Automation of a Business Process Using Robotic Process Automation (RPA): A Case Study

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Abstract. Robotic Process Automation (RPA) emerges as software based solution to automate rules-based business processes that involve routine tasks, structured data and deterministic outcomes. Recent studies report the benefits of the application of RPA in terms of productivity, costs, speed and error reduction. Most of these applications were carried out on back office business process where the customer is not directly involved, therefor a case study was conducted on a BPO provider to verify the benefits and results of applying RPA to a service business process with front and back office activities. The results show that productivity improvement is the main benefit of RPA, nevertheless time reduction was not achieved on this case.

Keywords: Robotic process automation · RPA · Automation · Business process

1 Introduction

For the execution of business process, workers currently spend substantial time dealing with Enterprise Resourcing Planning (ERP), Customer Relationship Management (CRM), spreadsheets and legacy systems in manual repetitive tasks like tipping, coping, pasting, extracting, merging and moving massive amounts of data from one system to another.

Consider that some of these highly structured, routine and manual tasks could be handle by a robot, so that knowledge workers have more time for value added tasks. This is the promise or Robotic Process Automation (RPA) that emerges in the last five years as a set of software tools and platforms that can automate tasks on rules-based business process [1].

Recent case studies reports the benefits of the application of RPA in different business process [2, 3] and some authors [4, 5] propose the criteria for selecting the process for automation. One of these criteria is highly structured tasks, corresponding typically to back office business process like finance, procurement and human resources. On the research no studies have found that reveal benefits of the application of RPA on front office business process like selling, requirements handling or after sales support. Considering the above, the research question proposed on this paper is ¿What are the results on applying RPA to service business process with front and back office activities? For answering the

question a case study was carry out on a business process of a Business Process Outsourcing (BPO) service provider.

This paper starts with a literature review of the RPA concept and evolution (Sect. 1), followed by the revision of different RPA applications (Sect. 2.2). On Sect. 3 a use case is analyzed in a business process that involves front and back office activities, to draw the results on Sect. 4 and finally conclusions and future work.

2   Literature Review and Related Work

2.1   Robotic Process Automation

According to Slaby [6], RPA is the technological imitation of a human worker with the goal of automating structured tasks in a fast and cost efficient manner. Even that the term "robot" brings to our minds visions of electromechanical machines, it is important to know that RPA is not a physical robot, it is a software based solution that is configured to carry out repetitive operational tasks and procedures that are used to be done by humans [7].

RPA can automate rules-based processes that involve routine tasks, structured data and deterministic outcomes, for example, transferring data from multiple input sources like email and spreadsheets to systems like ERP and CRM systems. Most applications of RPA have been done for automating tasks of service business process like validating the sale of insurance premiums, generating utility bills, paying health care insurance claims, keeping employee records up-to date, among others [7].

On the IT side, one "robot" equals to one software license. This robot is integrated across IT systems via front-end, as opposed to traditional software, which communicates with other IT systems via back-end so it is possible to integrate RPA with virtually any software used by a human worker, regardless of its openness to third party integration [3]. According to the Institute of Robotic Process Automation (IRPA) [8], RPA technology is not a part of a company's information technology infrastructure, but rather sits on top of it.

Some characteristics that distinguish RPA from other automation technologies like Business Process Management Systems (BPMS) are:

- RPA sits on the top of existing systems and access these platforms through the presentation layer, so no underlying systems programming logic is touched [5].
- In contrast to most BPMN modeling packages, RPA solutions do not require programming skills for software interface configuration. RPA is set to work by just dragging, dropping and linking icons.
- RPA doesn't create a new application and does not store any transactional data, so there is no need of a data model or a database like BPMS systems [5].

On the other hand, RPA is also different from cognitive automation. According to Willcocks and Lacity [7], Cognitive Automation is used to automate tasks and decisions that involve algorithms to interpret unstructured data resulting in a set of likely answers, as opposed to RPA that uses rules to process structured data and instructions. The outcome of cognitive automation is probabilistic, in RPA is deterministic, a single result.

A Capgemini [9] study suggest that an RPA software licence can cost between 1/3rd to 1/5th of the price of an full-time employee (FTE). Lacity and Willcocks [1] sustains that one robot can perform structured tasks equivalent to two to five humans. Although the benefits in cost savings that companies report with RPA [3], not every business process is suitable for its use. Fung [4] suggest some criteria of business process for RPA:

- *Low cognitive requirements*. Task that does not requires subjective judgment, creativity or interpretation skills.
- *High volume*. Tasks that are performed frequently.
- *Access to multiple systems*. Process that requires access to multiples applications and systems to perform the job.
- *Limited exception handling*. Tasks that are highly standardized with limited or no exceptions to handle.
- *Human error.* Tasks that are prone to human error due to manual labor.

According to these criteria, the strong candidates for RPA are back office areas that have processes that are more standardized than front office processes that require handling multiple exceptions. On the next section some case studies are analyzed.

2.2 Related Work

RPA applications have been reported over the last 5 years in business process like accounts payable, accounts receivable, travel expenses, fixed asset accounting, master data management, billing, keeping employee records, among others [2, 3, 5]. Most of these processes are back office or support processes for services where the costumer is not directly involved.

Telefonica O2 that launched on 2010 an RPA trial on two high-volume, highly standardized processes. One process was SIM swaps, a subprocess for replacing a customer's existing SIM with a new SIM but keeping his or her existing number. The other process was the application of a pre-calculated credit to a customer's account. On this process various software systems are needed. Telefonica compares using RPA versus BPMS for the automation finding that RPA for 10 automated processes would pay back in 10 months, in contrast, with the BPMS was going to take up to three years to payback [2].

Xchanging is a business process and technology services provider that applied RPA with one of its insurance customer. When brokers sell an insurance policy, they submit notices using a variety of inputs (email, spreadsheets, etc.) to Xchanging, which manages the multistep process of validating the sale. Previously, Xchanging's human operators managed the transactions manually. They organized the data, checked it for completeness and accuracy, worked with the insurance brokers to correct errors, extracted other necessary data from online sources, and then created and posted the official sales records. The structured parts of the process, including finding the errors, retrieving the online data, creating the official sales record, and notifying brokers when the process is complete, is managed by the robotic process automation software. Xchanging estimates cost savings averaging 30% per process [5].

Other case studies report the application of RPA in the finance industry [10], energy and BPO [7]. On the other hand, consulting firms like Deloitte [11] and Capgemini [9] conducted surveys that revealed that the main areas of RPA implementation will be: accounts payable, accounts receivable, travel and expenses, fixed assets and human resource administration. Capgemini survey [9] also revealed that the main measures for RPA success are: cost reduction, increasing process speed, error reduction and increasing compliance.

3   Case Study: RPA Application to a Business Process

The case study was conducted on a BPO provider firm located in Bogotá, Colombia. As part of its transformation strategy, this company created a Center of Excellence as a platform for process innovation, development of new services, better customer experience and organizational performance improvement, through process automation and deployment of new technologies.

RPA was pointed by some analyst as one of the new technologies that could thread traditional process outsourcing [6], but is also an opportunity for this industry therefor this BPO firm started by evaluating and prototyping this automation technology on some of its customer business process.

The use case was carried out on a process for generation of a payment receipt. The AS-IS process described on Fig. 1 starts when a customer calls and request the payment receipt, a front office agent creates the case on a CRM system. Then a back office agent open the case on the CRM, copy and paste the ID of the customer on the accounts receivable system and generates the payment receipt on a pdf file. The agent writes an email to the customer with the payment receipt attached and closed the case on the CRM.
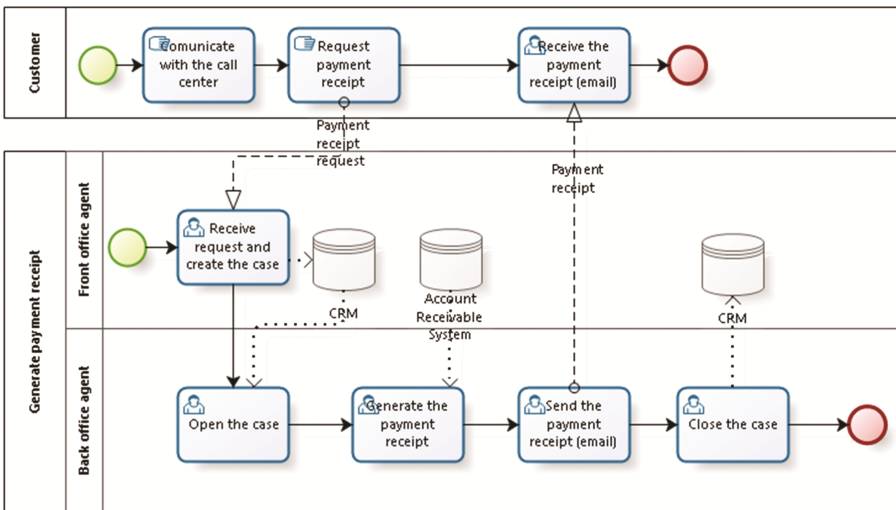

Fig. 1.   Generate payment receipt AS-IS process.

On Fig. 2 is the TO-BE automated process, where the back office activities were assumed by a software robot (RPA). After the case creation on the CRM is done by a front office agent, the robot access the CRM, copy the customer ID and paste it on the account receivable systems, generates de payment receipt, creates the email, send to the customer and finally close the case.
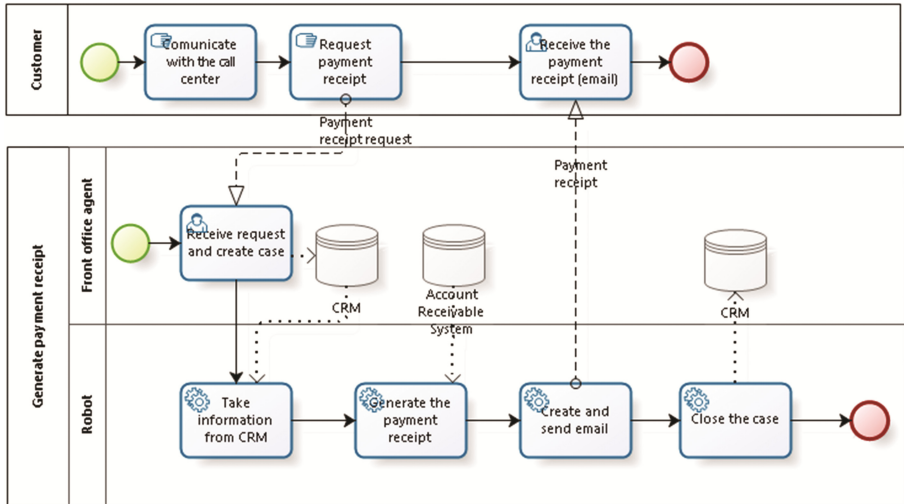

Fig. 2. Generate payment receipt TO-BE automated process

4 Results

For evaluating the results, the agents involved in the operation were divided in two groups, one group with RPA and the other group without RPA. On the group without RPA there was front and back office agents, on the group with RPA there were only front office agents because the robot perform the back office activities. The measures used for evaluating the results were case duration and productivity measured by the number of cases by agent on the evaluation period.

Table 1 shows the results on a one week evaluation period. The main benefit is productivity improvement measured by cases per agent, showing that the group with RPA could handle 21% more cases than the group without RPA. This productivity improvement is part of the benefits expected from RPA and for this BPO provider means that RPA could increase its capacity by 20% on this business process.

On the other hand, mean case duration was measured showing that the group with RPA has only 9 s less duration than the group without RPA. By surprise, reduction in terms of percentage is just 2%. One of the reasons for this is that some skill workers could perform the back office activities very fast, even faster that the software robot that imitates human behavior, with the difference that one license robot could perform several cases at the same time.

Table 1. RPA implementation results

Group with RPA	Number of Agents	22
	Mean case duration (seconds)	431
	Total number of cases	7163
	Cases per agent	326
Group without RPA	Number of Agents	13
	Mean case duration (seconds)	440
	Total number of cases	3505
	Cases per agent	270

5   Conclusions and Further Research

RPA is an automation technology based on software tools that could imitate human behavior for repetitive and non-value added tasks such as tipping, coping, pasting, extracting, merging and moving data from one system to another. The main benefits of RPA are cost reduction, increasing process speed, error reduction and productivity improvement.

When it comes to deciding on the use of RPA, companies should considerer that RPA is more suitable for high volume standardized tasks that are rules driven, where there is no need for subjective judgement, creativity or interpretation skills. Back office business process such as accounts payable, accounts receivable, billing, travel and expenses, fixed assets and human resource administration are good candidates for RPA. Also the back office part of customer service processes.

On the implementation side, it is important to consider that RPA doesn´t store any transactional data and does not require a database. RPA sits on the top of existing systems and access these platforms through the presentation layer. RPA solutions do not require programming skills for configuring the software as RPA interfaces work like BPMN modeling packages, by dragging, dropping and linking icons. Time and effort required to implement RPA are considerable less than automation technologies like BPMS.

The main benefit of RPA is cost reduction, based on productivity improvements as the case study reveals. Other benefits such as process agility are relative to the RPA configuration, hardware capacity and response time of the applications that the robot needs to access. Error reduction is also a measure, that although was not measured on the case study, could be improved by RPA.

RPA is one of the automation tools that need to integrate with other tools like BPMS and in the near future with cognitive automation tools. Technologies like IBM's Watson are being adopted for business process where unstructured information is analyzed for automating cognitive tasks. Future studies are required on how to combine these technologies.

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