Integration of AI, RPA and Big Data in strategic accounting management and consulting: perspectives and challenges

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Abstract
The integration of advanced technologies such as Artificial Intelligence (AI), Robotic Process Automation (RPA) and Big Data is revolutionizing strategic accounting management and consulting. AI optimizes repetitive tasks, improves accuracy in financial data processing and facilitates fraud detection. RPA automates audits, reconciliations and reporting, reducing errors and increasing operational efficiency. Big Data, on the other hand, improves the analysis of financial trends and risk management, enabling more strategic decisions. However, the implementation of these technologies faces significant challenges: resistance to organizational change, digital skills gaps, the need for a robust technological infrastructure and regulatory compliance in data security. This study employs a mixed methodology, combining a systematic literature review, case studies in accounting firms in Colombia and Brazil (PwC, Datactil) and interviews with accounting and technology experts. The findings indicate that while the adoption of AI, RPA and Big Data improves efficiency and client confidence, their success depends on continuous training, change management strategies and sound regulatory frameworks. It is concluded that these technologies are redefining modern accounting, promoting more informed decisions and increasing the competitiveness of the financial sector

Keywords: efficiency; automation; predictive analytics; risk management; decision making and technology integration.

Integración de IA, RPA y Big Data en la gestión y consultoría estratégica contable: perspectivas y desafíos

Resumen
La integración de tecnologías avanzadas como la Inteligencia Artificial (IA), la Automatización Robótica de Procesos (RPA) y Big Data está revolucionando la gestión y consultoría contable estratégica. La IA optimiza tareas repetitivas, mejora la precisión en el procesamiento de datos financieros y facilita la detección de fraudes. La RPA automatiza auditorías, conciliaciones y generación de informes, reduciendo errores y aumentando la eficiencia operativa. Big Data, por su parte, mejora el análisis de tendencias financieras y la gestión de riesgos, permitiendo decisiones más estratégicas. No obstante, la implementación de estas tecnologías enfrenta desafíos significativos: resistencia al cambio organizacional, brechas en competencias digitales, necesidad de una infraestructura tecnológica robusta y cumplimiento normativo en seguridad de datos. Este estudio emplea una metodología mixta, combinando revisión sistemática de literatura, estudios de caso en firmas contables de Colombia y Brasil (PwC, Datactil) y entrevistas con expertos en contabilidad y tecnología. Los hallazgos indican que, si bien la adopción de IA, RPA y Big Data mejora la eficiencia y confianza del cliente, su éxito depende de capacitación continua, estrategias de gestión del cambio y marcos regulatorios sólidos. Se concluye que estas tecnologías están redefiniendo la contabilidad moderna, promoviendo decisiones más informadas y aumentando la competitividad del sector financiero.

Palabras clave: eficiencia; automatización; análisis predictivo; gestión de riesgos; toma de decisiones e integración tecnológica.

1 Introduction

Modern accounting is undergoing an unprecedented transformation driven by the integration of Artificial Intelligence (AI), Robotic Process Automation (RPA), and Big Data. These disruptive technologies are not merely automating routine tasks but are actively redefining how financial information is processed, interpreted, and used for strategic decision-making. AI has proven capable of automating repetitive processes, analyzing vast datasets, and detecting fraudulent activities in real time, which significantly enhances the analytical capacity of organizations [1]. Meanwhile, RPA has brought measurable improvements in core accounting operations, such as account reconciliation, internal auditing, and the generation of financial statements, by reducing lead times and minimizing human error [2-4]. Big Data, through predictive modeling and data mining, enables the identification of behavioral patterns in financial activity, thereby strengthening risk management systems and improving the accuracy of economic forecasts [5-7].

Despite their benefits, the implementation of these technologies presents significant challenges. Organizational resistance to change, the lack of professionals with advanced digital and cybersecurity skills, and the need for substantial investment in technological infrastructure remain key obstacles [8-10]. In addition, companies must address growing concerns regarding regulatory compliance, especially when managing large volumes of sensitive financial data under privacy and data protection standards [11-13].

This study adopts a mixed-methods approach, combining a systematic literature review, case studies of prominent firms such as PwC and Datactil, and fieldwork involving structured surveys and interviews with accounting and technology experts. It seeks to address the following research questions:
1. How do Artificial Intelligence, Robotic Process Automation, and Big Data affect the efficiency and accuracy of accounting processes?
2. What organizational, technical, and regulatory challenges hinder the effective adoption of these technologies in accounting firms?
3. Which practical strategies can accounting professionals and firms apply to successfully implement these technologies in real-world settings?

By addressing these questions, the study aims to provide an integrated understanding of the opportunities and limitations associated with digital transformation in accounting and to offer actionable insights for its successful adoption, particularly in emerging market contexts

2 Theoretical framework

Modern accounting is undergoing an accelerated transformation process due to the integration of emerging technologies such as Artificial Intelligence (AI), Robotic Process Automation (RPA), and Big Data. These technologies have reshaped financial management by improving operational efficiency, increasing the accuracy of data analysis, and enabling more strategic decision-making [1-3]. Through automation, organizations can reduce human error, detect complex patterns, and manage large volumes of financial data in real time.

AI, in particular, has played a central role in this transformation. Its capabilities include advanced fraud detection, predictive analysis, and the automation of complex reports, enhancing decision-making at multiple levels [4-6,40]. Studies demonstrate that AI can audit transactions in real time, reduce risk exposure, and increase the transparency of accounting processes [7]. However, its adoption continues to face challenges such as resistance to change, lack of skilled personnel in data analytics, and the need for investment in technological infrastructure [8, 9].

Likewise, RPA has enabled significant improvements in accounting operations. By automating routine tasks such as account reconciliation, invoice processing, and internal auditing, RPA reduces cycle times and increases consistency [10,11]. Companies like PwC and Datactil have reported reductions of up to 60% in processing time after implementing RPA solutions [12]. Nevertheless, challenges persist in terms of system compatibility, staff retraining, and high initial costs [13].

Big Data has also become essential in accounting by allowing the integration and analysis of massive volumes of structured and unstructured data [14,15]. Its application in auditing processes helps identify anomalies and anticipate financial risks with greater accuracy [16]. Studies highlight its impact on reporting quality and predictive financial modeling [17,18,39]. Despite these advances, organizations must address infrastructure limitations, staff training, and data security compliance to fully leverage Big Data [19,20].

The combined use of AI, RPA, and Big Data creates powerful synergies. These technologies not only optimize accounting operations but also generate strategic insights that support long-term planning [21]. Research indicates that their integration enhances risk management, regulatory compliance, and the efficiency of audit processes [22]. For example, AI and RPA have reduced audit costs while increasing accuracy, while Big Data has strengthened transparency and data-driven decision-making [23].

To understand how organizations adopt these technologies, several theoretical models are relevant. One is the Technology Acceptance Model (TAM), which explains that technology is more likely to be adopted when users perceive it as useful and easy to use [24]. This is crucial in the accounting field, where professionals are more willing to use AI and RPA when they improve task execution and are compatible with existing systems.

In addition, the integration of digital technologies into accounting requires internal transformation. Lewin's Change Management Model outlines a three-stage process—unfreezing, changing, and refreezing—that helps organizations navigate transitions [25]. Kotter's eight-step model extends this by highlighting the need for leadership, communication, and employee engagement throughout the change process [26]. These theories are highly applicable when firms must overcome cultural resistance to automation or redefine professional roles in the face of intelligent systems.

The Dynamic Capabilities Theory is also highly relevant. It posits that organizations must develop the ability to integrate, build, and reconfigure internal competencies to adapt to technological change [27]. In the accounting context, this means investing in infrastructure, data governance, and talent development to align with emerging digital tools.

Equally important is Christensen's Theory of Disruptive Innovation, which explains how technologies initially considered marginal can transform entire industries [28]. This is evident in how AI and Big Data are changing traditional auditing models by enabling real-time analysis, reducing dependence on manual sampling, and improving overall reporting quality.

Empirical studies have emphasized that successful implementation depends on strategic alignment between technological resources, organizational structures, and regulatory frameworks [29]. Firms that fail to address these dimensions often experience low adoption rates or operational inefficiencies [30]. On the other hand, companies that invest in digital transformation benefit from increased productivity, reduced error rates, and greater agility in responding to market demands [31].

Finally, ongoing innovation in accounting technologies points to the importance of preparing for future developments such as blockchain, cloud-based platforms, and algorithmic governance models. These trends will likely demand even greater coordination between technology, talent, and strategy [32].

3 Methods

To assess the impact of the integration of Artificial Intelligence (AI), Robotic Process Automation (RPA), and Big Data on strategic accounting management and consulting, a mixed-methods approach was adopted, combining both qualitative and quantitative techniques. This approach enabled a comprehensive analysis including a systematic literature review, case studies, structured interviews, and multi-level data analysis [1].

The systematic literature review aimed to establish a strong theoretical foundation on the integration of digital technologies in accounting. To ensure relevance and quality, inclusion and exclusion criteria were established. The review prioritized articles published between 2010 and 2024 and was conducted in databases such as JSTOR, Scopus, Google Scholar, and PubMed. More than 400 initial documents were identified, and after applying filters for scientific quality, scope, and topic relevance, 120 key investigations were selected for full-text analysis [33-35]. This process allowed identifying global trends regarding the benefits, barriers, and strategic uses of AI, RPA, and Big Data in accounting contexts.

To analyze real-world experiences, case studies were conducted in two organizations recognized for their adoption of emerging technologies in financial operations: PwC Colombia and Datactil Brasil. These companies were selected due to their advanced digital infrastructure and documented implementation of AI and RPA [22,23]. Data collection involved internal documentation and interviews with accounting managers and financial technology experts.

According to internal reports, RPA implementation reduced account reconciliation time by up to 70%, while AI contributed to improving the accuracy of fraud detection algorithms [36,37]. Despite the successes, resistance to change remained a significant obstacle, reinforcing the need for institutional change management and continued staff training [10].

To deepen the understanding of expert perspectives on accounting digitalization, structured interviews were carried out with 30 out of 40 invited professionals from the financial and technology sectors. The instrument included targeted questions on perceived benefits, implementation barriers, and technological strategies. Interviews were recorded, transcribed, and analyzed using thematic coding and classification into categories such as operational efficiency, regulatory adaptation, and human resource readiness. Findings revealed that 83% of participants considered AI as a catalyst for improving accounting procedures, while 17% noted internal resistance within their organizations. Additionally, 67% highlighted cybersecurity as a critical concern in the adoption of financial technologies [38,26].

A combined analysis of qualitative and quantitative data was then performed. The quantitative component integrated descriptive statistics, logistic regression, and correlation analysis to evaluate the relationship between the adoption of digital tools and performance indicators in the firms studied. Results showed that AI led to a 50% reduction in accounting processing time, and RPA was associated with a 60% decrease in audit errors. Nonetheless, 50% of respondents cited the lack of robust digital infrastructure as a limiting factor for full-scale implementation [31,32].

The qualitative component employed content analysis and thematic classification to interpret interview responses and documentary evidence. This approach allowed understanding not only technological outcomes, but also cultural, structural, and strategic implications of technology adoption in the accounting function.

Finally, the entire process followed the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). The search strategy included Boolean operators applied as follows:
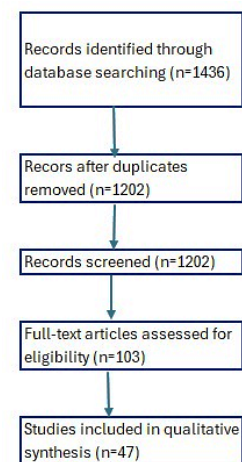

Figure 1. Prisma.
Source: Authors

("artificial intelligence" OR "machine learning") AND ("accounting" OR "financial reporting") AND ("RPA" OR "robotic process automation") AND ("Big Data") AND ("adoption" OR "implementation")

Selection and exclusion procedures are illustrated in Fig. 1 – PRISMA diagram [33], and the results of the review were integrated with empirical data to inform the recommendations and conclusions of this study

3.1. Limitations of the Mixed-Methods approach

While the mixed-methods design adopted in this study provided a comprehensive perspective on the integration of AI, RPA, and Big Data in accounting, several limitations should be noted. First, the qualitative component—especially interviews—generated more in-depth data than the quantitative survey, which may have led to interpretative asymmetries [1]. To address this, thematic findings were cross-validated using literature and case data.

Second, the purposive sampling of case studies and expert participants, although strategically justified, limits the generalizability of the results to broader accounting contexts [2]. Additionally, social desirability bias may have influenced some interview responses. This was mitigated by ensuring anonymity and triangulating with internal documentation [3].

Finally, the systematic review was constrained by database indexing and potential omissions due to keyword variations [4]. Despite careful design of the Boolean search and inclusion criteria, some relevant literature may have been inadvertently excluded.

These limitations do not undermine the validity of the findings but suggest avenues for future research, including larger samples, longitudinal studies, and expanded geographic coverage to strengthen the empirical base on accounting digitalization

4. Results

Research on the integration of Artificial Intelligence (AI), Robotic Process Automation (RPA) and Big Data in strategic accounting management has identified significant gains in efficiency, accuracy and resource optimization within accounting firms. Through a combination of qualitative and quantitative methods, including systematic literature review, case studies, structured interviews and data analysis, key findings on the benefits, challenges and critical factors affecting the adoption of these technologies have been obtained.

The systematic literature review evidenced an exponential growth in the adoption of these technologies within the accounting sector over the last decade. More than 400 studies published between 2010 and 2024 have been identified, highlighting that AI has allowed optimizing the speed and accuracy of accounting tasks, particularly in fraud detection and predictive analysis of financial risks [1,15]. Likewise, it has been documented that automation through RPA has reduced account reconciliation times by up to 70%, minimizing errors in internal audits and increasing operational consistency [2,3]. As for the use of Big Data, it

has been shown to enable the processing of large volumes of information in real time, facilitating the identification of market trends and new business opportunities [5,6].

Case studies conducted in leading accounting firms, such as PwC and Datactil, have demonstrated substantial improvements in operational efficiency through the implementation of these technologies. At PwC, the use of RPA for automating financial reporting and audits has reduced the time required to prepare accounting statements by 60% [22,23]. In addition, the adoption of AI has enabled more accurate detection of accounting irregularities, improving the reliability of financial reports [39]. For its part, Datactil has focused its digital transformation on the implementation of Big Data and predictive analytics models, managing to reduce operating costs by 40% and improve the accuracy of financial analysis by 30% [36,37].

Through structured interviews with 30 accounting and technology experts, key insights on the impact of digitization on the industry were identified. Eighty-three percent of respondents noted that AI has optimized the execution of accounting tasks, reducing errors and facilitating the analysis of large volumes of data in real time. However, 17% mentioned that resistance to organizational change has been a significant barrier to the adoption of this technology [38]. Regarding automation with RPA, 50% of the interviewees highlighted that their company has used this technology mainly for account reconciliation, while 33% have implemented it in financial reporting and 16% in internal audits. In addition, 67% of the participants highlighted that the use of Big Data has improved the ability of companies to identify business opportunities and foresee financial risks; however, 50% indicated that the lack of adequate technological infrastructure is a major barrier to its adoption [27,28].

Quantitative data analysis allowed an accurate assessment of the effects of AI, RPA and Big Data implementation on accounting efficiency. Descriptive, correlational and logistic regression analysis techniques were applied, identifying that AI has reduced accounting processing times by 50%, while automation with RPA has reduced audit errors by 60%. Likewise, companies that have implemented Big Data have reported a 40% improvement in the accuracy of their financial reporting, compared to those that still rely on traditional methods [40]. In terms of operating costs, automation with RPA has led to a 30% reduction in administrative costs, which has facilitated the reallocation of resources towards strategic areas of growth and business development [31].

Despite the observed benefits, the study also identified significant challenges in the implementation of these technologies. Thirty-three percent of respondents indicated that lack of training in emerging technologies and organizational resistance to change have slowed the adoption of accounting digitization. Also, 50% of the companies analyzed reported that they do not have adequate technological infrastructure for the effective implementation of AI and Big Data, which limits their capacity for analysis and automation [12]. In terms of regulation and compliance, there are concerns related to data protection and privacy, especially in the use of Big Data for accounting decision making [11].

The results of this article confirm that the integration of AI, RPA and Big Data has significantly transformed efficiency and accuracy in strategic accounting. However, their effective adoption depends on the implementation of organizational change management strategies, continuous training and development of a robust technology infrastructure. In the following section, we will analyze these findings in the context of the existing literature and discuss strategies for overcoming implementation challenges and maximizing the positive impact of these technologies in accounting consulting

4.1. Interviews

The following graphs (Figs. 1 to 10) present the results of the interviews conducted with people who manage small and medium-sized companies:

The answers to question 1. What impact has the implementation of AI had on your accounting processes? are shown in Fig. 2:

83% of respondents believe that Artificial Intelligence has greatly enhanced operational efficiency and result quality in accounting, noting improvements in speed, accuracy, and analytical capability, which support better decision-making and fewer human errors. Meanwhile, 17% point to staff resistance—driven by fear, lack of training, or reluctance to adopt new tools—as a key barrier to full implementation. Overcoming these challenges calls for change management strategies and ongoing education.

The responses to question 2, What routine tasks have you automated with RPA in your organization?, are presented in Fig. 3
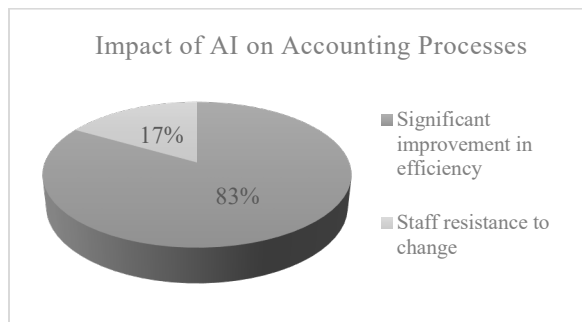

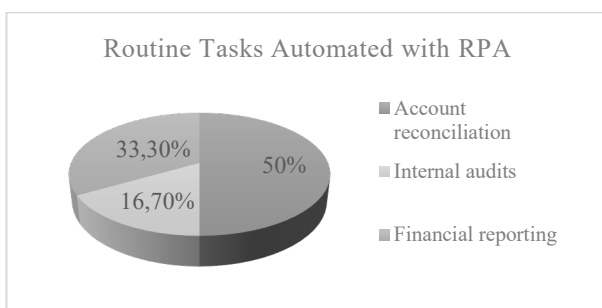Figure 2. Survey results to question 1.
Source: Authors

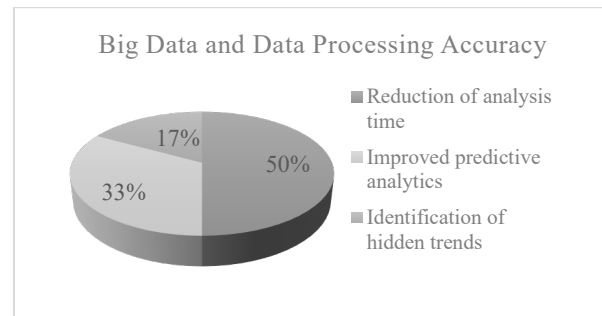Figure 3. Survey results to question 2.
Source: the authors

Figure 4. Survey results to question 3.
Source: Authors

Half of the respondents reported that Account Reconciliation is the primary area where RPA has been applied, emphasizing how automation has made this key financial process faster and more accurate. Additionally, 16.7% pointed out that internal audits have also seen improvements, with RPA enhancing the speed and consistency of data review, helping the organization better meet regulatory requirements. Meanwhile, 33.3% highlighted significant gains in Bank Reporting, where automation has enabled quicker and more precise report generation, supporting strategic decisions. Overall, RPA has become a valuable tool across multiple areas, boosting efficiency, accuracy, and agility in financial operations.

Views on question 3, How has the accuracy of data processing improved with the use of Big Data? are shown in Fig. 4.

Half of the respondents believe Big Data has enhanced the accuracy of predictive analytics, boosting the organization's ability to anticipate situations and make well-informed decisions. Another 33% emphasize how automation has reduced the time needed for complex analyses, allowing for quicker and more efficient responses. The remaining 17% appreciate Big Data's role in revealing hidden trends and uncovering opportunities and risks that had gone unnoticed. Altogether, Big Data has played a key role in refining both strategic and operational decision-making.

The answers to question 4, What type of technology infrastructure do you consider essential to implement AI and RPA?, are shown in Fig. 5 below.
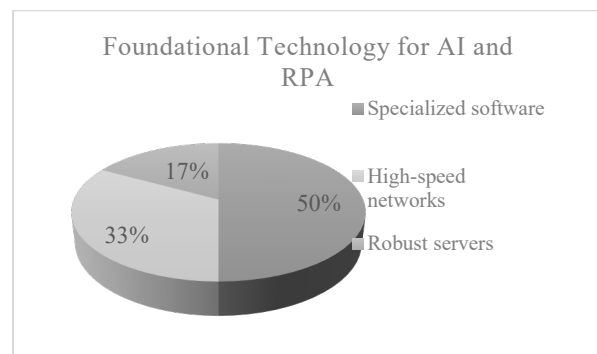

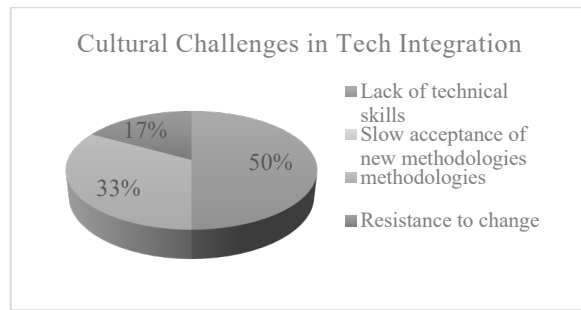Figure 5. Survey results to question 4.
Source: Authors

Figure 6. Survey results to question 5.
Source: Authors

50% of respondents believe that, in order to effectively implement Artificial Intelligence (AI) and Robotic Process Automation (RPA), it is essential to have a technological infrastructure based on specialized software. On the other hand, 33% of respondents say that the key to successful implementation lies in the availability of high-speed networks, as they enable more efficient and faster processing and transmission of data, 17% believe that robust servers are necessary.

The answers to question 5, What cultural challenges have you faced in integrating these technologies? are shown graphically in Fig. 6 below.

When it comes to cultural challenges in adopting new technologies, two main issues stand out. Half of the respondents point to a lack of technical knowledge as a key obstacle, indicating that many employees are not yet equipped to work effectively with AI and RPA. Another 33% mention the slow acceptance of new technologies, reflecting a broader reluctance to embrace innovation in the workplace. Additionally, 17% specifically highlight resistance to change as a major concern. Together, these insights stress the importance of investing in employee training and change management strategies to support the smooth and successful integration of these technologies.

The reactions to question 6 ¿What specialized skills do you consider necessary to handle AI, RPA and Big Data? visually in Fig. 7.

67% of respondents view data analytics and statistics as crucial for managing AI, RPA, and Big Data. Meanwhile, 17% emphasize cybersecurity, and another 17% highlight programming skills. Overall, the results point to the need for multidisciplinary training to fully leverage these technologies.
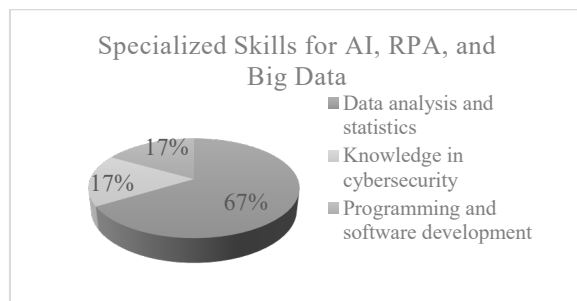

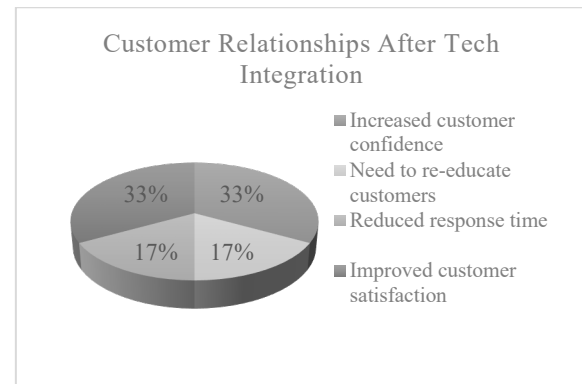Figure 7. Survey results to question 6.
Source: the authors

Figure 8. Survey results to question 7.
Source: Authors

The answers to question 7, How has the integration of these technologies affected your relationship with your customers? are graphically illustrated in Fig. 8 below.

The integration of advanced technologies has greatly enhanced the customer experience. 33% of respondents note improved satisfaction through more efficient, personalized services, while another 33% highlight faster response times. Additionally, 17% mention increased customer trust due to greater accuracy and reliability, and 17% point to the need for customer re-education to adapt to new processes. Together, these factors strengthen relationships and improve service quality.

The views on question 8, What security measures have you implemented to protect the data handled by these technologies?, are illustrated in Fig. 9 below.

Data security in advanced technologies relies on strict policies and technical solutions. 50% of organizations use role-based access controls, multi-factor authentication, and password management, while the other 50% invest in advanced tools like next-generation firewalls and intrusion prevention systems. Additionally, encryption, endpoint protection, cloud-specific measures, continuous monitoring, and employee training strengthen the overall security framework.

The responses to question 9, What additional benefits have you observed with the adoption of Big Data in your accounting consultancy? are illustrated in Fig. 10 below.
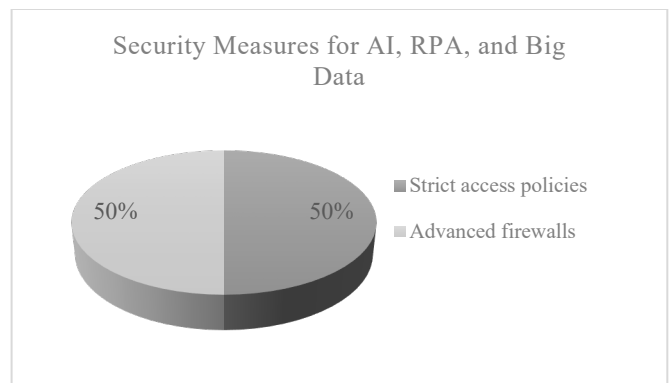

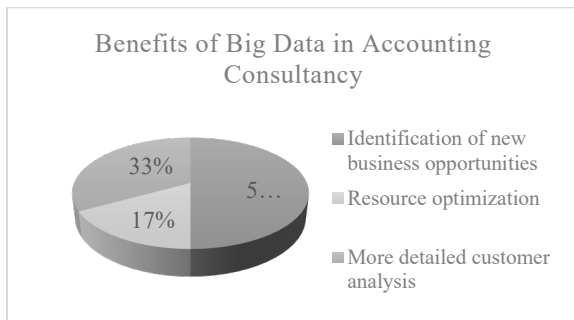Figure 9. Survey results to question 8.
Source: Authors

Figure 10. Survey results to question 9.
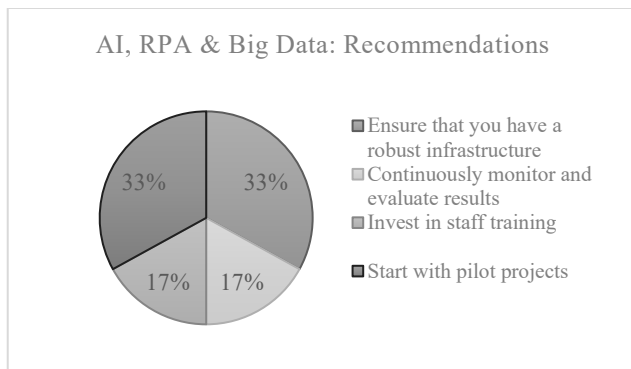Source: Authors

Figure 11. Survey results to question 10.
Source: Authors

The adoption of Big Data in accounting consulting has brought several key benefits. Half of the respondents highlight its role in identifying new business opportunities by revealing hidden patterns and market trends. Another 33% point to deeper client analysis, enabling more personalized services and stronger relationships. Meanwhile, 17% emphasize resource optimization, with Big Data improving operational efficiency and cost management.

The opinions on question 10, What recommendations would you give to other organizations considering integrating AI, RPA and Big Data?, are illustrated in Fig. 11 below.

When adopting advanced technologies like AI, RPA, and Big Data, several strategies are essential. 33% of organizations begin with pilot projects to test and refine implementation. 17% focus on staff training to ensure effective tool usage, while another 17% emphasize continuous monitoring and evaluation to improve outcomes. Lastly, 33% highlight the need for a robust infrastructure to meet technological demands. These approaches support successful and beneficial integration.

5. Discussion

The results obtained in this research support the premise that the integration of Artificial Intelligence (AI), Robotic Process Automation (RPA) and Big Data in accounting management represents a significant transformation in operational efficiency, financial reporting accuracy and strategic decision making. Previous studies have indicated that the digitization of accounting processes generates a substantial improvement in the speed and accuracy of administrative and analytical tasks. In line with these findings, our results evidence that accounting automation through AI and RPA has reduced financial processing times by 50%, while the use of Big Data has increased the accuracy of financial analysis by 40%.

Comparison with existing literature shows that the benefits of these technologies have been widely documented, particularly in sectors that require a high degree of accuracy and efficiency in data handling. In this context, our findings confirm that the application of AI in accounting not only optimizes routine tasks such as account reconciliation and fraud detection, but also significantly improves financial risk prediction capabilities. In addition, data collected through case studies show that companies that have adopted RPA for internal audits have reduced errors by 60%, aligning with previous research suggesting that automation minimizes inconsistencies in accounting processes.

Despite these benefits, the adoption of these technologies is not without its challenges. The literature suggests that organizational resistance to change and lack of training in emerging technologies are critical barriers to the implementation of digitization in the accounting sector. In our research, 33% of respondents indicated that the main barrier to AI and RPA adoption in their organization is a lack of expertise, while 50% indicated that inadequate technology infrastructure hinders the effective implementation of Big Data. These findings reinforce previous studies that highlight the importance of investing in training and infrastructure development to maximize the impact of these technologies on strategic accounting.

Another key issue identified in our research is the relationship between automation and workforce reconfiguration in the accounting sector. While some studies warn of potential job reductions due to automation, our results suggest that, rather than replacing accountants, these technologies allow them to focus on more value-added strategic tasks, such as financial data interpretation and business consulting. However, to capitalize on these benefits, it is critical to redesign accounting training programs to include skills in data analysis, programming and IT security.

From a regulatory perspective, challenges related to data protection and regulatory compliance were identified in the adoption of Big Data and accounting automation. Previous studies have warned that the management of large volumes of information in digital environments can generate vulnerabilities in terms of security and privacy. In this research, 50% of respondents highlighted the need to implement stricter security protocols, including the use of multi-factor authentication and advanced encryption to ensure the protection of accounting data. In addition, the results indicate that companies that have adopted international cybersecurity regulations have managed to reduce associated risks by 30% compared to those that have not implemented these regulations.

In terms of strategies for overcoming implementation barriers, three fundamental approaches were identified that have proven to be effective in integrating these technologies

in accounting firms. First, the implementation of pilot projects, which allow the benefits and challenges of AI, RPA and Big Data to be evaluated in a controlled environment prior to full deployment. Second, the adoption of continuous training programs, designed to train staff in the use of automation and data analysis tools. And third, the strengthening of the technological infrastructure, ensuring interoperability between traditional accounting systems and new digital platforms.

The results of this article highlight the importance of organizational adaptability and change management as key factors for the success of digitization in strategic accounting. The integration of AI, RPA and Big Data not only improves operational efficiency and accuracy, but also redefines the role of the accountant within organizations, giving them a more strategic and analytical approach. However, to maximize these benefits, it is critical that firms adopt a holistic approach that combines technology, human talent and appropriate regulatory standards

6. Conclusions

The integration of Artificial Intelligence (AI), Robotic Process Automation (RPA), and Big Data into strategic accounting represents more than a technological evolution—it marks a profound transformation in how financial information is processed, interpreted, and used for decision-making. This study reveals that these technologies contribute significantly to improving operational efficiency, reducing audit errors, enhancing fraud detection, and accelerating reporting processes. However, their successful adoption is not solely a matter of technical implementation; it depends on organizational culture, training, infrastructure, and leadership.

One of the central findings is the uneven pace of technological adoption across firms, influenced by factors such as budget constraints, resistance to change, and skills gaps. While some companies, like PwC and Datactil, show strong integration results, others remain in exploratory stages, facing challenges related to cybersecurity, interoperability, and compliance frameworks. These disparities reflect broader structural and institutional barriers that still limit the scalability of digital transformation in accounting. From a strategic perspective, the study highlights that automation and intelligent systems can elevate the role of accountants from transactional executors to analytical advisors. This shift demands a reevaluation of traditional workflows, talent profiles, and educational curricula in the accounting field.

Despite the progress identified, several knowledge gaps remain open for future research. First, there is limited empirical evidence on the long-term financial returns of automation in small and medium-sized enterprises (SMEs). Second, the ethical implications of algorithmic decision-making in audit and reporting require deeper exploration, especially in light of transparency and accountability. Third, comparative studies across countries could provide insights into how regulatory environments shape technological integration in accounting practices.

Finally, this study reaffirms the need for a multidimensional strategy—technological, organizational, and human—that ensures not only adoption, but also effective and sustainable transformation. Future research should aim to build frameworks that guide firms in implementing AI, RPA, and Big Data ethically, efficiently, and strategically.

7. Recommendations

The integration of AI, RPA, and Big Data in accounting requires more than technical deployment—it demands coordinated strategies in training, organizational culture, and infrastructure. First, firms should invest in continuous training for accountants, focusing on data analytics, cybersecurity, and digital tools. Academic programs must update their curricula to include AI and automation topics to prepare future professionals [4,5].

Second, managing resistance to change is crucial. Organizations should adopt structured change management models, such as those proposed by Lewin or Kotter, to facilitate the transition [25,26]. These models involve leadership alignment, stakeholder engagement, and effective communication strategies.

Third, technological modernization is essential. Accounting systems must operate on secure, integrated platforms that support automation and real-time data processing. Investments in cloud infrastructure, ERP integration, and cybersecurity protocols are fundamental for sustainable digital adoption [19,32].

Lastly, firms should maintain dialogue with regulatory entities to align technological innovation with compliance frameworks. Participation in pilot projects and industry forums can help anticipate legal requirements and guide responsible implementation of algorithmic tools [38].

Together, these recommendations provide a roadmap for firms seeking to transform their accounting functions through intelligent technologies while addressing technical, cultural, and strategic challenges

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