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The role of intelligent systems in modern business practices with a focus on management accounting

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Abstract

This review research paper explores the transformative impact of intelligent systems on the management accounting. The rapid evolution of technology, including advancements in artificial intelligence (AI), machine learning, and data analytics, has significantly altered traditional management accounting practices. This study aims to delineate the scope of these changes, assess the implications for management accountants, and identify the opportunities and challenges arising from the integration of intelligent systems. Selected recently published research articles in Scopus indexed journals in the past 5 years i.e. from the years 2019-2023 have been reviewed in this study. The significant variables identified in this study are presented in the form of research gaps and future directions. Key findings indicate that the adoption of intelligent systems has led to enhanced analytical capabilities, enabling management accountants to provide more accurate and timely insights for decision-making and strategic planning. This technological integration has also necessitated a shift in the role of management accountants from traditional task-focused roles to more strategic and advisory positions, emphasizing the need for a new skill set that includes technological proficiency alongside financial expertise. The paper concludes with recommendations for management accounting and organizations. These include investing in skills development, fostering a culture of innovation and adaptability, and implementing robust data governance frameworks to leverage the advantages of intelligent systems while mitigating associated risks. This research contributes to the understanding of the impact of intelligent systems on management accounting, offering valuable insights for professionals, policymakers, and academics interested in the future of finance and accounting in the context of technological advancement.

Keywords: Intelligent systems, management accounting, financial service sector, professional service sector, artificial intelligence (AI), technological proficiency, data analytics

Introduction

The advent of intelligent systems, characterized by artificial intelligence (AI), machine learning, and advanced data analytics, has precipitated a profound transformation across various professional landscapes, notably within management accounting (Bhimani, A., & Willcocks, L. P., 2014) ^[9]. This shift is particularly pronounced in the financial and professional service sectors.

Pall and Ogan (2018) ^[19] in their article after identifying the several research gaps between business intelligence and management accounting stated that the top accounting and information systems journals in the world indicates that to date and very little research was focused on artificial intelligence and management accounting. Dehning and Richardson, (2002) ^[24] conducted a research on management accounting and integrated intelligent information systems and found that no piece of research was conducted and identified. This sets the strong background for this research paper and highlights the importance of conducting thorough research review between intelligent systems and management accounting. In today's competitive business environment, companies are still depending on humans than intelligent systems even though intelligent systems can perform tasks more efficiently. In today's competitive business environment, there is a growing concern about technologies and intelligent systems.

The main objective of this study is to assess the current state of intelligent system adoption within the management accounting practices of financial and professional service sectors. The other objective is to analyze the impact of intelligent systems on the role, skills, and functions of management accounting, particularly in how these technologies are reshaping traditional practices and expectations within the profession. This is used as a basis for classifying and presentation of the reviewed literature in structured form.

The outcome of this review paper is an identification of research gaps and a proposal of research opportunities.

This research underscores the transformative impact of intelligent systems on the management accounting profession. By achieving its objectives, this study aims to contribute valuable insights to professionals, academics, and policymakers, guiding them through the challenges and opportunities of this technological paradigm shift. The findings are expected to not only advance the academic discourse on the subject but also provide practical guidance for leveraging intelligent systems to enhance the strategic value and effectiveness of management accounting in the modern business environment.

The discuss on the definitions on the impact of intelligent systems on the management accounting profession, as per the original definition by John McCarthy who defined the Artificial Intelligence (1955) as “the science and engineering of making intelligent machines, [where] intelligence is the computational part of the ability to achieve goals in the world”. Another definition given by Steven Finlay (2017) as “the replication of human analytical and/or decision-making capabilities”. Management accounting also is known as managerial accounting and can be defined as a process of providing financial information and resources to the managers in decision making. Management accounting is only used by the internal team of the organization, and this is the only thing which makes it different from financial accounting. R. T., Crawford, D. M., & Rebeschke, S. (2019) ^[21] defined as artificial intelligence and management accounting, “this involves the integration of advanced data analytics, machine learning, and artificial intelligence technologies to enhance the analytical capabilities of management accountants. This integration allows for the processing of large volumes of financial data at unprecedented speeds and accuracy, enabling more informed decision-making and strategic planning.

The advent of intelligent systems marks a significant evolution in the role of management accountants from traditional record-keeping and compliance-focused tasks to becoming strategic business partners. This evolution is characterized by a shift towards predictive analytics, financial forecasting, and the provision of actionable insights to guide business strategy. Enhancement of Efficiency and Innovation: The impact of intelligent systems on the management accounting profession is also defined by the significant enhancement of operational efficiency and the fostering of innovation within financial practices. Automated processes reduce the time and resources spent on routine tasks, freeing management accountants to focus on areas where they can add greater value, such as financial strategy development and innovation management.

Significance of the Topic

The significance of this research lies in its timely exploration of the intersection between technology and management accounting, a nexus of growing importance as intelligent systems become increasingly sophisticated and widely adopted. Strategic Decision-Making Enhancement: Intelligent systems offer unprecedented capabilities in processing vast amounts of data, yielding insights with the potential to significantly enhance strategic decision-making processes. This research highlights how these technologies can transform management accounting from a reactive, compliance-focused function into a proactive, strategic

advisor to business leadership Quattrone, P. (2016) ^[18]. As intelligent systems automate routine tasks, the role of management accountants is evolving towards more analytical, advisory, and strategic functions. This study aims to delineate this shift, emphasizing the need for new skill sets, including technological proficiency and strategic thinking, which are paramount for success in this new paradigm Alles, M. G., Kogan, A., & Vasarhelyi, M. A. (2008) ^[5]. As stated by Kokina, J., & Davenport, T. H. (2017) ^[14], Intelligent systems lays a crucial role in reshaping the management accounting. While the benefits of intelligent systems are manifold, their integration poses significant challenges, including data privacy concerns, the risk of obsolescence for traditional skills, and the potential for organizational resistance to change. This research seeks to offer a comprehensive understanding of these challenges, providing a roadmap for management accountants and organizations within the U.A.E to navigate the complexities of technological integration (Arnold, V., Benford, T., Canada, J., & Sutton, S. G. 2011) ^[8].

Development of a theoretical framework

(Izabella, 2021) ^[13] There is tremendous attention of increasing the research and researchers in the business world towards artificial intelligence in finance and accounting. The rapid development of artificial intelligence not only boosted the work environment but also brought many challenges and changes in the field of accounting. Li *et al.*, (2020) ^[15] in their study proposed that artificial intelligence is useful to make low level staff liberation from repetitive work outs and can pay attention to provide valuable information support in decision making. Artificial intelligence promotes accounting staff to concentrate on complex multi-disciplinary business issues. •Intelligent systems are expected to become more prevalent in companies in the medium-term and will be able to perform tasks currently done by humans more efficiently. Gonçalves *et al.*, (2023) ^[34], highlighted the need for companies to adapt and consider combining the capabilities of human and intelligent systems. Aiguo (2022) ^[25], discussed in their research article the evolution of accounting from a reflection of objective things to a cognitive system embedded in the real and virtual world, integrating with the digital virtual world. In addition to this, future of intelligent accounting involves the seamless connection between accounting language and computer coding language, enabling the digital substitution of business activities in the real and virtual world. It is an interdisciplinary field with attributes of computational social science, playing a role in big data analysis and auxiliary decision support.

Role of Intelligent Systems and Management Accounting Role of Intelligent Systems and SME's

Derbyshire *et al.* (2023) ^[26], investigated the role of intelligent systems in enhancing financial literacy among owners of small and micro-enterprises. The authors focus on South African business practices, arguing that intelligent systems, such as AI-driven educational platforms, can significantly improve understanding of tax guidance, business planning, and financial management. The study provides evidence that tailored financial literacy programs, supported by intelligent technologies, can lead to better financial decision-making and long-term business success for small business owners. Intelligent systems plays in

important role in small and medium enterprises (SME) as well. Quinco (2023) ^[27] suggested in their study that intelligent systems provide valuable support for these enterprises by offering cost-effective and scalable solutions that can improve decision-making and financial management. The research underscores the potential of intelligent systems to democratize access to advanced management accounting tools for SMEs, thereby supporting their growth and sustainability. Razak *et al.*, (2023) ^[23] in their study explored explores how intelligent systems contribute to the sustainability of SMEs in Malaysia through enhanced management accounting practices (MAPs). The study illustrates that intelligent systems, such as ERP and AI-based analytics, enable SMEs to access, analyze, and utilize financial and operational data more effectively. The authors argue that this access to high-quality information supports strategic decision-making and operational efficiency, which are critical for the sustainability of SMEs in competitive environments. Mihalciuc (2022) ^[29] examined how the implementation of management accounting practices, supported by intelligent systems, can improve the performance of SMEs. The research emphasizes the role of technology in enabling SMEs to implement sophisticated accounting practices, thereby enhancing their competitive advantage.

Role and management accounting implementation

There are studies offer a nuanced understanding of the transformative role of intelligent systems in management accounting and business practices. Dlamini (2023) ^[30], discusses how the advent of AI, machine learning, and big data analytics has transformed traditional management accounting into a more dynamic and strategic function within businesses. By synthesizing existing literature, this study outlines the role of intelligent systems have enabled more precise forecasting, real-time decision-making, and enhanced strategic planning in management accounting. Marques *et al.*, (2023) ^[35] specifically focuses on the impact of intelligent systems on the field of management accounting. The authors provide a detailed analysis of how technologies such as AI and data analytics are reshaping management accounting practices. They argue that intelligent systems not only improve efficiency and accuracy in financial reporting and analysis but also play a pivotal role in strategic planning by providing insights that were previously inaccessible. The paper discusses several case studies to illustrate how businesses have successfully integrated intelligent systems into their management accounting practices to gain a competitive advantage. Gunawansa (2021) ^[11] investigated the impact of modern management accounting practices on the performance of management accounting systems in the manufacturing sector of Sri Lanka. The study highlights how intelligent systems support the adoption and implementation of these practices, leading to improved system performance and organizational effectiveness. Alsharari (2021) ^[6], explored the implementation of management accounting practices within the e-business model of Walmart Corporation in the US. It discusses the role of intelligent systems in enhancing organizational effectiveness and performance through the strategic use of management accounting information.

Role of Intelligent Systems in Emerging Technologies

Ylä-Kujala *et al.*, (2023) ^[31] examined the adoption of

management accounting practices in small businesses and the interface with challenges and performance improvements. The research highlights how intelligent systems facilitate the adoption process by overcoming traditional barriers and enhancing the strategic value of management accounting in decision-making processes. Another study, Dai and Vasarhelyi (2023) ^[36], discuss the concept of Management Accounting 4.0, which represents the integration of intelligent systems into management accounting practices. The study predicts how emerging technologies like AI, IoT, and blockchain will revolutionize the field, making practices more predictive and strategic rather than just historical and compliance-focused. Yoshikuni *et al.*, (2023) ^[32]. Role of Emerging Technologies in Accounting Information Systems for Achieving Strategic Flexibility through Decision-Making Performance: This exploratory study investigates how emerging technologies in accounting information systems contribute to strategic flexibility and decision-making performance. It emphasizes the role of intelligent systems in enhancing the responsiveness and adaptability of accounting practices to market changes.

Role of Intelligent Systems in Decision-making of Management Accounting

Lee, J.-e. (2022) ^[37] Lee's study focuses on the influence of corporate business environments on management accounting practices. The research underscores the critical role of intelligent systems in adapting management accounting practices to rapidly changing business environments, thereby enhancing organizational effectiveness and strategic decision-making. Azhar *et al.*, (2022) ^[38], explored how a Japanese subsidiary in Malaysia utilizes intelligent systems within its accounting information and supply chain management practices. The findings illustrate the benefits of integrating advanced technologies in managing complex business activities and aligning them with Industry 4.0 principles. Fontenelle *et al.* (2021) ^[10] proposed an alignment between management accounting and lean manufacturing: rhetoric and reality. This paper explores the alignment between management accounting and lean manufacturing practices, proposing a maturity model to improve this alignment. The study provides insights into how intelligent systems can support the implementation of lean accounting principles to better match actual accounting practices with lean manufacturing objectives. Alhatabat (2020) ^[4], connect various functions and resources, providing a holistic platform for operations management and facilitating the adoption of both conventional and advanced management accounting practices.

Role of Intelligent Systems in increasing the Efficiency and Interaction between departments

Orlov *et al.*, (2022) ^[39], in this study the authors discussed the importance of harmonizing business processes and management accounting systems in supporting innovative projects within companies. The study highlights how intelligent systems can facilitate better interaction and coordination between different departments, enhancing the overall efficiency of project management. Medved (2021) ^[16], examined how digitalization and big data technologies can be utilized in management accounting to improve efficiency and strategic decision-making. The study

suggests that intelligent systems play a crucial role in enhancing data collection, processing, and analysis, thereby supporting more informed business decisions. Hou (2022) [33], introduced an accounting model that leverages knowledge graphs and deep learning techniques. The model aims to improve the efficiency and effectiveness of enterprise accounting and financial management by facilitating the transition from traditional to modern management accounting practices. (Wu, P. 2021) [23] Artificial Intelligence can enhance the strategic decision-making process by improving the accuracy and timeliness of accounting information. The study suggests that while traditional practices are still prevalent, there is significant potential for the adoption of modern techniques supported by intelligent systems to improve efficiency and decision-making (Acintya, 2020) [1].

These studies collectively illustrate the profound impact of intelligent systems on management accounting, from enhancing decision-making and efficiency to facilitating the adoption of modern practices and technologies in various business environments.

Role of Intelligent Systems in Modern Business Practices

Bimalendu, Pandy. (2023) [40], conducted a study on ‘Role of AI in Business Management’ and found that AI helps in customer engagement, organizing campaigns, to increase in supply chain management and real-time data analysis. All these will lead to efficiency and productivity.

Nataliya, Ladyzhets. (2022) [17], through their analysis of artificial intelligence (AI) has an interdisciplinary character and is applied in various industries such as economics, manufacturing, medicine, culture, education, and military equipment development. AI is increasingly being applied in business, and the article discusses the confusion of terms in this field and the dynamics of changes related to AI development. The article explores the formation of modern business landscapes with the increasing impact of AI, particularly in decision-making using AI-controlled business intelligence tools. The social aspects of the AI service

model, the relationship between AI and big data, and the formation of a competitive business environment are also discussed, highlighting management and consumer risks.

Aboobucker, Ilmudeen. (2022) [3] presented in their research paper on the use of AI in Russian business, supported by industry experts. Business intelligence and decision support systems are crucial for modern business organizations, as they rely on data to respond to operational and strategic needs. The volume of data generated by intelligent devices and the internet has increased exponentially, leading to the need for appropriate applications and systems to analyze big data. This paper discusses the applications, challenges, and conceptually designed architecture of business intelligence and decision support systems. It covers topics such as skills requirement, mining techniques, technical aspects, and design elements. AI plays a crucial role in modern business intelligence (BI) by enabling better decision-making, cost reduction, and understanding market conditions (Ahmed and Gad-Elrab, 2021) [2]. These authors also specified that AI has advanced significantly in recent years due to increased computing power and wider data access. AI models can now be trained in a shorter time using machine learning algorithms. Усамов, Албакова, Мустиев. (2021) [12], in their research paper analyzed the role of intelligent information systems in the modern world and identifies the problems of implementing these systems. It considers the essence of intelligent systems and the branches where they are used to improve production speed and service quality. The paper also discusses the three main unsolved problems of artificial intelligence that could potentially cause global chaos in the future. Mechanisms for solving these problems are proposed in the paper. The article emphasizes the importance of recognizing the positive and negative aspects of intelligent information systems and the need to responsibly utilize their advantages while minimizing negative consequences.

It categorizes intelligent information systems into general-purpose and specialized systems, which perform predefined tasks based on knowledge or knowledge engineering.

Table 1: Literature Review: Common Themes, Methodologies and the Findings

Common Themes	Methodologies	Findings
<p>Adoption of Intelligent Systems in SMEs: Many studies highlight the significant impact of intelligent systems on small and medium enterprises (SMEs), focusing on the adoption and integration of technologies like ERP, AI, and data analytics to enhance management accounting practices.</p> <p>Enhanced Decision-Making and Efficiency: A recurring theme is how intelligent systems contribute to improved decision-making and operational efficiency within organizations. This includes real-time financial reporting, predictive analytics for budgeting, and strategic planning.</p> <p>Financial Literacy and Education: Several studies emphasize the importance of intelligent systems in improving financial literacy among business owners, particularly in SMEs, through customized educational platforms and tools.</p> <p>Sustainability and Competitive Advantage: The role of intelligent systems in supporting the sustainability of businesses and providing a competitive edge is a key theme. This includes leveraging technology for strategic decision-making and operational improvements.</p>	<p>Case Studies: Many studies employed case study methodologies to explore the practical application of intelligent systems in specific organizational contexts, providing in-depth insights into the implementation challenges and benefits.</p> <p>Literature Reviews: Several studies conducted extensive literature reviews to trace the evolution of management accounting practices and the impact of intelligent systems, synthesizing existing research to identify trends and gaps.</p> <p>Surveys and Questionnaires: Some research utilized surveys and questionnaires to gather data on the adoption and impact of intelligent systems in management accounting practices among a broader set of organizations.</p> <p>Comparative Analysis: A few studies compared traditional and modern management accounting practices or the impact of technology adoption between different countries or sectors, using comparative analysis techniques.</p>	<p>Improved Access to Information: A universal finding across the studies is that intelligent systems provide businesses, especially SMEs, with improved access to accurate and timely information, supporting better strategic and operational decisions.</p> <p>Need for Skills Development: The integration of intelligent systems into management accounting practices necessitates enhanced skills and knowledge in both technology and finance, highlighting the importance of continuous learning and development.</p> <p>Barriers to Adoption: While the benefits are clear, studies also identify barriers to the adoption of intelligent systems, including resource constraints, lack of technical expertise, and resistance to change within organizations.</p> <p>Impact on Job Roles: Research indicates that intelligent systems are transforming job roles in management accounting, shifting focus from routine tasks to more strategic activities and analysis, and requiring a blend of technical and managerial competencies.</p>

<p>Evolution of Management Accounting Practices: The transformation of traditional management accounting into a more dynamic, strategic function through the integration of intelligent systems is a central theme.</p>		<p>Strategic Value Creation: Finally, a significant finding is that intelligent systems enable organizations to create strategic value by enhancing efficiency, fostering innovation, and improving competitiveness.</p>
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These common themes, methodologies, and findings provide a comprehensive understanding of the current state of research on the role of intelligent systems in modern business practices, with a focus on management accounting. They underscore the transformative potential of these technologies while also highlighting the challenges and requirements for successful integration into business strategies.

Research Gaps and Future Directions

In addition to presenting the variables and findings, highlighting where gaps exist in the current literature and suggesting future research directions is valuable. This could involve.

Identifying Underexplored Variables: Point out variables that have received less attention or were inconsistently studied.

Proposing New Relationships: Based on the review, suggest potential new relationships between variables that future studies could explore.

Recommending Methodological Approaches: Advise on methodologies that could address limitations of previous studies or better capture the complexity of certain variables. Each of these methods serves to organize and present the literature in a way that is accessible and meaningful to your audience, facilitating a deeper understanding of the existing research landscape and how your study contributes to it.

Table 2: Research Gaps and Future Directions in Intelligent System Adoption for Management Accounting in SMEs

Study Focus	Research Gaps Identified	Future Research Directions
Adoption in SMEs	Limited understanding of adoption barriers specific to industry sectors.	Explore sector-specific challenges and facilitators for intelligent system adoption in SMEs.
Human and Organizational Dimensions	Need for detailed exploration of the skills gap and training requirements.	Investigate effective training programs and change management strategies for technology integration in management accounting.
Decision-Making and Efficiency	Variability in the impact of intelligent systems on decision-making quality.	Conduct comparative studies on the effectiveness of different intelligent systems in improving decision-making and efficiency.
Strategic Value and Competitiveness	Insufficient evidence on the long-term strategic value created by intelligent systems.	Longitudinal studies to assess the sustained impact of intelligent systems on competitive advantage and strategic value.
Technology Integration	Challenges in integrating new technologies with existing systems and processes.	Research on best practices for seamless integration of intelligent systems within existing organizational infrastructures.
Cultural and Organizational Change	The role of organizational culture in the adoption and effective use of intelligent systems is underexplored.	Studies on the influence of organizational culture on the adoption and optimization of intelligent systems in management accounting.
Data Privacy and Security	Concerns related to data privacy and security in the use of intelligent systems.	Investigate strategies and technologies for enhancing data privacy and security in intelligent system applications.
Sustainability	Limited understanding of how intelligent systems contribute to sustainable business practices.	Examine the role of intelligent systems in promoting sustainability in management accounting and overall business practices.

The above table outlines key areas where the literature indicates a need for further investigation and suggests directions for future research to advance understanding and application of intelligent systems in management accounting and modern business practices. These gaps and directions not only highlight the dynamic nature of the field but also underscore the potential for significant contributions through focused research efforts. The findings of this study underscore the need for further research to explore the long-term impacts of intelligent systems on the management accounting profession, particularly in the context of the U.A.E.'s dynamic economic environment. Future studies could focus on.

Conclusion

The exploration of the impact of intelligent systems on the management accounting profession, particularly within the financial and professional service sectors of the United Arab Emirates (U.A.E), reveals a landscape at the cusp of significant transformation. This study has delved into the current state of adoption, the profound effects on roles and functions, and the challenges and opportunities that lie

ahead for management accountants in this era of technological advancement.

Technological Adoption and Integration: The adoption of intelligent systems across the U.A.E.'s financial and professional service sectors is rapidly evolving. These technologies, including AI, machine learning, and data analytics, are not merely tools but pivotal elements reshaping the fabric of management accounting. Their integration facilitates enhanced decision-making, predictive analytics, and strategic planning, underscoring the necessity for management accountants to embrace these innovations to remain relevant and competitive.

Transformation of the Management Accountant's Role:

The role of management accountants is undergoing a paradigm shift from traditional task-oriented functions to more strategic and advisory capacities. Intelligent systems automate routine tasks, elevating the accountant's role to focus on providing strategic insights and contributing to business growth. This evolution demands a new skill set that blends technological proficiency with financial acumen,

highlighting the importance of continuous learning and adaptation.

Navigating Challenges: The integration of intelligent systems presents a spectrum of challenges, from data privacy and security concerns to the need for significant organizational change management. Overcoming these barriers requires a concerted effort from both individuals and organizations, emphasizing the development of robust frameworks for data governance and the cultivation of a culture that supports innovation and technological integration.

Harnessing Opportunities for Innovation and Efficiency:

Intelligent systems offer unprecedented opportunities for enhancing efficiency and driving innovation within management accounting practices. They enable organizations to streamline operations, develop new financial products and services, and tailor their offerings to meet the evolving needs of the market. Embracing these opportunities can lead to significant competitive advantages and contribute to sustainable business growth.

In conclusion, the advent of intelligent systems heralds a new era for the management accounting profession, characterized by enhanced capabilities, transformed roles, and new challenges. As the profession navigates this technological frontier, the insights from this study offer a foundation for understanding the current landscape and envisioning the future of management accounting in the U.A.E. and beyond. Embracing change, fostering adaptability, and prioritizing innovation are imperative for management accountants to thrive in this evolving landscape.

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