMEs, there is a shortage of studies on implementing computerized accounting, with a predominant focus on large organizations in research. This research assesses the extent of AI utilization in accounting systems among Mumbai's small and medium-sized enterprises (SMEs).

The information technology revolution has altered the competitive landscape for SMEs, with e-commerce facilitating business dealings beyond national boundaries. Companies must update their accounting systems to meet modern global standards in response to these changes. A reliable accounting system is crucial for companies to adapt to the ever-evolving marketplace (Kim & Hong, 2019). Accounting systems must provide users with accurate, correct, dependable, and timely information in the information age, highlighting the need to apply communicative AI. Computerized accounting communication systems enable the creation of standardized financial reporting and statements, benefitting management and owners of businesses of all sizes (Kuhnlea et al., 2019;Hou et al., 2019; Xu et al., 2019). The increasing volume of transactions makes Computerized Accounting Systems (CAS) imperative, as manually tracking them becomes impractical. Accounting systems should capture non-financial information to supplement financial data for enhanced decision-making. In today's era of rapid technological advancement, accounting systems must deliver fast, accurate, and useful information (Wu et al., 2018).

Approximately 40% of India's GDP, 50% of total exports, and 45% of industrial employment are contributed by SMEs, employing around 19 million people, making them the second-largest employer after agriculture. Despite this significant contribution, the issues related to Communicative Accounting Systems (CAS) in SMEs have not received adequate attention due to a lack of data. This research seeks to bridge that gap by addressing CAS issues in SMEs through comprehensive analysis and recommendations.

2   Literature Review

Artificial intelligence (AI) encompasses computer programs, algorithms, systems, and robotics behavior. In a broader context, it refers to a set of tools that can enhance the diagnostics and therapeutics of a product or service. AI-incorporated accounting systems are now prevalent in various business sectors. Neha et al. (2023) explored the potential uses of AI in retail, citing the example of Erica, an AI-based virtual financial assistant in the mobile app for Bank of America. Erica's primary function was to assist in financial transactions and provide suggestions on various financial matters.

Furthermore, the application of AI in retail businesses was emphasized, particularly in handling the vast amount of data generated daily. Walmart, for instance, witnesses millions of transactions per hour. Ing et al. (2020) proposed a novel edge-cloud collaboration architecture tailored for SME manufacturers.

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They argue that in an increasingly competitive global economy, solutions are growing needed to help small and medium-sized enterprises (SMEs) with limited resources deploy intelligent and highly adaptable production frameworks (Zeng, J., 2017). The suggested design was shown to be feasible, extensible, and expected to contribute to achieving one of the United Nations' Sustainable Development Goals (Goal 9: Industry, Innovation, and Infrastructure). Their focus was on automating and upgrading manufacturing units through collaborative edge-cloud architecture and advanced AI systems.

According to Davenport et al. (2020), AI is projected to impact marketing tactics and customer behaviors substantially. They propose a multidimensional paradigm considering intelligence levels, task types, and robot embedding. The study agenda includes privacy, bias, and ethics, and they contend that technology will be more valuable if employed to assist human management.

Nevertheless, the success of any business depends on the efficiency, clarity, and speed of its financial and accounting system, regardless of the level of automation and AI integration in producing a product or service. In accounting information systems (AIS), software and technology tools are crucial in maximizing system performance. This component of AIS is where AI is increasingly explored to enhance the success and profitability of businesses, as highlighted by Hashem & Alqatamin (2021). Their investigation showed that AI significantly improved the proficiency of AIS and non-financial performance, providing necessary information and identifying weaknesses for management to leverage for further business advancement.

The application of Artificial Intelligence in accounting and financial matters has been observed since early times, initially for reporting, analysis, auditing, and assurance purposes (Baldwin et al., 2006). More recently, Chukwuani & Egiyi (2020) presented a comprehensive review of existing AI technologies in the accounting domain, their impact on the industry, and advancements achieved in AIS automation. Technologies currently in use include expert systems (software creating knowledge-based systems), neural networks (electronic models imitating the human brain), robots (designed to operate through user interfaces like humans), and fuzzy logic (mimicking human logical reasoning in decision-making).

Impacts of AI on Accounting Communication

Artificial Intelligence (AI) has the potential to transform the field of accounting, fundamentally altering the way financial information is processed, analyzed, and utilized. Several key impacts of AI on accounting include:

1) **Automating Routine Tasks**: AI can handle daily repetitive tasks like data entry, invoice processing, and bank reconciliations, reducing accountants' labor and allowing them to focus on more strategic and analytical aspects of their profession (Das et al., 2002).
2) **Improved Accuracy and Reduced Errors**: AI's intrinsic properties, such as high precision and consistency, reduce human errors commonly associated with manual computations (Azman et al., 2021). This heightened accuracy can result in more reliable financial reporting and decision-making.
3) **Real-Time Data Analysis**: AI facilitates real-time processing and analysis of large volumes of data, providing quicker insights into a company's financial health and performance. This enables businesses to make faster, more informed decisions and update budgets regularly to align with changing situations (Aziz, 2023).

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4) **Enhanced Fraud Detection**: AI can detect anomalies in financial transactions and identify potential instances of fraud (Watkins et al., 1993). AI systems can flag suspicious activities for further investigation by analyzing patterns and historical data.

5) **Financial Prediction and Analytics**: AI-based algorithms analyze historical financial data to identify trends and patterns, aiding in accurate financial forecasting and predictive analytics (Mirzaey et al., 2017). This assists businesses in making strategic plans and projections for the future.

Despite the numerous benefits, adopting AI in accounting communication raises concerns about data security, privacy, and the potential displacement of certain accounting roles. However, with proper implementation and training, AI can offer significant advantages to the accounting profession, ultimately leading to greater efficiency, accuracy, and value-added services for businesses and individuals.

AI has found application and adoption among Small and Medium Enterprises (SMEs) to enhance various facets of their businesses for a competitive edge. Numerous studies have investigated the potential implications, benefits, and challenges associated with integrating AI into accounting information systems for SMEs. AI's capacity to streamline routine tasks, such as data entry and reconciliation, can significantly enhance operational efficiency, reduce human errors, and save time and resources for SMEs. It plays a crucial role in impacting the SME business environment by enhancing efficiency, providing digital setups, improving access to finance, upgrading skills, and reducing the costs of research and innovation (OECD).

This article aims to identify how modern computer technology breakthroughs are perceived by SME owners and business managers and its impact on adopting AI-based Accounting Information Systems (AIS).

Objectives

Our main objective is to comprehend how advancements in the application of artificial intelligence (AI) in the business domain are reshaping the accounting practice, particularly for small and medium enterprises. The study aims to establish a framework for SMEs to incorporate Communication-based Artificial Intelligence (AI) as a component of their Accounting Information Systems (AIS) to address manual and traditional AIS challenges.

3 Material and Method

The nature of this study is exploratory, employing a non-probabilistic convenience sampling method. Data collection involved distributing questionnaires to owners or representatives of small and medium enterprises (SMEs). An online questionnaire was disseminated across various social media platforms, including Facebook, LinkedIn, and Instagram, with clear study objectives and a link to the questionnaire. The sample for this study comprised SMEs utilizing smart technology, and 131 fully completed questionnaires were received. Of these, 33 respondents were disqualified due to already utilizing AI, leaving a final sample of 98 participants for analysis. The study aimed to assess the feasibility of incorporating Artificial Intelligence (AI) solutions in the accounting practices of SMEs, utilizing SmartPLS 3 software for data analysis. The analysis focused on a four-question questionnaire to evaluate the conceptual model and draw conclusions regarding the study topic.

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Research Hypotheses

1) **H1**: The acceptance of AI applications in accounting information systems (AIS) positively relates to SMEs' likelihood of adopting AI.
2) **H2**: The acceptance of AI applications in AIS is positively related to the confidence level in the information offered by an AI-based AIS.
3) **H3**: The confidence level in the information offered by an AI-based AIS is related to the SMEs' likelihood of adopting AI.
4) **H4**: The difficulties arising in AI adoption are negatively related to the confidence level in AI-based AIS by SMEs.

4 Results

The descriptive statistics were initially examined, including standard deviation, mean, mode, maximum, and minimum (Table 1). All variables displayed higher mean and median values of 4, indicating an excellent range. The variable with the highest mean was "Value of AI for accounting," just exceeding 4, suggesting a high value placed on AI.

To evaluate the quality of the measurement model, various indicators such as reliability, convergent validity, internal consistency reliability, and discriminant validity were scrutinized. Since each survey item had only one question, individual indicators and internal consistency reliability were evident without additional effort. The AVE for all constructs was 1, surpassing the cutoff of 0.50.

Discriminant validity was assessed using two methods. First, the Fornell and Larcker criteria were applied, requiring the square root of AVE (Table 2) to have a stronger correlation with some construct than its highest association. Table 2 indicates that all constructs meet this condition. Second, the heterograft-to-monotrait ratio (HTMT) criteria were utilized, providing further evidence of discriminant validity. With only one question per item, the HTMT ratios in this scenario equate to the correlation between constructs shown in Table 4. Confirming that all HTMT ratios are within the more stringent 0.85 level.

Table 1: Descriptive Statistics (Mean, Median, Maximum, Minimum, and Standard Deviation) for Variables in the Present Study

	Variable	Mean	Median	Min	Max	Standard Deviation
(1) SMEs' likelihood of adopting AI	Dependent	3.63	4	1	5	**0.95**
(2) The acceptance of AI applications	Independent	4.16	4	2	5	**0.80**
(3) Difficulties to implement AI	Independent	3.76	4	2	5	**0.73**
(4) Confidence level in the information offered by an AI-based AIS	**Independent**	**3.81**	**4**	**1**	**5**	**0.74**

Table 2: Composite Reliability, Average Variance Extracted, Correlations, and Discriminant Validity Checks

Latent Variables	A	CR	AVE	1	2	3	4
(1) Smes' likelihood of adopting ai	1.000	1.000	1.000	**1.000**	0.638	0.297	0.465
(2) The acceptance of ai applications	1.000	1.000	1.000	0.638	**1.000**	0.294	0.535
(3) Difficulties to implement AI	1.000	1.000	1.000	0.297	0.294	**1.000**	0.272
(4) Confidence level in the information offered by an AI-based ais	1.000	1.000	1.000	0.465	0.535	0.272	**1.000**

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Table 3: Structural Model Assessment

Path	Path Coefficient	Standard Errors	T Statistics	P Values
The acceptance of AI applications ->SMES' likelihood of adopting AI	0.545	0.085	6.444	0.000
Confidence level in the information provided by an AI-based AIS -> The acceptance of AI applications	0.535	0.074	7.199	0.000
Confidence level in the information offered by an AI-based AIS -> SMEs' likelihood of adopting AI	0.174	0.084	2.079	0.038
Challenges in AI implementation -> Trust in the information offered by an AI-based AIS	0.272	0.112	2.439	0.015

Table 4: Bootstrap Results for Indirect Effects

Indirect Effect	Estimate	Standard Errors	T Statistics	P Values
Confidence level in the information offered by an AI-based AIS -> The acceptance of AI applications -> -> SMEs' likelihood of adopting AI	0.292	0.061	4.791	0.000
Difficulties in AI implementation -> Confidence level in the information offered by an AI-based AIS ->The acceptance of AI applications ->SMEs' likelihood of adopting AI	0.079	0.040	2.000	0.046

Evidence shows that the difficulty in implementing AI positively influences users' confidence in the information provided by an AI-based AIS ($\beta = 0.272$, $p < 0.05$). The significance of individual indirect effects through the mediator was tested using a bootstrapping approach to determine the validity of the mediation hypothesis, and the results are summarized in Table 4. The confidence in the information supplied by an intelligent system has a substantial ($\beta = 0.000$; $p > 0.05$) indirect impact on the likelihood of adopting AI for decision-making through the mediator of acceptance of AI. These findings support the concept of mediating effects.

The moderating role of faith in AI in the relationship between implementation difficulties and the likelihood of adopting AI was examined. The correlation between the data produced by AI and the estimation of its worth is statistically significant ($\beta = 0.046$; $p > 0.05$).

5 Discussion

Artificial intelligence (AI) integrated into accounting information systems (AIS) has the potential to transform how small and medium enterprises (SMEs) handle their financial processes. AI-driven AIS offers various advantages, including heightened accuracy and improved decision-making capabilities. Expert systems, data mining, and business intelligence play pivotal roles in the adoption of AI by SMEs. Expert systems replicate human expertise (Sullivan & Shively, 1989), while data mining and business intelligence tools assist in analyzing trends and making data-driven decisions (Jia et al., 2021). The sophistication of Natural Language Processing (NLP) and voice recognition technologies enables SMEs to develop AI-powered customer service chatbots and voice-activated virtual assistants (Olujimi & Ade-Ibijola, 2023). Adopting Machine Learning and predictive analytics, facilitated by cloud computing and AI as a service (AIaaS) platforms, allows SMEs to access AI capabilities without significant infrastructure investments (Zhao et al., 2022; Kaymakciet al., 2022).

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However, the complexity and challenges associated with AI, including data quality, security, privacy, and a shortage of adequately trained AI professionals, may pose hurdles for SMEs and various public institutions in implementing AI for their specific contexts (Mpofu et al., 2022). Recognizing the critical human factor, raising awareness among SME managers and workers about the benefits of AI, and establishing trustworthy conditions to facilitate a smooth transition is imperative.

To gain insight into how small and medium enterprises perceive and utilize AI-based AIS, researchers have explored various aspects. One such study by Wen et al. (2012) examined business managers, accountants, and accounting software (Table 5) to identify the key characteristics necessary for SMEs to adopt accounting software. The results indicated a notably low adoption rate, implying that SME owners and managers may encounter challenges when implementing accounting software. It follows that the implementation of AI-based AIS may present even more significant obstacles.

Table 5: Variables Influencing Adoption of Artificial Intelligence in Accounting Information System Software Adopted from Wen et al. (2012)

	Variable	Description
Personal Characteristics	Adoption	Businesses adopt accounting software to manage accounting
	Manager Characteristics	Business managers' age
		Business managers' education
	Accountant Characteristics	The number of accountants work for Business
		The average education of all accountants in a business
Software Characteristics	Adequacy	The software meets the business's needs
	Support	There is help from the vendors in case of software error
	Function	The software has various function Models
	Price	The software's price
	Security	The software guarantees the accounting data's safety
	Timeliness	The software's function is updated in Time

One of the ways to promote AI would be that national and local governments join forces to reskill workers in order to increase the likelihood of ai being implemented successfully in the finance sector, particularly in accounting. A collaborative approach is crucial to ensure that work processes are reinstated and that ai models are trained effectively. The focus should be on financing the transition to ai by gathering more evidence on the roi of ai applications, facilitating the smooth operation of knowledge markets, and promoting learning through platforms such as the oecd digital for smes initiative and the oecd ai policy observatory (OECD). Recent government policies in indonesia, such as it policies, startup unicorn in indonesia, and peer-to-peer online lending in indonesia, are working towards creating an environment in which startups and small and medium-sized firms can thrive in the context of emerging ai technology indonesia's commercial ai sector is attracting significant investment from the united states and china, with both countries aiding in the country's efforts to overcome its challenges in infrastructure, talent, and cybersecurity. China views indonesia as a crucial element for its digital, economic, and political expansion in southeast asia and has been actively supporting educational partnerships, investing in ai startups, and enhancing cybersecurity cooperation through government and company-led initiatives. The united states, on the other hand, is pursuing a private sector-led approach to invest in indonesia's ai capabilities (Goode & Kim, 2021).

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6 Conclusion

This article proposes a simplified methodology for integrating AI agents into an existing AIS or acquiring an AI-induced AIS. The objective is to ensure that the organization's needs guide the process rather than being overwhelmed by the potential offered by the technology. We have explored the challenges of current AIS systems and identified areas for improvement. The problems with existing AIS created an opportunity to leverage AI for solutions. The fundamental concepts of AI agents and their capabilities were presented. The theoretical models used in the research were contextualized, and a framework for further study was suggested.

The paper's shortcomings include the lack of validation for its framework, insufficient literature on AI in SMEs in developing countries (despite the rapid growth in this field), and a scarcity of actual AI implementations in the study area, limiting the practical utility of the framework. Small and medium-sized enterprises (SMEs), incubators, and governments are encouraged to engage with technological advancements that could enhance the performance of existing information systems, with the primary aim of promoting the systematic deployment of AI agents.

To ensure the model's completeness and provide a foundation for future adjustments with additional implementations, further research is required to validate the framework in a real-world setting. Another area for assessment and study is the possibility of assigning weights to different parts of the framework to facilitate decision-making in evaluating its suitability for adoption. Responsible AI usage requires establishing a legal framework and an error management strategy, encompassing training, judgments, actions, and consequences.

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