JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

THE IMPACT OF ROBOTIC PROCESS AUTOMATION ON BUSINESS MODEL

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ABSTRACT

In past few years, large number of processes are done by the organizations with the help of computers and initially concentrated on enhancing the better productivity efficacy and satisfaction of customer. Technology of RPA (Robotics Process Automation) is basically a continuous task that is followed by humans which can be taught to a machine. If in the process there is a repetitive or continuous task and main modules are recognized as the particular task, then all those modules can be easily programmed in a robot and it work more efficiently in comparison to human. The objective of the paper is to study the impact of Robotic Process Automation on Business Model. It also covers important concepts like process improvement vs process re-engineering. In order to complete the outsourcing task, RPA (Robotics Process Automation) technology is more suitable for it. There is only need of initial investments from the organizations but afterwards it enhances cycle and satisfy the requirements of customer and also lead to low operating or manufacturing cost. There should be a blend of technology and human skills within any organization for optimum utilization of resources so that output can be maximized and on the other hand cost can be reduced to a significant level.

Keywords: *Robotic Process Automation, Business Process Outsourcing, Business Process Management, Process Improvement and Process Re-engineering.*

1. INTRODUCTION

Globally, technology is continually rising, as is the complexity of running a corporation. Computers can now recognise human speech, and robots can imitate human actions. Companies have begun to invest in technology that allows them to respond to client wants and requirements more rapidly and effectively. Human error is thought to be one of the most unreliable variables, but once it is eliminated, precision, accuracy, and quality improve automatically. Organizations that still use Enterprise Resource Planning (ERP) systems spend a lot of time learning and developing the processes. Employers can assign more value-adding positions when robots or software perform these repetitive, routine, and manual chores. As a result, businesses are focusing on automating operations [1]. The term "automation" is defined as "the use or introduction of automatic equipment in a production or other process, facilities," According to Google.com, the term automation is defined as “the use or introduction of automatic equipment in a manufacturing or other process, facilities”. Automation is basically making the machines carry out tasks that normally a human performs. Using this concept of automation in the computer industry, the advantages of the usage is unparalleled to any other methodology used for a particular process. Thus, it can be said that in the near future, automated processes will pave the path to greater success for business enterprises. Currently, there are numerous technologies that can be used for automation of a process like Artificial Intelligence (AI), Machine Learning (ML), Robotic Process Automation (RPA), Business Process Automation (BPA), Industrial Robots, Virtual Assistance etc. All these technologies are currently used for automated processes, each one having a diverse and specific reason for usage. But among all of these applications and technologies, the Robotic Process Automation technology is the most eminent one, or as one might say, it is the base for all other existing automated technologies. According to [7], data gathering accounts for 17 percent of an organization's activity, while data processing accounts for 16 percent. These are tasks that are typically completed entirely by humans. As a result, these operations eat up a lot of the workers' time and energy. These tasks can be mechanised with the use of Robotic Process Automation (RPA). RPA is a piece of software that automates the delivery of business processes. RPA would increase productivity and data security by automating repetitive and time-consuming processes while requiring no changes to existing programme logic or other systems. RPA is the process of creating virtual workers and replicating repetitive human jobs. Rather than having employees interact with various applications, RPA uses software to accomplish the same goal. It isn't limited to console and mouse duties; instead, it follows a set of rules and has its own programming and security level [2].

In the present time, with the help of technology of RPA, greater volume, multi step methods with different types of approval principles and instruction booklet are automated from end to end. In future time period, RPA will more like a mind of human because it can adjust and perform several task by just detecting and deriving; even it also have particular level of emotional intelligence in itself.

2. BEFORE ROBOTIC PROCESS AUTOMATION

[7] has outlined the concept that led to the emergence of RPA in businesses. The key sources of value, according to him, are the organization's fundamental functions, and since the internet and networking are becoming increasingly integrated into daily operations, prioritising the core functions is becoming unavoidable. As a result, businesses have begun to use the Business Process Management technique (BPM). As the name implies, it aids in the comprehensive oversight of the entire business processing. Processes are continuously studied, created, implemented, and improved with the help of BPM.

In order to classifying the management discipline of BPM, there are two paths of developments:

1. Process Re-engineering: In this process, TO optimize IT to its utmost potential or ability, there were steady changes and improvements made to the current processes.

2. Process Improvements: In the past days of BPM, the main concentration was on studying and reviewing the pre-existing business process to enhance them in regular intervals. These methods mainly comprise Lean Manufacturing and Kaizen, Total Quality Management.

The two developmental routes complement each other, and an organisation will use both to attain its objectives. To improve a company's performance, it's critical to keep an eye on its processes and adjust them as needed. However, there is always a limit to how much a technology or process can be improved, and to advance beyond that point, a radical shift in the technology or process is required. New hazards and key components appeared as technology evolved. To mitigate these risks, BPM categorised and assessed alternative approaches, as well as determining when the best time to introduce the next breakthrough would be [8].

The graph of Performance vs. Time is depicted in the diagram below. Technology has two life cycles: 0 to t1 and t1 to t2. There is no more room for progress in performance for this specific technology at point t1, indicating the necessity for innovation. The gap in the graph is defined by the fact that the innovation will have superior performance criteria.

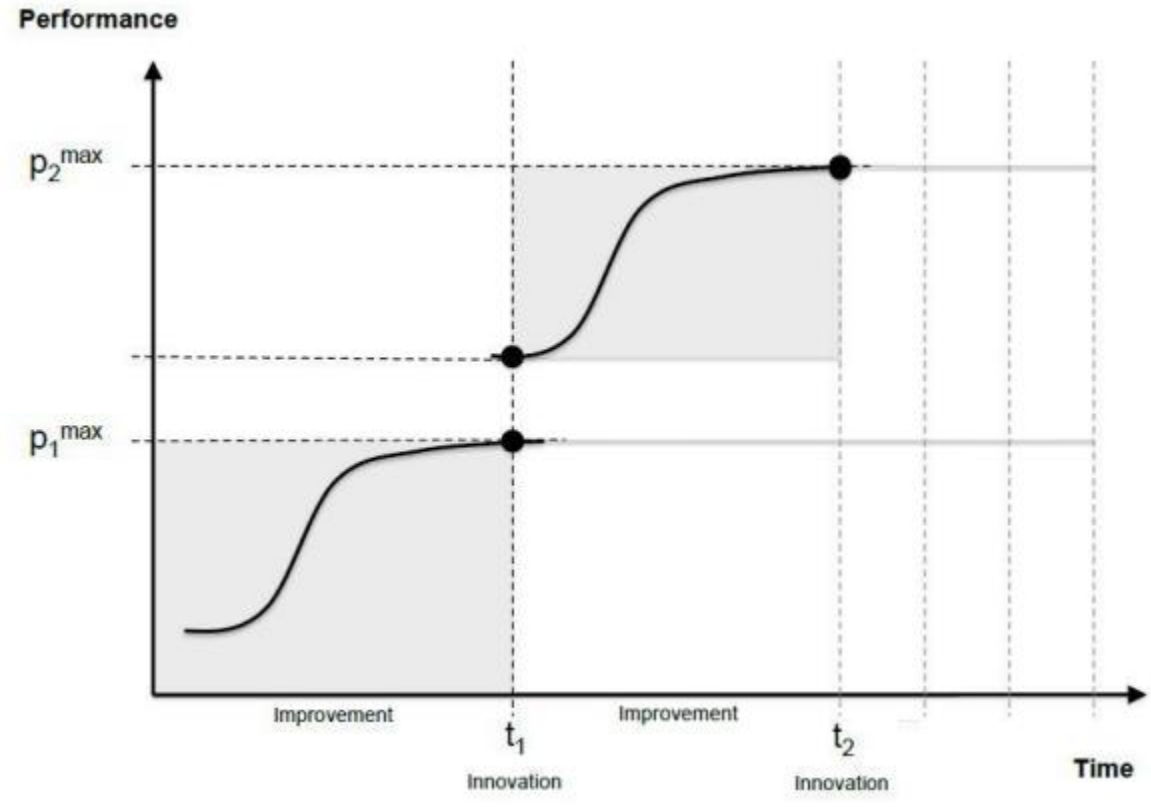

Figure 1: Process Improvement and Process Re-Engineering in BPM [8]

Now, if a company lacks the resources to perform Process Improvement and Process Reengineering, it usually hires professionals to accomplish it for them. This is referred to as BPO (Business Process Outsourcing) (BPO). The labor-intensive task is delegated to a different company when a project is outsourced. Most of the time, these entities will be located in nations with low energy and other resource costs, allowing the parent company to concentrate on its core mission [7]. Outsourcing, often known as offshoring, refers to the transfer of activities to areas other than the company's original headquarters that deal with the make or buy components of the business [11].

Outsourcing can be a hazardous option because the quality of the product or service delivered by the organisation is not always guaranteed. Outsourcing exposes you to unforeseeable and unavoidable dangers that can arise at any time. According to [12], there is a larger risk of generating disputes when it comes to information systems, with the majority of these issues relating to activity selection, contract drafting, and failing to select the suitable site. As a result, corporations began to create solutions to this problem

and developed a way that can automate not just processes but also handle an organization's backend work automatically. Robotic Process Automation is the name given to this method (RPA).

3. THE ADVENT OF AUTOMATION

The relevance of automation may be traced back to World War II, when the military made extensive use of sophisticated control equipment. Production technology is the process of developing a specific method for people to create items or perform services more easily and efficiently. People's working conditions and lifestyles altered dramatically after the start of the Industrial Revolution. Since then, the term "automation" has been synonymous with business improvement, and industries have continued to develop and apply new and inventive methods to improve their operations [10].

The First Industrial Revolution, sometimes known as Industry 1.0, occurred around the turn of the nineteenth century. This type of revolution replaced animal and human muscle power with steam and electricity-powered machines. Private businesses have evolved from serving a limited number of consumers to large corporations with owners, managers, and employees servicing a larger number of customers. This industrial revolution marked the start of a new era in which efficiency and production were the primary concerns [10].

Industry 2.0 is another name for the Second Industrial Revolution. It all started in the nineteenth century. It was the first time that electrical energy was used to introduce the concept of mass production. The worker/laborer became the one who controlled the machines and oversaw the automated control systems during this revolution. In comparison to steam engines, the mechanisms that assisted in mass manufacturing were significantly more efficient and resourceful in a friendlier manner. The first assembly line for mass production, Just in Time manufacturing (JIT), and Lean manufacturing are some of the other inventions associated with this era. These were primarily concerned with worker and resource optimization [10].

Industry 3.0 is another name for the Third Industrial Revolution. It was originally seen in the early twentieth century. The introduction of transistors and Programmable Logic Circuits (PLCs), which assisted in the synchronisation of software with electrical and hardware systems, marked the beginning of this revolution. These new innovations made it possible to obtain more accuracy at a faster rate with less human contact. The term "automation" was coined by combining electrical, mechanical, and software technologies. Computer Numerical Control (CNC) and Industrial Robots were widely used, allowing industrial processes to be more adaptable. Manufacturing processes were able to be integrated with computers because to technologies like Computer Aided Design (CAD) and Computer Aided Process Planning (CAPP). Organizations could also utilise software systems to keep track of goods (inventory planning), logistics planning, scheduling, and tracking of other activities. To help their firms grow, the companies used electronics and software to entirely automate their production. As a result, the companies were more adaptable and were able to expand their operations around the globe with ease. As a result of this progression, the concept of Supply Chain Management was born.

Industry 4.0 is another name for the Fourth Industrial Revolution. This creates new paradigms for the organization's production and management. It has had a significant impact on how a business runs. Interoperability, virtualization, decentralisation, real-time capability, service orientation, and modularity are just a few of the innovations made possible by this revolution. In terms of technology, the advancements made during this revolution are still utilised in today's sectors. It depicts the evolution of the industries from embedded systems to Cyber-Physical systems (CPS). CPSs are data transmission mechanisms that are governed by algorithms that are mostly managed by computers and can readily move data or make the same data available on multiple platforms at the same time. This revolution has witnessed the most technology advancements in terms of organisation automation and digitalization. Industry 4.0's key goal is to enable end-to-end digitization and minimise human engagement with non-value-adding and tedious jobs. With the rise of the Internet of Things (IoT), Cloud Computing, Business Process Management (BPM) and Robotic Process Automation (RPA). this is justifiable 10].

The digitalization of an organization's processes is of great interest to them, and it is their top goal in order to transform their factories/businesses into smart factories/businesses. The achievement of this goal is determined by how well they operate their procedures and how adaptable they are. It is impossible to digitalize an organization's operations in a short period of time. It's a lengthy, deliberate process that could take a couple of years to accomplish, but once it's in place, it'll be observed as long time advantages.

Automation is separated into two types, according to [14]: Hard Automation and Soft Automation. The production and manufacturing operations carried out by a robot or machine are referred to as hard automation, also known as fixed automation. Soft Automation, also known as Flexible Automation, refers to the part of the process that is programmed to vary depending on the needs of the customer. As crucial as automating manufacturing and production processes is automating the ways of processing transactions, adding and removing information, retrieving data, response triggers, and communication. Service Automation is a subset of Soft Automation, which is the most recent Industrial Revolution to boost automation development. Service Automation is a new technology breakthrough aimed at providing the best possible user experience by automating unnecessary manual labour. Artificial Intelligence, BPM, Machine Learning (ML), and RPA are some of the tools and terms related with Service Automation.

4. ROBOTIC PROCESS AUTOMATION

As explained by [9], RPA i.e. Robotics Process Automation is defined as the preconfigured software that uses the rules of business and activities to finish the independent execution of a integration process or method , transactions and task in one or more unrelated software to give an outcome or facilities with human exception management.

Organizations must perform given tasks within a certain period of time, with the appropriate amount of dedication, adhering to a defined set of standards, and preserving the quality of the outcome in order to satisfy customers. Customer Relationship Management (CRM), spreadsheet maintenance, data collection from numerous databases, and other such duties are examples of repetitive tasks. Imagine if these activities could be completed automatically, allowing employees to be assigned to more valuable positions that would benefit the company while also keeping exceptional employees engaged in their areas of expertise (Santiago, 2017). RPA accomplishes this. It automates repetitive tasks that require the worker to adhere to a set of guidelines. Physical robots that assist in manufacturing and production operations are often confused with RPA. As a result, it's critical to know what RPA stands for. RPA is a software-based solution that is programmed to execute repetitive tasks that are more focused towards the organization's backend procedures, as opposed to real robots. The robotic automation software does not take the place of the company's current systems. They actually cooperate with the system. RPA may be used with any application that people use, and it can be set up in a short amount of time to do operational duties. RPA has the advantage of interacting with the system in the same way that a human would, but much faster and more efficiently [5].

For example, suppose the work requires a person to sign into the system, search for a certain piece of data, get it, and pass it to the next operation for further processing many times during the day (The process is depicted in figure 2, below). A human worker, of course, would be inefficient at performing the task on a continuous basis. In this instance, RPA can step in and do the task as efficiently as possible for as long as it is required.

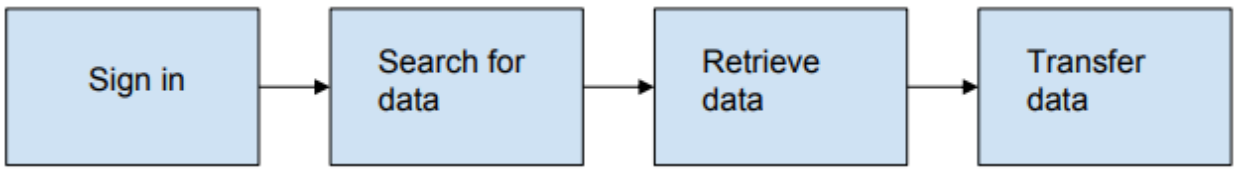

Figure 2: Example of a specific task in an organization [1]

Organizations can use RPA to use robots to automate large tasks in the back office as well as operations in the front office. They will transfer people to more value-adding duties as a result of this. The RPA programme may automate operations such as sending daily emails to a specified address, extracting data from a specific file, verifying data received from vendors, making choices based on a predefined set of facts, and preparing pre-filled papers for the company [1].

Semi-automation, also known as attended automation, and full-automation, sometimes known as unattended automation, are the two approaches to business process automation. To accomplish a whole task efficiently, semi-automated software relies on communication with a human administrator. The semi-automation software configurations are located at the administrator's workstation and are triggered by specified tasks or actions. This automation is designed to be flexible and simple to grasp, allowing workers to navigate between multiple screens and interfaces. Software robots, for example, can be used to assist customer care managers in gathering data from various sources.

Full-automation, on the other hand, does not require any human participation, and the robots initiate actions on their own to complete tasks on a continual basis. The key advantage of this strategy is that the robot can complete the activities autonomously 24 hours a day, 7 days a week throughout the year. When huge amounts of data must be collected, categorised, and distributed over a long period of time, this method is typically utilised [3].

5. FUNCTIONING OF RPA

As previously said, RPA technology is referred to as Lightweight IT. An Open System Interconnection Reference Model can be used to describe this (OSI). This paradigm was developed by the International Organization for Standardization (ISO), and it serves as a foundation for communicating and exchanging data between systems. The OSI model is made up of seven levels that are used to structure and illustrate the functions of each layer during data transit between devices. Before the information is sent on to the next layer, each layer of the system has its own function and value addition [4]. The application layer is the first layer. The data will be collected by the receiver through its own physical layer. The data is restored by passing it through all of the layers. The OSI model's layers are described below: [4]

Layer 1: Physical Layer This layer is mainly responsible for sending data sets between hubs and machines in a network. It's in charge of moving data bits from one piece of hardware to the next. This layer represents the system's hardware, such as storage devices and ethernet connections, and its purpose is to convey data to the appropriate location.

Layer 2: Data Link Layer The layer enables data transmission over a network. To transfer data, it builds an error-free link between devices. The data bits sent by the physical layer are received by this layer, which turns them into frames. Frames are created when bits are placed in a specific order [4].

Layer 3: Network Layer This layer is in charge of getting the data bundles to the right place. IP addresses can be used to determine a device's address. The network layer determines which physical path the data will take to reach its destination.

Layer 4: Transport Layer Transport layer guarantees that the data is properly organised and ready to be transported. It is in charge of detecting and correcting any errors in the data. The information is sent through the transportation layer's active protocols. The Transmission Control Protocol (TCP) is the most extensively used internet data transport protocol [4].

Layer 5: Session Layer When devices on a network begin to communicate with one another, the session layer is activated. This layer is in charge of contacting, communicating, establishing, and ending the device connection. When a user opens a webpage, for example, this layer becomes active in order to communicate with the webpage server and determine the data encryption [4].

Layer 6: Presentation Layer This layer prepares the data so that it can be used by the application layer. When necessary, this layer changes protocols, translates data, understands commands, and encrypts and decrypts data.

Layer 7: Application Layer This layer is in charge of facilitating communication between the device's software and the networking protocol. It lets apps to communicate with each other across the network. This is the top layer in the OSI model, and it is used by applications to open files that have been received or to create files that will be delivered [4].

6. THE APPLICATION OF RPA IN A BUSINESS MODEL

We have a good understanding of how the company plans to integrate RPA into their system. However, the question now is: what are the areas in which a company may automate, or what are the areas in which a company should automate? According to [16], the most widespread use of RPA has been in finance and supply chain management. The information below demonstrates which services in those departments can be automated.

Table 1: Services that can be automated in the finance department [16]

Finance Department:

Accounts Receivable	• Processing of order • Preparing cash receipts and sending notifications via email for late notices • Credit endorsements
Accounts payable	• Setting up and maintaining the accounts of vendors • Automating the work process procedures and endorsements • Data selection and payment methods
Journal entries	• ERP posting • Validating accounts and journal entries • Using pre-filled templates to create journal entries
Operational finance and accounting	• Gathering the information for transactions of revenue and information of lease agreements • Generating outcomes and reports on the internal analysis • Verifying the monthly sales data and calculating the commission
Bank reconciliation	• Handling discrepancies while creating journal entries • Reconciling balances • Gathering information from different systems and uploading the details of the transaction

Table 2: Services that can be automated in the supply chain management department [16]

Supply Chain Management Department:

Spend analytics	• Pre-filling the requirements of a periodic report • Gathering data from various sources for automated filling of reports
Payment requisition	• Matching and reconciling the payment receipts and invoices • End to end automation of the purchasing process for the customer
Scorecards	• Collecting information from various sources • Automatically creating dashboards and scorecards
Expense management	• Preparing sheet for standard expenses • Auto-forwarding of usual expenses
Procurement Management	• Managing data of the inventory for procurement purposes • Updating the Bill of Materials

As per the theory of [6], Irrespective from the above mentioned list of departments, there are several fields in an organization where RPA can be easily utilized such as processing of server, information storing area and security.

Table 3: Use cases for automation in a business [6].

Server automation	• Automate server provisioning and de-provisioning to perform server discovery and capturing and cloning server image • Automate server restart and shutdown to reduce energy consumption • Automate server and disc space clean up to remove the server activity log and temporary files
Storage automation	• Automate file and folder handling to avoid accidentally deleting, moving or archiving of data
Network automation	• Investigate and find poor configurations through the system so solutions can be sent before they affect the entire system • Performing automatic system upgrades for updated interface configurations.
Testing automation	• Automate end to end application testing • Automate the setup of pre-defined test schedule for quicker results
Security automation	• To secure the design, configuration, auditing and other IT services • Allow automation and adjustment of technical security operations

The results of a case study conducted by [15] on a Business Process Outsourcing Firm revealed considerable variations between the two scenarios. When the BPO firm did not employ RPA and when the firm did use RPA are the two circumstances. When a customer requested a payment receipt, the Firm was assigned the duty of generating one. In the first example, the team was split in half. One team takes the customer's request over the phone, while the other team in the backend collects data from multiple sources, compiles it, and then creates a payment receipt. When the Firm used RPA technology in the second scenario, only one team was required, which was the front-end team that interacted with the client. In barely over a week, there has been a considerable increase in productivity. One of the many advantages of using RPA in the organisation is increased productivity. The outcomes of the above-mentioned case study are shown in the table below.

This can be accomplished, according to [17], by establishing an RPA Center of Excellence (CoE). This centre is mainly responsible for the organization's tasks, such as ensuring stability, IT governance alignment, and RPA success measurements. The CoE comprises a number of teams working together, but the Robotic Operation Team is at the heart of RPA (ROT). ROT is divided into various roles, each of which is in charge of a specific task. RPA enablers, RPA Creators, and RPA Controllers are the three groups of roles. The RPA facilitator is responsible for introducing the concept of RPA and ensuring its

widespread adoption. The RPA Creator is in charge of bringing the RPA project to life. The RPA Controller is in charge of supervising and supporting the software robots that have been installed.

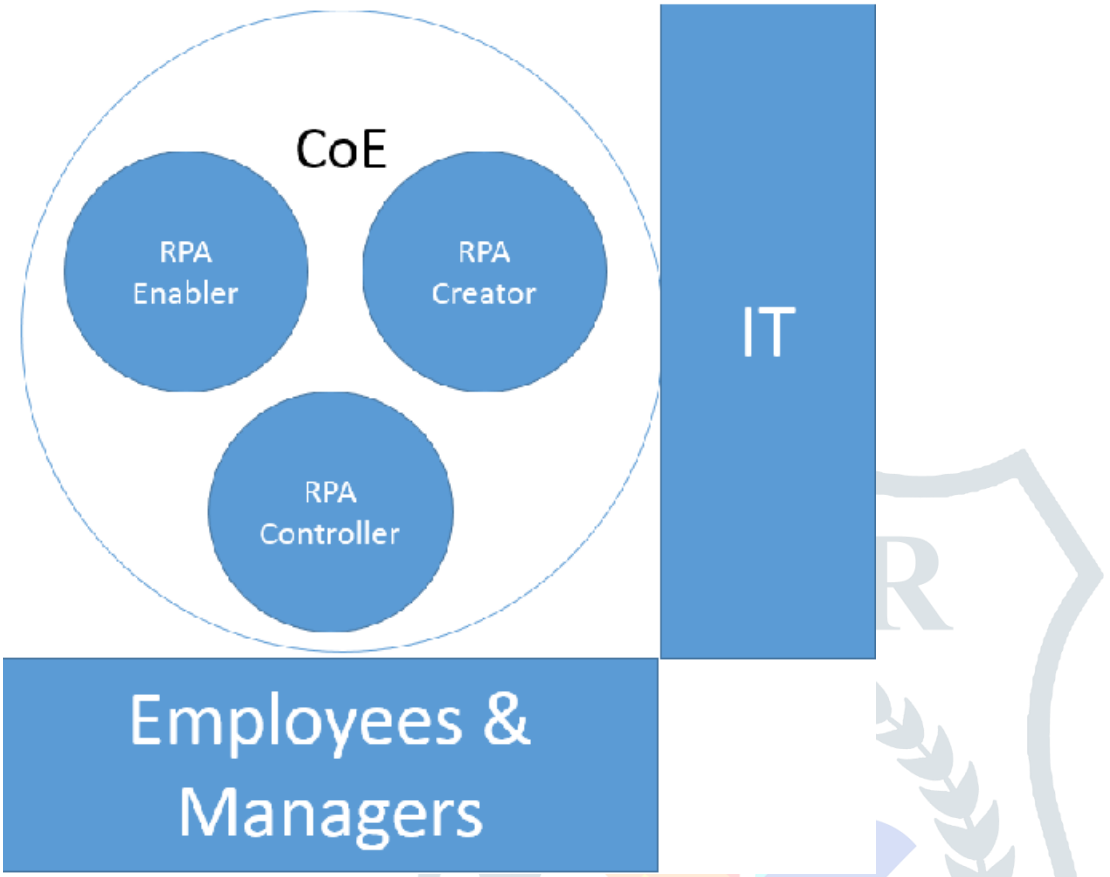

Figure 3 : RPA Center of Excellence [17]

The diagram depicts the key stakeholders of an RPA management team. The software robots are integrated into the company's technical contributions once the RPA concept has been accepted by the IT department [17]. According to [13], the IT department aids in the resolution of technical issues and facilitates traditional architecture design and security. It is critical to have an IT department since it influences the software robot's functionality by keeping it updated on a regular basis.

Employers and managers are the RPA management team's second most important shareholder. Employers and management play an important role in the development of robotic software as well as the creation of new jobs for qualified workers. Employers can be taught on RPA technology to increase the number of people on the development team, allowing RPA to reach its full potential [13].

7. CONCLUSION

In the present time, most of the companies and industries are now thinking about the different strategies and approaches so that they can complete more work and consume less time and the main reason behind this is the swiftly changing in the needs of the customer and consistently industrial growths and improvements. This is the cause which is responsible for the utilization of technology of RPA in organizations. RPA is basically known as a software tool that copy or replicate the action and activity of human and perform the repetitive task but does not add value to the organization. This task is much simple as copy and paste data from one place to another. There are some main benefits of using the technology of RPA, such as increasing in potential, increase in productivity, increasing overall time and less amount of expenses. As it is obvious that if most of the work performed by the robots then the quality and control increases as well. According to much organization, there is no requirement of any outside judgment and decision making in task hence, RPA is more appropriate for several tasks.

Dissimilar to the Business Process Management Systems, RPA does not requires the operator to have any programming skills as anyone can easily configure the software by just dragging and dropping. In order to complete the outsourcing task, RPA technology is more suitable for it. There is only need of initial investments from the organizations but afterwards it enhance cycle and satisfy the requirements of customer and also lead to low operating or manufacturing cost.

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