

Automation and Optimization of Management Processes through RPA

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Abstract

Nowadays, IT&C technology is a crucial tool for accelerating business growth. Many companies are losing money by having human resources perform repetitive tasks. Robotic Process Automation (RPA) is a new technology that provides companies with the ability to optimize their costs through process automation. The rapid development of information technology has become essential for business growth by optimizing various processes. One of the most significant technologies leveraging artificial intelligence (AI) is RPA. This technology uses software robots, commonly known as "bots," to automate repetitive tasks traditionally performed by humans. While traditional automation relies on manual programming and system integration, RPA employs AI and machine learning to adapt to new inputs and processes. This enables businesses to optimize both cost and time efficiency, making operations more agile and scalable.

Keywords: *Artificial intelligence, future workforce, process automation, RPA, digital transformation.*

JEL Classification: O33, M15, J24.

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1. Introduction

The implementation of Robotic Process Automation (RPA) in management processes positively impacts several key areas, including operational management, human resources management, customer relationship management, and supply chain management. By automating reporting processes and other repetitive operational tasks, managers can focus on more strategic, high-value activities, ultimately enhancing productivity and fostering innovation. This research aims to investigate how RPA optimizes and automates core management functions and how it influences overall business performance. Furthermore, this study will systematically review the literature on RPA's role in management, focusing on its benefits, challenges, and future potential. RPA technology is relatively recent, but it has experienced significant growth over the past five years. This technology enables companies to optimize operational costs efficiently. The present research aims to identify the most successful RPA implementations in contemporary companies, as well as best practices for the successful implementation of technologies that utilize artificial intelligence.

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2. Literature review

The evolution of technology has contributed to significant changes in various fields, including online commerce, accounting, marketing, etc. According to Zhang et al., 2023, RPA technology (Robotic Process Automation), which uses artificial intelligence and machine learning to automate repetitive processes, has become essential to ensure competitiveness in an increasingly competitive market. This transformation through information technology enables companies to contribute to cost reduction, increase the accuracy of repetitive processes, and improve the quality of managerial decisions. According to Lopes et al., 2023, the automation of accounting processes increases organizational efficiency. Their study measures the acceptance of the software tool by accounting professionals, based on the Technology Acceptance Model (TAM). The study results show that factors such as age, gender, and opinions on the impact of RPA technology on the quality of financial information do not influence the acceptance of RPA technology. Training personnel to use RPA technology is essential to increase the level of acceptance of the technology. Farinha, Pereira and Almeida claim that software robots can be developed more quickly compared to other IT technologies and require fewer specialists for their implementation. (2023b) RPA technology can create new jobs within companies. Even though robots work on their own, a support team will still be needed to manage their setup and continuous monitoring. (Santos, Pereira and Vasconcelos, 2019) RPA technology is a new way to automate repetitive tasks, helping drive digital transformation through IT solutions (Willcocks, Lacity and Craig, 2017).

Gruia et al. claim that digital transformation is essential for organizations, but success depends on understanding its impact on their business models (2022). Innovating and digitalizing these models allows organizations to thrive in the digital economy Costa et al., 2021, in their study, show that RPA technologies and artificial intelligence play a very important and crucial role in Industry 4.0 by improving accuracy and automating repetitive processes. Digital transformation helps organizations stay competitive by adapting their business models to new technologies (Chirvase and Zamfir, 2024). According to Nurgul et al., 2023, they identified 5 stages of integrating repetitive processes: design, modeling, execution, monitoring and optimization. Ribeiro et al., 2021, in their study, show that RPA technology offers significant advantages in the digitalization and automation of management and organizational processes, using AI algorithms that enhance the accuracy and efficiency of information processing and process optimization. RPA technology, in combination with AI, can improve and increase the efficiency of operational and management processes. RPA is a new technology that can redesign, optimize, and automate procurement processes. However, its implementation in the supply chain management function lags behind other business functions. This delay is primarily caused by several obstacles, including existing IT infrastructure and the complexity of the processes. (Hartley & Sawaya, 2019; Viale & Zouari, 2020).

The implementation of this technology, according to Nurgul, referring to the model above, will be illustrated in Figure 1 below:

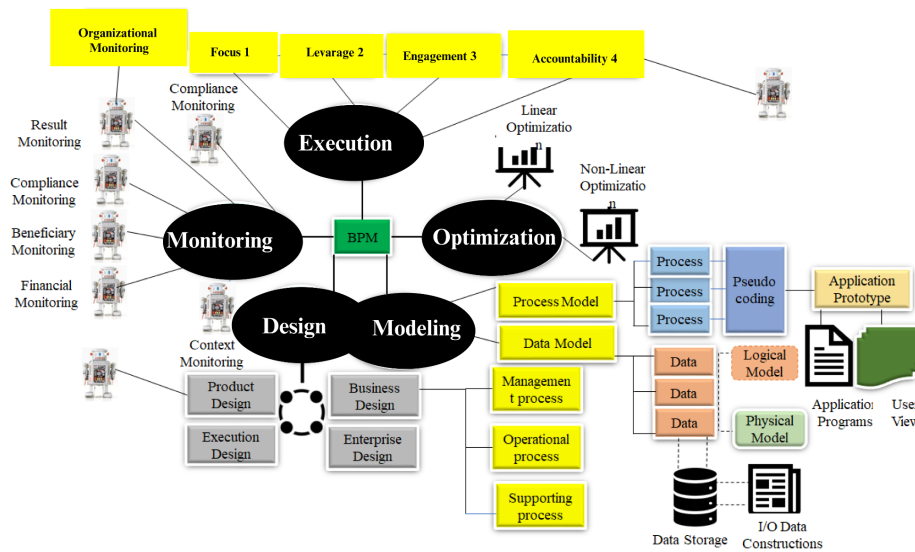


Figure 1. Adopted Nurgul et al., 2023 System model of RPA BPM

Source: authors' contribution

For the integration of technology within organizations, Nurgul et al., 2023 recommend 5 steps, namely:

Design process, which represents the development of new, scalable, and efficient processes to achieve the organization's objectives.

Modeling, which involves "as-is" and "to-be" processes, offering a more detailed view of how processes function.

Execution stage, which involves implementing the process automation model and configuring the robots within the physical or digital infrastructure.

Data monitoring stage, which involves the continuous and ongoing monitoring of data handled by the robots and identifying potential areas for process improvement to enhance performance.

Optimization, which focuses on cost reduction, eliminating bottlenecks, and improving process efficiency, as well as redesigning already automated processes.

Another study (Nirvikar et al., 2024) shows that RPA implementation cannot be applied to every type of organizational process (Table 1).

**Adopted from Katiyar et al, 2024 Summarizes
the key challenges in RPA implementation**

Table 1

Challenge	Description
Process Suitability	Not all processes are suitable for RPA, particularly those that are complex or require human judgment.
IT Infrastructure	RPA requires a robust IT infrastructure, including stable networks and secure data storage.
Governance and Control	Clear governance structures and control mechanisms are needed to manage RPA effectively.
Change Management	Implementing RPA requires significant changes to existing processes and job roles.
Scalability and Maintenance	Scaling RPA deployments and maintaining bots over time can be challenging.
Security and Privacy	RPA bots have access to sensitive data and systems, raising security and privacy concerns.

Source: authors' contribution

Process Suitability: Not all processes can be automated, and complex processes often require human intervention.

IT Infrastructure: RPA technology requires a solid IT infrastructure with stable networks and high-performance servers.

Governance and Control: A very clear structure is necessary for developing, testing, and monitoring robots.

Change Management: The implementation of technology directly produces changes within the organization, impacting internal roles.

Scalability and Maintenance: The increase in the number of automated processes generates challenges in maintaining and managing the robots.

Security and Privacy: This technology has access to sensitive organizational data and can affect critical information if there is no strict control and clear access rules in place.

Other studies (Enriquez et al., 2020) show that process automation using RPA technology has generated significant interest recently. A large portion of the studies conducted are theoretical or focused on specific fields, such as finance. The studies highlight a lack of technological solutions during the analysis phase, which are necessary to identify the most suitable processes for implementation. Research in the field of RPA has increased in the last decade, but the implementation of robots in practice lags behind theoretical developments (Chugh, Macht, and Hossain, 2022). Farinha, Pereira, and Almeida (2023) argue that Robotic Process Automation aims to eliminate human intervention in repetitive processes, which can be replaced by software robots. Robots are divided into two categories: unattended robots, which do not require human intervention and are fully automated and independent, and

attended robots, where humans intervene to activate the robots in certain scenarios or processes. RPA offers a digital transformation that helps organizations automate repetitive processes more quickly and streamline management and execution processes (Nawaz, 2019; Riedl & Beetz, 2019; Hofmann et al., 2020). Other studies show that RPA and artificial intelligence are transforming the global business landscape by increasing efficiency and reducing costs, supporting economic sustainability. Although there are challenges in implementing and integrating these technologies into existing IT infrastructure, particularly regarding data privacy, the benefits related to economic growth and innovation are significant.

2. Research question

In this research, we aim to analyze a vast body of literature on RPA technologies and their implementation within organizations, as well as their impact on organizations, specifically on management and execution processes. This research is guided by two essential questions:

RQ1: How can RPA automate repetitive processes and influence organizational efficiency?

This question examines how RPA can reduce human involvement and effort by automating repetitive processes, thereby contributing to increased organizational productivity.

RQ2: To what extent do challenges associated with RPA implementation, such as IT infrastructure and change management, affect long-term success?

The second question explores the identification of obstacles to RPA adaptation within organizations, focusing on technological preparedness and human resource management.

3. Research methodology. Findings and discussions

To answer the above questions, we will conduct a systematic review of the specialized literature using the PRISMA method. This methodology will ensure a more in-depth, transparent, and replicable analysis of the existing studies in the specialized literature regarding RPA technology. The methodology follows these steps:

Data sources: This involves a process of searching for relevant articles in academic databases, which include articles published in international journals: Scopus, Web of Science, Google Scholar, etc. The search for data sources was limited to works published between 2015-2024 to ensure the information is up to date.

Selection: Initially, 52 articles were identified, and then the most relevant papers were selected, where the main subject of the work included RPA implementation challenges, change management and RPA, IT infrastructure and RPA. From the 20 papers selected for a deeper analysis, articles that did not provide empirical evidence or case studies were excluded from the study.

Eligibility: The selected articles were evaluated based on eligibility criteria: the focus of the work was on RPA implementation in organizations, studies that discuss and prove that RPA is a beneficial technology for automating management and operational processes, as well as the challenges related to IT infrastructure and change management. Empirical studies representing experiences with implementing RPA technology in organizations, demonstrating its impact on organizational efficiency, were included.

Data extraction and synthesis were carried out systematically from the relevant and eligible studies, focusing on the research questions, namely: RQ1: How can RPA automate repetitive processes and influence organizational efficiency? RQ2: To what extent do the challenges associated with RPA implementation, such as IT infrastructure and change management, affect long-term success?

4. Findings and discussion

RQ1: How can RPA automate repetitive processes and influence organizational efficiency?

Recent literature demonstrates that RPA technology significantly enhances organizational efficiency by automating repetitive tasks across various departments. For example, in accounting, RPA can automate processes such as submitting monthly statements, verifying and validating customer invoices, and issuing invoices automatically. From our analysis, several key benefits were identified, including the reduction of human errors by automating tasks based on strict and clear rules, such as manual data entry into invoices from other data sources. This automation leads to fewer human errors and improved data accuracy within the organization.

RPA also significantly reduces the time required to complete tasks and lowers associated costs. Research shows that RPA can cut task processing time by 50% (Hartley and Sawaya, 2019) and reduce costs by decreasing the reliance on human resources for these processes. Additionally, RPA offers high scalability and flexibility, allowing companies to expand operations and double their processes without needing to increase employee numbers (Viale and Zouari, 2020). Lastly, it enhances organizational productivity by freeing up human resources previously engaged in repetitive tasks, allowing them to focus on more value-added processes that require creativity and human intervention (Syed et al., 2020).

RQ2: To what extent do the challenges associated with RPA implementation, such as IT infrastructure and change management, affect long-term success? The specialized literature used in our research highlights several challenges associated with implementing RPA technology in companies. According to Hartley and Sawaya (2019), many organizations face outdated IT infrastructure that cannot support RPA technology. The lack of integration between RPA and existing IT systems is a significant obstacle to successful implementation. Change management is another challenge, as organizational resistance to change remains one of the biggest obstacles, particularly in terms of human resources and organizational culture. People are often resistant to change, fearing job loss if processes are

automated. An effective change management strategy is essential for successfully implementing this technology (Hofmann et al., 2020). Moreover, Santos et al. (2019) highlight data security issues managed by robots, especially in industries like finance and healthcare, which complicates the process of automating tasks. Companies must implement strict security rules to prevent any issues that could arise when using this task automation technology.

5. Discussion

Our research findings provide valuable insights into RPA technology and its potential for implementation within organizations. The main benefit of RPA lies in reducing costs and processing time for repetitive tasks, eliminating human errors, optimizing processes, and enhancing organizational efficiency. Studies show that RPA technology can lead to significant improvements in productivity, contributing to increased competitiveness for companies. Reviewing recent specialized literature, several challenges in implementing RPA projects are highlighted. The biggest barriers are related to IT infrastructure and change management. Many companies attempt to implement this technology on outdated systems, which complicates the automation process. Employee resistance to change is a key factor in the implementation process, representing obstacles that must be carefully addressed and managed with a well-planned strategy. Based on data analysis, future research should focus on developing framework methodologies to facilitate the smooth integration of RPA technologies. In addition to its efficiency, RPA can be scaled to benefit businesses of all sizes, freeing up employees to focus on more important tasks. As businesses embrace digital transformation, RPA serves as a foundation for future integration with advanced technologies like AI. Organizations that adopt RPA and continuously improve their IT systems are more likely to remain competitive and adaptable in the evolving market.

Conclusion

The successful implementation of RPA technology continues to be a challenge, mainly due to outdated IT infrastructure and, on the other hand, fear of change or resistance to change from the human resources within organizations. Many organizations face difficulties in integrating RPA technology with existing software systems and outdated hardware. Additionally, problems arise from the lack of a solid strategy for implementing robots. Resistance to change by employees hinders the successful adoption of the technology. People fear losing their jobs due to the automation of processes, which is a major challenge during implementation.

Additionally, the shortcomings in RPA related employee training and RPA awareness among employees can also play a part in the resistance. When employees do not receive the correct and adequate training, as in how the automation would support the employee instead of replacing him, there is an increase in uneasiness among them which then makes it harder for integration to occur. Businesses cannot

do within their existing structure but must concentrate on change management and bring creativity into the organization. It should also be a two way communication about the effects of RPA to the employees and training them on how to use the new systems without harmonizing efforts, management of both personnel and machinery. In conclusion, RPA technology significantly improves the efficiency and productivity of organizations in the short, medium, and long term. Future research should focus on developing framework methodologies that help organizations overcome the barriers preventing the successful implementation of RPA, ensuring they can fully benefit from the advantages this technology offers.

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