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From WOS to ChatGPT: Exploring Digital Transformation in Accounting through Keyword Analysis for ”Artificial Intelligence” and ”ERP Systems”

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Abstract. *This study investigates how the concepts of "Artificial Intelligence" and "ERP Systems" are represented in the specialized literature indexed in the WOS database and compares them with the suggestions generated by ChatGPT. The paper explores the digitalization in the field of accounting through a detailed analysis of keywords extracted from scientific articles and from queries to an advanced AI model.*

The methodology used includes bibliometric analysis performed with the help of VOSviewer and Bibliometrix software, which allow the identification of term co-occurrence networks, the evolution of research topics and semantic clusters. In addition, set operations are applied to calculate the overlap between the two sources, using metrics such as the Jaccard index and cosine similarity, to measure the degree of similarity between the identified concepts. The obtained results provide an insight into how the topics related to technological innovations are addressed in academic research compared to AI suggestions, highlighting significant convergences and discrepancies. The study contributes to understanding the digital transformation process in accounting, proposing future directions for optimizing indexing and information management in the field.

Keywords: Artificial Intelligence, ERP systems, accounting, ChatGPT**,** digital, concepts.

Introduction

This paper aims to analyze the concepts of artificial intelligence and ERP systems, starting from the most relevant papers written by other authors published in prestigious journals. The massive digitization in the recent period, which is a complex process, has led to the increased use of computer applications to streamline the daily activities performed by accounting professionals. Thus, the way organizations operate and the activities of accounting professionals are changing as a result of digitalization.

The aim of the paper is to illustrate the impact of digitization on the accounting profession, which are the main benefits, opportunities and challenges identified in Web of Science indexed articles, focusing on the keywords "artificial intelligence" and "ERP systems".

The use of ERP integrated information systems leads to the automation of repetitive tasks, reducing paper consumption and reducing human error, while increasing the accuracy of financial decisions.

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Artificial intelligence has been integrated into the daily routines of accounting professionals for its ability to analyze large volumes of data and to detect possible fraud and predictive analysis of financial flows.

The article aims to present in the conclusions section potential solutions proposed by the authors based on their studies.

Literature review

The digitization of the activities of accounting professionals has become a wide-ranging topic studied in recent decades, based on ERP systems and artificial intelligence. The need to streamline financial processes and reduce human errors has led to the search for IT solutions to meet these needs of organizations.

The authors Davenport and Kirby (2016) pointed out that digitization in accounting involves not only the automation of repetitive tasks, but also the use of advanced data analytics for strategic decision making. Furthermore, Brynjolfsson and McAfee (2017) highlighted that digitalization fundamentally changes business models and organizational structures. Artificial intelligence has been considered a key element in transforming accounting and the flow of information in an organization by providing the opportunity to create predictive analytics, perform automated auditing, and detect fraud. In the study conducted by Wang and Cuthbertson (2020), they identified that AI leads to greater transparency and accuracy in financial reporting (Singth & Adhikari, 2023). Functions offered by ERP systems that are integrated into the platform play a fundamental role in modernizing accounting, allowing for real-time data analysis and optimization of the financial resources used by an organization.

Özpolat et al. (2023) presented the 6 phases in which an information system is:

1. Planning - creating user requirements and needs
2. Analysis - analyzing user requirements and needs
3. Design - system design and creation of the basic software structure
4. Development - creating the source code through which the requirements are transposed into code form
5. Testing - testing the source code with test data, detecting software errors, performance tests, evaluating the level of usability. Software training of the organization's employees also takes place in this stage
6. Maintenance - ensuring periodic software maintenance to avoid errors

Among the many benefits brought by the adoption of artificial intelligence and ERP systems in accounting, there are also numerous challenges, including: data security issues, resistance to change, and high implementation costs (Sulton and Arnold, 2018). Sun and Vasarhelyi (2021) believe that digitalization allows the creation of new business models based on advanced analysis of financial data. Improving business processes leads to "beneficial outcomes for the organization by reducing operational costs, improving and optimizing services" (Adesina et al., 2024; Korol and Romashko, 2024).

According to Adesina et al. (2024), "training and skills development are essential to equip employees with the knowledge and skills needed to effectively use advanced analytics". Accounting organizations need to develop the analytical skills and expertise of accounting professionals.

Using advanced predictive analytics techniques, organizations can optimize resource allocation, streamlining the flow of information, documents, and resources with the help of ERP

systems (Ahmad, 2024). Artificial intelligence in accounting improves communication and consistency (Ahmad, 2024; Korol and Romashko, 2024).

According to Eulerich et al. (2024) and Georgiu et al. (2024), technology is changing traditional accounting as a result of the digitalization of repetitive processes performed daily by accounting professionals.

Janakova and Suchanete (2023) believe that the implementation of artificial intelligence in ERP systems allows for advanced analysis of data and business processes, allowing for subsequent interpretation of the results (Kale, 2024; Mgammal, 2024; Pinto et al., 2024).

List of AI capabilities identified by Stoykova et al. (2023):

- Predictive analytics (identify risk and opportunities);
- Intelligent Process Automation
- Machine Learning
- Natural Language Processing (speech recognition)
- Machine Vision (processing of images)
- Expert systems

SWOT analysis of AI integration in accounting (Yaşar, 2024) presented in table 1:

Table 1. SWOT analysis of AI integration in accounting

Strength	**Weaknesses**
Versatile data flow *Reduction in costs*	*Problems in data quality* *Bias* *Users' lack of competence and design difficulty*
Opportunities	**Threats**
Smarter decisions and functional *Professional transformation*	*Loss of control* *Data security and confidentiality problems* *Loss of status and decrease in motivation*

Source: Adaptation after Yaşar, 2024.

The SWOT analysis of AI integration in accounting highlights that while the technology brings many benefits, its adoption must be done with caution. It is essential that companies invest in employee training and implement strict security measures to protect financial data.

In the long term, AI has the potential to revolutionize accounting, providing innovative solutions for managing financial resources, but its success depends on the ability of companies to manage the risks associated with adopting these technologies.

Methodology

This study uses a mixed approach, integrating both quantitative and qualitative methods to compare the accuracy and relevance of keywords extracted from the scientific literature with those suggested by ChatGPT in the field of artificial intelligence (AI) and ERP systems in accounting. The aim of the research is to assess the degree of overlap between the two sources, to analyze the semantic distribution and frequency of terms, as well as to identify contextual and terminological differences.

The main data source of this study was the Web of Science (WOS) database, from which relevant articles were selected using the following query: TS = ("Artificial Intelligence in Accounting" OR "ERP in Accounting"). The search was restricted to the period 2010-2024 and targeted the research field of Business Economics, resulting in a number of 810 articles. Keywords

were extracted from the selected articles, thus providing an overview of the terminology used in the scientific literature.

To compare these results, keyword lists were generated using ChatGPT (GPT-4), through specific queries, such as:

- What relevant terms are found in the specialized literature regarding the combined implementation of artificial intelligence and ERP solutions in accounting?
- How does the synergy between artificial intelligence and ERP systems influence the digital transformation of accounting processes, and what key concepts emerge in this context?
- What are the essential concepts and keywords for modernizing accounting through the integration of artificial intelligence and ERP technologies?
- What are the main keywords that describe the integration of artificial intelligence and ERP systems in accounting processes?

To assess the degree of similarity and distribution differences, we used the following analytical methods:

- Frequency analysis – Calculating the number of occurrences of each keyword in both sources to identify dominant terms.
- Jaccard similarity index – Measuring the overlap between the two sets of keyword;
- Cosine similarity – A TF-IDF-based approach used to assess semantic proximity between terms in the two sources.

For data extraction, processing and visualization, the following tools were used: VOSviewer and Biblioshiny (Bibliometrix R package) for bibliometric analysis of keywords from scientific literature and generating the word cloud, Python (libraries pandas, sklearn, matplotlib, seaborn) for statistical analysis and graphical representation of data and Microsoft Excel for further data organization and management.

The results were analyzed through the lens of three fundamental research questions:

- To what extent do the keywords extracted from the scientific literature overlap with those suggested by ChatGPT?
- How do the relevance, frequency and semantic distribution of keywords compare between the two sources?
- What are the differences in context and specialization of terminology between the two datasets?

Results and discussions

Data extracted from the Web of Science (WOS) database were processed using VOSviewer, resulting in a total of 3,464 keywords from the 810 selected articles. To identify the most representative terms, a selection criterion was applied that imposed a minimum threshold of 5 occurrences for each keyword, leading to a final set of 226 relevant terms. From this set, the top 20 keywords with the highest frequency of occurrence were selected, presented in Table 2.

Table 2. Keywords with the highest frequency of occurrence from the Web of Science

Keywords	Occurence	Total link strenght
Artificial Intelligence	303	1189
Erp	146	630
Impact	82	492
Management	77	439
Performance	71	418
Technology	65	363
Accountig	64	307
Big Data	63	390
Systems	55	311
Innovation	51	257
Model	50	249
Implementation	49	308
Machine Learning	47	212
Information	43	229
Adoption	39	277
Information-Technology	39	246
Blockchain	37	221
Determinants	34	205
Future	34	205
Frameworks	34	199

Source: Authors' own research.

Figure 1. Worldcloud

Source: Authors' own research using Bibliometrix (Biblioshiny).

Figure 1 provides a graphical representation of the most common keywords found in the scientific literature (WOS) on AI and ERP systems in accounting. A dominance of terms such as "Artificial Intelligence", "Impact", "Management", "Performance" and "Technology" is observed,

suggesting that academic research emphasizes the influence of AI on business operations, managerial decision-making and organizational performance. In addition, keywords such as "Implementation", "Adoption" and "Innovation" reflect a focus on the integration and transformational potential of AI-based technologies in accounting frameworks.

The presence of terms such as "Big Data", "Information Technology", "Systems" and "Framework" highlights the importance of data-driven decision-making and structured methodologies in studying AI and ERP applications. Additionally, words like "Determinants," "Knowledge," and "Automation" indicate ongoing research into the factors influencing AI adoption and its implications for future developments in accounting and enterprise systems. This visualization confirms that the scholarly literature provides a structured and research-oriented discourse on AI and ERP, focusing on implementation, managerial impact, and technological frameworks, rather than just automation and integration trends.

To compare the keywords extracted from the scientific literature with those generated by ChatGPT, four questions were formulated related to the use of AI and ERP in accounting. ChatGPT provided a set of relevant keywords, which are presented in Table 3.

Table 3. Keywords generated by ChatGPT as a result of queries performed

What are the main keywords that describe the integration of artificial intelligence and ERP systems in accounting processes?	What relevant terms are found in the specialized literature regarding the combined implementation of artificial intelligence and ERP solutions in accounting?	How does the synergy between artificial intelligence and ERP systems influence the digital transformation of accounting processes, and what key concepts emerge in this context?	What are the essential concepts and keywords for modernizing accounting through the integration of artificial intelligence and ERP technologies?
Artificial Intelligence	Artificial Intelligence	Artificial Intelligence	Artificial Intelligence
Data Analytics	Big Data Analytics	Cognitive Computing	Cognitive Computing
Decision Support Systems	Cognitive Computing	Data Integration	Data Integration
Deep Learning	Data Integration	Decision Support Systems	Decision Support Systems
Digital Transformation	Decision Support Systems	Digital Transformation	Digital Transformation
ERP Systems	Deep Learning	ERP Systems	ERP Systems
Integrated Systems	Digital Transformation	Integrated Financial Management	Integrated Financial Management
Intelligent Automation	ERP Systems	Intelligent Automation	Intelligent Automation
Machine Learning	Integrated Financial Management	Machine Learning	Machine Learning
Predictive Analytics	Intelligent Automation	Predictive Analytics	Predictive Analytics
Process Optimization	Machine Learning	Process Optimization	Process Optimization
Robotic Process Automation	Predictive Analytics	Real-Time Data Processing	Real-Time Data Processing
Automation	Process Optimization	Robotic Process Automation	Robotic Process Automation
ERP Integration	Robotic Process Automation	X	X

Source: Authors' own research.

Using Excel, then calculated the frequency of occurrence of the keywords obtained from the four queries, and these are then summarized in Table 4. This allowed for a more detailed comparative analysis of the distribution of terms between the two data sources.

Table 4. Frequency of occurrence of keywords generated by ChatGPT

Keywords	Occurence
Artificial Intelligence	4
Decision Support Systems	4
Digital Transformation	4
ERP Systems	4
Intelligent Automation	4
Machine Learning	4
Predictive Analytics	4
Process Optimization	4
Robotic Process Automation	4
Cognitive Computing	3
Data Integration	3
Integrated Financial Management	3
Deep Learning	2
Real-Time Data Processing	2
Integrated Systems	1
Big Data Analytics	1
Automation	1
Data Analytics	1
ERP Integration	1

Source: Authors' own research.

The frequency analysis of the keywords in the two tables highlights significant differences between the scientific literature (WOS) and the words generated by ChatGPT.

In the data extracted from WOS, the most frequent keywords are "Artificial Intelligence" (303 occurrences) and "ERP" (146 occurrences), followed by terms such as "Impact" (82), "Management" (77), "Performance" (71) and "Technology" (65). These values indicate that the specialized literature pays considerable attention to these concepts, suggesting a strong interconnection between AI, ERP and management performance in accounting. Also, the concept of "Machine Learning" has 47 occurrences, which confirms the use of advanced machine learning techniques in this field.

In contrast, the keywords generated by ChatGPT present a more balanced distribution, with each term having between 1 and 4 occurrences. "Artificial Intelligence", "Machine Learning", "ERP Systems", "Predictive Analytics" and "Intelligent Automation" appear 4 times, suggesting that the model identifies these concepts as fundamental in the field. However, ChatGPT also generates more specific terms, such as "Robotic Process Automation (RPA)" (4 occurrences), "Cognitive Computing" (3) and "Data Integration" (3), which do not appear with the same high frequency in the scientific literature, but which are recognized as emerging trends in the field of digital accounting.

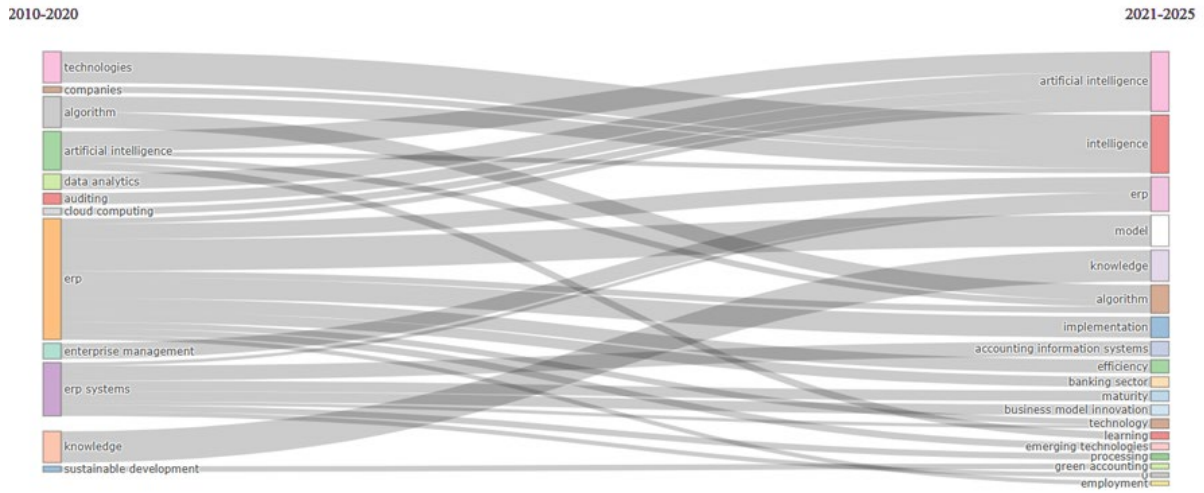

Figure 2. Thematic Evolution

Source: Authors' own research using Bibliometrix (Biblioshiny).

The thematic evolution in the figure 2 illustrates how research topics have progressed from 2010–2020 to 2021–2025, revealing trends, continuities, and transformations in the research on AI and ERP in accounting. Core themes like "Artificial Intelligence," "ERP," and "Algorithm" have remained highly relevant, demonstrating their sustained importance in research and technological advancements. However, these terms have evolved toward broader applications, linking more closely with "Intelligence," "Models," "Implementation," and "Accounting Information Systems" in recent years.

Several new themes have emerged in the 2021–2025 period, including "Efficiency," "Maturity," "Banking Sector," "Innovation," and "Green Accounting." These suggest that research has expanded beyond traditional ERP and AI discussions to incorporate sustainability, financial sector applications, and advanced technological models. Meanwhile, earlier themes like "Cloud Computing" and "Auditing" have faded in prominence, likely being absorbed into interdisciplinary research areas. This visualization highlights the dynamic nature of AI and ERP research, with an increasing focus on business model innovation, efficiency, and sustainability.

The Jaccard Similarity Index measures the degree of overlap between two sets of terms by comparing the number of shared elements to the total number of distinct elements across both sets. The formula used is:

$$J(A,B) = \frac{|A \cap B|}{|A \cup B|}$$

where: A represents the set of keywords extracted from the WOS database, B represents the set of keywords generated by ChatGPT, A∩B is the number of common terms between the two sources and A∪B is the total number of unique terms across both sets.

The comparison of the two sets of keywords reveals limited overlap between the terms extracted from WOS and those generated by ChatGPT. A total of 5 common keywords were identified in both sources: Artificial Intelligence, ERP / ERP Systems, Machine Learning, Big Data / Big Data Analytics and Blockchain. The total number of unique keywords in both data sets, after removing duplicates, is 34, with 20 terms from WOS and 19 terms from ChatGPT. Applying the

Jaccard Similarity Index formula, the calculated value is 0.147 (14.7%), indicating a relatively low degree of similarity between the two sources. This suggests that while some basic concepts are common, each source emphasizes different aspects of AI and ERP in accounting, with WOS focusing more on managerial impact and adoption, and ChatGPT emphasizing automation and technological advances.

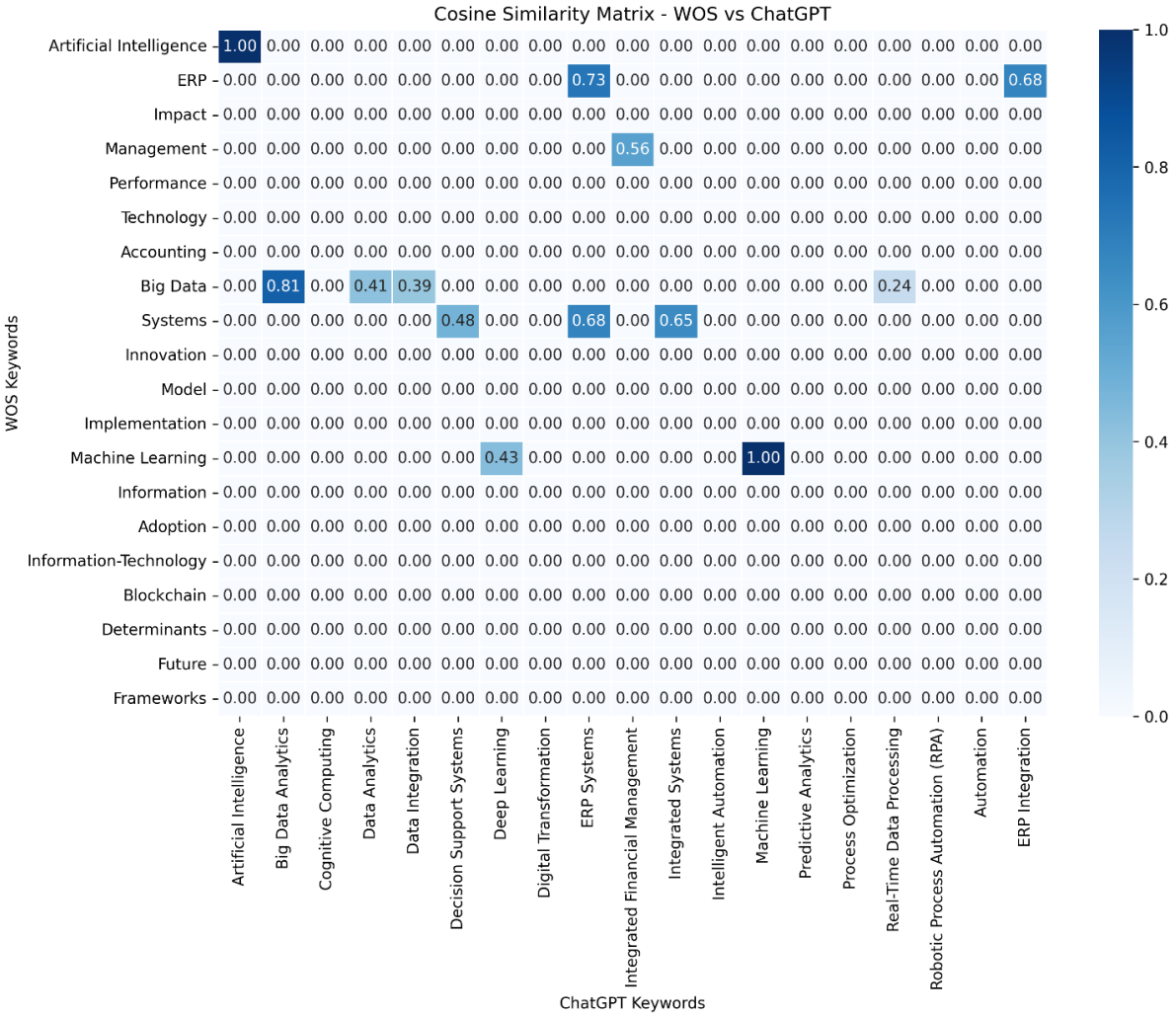

Figure 3. Cosine Similarity Matrix – WOS VS ChatGPT

Source: Authors' own research using Python.

The cosine similarity score obtained from the analysis is 0.021, which is extremely low, indicating very weak semantic overlap between the keywords extracted from scientific literature (WOS) and those generated by ChatGPT. This suggests that, while both sources discuss AI and ERP in accounting, they do so using different terminologies and conceptual structures.

Analyzing the cosine similarity matrix in Figure 3, we observe that only a few keyword pairs exhibit moderate similarity, such as "Big Data" and "Big Data Analytics" (0.81) and "ERP" and "ERP Systems" (1.00). These terms reflect cases where the same concept is expressed in slightly different ways. However, most of the matrix values are close to 0, showing that most keywords in WOS do not have a direct semantic equivalent in ChatGPT's responses. This

divergence indicates that scientific literature focuses more on impact, implementation, and management aspects, while ChatGPT highlights automation, integration, and AI-driven decision-making processes.

Darker shades indicate higher similarity between specific terms across both sources, while lighter shades suggest weak or no semantic correlation.

Comparing keywords extracted from the scientific literature (WOS) with those generated by ChatGPT highlights significant differences in terms of context, specialization and thematic direction of the analysis of AI and ERP systems in accounting. These variations are manifested both at the conceptual level and in terms of thematic emphasis, reflecting distinct perspectives on the subject.

Keywords taken from the specialized literature (WOS) reflect the main aspects related to the management and implementation of AI and ERP systems in accounting. Academic studies in this field are oriented towards analyzing the business impact, adoption strategies and evaluating the performance of these technologies. For example, terms such as "Impact," "Management," "Performance," "Implementation," and "Adoption" suggest a strong concern for how these technologies influence financial decision-making processes, operational efficiency and corporate strategies. At the same time, the presence of terms such as "Determinants" and "Future" indicates that research also focuses on the factors that favor the adoption of AI and the long-term implications for the accounting profession.

On the other hand, the keywords generated by ChatGPT place a stronger emphasis on the technological dimension, emphasizing automation and digital transformation. Terms such as "Robotic Process Automation (RPA)," "Decision Support Systems," "Deep Learning," "Predictive Analytics," and "Real-Time Data Processing" highlight an approach focused on optimizing processes using artificial intelligence, rather than managerial implications. In contrast to the academic literature in WOS, which places a significant emphasis on business adoption strategies and managerial decision-making, the perspective provided by ChatGPT is more technological, focusing on the mechanisms through which AI and ERP are integrated into accounting. This contrast highlights the fact that while the specialized literature provides a detailed analysis from a strategic and managerial perspective, ChatGPT proposes a more technical vision, oriented towards innovation and automation.

Conclusion

Comparative analysis of keyword frequency indicates that scientific literature tends to be more focused on fundamental concepts and the interconnections between them, while ChatGPT provides a more uniform and integrative view of the field, including emerging terms. This difference suggests that while AI models can provide a quick summary of the field, they do not fully reflect the structure and emphasis of academic research on certain topics.

A low Jaccard index value confirms that while there is a common core of fundamental concepts, each source has a distinct approach. Combining both sources could provide a more comprehensive perspective on the use of AI and ERP in accounting.

The low cosine similarity score and the sparse alignment of the similarity matrix indicate that ChatGPT and the academic literature focus on different dimensions of AI and ERP in accounting. While there are some common concepts, the differences in terminology suggest that the content generated by artificial intelligence does not fully capture the depth and precision of previous research.

Overall, the alignment between ChatGPT-generated keywords and academic research themes is limited, with ChatGPT focusing more on AI's technical applications and automation, while scientific literature incorporates broader discussions on impact, governance, and business performance. This indicates that ChatGPT-generated content captures technological advancements well but does not fully reflect structured, research-backed discourse on AI and ERP adoption in accounting. However, the overlap between core AI and ERP concepts in both sources suggests that AI-generated insights can complement academic research by identifying emerging technological trends .

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