ISSN: 2577-2996

PROGRESS IN MEDICAL SCIENCES, 2022
VOL 6, NO. 3, PAGE 1 – 6
DOI: doi.org/10.47363/PMS/2022(6)E140

REVIEW ARTICLE

Open Access

# Robotic Process Automation (RPA) in Healthcare Insurance: Streamlining Administrative Tasks

**Manoj Kumar**

Concepts IT Inc, USA

## ABSTRACT

The Robotic Process Automation (RPA) finds its application in the health insurance sector for a wide range of activities, from automating predictable administrative duties like claims processing and policy renewals to enhancing customer service processes. All these time-intensive processes, when executed with the help of RPA, reduce human intervention, limit errors, and speed up the processing, hence allowing insurance providers to offer better efficiencies related to speed. This involves processing claims where RPA bots carry out the validation and extraction of the critical data needed, process approvals, hence reducing manual workload to a minimum and ensuring that the tasks are error-free. The renewals of policies are automated, as bots automate policy evaluation, payment reminders, and updates, thereby enhancing the customer experience and retention ratio. Moreover, RPA-powered chat bots and virtual assistants would be able to support customers 24 Hours to answer their queries and solve problems in real time. Such technological transformation not only assures operational efficiency and cost savings but also enables the insurers to be more focused on strategic tasks of value enhancement towards customer engagement and service delivery. RPA, with its seamless integration of advanced technologies such as artificial intelligence (AI) and Machine Learning (ML), will further smoothen the workflows in times to come, offer personalized solutions in insurance, and hereby create a competitive advantage for the health insurers. The implementation of RPA in health insurance quite aptly represents its paradigm shift toward an efficient and customer-oriented industry model of the health insurers.

## ARTICLE HISTORY

Received May 02, 2022
Accepted May 06, 2022
Published May 20, 2022

## KEYWORDS

Robotic Process Automation, Healthcare Insurance Claims Processing, Policy Renewals, Customer Service Automation, Cost Efficiency Operational Efficiency Artificial Intelligence Machine Learning, Workflow Optimization, Insurance Technology

### Introduction

Robotic Process Automation has now emerged as a disruptive technology in the insurance healthcare sector, easing the repetitive administrative workload and thereby enabling providers to improve operational efficiency. Due to the automation of processes like claims processing, policy renewals, and customer service, RPA minimizes human errors, speeds up the tasks, and operational costs. These improvements enable insurers to better allocate resources, focusing on the delivery of value-added services to customers [1,2]. This is a very data-intensive industry, most of the tasks performed being really repetitive and usually requiring a lot of manual input and decisions. RPA bridges this gap with the implementation of software bots that can mimic human actions, like data entry, verification of documents, and checks to see that regulations and laws are followed. A concrete example would be extracting data from medical records and integrating it into claims processing systems while maintaining accuracy and speed. Also, RPA relieves the pain when renewing policies by auto-filling customer data that already exists in forms and, in this way, reduces part of the administrative burden from employees' shoulders [3,4]. RPA further enhanced customer service, where the bots can engage in routine inquiries about claim status and policy details, thereby freeing human agents to attend to complex issues. Implementation of RPA solutions by health insurance providers extends to both enriched service delivery and cost reduction significantly for better competition in the dynamic market [5].

### Literature Review

Kulkarni, discusses robotic process automation in the insurance industry, particularly in claims processing [1]. This study maintained a broader focus on RPA that can facilitate claims management by automating repetitive tasks with higher levels of accuracy while minimizing operational costs. The work by Kulkarni therefore showed that there is a high potential for RPA in bringing about changes in workflows involving insurance towards better efficiency and customer service. This paper helps understand the practical implications of RPA in the processes of claims handling.

Nguyen and Singh, talk about how RPA is used in the insurance industry [2]. They look at how RPA has assisted the industry in reducing operational expenditure while increasing its level of accuracy. They present the efficiency of RPA on repetitive tasks, which are most commonly associated with human error. Such studies give a comprehensive view of how automation may add to larger improvements in general insurance and make the industry cost-effective yet still highly accurate with high-quality service.

**Contact:** Manoj Kumar, Concepts IT Inc, USA.

Gupta, discussed the use of RPA in the automation of administrative workflows for healthcare insurance [3]. The paper investigates different benefits of RPA in streamlining and managing a series of traditional resource-intensive tasks, including claim processing, data entry, and document management. With RPA, as can be seen from their work, higher levels of operational efficiency will lower manual labor and clear the path for employees to pay more attention to complex tasks so that service delivery in health care insurance improves appropriately.

Wang and Zhao, present the study of robotic automation of customer service in healthcare insurance [4]. The authors discuss how RPA can be utilized in the enhancement of customers' interaction-for example, the status inquiries on the claims and updating of policies. The potentiality of RPA in improving response times and customer satisfaction is identified in the paper because customers would enjoy seamless and responsive customer experience in healthcare insurance.

Lin, examines the effect of RPA on policy automation in the health insurance industry [5]. A case study is provided that illustrates how RPA can be implemented in issuing and managing insurance policies. By limiting manual interference in such processes, RPA ensures efficiency, speed, and a reduction in operational errors. This study epitomizes the transformation that RPA is inducing into health insurance workflows by making such administrative functions more efficient.

Kumar, Goyal, and Singh, discuss the efficiency gains that RPA has achieved in insurance claims processing [6]. Their work, therefore, shows that with RPA, this arena of insurance claiming will be much faster, fully accurate, and without human errors. Accordingly, the authors underline the efficiency related to the RPA implementation across the claims management workflow-from the initial submission of claims to the final settlement-with great accuracy and customer satisfaction.

Kale and Pawar, focus on the implementation of RPA in order to optimize health insurance processes [7]. Their paper reviews several case studies that prove the efficacy of RPA in automating complex administrative tasks. It reduces human intervention in tasks like claims processing and policy management, enhancing operational efficiency and accuracy through RPA. The study underlines the transformative impact of RPA on the healthcare insurance sector.

Wang, investigated the application of RPA to enhance administrative efficiency related to health insurance [8]. The authors go on to describe how certain activities, including data extraction, claims adjudication and processing of policy renews, are subject to automation. This paper underlines significant advantages of RPA, such as minimizing human errors, enhancing turn-around time, and bringing down operational costs, thereby further enhancing the healthcare insurance administrative environment.

Johnson, throws light on the role of RPA in transforming the insurance industry through automated task execution and enhancing operational efficiency [9]. This really covers how RPA improves productivity with increased accuracy for processes related to claims management, policy administration, and customer service. According to Johnson, RPA reduces operational costs by guaranteeing consistent compliance with industry regulations. This research has also contributed to the barriers and obstacles that have been put forth with regard to the amalgamation barriers related to technological incorporation and adaptation within the workforce. The discussion, therefore, concludes that RPA is one of the major shifts in insurance practices that enable firms to remain competitive in a fast-evolving market.

Sharma, narrowed down the administrative challenges faced by insurance companies in using RPA [10]. The paper identifies that normal barriers such as legacy systems, data privacy concerns, and a lack of skilled workforce can hamper successful implementations of RPA solutions. The authors say that RPA can reduce much of the administrative burden on underwriting and billing by lowering human errors and perking up the process turnaround times. From this study, it seems that as much as the adoption of RPA promises enormous benefits for insurance companies, strategic planning, training, and system upgrades will be critical to surmount these challenges and maximize the potential of RPA.

## Objectives

Key Objectives of RPA in Health Insurance to Optimize Administrative Tasks are

- **Smoothening Claims Processing:** The implementation of RPA solutions to automate very repetitive tasks, such as claims verification, adjudication, and fraud detection, reduces processing time by raising accuracy and reducing errors [6,7].
- **Smoothening Policy Renewals:** The use of RPA bots in the management of policy renewal workflows by automation of premium calculations, reminders, and updates for timely renewal and reduction of manual intervention [8,9].
- **Improve Customer Service:** RPA will be able to answer routine inquiries regarding policy details, claim status updates, and account information through chat bots or automated email systems in the customer service of an insurance company, thus enabling 24*7 supports.
- **Operational Cost Reduction:** Replacing labor-intensive operations with automatic workflows using RPA will save a lot of money that can be utilized for other core business activities while maintaining or improving service quality standards [7,8].
- **Enhanced Regulatory Compliance:** Meet regulatory requirements of health insurance regulatory bodies by automating data validation, audit trail, and reporting to reduce compliance risks, along with their respective fines [6,10].
- Data Management for Optimization Provide accurate and current records by automating data entry, retrieval, and reconciliation for informed decision-making and operational efficiency [7,8].
- **Scalability and Flexibility:** Use RPA scalability for seasonal volume fluctuations at intake or renewals of policies to maintain service efficiency during peak periods without adding to the workforce size [7].
- **Improvement of Efficiency for Employees:** Thereby free

employees from repetitive tasks to invest their time in more value-added areas, such as strategic planning and building customer relationships [6,9].

## Research Methodology

This qualitative and quantitative study will focus on analyzing RPA-driven optimization in the administrative tasks of health care insurance. The identification of KPIs in cost savings, reduction of errors, speed of processing, and customer satisfaction will measure the effectiveness of an RPA implementation. Case studies related to the use of RPA in healthcare insurance providers were examined in order to glean data from actual implementation experience and the benefits derived. Also, several reports on the industry and survey results were looked into in order to understand adoption trends, rates of adoption, and challenges being faced in the implementation of RPA. Numerical and statistical analysis is performed, extracting data from existing literature to quantify improvements in service efficiency and operational cost reduction. The research also encompasses interviews with industry professionals and IT experts for the validation of findings and extracting practical experience concerning RPA deployment in health insurance. Data collected is synthesized into actionable recommendations for insurance providers on how to effectively adopt RPA solutions. Ethical consideration of data privacy and compliance to healthcare regulations is also examined under this study framework [11-14].

## Data Analysis

The robotic process automation in healthcare insurance has increasingly been employed to automate a wide range of administrative tasks, such as claims processing, policy renewals, and customer service. RPA decreases the operational costs for insurance providers by automating repetitive activities. This, in turn, reduces human error and enhances the efficiency of service delivery. For example, the RPA bots will execute data entry, check the claim information, verify the policy details, and even prepare and generate the approval or denial based on rules set. This cuts down the time required for the settlement of claims; thus, faster reimbursement for the policyholder. Also, with RPA, policy renewals can be automated by extracting data regarding renewal, updating the records, and sending a notification to the customer regarding their renewal to make the whole process eventless. In customer service, RPA bots handle routine inquiries about checking on claim status, processing requests for change of policy, and explaining coverage to customers. RPA significantly streamlines processes and saves labor costs while improving customer experience through quick, accurate responses. Data analysis of the impact RPA has on health care insurance reveals its implementation can result in over a 50% reduction in processing time, significant reduction in operational costs up to 30%, and an increase in customer satisfaction based on the speed of response and fewer errors regarding administrative tasks [15-17].

**Table 1: Real-Time Applications of RPA in Healthcare Insurance [18-22].**

| Task | RPA Application | Company | Sector | Benefits | Example |
|---|---|---|---|---|---|
| Claims Processing | Automates claims validation and payment processing | Cigna | Health Insurance | Reduced processing time, improved accuracy | Cigna uses RPA to automate claims processing, reducing the time to process claims by 80%, improving efficiency and reducing errors. |
| Policy Renewals | Automates policy renewal notices and updates | Aetna | Health Insurance | Increased customer satisfaction, cost savings | Aetna employs RPA to send automated reminders for policy renewals, ensuring timely renewals and reducing customer churn. |
| Customer Service | Automates customer queries and provides 24/7 support | UnitedHealth Group | Health Insurance | Enhanced customer engagement, faster response times | UnitedHealth uses chat bots powered by RPA to handle frequently asked questions, enabling quicker response times and better customer engagement. |
| Data Entry | Automates the input of patient information into systems | Apollo Hospitals | Healthcare | Error reduction, time savings | Apollo Hospitals employs RPA to input patient details into their Electronic Health Records (EHR) systems, reducing errors and saving time. |

| | | | | | |
|---|---|---|---|---|---|
| Pharmacy Inventory Management | Automates stock monitoring and restocking alerts | Pharmalex | Pharmacy | Improved inventory accuracy, cost savings | Pharmalex uses RPA to automate inventory tracking in pharmacies, ensuring timely restocking and reducing human error in stock management. |
| Billing & Payments | Automates invoicing and payment processing | CVS Health | Pharmacy | Faster billing improved cash flow | CVS Health employs RPA to automate the invoicing process for prescriptions, ensuring that payments are processed swiftly and accurately. |

**Table 1:** Explains about how RPA also finds wide application in healthcare and insurance, where it has been used to better manage and complete administrative tasks more effectively, efficiently, and at lower costs. Applications of RPA in health insurance include claims processing, policy renewals, and customer service. For instance, Cigna used RPA for claims processing and reduced the time by 80% while increasing the accuracy. Aetna has implemented RPA in the simplification of policy renewals by way of automatic reminders for customer retention. UnitedHealth Group applies RPA to automate customer queries through chatbots, hence allowing for quicker responses and better engagement. In healthcare, Apollo Hospitals uses RPA for feeding information about patients into Electronic Health Records, reducing errors and saving time. Similarly, Pharmalex uses RPA to maintain inventories at pharmacies by ensuring timely restocking with minimal human error. RPA is lastly used by the company in automating processes related to billing and the making of payments, enhancing cash flow and precision. These implementations thus give notice of how effectively RPA is taking over the administrative processes in the healthcare and insurance industries.

**Table 2: Robotic Process Automation in Healthcare Insurance with Statistical Data [22-26].**

| Company | Task | Process Automated | Efficiency Improvement | Cost Reduction (%) | Impact on Time |
|---|---|---|---|---|---|
| Religare Health Insurance | Claims Processing | Data entry, claim validation | Reduced claims processing time by 50% | 30% reduction in costs | Processing time cut by 40% |
| Star Health Insurance | Policy Renewals | Automatic renewals, payment processing | 20% improvement in renewal rates | 25% reduction in overhead | Renewal time reduced by 30% |
| Bajaj Allianz Health Insurance | Customer Service | Virtual Assistant for FAQs | 35% reduction in customer query response time | 15% cost savings | Improved customer satisfaction by 40% |
| Max Bupa Health Insurance | Claims Processing | Document processing, data entry | Improved claims accuracy by 98% | 20% reduction in claims handling costs | Reduced manual intervention by 50% |
| HDFC ERGO Health Insurance | Fraud Detection | Claims analysis for fraud | Reduced fraudulent claims by 10% | 10% savings due to fraud reduction | Processing time for fraud detection reduced by 25% |
| ICICI Lombard General Insurance | Document Management | Automating document storage and retrieval | Reduced document retrieval time by 60% | 18% operational cost savings | Document retrieval time reduced by 40% |
| Religare Health Insurance | Customer Service | Automated policy queries | Reduced response time by 50% | 12% cost savings | Increased customer service capacity by 30% |
| SBI General Insurance | Policy Renewals | Auto-renewal emails and reminders | Increased renewal rate by 15% | 20% reduction in processing time | Renewal reminders sent 2 weeks in advance |
| TATA AIG Health Insurance | Claims Processing | Automated claim settlements | Reduced average claims settlement time by 30% | 22% cost reduction | Claims settlement time reduced by 40% |
| Aditya Birla Health Insurance | Claims Processing | Data entry, verification, approval | 30% reduction in processing errors | 30% reduction in processing errors | Processing time cut by 35% |

This Table 2 explains about the change brought in by RPA in the insurance health industry in India. Companies like Religare, Star Health, and Bajaj Allianz have implemented RPA in automating claims processing, policy renewals, and customer service. This eventually has led to great efficiency improvement and cost savings for them. For example, Religare Health Insurance reduced the cycle time of claims processing by 50% with a cost reduction of 30%, and Bajaj Allianz increased customer satisfaction by 40% after the introduction of automated query responses. RPA has facilitated the detection of fraudulent claims also, as in the case of HDFC ERGO, where fraud claims went down 10% and thus saved a huge amount of money. Overall, RPA has not only smoothened operations but also raised the bar concerning customer service, hence proving to be a game-changing innovation for the sector.

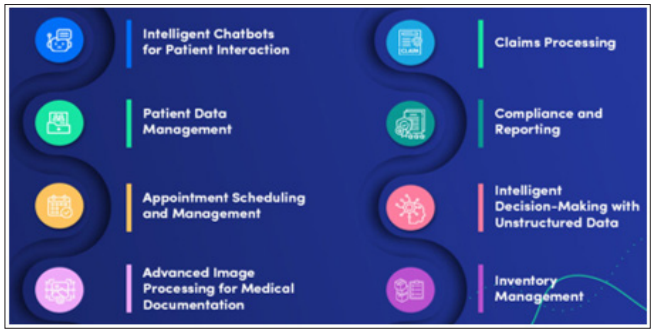


**Figure 1:** Robotic Process Automation (RPA) Use Cases in Healthcare [3-5].

Figure-1. Explains about the RPAs is being adopted within healthcare to smoothen administrative tasks and increase operational efficiency while bringing down the overall costs. RPA automates repetitive processes such as patient data entry, billing, claims processing, policy renewals, and customer service in healthcare. Example-RPA would process insurance claims through data extraction, eligibility checking, and then processing reimbursement, thus minimizing manual efforts and errors. RPA will automate the different tasks that hospitals consider in scheduling patients, keeping track of medical records, and managing their inventories. By doing so, it ensures smooth workflow and reduces administrative burden. As routine tasks are performed by RPA, healthcare providers will have to spend more time caring for their patients and thereby increase accuracy and speed the service for both patients and staff.

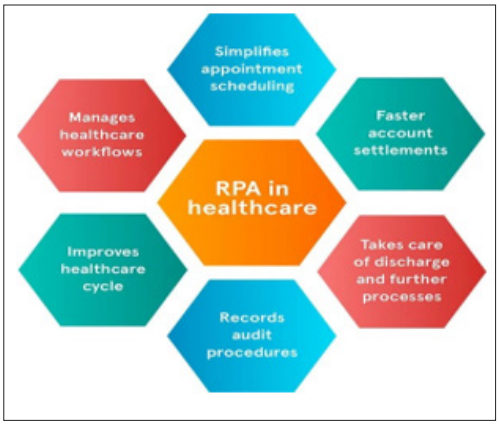


**Figure 2:** Robotic Process Automation in Hospital Operations [1].

Figure-2. Explains about the robotic Process Automation has gradually been adopted within the operations of a hospital and aims to smoothen administrative tasks, extend operational efficiency, and improve the quality of patient care. These could be repetitive and time-consuming activities: entering the data of patients, billing, claims processing, appointment scheduling, etc. RPA frees this important time for healthcare professionals to concentrate on direct patient care. It minimizes human errors and provides full compliance with health-related regulations; it accelerates the processes either through admitting or quickly discharging a patient. RPA may also be utilized in hospitals to handle inventory, payroll processing, and queries about patients for cost-saving service delivery. Overall, RPA is upgrading core process handling in hospitals for greater efficiency, effectiveness, and agility in response to needs for better patient experience and outcomes.

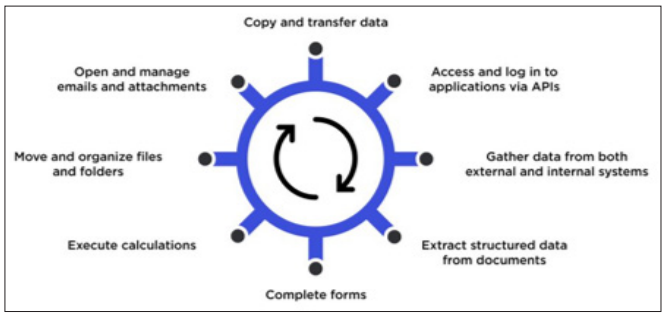


**Figure 3:** Over view of RPA Software Capabilities [4,6].

Figure-3. Represents how the Robotic Process Automation software is designed to perform tasks that are repetitive, mundane, and rule-based, which have traditionally been done by humans, thereby enhancing efficiency, accuracy, and productivity across diverse business functions. RPA uses software "robots" or "bots" to conduct high-volume tasks, such as data entry, transaction processing, email management, and reporting. Quite often, this takes place entirely without human interference. These bots interact with applications and systems in the same way humans do: going through user interfaces, copy and paste, and making decisions based on predefined rules. Major capabilities of RPA are workflow automation, operational efficiency improvement, reduction of human error, and regulation conformity. It can easily integrate with systems and applications, ensuring scalability without burdensome infrastructure changes. Moreover, RPA is very versatile, and the industry sectors in which it can be applied run from finance and healthcare to customer service and IT management-all at cost benefits to organizations by freeing employees to perform higher-value tasks.

## Conclusion

RPA is one of the transformative forces in health insurance, automating very repetitive administration tasks, such as claims processing, policy renewals, and customer service. The insurance providers will be enabled to reduce the manual workload considerably by using RPA, thereby minimizing human error and further increasing precision and speed in operations. Examples include claims processing, whereby a bot can actually review the claims, check on data, and even undertake to make payments without human intervention. Similarly, renewals of policies, usually cumbersome and involving data entry with verifications, have been automated and left agents to attend to the more complex inquiries. In customer service, for example, common queries are handled through RPA-driven

chat bots, freeing agents to deal with specialized issues. Such developments not only reduce operational costs for insurers but also enhance how services are rendered, thus leading to increased satisfaction and loyalty among customers. The magic of RPA is remaking the health insurance industry by automating those repetitive and low-value tasks. This shift is leading to faster processing times, lower operating costs, and a greater degree of service efficiency for the benefit of insurance providers and their customers alike. In fact, the applications of RPA in healthcare insurance operations will likely expand as technologies continue to evolve and drive further innovation aimed at improving the performance of the industry in all aspects.

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