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Digital Technologies in Accounting: A Narrative Review of the contemporary transformation of the profession.

Tecnologias Digitais na Contabilidade: Uma Revisão Narrativa da transformação contemporânea da profissão.

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Abstract

Objective: Critically analyse the literature on digital technologies in accounting to understand patterns of professional transformation, identify conceptual convergences and knowledge gaps, and outline strategic directions for future research and professional practice.

Methodology: Narrative review based on 97 studies published between 2008 and 2025, identified through a systematic search of the Web of Science, Scopus, and Google Scholar databases. Thematic analysis was applied to organize the studies into six main technological domains: Robotic Process Automation (RPA), artificial intelligence, big data and analytics, blockchain, cloud computing, and digital skills.

Results: There is evidence of the emergence of a collaborative paradigm between humans and digital technologies, where automation complements professional competence. RPA is well established in auditing and accounting processes, while artificial intelligence is redefining the role of professionals. Big data and analytics enable advanced predictive analytics, while blockchain remains in an experimental stage due to technical limitations. Cloud computing facilitates access to advanced technologies. Digital skills are emerging as essential for the future of the accounting profession.

Practical implications: The imperative need for continuous development of digital skills and commitment from organizational leadership to manage digital transformations in accounting stands out.

Originality/Value: This review provides an integrative synthesis of technological transformations in accounting, connecting multiple technological domains and proposing strategic directions for research and professional practice.

Keywords: Digital technologies; Accounting; Professional transformation; Narrative review; Automation.

Article classification: Literature review.

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1. INTRODUCTION

Accounting, historically characterized by the stability of its consolidated methods and practices, is at the epicentre of a technological revolution that is fundamentally redefining the nature and scope of the profession (Bhimani & Willcocks, 2014). This transformation transcends the mere incremental adoption of new tools to represent a paradigmatic reconfiguration that alters the essence of accounting work, the professional skills required, and the value added by accountants to contemporary organizations.

The simultaneous emergence of multiple disruptive technologies, including Robotic Process Automation (RPA), artificial intelligence, big data and analytics, cloud computing, and blockchain, is creating an ecosystem of accelerated change that challenges established assumptions about how accounting work is designed, organized, and performed (Kokina & Blanchette, 2019; Leitner-Hanetseder et al., 2021).

Warren et al. (2015) predicted that big data will fundamentally change accounting practice, while Gepp et al. (2018) provided empirical evidence that digital technologies are creating unprecedented opportunities for improved audit quality and strategic decision support. Appelbaum et al. (2017) documented that business analytics and enterprise systems are transforming management accounting through advanced decision support capabilities.

Feghali et al. (2022) highlight that COVID-19 forced companies to quickly migrate to digital accounting processes, transforming established practices and requiring accelerated adaptation of both technical skills and professional behaviour. This process exposed both the potential of digital tools to ensure operational continuity and the organizational obstacles inherent in the transformation, highlighting significant differences between organizations already prepared for digitization and those less agile in the transition process.

Although there has been a significant increase in research on digital technologies in accounting, as evidenced by Richins et al. (2017) and Janvrin and Watson (2017), the available literature has insufficient details, which limits a comprehensive understanding of the ongoing transformation process.

Salijeni et al. (2018) found that research in specialized journals indicates a predominance of studies focused on particular technologies or particular organizational contexts, with limited conceptual integration across multiple technological domains.

Leitner-Hanetseder et al. (2021) conducted an in-depth analysis of the profession in transition, while Schlegel and Kraus (2021) specifically examined the skills for digital transformation in the context of RPA. Abbas (2025) conducted a systematic review of the literature on artificial intelligence applications in management accounting. Westland (2024) addressed the use of data science and analytical techniques in auditing, while De Santis (2024) specifically explored the role of artificial intelligence, with an emphasis on machine learning algorithms and their practical implications. However, Gepp et al. (2018) argued that there are no comprehensive narrative reviews that consolidate knowledge from different technological domains in an integrated manner.

This gap is particularly problematic because, as highlighted by Matt et al. (2015), digital transformation is a systemic phenomenon in which different technologies interact synergistically, creating emergent effects that cannot be fully understood through isolated analyses. Brands and Holtzblatt (2015) emphasized that the need for an integrative perspective is amplified by the contextual nature of technological implementation, where organizational, cultural and regulatory factors significantly influence outcomes.

Specifically, this review goes beyond specific descriptions of technology, comparing six technology domains (RPA, AI/ML, big data and analytics, blockchain, cloud computing, and digital skills) in a single integrative narrative (Akter et al., 2020). By synthesizing evidence across domains, it clarifies how task reallocation, changes in professional identity, governance and accountability, and capacity development co-evolve during digital transformation, and identifies under-explored intersections (e.g., RPA with AI-enabled controls, cloud-enabled analytics, and blockchain-based assurance) that merit targeted future research and practitioner attention.

The narrative review methodology is particularly appropriate for this context due to the emerging and multifaceted nature of digital technologies in accounting, as established by Green et al. (2006) and reaffirmed by Sukhera (2022), where the literature is characterized by methodological diversity, varied organizational contexts, and different stages of technological maturity.

The objective of this study is to critically analyse the literature on digital technologies in accounting to understand patterns of professional transformation, identify conceptual convergences and knowledge gaps, and outline strategic directions for future research and professional practice.

This review contributes to knowledge in three distinct dimensions, aligned with Thomas and Harden's (2008) methodological framework for rigorous narrative reviews. At the theoretical level, it provides an integrative synthesis of the scattered results in the literature, articulating findings from different technological domains and consolidating them into a cohesive view of the transformation of the accounting profession.

This approach expands and deepens the contributions of Gepp et al. (2018), who identified the main emerging trends related to the incorporation of digital technologies in accounting practice. Methodologically, it demonstrates rigorous application of the narrative method to understand complex and emerging phenomena, as recommended by Grant and Booth (2009), validating this approach for studies of technological transformation in professional contexts. In practical terms, it seeks to offer clear strategic recommendations for the various stakeholders in the sector: professionals, teachers, managers, and regulators. These recommendations are based on the analysis of the challenges and opportunities outlined in the literature, in line with the guidelines of Pan and Seow (2016) and Lawson et al. (2014) regarding curriculum adaptation and the governance of technological implementation.

This review is organized into five main sections, following the structure recommended by Green et al. (2006) for narrative reviews. After this introduction, Section 2 describes in detail the methodology used, including search strategy, selection criteria, and analytical approach. Section 3 presents the thematic synthesis, organized into six technological domains. Section 4 presents the discussion, identifying cross-cutting patterns to understand professional transformations and knowledge gaps. Section 5 presents the conclusions and outlines strategic directions for future research and professional practice.

2. METHODOLOGY

2.1 Methodological Design

This research employs the narrative review methodology, an approach that allows for the critical and interpretative synthesis of diverse literature on a specific topic, as established by Grant and Booth (2009) and complemented by Sukhera (2022) in contexts of emerging technologies. The choice of this methodology to critically analyse the literature on digital technologies in accounting is justified by the emerging nature of the phenomenon studied, characterized by methodological diversity in the existing literature, contextual heterogeneity in organizational implementations, and the need for interpretative synthesis that transcends technical descriptions to examine systemic professional transformations.

Following principles established by Green et al. (2006) for quality narrative reviews, this research adopts: (1) clear justification for choosing the narrative approach in contexts of technological transformation; (2) explicit delimitation of boundaries, scope, and definitions related to technological domains; (3) a detailed explanation of inclusion and exclusion criteria; (4) reflexivity on factors that may influence interpretations of conceptual convergences; and (5) a transparent description of analysis and synthesis processes to outline strategic directions.

Thomas and Harden (2008) argued that narrative reviews are particularly appropriate when the goal is to develop a comprehensive understanding of complex phenomena through interpretive synthesis rather than quantitative aggregation. This characteristic aligns perfectly with our need across multiple technological domains.

2.2 Research and Selection Strategy

2.2.1 Databases and Research Strategy

The research was conducted in the main academic databases, following the recommendations of Petticrew and Roberts (2006) for comprehensive literature searches, as detailed in Table 1:

Table 1 - *Research Strategy*

Database	Keywords Used	Period	Filters Applied
Web of Science	"Digital technology" AND "accounting"; "robotic process automation" AND "audit"; "artificial intelligence" AND "accounting"; "blockchain" AND "accounting"; "big data" AND "accounting"	2008-2025	Peer-reviewed articles; No language restrictions
Scopus	"Automation accounting"; "digital transformation accounting"; "AI accounting"; "machine learning audit"; "cloud computing accounting"		Academic journals; Field: Business, Management and Accounting
Google Scholar	"Digital technologies accounting"; "RPA audit"; "artificial intelligence accounting"; "accounting analytics"		Citations >10; Journals Q1-Q4

Source: Own elaboration (2025).

2.2.2 Inclusion and Exclusion Criteria

The selection criteria followed the framework developed iteratively, according to the methodology proposed by Webster and Watson (2002) for literature reviews. These criteria are detailed in Table 2 — Inclusion and Exclusion Criteria, which summarizes in a structured manner the parameters applied to define the final set of articles included in this review.

Table 2 - *Inclusion and Exclusion Criteria*

Appearance	Inclusion Criteria	Exclusion Criteria
Period	Publications between 2008 and 2025	Publications before 2008
Type of publication	Peer-reviewed articles in academic journals	Grey literature, dissertations, theses, book chapters without independent review
Language	Primarily English and Portuguese; other languages accepted if content is relevant and accessible	Studies in languages that are not accessible or without reliable translation

Thematic focus	Applications of digital technologies in accounting/auditing to understand professional transformations	Studies focused exclusively on technical aspects with no implications for professional transformations
Type of study	Empirical, theoretical or methodological studies that contribute to identifying conceptual convergences	Studies that do not contribute to outlining strategic directions
Availability	Full texts available	Texts without full access

Source: Own elaboration (2025).

2.2.3 Selection Process and Final Set

The process followed the PRISMA transparency principles adapted for narrative reviews (Page et al., 2021; Rethlefsen et al., 2021), explicitly reporting all selection steps to allow for assessment of comprehensiveness and potential biases. The simplified selection flow is presented in Table 3.

Table 3 - *Simplified Selection Flow Diagram*

Step	Count (n)
Records identified through database searching (Web of Science, Scopus, Google Scholar)	**1290**
Duplicates removed	**398**
Records screened (title/abstract)	**892**
Records excluded after screening - Outside historical scope - No theoretical focus - Non-academic sources	**493** 214 187 92
Full-text articles assessed for eligibility	**399**
Full-text articles excluded (with reasons) - No access - No contribution to synthesis	**302** 156 146
Studies included in the narrative synthesis	97

Source: Own elaboration (2025).

Although this is a narrative rather than systematic review, reporting these selection metrics increases transparency and reproducibility (Page et al., 2021), allowing readers to assess the comprehensiveness of coverage and evaluate potential selection bias.The selection process, following the guidelines of Cronin et al. (2008), resulted in 97 studies

that comprise the final set for this review (distribution shown in Table 4). The simplified flow above reports the main screening stages and counts.

Table 4 - *Distribution of Studies by Technological Domain*

Technological Domain	Number of Studies	Percentage
RPA	28	28.9%
Artificial Intelligence /Machine Learning	24	24.7%
Big Data and Analytics	18	18.6%
Blockchain	12	12.4%
Cloud Computing	8	8.2%
Digital Skills	7	7.2%
TOTAL	97	100%

Source: Own elaboration (2025).

2.3 Analysis and Synthesis

The analysis followed a systematic thematic synthesis process developed by Thomas and Harden (2008), complemented by Braun and Clarke (2006), involving: (1) a familiar reading of all studies to understand emerging transformations; (2) initial coding identifying themes related to digital technologies; (3) thematic grouping organizing codes into technological domains for critical analysis; (4) conceptual refinement defining final themes and their interrelationships to identify knowledge gaps; (5) interpretative synthesis integrating perceptions across recognized domains to chart strategic directions. As this is a narrative review, the selection of studies, the assignment of domains, and the thematic interpretation necessarily involved the judgement of the researchers (Siddaway et al., 2018). Therefore, we made this interpretative role explicit and recommend documenting how categorization decisions were made (e.g., iterative coding memos, discussion, and resolution of disagreements among authors, and a record of borderline cases).

This gap is particularly problematic because, as highlighted by Hiebl (2023), qualitative analysis in accounting requires an iterative and systematic process, in which data is continuously reinterpreted considering emerging theories and organizational contexts. This approach allows for the development of an in-depth understanding of how different digital technologies contribute to systemic professional transformations.

2.4 Methodological Limitations

This review has limitations inherent to the narrative approach, as highlighted by Sukhera (2022) in the context of the discussion on methodological rigour. Selection bias may have affected which studies were included in the critical analysis and how the results on professional changes were interpreted. Temporal limitations mean that very recent technological developments may be underrepresented in the identification of conceptual convergences. Geographical bias may highlight the predominance of research in developed contexts, limiting the ability to generalize when drawing up strategic guidelines at a global level.

The interpretative nature of narrative reviews, as discussed by Green et al. (2006), means that different researchers could arrive at different emphases and conclusions using the same set of literature. Publication bias may have excluded negative results or failed implementations that would provide a more balanced perspective on professional transformations and knowledge gaps.

3. THEMATIC SYNTHESIS OF THE LITERATURE

3.1 Robotic Process Automation (RPA): Evolution of Accounting Automation

3.1.1 Conceptual Foundations and Frameworks for Professional Transformation

Huang and Vasarhelyi (2019) developed a theoretical framework for RPA, defining it as a technology that uses software robots to automate repetitive and structured accounting tasks governed by rules, thereby freeing professionals to perform activities with greater added value. Moffitt et al. (2018) expanded this perspective by demonstrating the potential to completely redefine traditional audit models, identifying conceptual convergences between automation and improved professional judgement.

Fernandez and Aman (2021) analyzed the evolution of RPA implementation in global business services, identifying the conceptual foundations and structural challenges that characterize this technological transformation in contemporary accounting practices. Kokina and Blanchette (2019) presented initial empirical evidence on the implementation of digital work in accounting, highlighting that the successful adoption of RPA contributes to significant professional transformations, including improved job

satisfaction when professionals transition from routine tasks to strategic analysis activities and advisory roles with clients. Cooper et al. (2019) specifically examined the impacts of RPA on the work experience in Big 4 companies, revealing patterns of professional transformation characterized by complex dynamics between technological efficiency and professional satisfaction.

Perdana et al. (2023) conducted a comprehensive study of practical implementations to understand professional transformations, documenting benefits and challenges in different organizational contexts that contribute to identifying knowledge gaps in small and medium-sized enterprises.

3.1.2 Applications in Auditing and Accounting Processes for Critical Analysis

RPA has significantly transformed auditing and accounting processes by automating repetitive tasks, thereby increasing efficiency and accuracy. Studies have indicated that RPA minimizes the risk of human error prevalent in manual accounting and auditing tasks, leading to improved operational performance and data integrity (Aalst et al., 2018; Bellinga et al., 2021; Tiron-Tudor et al., 2024). Furthermore, its implementation allows auditors to devote more time to critical analytical tasks rather than routine data entry, ultimately improving the quality of audits (Eulerich et al., 2021; Moffitt et al., 2018).

However, organizations must also address the challenges associated with implementing RPA, particularly regarding data security and integration with existing systems (Fernandez & Aman, 2021). Research indicates that successful RPA integration depends on understanding organizational dynamics, process requirements, and addressing workforce resistance to automation (Kaniadakis & Linturn, 2022; Sharma et al., 2022).

3.1.3 Implementation Challenges and Human Factors in Professional Transformation

The successful implementation of RPA presents significant challenges, particularly related to human factors and the organizational context. As organizations seek to automate processes, they encounter resistance stemming from employees' fear of losing their jobs and changes in responsibilities (Figueiredo and Pinto, 2020). Effective change management strategies that address these concerns are essential to promote acceptance

and engagement in RPA initiatives (Leitner-Hanetseder et al., 2021; Schlegel and Kraus, 2021; Viale and Zouari, 2020). Furthermore, the nature of the tasks that RPA aims to automate, which are predominantly structured and repetitive, highlights the need for careful analysis of existing workflows to identify suitable candidates for automation (Farinha et al., 2023; Sobczak, 2021). Furthermore, organizations must ensure that adequate training and skills development are provided to employees to help them adapt and thrive in an increasingly automated workplace (Kraus et al., 2024; Schlegel and Kraus, 2021).

Overall, addressing these challenges requires a balanced approach that integrates technological solutions with a profound understanding of human and organizational dynamics (Figueiredo & Pinto, 2020; Schlegel et al., 2024).

3.2 Artificial Intelligence and Machine Learning: Redefining Cognitive Abilities

3.2.1 Transformation of Professional Types through Critical Analysis

The transformation of professional roles due to artificial intelligence and RPA is significant, particularly in sectors such as accounting and auditing. RPA technology enables the automation of repetitive tasks, facilitating greater efficiency and accuracy in these roles (Aalst et al., 2018; Tiron-Tudor et al., 2024). Organizations leverage RPA to reduce human error and optimize processes, thereby reshaping job functions by transitioning manual tasks to automated tasks (Eulerich et al., 2021; Fernandez & Aman, 2021). The integration of machine learning into RPA significantly broadens the spectrum of automation, allowing processes that require cognitive decision-making, such as fraud detection and risk assessment, to be performed by software (Tiron-Tudor et al., 2024). However, this change requires a reassessment of workforce skills, as employees need to adapt to new technologies involving sophisticated cognitive functions (Kaniadakis & Linturn, 2022; Schlegel & Kraus, 2021).

Despite the benefits of RPA, challenges such as workforce resistance and the need for improved training and support for employees remain prevalent (Figueiredo & Pinto, 2020; Sharma et al., 2022). In addition, the integration of artificial intelligence has the potential to elevate operational capabilities beyond routine tasks to more complex functions, such as fraud detection (Leitner-Hanetseder et al., 2021). Thus, while RPA can

significantly redefine professional capabilities, successful implementation depends on strategic planning and a comprehensive understanding of employee dynamics (Farinha et al., 2023; Śliż et al., 2024).

3.2.2 Specific Applications and Technical Skills for Professional Transformation

Artificial Intelligence and machine learning are transformative forces that improve cognitive abilities in various sectors, driving the need to improve technical skills for professional transformation. Abbas (2025) conducted a comprehensive review of the use of artificial intelligence in management accounting, identifying key categories of applications, challenges faced, and proposing strategic guidelines for future research and the sustainable integration of artificial intelligence into accounting practice. In this context, artificial intelligence facilitates automation that goes beyond routine tasks, allowing professionals to participate in complex cognitive processes and decision-making functions (Leitner-Hanetseder et al., 2021; Moderno et al., 2023). De Santis (2024) analysed machine learning applications in financial auditing, demonstrating that predictive algorithms significantly improve fraud detection and promote a transition by professionals to proactive approaches to risk monitoring and analysis. In this sense, the success of artificial intelligence and machine learning implementations depends on collaborative structures that integrate technological advances with human experience (Zhang et al., 2020).

Gepp et al. (2018) provided a comprehensive review of big data in accounting and auditing, establishing a foundation for understanding patterns of professional transformation through subsequent research that helps identify conceptual convergences through multiple applications of artificial intelligence. This creates a demand for skills that enable dynamic interaction with advanced technologies, emphasizing not only technical skills but also critical thinking and adaptability (Lameijer et al., 2024; Sandy et al., 2022).

3.3 Big Data and Analytics: Expansion of Information Capabilities

3.3.1 Transforming Accounting Information to Understand Professional Patterns

The integration of big data analysis into the field of accounting has significantly transformed how professionals analyse patterns and obtain information related to financial processes. The analysis facilitates error detection and risk management using sophisticated data integration and monitoring systems, thereby increasing transparency and accountability in accounting practices (Shalhoob et al., 2024). In addition, the shift to data-driven decision-making allows professionals to gain a more in-depth understanding of financial trends and anomalies, promoting proactive rather than reactive strategies (Brands and Holtzblatt 2015; Fülbier & Sellhorn, 2023). This transformation is reinforced by the growing reliance on advanced analytics to identify fraud and discrepancies, thereby reinforcing the role of accountants as strategic advisors rather than mere record keepers (Zhang et al., 2020). Furthermore, the emergence of big data analytics is in line with the evolution of the workforce's technological skills, requiring continuous professional development to adapt to the new analytical structures and tools that will shape the future of accounting (Leitner-Hanetseder et al., 2021).

3.3.2 Applications in Auditing and Risk Assessment for Professional Transformation

Big data and data analytics have significantly influenced auditing and risk assessment, leading to a transformation in professional practices. Advanced data analysis increases the accuracy and efficiency of audit processes by automating data extraction and analysis, enabling auditors to identify anomalies and trends more effectively (Eulerich et al., 2021; Moffitt et al., 2018). Salijeni et al. (2019) investigated patterns of big data adoption among auditors to understand professional transformations, identifying implementation success factors that help identify conceptual convergences between technological capability and organizational readiness.

RPA supports these efforts by relieving auditors of manual and repetitive tasks, thereby enabling a strategic focus on areas such as fraud detection and risk assessment (Bellinga et al., 2021; Eulerich et al., 2021). The integration of RPA with big data analytics promotes a framework for real-time auditing, which can mitigate errors and improve data

integrity (Moffitt et al., 2018; Shalhoob et al., 2024). Furthermore, the interaction between RPA technology and big data leads to a more profound understanding of organizational risks, resulting in better decision-making and governance structures within accounting firms (Leitner-Hanetseder et al., 2021).

3.4 Blockchain: Disruptive Potential and Practical Realities

3.4.1 Conceptual Basis for Critical Analysis of Professional Transformation

Schmitz and Leoni (2019) provided a comprehensive analysis of the implications of blockchain for accounting practice to understand potential patterns of professional transformation, identifying theoretical benefits that could fundamentally reshape audit and assurance services. Rozario and Thomas (2019) explored warning signs in blockchain implementations through critical analysis, documenting implementation challenges that help identify knowledge gaps in practical implementation strategies.

3.4.2 Practical Applications and Limitations for Understanding Knowledge Gaps

Blockchain technology has disruptive potential in various sectors, including finance, supply chain management, and healthcare, but practical applications often face implementation challenges. Blockchain characteristics such as decentralization, transparency, and immutability promote trust and increase operational efficiency (Viale & Zouari, 2020; Zhang et al., 2020). However, issues such as scalability, regulatory compliance, and integration with existing systems remain significant limitations (Enríquez et al., 2020; Farinha et al., 2023). A detailed understanding of these barriers is essential for organizations seeking to leverage blockchain effectively (Madakam et al., 2019).

Furthermore, the knowledge gap regarding the implications of blockchain on workflow and organizational transformations may hinder its adoption. Studies highlight the need for organizations to invest in employee training and qualification to navigate the complex landscape of blockchain integrations (Stravinskienė, 2022). Addressing these knowledge gaps involves not only technical training but also change management strategies to mitigate resistance from workers concerned about job losses due to automation technologies such as RPA (Figueiredo & Pinto, 2020). Coyne and McMickle (2017)

analysed practical implications of blockchain for the auditing profession between theoretical potential and implementation reality, documenting current limitations for technological development.

3.5 Cloud Computing: Technological Democratization

3.5.1 Transformation of Technological Access for Analysis of Professional Patterns

Christauskas and Miseviciene (2012) provided an initial analysis of the implications of cloud computing for accounting information systems to understand emerging patterns of technological accessibility, laying the foundation for understanding how cloud technology contributes to democratizing access to sophisticated accounting tools. Dimitriu and Matei (2014) examined patterns of cloud adoption in accounting firms, documenting how cloud technology helps identify conceptual convergences between cost efficiency and improved access to capabilities.

3.5.2 Security and Compliance to Understand Professional Transformations

Tarmidi et al. (2014) examined cloud security concerns in accounting contexts through critical analysis, identifying critical considerations that contribute to understanding how security concerns affect professional transformations towards cloud-based services. Cleary and Quinn (2016) investigated regulatory compliance in cloud-based accounting systems between regulatory requirements and cloud service capabilities for implementation.

3.6 Digital Skills and Professional Development

3.6.1 Competency Frameworks for Critical Analysis of Transformation

Schlegel and Kraus (2021) conducted a critical analysis of competencies and skills for digital transformation, specifically in the context of RPA, to understand patterns of competency evolution, providing a comprehensive framework that contributes significantly to understanding how professional competencies should evolve to support professional transformations. Pan and Seow (2016) examined the skill requirements for

data analytics in accounting through detailed analysis, documenting specific competencies in current professional preparation programmes.

3.6.2 Educational Transformation to Understand Professional Development Patterns

Lawson et al. (2014) examined the focus of accounting curricula on students' long-term careers in the digital age through comprehensive analysis, providing an integrated framework of competencies that contributes significantly to understanding how educational preparation should evolve to support professional transformations. Sledgianowski et al. (2017) investigated student adoption of business analytics tools between student readiness and professional requirements for curriculum development.

4. INTEGRATIVE DISCUSSION

4.1 Emerging Paradigm: Human-Technology Collaboration to Understand Professional Transformations

In 97 studies, the literature converges on a paradigm of collaboration between humans and technology: digital tools automate routine processing, while professionals devote themselves to judgement, interpretation, and consulting work. This synthesis between domains helps explain why results differ across organizations and technologies and supports an integrative agenda for capacity building, governance, and curriculum redesign.Huang and Vasarhelyi (2019) and Moffitt et al. (2018) demonstrated that RPA contributes to professional transformations when humans provide supervision and exception handling, while robots perform routine processing, establishing a model that helps identify knowledge gaps in optimal task allocation. Leitner-Hanetseder et al. (2021) found similar patterns in artificial intelligence applications, where humans contribute strategic context while algorithms handle data processing, contributing to understanding conceptual convergences between human judgement and machine efficiency for the evolution of professional roles.

4.2 Contextual Variability and Success Factors in Critical Analysis

The literature reveals substantial variability in implementation success across different organizational contexts in understanding patterns of professional transformation, suggesting that digital transformation is a highly context-dependent phenomenon rather than a universally applicable solution. Organizational culture emerges as a critical determinant through the analysis of multiple studies, with research by Cooper et al. (2019) demonstrating that organizations that value innovation achieve superior results between cultural readiness and technological success.

Leadership commitment proves essential across all technology domains to effectively outline strategic directions, requiring visible sponsorship, resource allocation, and consistent messaging through implementation processes in change management approaches.

4.3 Transformation of Professional Identity through Integrative Analysis

Studies by Leitner-Hanetseder et al. (2021) and Appelbaum et al. (2017) document a fundamental reconceptualization of professional identity to understand systemic patterns of professional transformation through detailed analysis. Traditional roles based on technical precision are expanding to include strategic consulting and technological integration responsibilities between traditional experience and digital capabilities for professional development.

Value propositions for customers are shifting from information processing to insight generation through professional transformations, creating premium opportunities for digitally literate professionals while potentially marginalizing those resistant to change.

4.4 Gaps and Future Directions for Critical Analysis and Strategic Development

The critical analysis identified several significant gaps that represent important opportunities for future research to understand professional transformations more comprehensively. Longitudinal studies are rare for effectively outlining strategic directions, limiting understanding of sustained impacts over extended periods between short-term implementation effects and long-term professional evolution.

Intercultural research is limited, despite evidence that cultural factors significantly influence adoption patterns for understanding global patterns of professional transformation. Ethical dimensions receive insufficient attention despite growing concerns about artificial intelligence bias and accountability, which require urgent analysis between technological capacity and ethical responsibility.

5. CONCLUSIONS AND IMPLICATIONS

5.1 Summary of Main Results

This synthesis of 97 studies indicates that accounting is undergoing a structural transformation that extends beyond tool adoption to reshape work design, professional identity and governance arrangements. A consistent pattern is human-technology complementarity, in which digital systems extend analytical capacity while raising new requirements for oversight, accountability, and skills.

RPA demonstrates implementation maturity with documented benefits in efficiency and accuracy that contribute to professional transformations towards higher-value analytical activities. Artificial intelligence is redefining the nature of accounting work to understand conceptual convergences between machine processing and human judgement, creating professional archetypes in skills development requirements. Big data analytics enables predictive capabilities that outline strategic directions for proactive rather than reactive professional practice, while blockchain remains experimental due to technical limitations that require continued research to realize its transformational potential.

5.2 Implications for Stakeholders

For professionals: Proactive development of digital skills is essential for successful professional transformations that contribute to improved career opportunities. Data literacy, technology assessment skills, and digital communication emerge as core requirements for understanding conceptual convergences between traditional professional knowledge and digital analytical capabilities for individual professional development.

For organizations: Comprehensive strategies that address technology, people, and culture simultaneously achieve superior results in professional transformations that

contribute to sustainable competitive advantage. Leadership commitment and investment in training prove critical in identifying knowledge gaps in implementation approaches that help outline effective strategic directions for organizational digital transformation through systematic capacity building.

For lecturers: Curriculum modernization is becoming an urgent necessity to understand emerging patterns in the evolution of professional requirements, requiring the integration of analytics, programming, RPA and technological assessment with traditional knowledge that contributes to addressing conceptual convergences between academic preparation and professional practice needs that help to outline strategic directions for the development of educational programmes.

For regulators: Proactive development of frameworks addressing algorithmic accountability and professional responsibility is essential to understanding professional transformations in regulatory contexts, requiring critical analysis of conceptual convergences between technological capacity and regulatory compliance for adaptive regulatory frameworks that support innovation while protecting the public interest.

5.3 Directions for Future Research

Research priorities for understanding professional transformations more comprehensively include longitudinal studies examining sustained impacts over extended periods between short-term implementation effects and long-term professional evolution. Cross-cultural research investigating adoption patterns across different contexts to outline culturally sensitive strategic directions that help address knowledge gaps in global implementation approaches.

Ethics research addressing concerns of artificial intelligence bias and accountability to understand conceptual convergences between technological efficiency and ethical responsibility for responsible implementation of artificial intelligence. Integration studies examining synergistic effects of multiple technologies to identify knowledge gaps in holistic approaches to transformation that could contribute to more effective strategies for comprehensive digital transformation.

5.4 Final Reflection

Digital transformation represents a historic turning point comparable to the transition from manual to computerized accounting, requiring unprecedented collaboration between professionals, organizations, lecturers, and regulators to understand emerging patterns and outline sustainable strategic directions. Core professional values must be upheld as the profession evolves to embrace technological capabilities that enhance rather than compromise professional responsibilities, helping between technological advancement and professional integrity that help address knowledge gaps in ethical technology implementation.

This critical analysis provides a foundation for informed decision-making that contributes to understanding professional transformations while highlighting the continued need for research, adaptation, and collaborative effort to successfully navigate this period of transformation through strategic approaches that leverage conceptual convergences between human experience and technological capacity to outline effective strategic directions for sustainable professional evolution.

REFERENCES

Aalst, W., Bichler, M., & Heinzl, A. (2018). Robotic process automation. *Business & Information Systems Engineering, 60*(4), 269-272. https://doi.org/10.1007/s12599-018-0542-4

Abbas, K. (2025). Management accounting and artificial intelligence: a comprehensive literature review and recommendations for future research. *The British Accounting Review*, 101551. https://doi.org/10.1016/j.bar.2025.101551

Akter, S., Michael, K., Uddin, M. R., McCarthy, G., & Rahman, M. (2020). Transforming business using digital innovations: the application of AI, blockchain, cloud and data analytics. *Annals of Operations Research*, *308*, 7. https://doi.org/10.1007/s10479-020-03620-w

Appelbaum, D., Kogan, A., Vasarhelyi, M. A., & Yan, Z. (2017). Impact of business analytics and enterprise systems on managerial accounting. *International Journal of Accounting Information Systems*, *25*, 29-44. https://doi.org/10.1016/j.accinf.2017.03.003

Bellinga, J., Bosman, T., Hocuk, S., Janssen, W., & Khzam, A. (2021). Robotic process automation for the extraction of audit information: a use case. *Current Issues in Auditing, 16*(1), A1-A8. https://doi.org/10.2308/ciia-2020-043

Bhimani, A., & Willcocks, L. (2014). Digitisation, 'Big Data' and the transformation of accounting information. *Accounting and Business Research*, *44*(4), 469–490. https://doi.org/10.1080/00014788.2014.910051

Brands, K., & Holtzblatt, M. (2015). Business Analytics: Transforming the Role of Management Accountants. *Management Accounting Quarterly*, *16*(3).

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Christauskas, C., & Miseviciene, R. (2012). Cloud computing based accounting for small to medium sized business. *Engineering Economics*, *23*(1), 14-21. https://doi.org/10.5755/j01.ee.23.1.1220

Cleary, P., & Quinn, M. (2016). Intellectual capital and business performance: An exploratory study of the impact of cloud-based accounting and finance infrastructure. *Journal of Intellectual Capital*, *17*(2), 255-278. https://doi.org/10.1108/JIC-06-2015-0058

Cooper, L. A., Holderness, D. K., Sorensen, T. L., & Wood, D. A. (2019). Robotic process automation in public accounting. *Accounting Horizons*, *33*(4), 15-35. https://doi.org/10.2308/acch-52466

Cronin, P., Ryan, F., & Coughlan, M. (2008). Undertaking a literature review: A step-by-step approach. *British Journal of Nursing*, *17*(1), 38-43. https://doi.org/10.12968/bjon.2008.17.1.28059

De Santis, F. (2024). Artificial intelligence in auditing. In *Artificial Intelligence in Accounting and Auditing* (pp. 193–208). Springer. https://doi.org/10.1007/978-3-031-71371-2_9

Dimitriu, O., & Matei, M. (2014). A new paradigm for accounting through cloud computing. *Procedia Economics and Finance*, *15*, 840-846. https://doi.org/10.1016/S2212-5671(14)00541-3

Enríquez, J. G., Ramirez, A. J., Mayo, F. J. D., & García-García, J. A. (2020). Robotic process automation: a scientific and industrial systematic mapping study. *IEEE Access, 8*, 39113-39129. https://doi.org/10.1109/access.2020.2974934

Eulerich, M., Pawlowski, J., Waddoups, N., & Wood, D. (2021). A framework for using robotic process automation for audit tasks*. *Contemporary Accounting Research, 39*(1), 691-720. https://doi.org/10.1111/1911-3846.12723

Farinha, D., Pereira, R., & Almeida, R. (2023). A framework to support robotic process automation. *Journal of Information Technology, 39*(1), 149-166. https://doi.org/10.1177/02683962231165066

Feghali, M., Mansour, W., & Nakhle, S. (2022). Digital transformation of accounting practices and behavior during COVID-19: Evidence from Lebanon. *Journal of Accounting and Management Information Systems, 21*(2), 291-310. https://doi.org/10.24818/jamis.2022.02005

Fernandez, D. and Aman, A. (2021). The challenges of implementing robotic process automation in global business services. *International Journal of Business and Society, 22*(3), 1269-1282. https://doi.org/10.33736/ijbs.4301.2021

Figueiredo, A. and Pinto, L. (2020). Robotizing shared service centres: key challenges and outcomes. *Journal of Service Theory and Practice, 31*(1), 157-178. https://doi.org/10.1108/jstp-06-2020-0126

Fülbier, R. U. and Sellhorn, T. (2023). Understanding and improving the language of business: how accounting and corporate reporting research can better serve business and society. *Journal of Business Economics, 93*(6-7), 1089-1124. https://doi.org/10.1007/s11573-023-01158-4

Gepp, A., Linnenluecke, M. K., O'Neill, T. J., & Smith, T. (2018). Big data techniques in auditing research and practice: Current trends and future opportunities. *Journal of Accounting Literature*, *40*, 102-115. https://doi.org/10.1016/j.acclit.2017.05.003

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, *26*(2), 91-108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Green, B. N., Johnson, C. D., & Adams, A. (2006). Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade. *Journal of Chiropractic Medicine*, *5*(3), 101-117. https://doi.org/10.1016/S0899-3467(07)60142-6

Hiebl, M. R. W. (2023). Literature reviews of qualitative accounting research: Challenges and opportunities. *Qualitative Research in Accounting & Management*, *20*(3), 309–336. https://doi.org/10.1108/qram-12-2021-0222

Huang, F., & Vasarhelyi, M. A. (2019). Applying robotic process automation (RPA) in auditing: A framework. *International Journal of Accounting Information Systems*, *35*, 100433. https://doi.org/10.1016/j.accinf.2019.100433

Janvrin, D. J., & Watson, M. W. (2017). "Big Data": A new twist to accounting. *Journal of Accounting Education*, *38*, 3-8. https://doi.org/10.1016/j.jaccedu.2016.12.009

Kaniadakis, A. and Linturn, L. (2022). Organizational adoption of robotic process automation: managing the performativity of hype. *International Journal of Information Systems and Project Management, 10*(4), 20-36. https://doi.org/10.12821/ijispm100402

Kokina, J., & Blanchette, S. (2019). Early evidence of digital labor in accounting: Innovation with robotic process automation. *International Journal of Accounting Information Systems*, *35*, 100431. https://doi.org/10.1016/j.accinf.2019.100431

Kraus, P., Fißler, E., & Schlegel, D. (2024). A typology of challenges in the context of robotic process automation implementation projects. *International Journal of Organizational Analysis, 32*(11), 60-73. https://doi.org/10.1108/ijoa-11-2023-4100

Lameijer, B. A., Vries, E. S. d., Antony, J., Garza-Reyes, J. A., & Sony, M. (2024). The implementation of lean six sigma for the optimization of robotic process automation systems in financial service operations. *Business Process Management Journal, 30*(8), 232-259. https://doi.org/10.1108/bpmj-08-2023-0640

Lawson, R. A., Blocher, E. J., Brewer, P. C., Cokins, G., Sorensen, J. E., Stout, D. E., Sundem, G. L., Wolcott, S. K., & Wouters, M. J. (2014). Focusing accounting curricula on students' long-run careers: Recommendations for an integrated competency-based framework for accounting education. *Issues in Accounting Education*, *29*(2), 295-317. https://doi.org/10.2308/iace-50673

Leitner-Hanetseder, S., Lehner, O. M., Eisl, C., & Forstenlechner, C. (2021). A profession in transition: Actors, tasks and roles in AI-based accounting. *Journal of Applied Accounting Research*, *22*(3), 539-556. https://doi.org/10.1108/JAAR-10-2020-0201

Madakam, S., Holmukhe, R. M., & Jaiswal, D. K. (2019). The future digital work force: robotic process automation (rpa). *Journal of Information Systems and Technology Management*, 16. https://doi.org/10.4301/s1807-1775201916001

Matt, C., Hess, T. & Benlian, A. Digital Transformation Strategies. *Bus Inf Syst Eng 57*, 339–343 (2015). https://doi.org/10.1007/s12599-015-0401-5

Moderno, O. B. d. S., Braz, A. C., & Nascimento, P. T. d. S. (2023). Robotic process automation and artificial intelligence capabilities driving digital strategy: a resource-based view. *Business Process Management Journal, 30*(1), 105-134. https://doi.org/10.1108/bpmj-08-2022-0409

Moffitt, K. C., Rozario, A. M., & Vasarhelyi, M. A. (2018). Robotic process automation for auditing. *Journal of Emerging Technologies in Accounting*, *15*(1), 1-10. https://doi.org/10.2308/jeta-10589

Pan, G., & Seow, P. S. (2016). Preparing accounting graduates for digital revolution: A critical review of information technology competencies and skills development. *Journal of Education for Business*, *91*(3), 166-175. https://doi.org/10.1080/08832323.2016.1145622

Perdana, A., Lee, J., & Chu, T. (2023). Prototyping and implementing robotic process automation in accounting firms: Benefits, challenges and opportunities to audit automation. *International Journal of Accounting Information Systems*, *51*, 100637. https://doi.org/10.1016/j.accinf.2023.100641

Petticrew, M., & Roberts, H. (2006). *Systematic reviews in the social sciences: A practical guide*. John Wiley & Sons.

Richins, G., Stapleton, A., Stratopoulos, T. C., & Wong, C. (2017). Big data analytics: Opportunity or threat for the accounting profession? *Journal of Information Systems*, *31*(3), 63-79. https://doi.org/10.2308/isys-51805

Rozario, A. M., & Thomas, C. (2019). Reengineering the audit with blockchain and smart contracts. *Journal of Emerging Technologies in Accounting*, *16*(1), 21-35. https://doi.org/10.2308/jeta-52432

Salijeni, G., Samsonova-Taddei, A., & Turley, S. (2018). Big Data and changes in audit technology: Contemplating a research agenda. *Accounting and Business Research*, *49*(1), 95-119. https://doi.org/10.1080/00014788.2018.1459458

Sandy, D. A., Ritchi, H., Adrianto, Z., & Alfian, A. (2022). Robotic process automation in action: a use case in accounting task. *Journal of Digital Innovation Studies*, 52-65. https://doi.org/10.24198/digits.v1i1.38534

Schlegel, D., & Kraus, P. (2021). Skills and competencies for digital transformation: A critical analysis in the context of robotic process automation. *International Journal of Organizational Analysis*, *31*(3), 804-821. https://doi.org/10.1108/IJOA-04-2021-2707

Schlegel, D., Rosenberg, B., Fundanovic, O., & Kraus, P. (2024). How to conduct successful business process automation projects? an analysis of key factors in the context of robotic process automation. *Business Process Management Journal, 30*(8), 99-119. https://doi.org/10.1108/bpmj-06-2023-0465

Schmitz, J., & Leoni, G. (2019). Accounting and auditing at the time of blockchain technology: A research agenda. *Australian Accounting Review*, *29*(2), 331-342. https://doi.org/10.1111/auar.12286

Shalhoob, H., Halawani, B., Alharbi, M., & Babiker, I. (2024). The impact of big data analytics on the detection of errors and fraud in accounting processes. *Revista De Gestão Social E Ambiental, 18*(1), e06115. https://doi.org/10.24857/rgsa.v18n1-121

Sharma, C., Bharadwaj, S., Gupta, N., & Jain, H. (2022). Robotic process automation adoption: contextual factors from service sectors in an emerging economy. *Journal of Enterprise Information Management, 36*(1), 252-274. https://doi.org/10.1108/jeim-06-2021-0276

Siddaway, A. P., Wood, A. M., & Hedges, L. V. (2018). How to Do a Systematic Review: A Best Practice Guide for Conducting and Reporting Narrative Reviews, Meta-Analyses, and Meta-Syntheses. *Annual Review of Psychology*, *70*(1), 747. https://doi.org/10.1146/annurev-psych-010418-102803

Sledgianowski, D., Gomaa, M., & Tan, C. (2017). Toward integration of big data, technology and information systems competencies into the accounting curriculum. *Journal of Accounting Education*, *38*, 81-93. https://doi.org/10.1016/j.jaccedu.2016.12.008

Śliż, P., Siciński, J., & Jackowska, B. (2024). The impact of ambidexterity on robotic process automation implementation strategy in service enterprises. *Future Business Journal, 10*(1). https://doi.org/10.1186/s43093-023-00296-z

Sobczak, A. (2021). Robotic process automation implementation, deployment approaches and success factors – an empirical study. *Journal of Entrepreneurship and Sustainability Issues, 8*(4), 122-147. https://doi.org/10.9770/jesi.2021.8.4(7)

Stravinskienė, I. (2022). The link between the business process management capabilities and the benefits created by robotic process automation in an organisation. *Vilnius University Open Series*, 64-71. https://doi.org/10.15388/isc.2022.9

Sukhera, J. (2022). Narrative reviews: flexible, rigorous, and practical. *Journal of graduate medical education*, *14*(4), 414-417. https://doi.org/10.4300/jgme-d-22-00480.1

Tarmidi, M., Rasid, S. Z. A., Alrazi, B., & Roni, R. A. (2014). Cloud computing awareness and adoption among accounting practitioners in Malaysia. *Procedia - Social and Behavioral Sciences*, *164*, 569-574. https://doi.org/10.1016/j.sbspro.2014.11.147

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, *8*, 45. https://doi.org/10.1186/1471-2288-8-45

Tiron-Tudor, A., Lacurezeanu, R., Breşfelean, V., & Donțu, A. (2024). Perspectives on how robotic process automation is transforming accounting and auditing services*. *Accounting Perspectives, 23*(1), 7-38. https://doi.org/10.1111/1911-3838.12351

Viale, L. and Zouari, D. (2020). Impact of digitalization on procurement: the case of robotic process automation. *Supply Chain Forum an International Journal, 21*(3), 185-195. https://doi.org/10.1080/16258312.2020.1776089

Warren, J. D., Moffitt, K., & Byrnes, P. (2015). How big data will change accounting. *Accounting Horizons, 29*(2), 397-407. https://doi.org/10.2308/acch-51069

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS quarterly*, xiii-xxiii.

Westland, J. C. (2024). *Audit analytics: Data science for the accounting profession* (2nd ed.). Springer. https://doi.org/10.1007/978-3-031-47464-4

Zhang, Y., Xiong, F., Xie, Y., Fan, X., & Hai-feng, G. (2020). The impact of artificial intelligence and blockchain on the accounting profession. *IEEE Access, 8*, 110461-110477. https://doi.org/10.1109/access.2020.3000505

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