



# Exploring the Potentials of Robotic Process Automation: A Review

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## Abstract

*We are living in a world where every person wants to speed up their work with minimal effort. Sometimes we have irksome and repetitive tasks that require a lot of labour and time, and the solution to our trouble is automation. In 1946, the term "Automation" was coined. Now we can see that it has immensely impacted our lives, not a single day goes by without making use of it. This review article explores the ideas, uses, advantages, and difficulties of Robotic Process Automation (RPA) in an effort to give a thorough understanding of the field as it is today. This paper focuses on the revolution of automation in every field and the way it helps boost business, improve customer satisfaction, and relieve staff. It delves into the diverse applications of RPA in different industries. It will elucidate the area of implementation and the use cases, challenges, and benefits. It will also examine the sectors deploying RPA, such as banking and finance, healthcare, education, manufacturing, purchase and supply management, and digital forensics, and the outcomes observed by them. In conclusion, the review paper serves as a comprehensive analysis of the potential of RPA by examining its components, implementation, efficiency, and use cases in different industries. It focuses on understanding the idea behind RPA, its implementation, the features of RPA that can help them strengthen their business growth, such as affordability, reliability, scalability, consistency, compliance, and accuracy, and the significant opportunities for streamlining business processes.*

## Keywords

*Robotic Process Automation, Digital Transformation, Industry 4.0, RPA Challenges, RPA Benefits*

## 1. Introduction

The world is moving towards digitalization, and the use of information systems and emerging technologies is increasing [1]. To cope with social, industrial, and economic needs, industries are adopting the latest emerging technology. Disruptive in-



dustries are playing a big role in the change by enhancing and developing new technologies. Digital Transformation (DT) has been expedited by the COVID-19 epidemic. Organizations had to completely rethink how they conduct business in order for the economy and services to remain open and for customers and users to continue to receive services and products from them. [2] With growing digitalization, the need for automating tasks increases. The most recent and widely used method of automation is robotic process automation [3]. As organizations, institutions, firms, and people are linked and exchanging information via electronic means, attending to and processing all the information in time is becoming tough for humans. RPA can provide solution with artificial intelligence techniques and algorithms provides better and smoother execution of automated tasks [1]. The health care, telecommunications, financial, and institutional industries are more focused on optimizing their back-office tasks [4]. Industry 4.0 is aiming to increase the use of new and advanced features of AI and automation [1].

Robots and automation are not new advances or concepts in the environment of digital transformation. In recent years, corporate attention has been inclined towards the transformation of their systems by including automation [5]. One can differentiate between RPA and traditionally used automation methods by comparing RPA with a driverless automated car and traditional automation with a remote-controlled car. The RPA services are collated with the stereotypical software bot, where each bot works as an actual employee with their own personal workspace. It makes use of the input device's actions, such as keyboard and mouse controls, and executes the automated task accordingly. The actions of the bots cannot be seen on the physical screen; they run in a virtual environment. It works as if it was using the physical systems, but it has no control over the physical devices. It interprets the electronic movement and actions taking place on the screen. In the legacy automation systems, good knowledge of APIs and programming languages was required as the tasks were programmed at the back-end so that they could be automatically performed based on the rules and conditions programmed in the system. For this type of approach, integration into the existing software infrastructure needs to be done without affecting the system's workflow. This is not the case with RPA; its inclusion in the software is not needed; it interacts at a human employee level. In contrast to legacy automation, the workflow can be configured with a graphic user interface (GUI), eliminating the need for skilled programmers for the coding. This is one of the potential features of RPA that attracts firms to it [6,7]. The paper is an overall review of robotic process automation. It focuses on understanding the idea behind RPA, its implementation, and how it affects the technique of working and the way RPA is becoming hype.

## 2. Literature Review

Agencies all around the world, including technology for communication, amenities, monetary services, along with healthcare care, which are all fiercely competitive and are constantly under pressure to reduce costs in their back offices [4]. Companies are currently making investments in technological advances that allow them to meet consumer demands and needs quicker and more effectively [8]. It's crucial to achieve a balance between cost effectiveness and other performance criteria, such as superior customer service, corporate enablement, adaptability, stability and conformity, is crucial. Automation, which includes software robots, is one of the transformation levers that may turn low-performing back offices into high-performing ones [4]. The fundamental idea behind automated manufacturing and industry 4.0 is the adoption of AI by robots to carry out intricate jobs, cut expenses, and increase the standards of goods and amenities [1]. RPA is best employed with highly standardized, rules-based, reliable, and mature processes where costs are obvious and commercial value is well recognized. RPA practitioners have automated more than 35% of their back-office processes, according to the study [4]. While workflow management (WFM) has existed for several years, it was a costly strategy of automation compared to RPA [3]. One of the most untrustworthy variables is thought to be human error, but after it has been eliminated, consistency, proficiency, and standard of workmanship all naturally increase [8]. Traditional automation relies on coding rather than training, which is the key distinction between RPA and it. Members of the organization can train robots, which is one of RPA's key benefits [9]. The

objective is to design user-friendly interfaces that are easy to comprehend, tailored to the requirements of the end users, and usable by virtually anybody with a basic grasp of IT [10].

According to a survey by International Market Analysis, the robotic process automation (RPA) segment would probably generate more than 5 billion USD in sales by 2024. According to Gartner, the projected global revenue for RPA software in 2021 will be 2 billion dollars. This sector is expanding and becoming more significant for businesses and the economy at large scale. According to Gartner, the pandemic context has increased the application of these devices. By 2022, it was predicted that 90% of large companies globally would adopt this technology in some capacity, enabling digitally essential company procedures and making staff members free from tedious labor to perform strategic tasks [2]. Companies using RPA see reduced costs and increased operational effectiveness. Conventional IT-based process automation developments aim to improve the efficiency of current, subpar systems and processes by transforming or altering them. Consequently, they will surely change the current technological framework [11, 10]. Every business must now focus on cost efficiency and scaling up in order to remain profitable [12]. RPA tools, on the other hand, tend to have minimal IT requirements and, for instance, don't interfere with underlying computer systems. No fundamental system modification is needed because the robots access end-user computer systems in the same way that a person does—through the user interface (UI) with a predefined restricted access process [10] and Customers note substantial, multiple, and frequently concurrent advantages in areas such as cost, process correctness, regulatory compliance, speed, reliability, error reduction, and improved client satisfaction [4].

Software robots have been utilized in a variety of industries, such as chatbots that help users find relevant data online by accepting voice or keyboard inputs. In the past few years, there has also been some interest in straight-through processing (STP), a version of RPA that is still in its nascent stage. RPA, as opposed to STP and Chat bots are a development of earlier screen scraping solutions that attempted to visualize data from older programs that lacked automated interfaces in order to organize this type of information using newer user interfaces. The advantage of RPA is that it interacts with current programmes much like a human user would, rather than replacing them or changing their code [13].

The main task of RPA is to identify elements in It is not restricted by frame dimensions as a result, enabling more "intellectual" and fluid communication with a graphical user interface (GUI) that can link different interaction components. RPA software has the benefit of only interacting with other software when necessary to allow people to see the presentation layer. This layer is not included in the 7 layer Open Systems Interconnection (OSI) model, which outlines the way applications interact with networks [14]. The presentation level manages data compression, the encryption method, and translation between programmes. For RPA, interacting with the programme after it has been converted to a human-readable format is required [6].

Here, we'll examine the many advantages and downsides of employing RPA while also taking into account potential industry adoption.

### 3. Robotic Process Automation

RPA is a process to replace humans with software bots to perform monotonous tasks [6]. The repetitive tasks are faultlessly performed with the assistance of AI workers and software bots. It behaves as a user and operates at the user interface [1]. RPA is becoming a new form of automation in business processes. It is one of the most prevailing technologies of the 21st century and has given a new mechanism of work to all businesses [6]. It can be stated as a proficiency that results in the automatic fulfilment of directorial, scientific, or commercial jobs, utilizing the knowledge engineering and robotics as a "set of techniques concerning the operation and use of automata (robots) in the execution of multiple tasks in place of man. RPA is an umbrella term for tools that operate on the user interface of other computer systems" [1]. The task can be easily explained in steps to the software bot by recording the screen and defining the variables. It can almost do all the operations at



the user's end, e.g., switch to different applications, copy, paste, open emails, etc. No modifications to the IT infrastructure need to take place for RPA integration; instead, it operates it. It works on AI algorithms and machine learning capabilities [1].

The RPA can process the jobs in the background and is not affected by other running applications. The Graphical User Interface was formerly used by humans to perform such tasks, but it results in greater chances of errors. The solution to the problem is RPA, which records all the actions of the user, imitates the input patterns while interacting with the GUI, and provides speedy and error-free output [15]. RPA aims at improving efficiency and reducing repetitive tasks. It uses automatic theorem proving, an artificial neural network algorithm, intelligent data retrieval, natural language processing, and text mining techniques to boost functionality [1]. The workflow of RPA is shown in Figure 1 [12].

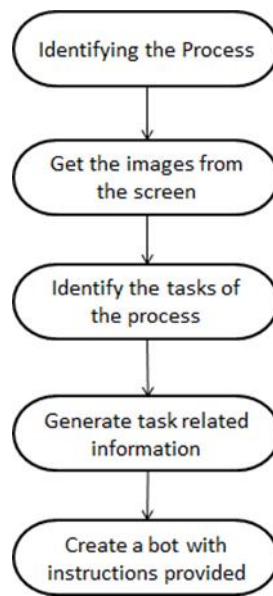


Figure 1. RPA Workflow.

### 3.1. Components

There are three main components of robotic process automation environment. They are also known as RPA bots or software robots. The arrangement of these components may change depending on the objectives of the firm. In actuality, only two parts are necessary. One is a studio to create automation instances and another is a robot that can instantly execute the instances that are already accessible [16].

#### Studio

An RPA studio is in charge of setting up the workflow that will be followed by the bots that will imitate human behavior. It gives users the ability to plan, design, and automate the workflow that bots will carry out. The bots may be configured by business users thanks to their straightforward scenario creation interface and recording and playback capabilities [3].

#### Orchestrator

The orchestrator is a tool for managing robotic process automation [16]. The bots must be scheduled, managed, watched over, and audited by the RPA orchestrator. Application Programming Interfaces (APIs) are a method for integrating the bots with applications from other developers [3]. It provides overall control and administration and combines all automated robotic processes systems under one roof [16].

## Bots

The artificial workplace will use RPA bots to complete tedious and routine manual labour. It is committed to handling a pile of unproductive activities so that staff members may concentrate on crucial work and problem-solving. Attended and unattended bots are the two basic categories into which the bots can be divided. While unattended bots are set up to operate completely autonomously in the background, attended bots are designed to collaborate with human users and require human triggers. This kind of bot can be programmed to launch and run automatically when triggered by a fulfilling circumstance or a business event and is dedicated to operating without the involvement of a human [3].

The figure 2 shows the connection between the components and the sequence for designing the process flow using the RPA tools [3].

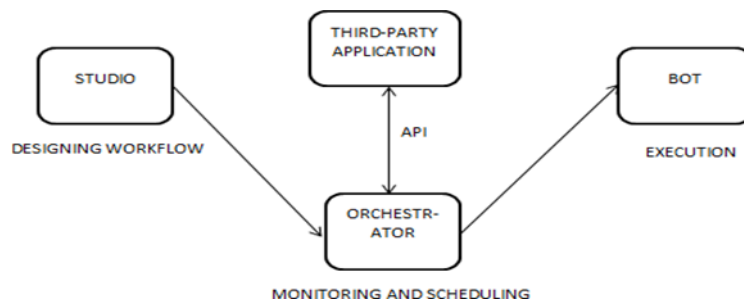


Figure 2. Components of RPA.

## 3.2. Operations

### The operations of RPA are listed below:

**Handling information:** All organizations are producing a ton of content. As data collection, analysis, and report generation become more complicated in everyday operations, manpower may be needed. Robotic process automation can only assist businesses and organizations in hastening the consolidation of applications and the integration of legacy applications by transferring content or establishing connections to legacy systems more quickly and easily [17]. Unstructured information culled from many systems could be gathered and organized using RPA applications to ensure that AI can leverage it for big data analytics. [7]

**Legitimate Corporate development:** Business processes will change significantly with the new RPA technology. A software robot can be utilized to carry out a procedure as instructed without improper data gathering, dishonest interference, or drifted from the specified method. [7] Robotic process automation has made it possible for enterprises to drastically boost their efficiency with which they utilize workers by supplementing a more sustainable workforce with a dependable, effective, and affordable digital workforce. This enables businesses to cut expenses, minimize mistakes, and get rid of risk [17].

**Web Scraping/spiderbot:** Robotic process automation streamlines the gathering of content in all forms from a variety of sources using a range of equipment. It involves automated software designed to gather material from online sources and then condense it in accordance with the user's needs using robots for automated aggregation of web resources [18]. Text, image, audio, and video formats are all possible. By using deep learning techniques, this robotic process automation technology can collect deep web data. Additionally, the mining process will be completed with the aid of artificial intelligence, big data analytics, and other online analytics [17]. An individual may easily grasp an idea with a small quantity of information rather than reading a lot of details because of the content aggregation [18].

**Screen Recording:** RPA employs a variety of artificial intelligence (AI) and machine learning (ML) methods, including vis-

ual recognition and optical character recognition (OCR) [3]. RPA provides web recording which is a process of identifying user activities made in a web browser as well as desktop recording to identifying user actions made in a desktop user interface. [13] It supports the supervised development using the application of ML techniques in conjunction with the OCR files and the evaluation of the material in e-mails because a set of previous knowledge is used to categorize and check the information within them [1].

### 3.3. Types of RPA Robots

Data robots, Authentication robots, system integration robots, and scheduled robots are the four examples of the bots activity used by the organizations [19].

**Table 1.** Types of RPA Robots.

Type	Features
Data robots	<ul style="list-style-type: none"> <li>• It involves transferring data from a destination to another through copying.</li> <li>• It can be used for cleaning and transforming data in accordance with many specified business requirements [19].</li> <li>• These robots may also be used for transforming document formats or encrypting files.</li> <li>• Examples: data caching, authentication with cryptographic methods, processing voice into text, etc. [5].</li> </ul>
Authentication Robots	<ul style="list-style-type: none"> <li>• Authentication robots were introduced to quickly legitimize money movements. [19]</li> <li>• They are able to communicate with the system to efficiently validate credentials and keep a record of RPA accessibility sessions [12].</li> <li>• This process is unstable because these robots can change responsive and inaccurate operations into unresponsive and accurate operations.[19]</li> </ul>
System Integration Robots	<ul style="list-style-type: none"> <li>• When two firms merge, systems integration robots are employed to connect systems like the core systems.</li> <li>• Regardless of the location, system integration enables an organization to merge challenging bills without the need for custom development.[19]</li> <li>• It entails actions such as posting and modifying information [5].</li> </ul>
Scheduled Robots	<ul style="list-style-type: none"> <li>• Simple tasks that must wait until a specific event occurs are carried out by programmed robots since they have been programmed to do so, unlike people who are prone to forgetting. [19]</li> <li>• They used to link pieces according to the designed workflow.</li> <li>• The procedures use cycles and are triggered by events [5].</li> </ul>

## 4. RPA Tools

Robots are significant guides in programmable mechanization. Subsequently, a robot ought to be insightful on the off chance that it needs to imitate human abilities. To achieve an errand, both the mind and the body must be composed. So a competent robot should have man-made consciousness that will separate it from another machine [20]. AI calculations and machine

learning (ML) approaches have been effectively used in a variety of everyday situations like trade, industry, and computerised administrations. ML is used to "educate" machines the way to operate with information accurately, mimicking the educational approach of human beings. The following is typically accomplished with AI computations, illustrating the ideal frameworks or strategies of rational qualities like connecting theory, genetic traits, indicators and estimates, in terms of cases, etc. It is possible to explore and separate data using artificial intelligence (AI) algorithms and the ML technique with the goal to streamline, categorize, anticipate, identify designs, and other things. Given the extent of the appropriateness of AI, RPA has continuously been adding to its robotization highlights executions of calculations or AI procedures applied in specific settings to group, perceive, sort, etc. [1]. In AI, contamination by humans is reduced and the likelihood of reliability is increased. Considering AI robots reduce the risks associated with human errors, this is its main advantage. AI robots are used to address issues, both man-made and natural. Over the duration of a consistently regulated life—people work for approximately four to six hours each day—man-made intelligence is accessible. It is typical for people to have some downtime to recharge and be ready for the next day. AI bots, on the other hand, are accessible around-the-clock, without much of a break or exhaustion, unless, in rare circumstances. In scenarios where the bot has broken or is out of order, that is the point at which it tends to be inaccessible. Digital collaborators are embraced at many sites to give clients the data they expect consistently. A few computerized chat bots are intended to not be able to recognize whether they are conversing with humans or chatbots [19].

#### 4.1. UiPath

A tool called UiPath enables the construction of RPA functions within its framework for writing and running programming scripts, enabling it to be configured with a collection of components and several plugins for the customization of business processes [1]. UiPath began as a service provider in the year 2005. They created an industry-standard platform for designing and instructing virtual assistants as their popularity in the market grew. In 2013, they introduced their initial RPA application [8]. In its current form, three components make up the UiPath Tool: Studio, Robot, and Orchestrator, which enables the future coordination of robots. The UiPath Studio element is a tool that facilitates the creation and upkeep of connections among robots, as well as the ease of information transfer along with other robotic operations and queue control. Additionally, it makes process planning, modelling, and implementation possible [1]. To construct customized methods for the programming library, users may benefit from Microsoft Visual Basic.NET or C# [8].

#### 4.2. Automation Anywhere

Another RPA process-focused application, Automation Anywhere, has the unique ability to tell users about the applicability of AI techniques and algorithms. The RPA system includes capabilities for integrating data analysis into RPA processes as well as a cognitive machinery module. Being a versatile program, it provides a set of information that makes it possible to configure, use, and apply RPA procedures. They employ advanced cognitive resources called intelligence bots and linguistic bots, which are used to make judgements in unorganized activities [8]. To extract information from documents and subsequently increase the effectiveness of document validation, the Automation Anywhere tool internally implements a number of artificial intelligence techniques and algorithms, including fuzzy logic, artificial neural networks, and natural language processing [1]. This business has a large number of customers since they provide the most affordable RPA licenses [8].

#### 4.3. Kofax

Kofax creates software for businesses and organizations that automates processes. The software programme comes with a number of modules geared towards RPA, business process orchestration using procedural software activity flows,



document recognition (using OCR procedures), and advanced data analysis [1].

This tool allows the functioning of operational streams across computer applications in order to expedite processes associated with enterprise resource planning (ERP) data systems. Data can be extracted from documents, other sources (web, e-mail, local files), and various other sources in different formats and designs [1].

#### 4.4. Blue Prism

Blue Prism's goal is to create software that may be used to improve the effectiveness and suitability of connections. The apps were created utilizing HTML, Java, and CITRIX. The primary emphasis was on targeting the executive back office because they noticed an enormous gap in the market for automation. This programme's setup mechanism allows users to automate a certain procedure by simply placing and dragging assembled objects [8]. They conclude that in order for artificial intelligence and sentiment evaluation to readily integrate with company procedures and provide significance, there must be a connected organizational structure. processing using rules and digitally organized inputs, for example, fraud detection or enabling debit and credit cards [17].

### 5. RPA in Different Fields

#### 5.1. Additive Manufacturing (AM)

Industry 4.0 is changing the way we work, and AM is using emerging technologies in the manufacturing process. AM uses robotic process automation to streamline their design work and increase its flexibility. The process requires following the design principles for AM, thus making it suitable for automation. While designing, the design engineer does not have an actual estimation of factors like cost estimation, quality performance, and process time, which is provided by the process engineer after analyzing it using computer-aided manufacturing tools. By using automation and computer-aided design, the model's cost and quality factors are computed with less human intervention. The idea behind RPA implementation in the AM process was to simplify the framework and reduce cost, speed, and execution time. The AM processes are triggered with the Computer Aided Manufacturing (CAM) tools and provide time for designers to focus on creative processes. It can reduce up to 15% of the total time consumed by the traditional method. With this approach, not only the time but the design iterations and cost can be reduced as well [21].

#### 5.2. Banking and Finance

The banking sector is encountering a multitude of demands nowadays, and providing coherent and cost-effective services to gain consumers' trust is one of the main objectives. RPA not only enables them to achieve these objectives but also helps them to withstand the growing competition and evolution. Data management has been improved, and the information can be fetched easily. The reduction of manual data entries results in more precise and dependable output in less time with the use of workflow automation software [12]. An individual account has access to numerous services like withdrawals, deposits, and loan details; maintaining all these records manually would be difficult with increasing digitalization, where one can use these services anytime. Replacing employees with RPA helps with better record management in less time and helps handle millions of transactions at the backend. RPA can interact with customers and respond to their queries in 19 different languages. [22]. The Optical Character Recognition (OCR) feature of RPA enables it to extract information from pictures and text for different operations and records [12]. This approach has been used in agriculture banking, treasury, trade, forex, etc. RPA has refined the traditional banking techniques, and it fulfils all the objectives for better functioning [22].



### 5.3. Digital Forensic

Digital forensic (DF) research aims to carry out the actions in the digital database and provides reliable and precise results. This field requires logical and decision-making capabilities for the investigation, so RPA is deployed for the pre-processing task that doesn't require any intelligence. It saves the investigator from data handling and processing and facilitates their full concentration on the logical tasks. RPA can export the files, import the files, do hash analysis, make a list of crime keywords, and the like. The bots are able to communicate with Autopsy software for forensic purposes and trigger the digging by keywords. They can also be implemented in Griffeye, where they load files and extract images. RPA can replace DF technicians and practitioners [6].

### 5.4 Education

The responsibility of educating the next generation falls excessively on educational institutions. In order to encourage the development of digital skills and give students the tools they need to live active and creative digital lives, educational institutions must integrate these technologies. Social connection and customization to each student's unique learning requirements and talents are essential components of modern education. It may be necessary to use artificial intelligence (AI) and machine learning (ML) approaches to streamline tasks in education. AI has the capacity to plan, strategize, and reach effective conclusions in the face of uncertainty. ML has the ability to raise student interest levels, enhance interaction between educators and learners, and beyond. The cloud-based programme, web application, or mobile apps allow users to interact, cooperate, and communicate through a variety of channels in order to create more unbiased grading systems. From enrollment to graduation, smart education manages student data in an effortless manner. [23, 14] The use of automated schooling helps to get rid of paperwork and manual procedures. Among other things, the programme can be used for enrollment, participation, conference and event organizing, sending an email, projects, assessments, administration, and accounting. The manual data processing used by traditional educational systems takes a lot of time and puts the employees in a difficult situation. [14] The teachers' responsibilities for managing attendance, assignments, study materials, and keeping parents informed prohibit them from focusing on each student individually. Automation may be able to address some of the problems with the current educational system. A personalized learning experience can be provided by AI that has been fed and educated by big data. Teachers can acquire new insights into the various learning styles of their pupils and offer advice on how to adapt their teaching strategies to suit their particular needs. In the closed world of education, students and teachers are now utilizing a variety of learning strategies and methods of knowledge absorption to enhance their educational experiences. In the rapidly changing field of education technology, chatbots and AI tools have changed the game. Personalized learning can be accelerated and scaled by AI [14].

### 5.5. Purchase and Supply Management

The digitalization of purchase and supply management (PSM), which frequently falls behind other business operations due to increased competition and cost pressure, is a top investment goal for enterprises. Due to this, robotic process automation (RPA), a revolutionary technological advancement, is rapidly being used to restructure, improve, and automate the procurement process. The transformation of the emphasis and functioning of procurement departments is accelerated by digitalization and emerging technologies. RPA technology is increasingly being regarded by both experts and practitioners as a cutting-edge, essential component of the Industry 4.0 digital transformation. As a corporate function that manages the supplier base, the PSM function evolves from a largely operational and transactional, reactive, and supportive position to one that becomes increasingly proactively involved and fully incorporated. PSM professionals



must therefore learn new skills, like automation knowledge and a willingness to adopt new technologies. The solution streamlines supplier integration and demonstrates strong connectivity to numerous software programmes, addressing lacking gateways and operational voids between diverse ERP and e-procurement platforms.

There are four organisational PSM digitalization maturity levels: Basic electronic procurement systems are included in the first level. Through the use of electronic data interchange (EDI) and applications that are web-based, these platforms are incorporated. Organizations begin to use more sophisticated technologies for transaction management at the second level of PSM digitization, which also lowers barriers to further adoption. To consolidate those interventions within the organization and broaden the extent of their application, internal oversight procedures and effectiveness metrics are built at the subsequent level.

For the procurement function, organizations that have reached the fourth level of PSM digitization use mature, cutting-edge technology that generates broad value and promotes external collaboration through relationship management and supply- market awareness [11].

## 5.6. Healthcare

In terms of employment and money generation, the healthcare sector is one of the biggest in any nation. It includes things like medical equipment, clinical studies, health insurance, etc. In any healthcare system, it can be difficult to manage and process data that is dispersed across numerous internal and external sources, including clinical applications, lab information systems, third-party portals, insurance documents, radiology information systems (IS), scheduling applications, and Human Resource applications [10]. Additionally, healthcare organizations are having a difficult time releasing new pharmaceuticals due to the necessity to balance quality and finances. Process automation can be used to get over any regulatory obstacles that the healthcare system's novel technique may face. The healthcare organization can increase safety thanks to the automation system [24].

## 6. Challenges

### 6.1. Automation of task

RPA can automate restricted kinds of tasks; thus, automating the work completely is not possible, and the work would be scattered. The tasks are selected on the basis of consistency, standardization, and ordinance. The delegation of responsibilities that are capable of automating is crucial because one error can result in the failure of the whole process of automation. The task algorithm needs to be simplified and structured to avoid complexity in the code. The RPA is dependent on humans for selection and coding procedures and is only helpful for monotonous and rule-based tasks [20].

### 6.2. System Failure

The bots need no human contribution once they are triggered, but they cannot handle errors or system failures, which may result in the abrupt termination of the process. [20] System failure is a common challenge that can occur for multiple reasons. The lack of fault tolerance capability makes RPA less reliable and requires human supervision. There are many factors responsible for system failure, like handling large amounts of data, an unstructured database, power failure, unstable network connectivity, compatibility, etc. [20, 11]

### 6.3. Cost

The RPA project cost cannot be estimated at the initiation stage. The projects are suitable for specific tasks only; the ob-

jectives cannot be achieved if the wrong work is selected for automation. The bots require maintenance to keep the workflow smooth. They need to be trained for proper and efficient implementation. Every organization has different work procedures, so they might need customization for better functionality, which will increase the overall cost [11].

#### 6.4. Security

The bots need supervision to keep the data safe and maintain privacy. The bot doesn't have cognitive thinking capabilities; an error in the configuration process can expose the data to various threats and cause deception in the data. The sensitive data should be monitored, and access should be role restricted. RPA bots require protection against cyberattacks such as hacking [20].

#### 7. Future Work

The RPA method will be implemented, and numerous recommendations will be made to enhance it. The first recommendation is to assess the business applicability of each RPA feature individually. Using actual data, evaluate the RPA's parameters and software robot archetypes [16]. There are numerous other concerns that need to be resolved because RPA studies are currently in their earliest phases [25]. Robotic process automation is going to possess the ability to grow independently. This technology's next major advancement will be RPA 2.0. It will increase the use of AI, digital employees, the entire labor force, and the digital evolution [26]. RPA moves closer to automating increasingly cognitive processes by utilizing elements of machine learning, artificial intelligence (AI), voice recognition, and sentiment analysis. As a result, bots will be able to carry out increasingly complex and human tasks or even make decisions on their own with a decreasing amount of human involvement [27]. Artificial Intelligence (AI) will advance beyond rule-based technology in its subsequent stages and incorporate AI components. SPA (Smart Process Automation)'s emergence It is thought that SPA, or smart process automation, is a development of robotic process automation. SPA will be used to automate the unstructured data tasks that robotics cannot complete on its own [26].

#### Conclusion

This paper is an overview of robotic process automation. The RPA is hype in the markets nowadays. It is adopted by different sectors and has proved beneficial. Its advantages are irresistible, but we cannot deny the fact that it has some disadvantages too. There are many tools that provide an environment where bots can be created, and workflows designed. Tools like UI Path, Automation Anywhere, and Blue Prism facilitate the build, use, and deployment of mechanisms. It uses minimal IT resources and decreases the average handling time. It has been deployed by many popular firms and organizations. It is not suitable for work that requires human judgments and cannot replace humans; instead, it proves an assistance to decrease the workload of the employees. It allows employees to focus on higher-value work. It has gained a lot of popularity and altered the way people work. RPA works independently but requires human intervention for the selection process, monitoring, and maintenance. It eliminates the need for temporary and unskilled employees for rule-based and monotonous tasks and saves time and money. RPA is already growing at a faster pace but has not reached its peak. It is an emerging automation technique.

#### References

- [1] J. Ribeiro, R. Lima, T. Eckhardt, and S. Paiva, "Robotic process automation and artificial intelligence in industry 4.0 – A literature review," *Procedia Comput. Sci.*, vol. 181, pp. 51–58, 2021. doi: <https://doi.org/10.1016/j.procs.2021.01.104>
- [2] S. Moreira, H. S. Mamede, and A. Santos, "Process automation using RPA – a literature review," *Procedia Comput. Sci.*, vol. 219, pp. 244–254, 2023. doi:10.1016/j.procs.2023.01.287.



- [3] D. Choi, H. R'bigui, and C. Cho, "Candidate Digital Tasks Selection Methodology for Automation with Robotic Process Automation, Sustainability", vol. 13, no. 16, p. 8980, 2021, doi: <https://doi.org/10.3390/su13168980>.
- [4] L. P. Willcocks, M. Lacity, and A. Craig, "The IT function and robotic process automation," *LSE Research Online Documents on Economics*, vol. 64519, 2015.
- [5] P. Hofmann, C. Samp, and N. Urbach, *Robotic process automation, Electronic Markets*. 2019. doi: <https://doi.org/10.1007/s12525-019-00365-8>
- [6] A. Asquith and G. Horsman, "Let the robots do it! – Taking a look at Robotic Process Automation and its potential application in digital forensics," *Forensic Science International: Reports*, vol. 1, no. 100007, p. 100007, 2019. doi: <https://doi.org/10.1016/j.fsr.2019.100007>
- [7] K. P. Naveen Reddy, U. Harichandana, T. Alekhya, and R. S. M., "A Study of Robotic Process Automation Among Artificial Intelligence", *International Journal of Scientific and Research Publications (IJSRP)*, vol. 9, no. 2, pp 8651, 2019. doi: <https://doi.org/10.29322/ijsrp.9.02.2019.p8651>
- [8] H. Kansara, "The Rise of Robotic Process Automation and its Application in a Business Model," *INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT)*, vol. 08, no. 04, 2019. DOI : 10.17577/IJERTV8IS040051.
- [9] Y. H. Hu, J. S. Fu, and H.C. Yeh, "Developing an early-warning system through robotic process automation: Are intelligent tutoring robots as effective as human teachers?," *Interact. Learn. Environ.*, pp. 1–14, 2023. doi:10.1080/10494820.2022.2160467 .
- [10] R. Bhatnagar and R. Jain, "Robotic process automation in healthcare-a review," *Int. Robot. Autom. J.*, vol. 5, no. 1, pp. 12–14, 2019. doi: <https://doi.org/10.15406/iratj.2019.05.00164>.
- [11] C. Flechsig, F. Anslinger, and R. Lasch, "Robotic Process Automation in purchasing and supply management: A multiple case study on potentials, barriers, and implementation," *J. Purch. Supply Manag.*, vol. 28, no. 1, p. 100718, 2022. doi: <https://doi.org/10.1016/j.pursup.2021.100718>.
- [12] P. Patri, "ROBOTIC PROCESS AUTOMATION: CHALLENGES AND SOLUTIONS FOR THE BANKING SECTOR", *INTERNATIONAL JOURNAL OF MANAGEMENT*, vol. 11, no. 12, Dec. 2020, doi: <https://doi.org/10.34218/ijm.11.12.2020.031>.
- [13] S. Agostinelli, A. Marrella, and M. Mecella, "Towards intelligent robotic Process Automation for BPMers," *arXiv [cs.AI]*, 2020.
- [14] K. Palanivel and J. Suresh, "Robotic Process Automation to Smart Education", *IJCRT*, vol. 8, no. 6, ISSN. 2320-2882, 2020. [https://www.researchgate.net/publication/342804167\\_Robotic\\_Process\\_Automation\\_to\\_Smart\\_Education](https://www.researchgate.net/publication/342804167_Robotic_Process_Automation_to_Smart_Education)
- [15] S. Séguin, H. Tremblay, I. Benkalaï, D.E. P. Chouinard, and X. Lebeuf, "Minimizing the number of robots required for a Robotic Process Automation (RPA) problem," *Procedia Computer Science*, vol. 192, pp. 2689–2698, 2021. doi: <https://doi.org/10.1016/j.procs.2021.09.039>.
- [16] M. Dwayne, "ROBOTIC PROCESS AUTOMATION," *International Journals of Research and Analytical Reviews*, vol. 10, no. 2, pp. 338–343, 2023..
- [17] S. Madakam, R. M. Holmukhe, and D. Kumar Jaiswal, "The Future Digital Work Force: Robotic Process Automation (RPA)," *Journal of Information Systems and Technology Management*, vol. 16, 2019. doi: <https://doi.org/10.4301/s1807-1775201916001>
- [18] M. Gami, N. Mehta, P. Jetly, and S. R. Patil, "Automated Aggregation of Internet Content using a RPA Bot," *International Journal of Innovative Research in Science, Engineering and Technology*, vol. 8, no. 3, 2019. DOI:10.15680/IJRSET.2019.0803256 3440
- [19] R. T. Yarlagadda, "The RPA and AI Automation," *SSRN Electronic Journal*, vol. 6, 2018.
- [20] D. Fernandez and A. Aman, "The challenges of implementing Robotic Process Automation in Global Business Services," *Int. J. Bus. Soc.*, vol. 22, no. 3, pp. 1269–1282, 2021. doi: <https://doi.org/10.33736/ijbs.4301.2021>.
- [21] A. George, M. Ali, and N. Papakostas, "Utilising robotic process automation technologies for streamlining the additive manufacturing design workflow," *CIRP Annals*, vol. 70, no. 1, pp. 119–122, 2021, doi: <https://doi.org/10.1016/j.cirp.2021.04.017>



- [22] S. N. Krishnaprasad, "Impact of Robots In The Financial Sector," pp. 72–76, 2018. <https://iosrjournals.org/iosr-jbm/papers/Conf.ADMIFMS1808-2018/Volume-1/11.%2072-76.pdf>
- [23] N. V. Joy, and P.G. Sreelakshmi, "Robotic Process Automation role in Education Field", *International Journal of Engineering Research and Technology (IJERT)*, ISSN: 2278-0181, Volume 8, Issue 04, 2020,
- [24] K.K. Lahane, A. A.Sutar, "AUTOMATION IN HEALTHCARE USING RPA", e-ISSN: 2582-5208 Vol. 03, Issue. 01, 2021.
- [25] L. V. Herm et al., "A framework for implementing robotic process automation projects," *Information Systems and e-Business Management*, vol. 21, no. 1, pp. 1–35, 2022. doi:10.1007/s10257-022-00553-8
- [26] W. A. Ansari, P. Diya, S. Patil, and S. Patil, "A review on robotic process automation - the future of business organizations," *SSRN Electron. J.*, 2019..
- [27] R. Chugh, S. Macht, and R. Hossain, "Robotic Process Automation: a review of organizational grey literature," *Int. J. Inf. Syst. Proj. Manag.*, vol. 10, no. 1, pp. 5–26, 2022. doi:10.12821/ijispm100101

