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Robotic process automation – research impulses from the BPM 2023 panel discussion

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Abstract

Robotic Process Automation is an established technology in organizations. In the last years, it has also received considerable attention in scholarly research with publications, special issues, and academic conferences dedicated to the topic. Given that Robotic Process Automation has now moved beyond the initial hype, we can ask what research should focus on in the future. To address this question, we conducted a panel discussion to discuss its current state and future development. This panel, which took place at the Robotic Process Automation forum at the Business Process Management Conference 2023, included experts from academia and industry, covering strategy consultants, implementers, and tool providers. In this report, we present insights from the panel discussions. We especially focus on three future research directions on Robotic Process Automation that emerged from the panel.

Keywords: Robotic process automation, Process mining, Cognitive automation, Panel report

Introduction

Robotic Process Automation (RPA) can be defined as “a technology that allows the development of (multiple) computer programs (i.e., bots) that automate rules-based business processes through the use of GUIs” (Plattfaut and Borghoff 2022). The bots emulate the actions of a human user, e.g., mouse movements, clicks, or keyboard strokes, which then are used to interact with underlying core IT systems. As a light-weight automation technology, RPA provides organizations with the opportunity to automate their business processes without changing these underlying IT systems (van der Aalst et al. 2018). As such, RPA is particularly well-suited for frequently occurring, simple, repetitive, and manual processes, such as transferring data between systems. However, through the integration of artificial intelligence (AI) and machine learning techniques, it can also be applied to automate more complex processes (Engel et al. 2022).

Although its core technology is based on older concepts such as screen-scraping (Tauli 2020), RPA only became widely popular around 2015 (Kregel et al. 2021). Since then, it has received considerable attention in industry (Enríquez et al. 2020), academia (Plattfaut and Borghoff 2022; Syed et al. 2020), and the general public (Kregel et al. 2021). RPA has attracted several special issues (e.g., Reijers et al. (2021)), has been the topic of

dedicated publication outlets (e.g., Plattfaut and Rehse (2023)) and has been shown to be perceived as “beyond the hype” (Kregel et al. 2021). Notably, RPA research has been the focus of multiple research fields, including business process management (BPM) (Plattfaut and Rehse 2023) as well as information systems (IS) (Haase et al. 2024). On the practical side, RPA has been proven to work reliably (Plattfaut and Rehse 2023), leading to widespread adoption (Gartner 2021). Following this development, the global market for RPA solutions has grown considerably and is expected to grow even further in the following years (Statista 2021). All these aspects are evidence for the degree of maturity that RPA has achieved.

This remarkable development elicits the questions: What should RPA research focus on in the future? Which new (methodological) angles are worth to be considered? Several literature reviews have already attempted to answer this question (Syed et al. 2020; Plattfaut and Borghoff 2022). However, as Webster and Watson famously coined, literature review set out to “analyze the past to prepare for the future” (Webster and Watson 2002). This orientation risks neglecting new and practice-driven perspectives on the specific phenomenon of RPA, which is unique in the sense that it gathers attention from both industry and academia at the same time, but potentially with a different focus. To ensure the relevance of both RPA scholarship and RPA practice and to avoid a further separation between the two, RPA can benefit from a closer engagement between academics and practitioners (Van de Ven 2018), particularly when selecting the problems to be studied and grounding them in reality.

To foster this engagement and initiate a joint discourse on the theory and practice of RPA (Van de Ven and Johnson 2006), we conducted a panel discussion at the Business Process Management (BPM) Conference in 2023. The goal of this panel was to bring together practitioners with different perspectives on RPA and engage them in a discussion with one another as well as the research community present at the conference. Our panelists stemmed mainly from industry, covering strategy consultants, implementers, and RPA tool providers. They were joined by two RPA researchers, one serving as a panelist providing an academic perspective on the topic and one serving as the panel moderator.

In this paper, we discuss the insights from this panel discussion on the current development of RPA and the future directions of the field. As such, the paper serves as a report on the (practical) aspects of RPA that the panel raised, placed in the context of current RPA scholarship. It is meant to contribute to the practitioner-engaged scientific discourse on RPA by providing novel perspectives on the topic. For this purpose, we first provide some background on RPA, contrasting the perspectives from scholarly literature (reviews) and practice. Then, we present the results of our panel discussion. Afterwards, we reflect upon the results in light of the existing literature and present three calls for further research on RPA, before closing with a short conclusion.

Background: robotic process automation

RPA is an umbrella term for a broad and ever-increasing range of concepts (Czarnecki and Fettke 2021; van der Aalst et al. 2018). Accordingly, researchers have proposed multiple different definitions of RPA. They cover different aspects of RPA, e.g., its focus on repetitive tasks (Lacity and Willcocks 2016), the emulation of human workers by the

interaction over graphical user interfaces (Penttinen et al. 2018), or the fact that RPA bots are easily built (Mayer et al. 2018). Literature reviews have set out to consolidate these definitions (Syed et al. 2020; Plattfaut and Borghoff 2022). We follow their work and understand RPA as “a technology that allows the development of (multiple) computer programs (i.e., bots) that automate rules-based business processes through the use of GUIs” (Plattfaut and Borghoff 2022).

Robotic process automation in scholarly literature

Figure 1 outlines the field of RPA as it is currently considered in literature. Very broadly, scholars see RPA as a novel *technology* which can be used to (partially) automate processes within an *organizational context*. RPA should contribute to a company’s *BPM goals*, i.e., to improve the time, cost, quality, or flexibility of their process execution (Dumas et al. 2018). Accordingly, we can separate existing research into three streams (Syed et al. 2020; Plattfaut and Borghoff 2022): (1) RPA itself, i.e., the underlying technology, (2) the goals of RPA, i.e., the benefits it brings to a process, and (3) the organizational context of RPA, i.e., the environment in which it is managed and applied. Within these streams, which are briefly outlined in the following, researchers mainly employ behavioral or design-oriented research methods to gain new insights or develop new solutions for the advancement of RPA.

In the first stream, it is noteworthy that there is not much research on core RPA technology. The implementation and configuration of rule-based software robots is considered to be relatively simple and sufficiently mature, such that it is typically left to industry. Technology-focused RPA research treats it as a black box, on which other technology is built. For example, RPA bots are orchestrated to achieve large-scale process automation (Rizk et al. 2021). Many papers also treat the automated scoping and configuration of RPA bots, e.g., through the use of process mining (Leno et al. 2021). In addition, researchers have started to combine core RPA technology with machine learning features to enable the automation of more cognitively challenging tasks (Reijers et al. 2021).

With regard to the second stream, contemporary research has put RPA in the context of traditional business process management, mainly focusing on achieving instrumental goals of improvements regarding time, cost, quality, and flexibility (François et al. 2022). In this context, a lot of effort has been invested into identifying characteristics of RPA-suitable tasks (Syed et al. 2020) and identifying them in an automated way, e.g., from textual process descriptions (Leopold et al. 2018). To this end, prior research used

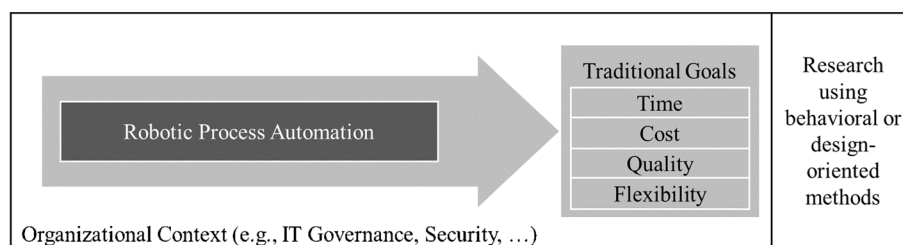


Fig. 1 The current field of RPA research

predominantly behavioral or design-oriented methods to create both descriptive and prescriptive insights (Plattfaut and Borghoff 2022).

Most RPA research can be associated with the third stream, i.e., the organizational context of RPA. This is also supported by two contemporary literature reviews. Syed et al. (2020) analyzed 125 peer-reviewed and white papers on RPA and derived a research agenda pertaining to the benefits of RPA, the organizational and technological readiness for RPA, the capabilities needed to implement RPA, corresponding implementation methodologies, and specific technologies and techniques for implementing RPA. Similarly, Plattfaut and Borghoff (2022) analyzed 82 research articles and developed research questions covering process suitability, bot design, integration of RPA and AI, operating model and governance of RPA, and the interplay of humans and RPA. As such, the contemporary literature reviews mainly call for more research on the way RPA can be implemented, about the benefits of RPA and how they can be realized, and on the operation of RPA within an organization.

Robotic process automation in practice

Particularly as an academic (Van de Ven 2018), it is much easier to get an overview over scholarly literature on RPA than it is to form an impression of the views of practitioners on the topic. Nevertheless, we can form such an impression by looking at white papers (Manyika et al. 2017) or studies (Deloitte 2017) by consulting companies, market reports by analysts (Gartner 2021), or case study reports (Stenzel et al. 2021). Even when taken with the necessary grain of salt, such gray literature shows that the conversation about RPA in practice focuses on similar three streams than the academic discourse (Chugh et al. 2022): (1) RPA technology, (2) the goals that RPA can achieve, and (3) the organizational context in which RPA exists. However, within and among these streams, the areas of focus differ considerably.

The focus of practitioners is on traditional “Class 1” RPA technology, where no artificial intelligence or machine learning is applied (Chugh et al. 2022). This is mirrored by the RPA definition in the IEEE Guide for Terms and Concepts in Intelligent Process Automation, which states that RPA is a “preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management” (IEEE 2017). Compared to scholarly literature, the focus is more on the concrete implementation and scaling of the technology (Stenzel et al. 2021). Although there are discussions on integrating rule-based RPA with more “intelligent” capabilities to widen its scope of tasks (Manyika et al. 2017), there are few reports on the practical use of such solutions.

Regarding RPA goals, there is a notable divide between the scholarly and the practical RPA discourse. Practitioners tend to focus on the tangible, short-term outcomes of RPA implementation, particularly its ability to improve operational compliance, reduce costs, and increase productivity (Deloitte 2017). The primary goal is to automate routine, time-consuming tasks to free up human resources for higher-level work (Manyika et al. 2017). Additionally, there is an emphasis on achieving faster processing times and improving accuracy in data handling by reducing human error (Stenzel et al. 2021).

Hence, practitioners are more concerned with immediate performance improvements and the potential return on investment that RPA can deliver. However, it is unclear how much of this potential can be realized, given that many companies are still in the process of RPA implementation (Deloitte 2017).

Compared to the (financial) goals of RPA, practitioners view its organizational context as a secondary concern (Stenzel et al. 2021). Whereas the broader implications of RPA for organizational structure, culture, and workforce dynamics are relevant for the academic discourse, particularly in the information systems discipline, practitioners focus more on the short-term impact (Deloitte 2017). Their concern is typically around how RPA fits within existing workflows, whether the organization has the necessary technical infrastructure, and how employees will adapt to the changes (Deloitte 2017). Resistance to change, retraining staff, and the integration of RPA with other systems are often practical challenges, but they are typically seen as hurdles to overcome rather than central points of strategic focus (Chugh et al. 2022).

A contrast in perspectives

Table 1 summarizes the perspectives that academics and practitioners have on RPA, according to their respective bodies of literature as sketched in this section.

Although we can see some similarities in the respective discourses, we also see that the weight of the respective areas differs. This might indicate a further divergence between the fields, which is not beneficial for either side. One way to counteract this divergence is to enable a joint discourse. This was the main motivation for our panel discussion, which is described in the next section.

Broadening the field of RPA research – results from the panel discussion

To get a broader understanding on the current issues in the field of RPA, to assess whether RPA still deserves additional research, and to direct the focus of this research, we conducted a panel discussion at the RPA forum of the 2023 BPM Conference. The goal of this panel discussion was to integrate a practical view into the academic discourse on RPA and bring together the practical and the scholarly perspective on the topic. The panel took place within the context of the RPA Forum, which has been a co-located event at the BPM conference for a few years and typically brings together large parts of the RPA research community, either as authors or as

Table 1 Contrasting perspectives on RPA

	Academia	Practice
RPA Technology	Defined w.r.t. rule-based processes Considered as black box Focus on integration of ML	Defined as rule-based software Considered as black box Focus on implementation and scale
RPA Goals	Process goals Identification of suitable processes Focus on long-term effects	Financial goals Identification of routine tasks Focus on short-term effects
RPA Context	Primary concern Considered on an organizational scale Focus on (theoretical) explanations	Secondary concern Considered on a project scale Focus on (practical) solutions

PC members (Plattfaut and Rehse 2023). As chairs of the 2023 RPA Forum, the two first authors of this report organized the panel, selected the participants, and outlined potential questions. One of them served as the panel moderator, the other one served as a panelist providing an academic perspective on the topic. For the 90-minute panel discussion, they were joined by four participants from practice: (i) a strategy consultant, (ii) a representative from a tool provider, (iii) a representative from an implementation company, and (iv) a BPM consultant. These participants were selected to achieve a broad view on RPA practice, with employees of different companies providing complementary perspectives on the topic. All initially selected participants followed our invitation.

In the following, we summarize the contents of that discussion, supported by direct quotes from the practitioner panelists wherever helpful to summarize the contents in a concise way. Note that the broad topics were previously planned by the two chairs, but that the discussion was conducted organically. The participants shared their own views freely, which sometimes opened up topics that were not previously planned.

The Current State of RPA Our panelists agreed with our understanding that RPA is an established technology. To quote one panelist (tool provider):

“Five years ago, we had a lot of questions around ‘Can we try this [RPA] before we buy it?’ [...] What you see right now is that we do not get those questions anymore. [...] A majority of the business users, but also from IT, now know that it is a proven technology.”

Apparently, RPA has achieved a certain degree of maturity from a technological perspective (Kregel et al. 2021). Also, it has gained acceptance among its users, who appear to trust its capabilities.

Nevertheless, the panelists also agreed that RPA is still an important topic today with interesting avenues of development both on the academic and the practitioner side. Further research and guidance is needed – especially from the process science community. During the panel, several phenomena from both ends of the socio-technical spectrum (Sarker et al. 2019) were discussed.

RPA as One of Many Automation Solutions In essence, RPA is a means to an end: It supports organizations in reaching a higher degree of automation. However, it is only one potential solution for this purpose. To quote a panelist (implementor):

“RPA, from my perspective is just one element there in the tool chain of helping organizations automate things.”

The value of RPA is the highest when no other way of automation is available or (economically) viable. However, this principle is not always followed, which causes multiple challenges.

Panelists stressed that in many situations, citizen developers (i.e., non-IT professionals involved in application development) (Plattfaut 2019; Hallikainen et al. 2018) rely on UI-based automation where other more stable forms of process automation would be preferable. One panelist shared an anecdote about an early RPA project, where a software

robot was used to extract foreign currency exchange rates from a website and enter them into an SAP system. This solution worked well until the UI of the website was changed and the robot began entering wrong data into the system. Because the knowledge about the implementation had diminished once the process step was automated, it took the company a week to find and address the problem.

This anecdote underlines the necessity of evaluating the different process automation options (e.g., RPA or core system automation). Core systems are typically more reliable and more stable than solely UI-based solutions such as RPA. The problem is that in many situations and for many systems, the required APIs are not readily available. Moreover, API-based automation is typically more expensive and more complex than RPA. Whereas API integration requires the involvement of IT specialists, RPA can be implemented by citizen developers. Additionally, the intricacies of diverse APIs across different systems and applications pose challenges in achieving seamless connectivity. This financial and operational complexity can deter organizations from embracing API-based automation, especially when the perceived benefits do not outweigh the associated costs.

The Long-Term Effects of RPA Building on these arguments, the panel argued that RPA may lead to a potential decline in business cases for core system renewal. When RPA readily tackles simpler, more immediate business cases, organizations may hesitate to invest in the overhaul or upgrade of core systems. The allure of automating individual tasks without significant system-level changes might overshadow the broader need for strategic core system upgrades. In essence, RPA functions as a bandaid to cover up more relevant IT problems. To quote one panelist (BPM consultant):

“My personal statement is that the more RPA you have in the process, the worse the quality of the process is.”

This raises questions about the long-term sustainability and scalability of RPA bots. Building on this, the panelists underlined the need for insights on how to build migration-ready RPA bots, a task that has recently been picked up by scholars (Strothmann and Schulte 2023).

RPA & AI Next to the topic of organizational RPA implementation and use, the panel also discussed the connection of RPA with other technologies. Current technological innovations offer considerable potential for reducing this manual effort, increasing both the scope and the applicability of RPA in practice. The first relevant technological innovation is the use of Artificial Intelligence (AI) techniques, particularly Machine Learning (ML), which can support RPA in multiple ways. The panelists discussed that AI has the potential to increase the scope of RPA to also include decision-making and other cognitive tasks. As one panelist (tool provider) put it:

“RPA is the body and AI is the brain.”

This relates to the capabilities of ML models to capture the input factors of human decisions in processes and train a model to automate these decisions. Combined with RPA as the process-executing technology, this considerably widens the potentials for process automation, which is why many RPA suites nowadays include AI components:

The fact that there is [currently] not that much AI on the market, [but] it's growing and it needs to be incorporated into your organization. RPA is quite suitable for this.

This could even be extended by generative AI technology, such as ChatGPT, which also hold the potential to automate manual creative tasks, such as writing e-mails. However, as the panelists pointed out, these technologically advanced solutions are often not necessary. In many mass processes, the focus is more on automating rule-based or transactional decision making than on generating new content.

RPA & Process Mining A second technological innovation that is highly relevant for RPA is process mining (Agostinelli et al. 2022), which holds considerable untapped potential for the development of more capable RPA bots. The panelists discussed multiple aspects of integrating process mining and RPA: First, analyzing a process by means of process mining prior to automating it by means of RPA can lead to a more streamlined and improved process, which simplifies the application of RPA. Second, the application of process mining to low-level UI log data (Rehse et al. 2024), often called task mining, can help to implement RPA more quickly and efficiently. Third, process mining can be extended to more unstructured data, such as e-mails, to enable process automation in the first place (Khandaker et al. 2024). Finally, process mining can help to find automation potentials by finding repetitive structured even in large and complex processes (Leno et al. 2021).

The participants stressed that the potentials of technological innovations, such as AI and process mining, are particularly relevant in non-standardized processes, where the definition and scoping of processes is a necessary prerequisite for RPA. For these systems, we need to establish the conceptual and technological boundaries of a process before even thinking about automating it. To quote one participant (implementor):

"In a happy SAP world with no customization in place, [RPA] works pretty fine. However, in all the organizations we are consulting, we have a very heterogeneous IT landscape with individual systems that maybe not even have something like a task identifier or case identifier."

This shows that for RPA to be applied outside of standardized, well-scoped processes, academics need to work on better leveraging the capacities of process mining and automated process analysis.

Knowledge Loss due to RPA On top of these technological themes, the discussion also covered the impact on people. One critical concern that emerged during the panel discussion was the potential for knowledge loss within organizations due to the widespread adoption of RPA. As organizations increasingly automate tasks, there is a risk that process knowledge may be eroded at both individual and organizational levels and corresponding skills decay (Mirispelakotuwa et al. 2023; Vu et al. 2023). With the delegation of routine tasks to RPA bots, employees may gradually lose the hands-on experience and expertise required to manually execute processes. This could be particularly problematic during scenarios such as system updates, upgrades, or unforeseen circumstances that necessitate a temporary return to manual operations. Individuals who have become reliant on automated processes may struggle to recall the intricacies of manual execution,

leading to delays and potential errors. As one panelist recalled from an insurance company they consulted:

“A couple of years after the automation the process knowledge is lost.”

On an organizational level, the cumulative impact of individual knowledge erosion poses a broader challenge. As processes become more automated, the institutional memory associated with manual workflows may fade. This becomes a significant risk when organizations need to revisit manual execution, either due to system changes or strategic shifts. The loss of organizational process knowledge could hinder adaptability and increase the learning curve when reverting to manual operations.

However, the single RPA bots are typically developed and visible in a Graphical User Interface. As such, reverse-engineering the process and the related process knowledge from the RPA bot is possible. One panelists argued that “there are people using RPA just to describe their own process”.

The Ethics of RPA Lastly, the panel emphasized the paramount importance of delving into the ethical dimensions associated with the deployment of automated processes. This opens up a broader field encompassing the ethical implications of process automation, transcending the immediate concerns of RPA implementation. As organizations increasingly leverage RPA to streamline operations and enhance efficiency, the ethical implications of these technological advancements come to the forefront. The panel highlighted the need for comprehensive research in this field, considering the potential impact on societal structures. This could start with further insights on the “human in the loop in all that automation”, as one panelist put it. However, this includes the need to explore the ethical considerations surrounding job displacement and the potential impact on the workforce (Willcocks 2020). Understanding societal attitudes and concerns can inform the development of ethical guidelines that align with public values.

As RPA continues to reshape organizational processes, understanding and addressing the ethical implications of process automation is paramount. Comprehensive research in this field will contribute to the development of ethical frameworks that guide responsible RPA adoption, ensuring a harmonious integration of technology with societal values and well-being.

Three calls for future research

The topics discussed on the panel broaden the field of RPA research. As indicated above, prior research mostly focused on the implementation of RPA itself and its effect on traditional dimensions such as time, cost, quality, and flexibility (Syed et al. 2020; Plattfaut and Borghoff 2022; François et al. 2022). Building on this, our panel suggests that RPA research should also focus on the social effects of RPA regarding the society, the organization, and the individual. Moreover, RPA research can also discuss the integration of RPA with other technologies such as AI, ML, or process mining. As an example, the panelists opened up interesting questions on the integration of RPA and generative artificial intelligence. Last, the insights gained from the panel also suggest to consider new methodological angles to RPA research. Contemporary research predominantly relies

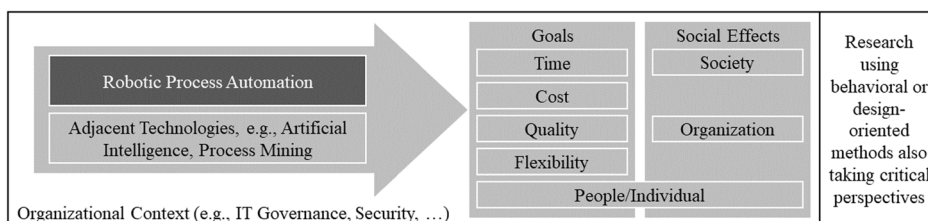


Fig. 2 Broadening the field of RPA research

on behavioral or design-oriented methods to create descriptive or prescriptive insights. Next to this, researchers should also take a critical perspective (Myers and Klein 2011) on the current practices associated with RPA to reveal opportunities for emancipation of individuals (Young 2023). Our three calls for future research are summarized in Fig. 2 and elaborated in the following.

The social aspects of RPA

The widespread use of RPA has led to profound implications for organizations. Processes could be improved regarding time, cost, quality - and sometimes flexibility (François et al. 2022). However, next to these instrumental values that RPA targeted, RPA has also considerable social effects, which can be on an individual, organizational, or societal level. The panel in particular discussed the effects of RPA on knowledge loss, both at the individual and at the organizational level. Due to the increasing automation of business processes, individuals and organizations lose the knowledge to execute these processes manually. This opens up interesting questions of knowledge management and preservation. Research has recently begun to tackle these questions (Mirispelakotuwa et al. 2023; Eulerich et al. 2024), but further research appears to be still necessary.

More broadly speaking, the application of RPA has an overall effect on the overarching socio-technical system. which can be understood in terms of task, human, technology, and structure (Heinzl et al. 2024). The deployment of RPA can be considered a socio-technical change which impacts all four components. Regarding the technology, new tools and methods are applied to develop the envisioned bot. Moreover, RPA interrelates with one or several existing application systems and is integrated into the organization’s technological infrastructure. Regarding the task, RPA alters how and by whom the tasks of a process is executed. This might impact not only the performance level of the execution, but also the execution itself, especially if the process is optimized towards RPA. Regarding the humans, project participants and stakeholders influence RPA development, operation, and adoption through their characteristics, interests, and expectations. In addition, their jobs and tasks might also get impacted by RPA implementation, which hints towards reciprocal effects on their attitude towards the robots. Regarding the structure, an RPA initiative is embedded into an organizational context. Institutional structures, strategies, and guidelines form the humans’ choices and behavior, thereby affecting project organization and decision-making.

The characteristics of the individual socio-technical systems, their components, and their dynamics determine how successful an RPA implementation will be (Lyytinen and Newman 2008; Wallace et al. 2021). Hence, some systems may be more suitable for the application of RPA than others, and it is important to assess their suitability holistically by including all four components into the assessment, to derive the most suitable use cases for RPA within an organization (Hofmann et al. 2020) and to better understand the social aspects of RPA (François et al. 2022). Methodologically, authors can rely on empirical research methods (Easterbrook et al. 2008), especially from the qualitative tradition (Davison 2023).

The integration of RPA with machine learning and (generative) artificial intelligence

The combination of standard RPA with emerging technologies from the field of artificial intelligence opens up remarkable opportunities in terms of the scope of RPA, meaning the types of tasks that the robots can conduct, and its reliability, meaning the ability of the robots to handle exceptions. Accordingly, this integration of RPA with other technologies can increase the effects that RPA has, both with regard to process improvement, but also with regard to the social effects sketched above. This integration of RPA with other technologies for the sake of automating more cognitive tasks has already been discussed in literature (Mendling et al. 2018; Viehhauser 2020). Still, the panel highlighted the importance of further developing and strengthening this line of research, in parts because RPA can be considered as a vehicle to integrate AI capabilities into processes without requiring a fundamental re-design of the underlying IT systems. In this sense, the benefits of RPA as a light-weight, democratized automation techniques remain the same, but the technological scope and power become much larger.

The panel focused on the integration of RPA with two technologies in particular: generative AI and process mining. The latter has already been discussed at various places in literature (El-Gharib and Amyot 2023). Nevertheless, the panel stressed its continued relevance, envisioning a future development where the enhanced capabilities of RPA moves it from a simple commodity to a central technology for process automation. This means that it has direct impact on the management of those processes, making the use of process mining even more important: In a cyclic fashion, the process is executed by means of RPA and analyzed by means of process mining. Through the continued identification of improvement potentials and the generation of new data that can be used for training (cognitive) RPA bots, this tight integration paves the way towards a continued automated process improvement.

The second technology that should be closer integrated with RPA is generative AI, particularly in the form of large language models (LLM). Different from process mining, this topic has so far not been widely discussed in research, mainly because powerful LLMs like GPT-4 have only been available to the public for a short amount of time. Researchers have investigated the capabilities of LLMs to configure software robots based on event logs (Fani Sani et al. 2023). However, the potentials of generative AI are much larger when used to provide input for the robot, e.g., by extracting the relevant information out of a lengthy document, or to collaborate with the robot to generate output, e.g., by writing e-mails (Haase et al. 2024). Hence, generative AI provides many interesting avenues for future research to advance the development of cognitive RPA.

Work on this future research area could rely on more practice-integrated methods such as action research (Baskerville and Pries-Heje 1999), design science research (Hevner et al. 2004), action design research (Sein et al. 2011), or clinical research (Baskerville et al. 2023).

Critical research perspectives on RPA

Contemporary research on RPA has focused on behavioral and design-oriented methods (Plattfaut and Borghoff 2022). Scholars studied the effect of RPA on organizations and derived implementation models for RPA or associated critical success factors. However, ethical questions come more and more into focus. An increasing automation will lead to both psychological (Haase et al. 2024) and societal (Manyika et al. 2017) effects that require further research. However, RPA with its seemingly lightweight approach can also empower users through the development of automation solutions. As such, it is one way to democratize IT development and empower or emancipate employees in the organization to shape their own IT application portfolio (Godefroid et al. 2024).

Analyzing such value-laden questions requires taking a critical perspective (Myers and Klein 2011; Young 2023). “Critical research in information systems is concerned with social issues such as freedom, power, social control, and values with respect to the development, use, and impact of information technology” (Myers and Klein 2011). It has been used to tackle ethical questions, e.g., regarding the effects of COVID-19 tracing apps (Rowe et al. 2020), or to develop guidelines to create empowering governance structures (Zubler et al. 2024).

From a methodology perspective, a plethora of critical research methods in IS research have been explored recently, e.g., in the form of emancipatory design science (Young 2023). Extending the portfolio of methods used in RPA research to also include these critical research methods will open up the field to new and exciting insights.

Conclusion

Although RPA is now an established field, there is still ample need for future research. The panelists agreed that RPA is relevant for both research and practice. However, RPA is constantly evolving as it is combined and merges with more and more adjacent concepts such as AI, ML, or process mining. As such, future research can, e.g., consider the social aspects of RPA, study the integration of RPA with other technological advances, or take critical research perspectives to evaluate the broader ethical implications. For those future research areas, potential methodological approaches are discussed in this report. As such, the panel and the related report provided answers to the questions on future research areas and related new methodological angles of study.

While we set out to accompany existing literature reviews on RPA with a more practice-driven perspective, we need to acknowledge that these practice-driven perspectives of course root in the experiences of the panelists. While we opted for a broad range of different perspectives (i.e., tool providers, consultants, BPM experts), our results are still limited by the selection of panelists and their idiosyncratic experience-based opinions.

In conclusion, our panel not only underlined the importance of the topic but also outlined areas for future research. We look forward to this research, especially from the process science community.

Authors' contributions

R.P. and J.R. prepared the panel and wrote the report. R.P. moderated the panel. J.R., C.J., M.S., and J.W. participated in the panel. C.J., M.S., and J.W. reviewed the report.

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Declarations

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