

ROBOTIC PROCESS AUTOMATION: OVERVIEW AND OPPORTUNITIES

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Abstract: Business processes are part of daily routine of every business; they are requested to perform at the best possible way, without any losses. Traditionally, over the time people are trying to automate processes using many techniques that may include machines or mechanical robots. A lot of processes performed in the modern business or e-business are done using computers so there is a need to avoid losses caused by bad or slow process performances. The way of automation of processes using software that will perform like humans and carry out tasks on the computers is referred to as the robotic process automation. Usually, it is used to automate processes of relatively low to middle complexity and high repetitiveness. Business which automated its processes using the robotic process automation is supposed to gain multiple benefits in terms of reduced costs, improved process efficiency and significantly reduced number of rework tasks within the process.

Key Words: robotic process automation (RPA), business processes automation (BPA), UiPath, RPA benefits

1. INTRODUCTION

The robotic process automation (RPA) does not represent neither physical nor mechanical robot, even if it brings to our mind a vision of some electromechanical machine.

In the term of robotic process automation, robot refers to a software-based solution, programmed to carry out procedures, processes or tasks on the repetitive way that are usually done by humans.

This concept has been developed and relatively widely applied since recent. Therefore, the aim of this paper is to present the basics of RPA, its applicability, benefits and some elements of the technology behind.

2. WHAT IS ROBOTIC PROCESS AUTOMATION?

As Salby [1] described in his study, RPA is a technological imitation of a human worker with the goal of automating structured tasks in a fast and cost efficient manner. It represents a computer software programmed to execute repetitive labour-intensive tasks.

According to the magazine Digitalist [2] RPA is defined as 'application of software and technology with the use of artificial intelligence to carry out repetitive tasks quickly, tirelessly, and accurately'.

While the Institute for Robotic Process Automation (IRPA) defines RPA as 'An application of technology that allows employees in a company to configure computer software, or a 'robot', to capture and interpret existing applications for processing a

transaction, manipulating data, triggering responses and communicating with other digital systems.'

The listed definitions suggest that there are no mechanical robots (i.e. hardware), and that the focus of RPA is to make a computer program intelligent and to 'learn' to perform some simple task that will be repeated many times.

Nowadays, many international companies such as Walmart, AT&T, Ernst & Young and American Express are using RPA in everyday business. Some examples of the typical tasks that are automated using RPA are:

- sending emails,
- opening applications, and
- copying and pasting information from one system to another.

3. ROBOTIC PROCESS AUTOMATION VS. TRADITIONAL PROCESS AUTOMATION

The traditional process automation is mainly considered as an inevitable aspect of Business Process Management (BPM), and it is referred to as Business Process Automation (BPA).

The primary focus of the traditional automation (BPA) is on process improvements by streamlining existing processes and removing inefficiencies. Therefore, this approach is based on creating or evolving systems and processes to increase efficiency. On the other hand, RPA is focused on enabling virtual workforce to do all the tedious, repetitive tasks. RPA doesn't optimize the process but aims to make it

faster, using software robots for performing process operations instead of human operators.

RPA is a tactical move to be used in the short term, until a traditional automation project can be planned and implemented. RPA is non-disruptive and is almost agnostic of the underlying technologies.

The traditional automation of business processes (BPA) is a strategic information system transformation move, highlighting all of the places where existing processes can be automated with better system integration or the set-up of a specialized process software.

While implementing RPA there is no need for high programming skills, since it could be deployed on server or on user's desktop and it automates actions at the User Interface level.

The traditional business process automation comprises the following solutions:

- BPM suite (BPMS),
- enterprise resource planning (ERP) system,
- application programming interfaces (APIs),
- service-oriented architecture (SOA) as a main basis of an IT infrastructure,
- integration platforms, and/or
- specialized process software.

Applications are integrated at the API/services level, the database level or infrastructure level. BPA integration requires much higher programming skills than RPA does.

The scope of traditional process automation is large and it covers workflow automation tools, specialized process software, structured and unstructured data, complex interfaces. On the contrary, RPA is not a suitable option for processes that manipulates unstructured data, that are based on complex processing instructions or processes with high exception rate. RPA is only used for scenario-based tasks.

Traditional automation is often related with downsides like higher implementation cost and duration, complexity of integration, capacity of integration solutions and limitation of legacy systems. In contrast to this, RPA is non-intrusive and doesn't require changes to existing applications, implementation is faster and project costs are in general less expensive than traditional automation projects.

When it comes to an organizational impact, RPA layered on top of existing applications; it doesn't require extensive employee training, therefore trainings like simple use of demonstration videos could be sufficient. Traditional automation is disruptive. It is initiated by IT specialists and requires a significant change management practice and training of employees.

4. APPLICABILITY OF ROBOTIC PROCESS AUTOMATION

As it was stated earlier, robots which are performing robotic process automation are designed to carry out repetitive tasks, therefore not all the processes are suitable for this kind of automation. According to Fung [8], the typical criteria for processes suitable for RPA are:

- Low cognitive requirements: processes with a lot of repetitive tasks are ideal candidate for RPA application, while complex processes with a lot of different, complex tasks are harder (or impossible) to be handle by RPA.
- Access to multiple systems is not required: RPA is applied on a top of existing applications, but it typically automatize tasks or operations within a single application or information system.
- High volume: processes and tasks that are preformed relatively frequently are good candidates for RPA application.
- High probability of a human error: processes and tasks that are typically performed by operators, and where a possibility of a human error is high (as evidenced from historical data records), should be the first choice in selecting processes for RPA implementation.
- Limited exception handling: processes which does not have a lot of possibilities for some exceptions are the potential candidates to be automatized by for RPA application.

According to previous studies, processes performed as a supporting process for the core business processes are better candidate for robotic process automation that the core (key) business processes. Besides, results of the study performed by Capgemini Consulting [9], showed that with license price of an average of 1/3 of a full time employee, license of the RPA tool is an ideal option to replace the human processes in the following tasks:

- Tasks performed about 50-60 times per day;
- Tasks performing storage of files;
- Tasks doing back office ERP transactions;
- Tasks generating huge number of emails;
- Tasks performing conversion of data.

The study done by Capgemini Consulting [9] performed an analysis to identify the set of ideal processes to be automated using RPA and results, considering the processes and their frequency and complexity, is shown in Figure 1. Processes with very high frequency and low complexity are typically automated using some of the traditional business process automation methods, while ideal for RPA automation are processes which are more complex and more frequent. There are also processes which should not be automated using RPA and those are the processes whose frequency is low and complexity is high.

Further, as presented in Figure 2, the study showed that the processes with the cycle time higher than 5 minutes and lower than 30 minutes are also good candidates for the robotic process automation.

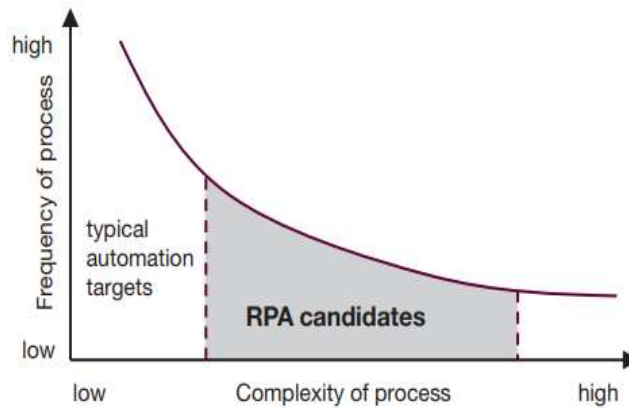


Figure 1. RPA processes candidates by frequency and complexity of process [9]

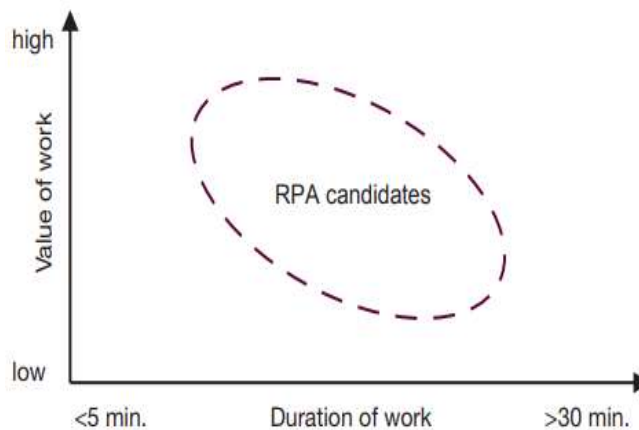


Figure 2. RPA processes candidates by value of work and duration of work [9]

5. BENEFITS OF ROBOTIC PROCESS AUTOMATION

Gartner research [10] has found that processes automated using RPA benefit in terms of a less time needed for rework of non-properly done work, and minimization of disruption to other team members related to the complex change management done within the team during traditional business process automation. Also automation of the repetitive tasks will make more time for the team to focus on more complex and non-easily automated portions of process.

ProV consulting [12] points out that the robotic process automation brings companies savings of nearly 30% and better customer experience by freeing up valuable resources for customers to be on the front line. The elimination of operational risk is also an issue which is defined as a crucial benefit, because it eliminates risk of performing the process on the wrong way or without knowledge. The procedure definition is an integral part of RPA, since processes are needed to be defined in order to be automated, aiming to enable better governance of the processes. The last but

not the least, an important benefit is that RPA works with existing IT systems and there is no need for their replacements, because RPA robots work at the same way as humans in terms of IT infrastructure.

6. DEVELOPING PROCESS AND TOOLS FOR ROBOTIC PROCESS AUTOMATION

6.1 Developing process for Robotic Process Automation

According to the K2 partnering [3], the suggested methodology for developing RPA includes four phases: assess, approve, design and implement.

Assess phase includes investigation of processes that could be automated, and evaluation of key criteria such as key performance indicators (KPIs). The key criteria should be agreed on and set before the implementation. The main deliverable of this phase is a feasibility report of the RPA project.

The second phase – approve - includes testing of the RPA concept. Before the piloting of the process improved by RPA, the whole documentation of the AS-IS process (performed by humans), and analysis

and documentation of the TO-BE process (now performed by the robot), needs to be done using Business Process Model and Notation (BPMN).

Design of the robot is the third phase. In this phase the vendor for the developing tool will be chosen and after acquisition of the developing tool the robot will be developed. The developing is an iterative process with iterations intended to make a robot fine-tuned to perform needed tasks. This stage ends with the user acceptance testing of the robot.

The final phase of the RPA development is implementation. In this phase robot is realized into working environment, mimicking an employee's behaviour, and its performance are monitored.

6.2 Developing environments for Robotic Process Automation

During the last few years, many software environments have become available in order to support RPA implementation. According to the FORRESTER research performed in the second quarter of 2018 (Figure 3), the UiPath, Blue prism and Automation Anywhere are the market leaders.

Each of them has pros and cons. According to this research, the UiPath is a leader with shared services

and ease of robot's design. On the other hand, Automation Anywhere is described as the RPA tool delivering enterprise-grade digital workforce platform, while Contextor is targeting agility.

UiPath [4, 13] is characterized as a leader by Forrester research. The main features of UiPath developing environment are:

- UiPath can be hosted in both virtual terminals or in cloud based environments;
- Intelligent scheduling and execution;
- Technology based on Microsoft .NET;
- Supported for many applications;
- Web and desktop applications features;
- Working with SAP, PDF, Java, .Net and other technologies.

Automation Anywhere's [7] offers the developing environment for RPA with the following main features:

- Emergent cognitive functions based on machine learning to automate complex tasks;
- Multi-tenancy;
- Optical character recognition (OCR) commands;
- Technology based on Microsoft platform.

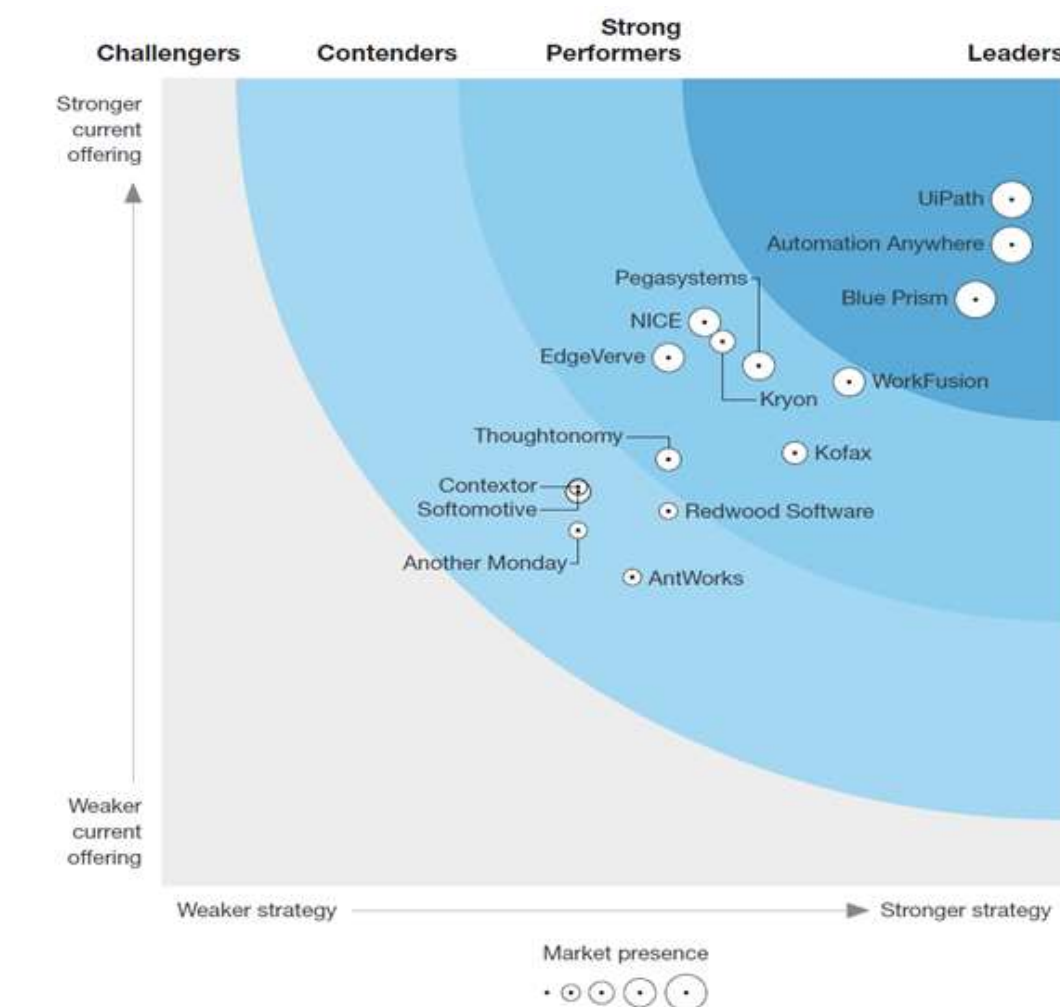


Figure 3. The Forrester way of RPA developing environments [6]

The developing environment designed by Blue Prism's [11] has the following characteristics:

- Secure, scalable, and central management of a virtual workforce of software robots;
- Automation of document types like Excel, XML, csv, pdf, image;
- Automation of software developed in Java or Web-based and Windows Applications.

7. RPA IN THE NEAR FUTURE

According to Google Trends [5], interest over time for the robotic process automation in the last 5 years has grown more than 5 times. The average number representing search interest in 2014, relative to the highest point on the search chart worldwide, was 10.09 while the average for the 2018 is around 58.31 and the number in 2019 is even higher. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means that there was not enough data for this term. The complete scale of interest in RPA over the time (for the last four years) is graphically presented in Figure 4.

The prediction for the future are that by the 2021 there will be more than 4 million robots doing office and administrative work as well as sales and related tasks. The enterprise RPA market is growing with a

compound annual growth rate (CAGR) of 65%, from nascent in 2016 to the forecasted nearly \$3 billion in 2021 [6].

The experts in the process automation field expect the following expansion direction of RPA [14]:

- Implementation of RPA in various industrial sectors: (i) service sectors such as banking and financial sector, analytics, legal sector, etc. (ii) production sectors: manufacturing, aviation, oil and gas, etc.
- The tasks involving data entry and data rekeying handled with RPA i.e. automated tools and techniques.
- The tasks that are computer-aided are governed with a set of protocols managed with by RPA application.
- The formatting tasks handled with the help of RPA, since they are based on a set of rules.

For a long term development, RPA needs to extend beyond the rigid rule-based methods. Therefore, the combination of RPA with artificial intelligence (including machine learning techniques) and big data i.e. data mining concept are foreseen in order to generate and execute refined process models. This is referred to as smart process automation, as a possible extension of RPA.

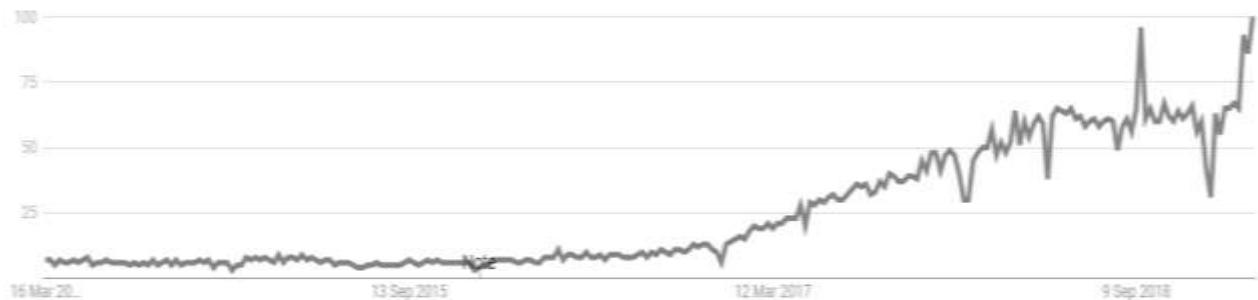


Figure 4. Popularity of RPA on Google [5]

8. CONCLUSION

The automation of business processes using the robotic process automation (RPA) can be a very efficient solution for the repetitive tasks and for companies facing different transitions, even organisational changes or system changes, since RPA is not a disruptive technology in terms of application in an enterprise. As a trend, it is becoming used by many companies which notice several benefits

mentioned above. Relatively low prices of the licences and a potentially big cost reduction qualify RPA as a good option for companies aiming to lower down the operational costs and risks. Process of RPA implementation is consisted of the phases including assessment and approval of the concept, followed by the fine-tuning of the robot and the process. The last stage is a final acceptance of RPA by the end user.

Since the main goal of RPA application is to improve the efficiency of business processes, it has to be highlighted that the processes, as candidates for

automation, should be carefully selected, in accordance to the famous Bill Gates' thought [15]: *'The first rule of any technology used in business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency'*.

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