ROBOTIC PROCESS AUTOMATION (RPA) IN THE DEVELOPMENT AND CREATION OF COMPANIES

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ABSTRACT

The subject covered in the article is Robotic Process Automation (RPA). This area includes technologies for optimizing resources, through methods such as the implementation of automated software. The general objective of the research is to demonstrate the ease of creating or outsourcing an RPA in processes, thus encouraging the insertion of new companies in the current market or their consolidation. RPA promotes agility, integrity and optimization of procedures for various task models. In the classification by type of collection, this article sought, by means of a bibliographical survey based on scientific articles on the subject, to exemplify and elucidate the importance of process automation in the current world market scenario. The research, in turn, was written based on data analysis, experiments and books, to authenticate the importance and technological advances in this area. The results analyzed boost the perception of ease of implementation and time management, corroborating the increase in profits and reduction in production costs.

Keywords: *Automation; RPA; robotics; artificial intelligence.*

1 INTRODUCTION

Nowadays, competition between companies in the market is highly fierce. In this scenario, it should be stressed that, according to Charles Darwin's Theory of Natural Selection, the organization that best adapts to the environment and its circumstances has the best chance of remaining in the market. Regardless of the niche in which the company operates and the type of work it offers, be it a service, online or physical product, it is necessary to optimize the entire production process, from the conception of the project to the final delivery to the client.

In order to do this, it is necessary to take the study of management methodologies seriously, constantly attributing robotic process automation (RPA) to

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this ideological bias. This is proving to be an excellent innovation option because its rise and relevance today is linked to its high potential for improvement. For these reasons, the abstraction of the concept is of clear importance, as its current impact affects any area that has processes, corroborating the prominence of companies that apply it.

The subject of the scientific article is robotic process automation (RPA) in the development and creation of companies, analyzing the impact on the reality of programming to optimize time and resources in order to increase profits.

The purpose of the study was to demonstrate how easy it is to create or outsource an RPA in processes. In short, there is no doubt that it is not necessary to consolidate the idea of a large company in order to investigate or apply the creation of RPAs in processes. An important and strategic step in the maturity of the management idea, if applied as soon as possible, can effectively lead to better results. Furthermore, the first benefit after implementation would be a significant gain in production time. In this way, resources can be used more effectively for more relevant tasks, where they are supposed to be dependent on the knowledge and decisions of employees.

To obtain the results, the bibliographic method was used, considering the fact that this is a relatively new topic for society, since it can impact the lives of many people, as it involves the mutual relationship between human beings and machines. In view of the above, it is considered that by better managing the time of the tasks performed, new possibilities for investment and technological advances are opened up, determining that there is no reason for human beings to perform repetitive tasks, which RPA could do error-free, thus obtaining the best possible performance.

2 ROBOTIC PROCESS AUTOMATION (RPA)

RPA is a software program or set of programs that are used to automate tasks that would previously have been done manually by a company’s employees, simulating actions carried out by these users in a manageable or in-process interface, without interaction with the user. The aim of this program is to achieve full automation of a process and, when this is not possible, it means that the process is not fully repetitive, i.e. it requires decision-making. In this case, there needs to be a user controlling and injecting data into the RPA so that it can know what needs to be

done (Santos, 2020).

> At the level of business processes, the concept generally refers to the configuration and use of software to carry out repetitive, low value-added work that was previously done by people, for example the transfer and integration of data from multiple sources such as email (Santos, 2020, p. 24).

2.2 BENEFITS

According to Scherman (2018), the benefit of RPA technology is to automate manual and repetitive processes, using specialized software to reproduce tasks such as downloading files and filling in forms.

> The benefits pointed out, then, are: (i) a reduction in process time; (ii) an increase in quality with a 100% reduction in errors, since once the error has been corrected, it will never be repeated; (iii) an increase in the speed of operations; and (iv) quality in processes (Scherman, 2018, p. 7).

In addition to these advantages, Santos (2020) adds that the RPA can work for twenty-four hours without stopping, getting distracted or tired, whereas an employee would have to fulfill the maximum amount of hours required by the CLT (Consolidation of Labor Laws) and could be subject to these adversities. In order to enjoy these benefits, it is necessary to implement technology in certain activities.

> The implementation of RPA requires an assessment of the process or task performed, in order to verify the feasibility of implementing this resource. Resource IT Solutions (ibid.) recommends that organizations draw up a survey of their processes, tasks and data. Repetitive processes, such as manual interconnections where systems do not communicate with each other, are the most suitable for automation. (Scherman, 2018, p. 7)

3 TYPES OF PROCESSES

According to Turban and Volonino (2013) *apud* Scherman (2018), a process or activity is the set of routines carried out by an entity with the aim of making the business better, producing something of value for the company, while governed by rules relating to a certain purpose.

Similarly, Oliveira (2009), *apud* Scherman (2018), states that the process would be the set of logically related sequential activities, with the aim of preferably serving the internal and external customers of a given company.

Therefore, Scherman (2018) concludes that a process must add value to the organization, and this value may not necessarily be monetary.

> There are two types of processes: production processes and business processes. The production process is defined as the use of resources (material, personnel, financial and technological) in order to achieve the organization's objectives. Business processes are a group of logically related tasks that use the organization's resources and support production processes (Lopes, 2020, p.10).

4 CRITERIA FOR SELECTING PROCESSES FOR AUTOMATION

It is important for companies to be aware of the criteria to be taken into consideration when choosing business processes and to focus on processes that have outstanding characteristics. For example, by presenting a high number of transactions, by driving the request for several access calls to applications, by interacting with stable systems for long periods, by need minimal human intervention, have few exceptions in their execution, and have high availability and quality of digital data that requires data without exceptions and failures for full operation (Geléa; Barbosa, 2021).

> The automation of this type of process has significant benefits, namely improved predictability, repeatability and integration of services, reduced costs and operational risks, increased productivity and the level and satisfaction of IT services (Geléa; Barbosa, 2021, p. 6).

5 TYPES OF AUTOMATION

Wencelewski, Paixão and Nascimento (2019) explain that, as with the types of processes, the types of automation are also classified into two groups: assisted automation and unassisted automation. In this context, they elucidate the origin of assisted automation as an executable tool and its initial difficulties. This type of automation, according to Wencelewski, Paixão and Nascimento (2019, p.63):

> [...] it began as a tool to improve the productivity of call centers, where agents would trigger a series of automated steps through various applications installed on their computers. This type of approach has drastically reduced processing time, resulted in savings and improved the customer experience. In this way, long and complex processes have been replaced by simple clicks, but one caveat of this type of approach is that it is very susceptible to changes in environmental

> settings, such as different video cards, resolutions or video configurations. (Wencelewski; Paixão; Nascimento, 2019, p. 63).

Similarly, unattended automation differs in that it doesn't require an employee to operate the computer, it just wants it to start or finish running. However, it has the disadvantage of requiring the availability of digitized and structured data. If there are no means of making them available, it is advisable to divide the process between human execution and automated processes, i.e. to carry out assisted automation (Wencelewski; Paixão; Nascimento, 2019).

6 HOW TO IMPLEMENT AN RPA

It is necessary to reconstruct business processes, using a set of methodologies and technologies, with the aim of optimizing and separating the processes into stages, in order to better understand their functionalities and responsibilities, not only, but also this procedure is variable between each process and the needs of each company. An RPA can be acquired by making it yourself, using programming or specialized RPA tools offered by companies dedicated to this service (Lopes, 2020).

> RPA is very easy to set up, so developers don't need to have any programming knowledge. RPA software interfaces resemble those of Microsoft Visio, in which code is generated by dragging and dropping, drawing icons that represent stages of processes that you want to automate (Lopes, 2020, p. 23,24).

Its simplicity is a great motivator for companies to want to outsource the process of making and implementing the RPA, only needing to hire a service, as reaffirmed by Lopes (2020, p. 29):

> The right choice of automation software is the key to implementing an RPA quickly and efficiently, so it is essential that companies choose the tool that best suits their business. By mid-2017, more than 45 RPA tools were available, with Blue Prism being the market leader.

6.1 IMPLEMENTATION COSTS

Suri *et al*, (2017) *apud* Breternitz and Luna (2020), explain that the biggest costs of an outsourced RPA tool are related to obtaining a license and maintaining it afterwards. Nevertheless, Lacity *et al.* (2015), *apud* Breternitz and Luna (2020), state

that this investment has a quick return on money and a solid return on investment, when managed correctly. They concluded that the costs of this investment should be constantly reduced over time.

6.2 IMPLEMENTATION DIFFICULTIES

Asatiani and Penttinen (2016), apud Amaral (2020), report that there are three difficulties in implementing an RPA:

> Firstly, although front-end integration brings flexibility and speed with which it can be implemented, it is still inferior to back-end integration designed for machine-to-machine communication. Secondly, despite all the disadvantages associated with outsourcing, this practice has a proven track record, backed up by numerous business cases and decades of experience; RPA, on the other hand, although highly promising, lacks similar credentials. Third is the impact of RPA on current employees, although post-implementation feedback on RPA may have been positive and no significant job losses have occurred (Lacity, Willcocks, & Craig, 2015), employees may see robots as direct competitors in their work which can create tensions between hierarchy and workers. Any introduction and implementation of RPA must be handled smoothly and communicated properly (Amaral, 2020, p. 32).

6.3 IMPLEMENTATION IMPACTS

Santos (2020) highlights the impacts pointed out in his interviews, in general, by the interviewees, as positive and sometimes even motivating, and they can be divided into those that can be measured quantitatively and those that are only perceived by the results of employees and companies. The interviewee, referred to as “C” by Santos (2020)**,** reports that the economic impacts were positive when measuring the performance of the robots (automation software) in certain areas:

- Number of automations, which as the name suggests, quantifies the number of tasks that have been carried out;
- Running time during which the robots remained working;
- “FTE (Full time equivalent) return”: this is the conversion of the hours that each task would take humans to carry out. In FTE we can obtain, in euros, the value generated per month from each robot that was in operation.
- RORT (Return on run time), which is indicative of the hourly productivity of each robot, showing those that are being most and least productive.

Santos (2020) reiterates what has already been said in the definition of APR as a procedural effect. This is because humans are more likely to make mistakes than robots that have been created and programmed to always behave in the same way. If the robot is not programmed with defined rules, clear and structured data, there may be errors in execution, and these excess errors are one of the limitations of autonomous automation. If not detected, they will be repeated endlessly in production. Similarly, as employees stop performing repetitive processes and start carrying out activities that add more value and provide more critical analysis, the company leads to increased productivity in the activities carried out.

7 MATERIALS AND METHODS

In order to carry out the research, data was sought through bibliographical research in books and scientific articles. This data contributes to a more simplified explanation of the methods and stages of creating an RPA. It has been shown that anyone with programming skills can develop an RPA, regardless of the level of complexity of the task to be automated.

In order to choose the task to be automated, the growing popularity and emergence of new podcasts on the YouTube platform was taken into account. Nowadays, people are making money with this new format, but the video ends up being too long, thus generating little engagement. Consequently, thanks to the demand for smaller videos of the same quality, a new content niche has been created. To make a video in this new format, the process of watching the complete original video, separating out its best moments, editing, rendering and putting the video out for people to watch takes a long time. So this is a perfect opportunity to test the creation of an RPA in task optimization and time management.

The programming language used to create the research was NodeJs, purely for reasons of convenience and familiarity with the language. It’s worth noting that any high-level language could have been chosen for this, since each one has its own way of writing, but leads to the same resolution of the problem. The type of automation to be used was assisted automation, because of its equivalence to unassisted automation.

The desired results in relation to the creation of RPA were obtained by means of research, generally experimental, since it involves the direct manipulation of data

in a simulation of a real problem in order to explain the causes and effects of RPA. However, it also has the characteristics of exploratory research, as it aims to provide greater affinity with the topic, fostering a panoramic view of the situation for the initiation of new research in this growing area.

7.1 SEARCHING FOR DATA

The first step was to group some YouTube podcast channels by their unique identifiers, i.e. their id on the platform, through an https request using the GET method.

Figure 1 - Channels with their ID
Source: Prepared by the author.

The structure of the project was modularized so that each file was only responsible for one function, in line with good programming practices, with the aim of avoiding changes in more than one place in the event of errors. Therefore, an orchestrator has been defined that will ask the user which type of operation the RPA should proceed with. To summarize the application, we will focus only on the main function of RPA, as it is the most extensive and has the most processes. The other functions are just parts of the main function. For example, by choosing the “downloadVideo” function, it is assumed that the user only wants to download the video from the internet. Therefore, it is not necessary for the RPA to edit or render it. Depending on the type of operation, the RPA must search for the necessary

information in communication with the Application Programming Interface (API) offered by Google, or by *webscraping*[1] a web page, and if a decision needs to be made, it must ask the user which way to proceed.

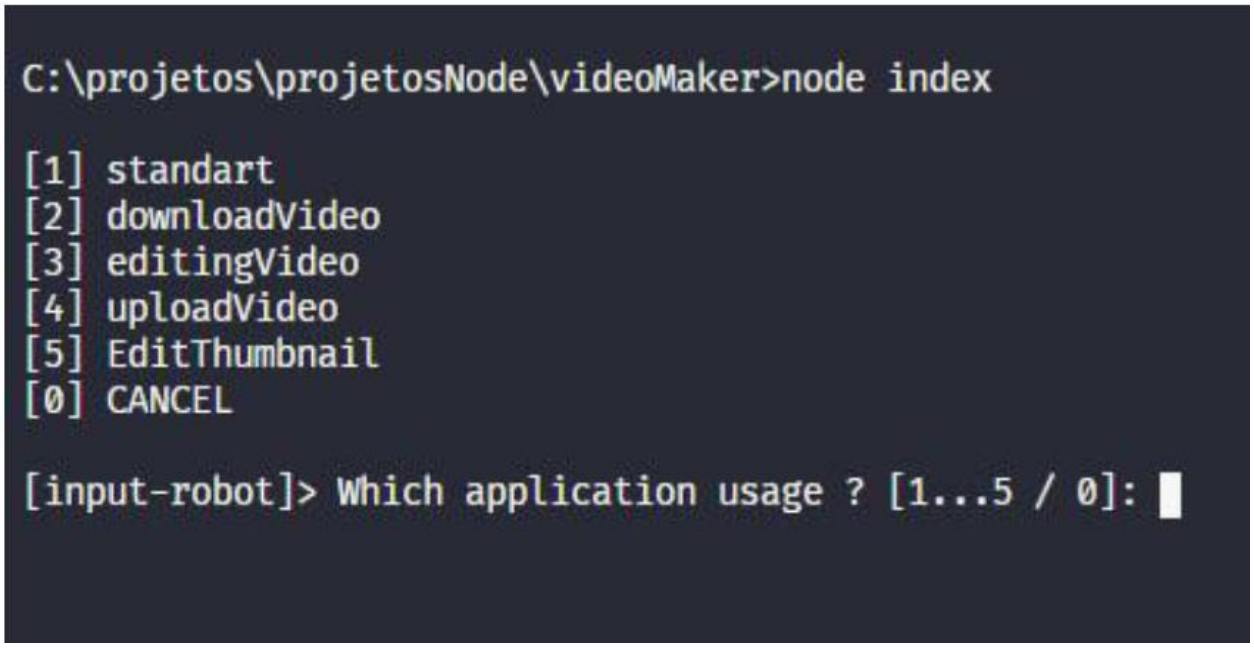

Figure 2 - RPA questioning the type of use of the application
Source: Prepared by the author.

Once all the video information has been collated, it is saved in text files.

Figure 3 - Saved video information
Source: Prepared by the author.

[1] This kind of “mining” of the Internet involves extracting relevant information from a given site and then analyzing it. This data will be used to improve decision-making with a greater chance of success. Available at: < https://rockcontent.com/br/blog/web-scraping/>. Accessed at: 10 Aug 2021.

Figure 4 - Example of lines taken from the video
Source: Prepared by the author.

7.2 MANIPULATING RESOURCES

Once you have the information you need for editing, you need the video. RPA then downloads this material with the information it has.

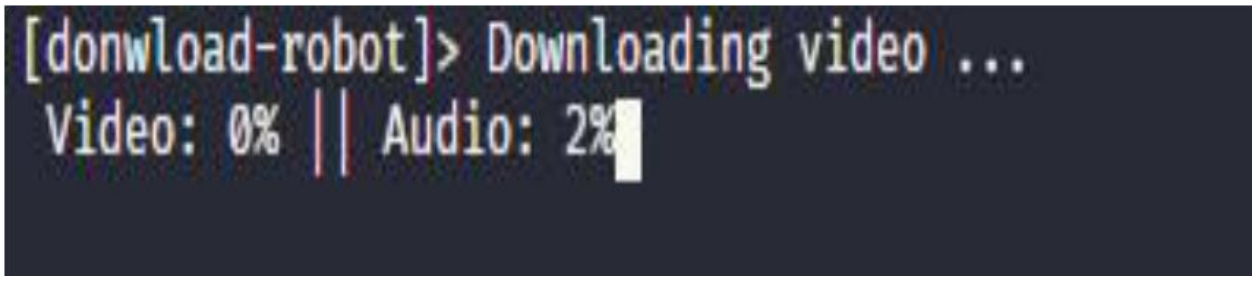

Figure 5 - Downloading the video to edit it
Source: Prepared by the author

Then you need to edit the material. The RPA first edits the thumbnail[2] with the image it downloaded via Google's Custom Search API, as well as separating the best moments of the video for future rendering. The RPA uses the saved lines from the video, as shown in figure 4. They are sent to the Natural Language Understanding (NLU) API, one of several APIs that make up Watson. This, in turn, is an artificial intelligence from International Business Machines (IBM). In short, Watson reads the entire video and returns to the user to choose the most important words. Each word is filtered in the video, thus obtaining the times that each scene should have for the new video.

[2]It's a thumbnail version of images used on the Internet to facilitate searches. Available at: < https://rockcontent.com/br/blog/thumbnail/>. Accessed at: 10 Aug 2021

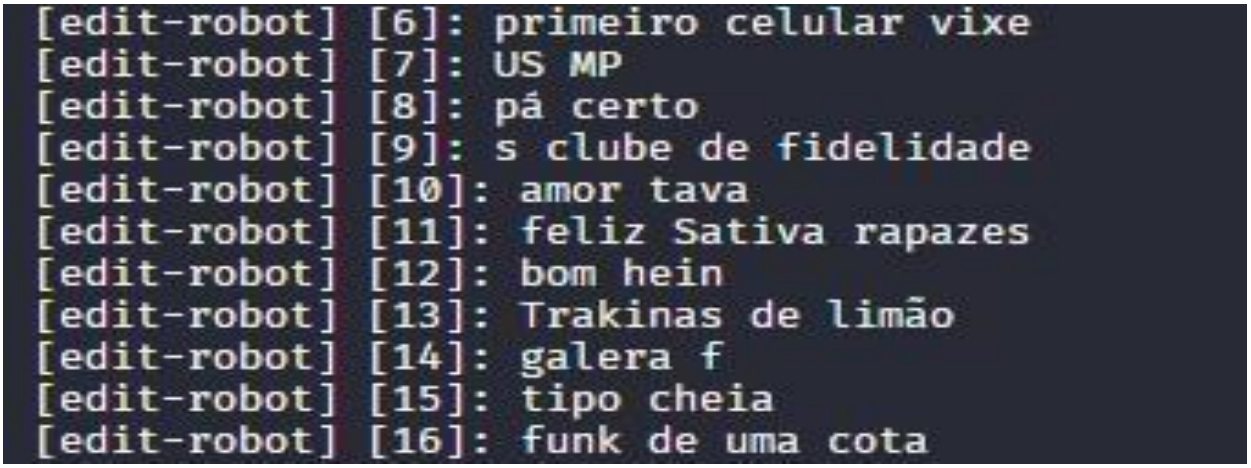

Figure 6 - Watson returning the most important words from the video.
Source: Prepared by the author

RPA then renders the video and uploads it to YouTube with a title, description and thumbnail.

Figure 7 - Video available on Youtube.
Source: Prepared by the author.

8 RESULTS AND DISCUSSION

After correcting the problem exposed in the previous methods, it was observed that the greatest difficulty would be the time taken to perform the task. The time varies depending on the size of the video to watch, the number of times watching to separate the best moments, editing, creating the thumbnail and posting on the platform. However, it would take one or more days, depending on the number of people working and their efficiency.

After implementing RPA, the average time spent is now a maximum of three hours. It is only necessary to increase the number of channels available, as shown in Figure 1. And then, during the course of the program, choose keywords previously analyzed by Watson, IBM's artificial intelligence, to separate the best moments of the video, as exemplified in Figure 6.

Watson's artificial intelligence, by analyzing all the lines in the video, makes the quality of the parts superior compared to the manual process, given that Watson has been trained to detect the most important parts of a sentence. Therefore, all the video time options that the intelligence provides already have a certain degree of quality, so it's up to the user to decide which one they like best and inhibits any quality errors.

As presented by Geléa and Barbosa (2021), an RPA was used in customer service at a pharmacy. The service was provided on three different platforms: online, e-mail and telephone. From January to May, there was a need to increase the number of robots, as the number of calls began to grow after the efficiency of RPA was shown to be superior to manual calls. At the end of the test period, the RPA was 98.98% accurate throughout the entire order fulfillment and creation process.

The results presented by Santos (2020) were collected from Siemens' Lisbon Tech Hub company in Portugal, which already used automation tools in its routines. The tool in question was offered by the company UIPath and has the same name as the supplying company. The results came from a survey with the employee responsible for the RPA development team in Portugal. In short, he claims that Siemens has always focused on technological innovations and, by implementing this tool, it has reduced the time it takes to perform tasks by one fifth of what it used to take. UiPath was chosen for reasons of usability and the cost of its license compared to the others.

9 CONCLUSION

Based on the articles studied for this paper, it became clear that process automation is an important concept. However, in recent years it has gained more notoriety and robustness. Despite being a relatively new area with few discoveries, it is no longer something unimaginable, related to science fiction.

This rising technology could provide promising results in the not-too-distant future, boosting two areas with it, both for professional offers and investment opportunities.

The research is very recent and will face many obstacles along the way, such as the current prejudice related to workers thinking they are losing their jobs, or the ignorance of thinking of the area as science fiction. In this way, the opportunity to invest in the current market is lost.

In short, this technology has enormous potential in the future, but its evolution does not depend exclusively on technological progress, but also on a change in society, in what we see as the ethics and morals of dividing human labor from a machine.

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