



# Process and Impact Evaluation of Artificial Intelligence in Managerial Accounting: A Systematic Literature Review

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**Abstract:** This systematic literature review examines how researchers have evaluated the role of Artificial Intelligence (AI) in Management Accounting (MA), focusing on process and impact evaluations. The findings of the nine recent research papers completed between 2019 and 2023 were incorporated in this review. The study followed a three-phase, structured process: planning the review, conducting it, and reporting the findings. The study utilized multiple databases to source relevant papers and applied stringent inclusion and exclusion criteria, followed by a thematic synthesis approach. The results showed that the reviewed articles highlighted four aspects of AI in MA process evaluation: technological acceptance and usability, ethical and security considerations, skills and competence, and the decision-making process. Two aspects were pinpointed under impact evaluation in the reviewed articles: enhancement of accounting practices and the evolution of roles and skills. Two important predictions that the papers repeatedly asserted were that AI adoption in MA is still in its early stages but will transform the field soon. It will dramatically enhance MA practices, creating new challenges and skills requiring urgent attention. Ethical and security considerations were also stressed in the reviewed articles. As AI algorithms are developing rapidly, the findings are limited to only giving a broad picture of the recent state of the field. However, this paper identified aspects of AI in MA evaluation that should contribute to setting evaluation criteria, which would be helpful for future assessments. In light of the high potential of AI in the field of MA, this paper contributes to developing a comprehensive overview of the use of AI in this field. Furthermore, systematic reviews on AI applications in the MA field are limited. Therefore, this research addresses this gap by systematically reviewing recently published research papers.

**Keywords:** Managerial Accounting, Artificial intelligence, Business Intelligence, Big Data, Machine learning, Ethical considerations, Data Privacy, Decision-making, Skills and Competences.

## 1. INTRODUCTION

A vital aspect of organizational decision-making is management accounting, which includes providing internal stakeholders the ability to view both financial and non-financial data to facilitate efficient planning, control, and performance evaluation (Langfield-Smith, 2008). This field covers a wide range of areas, including as risk management, strategic planning, budgeting, performance measurement, and cost accounting. The introduction of AI into management accounting (MA) has resulted in the emergence of a new era for managing financial data and strategic decision-making by organizations. Nowadays, management accountants have access to sophisticated techniques that utilize AI technology such as machine learning, Natural Language Processing (NLP), and predictive analytics to analyze extensive data and complex information. Such technological advances have transformed the dynamic of work fields and offered organizations a wide range of options they could not previously have

to increase innovation and achieve a competitive edge. (Schneider and colleagues, 2015).

AI is becoming more significant and more common in MA for many substantial reasons. Initially, this integration became possible because of the rapid increase in data generation and data processing technologies. AI-driven systems are now technologically smart, making them efficient enough to recognize complicated trends or patterns in enormous amounts of data and provide previously unattainable insight (Aktürk, 2021). Accordingly, due to the demand for timely and accurate financial information in modern business environments, the need for analytical, fast-processing AI-driven systems has drastically grown.

Additionally, companies are embracing AI-based accounting process management systems due to the expansion of global business operations and the continuous evolution of evolving regulatory environments. These



factors offer an excellent environment for AI to succeed in MA by improving accuracy and operational efficiency. Research shows the different ways each company has used AI-powered accounting software. The software serves as a tool primarily for uploading document photos, collecting invoice data intelligently, tracking user activity, monitoring risks, and keeping track of invoice approvals. Using AI in accounting software has decreased labor expenditures while increasing workers' productivity, efficiency, and customer satisfaction. It also supported better governance processes, customer service, and flexible working schedules (Lee et al., 2020).

There are issues associated with using AI in MA. However, training employees and establishing an AI infrastructure involves significant initial expenses. Also, as staff members adjust to new AI-driven procedures, employers may encounter resistance to change. Additionally, implementing AI still requires careful consideration of data privacy, security issues, and ethical implications. The challenge of successfully integrating AI technologies with current accounting systems adds another layer of complexity to shifting to AI in MA, as the current systems are not always compatible with AI at various levels, which can cause the loss of some data or features. Regular maintenance and monitoring are essential to prevent system failures, which can be costly and inconvenient (Marques et al., 2023).

AI-driven MA raises several moral conundrums. There is a severe risk that biased algorithms might lead to inaccurate financial reporting and decision-making. In the beginning, although blockchain and other AI advances improve security and transparency, they also raise the risk of cybersecurity lapses since AI can be used to launch focused cyberattacks that jeopardize financial data. Secondly, businesses occasionally use long-term conditions that users could find confusing. This, in return, presents ethical issues regarding user privacy. In addition, ensuring fairness, eliminating bias in AI data, and maintaining transparency in AI algorithms are crucial for establishing confidence in the system. Accuracy, dependability, and a wide range of training data must be given the most significant importance by AI systems in order to produce outcomes that can be trusted. Accountability and responsibility for the consequences arising from the usage of AI are essential (Rabbani et al., 2022). To sum up, there are advantages to incorporating AI into MA; however, significant challenges and ethical issues require careful consideration. By tackling these challenges and issues, companies may take advantage of AI's ability to improve financial management procedures, foster sustainable growth, and maintain competitive advantages in corporate environments that are repeatedly changing.

As organizations seek to harness the power of AI in managerial accounting, it is imperative to evaluate the existing system critically. According to Hawe et al. (1990), evaluation is defined and emphasized as a systematic

and methodical process. It is a crucial component aimed at assessing an initiative's effectiveness, efficiency, and impact. The evaluation methods are generally divided into the four following groups: formative, process, impact, and outcome evaluations. Formative evaluation involves gathering feedback throughout the planning and development step to validate the existence of alignment along the goals; process evaluation focuses on how the initiative is executed, analyzing whether it conflicts with the design framework, and indicating some possible problems. Additionally, impact evaluation quantifies the immediate impact or changes generated from the initiative's execution, such as changes in knowledge or behavior. Lastly, outcome evaluation assesses the long-term effects by assessing whether or not the initiative fulfilled its goals (Hawe et al., 1990).

By examining process and impact evaluations, this systematic literature review seeks to explore how researchers have evaluated the application of AI in the field of MA. The review explores how AI adoption is conceptualized and implemented and its immediate effects on MA by employing these two evaluation methods. The two other types of evaluation, i.e., formative and outcome evaluation methods, did not appear in the search. This can be because these two types find a greater relevance in the real life of practical projects and thus require an extended timeline for results to materialize and the subsequent evaluation of processes to unfold.

AI, characterized by machine simulation of human intelligence processes, has found myriad applications in managerial accounting. In this context, the utilization of AI ranges from predictive analytics for budgeting and forecasting to automating routine tasks such as data entry and report generation. These advancements can significantly influence how businesses are strategized, allocate resources, and make critical financial decisions. In this regard, the review is guided by the two primary research questions:

- 1) What are the aspects of assessing Artificial Intelligence (AI) processes in managerial accounting?  
This question delves into the multifaceted considerations researchers have explored when accessing the implementation process of AI in managerial accounting. The aim is to identify the critical dimensions employed to evaluate the various stages of AI, adoption, and integration, offering insight into the intricacies involved.
- 2) What is the impact of using Artificial Intelligence (AI) in managerial accounting?  
This question seeks to uncover the tangible and intangible outcomes of integrating AI into managerial accounting practices. The study explores the impact on MA practices, accountants' roles and skills, and the broader organizational implications that AI adoption may bring.



## 2. A FUNDAMENTAL OVERVIEW

### A. Managerial Accounting

MA forms the basis of internal corporate processes in a broad field by providing essential financial data and operational insights for effective managerial decision-making (Quattrone, 2016). MA is forward-looking and prioritizes data analysis, cost management, and strategy planning to help internal decision-making, unlike financial accounting, which relies on historical data for external stakeholders (Maas et al., 2016).

A vital part of MA cost accounting is the process companies use to evaluate and monitor their operating costs to make rational decisions about pricing and budgeting (Appelbaum et al., 2017). This comprehensive cost analysis creates a foundation for budgeting, another essential MA component. The budgeting objectives should be to create detailed financial plans that provide direction for business operations and resource allocation (Richins et al., 2017).

Performance measurement is another essential tool enabling businesses to evaluate their operations' effectiveness and efficiency accurately. By using various metrics, such as Return On Investment (ROI) and Key Performance Indicators (KPIs), which assist in connecting operational operations with strategic objectives, managerial accountants can determine areas of strengths as well as areas of challenges (Buallay et al., 2021).

The primary objective of MA in making decisions through the use of financial data, applicable cost analysis, and capital planning techniques is to develop tactical and strategic company plans. Managerial accountants actively enhance corporate strategies and ensure their objectives are accomplished. This is because they can turn complex data into insights that can be implemented (Mikes & Kaplan, 2015). In addition, financial forecasting and analysis are crucial. They use data from the past and present to forecast future financial situations. Modern technologies such as machine learning are increasingly driving these predictive analytics, improving the accuracy of financial forecasts and offering a more solid basis for long-term planning.

As an essential part of MA, risk management involves identifying potential financial risks and suggesting treatments. According to Bedford, Malmi, and Sandelin (2016), adopting a proactive approach ensures that companies are prepared to manage possible financial ambiguities and are strategically positioned to function sustainably over an extended period.

Internal reporting guarantees management receives the information needed to make timely and informed decisions by offering regular, detailed updates on the work's financial and operational health catered to the internal stakeholders' needs. The internal focus of MA is highlighted by the nature of these reports, which are not usually distributed outside the company (Maas et al., 2016).

MA is expected to follow an upward trend, becoming increasingly linked with technology developments. The role of the MA is expanding to include that of a strategic

advisor as businesses create more data. This individual assesses the business's financial data and uses analytics and predictive modeling to forecast future projects (Quattrone, 2016).

In an era of rapid change and complexity, the elements of managerial accounting — cost accounting, budgeting, performance assessment, decision-making, financial analysis, risk management, and internal reporting — are of greater significance. Collectively, these components offer a thorough understanding of an organization's financial situation, which aids in setting the strategic decision-making process that drives the company to succeed in a highly competitive business environment.

### B. Artificial Intelligence in Accounting and Finance

AI focuses on creating intelligent machines capable of conducting tasks that generally call for human intelligence. AI has revolutionized the accounting and finance sectors by quickly and accurately analyzing vast data (Davenport & Ronanki, 2018). This technological advancement comes in many forms, such as Natural Language Processing (NLP), which allows machines to understand and interpret human language, including in financial documents and machine learning. As described by Susskind & Susskind (2015), this enables algorithms to learn from data patterns and adapt to them accordingly and systematically.

By automating many transactional and legal procedures, AI majorly diminishes human error and frees the accounting staff to focus more on strategic duties such as financial decision-making (Kokina & Davenport, 2017). Since these AI technologies are capable of recognizing and assessing costs and profits much faster than humans could, they, in return, increase the productivity and efficiency of the staff (Dai & Vasarhelyi, 2017). AI is used in finance to forecast trends, rate risks, and provide insight into market dynamics. These capabilities are crucial for risk management and investment strategies.

The adoption of AI to enhance decision-making has a considerable impact. By integrating data from various and diversified sources, AI could offer extensive insights, allowing finance professionals to make more strategic and informed decisions. This is proven in disciplines like credit scoring, where AI algorithms evaluate reliability by observing social media activity, market trends, and borrowing patterns (Sun & Vasarhelyi, 2017). Moreover, AI proposes solutions for fraud detection while maintaining financial integrity by identifying patterns that could signal or indicate acts of fraud (Sledgianowski et al., 2017).

In addition, AI simplifies complex financial reporting by generating personalized financial statements and real-time analytics. These capabilities are essential for stakeholders who demand data that is more transparent and up-to-date (Appelbaum et al., 2017). By managing the complex structure of regulations more quickly and effectively than traditional workflow management techniques, AI can help businesses meet the most recent worldwide financial standards and legal requirements (McKinney et al., 2017). The deployment of AI in finance and accounting has

been launching new opportunities. For instance, artificial intelligence promotes the development of complex financial models capable of accurately modeling various economic situations, offering businesses a valuable instrument for strategic planning (Tegmark, 2017). Additional advancements in AI technology are expected. They include the possibility for autonomous financial systems to perform complicated tasks like real-time auditing and continuous financial planning.

AI-driven insights in financial reporting, which can provide real-time insights and predictive analysis, may now assist companies in tracking financial performance more effectively. Applications of machine learning for anomaly proof of identity possess the potential to revolutionize the auditing process and enhance the accuracy and reliability of financial audits (Dai & Vasarhelyi, 2017). As a result of the widespread utilization of enormous amounts of data, AI is now essential to organizing and generating value from enormous volumes of financial data that provide previously unreachable forecasted insights.

Although AI has plenty of potential, some shortcomings in accounting and finance exist. The requirement for new skill sets, concerns about data privacy, and the potential for systematic bias in decision-making are valid challenges that could likely arise (Chui et al., 2016). As a result of constant technological advancements, the financial industry is going through a paradigm shift towards a more strategic and value-added services approach. Finance professionals' ability to collaborate with AI is becoming more crucial in defining their designated roles (Kokina & Davenport, 2017).

### 3. REVIEW METHODOLOGY

A systematic literature review (SLR) method is applied to review the primary research papers that are currently available. SLR is a method for collecting, reviewing, and evaluating every research study relevant to a particular topic, field of study, research question, or phenomenon selected (Kitchenham, 2004). This systematic literature review process was carefully developed to ensure a comprehensive and objective investigation of the relevant research publications by applying three main stages. According to Kitchenham's (2004) guidelines for performing SLR, which are as follows: (a) planning the review, (b) conducting the review, and (c) reporting the review. Figure 1 illustrates the SLR process plan.

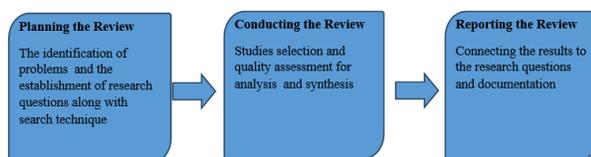


Figure 1. Process of SLR research

#### A. Review Plan

##### 1) Research Questions

Being a relatively new topic in MA, this research addresses the following questions: What are the aspects of assessing AI in managerial accounting, and what are the effects of using AI in MA? To establish these research questions, a primary study of relevant articles was conducted to gain a deeper understanding of the problem issue and identify the relevant questions.

##### 2) Search Technique

A careful analysis of the research questions was conducted to determine which keywords would be most appropriate for the search process. Following that, multiple database search methods were used to identify studies on AI in MA: Scopus, ScienceDirect, and Google Scholar. They were chosen since they cover the most extensive databases, focusing on particular accounting journals and more general business and technology databases. Articles published within the last ten years were included to keep the search relevant to current practices, following the inclusion and exclusion criteria presented in the next section.

##### 3) Inclusion and Exclusion Criteria

Inclusion criteria were established to select studies that explicitly addressed the keywords Artificial Intelligence, Cognitive Computing, Management Accounting, Managerial Accounting, Digitalization, Big Data, Business Intelligence, and Business Analytics. Furthermore, the search was done for papers published only in English. Additionally, studies older than ten years, systematic literature reviews, gray literature, and duplicate studies were also subject to exclusion.

#### B. Review Implementation

##### 1) Selection of Studies

Search efforts began on the 2nd October 2023 and were completed on the 3rd November 2023. The first phase of the search resulted in the retrieval of 207 studies that were further filtered by the screening process, which involved an initial review of titles and abstracts. As part of the second phase of the selection process, the full-text adequacy evaluation was used to determine whether a study should be included or excluded and ascertain the relevance and contribution of the SLR method. Nine primary studies were shortlisted for further evaluation and analysis, as shown in Figure 2. It is important to highlight that although the number is relatively small for what a systematic literature review would often use, this was expected due to the fact that at the time of writing this paper, not many evaluations of the relatively new topic of AI in MA was published. Additionally, the selection process followed (as explained below) set restrictions to ensure quality.

According to the set of variables of each chosen paper,

including the study objectives, techniques, results, limitations, and conclusions, a thematic synthesis approach was applied. This made it possible to find themes and patterns in the literature. The investigation format was intended to accomplish theme saturation and provide an in-depth and refined understanding of the research domain. It is important to emphasize that this review’s results will apply to the AI algorithms that are to be used when the reviewed articles are published.

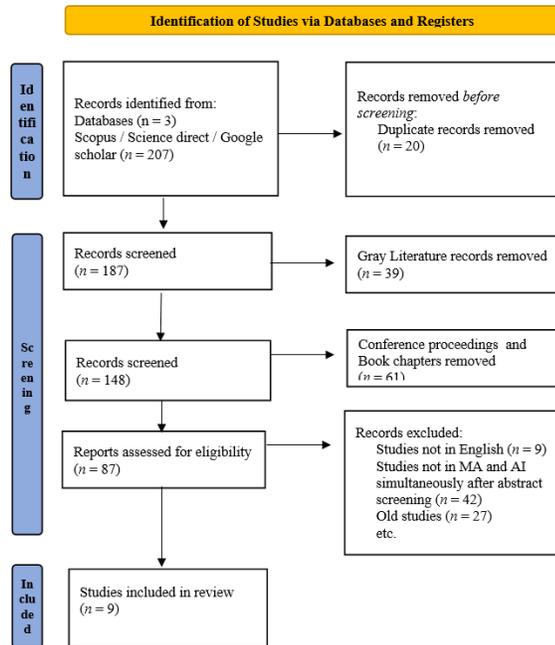


Figure 2. Flow of selection process according to Pageet al. (2021)

### 2) Quality Assessment

In order to assess the quality of the selected primary studies, specific assessment criteria were developed to eliminate potential sources of bias in the research. During the Quality Assessment (QA) phase, each of the primary studies that has been selected was evaluated in order to assess its significance and completeness (Kitchenham, 2007). Table 1 comprises the QA questions generated after analyzing Kitchenham’s (2007) QA criteria checklist. The QA assessment of each chosen primary study was conducted using scoring systems that classify studies as Excellent, Moderate, or Poor based on their responses to the QA (1- 6). An Excellent rating is assigned when the study comprehensively responds to these questions (as outlined in Table 1). In contrast, a Moderate rating is given to studies that partially address the QA questions, indicating room for improvement in their approach to QA. When there is no discernible evidence of the QA questions being adequately addressed, the study receives a Poor rating, signifying a need for substantial improvement in

its quality assessment methodology. This scoring system provides a nuanced evaluation of the primary studies, providing a clearer understanding of their quality and more accuracy in addressing the research questions.

As Table 2 demonstrates, none of the papers has scored Poor for any criteria. Spraakman et al.’s paper (2020) scored Excellent in all criteria, while each of Abdelhalim’s paper (2023) and Bao et al.’s (2023) scored Moderate in one criteria, for proper definition of research objective and the systematic analysis and discussion of results respectively.

### C. Reporting the Review

The following sections examine and discuss the data from the nine chosen primary studies.

#### 1) Distribution Across Time

Figure 3 displays the primary research studies’ year-wise distribution. It provides a year-by-year count of publications from 2019 to 2023. Starting with one publication in 2019, the number varies each subsequent year. There were two publications in 2020, followed by one in 2021 and 2022. In 2023, the chart shows an increase to four publications.

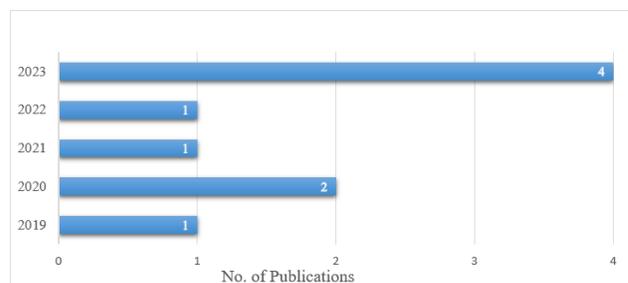


Figure 3. Research studies’ year-wise distribution

#### 2) Description of The Primary Studies

Table 3, shown below, provides a consolidated overview of research and studies on the role of AI and business intelligence (BI) in MA. This systematic review details how each paper examines technological acceptance, the impact of AI in MA on decision-making processes, skills evolution, and ethical considerations.

Various research methods were employed across the studies, including structural equation modeling and quantitative and qualitative approaches through interviews. The key findings highlight the significance of users’ perceptions and satisfaction regarding adopting AI, the potential of big data and AI to enhance MA efficiency and the ethical challenges posed by AI’s complexity and data integration issues. Table 3 also summarises conclusions, noting the general trend towards the growing acceptance of AI and BI, but with



caveats regarding the need for broader research, especially concerning the ethical implications and skill-sets required by accounting professionals. It reflects a transition in the field, with technology offering opportunities and challenges and underscores a clear need for ongoing research to navigate this landscape effectively.

TABLE I. Questions for Quality Assessments

No.	Questions of Assessment	Score scale
1	Is the chosen research methodology aligned with the research problem?	Excellent/Moderate/Poor
2	Are the research objectives of the study well-defined?	Excellent/Moderate/Poor
3	Does the study explicitly outline the proposed research methodology?	Excellent/Moderate/Poor
4	Has the study provided a clear description of the experimental environment?	Excellent/Moderate/Poor
5	Are the study's results and findings systematically analyzed and discussed?	Excellent/Moderate/Poor
6	Does the study address the practical implications and real-world relevance of the research?	Excellent/Moderate/Poor

TABLE II. Quality Assessment of Reviewed Articles

Reviewed Papers by author(s)	The Alignment of the chosen research methodology with the research problem	Proper definition of research objective	Explicitly of outlining the proposed research methodology	Providing a clear description of the experimental environment	The systematical analysis and discussion of the studies results and findings	Addressing the practical implications and real-world relevance of the research
Oesterreich et al. (2019)	Moderate	Excellent	Moderate	Moderate	Excellent	Excellent
Spraakman et al. (2020)	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Pilipczuk (2020)	Excellent	Excellent	Excellent	Excellent	Moderate	Moderate
Youssef et al. (2021)	Moderate	Moderate	Excellent	Excellent	Excellent	Excellent
Värzaru (2022)	Excellent	Excellent	Excellent	Moderate	Moderate	Excellent
Marques et al. (2023)	Moderate	Excellent	Excellent	Moderate	Moderate	Excellent
Zhang et al. (2023)	Moderate	Moderate	Moderate	Excellent	Excellent	Excellent
Abdelhalim (2023)	Excellent	Moderate	Excellent	Excellent	Excellent	Excellent
Bao et al. (2023)	Excellent	Excellent	Excellent	Excellent	Moderate	Excellent



TABLE III. Summary of selected studies.

Authors	Purpose	Research Methodology	Key Findings	Conclusion and Limitations/Recommendation
Vărzaru (2022)	To evaluate accountants' acceptance of Artificial Intelligence technology.	Path analysis and structural equation modeling (SEM) were used to test hypotheses.	Results indicated that (PEU) significantly influences behavioral intention and actual use of AI solutions, and users' satisfaction positively impacts future behavioral intention and use of AI solutions. User perceptions and satisfaction play an important role in AI adoption in Romanian organizations.	In MA, AI technology is becoming more accepted due to its benefits. Intent to adopt AI is strong among users. Limitations: 1- Results are specific to Romanian accountants. 2- Perceptions are not tracked over time. 3- Focuses on accountants, missing perspective from other positions. 4- Additional factors should be explored in future research.
Marques et al., (2023)	To examine the impact of artificial intelligence, big data, and the Internet of Things on management accounting.	This paper combined qualitative and quantitative approaches. Interview responses were analyzed qualitatively using MAXQDA 2020 software. The data was visualized in graphs. Quantitatively, data from online questionnaires were analyzed using descriptive statistics, which were summarized in tables and charts.	The impact of the Internet of Things (IoT) on MA is still unclear. Big data and AI can add value to the MA profession by increasing efficiency, productivity, and cost-effectiveness. Management accountants' trust in the information provided by AI systems positively impacts their perception of the value of AI and their likelihood of adopting AI technology. Data science, intelligent systems, and IT knowledge are essential skills for management accountants.	MA is slow to adopt new technologies, although they offer many advantages and are becoming more widely used in other industries. Most management accountants have not yet started using these technologies. AI technologies have the potential to improve productivity and efficiency in MA significantly. Limitations: The study only included participants from Portugal and Brazil, so its findings may not apply to other populations.



Zhang et al. (2023)	To investigate the pre- and post-adoption ethical implications of artificial intelligence (AI) on managerial accounting.	Qualitative approach via interview	Using AI in complex management and accounting raises ethical concerns due to data integration and customization. That includes data, security, transparency, bias, and overreliance by inexperienced accountants. These concerns are more significant for AI in MA due to its complexity and emerging nature. Inconsistent data structures and incomplete data reduce AI's effectiveness. Accountants need to understand AI and its operations to avoid ethical risks. Any future accountants will rely more on their professional judgment, potentially leading to more independent work.	Before AI systems are adopted in managerial accounting, several ethical risks need to be considered, including data security, privacy, misuse, accountability, beneficiaries, and the competence of AI vendors. Some of the impacts of AI on MA and decision-making can be seen immediately, while others may not be apparent for years. Limitations: 1- The interviewed companies are exclusively clients of a prominent AI vendor in China. 2- Given the rapid development of AI, it is possible that additional ethical issues and challenges may arise as new algorithms are introduced.
Bao et al. (2023).	To investigate the impact of BI on MA in companies.	Quantitative method - survey questionnaire	Several factors influence the success of business intelligence (BI). Firstly, data quality is crucial for meaningful insights. Second, integrating BI with other systems enhances its effectiveness. Third, flexibility in BI solutions is vital for adapting to changing needs. User access and support play a role in BI success. Lastly, aligning BI with the specific decision types improves outcomes. Understanding and addressing these factors are key to successful BI implementations and maximizing its value.	For managers in industrial companies, this study has the potential to result in a reduction in decision costs. Additionally, Managers in industrial companies should prioritize variables such as decision type and data quality over flexibility and integration with other systems. Limitation: The impact of business intelligence on other areas of companies is not examined; hence, for future study, the impact on specific areas such as customer service, operations, or human resources could be investigated.



<p>Oesterreich et al., (2019)</p>	<p>To investigate the availability of business analytics skills in the current skill sets of controlling professionals to determine whether there is a skills gap.</p>	<p>A text analytics approach is employed to identify patterns within the semi-structured data.</p>	<p>The existing competence profiles of controllers do not align with the latest requirements for business analytics skills. However, it is essential to approach whether a skills gap exists with caution, considering the specific organizational context, such as the level of IT adoption or the extent of job specialization.</p>	<p>Offering valuable insights into the observed skills gap between controllers with business analytic competencies and the current competence profile of controlling professionals. Additionally, gender differences in the availability of business analytics competencies and the influence of company size on employee competence supplies have been identified as moderating factors. Limitation: The data sample used is limited to the profiles of German controlling professionals from prominent large companies.</p>
<p>Pilipczuk (2020)</p>	<p>To explore how cognitive technologies are affecting management accounting. The research aimed to build the management accountant skills model that exists today.</p>	<p>Between November 2019 and January 2020, a study compared five countries (US et al.) using "Indeed" as the data source. Job posts were filtered using keywords related to management accounting, big data, and cognitive abilities. The study assessed job offers and the cognitive, cognitive analytics and extensive data skills required for each country. Additionally, it explored labor force data and software skill needs.</p>	<p>The need for cognitive analytics and extensive data expertise in management accounting varies by nation. More employees need these skills in the USA than in Poland or Ukraine. The demand in the UK is comparable to that found in the US and Canada.</p>	<p>In order to handle vast amounts of data, extract information, and manage it, management accountants need to master sophisticated IT abilities. The recommendations include enhancing cognitive reflection skills and the capacity to identify patterns and prioritize information. Limitation The study covers limited Western countries only.</p>



Youssef et al., (2021)	To examine how business intelligence and analytics mediate the relationship between three sets of management accounting practices and enterprise resource planning (ERP): costing, performance evaluation, and budgeting.	The study investigated data obtained via a cross-sectional survey of 82 UAE-based firms using structural equation modeling (SmartPLS 3)	The beneficial effects of the degree of ERP system usage, as a modular build, on the degree of three sets of MAP applications. Furthermore, they demonstrate that the degree to which ERP systems are used and the degree to which each of the three sets of MAPs is applied are primarily mediated by the degree to which BI&A systems are used.	Adopting enterprise resource planning (ERP) benefits management accounting practices (MAPs), and BI&A works as a mediator to strengthen this link. This emphasizes how crucial it is to combine BI&A and ERP systems to enhance management accounting functions. Limitations 1- The study acknowledges the inherent limitations of survey-based research. 2- Future studies should consider ERP as a modular construct and could explore BI&A's mediating effect in different country contexts. 3- It suggests including variables such as management sophistication and management control system characteristics in Future research.
Abdelhalim (2023)	To assess the relationship/effect of integrating big data analytics and management accounting on corporate sustainability performance development.	A qualitative case study approach is employed in this study with multiple collecting data tools, such as in-depth interviews and observation, along with a content analysis of the annual reports for the year 2021 of Almarai Manufacturing Company.	Effective integration between big data analytics and management accounting can significantly improve corporate sustainability performance development. Furthermore, big data can assist in forming corporate value-added strategies and activities.	According to Almarai Corporation's case study, big data analytics significantly enhance management accounting practices, increasing sustainability and a competitive advantage. However, as the findings are based on a single company, they highlight the need for broader research to confirm these benefits across the industry. Limitations: 1. The study is based on a single case study from a Saudi Arabian manufacturing company. Therefore, the results cannot be considered generalizable. 2. Future research could explore the relationship between big data and management accounting practices in a broad range of companies, applying different methodologies and contexts to enhance the robustness of the findings.



<p>Spraakman et al., (2020)</p>	<p>To determine how data analytics (DA) affects the tasks of management accountants (MA).</p>	<p>A qualitative methodology was used. The evidence was gathered through the use of ten open-ended interview questions.</p>	<p>Although Management accountants prepare and communicate data, they underutilize predictive analytics and use essential tools like Excel. According to the study, management accountants must improve data analytics, data structures, and analysis presentation skills.</p>	<p>MAs must develop data management and communication skills to facilitate decision-making. They must participate in educational programs and professional development, including Excel training, to stay current with these changes. A future study could investigate the reliability of findings over a more extended period, explore the need for more focused management accounting roles, examine drill-down practices and tools, and examine industry-specific trend analysis and prediction methods.                  Limitations                  Small sample size (20 organizations in central Canada) and short interview duration.</p>
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The nine articles were cited in other studies, and the citation ranged between once and 89 times as shown in Figure 4 below.

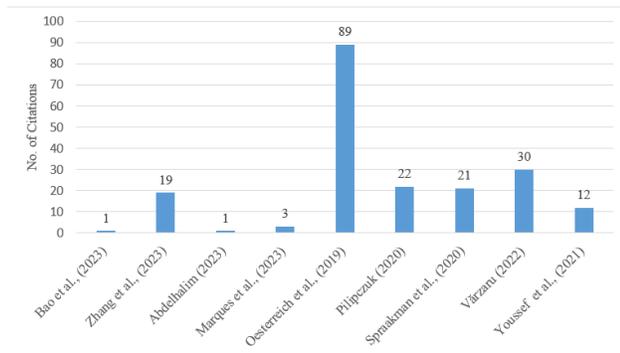


Figure 4. Number of times each of the selected studies has been cited until the time of the SLR.

#### 4. SYNTHESIS OF FINDINGS

This review organizes the chosen research papers into four categories to address the first research question (RQ1): 1) technological acceptance and usability, 2) ethical and security considerations, 3) skills and competence, and 4) the decision-making process. For the second research question (RQ2), two additional categories were identified: 1) enhancement of accounting practices and 2) evolution of roles and skills. The summaries of 9 peer-reviewed research papers were consolidated in Table 3.

##### A. Aspects for Evaluating the Process of AI in MA – RQ1

The reviewed papers have evaluated four process aspects of using AI in MA,; they are as follows.

##### 1) Technological Acceptance and Usability

A major aspect mentioned in the evaluations has been the acceptance of AI in MA, which is vital for its successful integration. Varzaru (2022) emphasizes how the Perceived Ease of Use (PEU) and Perceived Usefulness (PU) significantly influence AI technology adoption. This is further supported by Marques et al. (2023), who stressed the importance of user-friendly AI interfaces for effective implementation. Their findings indicated that the profession is becoming more open to these technologies, showing a shift in attitude towards using technological advances to improve MA procedures. Additionally, both of the studies implicitly confirmed the importance of organizational culture. According to Varzaru et al. (2022), an innovative and flexible culture has a greater chance of adopting and commanding AI appropriately. Marques et al. (2023) addressed this matter by investigating how prepared the industry and general market are to utilize AI technologies; this will indirectly influence how ready an organization's

culture is.

The two author groups have acknowledged the need for AI technologies to integrate seamlessly with current platforms and systems. Based on Varzaru (2022), compatibility may significantly simplify AI procedures in MA. While Marques et al. (2023) do not specifically address system compatibility, they highlight its importance by focusing on the requirements for adaptability and practicality in current working methods.

##### 2) Ethical and Security Considerations

The integration of AI in MA proved its vitality to ethical and security considerations, yet studies' insights on their importance and impact vary as well. In a broader sense of applying AI, some perceive these issues as significant obstacles to adoption, while others perceive them as manageable but still necessary. According to Zhang et al. (2023), deploying AI demands strong governance and the existence of moral standards because they raise concerns with data security, privacy, and ethical application of AI. As an alternative, Spraakman et al. (2020) advocated a more practical viewpoint by viewing ethical issues as manageable as long as they are broadly integrated into the process.

These variations might result from the researchers' varied backgrounds and interests or reflect MA's different AI adoption phases. Spraakman et al. (2020) take a more operational-oriented or perhaps realistic journey by considering ethical issues as part of the ongoing management evolution of AI systems in MA. Nonetheless, Zhang et al. (2023) focused on the foundational aspects needed for successful AI incorporation.

##### 3) Skills and Competence

The studied and reviewed papers underlined the skills and competency points demanded by professionals in their respective fields. Significant changes are happening concerning these competencies and skills. Oesterreich and Teuteberg (2019) stress acquiring new technical skills, particularly in data analytics, AI literacy, and traditional accounting skillsets. They support an integrated strategy in which the foundational accounting knowledge is improved and complemented by these trendy technological skills. This point of view underlines the necessity for accountants to adjust to the changing demands of their professions and acknowledges the growing significance of technological proficiency in the digital age. Expanding on this review, Pilipczuk (2020) investigated how integrating AI into MA can be transformative and highlighted the significance of combining traditional competencies with improved cognitive abilities, for example, problem-solving and strategic thinking. This study suggests a more subtle shift, arguing that the fundamental goal of integrating AI into accounting should be to redefine the role of accountants as opposed to only adding a new set of skills.

When taken as a whole, these studies offer a nuanced

understanding of evolutionary AI's abilities within the context of MA. Oesterreich and Teuteberg (2019) stated that modern accountants must possess dual skill sets and establish a baseline requirement for technological skills in addition to their practical knowledge and traditional competencies. Taking this idea one step further, Pilipczuk (2020) proposed a revolutionary shift combining these technical skills with complex cognitive capacities, reflecting AI's increased complexity and analytical requirements. This complementary story demonstrates how professional development in accounting is multifaceted, demanding both the acquisition of new technical skills and the enhancement of cognitive abilities to meet the opportunities and challenges posed by AI.

#### 4) *The Decision-Making Process*

The reviewed articles also deemed the decision-making process an essential aspect of AI in MA. Examining the effect of AI integration in MA, the two studies by Marques et al. (2023) and Bao et al. (2023) address the matter differently, with the main focus being the impact on decision-making processes. Marques et al. (2023) highlighted the transformative role of AI in enhancing and reshaping the strategy and analytical aspects of decision-making within managerial accounting. Their analysis suggested that AI extends beyond merely augmenting current processes instead of significantly redefining the accountants' role to word more strategic and advisory functions. This view posits AI as a driver for a broader, more proactive, and predictive decision-making approach. Conversely, Bao et al. (2023) presented a perspective where AI, particularly business intelligence, is seen as a tool that enriches and supports the existing decision-making framework. They argue that AI strengthens the traditional roles of accountants by providing more profound, more accurate insights and, thus, improving the quality of decisions without drastically changing the core nature of decision-making roles. This evaluation underscores the multifaceted nature of AI integration in MA, indicating that AI's influence can range from augmenting current practices to fundamentally reshaping the roles of employees and decision-making processes. The differing perspectives reflect a broader debate in the field of AI in MA, balancing the views of AI as a revolutionary force against its incrementally enhancing role in MA.

#### B. *Evaluating the Impacts of Using AI in MA – RQ2*

The reviewed papers have focused on two significant impacts of using AI in MA.

##### 1) *The Enhancement of Accounting Practices*

One of the most critical impacts explored in the reviewed articles was the improvement in accounting practices generated from the use of AI in MA. According to Spraakman et al. (2020), AI can automate repetitive

tasks and free up accountants' time for them to have more time and focus on more complex projects. AI can also improve accuracy in accounting. According to them, AI can gradually improve processes by simplifying rather than replacing them. However, Youssef and Mahama (2021) provided a more comprehensive analysis of AI's impacts, covering how it affects budgeting, costing, and performance evaluation, among other accounting-related topics. Their analysis exceeds operational efficiency, suggesting that AI has a more extensive impact on accounting practices and offers deeper analysis and insights that greatly aid the strategic decision-making process.

Abdelhalim (2023) took an unusual stance by focusing on AI's role in sustainability reporting and compliance, broadening the scope of AI's effects to include social governance and environmental aspects of accounting. This outlook underscores AI's strategic importance in linking accounting processes with more general sustainability goals and demonstrates its usefulness in tackling new issues in the industry. When taken as a whole, these studies point out the complexity of AI's application in accounting. While most people perceive AI as a way of improving operational efficiency, others believe that AI has a broader impact, influencing strategic decision-making and bringing accounting practices into line with changing global priorities such as sustainability. This diversity of views illustrates how AI serves a complex and growing role in accounting, helping accountants embrace new challenges and priorities and enhancing established processes.

##### 2) *The Evolution of Roles and Skills*

Besides enhancing accounting practices, the systematic review has found that another evaluated impact was the evolution of roles and skills in the field of MA. The transformation of roles and skills in managerial accounting, driven by the adoption of AI, is a key theme explored in this review, notably in the works of Oesterreich and Teuteberg (2019), Pilipczuk (2020), and Marques et al. (2023). These studies collectively paint a nuanced picture of how AI is reshaping the accounting profession, emphasizing the enhancement of existing roles and the emergence of new competencies.

Oesterreich and Teuteberg (2019) delved into the expanded skill requirements in the era of AI-drive and accounting. Their research concluded that in addition to traditional accounting expertise, it is essential for accountants to develop their technical skills in data analytics and AI. This approach suggests broadening the accountant skillset to encompass technological capabilities, positioning, and accountants to effectively harness AI tools and interpret AI-driven insights.

Pilipczuk (2020) contributed to this discourse by examining the cognitive shift necessitated by AI. The study shifted attention from solely technical skills to integrating improved cognitive skills, like strategic analysis and problem-solving. It posited that adapting to AI in accounting involves acquiring new technical knowledge and redefining



cognitive approaches to analysis and decision-making. This indicates a more comprehensive transformation in the accountants' roles. Furthermore, Marques et al. (2023) highlighted how AI enables accountants to adopt more strategic and advisory roles. Their analysis shows that AI's capacity for processing large-scale data and offering real-time insights propels accountants beyond traditional roles, positioning them as strategic advisors and decision-support specialists. This change illustrates a significant shift in accountants' roles, underpinned by the advanced capabilities offered by AI technologies. These viewpoints reveal that there is a significant shift and a dynamic change in the field of accounting. It highlights the need for continuous professional growth and rethinking of accounting education to prepare professionals for the evolving demands of AI-integrated workplaces.

## 5. CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

The launch of AI in MA is a historic development that promises to transform the field entirely. AI has the vast potential to enhance decision-making, optimize processes, and provide strategic insights. However, one should realize that its full potential comes with challenges and ethical considerations. This emphasizes the importance of continuous evaluation of AI in MA. This study has presented an SLR of academic articles evaluating AI in MA, focusing on process and impact evaluations. Using the guidelines of Kitchenham (2004), the SLR has narrowed the focus to nine articles that fulfilled the inclusion and exclusion criteria. The review revealed four aspects of AI in MA process evaluation: technological acceptance and usability, ethical and security considerations, skills and competencies, and the decision-making process. As for the impact evaluation, two aspects were mentioned in the reviewed articles: the enhancement of accounting practices and the evolution of roles and skills.

Future research should delve into empirical studies, focusing on the real-world implementation of AI in MA. This includes detailed case studies of organizations that have integrated AI into their accounting processes, examining the outcomes, challenges, and strategies for future success. There is a need for comprehensive longitudinal studies to evaluate the long-term impact of AI on MA. Such studies should examine how AI influences job roles, employees' engagement and the overall organizational performance over extended periods.

Future research should aim to develop ethical frameworks and regulatory standards for AI in MA. Investigating how AI impacts data privacy, addressing biases in AI, algorithms, and ensuring transparency and accountability in AI-driven decisions are crucial areas of focus. Researchers should also explore the transformation of educational and training programs to prepare better and equip future accountants with the necessary AI and data analytics skills. This involves curriculum design and professional development to align with the digital transformation occurring in the field.

Lastly, there is a significant scope for cross-disciplinary

research that combines insights from technology, business, ethics, and psychology. Such research would provide a more holistic understanding of the broader implications of AI in MA. Embracing this technological revolution, preparing the accounting workforce for the digital era and ensuring the responsible and ethical use of AI are imperative for the field's future progression.

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