

RPA SOLUTIONS: MANAGING ESSENTIAL TECHNOLOGIES FOR AUTOMATING ORGANIZATIONAL PROCESSES IN THE CONTEXT OF INDUSTRY 4.0 – A CASE STUDY.

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Abstract: Due to the rapid evolution of technology in recent years, the way in which everyday activities are approached is constantly changing. A multitude of innovative technologies based on artificial intelligence, various automation solutions such as software robots (RPA) and process management such as ERP systems have emerged and have brought about changes to many aspects of life. The use of RPA tools within organisations can lead to the optimization of business processes, to the reduction of execution times and cost efficiency and also maintain data accuracy. So in order to stay relevant on the market and improve their operations, companies are turning to these new automation technologies. This article illustrates how software robots (RPA), generated using tools within the UiPath platform, are used to automate the purchasing and sales processes recorded in an organisation's integrated ERP - SAP system. The results highlight the fact that the use of RPA solutions helps to streamline the workflows within the SAP system.

JEL classification: O14, L87, M15, M21

Key words: RPA- Robotic Process Automation, UiPath, SAP, ERP- Enterprise Resource Planning

1. INTRODUCTION

According to experts' studies, it is expected that a number of the jobs involving repetitive tasks that do not require human expertise will be taken over by robots. Recently, most enterprises are beginning to turn their attention to RPA solutions because their use can bring a multitude of benefits, as mentioned in Figure 1, the most important being the significant reduction of workforce costs, the decrease of the time required for the fulfillment of a work-flow, facts that lead to the increase of the profitability of the company in question (Yarlagadda Ravi Teja, 2018). Robotic process automation tools are mainly used by organizations that want to excel on an operational level (Hofmann P., Samp C., Urbach N., 2020).

RPA technologies are based on the combination of machine learning algorithms, artificial intelligence and advanced robotics tools. Also, in order to better understand the idea of using software robots, it is important to first be familiar with the concept on which the Industry 4.0 is based. It aims to optimize business processes, integrating digital and physical technologies in order to streamline the operations and eliminate unnecessary activities (Kaya C. T., Türkyılmaz M., Birol B., 2019).

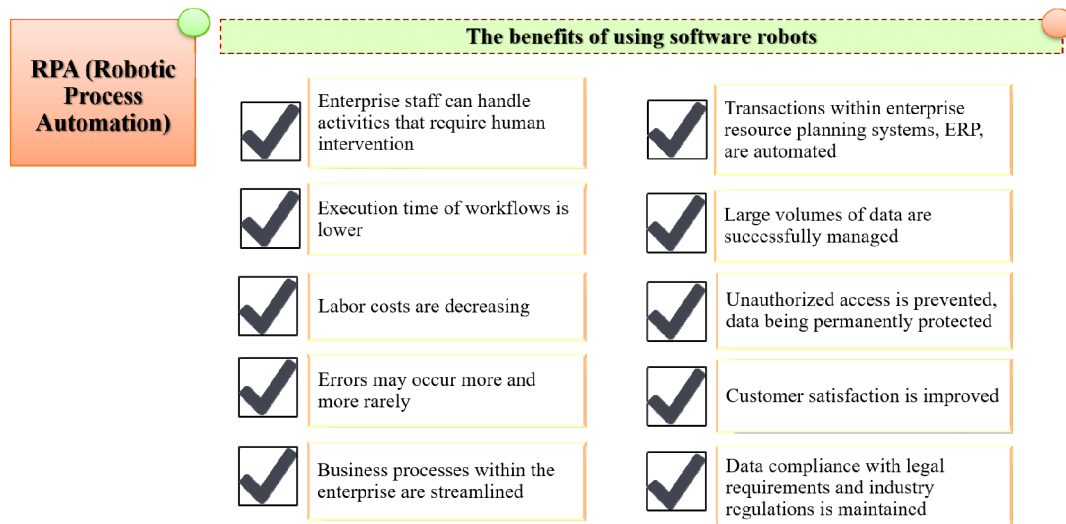


Figure no. 1 – The benefits of using RPA technologies

Software robots are technologies designed to imitate human tasks, performing actions such as opening web or browser applications, inserting certain data into text boxes, extracting information from a page, automatically saving materials and more. RPA solutions are easy to implement and use, allowing the company's staff to focus on more complex activities that require manual intervention (Hofmann P., Samp C., Urbach N., 2020). UiPath company, one of the most well-known suppliers of RPA solutions, provides users with a variety of tools used to create and manage software robots. This company was

founded in Romania and was an immediate success, becoming appreciated and used globally. Within the UiPath platform, a project can be generated, and at the Main Workflow level activities are added, using drag-and-drop feature. Therefore, robots based on advanced technologies perform the activities requested by the user, correctly press keys, navigate the system and retrieve the necessary data (Dobrica L., 2022).

2. LITERATURE REVIEW

In the analysis of the specialized literature that was the basis for the creation of this scientific article, the authors started from a bibliometric analysis based on current hypotheses found in the implementation of intelligent solutions, along the companies that have implemented such technologies. In this scientific article, the authors provide a comprehensive overview of the implementation and management of RPA technologies in the context of Industry 4.0, illustrated by a detailed case study. It covers a number of theoretical notions, what implementation steps have been taken, a number of challenges, what benefits and implications have been highlighted, so that through this study, everything needed to understand RPA solutions can be provided in modern and current industrial contexts (Schlund, S., and Schmidt, M., 2021). In this period, there is more and more discussion about the adoption and adaptation by companies of intelligent technologies for the automation of business processes. Furthermore, the implications that modern technologies based on AI (Artificial Intelligence), ML (Machine Learning) or RPA (Robotic Process Automation), under the umbrella of Industry 4.0, have on them, in order to streamline and optimize their processes through these IT solutions, are intensively discussed. Probably one of the most visible advantages, and of course benefits, come from man-machine collaboration, so a division of work tasks, within an economic process, from O2C or P2P to production, between the workforce (people, physical) and software systems (robots, software bots), is a huge advantage in an increasingly competitive market (Sönmez, Ö.E., Börekçi, D.Y. (2020)). The interconnection between people and machines throughout an economic process, whether sales, purchasing, production or quality management, makes the successful application of intelligent solutions drive an intelligent business environment based on clear directions for business success.

3. RESEARCH METHODOLOGY

Currently, most large and medium-sized companies use systems for resource planning called ERP (Enterprise Resource Planning) systems. This type of ERP system allows organizations to integrate all business processes within a single platform to increase efficiency and maintain their position on the market (Addo-Tenkorang R., Helo P., 2011). ERP systems have become essential tools for the business environment because they bring a multitude of benefits, the most widely used ERP system being SAP. The SAP company was founded in Germany in 1972, and since then there have been several versions of the solutions, the latest version being SAP S/4HANA. The SAP system includes different modules that correspond to the departments inside the organizations, such as the specific sales module (Sales and Distribution), the procurement and materials management processes module (Materials Management), the module for managing financial accounting (Financial Accounting) and many more (Blount Y., Abedin B., Vatanasakdakul S., Erfani

S., 2016). They are interconnected, so if certain functionalities are not properly configured in a specific module, they will not operate properly in the others either.

In the context of a company that uses the SAP system, when the purchase of certain materials from a supplier is wanted, it is necessary to execute a purchasing process that involves data entry into SAP windows by the employed personnel. The same steps are followed in case of selling products to a customer as well. Since filling in data is a repetitive and time-consuming process, it can be done automatically using UiPath software robots. Next will be presented the case study related to the development of a robot generated based on UiPath technologies for the automation of purchasing and sales flows in the SAP system. By implementing such solutions, operational efficiency and user satisfaction will be improved and process accuracy will be ensured.

The purchasing process of the MM module in SAP consists of five main stages through which the supply flow of the organization is managed with the necessary materials. This is also called "Procure-to-Pay". The first stage involves creating a purchase requisition where the wanted products and quantities will be mentioned in order to notify the supplier about the customer's needs. Based on this document, a purchase order will be generated and the next step is to check whether the goods have been received. The invoice will be recorded, thus confirming that the materials have been successfully delivered and that all conditions have been met. The final step consists in making the payment to the supplier, the generated financial transactions being automatically recorded in the accounting record (Kirana D. A., Saputra M., Puspitasari W., 2021).

In the same manner, the sales process of the SD module in the SAP system, "Quote-to-Cash", consists of six steps, starting from the creation of a sales quotation for the customer and finishing with the collection of the payment from the customer. Based on the sales quotation, the corresponding order will be created, specifying the products to be delivered to the customer, the delivery date, quantities and prices. The materials will be picked from storage locations and shipped to the client, documents that certify their release from stock being created. Finally, an invoice will be generated and sent to the customer and afterwards the payment will be received. Therefore, all activities related to sales, to customer orders, to product shipping and invoicing are efficiently managed (Islam M. A., 2019).

As it can be seen, these two important operational processes require quite a lot of time and patience in order to be correctly solved, so in the following lines I will illustrate how they can be automated using an UiPath software robot.

4. RESULTS

The automation of the purchase and sales process requires the software robot to take the data from an Excel document and insert it into the existing text boxes in SAP windows. In order to get to the windows where the extracted information will be filled in, the transaction codes corresponding to each step are entered inside the search bar in the SAP system. The transactions used in the Procure-to-Pay process are as follows: ME51N for generating the purchase requisition document, ME21N for creating the purchase order, MIGO for creating the goods receipt document, MIRO for the invoice and F-53 for payment. This operation is successfully executed using the "Type Into" activity, provided to users by the UiPath platform.

Furthermore, the first two steps of the purchasing process require that the materials, quantities, the plants and respective storage locations of the products to be added using a repetition statement, in this case "For Each Excel Row" because there are multiple records to be inserted. The rest of the data needed to make the documents complete are included using "Type Into". It is also important to note that at the end of completing each document, the robot executes "Click" to press the designated save button in the system. In addition, in order for the created software robot to input the data correctly, the respective text boxes must be indicated on the screen of the SAP interface. Anchors are used in order to identify elements on the screen easily and faster.

For the automation of the Quote-to-Cash process, the activities used are similar, with the help of the "Type Into" activity the transactions are entered: VA21 specific to generating the quotation, VA01 for the sales order, VL01N for creating the delivery documents, VL02N for shipping them to the customer, VF01 for invoicing and F-28 for collecting the payment. As in the case of the procurement process, information related to products and quantities is included in the "For Each Excel Row" and the customer name and date of the documents are filled in via the "Type Into" activity.

On top of that, the Excel document used is specified in the "Use Excel File" activity and the spreadsheet is read by "Read Range", the name of each column will be taken into consideration in order to identify what information needs to be extracted. The quantities of products extracted from the warehouse and the quantities delivered are mentioned in the delivery document, and are also included using repetition statements. The goods are dispatched when the button labeled "Post Goods Issue" is automatically pressed using the "Click" activity.

The information required in order to create the payment receipt document is entered through the "Type Into" activity, and inside the "Type this" instruction, the date, order amount and bank account are specified. The following figure shows some examples of operations within the project created with the help of UiPath technologies.

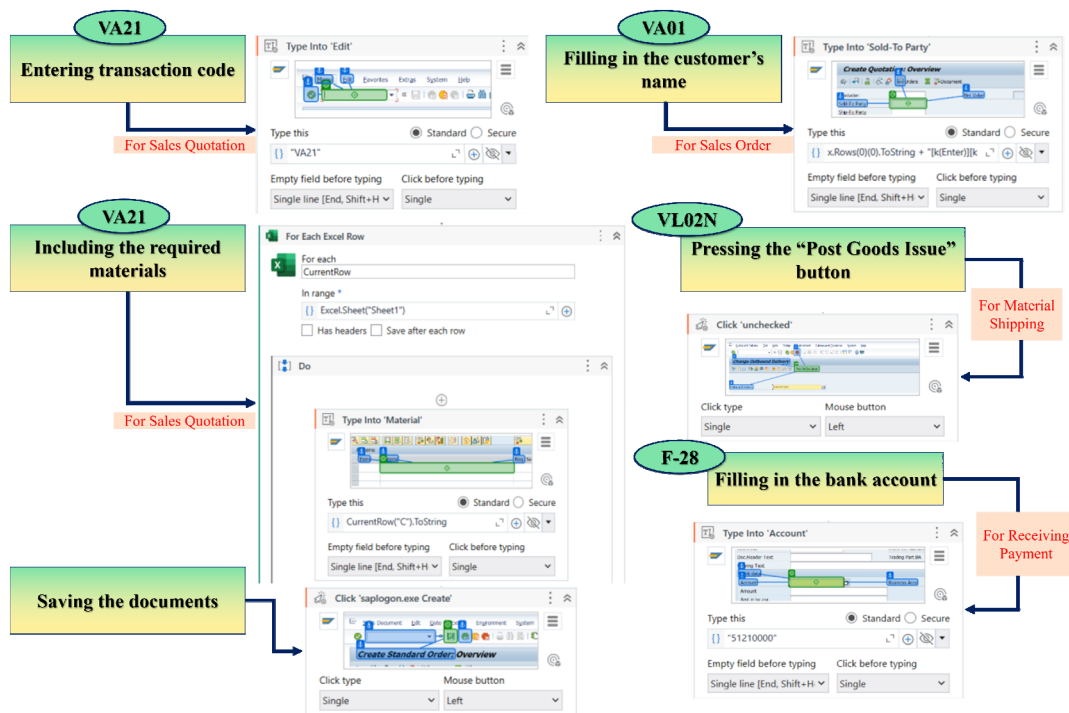


Figure no. 2 – An overview of a few examples of operations achieved with the help of UiPath instruments

5. CONCLUSIONS

In the event that companies want to focus on modernizing their procurement and sales operational processes, RPA solutions are one of the best choices. In addition to significantly optimizing workflows and saving execution time, software robots help reduce the risk of human error and ensure data accuracy. In this paper, it was presented the importance of using a robot created with UiPath technologies in order to automate the procurement and sales processes. Within the created robot, the data is taken from an Excel document and entered into the specific windows in the SAP system. Integrating RPA and ERP tools into organizations can lead to accelerated business processes, real-time access to information and also to the connection of all operations to create an overview that can be easily managed.

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