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# Literature review on the implementation of Robotic Process Automation in healthcare and its social influence

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**Abstract**

This article presents a literature review on the implementation of Robotic Process Automation (RPA) in healthcare and its social influence. RPA is an emerging technology that automates repetitive and rule-based processes, providing greater efficiency and cost reduction. In the healthcare sector, RPA has the potential to transform administrative operations, improve data accuracy, and free up professionals to focus on patient care. This systematic review examines recent studies on the benefits and challenges of adopting RPA in healthcare, with a particular focus on its sustainability and social impact. The findings indicate that while RPA can offer significant operational and economic improvements, its implementation also raises ethical and social issues, such as the potential replacement of jobs and the need for workforce reskilling. It is concluded that a balanced and well-planned approach is essential to maximize the benefits of RPA in healthcare while mitigating its potential adverse consequences.


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## 1. Introduction

The healthcare sector faces an ongoing challenge, balancing the escalating demand for high-quality care with the imperative for operational efficiency and cost control. Technological advancements continually reshape the healthcare landscape, offering innovative solutions to address these pressing issues. One such technology with significant potential is Robotic Process Automation (RPA) [1].

RPA automates repetitive, rule-based tasks, thereby freeing up valuable human resources to focus on more complex, patient-centered activities [1, 2]. This technology has garnered considerable interest across various industries, and healthcare is no exception [3, 4].

This literature review delves into the implementation of RPA in healthcare, exploring its benefits and potential challenges. We examine recent studies to understand how RPA impacts operational efficiency, data accuracy, and ultimately, patient care [5]. Furthermore, we analyze the social implications of RPA in healthcare, with a focus on sustainability and the potential displacement of the workforce [6]. By critically reviewing existing literature, our aim is to provide a comprehensive understanding of the opportunities and considerations surrounding the adoption of RPA in the healthcare sector [6].

The automation landscape in healthcare is dynamic, with new technologies and approaches emerging continuously. RPA has become one of the most popular automation tools in the sector due to its ability to streamline a wide range of administrative and back-office tasks [7]. This liberation allows healthcare professionals to dedicate more time to critical activities such as direct patient care and innovative research [7].

By synthesizing findings from various sources, this review seeks to illuminate the transformative potential of RPA in healthcare operations. It highlights not only the operational efficiencies and economic benefits that RPA can bring but also the ethical and social considerations that accompany its adoption. These insights are crucial for devising a balanced approach to maximize the advantages of RPA while proactively addressing its potential challenges.

The central research question guiding this study is:

- **What is the social influence that exists from the implementation of Robotic Process Automation technology in the healthcare area?**

In conclusion, this literature review aims to contribute to the ongoing discourse on RPA in healthcare by offering a comprehensive analysis of its implementation, benefits, and social impacts. Understanding these facets is essential for healthcare organizations and policymakers striving to navigate the complexities of integrating RPA into their operational frameworks effectively.

The remainder of this paper is structured as follows: Section 2 will detail the research methodology employed in this study, outlining how the data was gathered and analyzed. Following this, Section 3 will synthesize and analyze the articles retrieved, summarizing key information about the models and works identified in relation to the research topic. Finally, Section 4 will present the conclusions drawn from the study, along with recommendations for future research endeavors to further explore and expand upon the findings presented in this paper.

## 2. Methodology

The approach used in this study involved analyzing a selection of important data sources. Throughout the research, relevant information pertaining to the topic was gathered, drawing from contributions by leading authors who have explored aspects of the theme. The articles collected and reviewed were accessed through the online "B-on" library database. This platform was chosen for its comprehensive coverage of peer-reviewed journals across various scientific disciplines. It includes publications from international scientific conferences indexed in ISI WOS and/or Scopus systems, making it one of the largest databases available. Researchers accessed this library, provided

by the Portuguese Foundation for Science and Technology, to conduct the search process for this study, focusing on three specified groups (Group 1, Group 2, and Group 3) detailed in Table 1.

- **Group 1:** "RPA" Or "Robotic Process Automation" Or "Intelligent Process Automation" Or "Tools Process Automation" Or "Artificial Intelligence In Business Process" Or "Machine Learning In Business Process" Or "Cognitive Process Automation".

- **Group 2:** "Medical" Or "Healthcare" Or "Medicine" Or "Health" Or "Medical Services" Or "Healthcare Services" Or "Medicine Services" Or "Health Services" Or "Medical Service" Or "Healthcare Service" Or "Medicine Service" Or "Health Service" Or "Medical and Healthcare Services" Or "Medical and Healthcare Service" Or "Medicine and Healthcare Services" Or "Medicine and Healthcare Service" Or "Medical and Health Services" Or "Medical and Health Service" Or "Medicine and Health Services" Or "Medicine and Health Service" Or "Medical Administrative Services" Or "Healthcare Administrative Services" Or "Medicine Administrative Services" Or "Health Administrative Services" Or "Medical and healthcare Administrative services".

- **Group 3:** 'Sustainability' or 'Sustainable' or "Social" or 'Social Sustainability'.

For four research trials, the "B-on" platform was used to search using three groups, employing the OR operator to connect either the Title or Abstract (AB) of the specified sets. Table 1 shows the number of articles identified in each research trial.

**Table 1.** Research tests performed through the "B-on".

| | Title | OR | Abstract (AB) | |
|---|---|---|---|---|
| **Set 1** | (Group 1 AND Group 2 AND Group 3) | OR | (Group 1 AND Group 2 AND Group 3) | n = 118 |

Following this, during the course of the research, a series of criteria were used to sift through the acquired publications, and the outcomes in terms of publication counts are outlined in Table 2.

**Table 2.** Publications obtained through the B-on, after the application of some filters.

| | **Set 1** |
|---|---|
| **Initial result:** | 118 |
| 1 - Restrict to: Peer Reviewed | 98 |
| 2 -Type of fonts: Academic Journals; Conference Materials; Books; Ebooks | 97 |
| 3 - From: 2010 to 2024 | 86 |
| 4 - Language: English | 48 |
| 5 - Restrict to: Full Text | 44 |
| **Final result:** | 44 |

After applying the filters, we conducted a review of the titles, key terms, and abstracts of each article to determine their relevance to the research topic. Initially, 118 papers were identified from the research. After applying the filters, we examined a total of 44 articles, of which only 18 were directly aligned with our research theme. The limited number of relevant papers can be attributed to many focusing on evaluating the establishment of a collaborative network, which falls outside the scope of this study. It's important to note that assessing network

formation differs from assessing an organization's participation or integration within a network. Figure 1 illustrates the flow of our literature search and the methodology employed in this research.

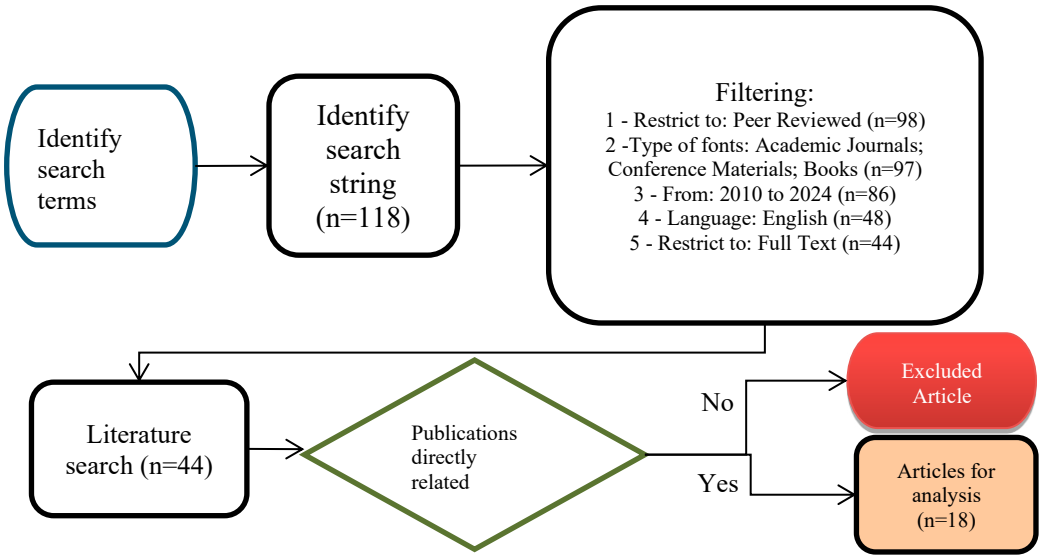


**Figure 1.** Flow diagram of literature search and respective screening.

## 3. Articles Synthesis and Analysis

This section provides a synthesis and analysis of the articles retrieved, focusing on those most relevant to the topic of this study. Table 3 displays the 18 identified articles along with the themes of the models they address.

**Table 3.** Comparative table of identified articles.

| Article | Sustainability | Social | Contribution |
|---|---|---|---|
| **[8]** | X | X | Literature review |
| **[9]** | X | X | Model |
| **[10]** | X | X | Framework |
| **[11]** | X | X | Model |
| **[12]** | X | X | Model |
| **[13]** | X | X | Literature review |
| **[14]** | X | X | Model |
| **[15]** | X | X | Literature review |
| **[16]** | X | X | Case study |
| **[17]** | X | X | Model |
| **[18]** | X | X | Framework |
| **[19]** | X | X | Case study |
| **[20]** | X | X | Literature review |
| **[21]** | X | X | Case study |
| **[22]** | X | X | Literature review |
| **[23]** | X | X | Model |

| | | | |
|---|---|---|---|
| **[24]** | X | X | Literature review |
| **[25]** | x | X | Model |
| **% Area p/ articles** | 100% | 100% | |

*3.1. Synthesis of the results*

Analysing the previous tables, it is possible verify the following remarks:

- **Operational Efficiency Enhancement:** RPA's role in streamlining administrative tasks and improving workflow efficiency.
- **Cost Reduction:** Economic benefits through reduced operational costs and resource optimization.
- **Impact on Data Accuracy:** Improving data quality and reliability in healthcare systems.
- **Patient Care Enhancement:** How RPA frees up healthcare professionals to focus more on direct patient care.
- **Technological Integration Challenges:** Issues related to integrating RPA with existing healthcare IT infrastructures.
- **Ethical Considerations:** Addressing ethical concerns such as patient data privacy and confidentiality.
- **Workforce Reskilling Needs:** Necessity for workforce training and skill development in response to automation.
- **Job Displacement Concerns:** Potential effects of RPA on healthcare job roles and employment stability.
- **Sustainability Implications:** Environmental impacts and sustainability considerations of RPA adoption.
- **Legal and Regulatory Compliance:** Adherence to healthcare regulations and legal frameworks with RPA implementation.
- **Patient Experience:** How RPA influences patient experience and satisfaction levels.
- **Risk Management:** Strategies for mitigating risks associated with RPA implementation in healthcare settings.
- **Long-Term Viability:** Assessing the scalability and long-term sustainability of RPA solutions.
- **Case Studies and Best Practices:** Successful implementations and lessons learned from real-world applications.
- **Interdisciplinary Collaboration:** Benefits of interdisciplinary approaches in optimizing RPA's impact on healthcare.
- **Policy Recommendations:** Guidance for policymakers on fostering responsible RPA adoption in healthcare.

- **Future Research Directions:** Areas requiring further exploration and research in RPA within healthcare.
- **Global Perspectives:** International trends and variations in adopting RPA across healthcare systems.
- **Educational Initiatives:** Promoting educational programs to prepare future healthcare professionals for RPA.
- **Social Acceptance and Perception:** Public perception and acceptance of RPA in healthcare contexts.

## 4. Conclusion

In conclusion, this literature review has explored the multifaceted landscape of Robotic Process Automation (RPA) in the healthcare sector, focusing on its implementation, benefits, and social implications. RPA emerges as a transformative technology capable of significantly enhancing operational efficiency, reducing costs, and improving data accuracy in healthcare organizations. By automating repetitive tasks, RPA liberates healthcare professionals to concentrate more on direct patient care and innovative endeavors, thereby potentially elevating overall patient outcomes and satisfaction.

Following the central question that presided over this work, we conclude that the implementation of Robotic Process Automation (RPA) in healthcare has significant potential to optimize administrative operations, improve data accuracy and free up human resources for more complex and patient-centered tasks. However, the introduction of RPA also brings with it ethical challenges, such as protecting the privacy of patient data and concerns about the socioeconomic impact, including potential job replacement and the need for retraining. To maximize the benefits of RPA while mitigating its risks, it is crucial to adopt a cautious and strategic approach, incorporating robust ethical standards, appropriate reskilling policies, and ongoing dialogue with all stakeholders involved in the healthcare ecosystem.

However, alongside its promising benefits, the adoption of RPA in healthcare necessitates careful consideration of ethical, social, and practical challenges. The ethical concerns surrounding patient data privacy, the potential displacement of healthcare jobs, and the imperative for workforce reskilling highlight the need for a balanced approach to implementation. Addressing these issues requires collaboration among stakeholders—healthcare providers, policymakers, technologists, and educators—to ensure that RPA integration aligns with regulatory standards, preserves ethical integrity, and promotes sustainable practices.

From a social perspective, the introduction of RPA prompts broader discussions on societal readiness and acceptance of automation in healthcare settings. Public perception, coupled with proactive educational initiatives and transparent communication, will be pivotal in fostering trust and acceptance of RPA technologies.

Looking forward, continued research is essential to further explore the long-term impacts of RPA on healthcare systems globally. Future studies should delve into interdisciplinary collaborations, policy frameworks, and innovative approaches to maximize RPA's benefits while mitigating potential risks. By doing so, we can harness the full potential of RPA to advance healthcare delivery, uphold patient-centric care, and navigate the evolving landscape of digital transformation responsibly.

In essence, while RPA offers promising solutions to current healthcare challenges, its successful integration requires a conscientious approach that prioritizes patient welfare, ethical standards, and societal well-being. By addressing these complexities proactively, stakeholders can pave the way for a more efficient, sustainable, and inclusive healthcare future.

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