



The Digital Transformation of the Internal Audit Function: A Qualitative Literature Review

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Abstract

Artificial Intelligence (AI) is significantly transforming the internal audit function by enhancing efficiency, accuracy, and data management. Through the automation of repetitive tasks and comprehensive data analysis, AI repositions internal auditors as strategic advisors. However, its adoption presents challenges related to technological complexity, data security, and the need for new skills. In Morocco, AI integration remains limited, hindered by organizational and cultural barriers. This study highlights the importance of examining individual factors influencing AI acceptance among internal auditors. Digitalization thus emerges as a key lever for modernizing and enhancing the strategic role of internal auditing. To explore this transformation, a qualitative literature review was conducted to understand how digitalization has evolved within internal auditing at a global level. More than a simple inventory of publications, this approach captures the discursive and semantic dynamics that have shaped the relationship between digitalization and auditing over time and across regions. The review reveals both convergences and divergences in how internal audit functions are adopting digital tools, and highlights the distinct developmental paths followed by developed countries, emerging economies, and developing regions. Ultimately, the qualitative literature review provides a relevant analytical framework and a rich geographical and textual mapping of the changes underway in auditing in the digital age.

Keywords: Digitalization, internal audit, qualitative literature review.

Introduction

Artificial Intelligence (AI) is increasingly recognized as a key driver of transformation across numerous professional domains, including internal auditing (Badiâa Amar, 2022). In today's rapidly digitalizing environment, organizations are compelled to adopt technological innovations to maintain competitiveness and meet evolving customer expectations. Studies by Fagoo et al. (2021) and Al-Sayyed et al. (2021) have shown that organizations that adapt effectively to these technological shifts enjoy various financial and organizational benefits, including a significant increase in the volume of transactions and data processed.

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The importance of auditing continues to grow in an increasingly complex economic and regulatory landscape. Whether internal or external, auditing plays a fundamental role in corporate governance by ensuring financial integrity, regulatory compliance, and operational efficiency. In a globalized and digitally accelerated context, auditors are now faced with massive volumes of data and emerging risks, making their roles more essential—and more complex—than ever before (Coderre, 2015). Auditing today goes beyond detecting fraud and errors; it also contributes to continuous process improvement and supports strategic decision-making (Lenz & Hahn, 2015). Moreover, in response to recent financial scandals and growing calls for transparency, auditing enhances stakeholder confidence and contributes to the stability of financial markets (Knechel & Salterio, 2016).

The adoption of AI in the internal audit function is significantly transforming both the scope and effectiveness of audit assignments. AI enables auditors to overcome the limitations of traditional sampling by facilitating comprehensive analysis of large datasets. This redefinition of work processes grants internal auditors a new capability to instantly process vast and dispersed corporate data (Ghanoum & Alaba, 2020), largely through the automation of repetitive tasks and the optimization of audit procedures (Badiâa Amar, 2022). According to Kokina and Davenport (2017), “AI will enable auditors to focus on higher value-added tasks, such as interpreting results and making strategic recommendations.” Consequently, AI shifts the auditor’s role from executing procedures to acting as a strategic advisor on risk and control (KPMG, 2018). In addition, Luo et al. (2018) highlight the critical role AI plays in enhancing fraud and anomaly detection—an area of particular importance for internal auditors.

Nevertheless, these technological advancements also raise ethical and governance challenges. As noted by Agustí and Orta-Pérez (2022), the accelerated pace of digital transformation requires organizations to continuously adapt to the evolving demands of the digital age. This is echoed by Issa et al. (2016), who emphasize the profound impact of AI on auditing practices and the urgent need for auditors to acquire new skills, especially in data analytics and AI system management (Issa, Sun & Vasarhelyi, 2016).

Furthermore, AI introduces regulatory and data privacy concerns, underscoring the auditor’s vital role in assessing risks related to ethics and compliance with legal frameworks (IIA, 2017). Today’s auditors are therefore expected to develop specialized skills to navigate these risks, particularly those involving algorithmic bias and transparency in automated processes.

In the Moroccan context, the integration of AI into internal auditing remains at an early stage. A study by KPMG Morocco (2020) indicates that the banking and telecommunications sectors are leading the way in implementing AI in their audit processes. While Moroccan companies are beginning to explore AI’s potential in internal auditing, adoption lags behind that of developed countries. Key barriers include a shortage of AI-related skills, high implementation costs, and resistance to organizational change (El Idrissi et al., 2020). El Ouadghiri and Benmoussa (2021) further argue that effective AI

adoption in Morocco requires adjustments to local cultural and organizational specificities.

This study adopts a contextualized approach to explore the factors influencing internal auditors' perceptions and attitudes toward the adoption of AI in their professional practices. By contributing to a deeper understanding of the digital transformation of internal auditing, this research offers valuable insights for practitioners and decision-makers. It identifies the key enablers and barriers that must be addressed to ensure the successful and sustainable integration of AI into internal audit practices.

Theoretical and conceptual framework

Artificial Intelligence (AI) is increasingly emerging as a valuable tool for professionals seeking to enhance their performance. AI enables the automation of routine tasks, the analysis of large and complex datasets, and the generation of relevant insights to support decision-making (Ali et al., 2023; Damerji & Salimi, 2021). Fundamentally, the goal of AI is to equip machines—particularly computer systems—with cognitive capabilities akin to those of human beings. By combining software and hardware components, AI aims to replicate human brain functions. Leveraging its ability to process and analyze vast quantities of data, AI can evaluate complex situations, make informed decisions, and carry out tasks that require judgment. Nevertheless, human expertise remains essential, particularly during the initial stages of data processing and the design of expert systems.

The auditing profession is one of the fields most significantly impacted by the rise of AI. In particular, AI presents a promising avenue for fraud detection within internal auditing. Through its real-time data analysis capabilities and pattern recognition algorithms, AI can detect subtle indicators of fraud that may go unnoticed by human auditors. With access to relevant data, AI systems can assess risks, support decision-making, and automate certain judgment-based tasks. Alongside the adoption of AI, computer-assisted audit techniques (CAATs) have also gained prominence. These tools and software solutions support auditors in performing their tasks more effectively by automating audit tests, processing large datasets, and identifying anomalies and potential risks. This contributes to time and cost savings, improved accuracy in audit procedures, and enhanced overall audit efficiency (Ali et al., 2023; Damerji & Salimi, 2021).

In academic research, numerous studies have explored the role of AI in improving organizational performance. As noted by Han et al. (2023), AI has become a growing area of interest among researchers. Investigations span a range of sectors, including logistics and supply chain management, quality control, manufacturing processes (Handoko & Liusman, 2021; Kinkel et al., 2022), as well as strategic decision-making, risk management, and general business operations (Seethamraju & Hecimovic, 2022; Dwivedi et al., 2014; Varzaru, 2022a, 2022b).

Consequently, artificial intelligence represents a fertile area of research within the internal auditing domain. For instance, Chung et al. (2021) examined how AI can automate internal audit tasks, emphasizing the potential of algorithms to enhance both the efficiency and accuracy of accounting and

financial audits. Wang and Zhang (2022) investigated the application of AI for anomaly and fraud detection in financial systems, showcasing the utility of machine learning techniques such as neural networks and random forests. Kaufmann et al. (2022) analyzed AI's impact on risk management in internal audit processes, finding that predictive analytics and real-time alerts improve auditors' ability to anticipate and assess risks. Liu et al. (2022) focused on the evolving role of internal auditors, highlighting the increasing demand for technical competencies and the ethical and confidentiality concerns associated with AI use. Similarly, Singh and Patel (2023) demonstrated AI's contribution to the processing of large volumes of audit data, facilitating faster and more accurate analysis and enhancing the identification of potential issues.

Previous studies investigating AI adoption have commonly relied on frameworks such as the Technology-Organization-Environment (TOE) framework or the Diffusion of Innovation (DOI) theory, selecting variables in line with the specific context of their research. In this study, however, we adopt a theoretical lens centered on the individual level, particularly focusing on the internal auditor. To this end, we draw on individual-level adoption models such as the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Unified Theory of Acceptance and Use of Technology (UTAUT). These models provide valuable insights into the psychological and behavioral factors that influence the acceptance and use of AI by internal auditors.

Hypothesis Development

This study investigates the individual factors that influence internal auditors' perceptions and attitudes toward the adoption of Artificial Intelligence (AI) in their professional practices. Specifically, it aims to determine whether AI is perceived as an opportunity or a threat to internal auditing, and to identify the key elements shaping these perceptions.

We propose a relationship between perceived benefits of AI and its adoption level, hypothesizing that a positive perception of AI's advantages is associated with greater use of digital tools in auditing. To address these objectives, the study explores several dimensions.

First, we examine internal auditors' overall perceptions of AI—whether the technology is generally viewed as an enabler or a hindrance in their professional functions. In complex organizations with hierarchical structures and large volumes of data, AI presents considerable advantages for the internal audit function (IAF). These include ease of use, perceived usefulness, and reduced effort in performing tasks. Organizations with a high degree of automation report tangible benefits in areas such as data collection, transformation, storage, control, and compliance. Concurrently, technological developments, such as low-cost data storage enabled by cloud computing, facilitate the handling of extensive datasets. AI thus becomes a key tool for assessing the completeness, reliability, and accuracy of data, even at high volumes and complexity (Erb, 2018).

Hypothesis 1: *AI is perceived as an asset by internal auditors due to its potential to enhance efficiency, audit accuracy, and data management.*

However, integrating AI into internal auditing also raises several concerns and challenges. These include increasing technological complexity, potential job displacement through automation, and heightened risks to data security. As the use of AI expands, it may lead to greater technological dependency, diminished human interaction, and added difficulty in anomaly detection processes (Seethamraju & Hecimovic, 2022).

Several researchers have expressed concern that AI could threaten employment in the internal audit profession by automating repetitive tasks traditionally performed by humans (Muspratt, 2018). This automation could limit opportunities for certain roles, particularly those focused on routine procedures (Adhikari, 2021; HRF, 2022; Tableau, 2021; Yakimova, 2020). According to Mach (2022), some organizations remain hesitant to implement AI due to concerns about potential job losses. While empirical evidence suggests that AI has not yet replaced human auditors, these apprehensions persist.

Nonetheless, the impact of AI is more nuanced. It also presents new opportunities for auditors to focus on higher-value tasks that require human judgment and insight. Realizing this potential, however, demands a significant shift in skills and work processes. Simultaneously, technologies such as cloud computing, although beneficial for data integrity, pose serious security challenges. The automated processing of large datasets increases exposure to risks such as fraud and unauthorized data access (Puthukulam et al., 2021). Ensuring ethical and legal compliance in data usage requires strict regulatory oversight (Zhou, 2021).

Hypothesis 2: *AI is perceived as a threat by internal auditors due to concerns over data security, job automation, and technological complexity.*

The study further aims to identify individual-level factors that influence internal auditors' perceptions and acceptance of AI. By examining these dimensions, we seek to highlight the drivers and barriers to AI adoption in the internal audit function and to offer concrete recommendations for its effective and sustainable integration.

Perceived benefits play a pivotal role in shaping auditors' willingness to adopt AI. These may include perceived ease of use, functional utility, reduced effort, and favorable organizational conditions. Leung (2013) defines perceived benefits as users' recognition of the value associated with a given technology. Empirical studies (Dharma et al., 2017; Kim et al., 2009; Pedrosa et al., 2020) have demonstrated that such perceptions significantly influence auditors' intentions to adopt digital tools, including e-auditing solutions.

Hypothesis 3: *Perceived benefits of AI, such as ease of use, usefulness, and reduced effort, positively influence its adoption in internal auditing.*

Finally, this research explores the role of training and skill level in shaping auditors' perceptions of AI. Auditors with strong technical training and prior experience in AI are more likely to perceive it as a valuable and reliable tool, capable of improving audit quality and supporting more informed decision-making. A better understanding of AI systems encourages tool adoption and smoother integration into audit workflows.

Conversely, limited training or experience may result in negative perceptions. AI might be seen as overly complex, difficult to implement, or lacking added value, ultimately slowing adoption. Thus, the auditor's skill level is a critical determinant of how they perceive AI's advantages and constraints. Adequate training helps reduce technical barriers, minimize errors, and increase confidence in AI-generated results.

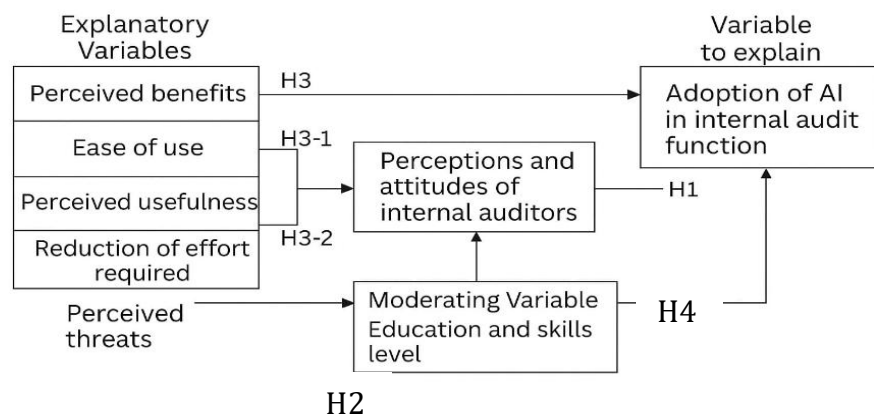
Hypothesis 4: *Internal auditors' level of training and AI-related skills influence their perception of, and willingness to adopt, this technology.*

1. Proposal of a conceptual research model for the digital transformation of the internal audit function:

This study aims to establish the current state of adoption of artificial intelligence (AI) in internal auditing, focusing on internal auditors' perceptions and attitudes towards this technology.

Our conceptual model aims to explore the individual factors that influence internal auditors' perceptions and attitudes towards the adoption of artificial intelligence (AI) in their professional practice. It is based on the idea that the perception of AI as an opportunity or a threat depends primarily on perceived benefits (such as ease of use, functional utility and reduced effort), perceived risks (such as technological complexity, data security and job automation), as well as auditors' level of AI training and skills. In this sense, Hypothesis 1 suggests that AI is perceived as an asset due to its ability to improve efficiency, audit accuracy, and data management, while Hypothesis 2 states that it can be perceived as a threat due to technological, security, and human risks. The model postulates that the more concrete benefits auditors perceive from the use of AI (hypothesis 3), the higher their willingness to adopt it. On the other hand, risk-related concerns may act as a brake on adoption. Furthermore, Hypothesis 4 argues that AI knowledge and experience strongly influence these perceptions, playing an essential moderating role and facilitating a more positive appropriation of the technology. This model thus makes it possible to analyze the levers and obstacles to the adoption of AI in the internal audit function, while integrating personal and organizational dynamics.

Figure 1: Theoretical model of research for the factors that influence internal auditors' perceptions and attitudes towards the adoption of artificial intelligence:



Source : auto-conception

Research methodology

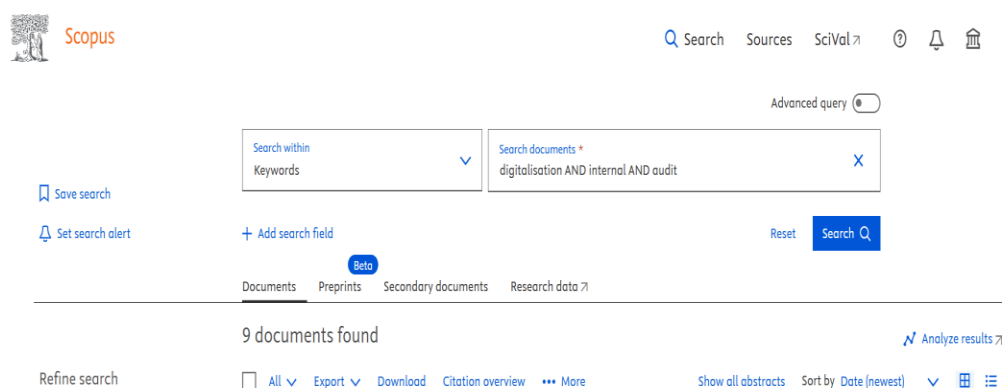
The qualitative approach is a rigorous research method, aiming for an in-depth understanding of the phenomena under study. It focuses on exploring the underlying dynamics rather than quantifying them, thereby helping to answer the “why” and “how” questions (Dumez, 2011).

Although its integration into the management sciences is relatively recent compared to its roots in the humanities and social sciences, this approach is undergoing increasing development. In this respect, Garcia and Gluesing (2013) highlight a significant increase in the number of management science publications using qualitative methods over the last few decades. This development not only reflects a growing interest in this approach but also its relevance for understanding the complexity of phenomena in this disciplinary field.

As part of our research, we carried out a review of existing literature in order to explore and better define the two concepts of internal auditing and digitalization. To this end, we conducted a systematic review of scientific publications referenced in the Scopus database, which enabled us to select 09 articles. The figure below shows the selection protocol that led to the constitution of our final sample.

This review covered the period from 2020 to 2025, in order to provide a sufficiently broad timeframe to apprehend the long-term evolution of the concept under study. This period has seen a growing development in terms of scientific publications that focus on digital transformation and internal auditing due to the advent of digital tools such as AI and ChatGPT after the COVID-19 health crisis, which fostered the emergence of scientific research in the field of auditing.

Figure 2: The filtration and constitution protocol of our sample:



Source: Scopus

This selection process was guided by the use of inclusion/exclusion criteria in order to guarantee a certain representativeness of contributions in the field of

internal auditing. The table below illustrates our sample constitution protocol.

Table 1: The table of elements and inclusion criteria for our sample:

Elements	Inclusion criteria	Exclusion criteria
Type of document	Journal articles Conference papers	Books, dissertations, doctoral theses
Source quality	Articles from the Scopus database	References off-topic and target context
Objective	Studies exploring existing literature	Other
Methodological approach	Literature reviews, qualitative or quantitative studies	Other
Content	Originality of research work	Redundant content
Language	Publications in the English language only	Other languages
Period	2020-2025	

Source: Auto-conception

In this study, we carried out a systematic examination based on textual, geographical, and chronological analysis in order to gain a clearer understanding of the research concept under study.

Furthermore, we relied on a qualitative literature review, analyzing researchers' choices based on the identified factors, the key concepts discussed, and the temporal and geographical context in which these studies were conducted.

Results and discussion:

A. Textual analysis

Textual analysis is a qualitative method for studying, interpreting, and evaluating a corpus in depth. It enables us to understand how an author structures his or her reasoning, notably through the use of terminology (Mesbahi and al., 2024).

This approach has a broad reach, integrating conceptual, theoretical, and practical dimensions (Mesbahi and al., 2024). In our work, we focused on examining the keywords in the abstracts of publications in order to identify the most recurrent terms in the field of internal auditing.

The table below summarizes the results of this keyword frequency analysis.

Table N°2: Analysis of keywords related to the digitalization of the internal audit function

Keyword	Occurrence (Number of References)
Internal Audit	7
Digitalization	7
Data analytics	4
Artificial Intelligence	3
Internal audit function	2
Machine learning	1
Digital technologies	1
Digital platforms	1

Source: Auteurs

We have included only those keywords that relate to the field and context of digitization of the internal audit function, which is why the keyword analysis shows a predominance of the keywords “Internal Audit” and “Digitization”.

Alongside “Internal Audit”, we note a notable frequency of three key concepts: “Data analytics”, “Artificial Intelligence”, and “Internal Audit Function”.

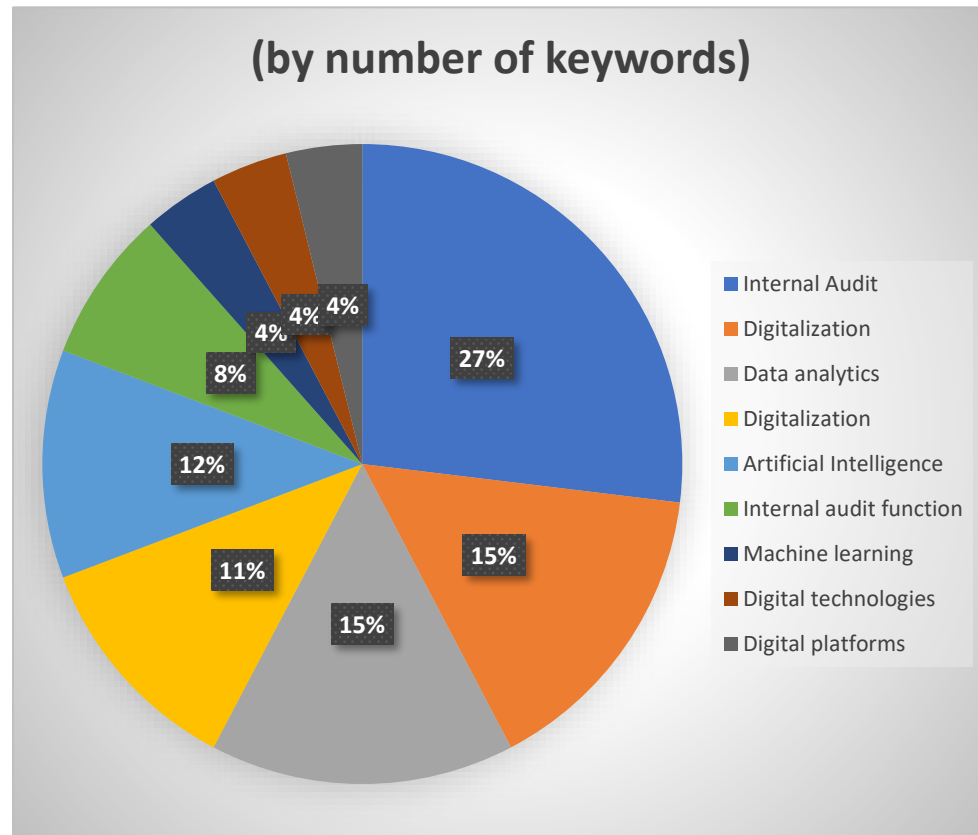
Figure N°3: Cloud of key concepts related to digitalization and internal audit:



Source: Generated par WordArt.

What's more, we can also see from the figure below that some keywords are less frequent than others. In this sense, the concepts “Machine Learning”, “Digital Platform”, and “Digital Technologies” are the least cited in the lingo covered by our study.

Figure N°4: Analysis of keywords related to the digitization of the internal audit function between 2000-2025:



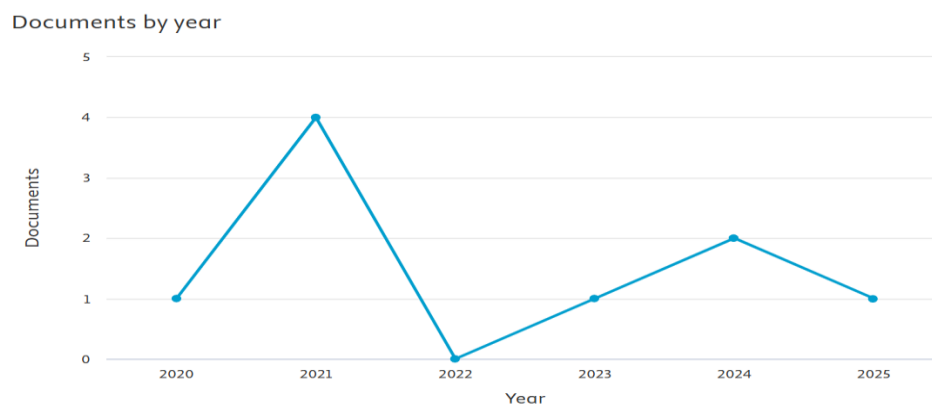
Source: auto-conception.

B. **Chronological analysis**

Chronological analysis examines how research on a subject evolves. This qualitative approach provides a benchmark for readers, enabling them to identify trends and changes in the field of internal auditing over a given period. MESBAHI and al (2024).

For this purpose, we have chosen a time interval of three years, as shown in the table below.

Figure N°5: Chronological analysis of research into the digitization of the internal audit function between 2000-2025:



Source: Scopus

From this table, we were able to draw up a graph tracing the evolution of research into the digitization of the internal audit function by period. We can see from this graph that 2021 is the reference year for the intensification of research into the digitization of the internal audit function, followed by 2024. However, 2022 was the year in which there were no publications in the field of the digitization of the internal audit function, since after this year several technological tools appeared, such as ChatGPT and DeepSeek. The following table shows the chronological evolution of research on internal audit quality over the period 2000-2025.

Table N°3: Chronological analysis of research on digitalization and the internal audit function:

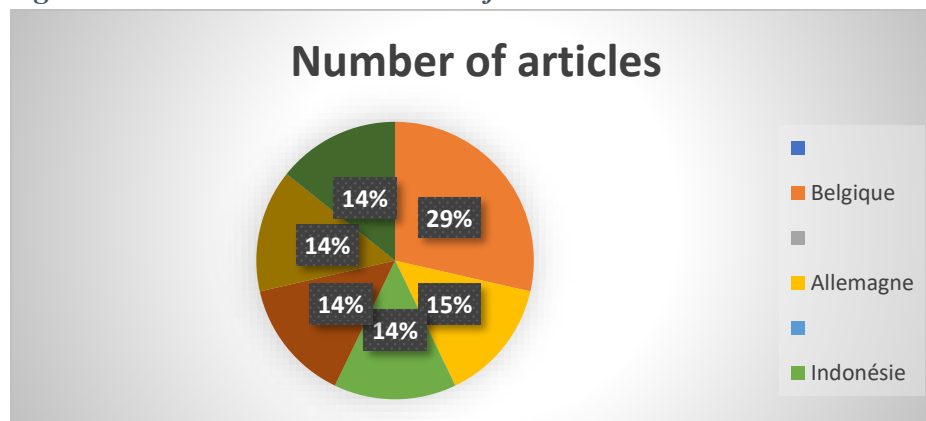
Period	Number of articles
2020	1
2021	4
2022	0
2023	1
2024	2
2025	1
Total	9

Source: Authors

From the following table, we can see that the total number of articles dealing solely with the digitization of the internal audit function is 9, which shows that there is a low level of development of this concept worldwide.

Since 2021, the number of scientific articles has also increased, according to this table, due to the emergence of technological tools in the world.

Figure N°6 : Number of articles published between 2020-2025 on digitalization and the internal audit function:



Source: Auto-conception

C. Geographical Analysis:

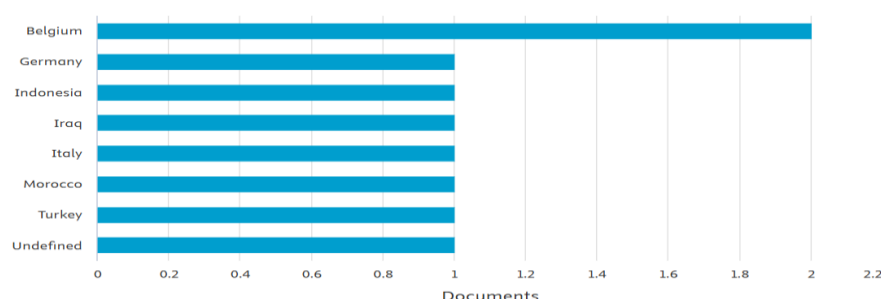
A geographical analysis of the scientific publications listed in the Scopus database has enabled us to better identify the regions where the concept has been most developed and spread internationally.

From this point of view, the graph below highlights the countries that stand out for their significant scientific output on this theme. The associated figure completes this visualization by specifying contributions by country.

Figure N°7: Geographical analysis of research on digitalization and the internal audit function:

Documents by country or territory

Compare the document counts for up to 15 countries/territories.

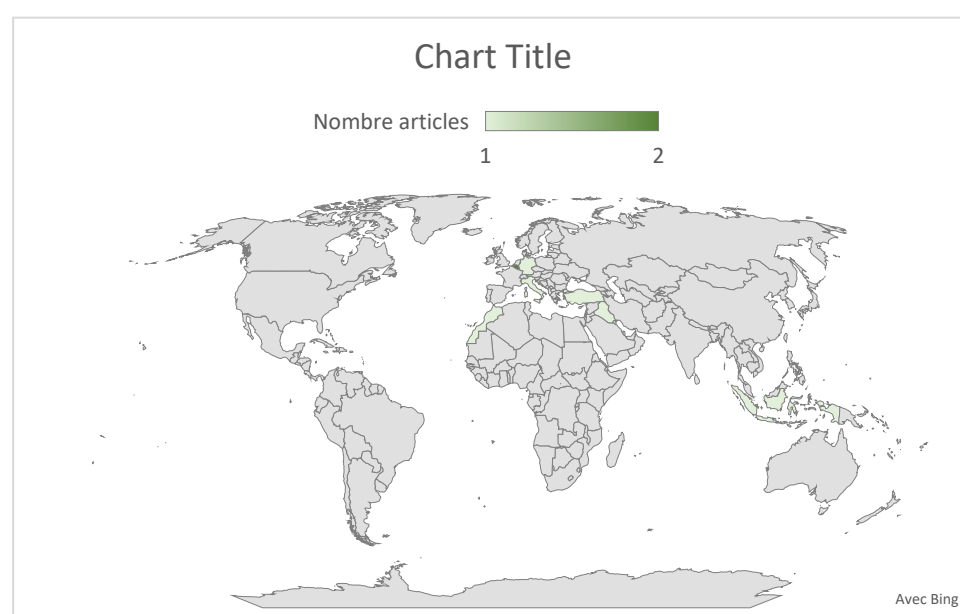


Source: Scopus

From this figure we can see that Belgium and Germany are the two countries with the highest number of scientific publications in the field of digitalization of the internal audit function, followed by Indonesia and Iraq.

The figure above shows the number of scientific articles published by country on the concept of digitization and the internal audit function over the period 2000-2025.

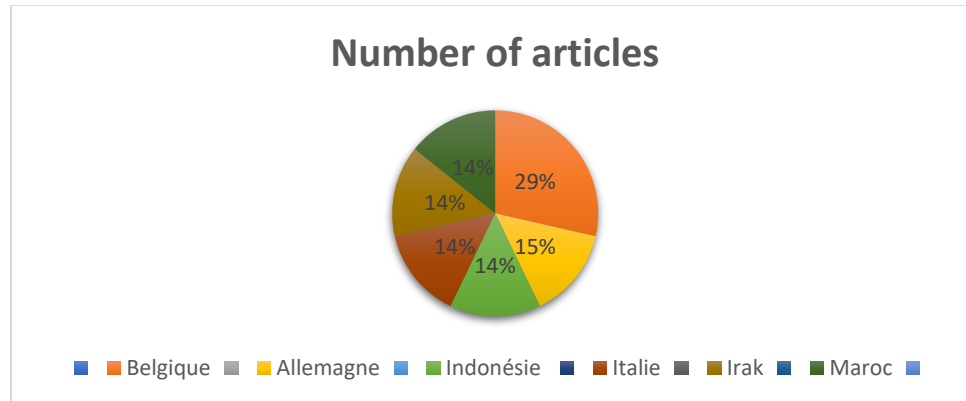
Figure N°8 Dispersion of scientific articles published by country on digitization and internal auditing between 2020-2025:



Source: Auto-conception

From this figure, we can see the dispersion of scientific articles around the world, especially in the field of internal auditing and digitalization between 2020 and 2025.

Figure N°9: Number of articles published by country between 2020-2025 on digitalization and the internal audit function:



Source: Auto-Conception.

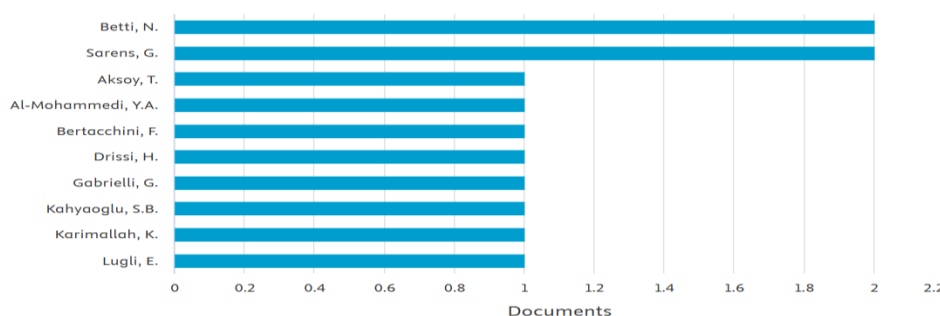
D. Analysis by Author:

This analysis enables us to visualize the collaborative links between the authors entered in our database. According to the figure generated and by browsing the database extracted from Scopus, the article object of the collaboration well cited and analyzed was prepared by the two authors represented by: Betti, Nathanaël and Sarens, Gerrit in 2021, published in the Journal of Accounting and Organizational Change, with a citation total of 48. The article is entitled "Understanding the internal audit function in a digitized business environment".

Figure N°10: Number of articles published by the author between 2020-2025 on digitalization and the internal audit function:

Documents by author

Compare the document counts for up to 15 authors.



Source: Scopus

E. Discussions

The results of this qualitative literature review reveal the scientific community's growing interest in the integration of artificial intelligence (AI) in the field of internal auditing. An analysis of the most influential publications highlights several major lines of research currently structuring the field.

Firstly, a notable trend concerns the automation of internal auditing tasks through AI-based technologies. The frequently cited work of Chung and al (2021) highlights the contribution of intelligent algorithms to improving the operational efficiency and accuracy of accounting and financial audits. This trend confirms the evolution of internal auditing towards a model more focused on the performance, speed, and reliability of controls.

Secondly, the mobilized literature review highlights a focus on studies of anomaly and fraud detection via AI. The contributions of Wang and Zhang (2022), which mobilize machine learning techniques such as neural re-sections and random forests, have been widely echoed. This approach demonstrates the potential of AI to strengthen the preventive and detective role of internal auditing in the context of increasingly complex financial information systems.

Thirdly, the recent publications studied in our literature review converge on a recognition of the strategic role of AI in risk management. In this sense, Kaufmann and al. (2022) show that AI's predictive capabilities offer internal auditor's new tools to anticipate emerging risks and generate alerts in real time. This development reinforces the proactive dimension of auditing, which is now focused on anticipation and continuous monitoring.

Furthermore, several articles identified, notably by Liu and al (2022), Betti, Natha-naël, and Sarens, Gerrit, focus on the changing role of the internal auditor in the age of artificial intelligence. The authors highlight the need to acquire new technological skills, as well as the ethical and confidentiality issues that accompany the adoption of these tools. These findings highlight a profound transformation in the profiles and practices of auditors, who are called upon to combine business expertise with digital skills.

From a theoretical angle, our analysis reveals a diversity of frameworks. Whereas models such as TOE or DOI dominate studies at the organizational level, we have observed a growing interest in models focused on the individual in recent work. In particular, theories such as TAM, TPB, and UTAUT are being used to explore the psychological and behavioral factors influencing internal auditors' adoption of AI. This reflects a shift in scientific questioning from global technological adoption to a more detailed understanding of the individual determinants of AI acceptance in auditing practices.

Thus, the results of this study reveal that the analysis of the relationship between the two concepts remains little explored in the literature. This gap underscores the need for in-depth empirical work to better identify, structure, and validate this relationship, and thus enrich theoretical and practical understanding of the field.

Conclusion

In conclusion, digitalization today represents an essential strategic lever for the development of internal auditing. It not only enhances the effectiveness of audit assignments but also reinforces their relevance in the face of increasingly complex organizational environments. The integration of technologies such as artificial intelligence, data analytics, robotized processes

(RPA), and integrated information systems is profoundly transforming auditing practices, offering a more proactive, continuous, and real-time view of risks.

Digitization thus promotes better coverage of risk areas, increased predictive analysis capacity, and time savings and reliability in information processing. It also helps to reposition the Internal auditor as a key player in corporate governance, helping him or her to formulate more relevant and strategic recommendations. However, this transformation requires an increase in the skills of audit teams, as well as an adaptation of reference frameworks, tools, and methodological approaches. In this way, digitalization is not just a technological opportunity, but a veritable dynamic of modernization and value creation for the in-house audit function, serving the performance and resilience of organizations.

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