



Selection of Business Processes for the Successful Application of Robotic Process Automation

Masterarbeit

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1 Introduction

1.1 Relevance and Motivation

Companies are increasingly forced by the ever more complex economic environment to further develop their operational activities in order to remain efficient, cost-effective and customer-oriented to be able to withstand competitive pressure (Brettschneider, 2020; Flechsig et al., 2019). This includes, in particular, the continuous management and adaptation of their processes (Syed et al., 2020). Many companies are today still characterized by inefficiency in operational activities, as a lot of time is spent on simple and repetitive activities (Flechsig et al., 2019). Additionally, technological possibilities are constantly evolving. People have been made to behave like robots for over 130 years. The goal is to increase the efficiency of organizations by structuring, measuring and routinizing work (Lacity and Willcocks, 2016a).

Taking these two aspects into account, robots have long been introduced in the manufacturing industry, for example to automate production activities. However, administrative processes were often neglected and only little automated (Brettschneider, 2020).

In this context, the term Robotic Process Automation (RPA) is emerging more and more, which includes so-called software-based robots, which have to be distinguished from physical and mechanical robots (Timbadia et al., 2020). This technology is a rapidly emerging approach that has attracted great interest in many industries for process automation and thus can be considered a disruptive technology (Ivančić et al., 2019). The basic idea is to use software tools to act like a human employee by recording and mimicking their actions (Martins et al., 2020). In particular, the repetitive, simple and tedious tasks that are seen as rather inefficient can be performed by a software robot (Leshob et al., 2018). No changes to underlying applications or software need to be made using programming, making RPA a fast and easy-to-implement technology (Asatiani and Penttinen, 2016). Various RPA software then serve as tool to support the implementation (Agostinelli et al., 2020).

A study by Capgemini (2021) highlights that RPA is seen as an important technology trend and will become the standard in the near future. According to Gartner (2020), 90% of companies are expected to have implemented RPA as early as 2022, and Transformation Insights (2021) forecasts that the global market for RPA is expected to grow by \$12 billion over the next 10 years, reaching approximately \$13.39 billion by

2030. Despite the growing interest in RPA, there is still a high need for research on the entire topic (Aguirre and Rodriguez, 2017; Geyer-Klingenberg et al., 2018).

The successful implementation of RPA requires several steps (Herm et al., 2020). The biggest challenge is the step of selecting processes that are suitable and profitable for automation by RPA (van der Aalst et al., 2018). This is due to the fact that the number and complexity of business processes in companies is very high which requires a systematic method for identifying these processes of RPA implementation (Eggert and Moulen, 2020).

Accordingly, this thesis is to address the current topic of RPA, in particular with regard to the characteristics of suitable processes, in order to develop a catalog of criteria for researchers and practitioners with the help of the current state of research and an empirical approach.

1.2 Objective, Research Questions and Structure of Work

Despite the growing interest of RPA, the state of research in the context of process selection is still expandable. The literature frequently relies on a few process characteristics, but these relate only to the pure processes, such as being manual, repetitive, simple, rule-based, and structured tasks (Hofmann et al., 2020; Petersen and Schröder, 2020). However, organizational or technical criteria are often disregarded (Syed et al., 2020).

Previous research aimed at identifying criteria for a process to be suitable for RPA has been conducted on the basis of a literature review (Wellmann et al., 2020) or on the basis of expert interviews (Eggert and Moulen, 2020), but has never been compared or combined. Overall, qualitative empirical studies have been the exception so far and have only been applied to a few companies and industries (Eggert and Moulen, 2020). Additionally, the process selection methods that have been published to date mostly provide only high-level decision making and relate to profitability rather than process feasibility (Wellmann et al., 2020). Therefore, a list of criteria was presented, but without allowing practitioners to evaluate processes in a simple way. In this context, Leshob et al. (2018) recommended the implementation of a practicable process selection tool.

For this reason, this work aims to identify criteria that make a process implementable for RPA. The added value of this research is that the methods of the literature analysis and the qualitative research method are combined and compared, to be able to validate already known criteria, but also to identify other criteria that have not yet

appeared in research. In addition, the results will then be used to create a catalog of criteria that will enable practitioners to evaluate processes for their RPA suitability in a time- and cost-efficient manner.

This leads to the following research questions:

RQ1: *Which characteristics should a business process, but also a company, possess in order to be suitable for RPA?*

RQ2: *How can a company determine in a practical way whether a business process is suitable for RPA?*

To answer these research questions, this thesis is divided into the following 8 sections, which build on each other in terms of content and methodology. Chapter 1 could already give an overview of the motivation, relevance, objective and structure of the research work. In chapter 2, the theoretical foundations are presented in order to generate a fundamental knowledge for the further research work. For this purpose, processes, and in a narrower sense business processes, are defined first, before the evolution from Business Process Management to RPA is explained. Furthermore, three different maturity models are presented, which are used in the course of the research work to evaluate companies on three different levels based on their maturity. Chapter 3 first begins with a brief definition of RPA. This is followed by a structured literature review according to vom Brocke et al. (2009; 2015) to present the state of research on RPA. Based on this systematic literature review, important topics such as the functionalities, benefits and challenges, but also the implementation process and a market overview of RPA software are covered. Afterwards, the main topic of the thesis will be addressed, which is the process selection. Based on the literature review, process categories are then identified, which serve as the basis for the qualitative research method in the form of expert interviews, whose methodology for data collection including their analysis and results are then explained in chapter 4. Following a comparison of the literature and the qualitative research findings, a criteria catalog is then developed in chapter 5 to enable practitioners to assess processes for their RPA suitability as efficiently as possible. The results are then evaluated within a single case study in chapter 6. The results of the literature review and the empirical study are summarized and critically discussed in chapter 7 to answer the research questions. In the course of this, the limitations of the research and recommendations for action for research and practice are also discussed. The research work then concludes with a conclusion and an outlook on future research topics in chapter 8.

The case study was only conducted in one company on the basis of 2 processes. Here, the interview group consisted only of employees from the business departments, but not from IT. This led to the fact that not all criteria could be answered with high accuracy. It can therefore be recommended that the developed tool or a similar selection tool should be reviewed within several companies in order to identify additional or redundant criteria and to discuss existing criteria. For this purpose, a wide variety of process stakeholders and IT staff should be involved.

Last, it can be recommended to the future research that more focus should be put on the development of RPA towards IPA. Especially with regard to process selection, it can be expected that by incorporating artificial intelligence or ML, suitable processes will be characterized by different criteria. As a result, selection tools, such as those developed in this thesis, should be adapted.

8 Conclusion and Outlook

This research was originally motivated by the research gaps already outlined in the introduction. Accordingly, the process selection is one of the biggest challenges in the context of RPA implementation, but there is a lack of viable process selection tools to support companies in this step. To overcome this gap, the goal of this work was to find out which criteria a process, but also a company, should have in order to be suitable for RPA. In the next step, a practicable criteria catalog was created, which would serve as a practicable selection tool.

After providing an overview of the theoretical foundations, a systematic literature search was conducted according to vom Brocke et al. (2009; 2015) to identify the criteria that a process, as well as a company, must fulfill in order to be suitable for RPA. A total of 44 relevant papers could be found. Within this literature, 23 criteria could be identified, which could be classified into the categories of quantitative process criteria, qualitative process criteria, and technical criteria. This includes, for example, that a process is suitable for RPA if it is repetitive, routine, rule-based, less complex or standardized, but also characterized by few changes to the involved systems and applications.

A total of 9 expert interviews were then conducted, transcribed and analyzed using qualitative content analysis according to Mayring (2014). In addition to the 23 criteria, 19 further criteria were identified, resulting in a total of 42 criteria that should be met in order to automate processes using RPA. The organizational criteria build a category which was further formed.

The comparison of the results of the two methods revealed that organizational criteria in particular are absolutely not found in the literature. This includes in particular stakeholder involvement during process selection, awareness of process KPIs, digital maturity and RPA governance. Technical criteria, such as system interaction or a stable IT environment, also represent important challenges for the selection of processes, but are not mentioned in the literature.

In order to evaluate not only the process-related criteria, which are considered important both in the literature and in the interviews, a catalog of criteria was created in the following course, which enables companies to evaluate processes holistically for their RPA suitability. Due to redundant and mutually exclusive criteria, a collection of 31 criteria could be developed, which can be divided into four dimensions: RPA maturity, organizational criteria, process criteria and technical criteria. The criteria can then be evaluated on the basis of various questions in order to be able to use the tool to assess the extent to which each area is suitable for RPA. To validate this tool in the form of a criteria catalog, it was applied to two different processes in a consulting company.

However, the limitations of the research must also be considered so that recommendations for future research can be made. From the whole sequence of methodologies, it could be determined that many criteria, can be interpreted differently or cannot be answered by individual persons. Accordingly, it is essential to involve as many possible process stakeholders as possible in the process selection process, such as the employees of the specialist departments, IT and management. On the one hand, this serves to create synergies and makes process selection easier, since both business and technical expertise is involved, but also to raise awareness among the employees who are to use the RPA bots. Likewise, this can also lead to strengthening the digital mindset of employees. Since the boundaries between the technical feasibility but also the profitability of automation are often blurred in the criteria catalog, it is recommended to consider these two goals of process analysis separately in the future.

Furthermore, it will play an increasingly important role in the future that robots are not only developed in a centralized manner, but can also be used in the long term by each employee to design their individual workplace. The trend of intelligent process automation will also emerge in the future, as RPA will be combined more and more with components of artificial intelligence, such as OCR or NLP or elements of ML. In the long term, this will result in an adaptation of the criteria catalog, as more complex and unstructured processes will also be suitable for automation. The option to

customize the existing criteria catalog in a practicable way exists due to the simple configuration.

This research shows that not only criteria that directly affect the process, but also organizational and technical aspects play an important role in the context of process selection for RPA. The developed tool, which is based on these criteria, thus made it possible to provide a practicable and individually adaptable tool for evaluating processes regarding their RPA suitability. Further research and further development of such selection tools depending on the company's objectives, but also technological developments such as IPA, should however be pursued more intensively in the future.