

The Human Side of RPA – Contextualizing Process Actors and RPA Implementation

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Abstract—Robotic Process Automation (RPA) is gaining attention in research as its implementation in the practice is growing. As a form of business process automation, it is part of the toolbox of business process analysts, managers, and IT departments. Nevertheless, the integration of process workers into RPA implementation projects has received relatively little attention despite its importance for the acceptance and use of RPA-technology. This study examines the involvement of process workers in RPA projects from a business analyst’s perspective based on four qualitative interviews. The findings affirm previous research on the origins of RPA project implementation and performance indicators while outlining issues in the implementation and maintenance phases. The perception of the integrated RPA and its effects on the processes by process workers show mixed reactions, where fear of job loss and questioning the automation necessity prevail.

Keywords: *Robotic Process Automation; Business Process Management; technology implementation; participation; employee wellbeing.*

I. INTRODUCTION

As companies demand an increasing degree of process automation to stay competitive in their markets, the use of Robotic Process Automation (RPA) as part of their Information Technology (IT), constitutes a ‘highly promising approach’ [1] that an increasing number of companies rely upon to optimize and implement their internal business processes [2]. As such, this technology has the potential to be included in the Business Process Management (BPM) standard toolbox [3]. RPA uses software based on machine learning techniques to automate repetitive rule-based manual tasks within business processes. Since its introduction in the early 2010s, it has gained popularity in business process automation [4]. RPA offers the potential to automate business processes by taking over the role of employees and streamlining routine tasks without the need for complex programming [5].

However, still many of the initial RPA projects fail. Hence, it is necessary to identify suitable processes and determine the automation requirements for each process step

and use BPM approaches to optimize processes or tasks before their automation. Another aspect of successful technology implementation is its acceptance by future users [6], [7]. Thus, the goal of this study is to explore the status quo of the involvement of process actors in the implementation of RPA projects. Focusing on the workforce, this study also explores measures of RPA success in terms of process performance and the role of security, as suggested by Zhang et al. [7]. It uses qualitative interviews with four business analysts and software developers from Germany with experience in RPA implementation projects.

Based on the qualitative analysis of the interviews as described by Mayring [8], the findings are in line with the research that shows that RPA projects are driven by middle management or organizational units [7], [9], while displaying that the input from affected units and feedback from business units are also being considered. From the implementation perspective, the findings indicate that implementing and maintaining RPA is a significant undertaking that requires additional maintenance effort compared with traditional software. On the other hand, employees’ reactions to RPA projects vary. Post-implementation perception shows improvements in job satisfaction but also challenges related to employee acceptance and perception in the initiation phase. Factors such as fear of change and the time required to adapt contribute to the limited enthusiasm and acceptance of the technology from the process workers. The paper analyses the question of how the opinions and needs of the process workers are considered for the integration of RPA technology in the process. The results of the analysis can be used by process owners, process managers as well as RPA project teams and engineers to ensure an effective technology integration that also considers the opportunities and challenges of the involved process actors.

The paper is structured as follows: first, in section II, the research on RPA implementation and employee involvement is reviewed. Research questions and method are presented in Section 3. The findings are summarized in Section 4. Discussion and outlook finish the paper.

II. RPA IMPLEMENTATION APPROACHES

RPA has been widely adopted in a diverse set of business functions, such as accounting, human resources, finance, supply chain management, marketing, and IT. Many processes in these functions are standardized [10]. In terms of the industrial domain where these services are used, financial services are among the sectors that are the farthest ahead in RPA adoption. Riedl and Beetz [11] provide a literature review that results in the description of the factors to determine business processes that are suitable for RPA integration. Building on this work, Wewerka and Reichelt [2] derive from their literature analysis that best suited for RPA automation are repetitive, rule-based, and complex business processes demanding high manual efforts. Furthermore, as RPA can automate different process tasks, it is designed to be easily implemented and used, and does not require modification of existing IT infrastructures [12]. The RPA literature focuses mostly on successful RPA projects and the positive effects of the RPA implementation, leaving room for further research on failed projects and the challenging effects of the implementation of the technology. The positive effects mentioned in the literature review by [2] can be summarized as resulting in faster, better available, more compliant, and business processes with improved quality. Herm et al. [13] offer a flexible framework as guidelines to be applicable in complex and heterogeneous corporate environments for RPA implementation. They identify three stages of RPA project: initialization, implementation, and scaling. Being focused on the BPM side of project management, process workers are not factored into this implementation framework.

Nielsen et al. [14] suggest five key factors for successful RPA implementation in supply chains. These factors are: prioritizing the benefits that can be obtained through the RPA initiative, performing a feasibility study, assembling a cross-functional team, having a team leader and receiving support from top management. While focusing on the business benefits and project management, the authors leave the role of process out of scope. Nevertheless, automation in the workplace and the adoption of new technologies can affect employees' work experiences in both positive and negative ways [6]. Plomp and Peeters [15] found in their extensive literature review that the implementation of new technology was associated with intensified job demands, including job complexity and workload. Job demands are, e.g., workload, time pressure, and role conflict. They refer to the facets of a job that require continuous cognitive or emotional effort and hence are related to physiological or psychological costs [16]. RPA technology is currently being designed to make administrative work procedures streamlined and effective, which is supposed free up employees' time for more creative work [17].

Nevertheless, RPA significantly alters some tasks and their design, but it does not automate and replace all aspects

of jobs [18]. Implementing RPA in the existing business processes thus, might alter how employees perceive their work, leading to better or worse designed jobs and therefore probably impacting key outcomes related to employee work experiences and wellbeing [15], [18].

The negative impact of RPA on process workers has been analyzed by Peeters and Plomp [6]. Their research revealed that RPA use was negatively related to both autonomy and task variety as job resources, which formed a threat to employee work engagement. Furthermore, they pointed out that the negative association between RPA use and autonomy and task variety could lie in the ongoing implementation process of workplace automation.

Hence, this study follows the call for research by Wewerka et al. [2] and takes into the same line as Peeters and Plomp [6] by addressing process performance indicators in RPA projects but also the question about the perception of the technology by the process workers. The research questions are thus: where during the RPA implementation project is the wellbeing of the process workers being considered and what process optimization factors are expected to be advanced using the RPA.

III. RESEARCH METHOD

To answer the research questions mentioned above, semi-structured interviews were conducted with four RPA implementation experts from German companies that had actively participated in RPA implementation.

TABLE I. OVERVIEW OF THE INTERVIEW PARTNERS FOR THE STUDY.

Interviewer ID	Position	Project domain
1	IT Consulter	Logistics, finance
2	Senior Software Engineer	Logistics, finance
3	Senior IT Consulter	Finance
4	IT Manager	Logistics

The interviews were led in June 2022 via a video conference tool, anonymized and transcribed for qualitative content analysis [11]. For the purpose of the paper, the relevant parts of the interviews were translated from German to English.

Table 1 shows the overview of the interview partners and their roles in the discussed RPA project (see Table 1). In these projects, software engineers are responsible for the development, testing and documentation of the robots, i.e., the software code. They worked closely with the companies that initiated the RPA implementation project and were responsible for maintaining and improving the robots during the project. RPA IT consultants have the process knowledge and experience with the business processes and process steps that are being automated with RPA. Since RPA technology is used across different domains, the interviewed experts could

provide their insights based on experience from different industries.

Content analysis was following the categories of the research questions: Process initiation, process performance indicators, technology implementation and maintenance, technology operationalization, involvement of the process workers, benefits from RPA implementation for process workers, reaction to the project initiation by the process workers Besides process errors (error rate) and rework, security was coded as part of the process quality dimension during the content analysis. The respective indicators were privacy, information security, and access misuse [19]. A detailed overview of the performance indicators as well as the transcripts of the interviews as well as the survey questions can be obtained upon request (see author's email).

IV. SUMMARY OF THE RESULTS

The findings from the interviews are presented here in the categories of the research questions that were also the guiding categories of the content analysis. To understand the influence of employee requirements on the RPA projects and implementation, the initiative for the project initiation was surveyed. Since the technology can support routine and monotonous tasks, project initiation can come from the process workers. Correspondingly, given the complexity of the interaction of the legacy process and the newly introduced technology, it was expected that the roles for its further maintenance were also defined in cooperation with the process workers. Process performance indicators were surveyed in the interview to understand the impact of RPA on the process. Further questions were focused the actual involvement of the process workers and the expected as well as actual benefits and reactions of the process workers.

A. Project initiation and continuity

The interview partners mentioned that the initiative for the RPA projects originated from IT consultants already present in the enterprise, central organizational units that monitor innovative technology implementations, or managers who perceived potential cost savings by the introduced technology that was going to be achieved, among others, via reducing the workforce.

"I was the initiator when it came to implementing RPA. And the second person who significantly initiated [the project] was the finance commercial manager." (Interview partner 4, 00:04:22)

"The initiative came from an innovation team, as they are responsible for providing impulses for innovation, for AI, blockchain, or the use of RPA in the bank. In the next step, it was discussed with the management board and the executive board". (Interview partner 3, 00:08:14)

"The automation idea came from the management level, but employees are against it, you can tell." (Interview partner 2, 00:58:40)

"Most often, the idea comes from managers who can save [costs] by chasing away employees." (Interview partner 2, 01:05:05)

One interview partner added that the introduction of the RPA technology was motivated by its availability and costs as well as enhanced process quality and thus was meant to replace human workers:

"The main motivation, I would also say, is actually these two points. On the one hand, you have to prevent having to hire more people for traditional clerk jobs by saying that before you hire new clerks, you first try to automate things, make things more efficient, so that you don't have to make the investment in new employees and try to automate things and, on the other hand, minimize the risk [of human error] [. . .]". (Interview partner 3; 00:07:08)

However, it is noted that the selection of processes for automation includes input from the affected business units, with a focus on small and less complex processes first, in order to showcase the benefits of RPA. The feedback considering these implementations is collected from, e.g., line managers, but not from the process workers.

"[. . .] provide a computer on which you can run RPA, just with sample data [. . .] of course, then let the whole thing run through. The department checks whether the result [. . .] fits or doesn't fit. Then, [. . .] RPA is really implemented on a company's computer using which you can work with the original data". (Interview partner 1, 00:05:27)

Implementing and maintaining RPA is recognized by the interview partners as a significant undertaking, requiring more maintenance effort compared to the development of the traditional software. Interview partner 1 stressed that RPA implementation and maintenance is a project that should not be underestimated.

"The decisive factor for the implementation of RPA, which I think is always left out a bit, is that it also requires a great deal of maintenance and a great deal of effort to maintain the processes themselves. You can't neglect that. It is also more maintenance effort than if you now develop software and then make it available." (Interview partner 1, 00:35:01).

B. Process Performance Indicators

Key Performance Indicators (KPIs) play a crucial role in the reviewed RPA projects in the interviews, aiding in the identification of automation potential and evaluating the success of the implementation. The following indicators were derived from the research on process performance and were approved as measurable and useful by the interview partners: Process cycle time, processing availability, and cost savings. Process costs are assessed as decreasing after the RPA implementation, e.g., due to the bridging function of the RPA between the legacy systems and new software:

"The API interface is not typically located between web-based platforms and core banking system in banks is often

outdated, sometimes 20 years or older. Investments are too expensive, to build a new banking system.” (Interview partner 3, 00:16:44)

Higher quality, i.e., less mistakes during data transformation, are considered an additional benefit. Furthermore, the interview partners delivered estimation from their experience of the RPA implementation on some of the KPIs:

“The throughput time has gone down for entire processes. I can definitely say that the throughput time has gone down. Also [the] error rate.” (Interview partner 1, 00:47:22)

However, the interviews suggest that process security aspects receive relatively low attention from the RPA implementation team. Their importance is also dependent on the domain the technology is being implemented in. Data protection regulations and industry-specific requirements can hinder the implementation of RPA projects all together, as the compliance with these regulations needs to be ensured before proceeding.

“The security analysis depends on processes and if something changes or is delayed and something goes wrong with the process, you must be able to start over [. . .]”. (Interview partner 4, 00:36:51)

“In a banking context, you have always to assess a certain data protection class when dealing with the data in IT. Depending on the classification, it can even be impossible to implement the process, or you must first ensure that data is protected. If you deal with customer data, it must be ensured that the data is secured. That includes the data protection analysis and data classification”. (Interview partner 3, 00:19:41)

C. Involvement of the Process Workers

Concerning the question about the involvement of the process workers, the interview partners were relying on their impressions from the communication with process workers during the process analysis phase and during the technology implementation. The anonymous survey directed at collecting the information directly from the employees was designed by the researchers but did not receive any responses. Thus, the described results offer only indirect insights on this topic. The interview partners stated that the involvement of process workers in the RPA- implementation project received little attention from the project team. One tool for employee communication, the awareness session, was mentioned. It aimed to describe the project’s goals, processes, and outcomes to the employees from the affected business unit.

The supplementary goals of the meeting were to assure the participation of the process workers during the process analysis and also to prepare the employee for the changes in their responsibilities and tasks after the project.

“At the bank we offered the awareness session to explain how to identify the processes”.

“We have always done awareness sessions, to explain what RPA is. In the cooperation with the business unit, we started firstly with the collecting of KPIs, to understand how often the processes is executed, what is the data format, whether this manual process can be automated”. (Interview partner 3, 00:29:57, 00:03:20)

D. Benefits for Process Workers

As perceived by the interview partner, employee perception in the post-implementation phase shows improvements in job satisfaction, as employees no longer have to perform tedious tasks and the overtime rate has gone down.

“What I took from the [interactions with] employees, [is] this [job] satisfaction. Because there were many of these processes that annoyed them when they had to perform [them]. I can say that RPA has made things much better in many cases. [. . .] Overtime rate is [allegedly] going down because you don’t have to do that tedious work anymore. [Thus,] Advanced training rate can go up, because you have more time to do training.” (Interview partner 1, 00:49:30)

“Due to the compliance requirements in the financial sector, a human actor is required to approve some of the process results that were derived using RPA. Hence, the amount of work for the human actor decreases.” (Interview partner 2, 00:36:41).

One interview partner mentioned that employees that were working in the now RPA supported process can now become inhouse IT developers or business analysts:

“That is, the time that is freed up, in the automated process, can be used to also think about making the activities more efficient. Classic role in the case [would be] business analyst, which may not have existed before.” (Interview partner 4, 00:13:05).

“Another possibility is also [. . .], if IT skills are available in the business unit [or with the process worker], development can of course also be carried out by the business unit.” (Interview partner 4, 00:15:17)

E. Reaction of the Process Workers

However, employee reactions to the announcement of the RPA project vary, with some questioning the need for

automation and others suggesting specific parts of processes for automation while highlighting the value of their expertise.

“Another dark topic is acceptance. From my experience cheering is rarely seen, that is, it keeps within limits. There are many reasons for this: fear of change, costs of (personal) energy, time to adapt. Automation often brings new problems: IT must be built, licenses purchased (costs money, personnel, stress of the employees (due to new tasks formats, etc.)”. (Interview partner 2, 01:05:05)

During the implementation phase, no employee engagement or participation techniques were mentioned besides the feedback from the business unit during the pilot run. Also, not in every business context do the process workers have IT-related skills or are interested in taking over more IT-related tasks and becoming Business Unit Developers [23]. However, the findings also highlight challenges related to employee acceptance and perception of RPA. Some employees express concerns that the implementation is an attempt to replace them or view the consultants involved as strangers working to eliminate their positions. Factors such as fear of change, personal energy costs, and the time required to adapt contribute to a relatively limited level of enthusiasm and acceptance among employees.

“I have noticed that employees have a feeling that the boss wants to get rid of them. The employees consider us [consultants] as strangers who come to get rid of them. From three colleagues, then 2 stay [after the RPA project]. ‘RPA robot is coming to replace me’. Or ‘I actually want to do this task for another 20 years, I don’t want to be transferred somewhere else’. Automation idea comes from management level, but employees are against it, you can tell.” (Interview partner 2, 00:58:40)

V. DISCUSSION AND OUTLOOK

The field of RPA is a relatively new area of research with few scientific works available on the topic. While the subject is becoming increasingly prevalent in industry, the majority of existing research has focused on the process management and performance side of projects. This study addressed this gap by examining the operation stage of RPA implementation, including the acceptance of the technology by process workers and their concerns in the handling of this technology. The presented research is in line with previous findings that successful RPA implementation requires business process analysis and optimization prior to implementation [19]. Also, the findings show that initiatives for implementing RPA tend to be driven by management or a central department within the enterprise, with the expectation of reducing costs, replacing human labor, and improving

process quality. In addition, our study highlights the lack of employee involvement in the RPA implementation process, as well as the need for further research on the implementation of the aspects of process security and the maintenance of the introduced RPA-supported processes.

The limitations of this work are a limited number of interviews as well as the limited information that could be obtained from the process workers directly. Also, the interview partners were project members whose expertise is mostly limited on the RPA projects in the financial industry.

Future work in this field will focus more on the process worker competences and training. A maturity model of process actor participation in IT implementation and co-creation of the RPA-supported processes will be developed and evaluated. Suitable co-creation and participation methods need to be identified and evaluated to ensure an effective and efficient process support and maintenance with RPA technologies. Security aspects will be put into focus in the planning and implementation phase.

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