West Science Interdisciplinary Studies
Vol. 1, No. 06, February 2023: pp. 84 - 93

Examining the Effects of Robotic Process Automation on Operational Efficiency and Business Process Optimization (Literature Study)

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ABSTRACT

This research study investigates the influence of Robotic Process Automation (RPA) on operational efficiency and business process optimization. The study adopted a systematic literature review approach to collect and analyze relevant academic articles, industry reports, and conference proceedings. Findings reveal that RPA implementation significantly improves operational efficiency by automating repetitive and rule-based tasks. This automation reduces manual effort, minimizes errors, and speeds up process execution, leading to increased productivity, faster response times, and cost savings for organizations. RPA also contributes to business process optimization by streamlining workflows, eliminating bottlenecks, and standardizing processes. Standardized execution of tasks through RPA improves process efficiency, quality, and visibility, allowing organizations to make data-driven decisions and continuously optimize their operations. However, challenges such as process complexity, employee resistance to change, integration issues, and data security concerns need to be addressed for a successful RPA implementation. Organizations must develop a comprehensive implementation plan, establish a governance framework, and foster a culture of collaboration to overcome these challenges. The practical implications derived from this research offer guidance for organizations that are considering or implementing RPA solutions. Recommendations include conducting a thorough process analysis, developing a comprehensive implementation plan, establishing governance mechanisms, encouraging collaboration, and continuously optimizing processes. While this study provides valuable insights into the impact of RPA on operational efficiency and business process optimization, it acknowledges the limitations of the research, such as the reliance on literature up to September 2021 and the subjectivity of the data analysis.

Keywords: *Robotic Process Automation, Operational Efficiency, Business Process Optimization, Literature Study, Systematic Review.*

1. INTRODUCTION

In today's highly competitive business landscape, organizations are constantly looking for innovative approaches to improve operational efficiency and optimize their business processes. One such approach that has gained significant attention is Robotic Process Automation (RPA). RPA involves the use of software robots or bots to automate repetitive, rule-based tasks that are typically performed by humans. These software robots are designed to mimic human actions and interact with various digital systems and applications, allowing organizations to streamline operations, reduce costs, and improve overall performance. RPA implementation can provide several benefits to businesses, including increased productivity and efficiency, reduced costs, and improved accuracy and consistency. However, it is important to address challenges related to workforce, IT governance, privacy and security, system sustainability, and measurement of RPA success. A holistic approach to address all the key aspects that organizations need to be aware of in terms of security, compliance, and auditability is highly recommended.

Robotic Process Automation (RPA) is a technology that automates repetitive and rule-based tasks, allowing employees to focus on more complex and value-added tasks. RPA has gained tremendous popularity among IT leaders over the years due to its ability to save time and money[1]. However, RPA implementation also has several challenges related to workforce, IT governance,

privacy and security, system sustainability, and measuring RPA success[2]. One of the main benefits of RPA implementation is increased productivity and efficiency, and reduced costs3. RPA can also improve accuracy, consistency, and customer and employee satisfaction[3]. However, it is important to note that RPA implementation can lead to employee dismissal or the need for retraining[3]. In terms of security, RPA bots handle sensitive data and transmit it across business-related systems for various processes.

Therefore, it is important to ensure that sensitive data is properly secured to prevent exposures that could impact the business1. A holistic approach to address all the key aspects that organizations need to be aware of in terms of security, compliance, and auditability is recommended[4]. To ensure effective adoption of RPA in accounting, it is important to understand the start-to-end process by which RPA is implemented in the accounting function. This includes examining the workforce, IT governance, privacy and security, system sustainability, and measurement of RPA success[2].

RPA is an emerging technology that can be adopted by organizations to achieve various automation goals in the form of accuracy, efficiency, increased productivity, and reduced operational costs. RPA can be used across a wide range of industries and business processes, and offers several benefits to businesses. Along with the need for organizations to accelerate the use of digital technology, RPA can support the automation of business processes in accordance with the rules of work performed by humans. Robotic Process Automation (RPA) is an emerging technology that is widely used in sectors such as human resources, healthcare, finance, accounting, manufacturing, higher education, and supply chain management, among others[5]. RPA, also known as "software bots", replace manual, rule-based, and repetitive tasks that humans perform. These software bots are currently evolving to become more sophisticated, mimicking human activities and enabling humans to accomplish higher-value tasks. Therefore, RPA impacts the overall operational efficiency in organizations through various aspects through its integration with employees, existing technology and infrastructure, and business processes[5].

RPA can support the automation of business processes according to the rules of work performed by humans. RPA is a new technology that can be adopted by organizations to achieve various automation goals such as accuracy, efficiency, increased productivity, and reduced operational costs2. The Covid-19 pandemic has brought changes to every organization to be able to make changes quickly and adaptively. Organizations need to accelerate the use of digital technology that has an impact on changing business processes[6].

RPA offers several benefits to businesses, RPA is less prone to errors, which can improve accuracy in business processes. RPA can perform tasks faster than humans, which can improve efficiency in business processes. RPA can reduce the size of manual workloads, which can reduce operational costs. Execution time through RPA is faster than tasks performed by human employees, which can increase productivity in the organization. RPA follows rules and keeps an audit trail, which can improve compliance in business processes[5].

RPA can be used in various industries and business processes. In banking, RPA can be used to automate business processes in various work units ranging from operations, human capital, finance, compliance, and others[6]. RPA can also be used to optimize financial processes for small and medium-sized companies preparing for IPO[7]. Finance, RPA can be used to support portfolio management and automate financial processes4. RPA can be used to optimize cost management

systems for the implementation of strategic management accounting to support management decision making[8]. RPA can be used to automate repetitive tasks such as data entry, claims processing, and appointment scheduling[5]. RPA can be used to automate repetitive tasks such as data entry, inventory management, and quality control[5].

Robotic Process Automation (RPA) is a technology used to automate, maintain, analyze, and update existing databases in a cost-effective and error-free manner[9]. RPA is a valuable tool in banking and financial institutions, and has demonstrated various benefits for various organizations[10]. RPA can reduce repetitive tasks in banks and help reduce operational costs by 30% - 70%2. RPA can also reduce labor by hiring responsible Bot workers, which then saves operational costs and improves task efficiency and accuracy[10]. In healthcare, RPA can be used to automate patient registration, which can speed up and streamline processes, improve customer satisfaction, and provide a competitive advantage[9]. RPA can also be used to schedule doctor visits and deliver all pertinent information to the doctor with a single click[9]. RPA can automate loan processing by collecting customer information, loan approval, loan monitoring, and automatic loan pricing, which can help reduce prices and save time[10]. RPA can also be used to detect fraud and keep an eye on growing trends in the payments world[10]. RPA impacts the overall operational efficiency in an organization through various aspects through its integration with employees, existing technology and infrastructure, and business processes3. RPA reduces IT burden as it does not interfere with the underlying legacy systems, increases reliability, reduces the size of manual workloads, and improves compliance[5]. Tasks performed through RPA are accurate as they are less prone to errors, and the productivity level of the organization increases as the execution time through RPA is faster than tasks performed by human employees[5]. RPA was also introduced as a low-code technology that uses drag-and-drop functionality with little to no programming knowledge[5].

Robotic Process Automation (RPA) is often adopted by organizations motivated to reduce costs, improve efficiency, productivity, and quality of service[11]. Strategic benefits: RPA can help organizations achieve their strategic goals by improving their ability to innovate, respond to market changes, and gain competitive advantage[11]. Managerial benefits: RPA can provide real-time data and insights to managers, enabling them to make better decisions and improve their ability to manage processes and resources[11]. Organizational benefits: RPA can help organizations improve their overall performance by reducing errors, increasing compliance, and improving customer satisfaction[11].

Operational benefits: RPA can automate repetitive, rule-based operations, freeing employees to focus on more complex and creative tasks, which can improve job satisfaction and employee retention[12]. Unexpected benefits: According to exploratory case studies, there are several unexpected benefits that add to the anticipated benefits during the pre-introduction, introduction, and operational stages of RPA implementation[11]. Benefits in specific domains: For example, in a study conducted by Calva and Alfaro, the implementation of an RPA system at Core Andina Group helped increase the average percentage of registered e-invoices and reduce the average percentage of rejected e-invoices[13]. To ensure the success of an RPA initiative, it is important to consider key success factors such as having clear, well-defined, and unchanging

processes, aligning the goals of the RPA initiative with the strategic goals of the organization, selecting the right processes for automation, and performing change management[12].

The adoption of RPA has witnessed substantial growth across industries, with organizations realizing its potential to revolutionize their operational capabilities. By automating routine and mundane tasks, RPA allows employees to focus on more strategic and value-added activities, thereby increasing productivity and efficiency. In addition, RPA offers the flexibility to scale operations based on demand, leading to improved customer service and reduced response times. Given these potential benefits, it is imperative to examine the effect of RPA on operational efficiency and business process optimization. The main objective of this literature review is to examine the effect of Robotic Process Automation on operational efficiency and business process optimization.

2. LITERATURE REVIEW

A. Operational Efficiency and Business Process Optimization

Operational efficiency refers to an organization's ability to minimize waste of resources, reduce costs, and maximize output while maintaining quality standards[14]. It involves streamlining processes, removing bottlenecks, and improving overall productivity[15]. Business process optimization, on the other hand, focuses on improving the effectiveness and efficiency of specific business processes to achieve strategic goals and deliver value to customers[16].

Theoretical models and frameworks related to operational efficiency and business process optimization provide a foundation for understanding the concepts and principles underlying these areas. Several established frameworks can be used, such as the Lean Six Sigma approach, Total Quality Management (TQM), Business Process Reengineering (BPR), and Theory of Constraints (TOC)[17]. These frameworks emphasize the importance of eliminating waste, continuous improvement, standardization of processes, and alignment of processes with organizational goals.

B. Robotic Process Automation (RPA)

Robotic Process Automation (RPA) involves the use of software robots or bots to automate repetitive, rule-based tasks typically performed by humans[18]. RPA technology allows organizations to create software robots that interact with various systems, applications, and data sources, mimicking human actions and decision-making processes[19]. RPA can be applied to a variety of processes across different departments, including finance, human resources, customer service, and supply chain management[20].

The theoretical foundation of RPA can come from various fields, including computer science, artificial intelligence, and automation. Concepts such as cognitive automation, machine learning, natural language processing, and process mining contribute to the understanding and development of RPA capabilities[21]. In addition, theoretical frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) can be used to examine factors that influence the adoption and implementation of RPA within organizations.

C. Relationship between RPA, Operational Efficiency, and Business Process Optimization

Robotic Process Automation has the potential to significantly impact operational efficiency and business process optimization[22]. By automating repetitive and rule-based tasks, RPA reduces manual effort, minimizes errors, and speeds up process execution[23]. This automation allows employees to focus on higher-value activities that require creativity, critical thinking, and decision-making skills, thereby improving overall productivity and operational efficiency[16].

Additionally, RPA enables organizations to optimize their business processes. Task automation through RPA streamlines workflows, eliminates bottlenecks, and reduces process cycle times[14]. By standardizing processes and ensuring consistent execution, RPA helps achieve process efficiency, quality improvement, and cost reduction[24]. The increased visibility into processes facilitated by RPA also enables organizations to identify areas for improvement, make data-driven decisions, and continuously optimize their operations.

Theoretical frameworks and models related to operational efficiency and business process optimization provide a lens through which to analyze the relationship between RPA and these concepts. By reviewing existing literature, this research will explore how RPA implementation affects operational efficiency and contributes to business process optimization. The findings will be synthesized and analyzed to provide a theoretical understanding of the impact of RPA on operational performance and offer insights for successful implementation.

3. METHODS

This research method adopts a systematic literature review approach to examine the influence of Robotic Process Automation (RPA) on operational efficiency and business process optimization. The systematic review methodology ensures a comprehensive and objective analysis of the relevant literature, enabling the identification of key themes, trends, and factors affecting RPA implementation.

The data collection process involves searching and selecting relevant literature from academic databases, industry reports, and conference proceedings. The search strategy will use appropriate keywords related to RPA, operational efficiency, and business process optimization. The inclusion and exclusion criteria outlined in the literature review section will be applied to select high-quality and relevant publications. The data analysis process consists of several stages:

Data Extraction: Relevant information will be extracted from the selected literature, including authors, year of publication, research objectives, methodology, key findings, and insights related to RPA, operational efficiency, and business process optimization.

Data Synthesis: The extracted data will be synthesized and organized based on thematic analysis. Similar themes, concepts, and findings will be grouped to identify patterns and trends in the literature.

Framework Analysis: The synthesized data will be analyzed using a framework approach. Theoretical frameworks related to operational efficiency, business process optimization, and RPA will be used as a lens to interpret and analyze the findings. This analysis will involve mapping the identified themes and concepts onto the theoretical framework to understand their interrelationships and implications.

Cross Validation: Findings and interpretations will be cross-validated by multiple researchers involved in the study to ensure objectivity and reliability. Any discrepancies or differences in interpretation will be resolved through discussion and consensus.

4. RESULTS AND DISCUSSION

Analysis of the selected literature on the effect of Robotic Process Automation (RPA) on operational efficiency and business process optimization revealed several key findings:

1. Improved Operational Efficiency: RPA implementation is consistently associated with improved operational efficiency. By automating repetitive and rule-based tasks, RPA reduces manual effort, minimizes errors, and speeds up process execution. This automation enables organizations to achieve higher productivity, faster response times, and cost savings.

2. Streamlined Business Processes: RPA contributes to business process optimization by streamlining workflows and eliminating bottlenecks. Task automation through RPA standardizes processes and ensures consistent execution, leading to improved efficiency and process quality. RPA also provides greater visibility into processes, allowing organizations to identify inefficiencies, make data-driven decisions, and continuously optimize their operations.

3. Better Customer Experience: RPA enables organizations to provide a better customer experience by reducing process cycle times and improving service quality. Automation of customer-facing processes, such as order processing and customer support, through RPA enables faster response times, accuracy, and personalized interactions. This will increase customer satisfaction and loyalty.

Cost Reduction: RPA implementation can result in significant cost savings for organizations. By automating tasks previously performed by humans, organizations can reduce labor costs, minimize errors and rework, and optimize resource allocation. RPA also allows organizations to scale operations based on demand, thus avoiding the need for additional human resources during peak periods.

Challenges and Barriers: The literature highlights several challenges and barriers to successful RPA implementation. These include the complexity of process automation, resistance to change from employees, integration issues with legacy systems, data security concerns, and the need for ongoing maintenance and monitoring of RPA solutions.

Discussion of Findings

Findings from the literature review show the significant impact of RPA on operational efficiency and business process optimization. Task automation through RPA not only increases productivity and reduces errors, but also enables organizations to optimize their processes, improve customer experience, and achieve cost savings[7].

The streamlined business processes facilitated by RPA lead to improved process efficiency, standardization, and reduced errors[25]. By automating routine and repetitive tasks, employees can focus on higher-value activities that require creativity and critical thinking, ultimately contributing to improved operational efficiency[26].

Additionally, the implementation of RPA enables organizations to improve their customer experience by reducing response time, ensuring accuracy, and providing personalized interactions.

This customer-centric approach results in increased customer satisfaction and loyalty, which ultimately drives business growth[7].

However, the literature also highlights various challenges and barriers to successful RPA implementation. These challenges include the complexity of process automation, resistance to change from employees, and integration issues with existing systems. Organizations should address these challenges by investing in appropriate change management strategies, providing training and support to employees, and ensuring compatibility and integration of RPA solutions with existing IT infrastructure.

In addition, the findings also emphasize the importance of ongoing maintenance and monitoring of RPA solutions to ensure their continued effectiveness. Organizations should establish a governance framework, establish robust data security measures, and regularly assess the performance of RPA solutions to address potential risks and maintain operational efficiency.

Practical Implications

The findings from this literature review have practical implications for organizations that are considering or currently implementing RPA solutions. The following recommendations can be derived from the analysis:

1. Conduct a thorough process analysis: Before implementing RPA, organizations should conduct a detailed analysis of their processes to identify tasks that are suitable for automation. This analysis should consider factors such as task volume, complexity, and frequency to determine the potential benefits of RPA implementation.

2. Develop a comprehensive implementation plan: Organizations should develop a well-defined implementation plan that includes change management strategies, employee training, and a phased approach to RPA implementation. This plan should address potential challenges and ensure smooth integration with existing systems.

3. Establish governance and monitoring mechanisms: Organizations should establish a robust governance framework and monitoring mechanisms to ensure the continued effectiveness and security of the RPA solution. Regular performance assessments, data security audits, and proactive maintenance are essential to maximize the benefits of RPA.

4. Foster a culture of collaboration: To overcome resistance to change and ensure a successful RPA implementation, organizations must foster a culture of collaboration and engage employees in the process. Involving employees from the early stages of implementation, providing training and support, and communicating the benefits of RPA can help gain employee buy-in and minimize resistance.

5. Continuously optimize the process: RPA should be seen as a catalyst for continuous process improvement. Organizations should regularly assess and optimize their automated processes, leveraging data and insights from RPA analytics to identify areas for further improvement and innovation.

By following these recommendations, organizations can harness the potential of RPA to improve operational efficiency, optimize business processes, and drive sustainable business growth.

5. CONCLUSION

In conclusion, this research study aimed to examine the effect of Robotic Process Automation (RPA) on operational efficiency and business process optimization. A systematic literature review revealed several key findings and insights. The findings show that RPA implementation has a significant positive impact on operational efficiency. By automating repetitive and rule-based tasks, RPA reduces manual effort, minimizes errors, and speeds up process execution. This automation leads to increased productivity, faster response times, and cost savings for the organization. In addition, RPA contributes to business process optimization by streamlining workflows, eliminating bottlenecks, and standardizing processes. Task automation through RPA enables organizations to achieve higher process efficiency, improved quality, and increased visibility into their operations. These factors collectively contribute to better overall business performance. The literature review also highlighted the importance of considering the challenges and barriers associated with RPA implementation. Automation of complex processes, resistance to change, integration issues, and data security concerns were identified as potential barriers. Organizations should address these challenges through appropriate change management strategies, employee training, and a strong governance framework.

The practical implications of this research provide guidance for organizations that are considering or implementing RPA solutions. Conducting a thorough process analysis, developing a comprehensive implementation plan, establishing governance mechanisms, fostering collaboration, and continuously optimizing processes are recommended strategies to maximize the benefits of RPA. It is important to acknowledge the limitations of this research study. These findings are based on literature available up to September 2021, and new developments beyond that timeframe may not have been considered. In addition, the analysis and synthesis of the literature is subject to interpretation.

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