Introduction to RPA

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Abstract - This paper talks about what is RPA, its history leading up to now, positioning and advantages and disadvantages. This paper also focuses on current use of RPA and ways of implementing it. Paper also talks about the current state of RPA and future changes that could happen in RPA. Aim of this paper is to give basis knowledge about all fields and components related to RPA, in a way that is easy to understand.

Key Words: RPA, Automation, UiPath, Automation Anywhere, Blue Prism, Business Process Automation

1. INTRODUCTION

In today's world increase in population has caused increase in demands of almost everything. To keep up with the increase in demand industries and organisations push their employees to do more and more work. Due to increase in competitors in every field organisation are trying to find way to increase their rate of work and along with efficiency and quality. This has caused various organizations to turn toward automation. Automation does not involve excessive need of workers and also need less work from users i.e. human stand point. Automation can do daily repetitive task without getting tired with almost hundred percent efficiency every single time and faster than human work force can. While looking towards automation one of the biggest players in the field of business process automation is RPA.

1.1 Definition

Robotic Process Automation is the technology that allows anyone today to configure computer software, or a "robot" to emulate and integrate the actions of a human interacting within digital systems to execute a business process. [1] RPA robots utilize the user interface to capture data and manipulate applications just like humans do. [1] They interpret, trigger responses and communicate with other systems in order to perform on a vast variety of repetitive tasks. [1] Only substantially better: an RPA software robot never sleeps and makes zero mistakes.[1]

1.2 Background and Emergence

To understand history of RPA we have to look at 3 main technologies namely, screen scraping, workflow automation and management tools and Ai. These 3 are main forefathers of RPA. The idea of combining these three together and elevating their capabilities gave rise to RPA. Current form of RPA includes many technologies but these three still remain core technologies and principals used. While Screen scraping, Workflow automation and management tools and Ai were present since around 2000,1920,1956 respectively, the term RPA stared to appear around early 2000s. [2]

1.3 Current form

Main principal used in RPA are same as before, but development of new technologies has significantly increased RPA's capabilities. With help of software robots now we can easily automate simple task and as expected before, automation on larger scale in different organization and factories have already began.

2. Literature Review

2.1 Platforms used for RPA development:

There are 3 main platforms to develop RPA workflow they are UiPath Studio, Automation anywhere, Blue Prism. Right now, Blue Prism (34%) is most popular followed by Automation anywhere (28%) closely followed by UiPath (26%) and then all other platforms (12%). Although currently Blue Prism and Automation anywhere currently remain top 2 platforms, UiPath could soon over take both as UiPath offers its RPA building platform UiPath Studio community version for free along with many learning plans which are also for free. Community version for Automation anywhere and Blue Prism are paid so students and new commers who want to learn RPA but don't want to spend too much money in doing so are leaning towards UiPath. Apart from that there are quite a few differences between the 3 platforms some of which are shown below

Table -1

Blue Prism	Automation Anywhere	UiPath
Basic programming skills are beneficial. It can create business objects and manage them in the control centre.	This tool is good for the basic developer.	This tool is based on visual design. It provides a faster implementation.
It is used for Desktop, Web and Citrix automation.	It is used to achieve fair efficiency across all mediums.	It is used for BPO automation. It shines in Citrix automation.
RPA bots are only used for back-office automation.	RPA bots are used for both front-office and back-office automation.	RPA bots are used for the front-office as well as back-office automation.
This tool has only application-based access.	This RPA tool has only application-based entrance.	This tool has both browser and mobile access.
It has a low level of cognitive capability.	It has a medium level of cognitive capability.	It also has a medium level of cognitive capability.
It has client-server architecture.	It has client-server architecture.	It is a web-based (Cloud Based) orchestrator tool.
This tool is based on c-sharp.	This tool is based on Microsoft technologies.	This tool is based on numerous technologies such as SharePoint, cabana, and elastic search.
This RPA tool is good for operational scalability. The execution speed is very high.	This RPA tool provides limited deployment in a large-scale robot deployment.	This RPA tool frequently fails or crashes in medium projects.
It includes a visual process designer.	It includes a script-based process designer.	It includes a visual process designer.
It includes very high reliability.	High reliability is one of the most important features of this tool.	It includes a moderate amount of reliability.
This RPA tool has a high cost of acquisition. It provides restricted training.	This RPA tool has a higher cost of deployment.	This RPA tool has effective, entry-level pricing.
It includes three types of certifications. e.g., delivery provider, capability provider, and service provider.	It has recently launched several certifications programs.	It has free online training and certification programs.
It allows the user to write codes. However, users can also use it without any knowledge of programming or coding.	Programming knowledge is not mandatory.	Programming knowledge is not mandatory.

Popularity pie chart
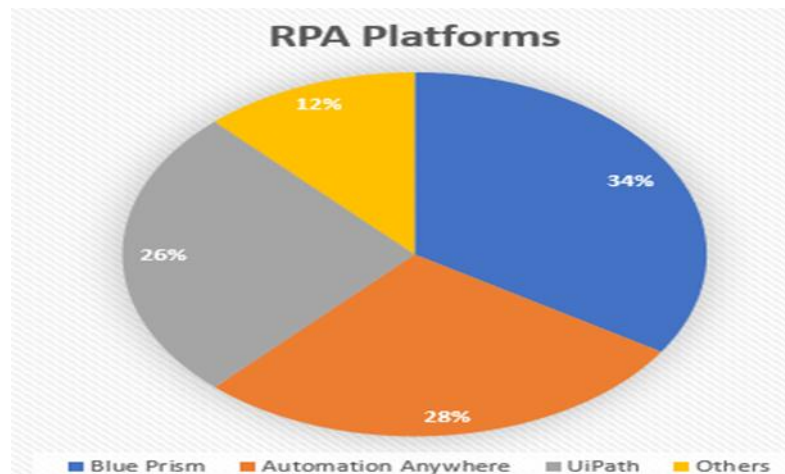
2.2 Benefits and Challenges

RPA has many benefits which make it very desirable and useful to implement in an organization. There are two sides to every story RPA is no different, it has advantages but it also has certain challenges, few of which are mentioned below.

A) Benefits:

- Decreased cycle times: RPA software robots perform task faster than humans hence decreasing cycle time [3]

- Flexibility and scalability: Studies have shown that when humans are asked to make small changes in daily tasks, they are habitual of, they will often forget making the modifications. RPA programs are installed on servers to combat this challenge, making processes flexible and scalable in case the demand shoots or the scope of a process expands.[4]

- Improved accuracy: RPA software robots performs task with full efficacy and zeros error every single time hence increasing accuracy of task.

- Improved employee morale: RPA frees up employees from tedious repetitive work and allowing them to work on problems and processes they actually enjoy and love.

- Detailed data capture: With robotic hands working on data and analytics, there are lesser risks of data leakages, obsolete information, and incorrect analytics.[3]

- Optimise resource use: With robots making close to zero errors amount of resources used for particular task remains that same also human resources i.e. employees can be shifted to work on more important task rather than tedious repetitive ones which require less cognitive awareness.[4]

- Cost effectiveness: RPA robots can mimic humans which means they can displace human workers allowing them to work for reduced hours or at reduced numbers of workers itself saving company fair bit of money.[4]

- Hassle free implementation: RPA implementation does not require setting up an API, which saves businesses huge costs and time. Robotic process automation comes with its own set of GUI ones that are easier to use and need little technical expertise [4]

- Secure enterprise data: RPA can be integrated with multiple applications to enhance the security of enterprise data. These integrations will ensure that client's apps are not modified or enhanced by a robot.[4]

- Improved quality/throughput: Humans generally get tired or lose motivation do to tedious reputative work causing them to make minor sometimes even major errors but software robots of RPA work with zero errors improving quality and throughput.

B) Challenges:

- Potential job loss: If robots can do processes more efficiently and faster than humans companies might feel the need to keep same amount of labour force.[3]

- Initial investment cost: RPA is still evolving so companies have to decide whether to implement RPA in its current form and maybe miss out no news features or technologies that might come in after few years.[3]

- Hiring skilled staff: Companies might feel the need to hire employees with basis automation skills or trains existing staff in order to better utilize RPA.[3]

- Employee resistance and onboarding: People are always reluctant to change, implementing new technology mean learning the basis of it and there will also be rise of new responsibilities with it. So, employee onboarding is a challenge.[4]

- Process selection: RPA cannot automate all the process so it is vital to select processes that meet selection criteria and are beneficial to companies in both short and long term.[4]

3. Current uses of RPA

RPA is currently being used in many domains and fields, these include Finance, IT, Manufacturing, Management, Data Analysis, etc. RPA has ability of being customizable in the sense that if a process meets the automation criteria regardless of domain of that process it can be automated using RPA. Regardless of that there are many processes that are nearly certain in every organization no matter what domain they belong to that have already been or can easily be automated. Many departments that most organizations such as HR, Finance, Accounting, IT services, Supply chain, Manufacturing and many others have many processes that are already automated.
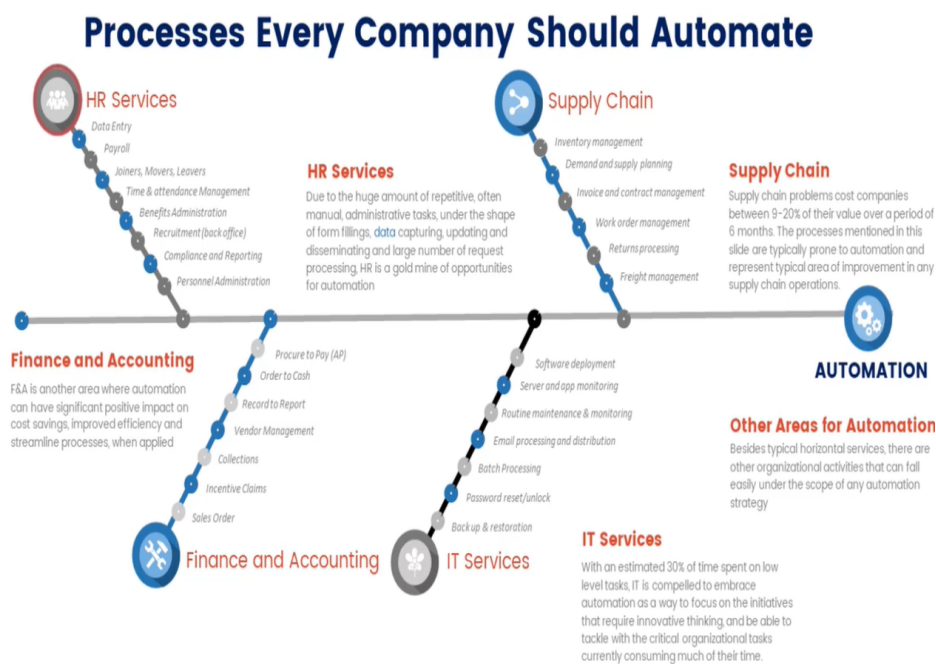

Fig 1

3.1 Implementation criteria

RPA cannot automate every process just yet so it uses certain criteria to select the process that are best suited for automation. Main factors that should be present in a process that makes the process contender for automation are Highly manual and repetitive process, Process with reliable standard readable electronic input type, Non changeable processing method or system change, Rule based process, High volumes, Automation savings(its recommended to automate processes if it provides saving in

terms of human work effort of minimum 2 FTEs), Low exception rate, Mature and stable process. [5] One great process that is perfect for automation is reading invoice data code for this is show below in UiPath. This code will capture amount of payment and display it. For use in industries where you have to calculate total payment and send daily report to superiors you can easily store payment amount in an excel sheet, perform necessary operation and send email of that excel sheet along with a particular message with the attached excel sheet.
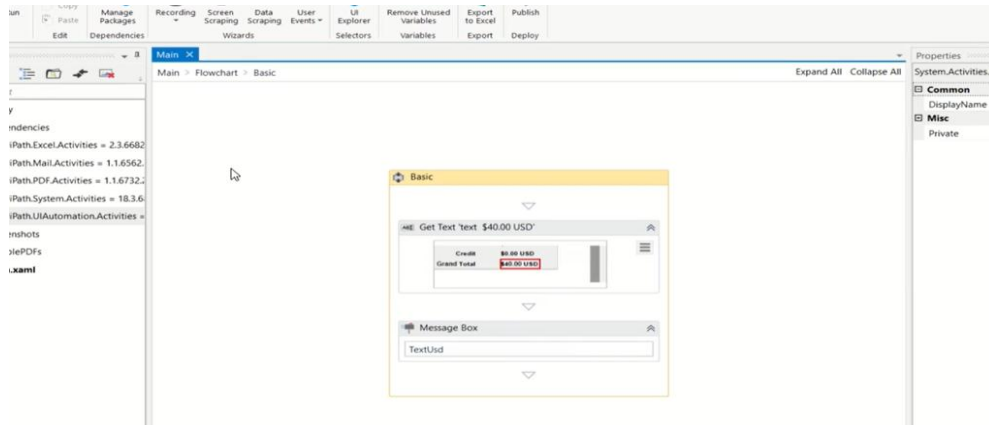
Code in UiPath Studio to capture the payment amount from invoice in pdf form
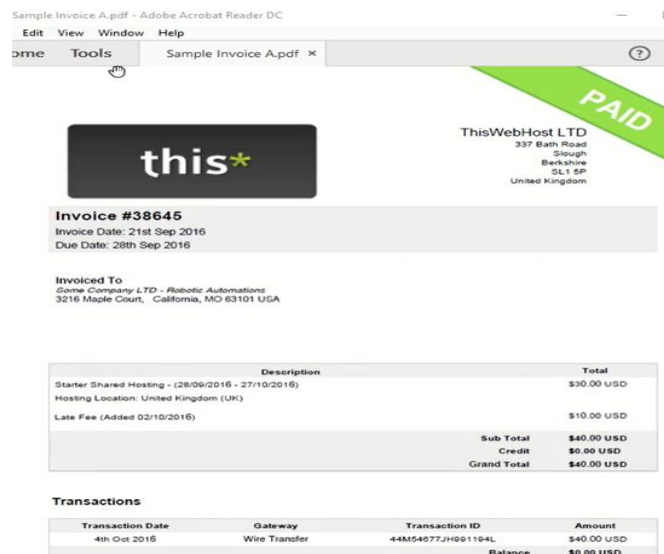
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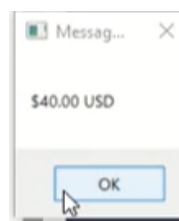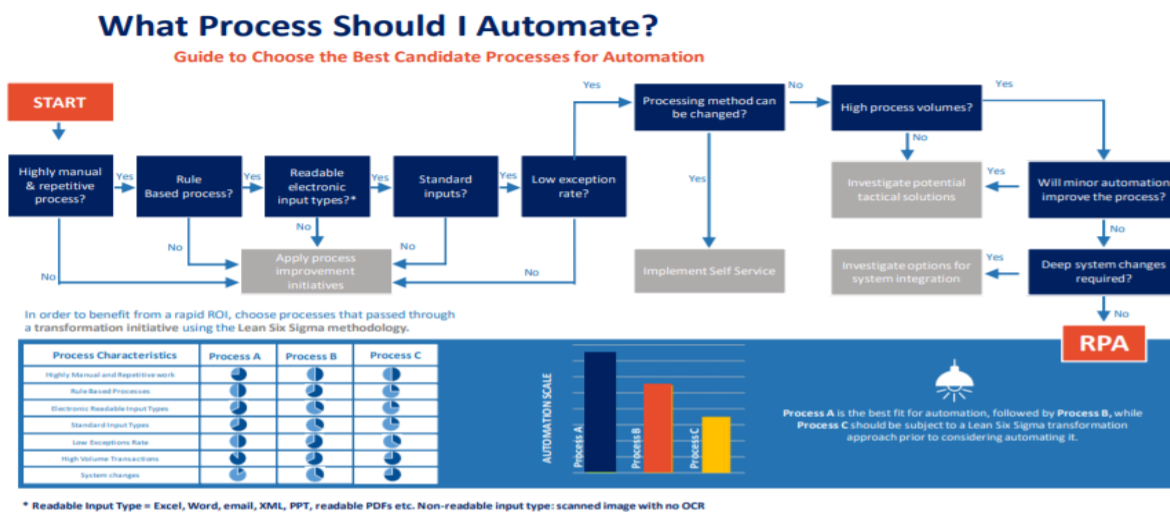
Displaying amount as message box

Fig 2

3.2 Domains which use RPA

RPA is used in variety of domain few domains where organizations have implemented RPA are Healthcare: Max Healthcare is one of India's top healthcare service providers. They have treated more than 2.8 million patients from 130 nationalities.[6]

Transportation: DHL Global Forwarding Freight (DGFF) is a leading provider of the ocean, overland, and air freight-forwarding services. This company has a global service centre unit with five centres. The human employee strength is more than 4500 and brokers transport services between the freight carriers and the customers to ensure efficient transport and routing services. [6]

Finance: Ernst and Young or commonly known as EY is one of the largest professional services firm headquartered in London. It provides assurance, tax and transaction services and advisories to solve client's challenges. [6]

Retail: RBS or Retail Business Services is a branch of the Ahold Delhaize USA which provides services to Food Lion, Stop & Shop, Giant Food, Giant/Martin's, Peapod, and Hannaford. [6]

Telecommunication: Sprint Corporation is one of the top telecommunication company based in Overland Park, Kansas. It is the fourth-largest mobile network operator in the United States and offers a wide variety of wire-line and wireless services. It has around 53.9 million customers and has an annual revenue of $33.6 Billion. [6]

BPO: MAXIMUS is a worldwide leading provider of government services. It designs, develops and delivers health and human services programs. This company has offices situated in 6 countries with their employees answering more than seven million calls at contact centres every month. [6]

Education: The University of Melbourne is located in the heart of Melbourne and has close to 50,000 students studying in various streams such as law, business, economics, arts, media, and engineering. This university has partnered with leading research centres and is one of Australia's oldest and most reputed institutions. [6]

There are many other domains where RPA is already implemented and with development and popularization the scope of RPA will very likely increase.

3.3 Cost of implementation and results

How much does RPA cost? According to Deloitte, SMEs can pay from **$4,000** to **$15,000**, for one bot. However, enterprise organizations may need as much as **$20 million**, for a complete RPA solution of up to 500 robots, which can displace over 1,000 employees, and generate over $100 million in savings. [7]

While talking about results we will focus on companies which we have already mentioned. The results of **Max Healthcare** using UiPath are as follows Around 1 crore of pending payments was recovered. 65-75% of the time saved in CGHS and ECHS processing. Almost 50% of turnaround time was reduced for claims processing. [6] **DHL** After the pilot project was successful, the team started a Centre of Excellence (CoE) to define the standards for RPA based process automation such as the configuration and services for DGFF. If we talk of the numbers, then UiPath has helped DGFF achieve the following numbers:50% reduction in the total resources required to complete the process. Enabled human employees to do much rewarding work.300 robots are providing work equivalent to 300 full-time employees, who are presently working with better initiatives. Has deployed 80+ robots in less than a year. Achieve complete ROI in 1 month. [6] **EY** (Ernst and Young) results achieved are as follows: More than 1 million dollars were annually saved. 0 errors from processes with regulatory components. 2-3 times greater efficiency. Better customer experience. [6] **RBS** results achieved are as follows:69,000+ full-time employee hours are saved. 75% of the finance eligible processes are automated. 65+ bots are deployed in production. [6] **Sprint** results achieved are as follows: More than 20,000 hours are saved. 50+ automation developed. More than 50+ automation in the pipeline. [6] **Maximus** results are: More than 2.5 Million $ saved annually.39 bots deployed in production and more than 10 are expected to be deployed in production by next year. [6] **University of Melbourne** results achieved are: Increase the efficiency of critical business processes. Boost staff engagement and reduce 10000 hours of manual force was reduced. Improve customer experience. 97% of throughput in processing supplier details. 22 processes are automated.

When we analyze the results, we can see there is significant improvement in all aspects that were expected to happen. We can conclude that RPA performed to its expectation or even slightly above it

4. Future of RPA

When we look at RPA's future it appears that RPA will only grow. An ISG study has revealed that around 92% of companies are looking to implement RPA in their organizations by 2020. [8]Survey of 500 European companies as conducted by ISG showed that the budget for RPA has increased by average 9% during last year while investment in consultancy and IT services have also increased.[8] All of the data was collected before the Covid -19 outbreak so we are likely to see some form of decrease in all expects of organization including implementation of RPA.

4.1 Current market for RPA

According to Deloitte's 2017 RPA survey, market trends are indicating near-universal adoption of RPA in the next five years. [9] Average spending among companies surveyed was $1.5 million for RPA pilots and upwards of $3 million for scale programs. [9] 53% of respondents have already started their RPA journey. [10] This is expected to increase to 72% in the next two years. [10]

The benefits of RPA adoption are significant. Payback was reported at less than 12 months, with an average 20% of full-time equivalent (FTE) capacity provided by robots. [10] RPA results are quite impressive with improved compliance (92%), improved quality / accuracy (90%), improved productivity (86%), cost reduction (59%). [10]

78% of those who have already implemented RPA expect to significantly increase investment in RPA over the next three years, yet scaling RPA is clearly proving more difficult than anticipated: only 3% of organizations have scaled their digital workforce. [10]

4.2 Indication about RPA's future

RPA in its current state is a great tool for automation, but as technologies evolve and we look towards automating process that are more and more complex, RPA alone, could lack the ability to do so. But as technology evolve so will RPA, there are already talks about major addition in RPA. We are already looking at next version of RPA in form of Hyper automation. Hyper automation has RPA at its core but it increases automation capabilities with Ai, ML, Process mining, analytics and many other tools.

5. Conclusion and questions to answer

Looking at all results and listening to leading organizations in different domains points us in direction that RPA is meeting all exception and, in many cases, even exceeding it. As organizations search for way to improve, they are bound to come across automation as one of the tools for it, with RPA being one of the top dogs in automation it is bound to grow. If an organization wants to be successful now and, in the future, it should definitely consider RPA as an option. If we look at RPA for a different point of view it has the ability to imitate and do lots of work that a human does. With RPA implemented and performing to its fullest organizations might fill that some of their existing staff are not require. In countries which lack man power this might not be a big issue but in countries with huge populations like India and China this could result in decent chunk of people being

laid off, this is one issue of major concern with regards to RPA and answer for this is yet to be found. That being said RPA has great ability to free humans from tedious repetitive work so that we can focus on work which demands higher cognitive awareness. Not only that it does the tedious repetitive better and faster that most humans can do. RPA is definitely technology worth keeping an eye on.

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Fig 1 Source: https://academy.uipath.com/learningpath-viewer/1965/1/153870/2

Fig 2 Source: https://academy.uipath.com/learningpath-viewer/1965/1/153870/2

Table 1 Javatpoint.com https://www.javatpoint.com/uipath-vs-blue-prism-vs-automation-anywhere