A typology of challenges in the context of robotic process automation implementation projects

Patrick Kraus and Elias Fißler
Business School, Pforzheim University, Pforzheim, Germany, and

Dennis Schlegel
Faculty of Informatics, Reutlingen University, Reutlingen, Germany

Abstract

Purpose – In recent years, the robotic process automation (RPA) technology has increasingly been used to automate business processes. While a lot of research has been published on the potential and benefits of the technology, only a few studies have conducted research on challenges related to RPA adoption. Hence, this study aims to identify and discuss challenges related to RPA implementation projects.

Design/methodology/approach – Following an inductive methodology, interviews have been conducted with consultants who were involved in multiple RPA implementation projects. Hence, their extensive experience and views contribute to a detailed and in-depth understanding of the phenomena under research.

Findings – The results suggest that there are various process-related, technical, resource-related, psychological and coordinative challenges that must be considered when conducting an RPA implementation project.

Originality/value – This paper contributes to knowledge by presenting a new typology of challenges, as well as providing an in-depth discussion of the individual challenges that organizations face.

Keywords RPA, Implementation projects, Challenges, Digital transformation

Paper type Research paper

Introduction

In recent years, the technology of robotic process automation (RPA) has gained an increasing amount of attention, both in academia and practice (Asatiani *et al.*, 2022). RPA is a type of software that works on the user interface of computer systems, comparable to the way that human employees would do it (van der Aalst *et al.*, 2018). Although the technology has been used in firms for several years, only little is known about the challenges that organizations face in RPA implementation projects, and recently intensified research on RPA challenges was demanded (Fernandez *et al.*, 2024). While there are a few interesting results about challenges from prior studies (e.g. Figueiredo and Pinto, 2021; Suri *et al.*, 2017), especially the question remains open whether the results of previous studies are

transferrable to other contexts, as previous research was conducted in specific contexts such as shared service centres or accounting and auditing firms, which tend to be specific.

Our main research objective is, hence, to provide an in-depth and detailed understanding of the phenomena under research, i.e. to identify and discuss the challenges in detail. Given the limited knowledge and dynamics within the research field, we apply an interpretive qualitative research approach (Lincoln and Guba, 1985), which is in line with our main research objective. Our research questions can be formulated as follows: Firstly, what are the challenges in RPA implementation projects, and secondly, how can these challenges be systematized into higher-level themes?

The paper is structured as follows: we start with a literature review, which provides a brief background of the topic and terminology and synthesizes the results of previous research to provide the initial base for our fieldwork. Subsequently, we discuss our research design and provide rationalizations for the use of an expert interviewing approach. The paper proceeds to discuss the identified challenges in data and reflect our findings in the context of previous work in the field. The paper finally summarizes the main findings and provides an outlook on further developments.

Literature review
Background
The fact that companies are striving for automated business processes is not a new phenomenon (van der Aalst *et al.*, 2018). Established solutions such as business process modelling, which achieve automation by making changes to the back-end of software applications, are often time-consuming and costly (Santos *et al.*, 2020). With RPA, there is a software-based solution that interacts with various computer systems like a human would do (Willcocks *et al.*, 2015). Therefore, so-called software robots are used to learn and automate manual activities at the user interface (van der Aalst *et al.*, 2018; Czarnecki and Fettke, 2021) and to perform these activities quickly and profitably (Enriquez *et al.*, 2020) also making use of additional advanced digital technologies such as artificial intelligence that may enhance and improve the applicability of RPA (Ribeiro *et al.*, 2021). Using RPA can significantly increase process efficiency by improving productivity and reducing errors (Devarajan, 2018). In addition, the technical barriers to implementation are also low, as little to no programming knowledge is required (Madakam *et al.*, 2019) and the literature offers general practical advice about an RPA operating model (Asatiani *et al.*, 2022). Hence, it is not surprising that RPA has been widely used in various areas such as accounting (Eulerich *et al.*, 2022), in purchasing and supply management (Flechsig *et al.*, 2022) and is also being used in newer contexts such as academia (Gupta *et al.*, 2022).

Previous studies and research gap
While many papers have analysed the potential and benefits of the RPA technology (Aguirre and Rodriguez, 2017; Hindel *et al.*, 2020; Radke *et al.*, 2020; Ratia *et al.*, 2018; Šimek and Šperka, 2019; Suri *et al.*, 2017; Wewerka and Reichert, 2020), only a few studies have dealt with challenges of implementing RPA in organizations. Suri *et al.* (2017) have conducted a survey among 42 respondents from international companies across nine industries, identifying 11 challenges when implementing RPA in shared services organizations. They found that the key challenges are the fear of job losses by employees, lack of standard processes, unclear division of responsibilities between IT and functional organizations, lack of resources and budget constraints. The study did not provide any clustering of the challenges. Figueiredo and Pinto (2021) have done semi-structured interviews with ten interviewees, also in the context of shared service centres. They

conclude that the main challenges were the lack of resources managing and developing the software and insufficient internal training, which leads to a lack of expertise. It is striking that only two challenges could be identified by this study. In a similar vein, it is supported by the literature that a lack of process expertise is a substantial obstacle for RPA implementation. Likewise, clearly defined KPIs to measure business process changes as well as managing the changes of workforce responsibilities were identified (Crisan *et al.*, 2023). Dahabiyeh and Mowafi (2023) examined RPA challenges in the context of audit firms in Jordan using semi-structured interviews. While they identified several challenges (e.g. digital readiness, costs, lack of acceptance, lack of technical skills, data privacy and client-related challenges), they allocate these challenges to the typical audit process phases, which limits the application of the challenges in other contexts. Other studies provide further initial insights into RPA challenges in the accounting and auditing context without providing a conceptualization or systematic ordering of the identified challenges (Januszewski *et al.*, 2021; Perdana *et al.*, 2023). Besides the above studies, Pramod (2022) usefully compiled a literature review to identify RPA adoption challenges, classifying them into the categories of technical, operational, human and strategic. The results of the study indicate that there seem to be a limited number of empirical studies, which systematically focus on and analyse various challenges of RPA implementation, as challenges seem to be spreaded across the identified articles. In a similar vein, Syed *et al.* (2020) found in their literature review 15 challenges in the areas of benefits, readiness, capabilities, methodologies and technologies. Based on interviews with 14 participants, Fernandez and Aman (2021) identified challenges regarding the type of task that can be automated, system failures and safety and data privacy in the service context.

Conducting a systematic review of the literature and based on primary data, Herm *et al.* (2023) have developed a framework for RPA implementation projects, which consists of the activities identification of RPA demand, alignment with business strategy, screening of technologies, process selection, software selection, RPA pilot, evaluation of the business case and rollout. Šperka and Halaška (2022) developed a framework for RPA implementation in loan application processes, including data preparation, process discovery, process analysis, process simulation and assessment of RPA candidates. While both frameworks provide substantial support within the RPA implementation process, they do not specifically address the challenges that occur during RPA implementation.

However, due to the variety of underlying studies in different contexts and using different methodologies, it remains unclear, whether the author's analysis is based on a consistent definition of what a challenge constitutes and whether bias is induced from the underlying studies. We have reviewed and discussed several studies, which have addressed challenges in the context of RPA. We agree with Fernandez *et al.* (2024, p. 706), who identified challenges in RPA adoption as an emerging theme and state that there "[. . .] are various challenges associated with RPA which need further research attention". We aim to address this call by developing a typology of RPA implementation challenges. Due to the nature of the previous studies discussed above, there remain several research gaps. Firstly, due to the specific focus of identified studies on shared services organizations and auditing and accounting firms, it is unclear whether these challenges are specific to these types of organizations. There seems to be a lack of prior studies about challenges in a general context. Secondly, due to the limited number of studies and sample sizes, triangulation by further studies would further enhance the confidence of the previously identified results. Finally, there seems to be a lack of typologies of RPA challenges, as some of the studies do not provide a structured ordering of the identified challenges.

Research design and method

Given the novel and dynamic nature of the research field and our research objectives, we apply an interpretive qualitative approach, which allows us to understand the phenomena under research in an inductive and in-depth way (Denzin, 2010; Lincoln and Guba, 1985; Morgan and Smircich, 1980). As digital transformation and digital technologies are rather new phenomena (Hanelt *et al.*, 2020; Verhoef *et al.*, 2021), such as RPA (Syed *et al.*, 2020), it is not surprising that flexible interviewing approaches have proven to be a useful research method in this field (Carstens, 2021; Mergel *et al.*, 2019; Vogelsang *et al.*, 2018). Important for the accomplishment of our research objective was that the participants can articulate themselves in a free and open manner and that new perspectives can emerge during the fieldwork (Kvale *et al.*, 2009). After critical reflection within the research team, we decided to conduct qualitative, semi-structured interviews with subject matter experts (Littig, 2009; Van Audenhove and Donders, 2019), which provided guidance to some extent but also allowed a flexible and open interview approach. Due to the type of participants, other qualitative data collection methods (Easterby-Smith *et al.*, 2008), such as focus groups or observational methods tend to be either impractical or not appropriate to approach the research question, as, for instance, it would hardly be possible to organize focus group discussions with the intended participants, due to time restrictions, geographical reasons and personal contact restrictions during the time of data collection.

As we intend to increase our knowledge, regarding challenges in RPA implementation projects, we need participants who have substantial experience and knowledge in conducting various RPA projects in different companies. Therefore, we recruited consultants who were involved in respective projects and have on average 3.9 years of experience in RPA projects. To generate our sample, we contacted major consulting companies. We recruited consultants from big four consulting companies, IT/technology consulting companies and management consulting firms. Additionally, we were able to include one in-house consultant, who was intensively involved in several RPA implementation projects. We identified potential consultants on the websites of the respective companies and contacted them by email and afterwards conducted follow-up telephone calls. In total, about 20 potential participants have been contacted to generate our sample. Finally, our sample consists of six participants, which can be considered as an adequate sample size in qualitative research (Carstens, 2021; Diefenbach, 2009; Rapanta *et al.*, 2021), especially in relatively novel fields. The sample is shown in the following Table 1:

As can be seen in the table, the interviews lasted between 29 and 86 min and the total interview time was 316 min. While telephone interviewing is a well-established interview form (Cachia and Millward, 2011), online interviewing is a rather new phenomenon, however, since the COVID-19 pandemic, has developed towards an important instrument in primary management research and offers an adequate option (Gray *et al.*, 2020; Nanni, 2021).

Interview	RPA experience	Position	Type of consultancy	Duration of interview
I1	4 years	Consultant	Big four consultancy	86 min
I2	1 year	Consultant	In-house consulting	52 min
I3	2.5 years	Consultant	IT consultancy	29 min
I4	6 years	Director	Management consultancy	48 min
I5	3 years	Senior Consultant	Big four consultancy	60 min
I6	7 years	Senior Consultant	IT consultancy	41 min

Source: Created by the authors

Table 1.
Sample overview

Data collection for our study took place between July and August 2021. In line with these considerations, our interviews were conducted via Zoom. Five interviews were in German and one was in English language. The interview guide consists of the following themes:

- Personal background of participants (academic background, experience, main tasks and projects);
- Requirements for an RPA implementation (company, processes, competences);
- Phases of an RPA implementation project (frameworks, communication, failure of projects); and
- Chances and risks of RPA.

The interview guide was developed partly deductively, based on existing literature, and inductively, complementing the interview guide with novel topics, especially regarding the chances and risks of RPA projects, which primarily provided the base for our novel typology of challenges. The finalization of the interview guide was an iterative process within the research team. It is important to note that a flexible interview approach has been applied to the fieldwork and that open questions have been asked and respective probing was applied, when more information was needed (Rubin *et al.*, 2012). Interviews have been recorded and transcribed afterwards, and listening to the recordings and preparation of the transcripts can be considered as a first step to familiarize with the data. Subsequently, a thematic and iterative coding approach (Braun and Clarke, 2006; King, 2012) was applied by all three authors leading to a comprehensive hierarchical coding structure, which was revised several times. Intense discussions and reflections among the research team ensured the quality of the data analysis procedures (Diefenbach, 2009). The paper proceeds to discuss the major findings of this research in the following section.

Findings and discussion

The interviews with consultants in the field of RPA have generated a novel and comprehensive understanding on the overall topic of RPA, such as about definitions, requirements for the implementation and the procedures of implementation within the projects. However, it was striking that participants made challenges in RPA implementation projects to an important part of the expert interviews, and we provided them the space to do so. Additionally, as identified in our review of previous studies, a research gap is particularly apparent regarding challenges which can lead to a failure of respective RPA implementation projects. Given the significance RPA has gained and the immense investments in RPA (Gartner, 2018), successful RPA implementation can be seen as crucial to many corporate digital transformation initiatives. However, the literature indicates that around 50% of RPA projects fail (Herm *et al.*, 2020, 2023). For this reason, we believe that developing an in-depth understanding of critical challenges provides an important contribution to the field. We, therefore, also integrate several interview quotes, which vividly exemplify the phenomena under research.

A typology of challenges in robotic process automation projects
Data indicate several challenges on which the subject matter experts, in our case RPA consultants, reported. The challenges can be synthesized in the following typology (Table 2) and will be discussed in detail afterwards.

Process-related challenges
It can be observed that a major challenge is related to developing a detailed understanding of the actual process, as initial process documentations rarely exist. Interviewees (I4, I5) indicate that often employees perform processes but seem to have a little understanding of

Type	Challenges
Process-related challenges	Lack of process documentation
	Incomplete process analysis
	Insufficient optimization of processes
Technical challenges	Selection of the appropriate software platform
	Changes to the infrastructure
	Changes to systems and software applications
	Change of source data (internal/external)
	Inconsistent and insufficient error handling
	Unclear responsibilities in authorization management
Resource-related challenges	Lack of expertise
	Lack of staff resources
	Short-term/medium-term dual burden of costs
Psychological challenges	Existence of personal objections
	Existing rejections from the IT department
	Existence of unrealistic expectations from stakeholders
Coordinative challenges	Timely and continuous involvement of the IT department

Source: Created by the authors

Table 2.
Typology of
challenges

what they actually do and developing process documentations considerably increases the familiarization of employees with their processes. A critical review of the actual process is an important prerequisite of a successful automation initiative, as has been vividly reported:

> A further challenge is the review of processes. It is dangerous, when the process has not been analysed in very detail and later, during the development phase, it turns out that it does not make sense what one actually is doing (I5).

> Frequently, new rules have to be implemented and the target process needs to be optimized. Only then automation begins, as it does not make sense to automate a bad process (I3).

There are indications that, in practice, there seem to be problems, especially regarding the optimization and the development of new target process as this generally is a demanding part of the project work. However, to achieve the intended benefits and cost reductions the improvement of process quality is a core prerequisite (Smeets *et al.*, 2021) and a thorough and detailed review and reflection on the processes is fundamental to avoid conceptual shortcomings which could lead to unnecessary changes and a delay of the development process.

Technological challenges
The experts refer to the selection of the appropriate RPA software as a decisive question. Surprisingly, none of the expert participants addressed the issue that front–end automation by means of RPA is always a second-best solution compared to back–end automation within a standardized and homogenized system infrastructure at least from a technological point of view (Hofmann *et al.*, 2020). The selection of the "right" RPA software provider has a huge influence, whether the expectations and benefits can be achieved (I4) and software evaluation and selection in the light of the individual technological challenges has also been addressed in the literature (Bensberg *et al.*, 2021). Various sources of changes may lead to a reduced usability of RPA bots. A considerable challenge is the continuous change and development of the various application systems within the ecosystem in which the bots are

integrated (I3, I5, I6). Every change in the system landscape requires an adjustment of the bot's coding. It can be argued that the stability of the bot considerably depends on the stability of the system landscape:

> Changes of the user interface need to be corrected in the code of the bot. A system-based interface however does not change and is the more stable approach (I3)

> Another challenge is the change of source data. If they are not constant, continuous adaptions to the bot may be necessary and these are extremely time consuming and can ruin the business case (I5)

It may also be the case that the bot accesses external data sources such as websites and minor changes to the HTML structure may lead to a reduced functionality of the bot (I5). The above-described technical changes have a negative impact on the calculated business case and the amortization period and need to be anticipated. Regarding a quick elimination of the interruptions of the bot, implementing a systematic and efficient error handling is a key aspect (I3, I5, I6). Finally, an RPA-bot needs the required system authorizations to fulfil the transferred tasks, and hence, authorization management and clear responsibilities can be seen as another crucial technical challenge, especially in more complex system landscapes and cloud environments.

Resource-related challenges

It can be argued that the development of a stable and well-working operating model, which runs and extends the application of RPA bots within the company, is a requirement in more mature RPA contexts for the long-term successful application of bots after the initial pilot phase and projects. The literature refers, with regard to this, to RPA Centre of Excellence (Anagnoste, 2018; Willcocks *et al.*, 2015), a term also used during some of the expert interviews (e.g. I1). As suggested by Langmann and Turi (2020), it is recommendable to develop staff resources and respective know-how and expertise after the POC phase to support the advancement of the RPA implementation and the automation of further processes. In a similar vein, Anagnoste (2018) recommends building an interdisciplinary team which can independently automate further processes. This is also reflected in our data (I1, I3) and building internal resources is seen as a pivotal challenge to avoid a dependency on external consultants. Consulting companies are quite fast regarding the implementation of RPA and partly also take care of maintenance and support; however, the problem is that internal employees do not learn how to manage the RPA environment by themselves and that the external service is related to additional costs, both issues become more serious, with an increased number of bots and complexity (I1):

> So, the challenge or reason for failure is when you do not focus on internal resources during the pilot project. And with internal resources, I do not mean one or two players, it should be a team with different roles: business partner, business analyst, solution architect, a good developer, who knows everything about RPA. With all the platforms you have so many different features and applications that you can use (I1)

> This is firm specific. Either you engage a consulting company for the end-to-end service or it does make sense to develop RPA key user in the functional areas, who have a strong RPA know-how. This is a proven approach, especially with regard to keep the pipeline filled (I6)

However, the literature also questions whether or to which extent own staff resources need to be built up Schlegel and Kraus (2021) and there are also indications in data that a massive build-up of own employees is not necessarily a prerequisite for a successful RPA initiative, but the identification of key users in the functional areas, who have good knowledge of the

processes, is important, as they guarantee that the pipeline of potential processes for automation is filled (I6) and a comprehensive pipeline of potential processes that can be automated is seen as an essential issue for the continuous progress of the RPA initiative (I1, I3, I6).

Psychological challenges
When observing the discussion on RPA, it can be identified that from a scholarly perspective, that there indeed is an increased interest in research (van der Aalst *et al.*, 2018; Hofmann *et al.*, 2020; Willcocks *et al.*, 2017) and practitioner discourses (PwC, 2020) but also in public media partly indicating that "robots will take over" and that there will be massive job losses, etc. Such media coverage can devastate the perception of a technological solution and psychological aspects represent a major challenge for a successful implementation of RPA. A study by PwC (2020) found that around 20% of companies decided to forego the use of RPA to avoid the potential loss of jobs. An RPA initiative might even be cancelled or not be started at all due to such concerns about the technology (I4):

> If there is a business case but, in the company, bots are seen as a pure mechanism to destroy jobs, you can prepare for the situation that the topic gets a severe political component and then perhaps it will not be followed up (I4).

Data refers to several useful considerations with regard to address such obstacles. It is seen as essential to emphasize that employees develop an understanding what bots are and how they function and that in many projects the main concerns do not come from the involved employees, but rather there is a rejection from the IT department as RPA is seen as an immature and sloppy technology (I5, I6). The following Table 3 summarizes several arguments which could be used to encounter concerns and rejections from the two major stakeholders of RPA projects:

Another major challenge for the successful completion of an RPA implementation project is unrealistic expectations regarding the benefits of RPA which may lead to the situation that advantages and benefits are no longer experienced as such. Hence, ensuring a realistic level of expectations and expectation management is consequently an important issue in RPA projects (I1, I4, I6):

Source of rejection	Consultant	Argumentation to counteract rejective attitudes
IT department		
	I6	Exemplify that a simple implementation of bots is similar to macros, etc., and is mostly limited to POC phases. Mature RPA applications include complex ecosystems, which allow deeper implementations and comprehensive automation initiatives
Concerned employees		
	I5	Increase the understanding and functionality of bots
	I4	Illustrate that the number of repetitive, trivial and error-prone tasks can be reduced
	I5	Emphasize that the daily work routines will be facilitated
	I5	Show that bots are "dumb" and that they can only do what was specified to them
	I4	Clearly indicate that employees will not lose their jobs but that they will have more time to do their job appropriately

Source: Created by the authors

Table 3.
Rejective attitudes and potential argumentations to reduce the risk

When you automate a process, you are increasing the efficiency of the company, but you are not reducing costs because the employee does less, and you are paying for a bot (I1).

Also, the solution providers raise wrong expectations, in the sense that all can be done very quicky, like a spearhead. But the technology also has weaknesses. To change the mindset that a process is automated within two days towards the development of an understanding for the complexity of the matter is always a huge challenge (I6).

Consequently, the volume of cost savings, at least theoretically, depends on the willingness to lay off employees, which could lead to a direct, short-term cost reduction. Otherwise, there occur new cost categories such as license fees, maintenance and infrastructure costs. However, due to efficiency gains there can be overserved indirect benefits and medium-term direct effects in the sense that it might not be necessary to recruit a new employee (I1). There also is the expectation that RPA should be quickly implementable and adjustable as well as scalable (I6). However, it is important to keep in mind that the scalability of RPA differs from use case to use case, and in tendency, the complexity increases with the volume of automated processes.

Coordinative challenges

Data indicate that it can be seen as a pivotal issue to involve the IT department at a very early stage during the project as they provide the infrastructure and systems in which the bots operate (I1, I3, I6), and the IT will become the system-owner of the bot and are hence an important stakeholder. The literature indicates that sometimes, IT is not adequately involved in RPA projects as it is rather seen as a business issue (Lacity *et al.*, 2015; Syed *et al.*, 2020). Moreover, without the involvement of the IT, technical questions might not be addressed adequately during the project work (I1):

This is essential because the IT is strongly involved in administrating the application landscape. In the context of RPA, there often exist dependencies. If the SAP system gets a patch, this has an impact on the bots. With RPA you access existing infrastructure and systems, and the IT has the sovereignty. This means you must integrate the colleagues fairly early during a project (I6).

After having discussed the identified challenges, we move on to summarize our main findings and distil our contribution to knowledge.

Conclusion and outlook
Contribution to knowledge
Our research provides important contributions to knowledge. After having reviewed the existing literature on RPA, our review indicated an important research gap about challenges within RPA implementation projects, which was independently addressed by our subject matter experts in the fieldwork. Previous research identified challenges in specific contexts such as shared service centres or auditing and accounting firms and seldomly provide conceptualizations of RPA challenges. Nevertheless, these studies importantly identified several potential challenges. As our study is based on expert interviews with consultants that were involved in various RPA projects in many different companies, we can contribute a broader perspective of challenges to the academic debate on RPA. Both previous studies found that a lack of resources as well as a lack of expertise represent major challenges. This was also confirmed by our study, and more generally, know-how and expertise are a critical issue in all digital transformation initiatives (Faina and Almeida, 2020; Sousa and Rocha, 2019). However, a new perspective, we identified in the data is, to what extent own expertise and capacities need to be established and what should be done by external service providers. Moreover, our data

indicate that psychological challenges in terms of dismissive attitudes towards RPA can be key challenges within the conduction of an RPA project due to various reasons such as fear of job losses and negative views because of media reporting. We were able to distil several useful strategies and argumentations to avoid the development of overly negative perspectives, and as also found by Suri *et al.* (2017), a systematic and well-organized change management and especially communication is a major issue. Based on our data, we could develop a novel typology of challenges, which, on the one side, provides more detail and depth to already identified and discussed challenges but also usefully added several further challenges, such as several technical challenges to the overall scholarly debate.

Synthesis, limitations and avenues for further research
Our study has both theoretical and managerial implications. The developed typology of challenges theoretically enriches the scholarly debate on RPA challenges, especially in an implementation project focus. Our typology theoretically contributes by adding specific, RPA-related challenges and extends existing frameworks. Moreover, the typology underscores the multidimensional nature of challenges in RPA projects, which can inform future research on technology implementation. It suggests that successful RPA implementation requires addressing a complex interplay of process, technical, resource, psychological and coordinative factors. This holistic view encourages a multidisciplinary approach to understanding and managing technology adoption. By identifying specific challenges in RPA implementation, our typology also contributes to the ongoing research on critical success factors for RPA projects. It may provide a basis for developing and testing hypotheses about the relationship between these challenges and project outcomes. The identified challenges, however, also assist practitioners who are involved in the conduction of RPA projects and may help to successfully manage such projects. Managers could consider our typology as a checklist for comprehensive project planning. Addressing each category of challenges in the planning phase can lead to more realistic timelines, budgets and resource allocation strategies, thus avoiding common pitfalls that lead to project delays or failures. To overcome psychological and coordinative challenges, active and continuous engagement of relevant stakeholders, especially the IT department and end-users, is crucial. This involves setting realistic expectations, addressing personal objections and ensuring that roles and responsibilities, particularly in authorization management, are clearly defined and communicated. The technical challenges outlined in the typology imply the need for flexible infrastructure and governance frameworks that can accommodate changes in software, systems and data sources. This includes establishing clear protocols for error handling and making strategic decisions about software platform selection. As every research activity, our study is characterized by several limitations. Our findings rely on a relatively small sample of experts, which is appropriate for similar research approaches; however, it does not allow generalization, which is also not intended by our study. Moreover, we primarily included external consultants in our sample. These limitations ultimately lead to several suggestions for further research, of which only a few can be indicated here. It could be promising to include data of further stakeholders of RPA projects such as internal employees and responsible managers to complement and validate the findings. To achieve a higher level of detail, it could be useful to apply comparative case study approaches in which a few number of projects are examined in detail. Regarding a broader content-related perspective, it is worthwhile to develop a better understanding of the overall organization of RPA initiatives, and, more generally, digital transformation initiatives with regard to an appropriate balance of own resources and external resources, such as service providers or consultants, which can be used when needed.

References

Aguirre, S. and Rodriguez, A. (2017), "Automation of a business process using robotic process automation (RPA): a case study", in Figueroa-García, J.C., López-Santana, E.R., Villa-Ramírez, J. L. and Ferro-Escobar, R. (Eds), *Applied Computer Sciences in Engineering – 4th Workshop on Engineering Applications*, Springer, Cham, pp. 65-71.

Anagnoste, S. (2018), "Robotic automation process – the operating system for the digital enterprise", *Proceedings of the 12th International Conference on Business Excellence 2018*, pp. 54-69.

Asatiani, A., Copeland, O. and Penttinen, E. (2022), "Deciding on the robotic process automation operating model: a checklist for RPA managers", *Business Horizons*, Vol. 66 No. 1, pp. 109-121, doi: 10.1016/j.bushor.2022.03.004.

Bensberg, F., Auth, G. and Czarnecki, C. (2021), "Finding the perfect RPA match", in Czarnecki, C. and Fettke, P. (Eds), *Robotic Process Automation – Management, Technology, Applications*, De Gruyter Oldenbourg, Berlin/Boston, pp. 47-76.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 37-41.

Cachia, M. and Millward, L. (2011), "The telephone medium and semi-structured interviews: a complementary fit", *Qualitative Research in Organizations and Management: An International Journal*, Vol. 6 No. 3, pp. 265-277.

Carstens, N. (2021), "Digitalisation labs: a new arena for policy design in German multilevel governance", *German Politics*, Vol. 32 No. 2, pp. 249-266, doi: 10.1080/09644008.2021.1887851.

Crisan, E.L., Chis, D.M., Bodea, E.E. and Buchmann, R. (2023), "Mechanisms for robotic process automation implementation in organizations: a systematic literature review", *Journal of Advances in Management Research*, Vol. 20 No. 5, pp. 920-946, doi: 10.1108/JAMR-04-2023-0100.

Czarnecki, C. and Fettke, P. (2021), "Robotic process automation", in Czarnecki, C. and Fettke, P. (Eds), *Robotic Process Automation – Management, Technology, Applications*, De Gruyter Oldenbourg, Berlin/Boston, pp. 3-24.

Dahabiyeh, L. and Mowafi, O. (2023), "Challenges of using RPA in auditing: a socio-technical systems approach", *Intelligent Systems in Accounting, Finance and Management*, Vol. 30 No. 2, pp. 76-86, doi: 10.1002/isaf.1537.

Denzin, N.K. (2010), *The Qualitative Manifesto – A Call to Arms*, Left Coast Press, Walnut Creek.

Devarajan, Y. (2018), "A study of robotic process automation use cases today for tomorrow's business", *International Journal of Computer Techniques*, Vol. 5 No. 6, pp. 12-18.

Diefenbach, T. (2009), "Are case studies more than sophisticated storytelling?: Methodological problems of qualitative empirical research mainly based on semi-structured interviews", *Quality and Quantity*, Vol. 43 No. 6, pp. 875-894.

Easterby-Smith, M., Thorpe, R. and Jackson, P.R. (2008), *Management Research*, 3rd ed., Sage, London.

Enriquez, J.G., Jimenez-Ramirez, A., Dominguez-Mayo, F.J. and Garcia-Garcia, J.A. (2020), "Robotic process automation: a scientific and industrial systematic mapping study", *IEEE Access*, Vol. 8, pp. 39113-39129.

Eulerich, M., Pawlowski, J., Waddoups, N.J. and Wood, D.A. (2022), "A framework for using robotic process automation for audit tasks*", *Contemporary Accounting Research*, Vol. 39 No. 1, pp. 691-720, doi: 10.1111/1911-3846.12723.

Faina, I. and Almeida, F. (2020), "Key competencies for digital transformation in workplace", in Matos, F., Vairinhos, V., Salvisa, I., Edvinsson, L. and Massaro, M. (Eds), *Knowledge, People, and Digital Transformation – Approaches for a Sustainable Future*, Springer, Cham, pp. 219-234.

Fernandez, D. and Aman, A. (2021), "The challenges of implementing robotic process automation in global business services", *International Journal of Business and Society*, Vol. 22 No. 3, pp. 1269-1282, doi: 10.33736/ijbs.4301.2021.

Fernandez, D., Dastane, O., Omar Zaki, H. and Aman, A. (2024), "Robotic process automation: bibliometric reflection and future opportunities", *European Journal of Innovation Management*, Vol. 27 No. 2, pp. 692-712, doi: 10.1108/EJIM-10-2022-0570.

Figueiredo, A.S. and Pinto, L.H. (2021), "Robotizing shared service centres: key challenges and outcomes", *Journal of Service Theory and Practice*, Vol. 31 No. 1, pp. 157-178, doi: 10.1108/JSTP-06-2020-0126.

Flechsig, C., Anslinger, F. and Lasch, R. (2022), "Robotic process automation in purchasing and supply management: a multiple case study on potentials, barriers, and implementation", *Journal of Purchasing and Supply Management*, Vol. 28 No. 1.

Gartner (2018), "Gartner says worldwide spending on robotic process automation software to reach $680 million in 2018", available at: www.gartner.com/en/newsroom/press-releases/2018-11-13-gartner-says-worldwide-spending-on-robotic-process-automation-software-to-reach-680-million-in-2018 (accessed 31 March 2021).

Gray, L.M., Wong-Wylie, G., Rempel, G.R. and Cook, K. (2020), "Expanding qualitative research interviewing strategies: zoom video communications", *The Qualitative Report*, Vol. 25 No. 5, pp. 1292-1301.

Gupta, A., Prabhat, P., Sawhney, S., Gupta, R., Tanwar, S., Kumar, N. and Shabaz, M. (2022), "Robotic process automation use cases in academia and early implementation experiences", *IET Software*, Vol. 17 No. 4, p. 12061, doi: 10.1049/sfw2.12061.

Hanelt, A., Bohnsack, R., Marz, D. and Antunes Marante, C. (2020), "A systematic review of the literature on digital transformation: insights and implications for strategy and organizational change", *Journal of Management Studies*, Vol. 58 No. 5, pp. 1159-1197, doi: 10.1111/joms.12639.

Herm, L.-V., Janiesch, C., Helm, A., Imgrund, F., Fuchs, K., Adrian, H. and Winklelmann, A. (2020), "A consolidated framework for implementing robotic process automation projects", in Fahland, D., Ghidini, C., Becker, J. and Dumas, M. (Eds), *Business Process Management. BPM 2020. Lecture Notes in Computer Science*, Springer, Cham, pp. 471-488.

Herm, L.-V., Janiesch, ·C., Helm,. ·A., Imgrund, F., Hofmann, A. and Winkelmann, A. (2023), "A framework for implementing robotic process automation projects", *Information Systems and e-Business Management*, Vol. 21 No. 1, pp. 1-35.

Hindel, J., Cabrera, L.M. and Stierle, M. (2020), "Robotic process automation: hype or hope?", *Proceedings of the 15th International Conference on Wirtschaftsinformatik*, Potsdam.

Hofmann, P., Samp, C. and Urbach, N. (2020), "Robotic process automation", *Electronic Markets*, Vol. 30 No. 1, pp. 99-106.

Januszewski, A., Kujawski, J. and Buchalska-Sugajska, N. (2021), "Benefits of and obstacles to RPA implementation in accounting firms", *Procedia Computer Science*, Vol. 192, pp. 4672-4680, doi: 10.1016/j.procs.2021.09.245.

King, N. (2012), "Doing template analysis", in Symon, G. and Cassell, C. (Eds), *Qualitative Organizational Research: Core Methods and Current Challenges*, Sage, London, pp. 426-450.

Kvale, S. and Brinkmann, S. (2009), *InterViews: Learning the Craft of Qualitative Research Interviewing*, 2nd ed. Sage, Thousand Oaks.

Lacity, M., Willcocks, L. and Craig, A. (2015), "Robotic process automation: mature capabilities in the energy sector", No. Paper 15/06, The Outsourcing Unit Working Research Paper Series.

Langmann, C. and Turi, D. (2020), *Robotic Process Automation (RPA) – Digitalisierung Und Automatisierung Von Prozessen: Voraussetzungen, Funktionsweise Und Implementierung Am Beispiel Des Controllings Und Rechnungswesens*, SpringerGabler, Wiesbaden.

Lincoln, Y.S. and Guba, E.G. (1985), *Naturalistic Inquiry*, Sage, Beverly Hills.

Littig, B. (2009), "Interviewing the elite—interviewing experts: is there a difference?", in Bogner, A., Littig, B. and Menz, W. (Eds), *Interviewing Experts*, Palgrave Macmillan, London, pp. 98-113.

Madakam, S., Holmukhe, R.M. and Kumar Jaiswal, D. (2019), "The future digital work force: robotic process automation (RPA)", *Journal of Information Systems and Technology Management*, Vol. 16, pp. 1-17.

Mergel, I., Edelmann, N. and Haug, N. (2019), "Defining digital transformation: results from expert interviews", *Government Information Quarterly*, Vol. 36 No. 4, p. 101385.

Morgan, G. and Smircich, L. (1980), "The case for qualitative research", *The Academy of Management Review*, Vol. 5 No. 4, pp. 491-500.

Nanni, R. (2021), "The 'China' question in mobile internet standard-making: insights from expert interviews", *Telecommunications Policy*, Vol. 45 No. 6, p. 102151.

Perdana, A., Lee, W.E. and Mui Kim, C. (2023), "Prototyping and implementing robotic process automation in accounting firms: benefits, challenges and opportunities to audit automation", *International Journal of Accounting Information Systems*, Vol. 51, p. 100641, doi: 10.1016/j.accinf.2023.100641.

Pramod, D. (2022), "Robotic process automation for industry: adoption status, benefits, challenges and research agenda", *Benchmarking: An International Journal*, Vol. 29 No. 5, pp. 1562-1586, doi: 10.1108/BIJ-01-2021-0033.

PwC (2020), "Robotic process automation (RPA) in der DACH-Region, robotic process automation (RPA) in der DACH-Region".

Radke, A.M., Dang, M.T. and Tan, A. (2020), "Using robotic process automation (rpa) TO enhance item master data maintenance process", *Logforum*, Vol. 16 No. 1, pp. 129-140.

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L. and Koole, M. (2021), "Balancing technology, pedagogy and the new normal: post-pandemic challenges for higher education", *Postdigital Science and Education*, Vol. 3 No. 3, pp. 715-742.

Ratia, M., Myllärniemi, J. and Helander, N. (2018), "Robotic process Automation – creating value by digitalizing work in the private healthcare?", Mindtrek '18: Proceedings of the 22nd International Academic Mindtrek Conference, *Tampere*, pp. 222-227.

Ribeiro, J., Lima, R., Eckhardt, T. and Paiva, S. (2021), "Robotic process automation and artificial intelligence in industry 4.0 – A literature review", *Procedia Computer Science*, Vol. 181, pp. 51-58.

Rubin, H.J. and Rubin, I.S. (2012), *Qualitative Interviewing: The Art of Hearing Data*, 3rd ed., Sage, Thousand Oaks.

Santos, F., Pereira, R. and Vasconcelos, J.B. (2020), "Toward robotic process automation implementation: an end-to-end perspective", *Business Process Management Journal*, Vol. 26 No. 2, pp. 405-420.

Schlegel, D. and Kraus, P. (2021), "Skills and competencies for digital transformation – a critical analysis in the context of robotic process automation", *International Journal of Organizational Analysis*, Vol. 31 No. 3, pp. 804-822, doi: 10.1108/IJOA-04-2021-2707.

Šimek, D. and Šperka, R. (2019), "How robot/human orchestration can help in an HR department: a case study from a pilot implementation", *Organizacija*, Vol. 52 No. 3, pp. 204-217.

Smeets, M., Erhard, R. and Kaußler, T. (2021), *Robotic Process Automation (RPA) in the Financial Sector – Technology – Implementation – Success For Decision Makers and Users*, Springer, Wiesbaden.

Sousa, M.J. and Rocha, Á. (2019), "Digital learning: developing skills for digital transformation of organizations", *Future Generation Computer Systems*, Vol. 91, pp. 327-334.

Šperka, R. and Halaška, M. (2022), "The performance assessment framework (PPAFR) for RPA implementation in a loan application process using process mining", *Information Systems and e-Business Management*, Vol. 21 No. 2, pp. 277-321, doi: 10.1007/s10257-022-00602-2.

Suri, V.K., Elia, M. and van Hillegersberg, J. (2017), "Software Bots-The next frontier for shared services and functional excellence", in Oshri, I., Kotlarsky, J. and Willcocks, L.P. (Eds), *Global Sourcing of Digital Services: Micro and Macro Perspectives. Global Sourcing 2017. Lecture Notes in Business Information Processing*, Springer, Cham, pp. 81-94.

Syed, R., Suriadi, S., Adams, M., Bandara, W., Leemans, S.J., Ouyang, C., ter Hofstede, A.H., van de Weerd, I., Wynn, M.T. and Reijers, H.A. (2020), "Robotic process automation: contemporary themes and challenges", *Computers in Industry*, Vol. 115, p. 103162.

Van Audenhove, L. and Donders, K. (2019), "Talking to people III: expert interviews and elite interviews", in Van den Bulck, H., Puppis, M., Donders, K. and Van Audenhove, L. (Eds), *The Palgrave Handbook of Methods for Media Policy Research*, Palgrave Macmillan, Cham, pp. 179-197.

van der Aalst, W.M.P., Bichler, M. and Heinzl, A. (2018), "Robotic process automation", *Business and Information Systems Engineering*, Vol. 60 No. 4, pp. 269-272.

Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N. and Haenlein, M. (2021), "Digital transformation: a multidisciplinary reflection and research agenda", *Journal of Business Research*, Vol. 122, pp. 889-901.

Vogelsang, K., Liere-Netheler, K., Packmohr, S. and Hoppe, U. (2018), "Success factors for fostering a digital transformation in manufacturing companies", *Journal of Enterprise Transformation*, Vol. 8 Nos 1/2, pp. 121-142.

Wewerka, J. and Reichert, M. (2020), "Towards quantifying the effects of robotic process automation", International Workshop on Frontiers of Process Aware Systems (FoPAS 2020), *Eindhoven*.

Willcocks, L., Lacity, M. and Craig, A. (2017), "Robotic process automation: strategic transformation lever for global business services?", *Journal of Information Technology Teaching Cases*, Vol. 7 No. 1, pp. 17-28.

Willcocks, L., Lacity, M. and Craig, A. (2015), "The IT function and robotic process automation", No. Paper 15/05, The Outsourcing Unit Working Research Paper Series.

Corresponding author
Patrick Kraus can be contacted at: research@patrickkraus.net