# From Accountant to Software Developer – Transforming Employees with Robotic Process Automation (RPA)

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## Abstract

*Constantly changing technologies affect not only the value types that companies generate but also their processes and their most important resource: employees. Such transitions referred to as digital transformation, mean that employees must tailor their skills and ways of working to stay considered a long-term asset for their company. Intelligent information systems, such as robotic process automation (RPA), are gradually taking over employees' work efforts, and thus replacing part of the human workforce. In the paper, we investigate whether non-technical employees (in this case, accountants) can be retrained to work as entry-level RPA software developers. In our case study (observations blended with interviews), we show how retraining transforms employees' identity, addresses their anxiety and skepticism, and impacts the organization. Further, we show the relevance of domain knowledge, digital literacy, and the cornerstones of a training program transforming accountants into RPA developers.*

**Keywords:** Digital transformation, Employee training, Robotic process automation, Software development

## 1. Introduction

With the growing importance of information technology (IT) in the business activities of companies, the ways of working, generating value and optimizing operational processes has been rapidly changing (Orlikowski, 2000; Wessel et al., 2021; Siemon et al. 2022). IT, which had been initially seen as a tool or support function to deliver production factors for creating product offerings and services, has now become a production factor itself (Wagner & Weitzel, 2007). IT generates value on its own and creates company profits and success (Orlikowski, 2000; Wagner & Weitzel, 2007). This influence of IT on the organization, its working methods and value propositions is examined from different perspectives and investigated scientifically in order to give companies strategic measures for a systematic and effective transformation process (Wessel et al., 2021; Baptista et al., 2020). Wessel et al. (2021) investigated two organizations, in which IT transformed companies (their value proposition) and differentiated IT-enabled organizational transformation (ITOT) from digital transformation (DT). While ITOT is considered to be a process in which IT supports value propositions, DT is a process in which IT (re)fines value proposition. It implies "either the emergence of a new organizational identity (DT) or reinforcing an existing organizational identity (ITOT)" (Wessel et al., 2021, p. 37). Both processes lead to a transformation of an organizational identity, a depiction of what a company is and how its "members make sense of what the organization claims to be" (Wessel et al., 2021, p. 9).

The concept of DT has spread across business practice and is a highly investigated phenomenon in academia. Like other technological advancements, IT is changing internal structures within the company, as well as ways of working and processes (Orlikowski, 2000; Wessel et al., 2021). The constant development of IT entails advancement of workplace technologies, which can be divided and classified into three different layers according to Baptista et al. (2020). Firstly, individual tools, which are standalone applications support the individual office work and its tasks. Secondly, the group and community tools, which represent enterprise-wide technology that brings employees together and offers collaborative features. Thirdly, intelligent augmentation tools, i.e., applications that contain sophisticated algorithmic functions and artificial intelligence (AI) capabilities that can be used to augment activities of workers (Baptista et al., 2020). These tools have profound impact on employees, who must continuously develop their skills in order to cope with technological progress (Kozanoglu & Abedin, 2020).

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Particular attention is being paid to the use of intelligent systems, including intelligent augmentation tools (Baptista et al., 2020), some of which are based on elements of AI (Berente et al., 2021; Kitsios & Kamariotou, 2021). Those systems can not only support individual ways of working but may also augment employees in their daily tasks (Anderson et al., 2018; Dellermann et al., 2019). Sometimes it may lead to resentment and anxiety among employees, who fear losing their jobs. Still, the automation and execution of formerly manual tasks by intelligent systems is by no means a replacement of human employees, but rather an augmentation of their working capabilities (Dellermann et al., 2019; Gerber et al., 2020; Siemon, 2022). Human workers and intelligent systems complement each other, forming a hybrid workforce, to achieve better work performance by smart division of tasks and leveraging capacities of humans and intelligent systems to the same extent.

An important application of this concept is robotic process automation (RPA), which follows automated approach to repetitive, manual, time-consuming or error-prone tasks performed by software robots (Osmundsen et al., 2019). RPA technology can consequently support human employees in their work tasks and take over those that are non-value-adding for human employees, in the same time liberating their talents and capacities (Bourgouin et al., 2018). However, software robots require development background, which requires both domain-specific knowledge describing the process to be automated, as well as software-specific knowledge to implement the solution (Mendling et al., 2018). This usually requires collaboration between domain experts and software developers, who play a crucial role in the adaptation of IT at companies. Software developers are therefore an essential resource to carry out a successful DT, even though hiring software developers or IT-savvy employees is not always the best solution to provide companies with necessary skills and resources. RPA has direct impact on shaping organizational workforce and culture, from the perspective of personal development and re-skilling of employees, as their job profiles and work assignments transform into more creative, demanding, and at the same time, more challenging (Rajesh et al., 2018). Nonetheless, minor threats have been reported, mostly related to competitiveness at labor market and job replacements (Kedziora & Smolander, 2022). A survey on attitudes towards robots among European citizens found a drop in the positive approach, especially to robots assisting human workers (Gnambs & Appel, 2019). Analyzing perceptions of the job-replacement threat, it was found that reactions to automation impact differ, depends on whether responders were speaking about their work or the work of other people (Granulo et al., 2019). According to Frey & Osborne, (2017), accountants and auditors are among the professions that will be particularly affected by automation. As retraining has already been recognized as a crucial and important means for organizational transformation, processes and research looks at the necessity of employee training and retraining (Blount et al., 2016; Kane et al., 2019; Kozanoglu & Abedin, 2020). Hence, the question arises whether employees in non-software development-related positions can be retrained to undertake software development activities and, particularly, to develop intelligent systems (incl. RPA technology). Utesheva et al. (2016) argue that key actors of a company, such as employees, undergo a metamorphosis of their identities when specific technologies are introduced within the company that have transformative impact on their workplace activities. This metamorphosis requires an ongoing strategic renegotiation of all actors involved as the employees and their identity is not only disrupted by the introduction of the technology, but also transformed (metamorphosed as described by Utesheva et al., 2016). This raises the question of how accountants, as a specific workplace identity, perceive the metamorphosis to RPA-engineers and how they cope with their retraining. In addition, the question arises as to what impact the use of intelligent systems to retrain non-IT positions has on the organization (Baptista et al., 2020).

Against this backdrop, we address the questions of what the retraining of employees of non-software development positions (in specific, accountants) to become entry level RPA developers has on the organization and its transformation. Moreover, we aim to explore how such retraining can be successfully designed and executed. Furthermore, we strive to observe individuals' experience of the training, including skepticism, challenges, fears, and (self-)doubts (employees' identity). For this purpose, we formulated the following research questions:

**RQ1.** How to retrain accountants to RPA-developers and what are the implications for the organization?

**RQ2.** What is the perception and experience of participants at the retraining process?

To achieve this goal, our paper is structured as follows. First, we look at the fundamentals of DT, with particular focus on the role of employees and retraining. Then we describe the specifics of RPA as an intelligent system. Our methodological section presents a case of the Finnish company NORIAN where a retraining program was developed, and four employees (accounts) that got retrained as entry level RPA developers. Through interviews, we collect data

from these four employees and two other employees who developed and delivered the training. Finally, we discuss the results and implications.

## 2. Conceptual Background

### 2.1. Digital Transformation and the Role of Employees

DT is changing organizations in many ways and its effects have substantial impact on the organization. Baptista et al. (2020) segregate the impact of workplace technologies as three orders of effects. The first-order effects are convergent changes which have immediate effect on the activities of employees and their task execution. Thereby. established patterns of work are improved and current ways of working enhanced. Second-order effects denote the transformation of work, which mainly denote unintended and unexpected changes in patterns and nature of work. This leads to fundamental changes in organizational schemata and more thinking about the nature of work. Efforts must be made to figure out new configurations of work, which can possibly replace existing ones. Third-order effects are transformation of the organization and involve a change in the deep structures of the company. The core structure of the company is questioned, and the basic organizational identity must be reconsidered, particularly from the perspective of value proposition (Baptista et al., 2020).

In addition, DT has critical impact on a company workforce, which is confronted with increasing digitalization (Blount et al., 2016; Kane et al., 2019; Wessel et al., 2021). Employees must adapt to new requirements, working and delivery methods in order to remain a productive part of the company. This leads to a metamorphosis of individual employee identity, as a retraining not only changes their tasks, activities and skills, but also their whole position within the company (Utesheva et al., 2016). In contrast, this can result in employees leaving the organization and the company being forced to recruit new employees (Wessel et al., 2021). Wessel et al. (2021) report that employees taking part in case study considered the change to be in “misalignment with their competence” (p. 32) that resulted in them leaving the company. Despite the importance of employees and their digital competencies, much recent academic and professional sources focus on technology or organizations' external forces rather than internal resources such as employees (Kozanoglu & Abedin, 2020).

In this context, digital literacies, digital skills and employee experience play crucial role in DT and contribute to organizational affordance (Kozanoglu & Abedin, 2020). Kozanoglu and Abedin (2020) argue that “digitally literate employees could not only understand what the technology is and how to use it but also, they could particularly get good grasp of when and why to use the technology” (p. 19). According to Kane et al., along the execution of DT "the average worker will probably experience numerous waves of disruption during the course of a career" which requires continuous training (2019, p. 1). To maintain and support digitally literate employees without hiring new people, it is important to train and educate existing employees (Blount et al., 2016; Schenk & Dolata, 2020).

As DT takes over every industry, qualified training or even retraining is of enormous importance, which must be well planned and effectively designed. For example, Blount et al. (2016) have already shown how training concepts for accounting students have led to equipping accountants with digital skills, in this particular case the use of the enterprise resource planning software package by SAP (Blount et al., 2016). The results of the implementation showed that accountants did have problems in dealing with digital tools such as SAP, but that digital skills were still promoted (Blount et al., 2016). However, introducing certain digital skills into education and training programs is often not enough to prevent employees from leaving and new employees from being hired because specific experts are needed (Kane et al., 2019). More far-reaching measures such as the complete retraining of experts may be an option. Experts who otherwise perform tasks that can be almost automated by new technologies (Dellermann et al., 2019), for example, can be retrained to design and implement these technologies.

### 2.2. Robotic Process Automation

RPA has been referred to as multidimensional discipline covering plethora of technologies and tools to automatically execute workflow steps of a given process (Santos et al., 2019). According to Willcocks et al., (2016, p. 2), RPA is “an infinitely scalable virtual human that can be instructed very quickly in order to carry out operational procedures at the speed of a machine”. The technology relies on low-code programming facets and screen scraping technologies (Smeets et al., 2021). Software robots can perform tasks formerly executed manually by humans, yet with no errors, 24/7, operating at the existing graphical user interfaces, acting as another step at the business process management evolution (Dumas et al., 2013). Operational robotics can be used to enhance digital labor capabilities, by performing simple, non-value adding, repetitive, and manual workflows (Zhang & Liu, 2019).

The key business drivers of this technology are often increased compliance, quality, predictability and

stability of processing results, faster speed of delivery, and economic efficiency understood as cost reductions (Kedziora et al., 2021). It became an attractive innovation for multiple business, as well as non-business organizations (Sampson, 2020) that in the past few years decided to initiate automation activities in order to transform digitally with an easily scalable, quick to deploy and cost-efficient solutions (Hofmann et al., 2020). RPA can be further divided onto attended and unattended solutions (Kedziora & Penttinen, 2021). The attended automation is triggered by a user and is often used for simple manual processes as a 'virtual assistant' of a human employee that must be triggered, restarted by that person (Javed et al., 2021). Unattended robots can be automatically scheduled from a tool named 'orchestrator' to perform tasks without a human trigger, intervention and its execution can be triggered with a workflow queue (Liermann & Stegmann, 2021).

Software robots may get enhanced with components of other technologies, such as machine learning, optical character recognition, voice recognition or natural language processing (Mendling et al., 2018).When that happens, RPA turns onto intelligent automation/intelligent system that goes beyond its basic capabilities and allows the hybrid solution to navigate onto blurred locations, act as chat/voice bot simulating conversation, advice the users on the best choices or even react to their queries (Belanche et al., 2019). The automated process normally follows various action steps and predefined business rules, yet intelligent automation flows may include unambiguous behaviors that have low cognitive requirements (Romao et al., 2019). It certainly evolves onto direction of the automated, intelligent decision-making systems that are self-learning and gather process data to make judgements without human involvement at a case (Mökander et al., 2021). Being a multidimensional and multiperspective phenomenon, AI is expected to outperform human labor (Coombs et al., 2020), due to its recent developments in simulating human behavior to attempt conducting same processes, classify data, predict outcomes, make decisions, or detect similar information than human employees (Polak et al., 2020).

## 3. Method

To address our research questions, we took the approach of a case study, in which we examine the design, implementation, and evaluation of a real case of the Finish accounting organization NORIAN. As we aimed to unleash new insights on the phenomenon that had not been explored so far, we focused on discovery and extension of the available of academic research and practice, rather than testing and validation (Sarker et al., 2019). The use of a case study as a research method is suitable for developing an in-depth, multi-layered understanding of a complex phenomenon in a real-world context (Yin, 2009). At our exploratory study, one author was a part of the company that allowed him to follow and document the design and implementation of a program retraining experienced accountants to RPA developers. He was not designing, nor conducting the training program, but working inside the case organization enabled him to directly collect data, in the form of training documentation and interviews. This specific use case served as an exemplary setting to collect empirical data (following observational approaches), in which the researcher documented the process of developing the training program, selecting employees, as well as examined challenges and approaches to the achieved results. Subsequently, the training experience of persons involved, and the effectiveness of the program was explored based on testimonials within the company. In total, six interviews were conducted with all employees who got retrained from accountants to RPA developers, as well as with two employees responsible for designing and conducting the training. As the analyzed data got extended with additional materials, such as training documentation, explaining its objective, entry requirements, milestones, requirements, success factors, as well as communication memos, we can consider the study appropriate within an exploratory setting (Corbin and Strauss, 1990).

The entire process of program design and data collection took place over a period of five months, between December – April 2022. The participants at semi-structured interviews did that voluntarily (not paid), so we had to take into account the limited availability of responders. Such approach was characterized by fluid, yet flexible structure, so the predefined questions and topics to cover are provided (Mason, 2004). All the interviews were conducted in English, with no communication issues nor limitations. Since one of the researchers, who performed and recorded interviews via online video tool, had himself over five years of managerial experience at one of the renowned intelligent automation consultancies in the Nordics, the practitioners were interviewed on equal standing from the natural authority perspective, at the same time not harming the validity, transparency, nor reliability of the study (Clausen, 2012). The synthesis and analysis of data performed by both authors was reflexive, as the identified themes and topics additionally influenced the discussion objectivism by the joint reflection on

the collected data. First, we started by describing and summarizing observed documentation and experiences of interlocutors, built along the narrative of guiding questions (professional background and experience), followed by insights on the identified research questions. In the end, the data got synthetized to address research questions. Figure 1 shows the course of our methodological procedure, which is described in detail below.

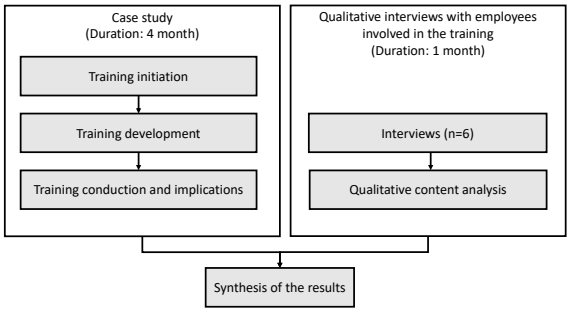


**Figure 1. Research process**

## 3.1. Case: Transforming Accountants to RPA Developers at NORIAN

The case company, NORIAN, based in Helsinki and Jyväskylä, Finland, yet operating globally as part of ECIT Group, is a renowned service provider of outsourcing services in the areas of accounting, finance, and process automation.

The company started with the development of training schema named “Software robotics training program «*from accountant to developer*»” in 2019, with the goal that “participants gain a new dimension to their career” and get a chance to learn about RPA programming. Participants who go through the multi-day training (20 full days) got a chance to become entry level developers that may later continue their studies and professional development onto areas of solution design, process modelling, system advisory, or RPA programming. Contents of the training included learning how to design and model an automated process, document exceptional transactions where the robot needs to act in a non-standard way and implement automations using UiPath platform. As the persons taking part at trainings had strong subject matter expertise, it was important to maximize synergy of their strong accounting experience, now combined with understanding of software fundamentals.

The company expected the program to deliver a number of benefits, including:

- "*learning how to approach software robotics,"*
- "*learning about the benefits and problems of software robotics*,"
- "*motivating employees in a new way - to have more positive attitude toward digitization and robotics,"*
- *"creating understanding in which processes and workflows software robotics should be used,"*
- *" jumping into the sled of digitization and use their company and industry specific expertise in a new way, as the robot can do most of the work involved in the process so that people have a more interesting" job".*

Participants were not required to have previous knowledge of software robotics or software development, nor in-depth IT skills. At the end of the course, participants were supposed to learn how to independently develop RPA robots and have at least one of their processes formerly done manually automated, following the “bring your own process“ rule. Participants learned the basics of software development principles. as well as low-code and no-code approaches.

## 3.1. Data Collection and Analysis: Interviews

In addition to training materials from the case company, author's notes and memory transcripts, authors of the paper conducted research interviews to obtain more extensive empirical data that primarily reflected the experiences of accountants and trainers. We interviewed two persons (IP1 and IP2) who initiated, designed, and delivered the training, as well as all four participants (experienced accountants) (IP3-IP6) who attended the training and got a chance to learn RPA basics. Table 1 shows an overview of the interviewees.

For the survey, two semi-structured interview guides were developed. One interview guide (IG1) was developed for IP1 and IP2 and another interview guide (IG2) for IP3-IP6. IG1 was primarily aimed at shedding light on the motives and necessity of developing the program, as well as exploring selection of participants. In addition, challenges and successes were to be explored. IG1 consisted of six open-ended questions. IG2 primarily aimed to explore the experience of the participants, focusing on possible concerns and fears about novel technology, (self)doubts and problems, and successes. IG2 consisted of a total of seven questions. The development of the interview guides was guided by finding of Kozanoglu & Abedin (2020).

**Table 1. Interview panel**

| ID | Gender | Description |
|---|---|---|
| IP1 | male | Software developer and senior consultant with +10 years of experience. Head designer and teacher of the training program. |
| IP2 | male | Manager of intelligent automation services with 25 years of experience. Supervisor of the program. |
| IP3 | female | Chief accountant with +20 years of experience with accounting, senior expert and advisor at accounting services. |
| IP4 | female | Service manager for accounting services with 15 years of experience. |
| IP5 | male | Accountant with 20+ years of experience. |
| IP6 | female | Accountant with 10+ years of experience. |

Interviews were conducted via Zoom or Microsoft Teams between February and March 2022 and lasted an average of 26 minutes (ranging from 21 to 29 minutes). The interviews were recorded and subsequently transcribed. A qualitative content analysis was conducted by one author and text segments were coded, as well as paraphrases formed, to note key takeaways. The results of the interviews and the secondary data incl. documentation of the author observing the process got reported in the next section.

## 4. Results and Discussion

The results of the study are presented in two parts, first addressing the findings of IP1 and IP2. Then the results of the participants of the training are presented. Finally, the synthesis offers the review of results interviews' results and additional data obtained along the research process.

### 4.1. Regarding the Training Program

The training program was formed out of necessity and request from a number of the company's customers. As a result, the program was designed and implemented internally. Both experts (IP1 and IP2) emphasized that the role of accounting and payroll will change in the future. IP1 says that *"these people will also be the ones who will be developing the robots in the future"*. Their profession will change and consequently the competencies of the accounting staff will have to transform, otherwise they might no longer be motivated and effective. Both experts commented on the target group of the training, which are non-technical office employees and, in their case, accountants. Accountants have strong domain-specific knowledge and, above all, experience in process design and optimization. In addition, IP2 mentioned that the training should also be offered in the future to other employees, with specific domain knowledge and experience of processes (e.g. customer service or insurance). IP1 further highlighted that the program can stimulate interest of the target group (accountants) to get new perspectives on their work structures and help to encourage and find motivated participants (observation notes).

Technology played a big role in this enthusiasm. RPA reflects modern approaches, which triggered excitement but also some skepticism among participants. Robots or AI are terms that some participants could not imagine ever being able to learn to develop. Skillful communication, which creates a balance between creating interest and excitement, as well as addressing lack of understanding, fears and doubts, was emphasized as essential by IP1 and IP2. Especially the low-code approach was emphasized, but also the potentials were shown.

Risks in the implementation of the program are described by the experts, as the availability and time of the participants, struggles with technical mindset (not necessarily with the technological skills) and the possible leaving of the company due to the newly gained skills. However, no employee left the company after being trained to become an RPA developer (observation notes). The experts also emphasized that it would be the best if participants had equal or comparable background in terms of their domain knowledge and, if possible, good digital literacy, stating that *"it would be good not to mix people from different skill levels in the same training"* (IP2).

### 4.2. Regarding the Participants

The participants confirmed the statements of IP1 and IP2 and emphasized their excitement and motivation to participate in a program organized around novel technologies. Some participants mentioned that despite their initial doubts about the technology, the use of RPA does not mean that their jobs might be replaced, but that *"giving some jobs to the machines is a good opportunity"* (IP6). Overall, the participants were very positive about the technology and mentioned that some of their initial fears about the complexity were unnecessary and that they had learned it quickly. Nevertheless, some participants also said that they were *"occasionally a bit frustrated when the robot did not work"* (IP4) and that designing a robot is a complex and multidimensional process, which takes time and creativity to achieve the desired result. In this context, it was important to learn in the group, *"as you can share your experience (e.g., fears, frustrations, concerns)"* (IP5). Also, it was important for the participants to all have similar understanding of

RPA and software development at the beginning, because otherwise it would be *"stressful for ones and boring for others"* as IP3 mentioned. When participants were asked to rate their own digital literacy, a consistent picture emerged. All participants rated their digital literacy as very basic to medium. They were merely users of various systems, with no experience in software development. From the observation notes, however, it can be seen that although they all had similar (low) expertise in the area of software development and (high) expertise in the area of accounting, some differences in understanding and approach were noticed. When asked if they participated in the training because they believed that DT requires training in digital skills and there is possible anxiety of being replaced by AI at some point, the participants uniformly answered: They agreed that DT is on the way and that the nature of work will change. IP4 mentioned that there was no pressure, but expertise in RPA will help her to be a better accounting manager, as she understands how processes are being built. IP5 also mentioned that he will now know how to improve processes better. This shows that the training has synergetic effects on the work as an accountant.

All participants saw their newly acquired skills as an important asset for their future activities and emphasized the general digital literacies they had gained, which go beyond the actual RPA development. These are essential in order to be part of the value creation of a company in the future. Participants also reported a form of transformation (the term 'transformation' was repeatably used by the participants to describe their retraining), rather than re-training, as they now see themselves as software developers to some extent, and their identity is no longer of pure accountants from the past. Participants also mentioned that the retraining made them feel more secure about their job and reinforced their feeling of being valuable to the company in the long run, even though IP6, for example, modestly mentioned that she has not yet "*achieved anything big, because her robot is not yet a big achievement with all its faults*".

## 4.3. Synthesis

For a systematic retraining program, several factors are relevant and need to be addressed, which we summarize below in a synthesis of results with five relevant points.

**Synergy between domain knowledge and programming awareness:** RPA is a cross-domain technology that employs software engineering to develop robots for automating execution of rudimentary tasks. Using low-code approaches, the development of the actual robots is essential and requires special expertise, but domain knowledge is equally important. Regular RPA developers can therefore only develop effective robots in collaboration with domain experts. By training domain experts to become RPA developers, this domain knowledge is combined with RPA development skills. Consequently, specialized RPA developers emerge and act independently. This results in a more productive workforce by retraining domain experts, namely by combining domain knowledge and software development skills.

**Enthusiasm, skepticism and anxiety:** New technologies that can potentially endanger one's own job, may cause some fears among employees. Faced with this, new technologies also lead to curiosity and motivation. This is especially true for intelligent systems, which trigger both fear and curiosity. It is therefore essential to demonstrate both the curiosity and opportunities, as well as to clearly communicate the concerns regarding complexity, comprehensibility, and learnability of such systems. It is important to emphasize that such developments are intended to augment work rather than replace it entirely, and that the skills learned do not help to replace possible jobs with robots. This shows that RPA or associated technologies or concepts such as AI are often subject to objections, which is mainly due to explainability and understandability. RPA development should therefore be demystified, and the black box of this technology fundamentally demonstrated and explained in order to address skepticism and potential anxiety. In this context, it is important to maintain the enthusiasm and display the vast potential as well as to keep the interest in this new technology.

**Digital infrastructure and resources**: An essential prerequisite for the training program, which also applies to DT processes in general, is the existence of digital infrastructure. In the specific case of RPA, this means software licenses from UiPath, but also workstations on which the training can be carried out. Human resources, such as IT personnel who maintain the infrastructure, but also experienced teachers (RPA experts with pedagogical skills) are indispensable. To introduce domain experts with the necessary RPA knowledge, it is important to have experienced RPA experts as well as overarching digital leaders (as in our case the manager of AI services) who have a higher-level view of the technology, and also carry a profound digital mindset.

**Digital mindset and literacy**: An outcome of the training program should not only be to train RPA experts, but also to promote digital literacy and DT in general. This is important to understand general software programming fundamentals, but also to

understand relevant dependencies of software projects. Of long-term relevance for a company is therefore to promote the general digital competencies to better meet digital challenges. For the actual training, it is also important that all participants have a similar level of digital literacy to begin with.

**Time and availability**: Training programs are always time-consuming and require a certain amount of availability from the participants. This effort should also be clearly communicated and created in the training, in order to be able to internalize and intensively learn the complex processes and procedures of RPA, as well as to be able to apply them independently.

## 5. Implications and Conclusions

Our findings come with a number of implications which in turn contribute to different theoretical strands. We were able to show the crucial role employees play in the DT of companies and that not only executives and companies in general see the need for further training and retraining, but also employees question their previous ways of working and recognize the need to further develop themselves in the area of digital technologies and software engineering (Utesheva et al., 2016). As mentioned above, RPA can be seen as an intelligent augmentation layer (Baptista et al., 2020), because while it has potential to replace human work, it primarily augments it, as our case has shown. RPA follows certain work patterns of humans (accountants) and is accordingly trained by them (in combination with domain experts) to take over some basic operational processes. This augmentation is also visible in the sense of hybrid intelligence, as defined by Dellermann et al. (2019).

Furthermore, according to Baptista et al. (2020), we see the development and execution of our program and the implications of retraining primarily as a first-order effect, as well as a second-order effect. As a first-order effect, we see RPA as a technology that, through its introduction, has immediate effects on individual activities, namely changing the previous activities of accountants. In the process, established patterns of work, namely rudimentary and time-intensive processes, are automated by RPA and ways of working are enhanced. This has immediate effects on the changing of tasks and represents new configurations in the workplace. Second-order effects can also be demonstrated by our results, as the retraining triggered fundamental changes in organizational schemata and entire positions, incl. work practices and professional identity, as participants got transformed from accountants to developers (note: participants used the term transformed). Only through the strategic intervention of the company (through the retraining) could unexpected and unintended changes through the use of RPA be prevented, such as job losses due to the replacement of employees. Consequently, retraining can be seen as a strategically correct decision, i.e., reflecting new configurations on existing ones (Baptista et al., 2020), in order to deal with the second-order effect, namely the use of RPA. As a result, new complex digital/human workplace configurations were created in a targeted manner. First effects on a third order can also be seen, as Norian, acting in the field of accounting, is now rethinking its value propositions and wants to enter the future of accounting service delivery, by expand their offerings with RPA and digital consultancies in processes and systems (Baptista et al., 2020).

For companies, our findings further show that DT does not have to mean changing employees by enhancing non-technical positions, such as accountants with software development awareness. Retraining also adds further value by equipping domain experts, such as accountants with software development skills. In addition, such training creates further digital skills, which overall contribute to a better understanding of the DT of the company, as digitally literate employees understand the technology, its limitations, how it can be used and how to implement it (Kozanoglu & Abedin, 2020). Regarding RQ1, we were able to show how retraining due to the introduction and potential disruption of a new type of technology (i.e., RPA) can be implemented systematically and purposefully, and what effects this has on the transformation of a company.

An essential driver is the technology itself, namely RPA and the associated enthusiasm and excitement. Even if RPA development is not a core software engineering solution due to its low-code character (Willcocks et al., 2016), it is precisely this combination of novel and exciting technology and simple development of complex processes that promotes relevant digital literacy. At the same time, such low-code technology offers an easier and faster entry-level barrier for learning its basics and developing a basic piece a software that works and shows real results. Our findings also contribute to the RPA or intelligent automation research stream by showing how relevant specific domain knowledge is at systems and process development. This synergy is essential to be able to automate the processes and procedures and develop effective software robots. For RPA development in general, this shows that teams of domain experts and RPA developers are important and that training domain experts to become RPA developers is a highly effective combination.

Furthermore, we observed that RPA development linked to intelligent systems and AI can lead to excitement and great interest. This interest is therefore a motivating factor that should be exploited. Furthermore, a modern low-code approach means that even employees with low digital literacies can be effectively trained to understand, design, and implement software robots. RPA development skills and the associated digital literacies therefore represent an essential added value for employees and companies. This process is characterized as a metamorphosis, which was triggered by the retraining process (Utesheva et al., 2016). Traditional accountants have undergone an identity shift, training skills and digital literacies, redefining and learning entire activities. This not only changed their work activities, but also the position titles and internal affiliations of individual employees. Hence, retraining from accountants to RPA-developers, entailed a metamorphosis and change of identities (defined by our participants as transformation) that is seen as a crucial implication of a DT (Utesheva et al., 2016). In regards RQ2, we can conclude that the retraining process triggered both anxiety and excitement, resulting at our participants not identifying themselves as pure accountants anymore after the retraining (metamorphosis).

However, our exploratory study is subject to limitations, for example, that we only considered one case in a specific industry. The results are therefore only to some extend generalizable and transferable and should be verified in other companies, especially in other industries and countries. Our small number of interviewees also contributes to this limitation. Further research should include subjecting other domain experts to RPA training. It could be shown how other domain knowledge can be reconciled with RPA development skills and whether this in turn can result in effective RPA developers. Specifically, these could be employees in customer support, enterprise resource planning, procurement, human resources, administration, or other transaction-heavy positions. In addition, the role of technology should also be examined and whether other technological approaches lead to similar excitement and enthusiasm, but also doubts and skepticism. In doing so, the role of possible concerns for the loss of the job through the replacement of intelligent technologies and AI can be investigated, for example, by conducting training courses on other software development activities (e.g., UI and frontend development, database development or backend development).

## 6. References


Anderson, J., Rainie, L., & Luchsinger, A. (2018). Artificial intelligence and the future of humans. Pew Research Center.

Belanche, D., Casaló, L. V., & Flavián, C. (2019). Artificial Intelligence in FinTech: Understanding robo-advisors adoption among customers. Industrial Management & Data Systems.

Baptista, J., Stein, M.-K., Klein, S., Watson-Manheim, M. B., and Lee, J. (2020). Digital Work and Organisational Transformation: Emergent Digital/Human Work Configurations in Modern Organisations. The Journal of Strategic Information Systems (29:2), Strategic Perspectives on Digital Work and Organizational Transformation, p. 101618. (https://doi.org/10.1016/j.jsis.2020.101618).

Berente, N., Gu, B., Recker, J., & Santhanam, R. (2021). Managing Artificial Intelligence. MIS Quarterly, 45, 1433–1450. https://doi.org/10.25300/MISQ/2021/16274

Blount, Y., Abedin, B., Vatanasakdakul, S., & Erfani, S. (2016). Integrating enterprise resource planning (SAP) in the accounting curriculum: A systematic literature review and case study. Accounting Education, 25(2), 185–202.

Bourgouin, A., Leshob, A. and Renard, L. "Towards a Process Analysis Approach to Adopt Robotic Process Automation". in ICEBE 2018 - 15th International Conference on e-Business Engineering, pp. 46-53. 2018.

Clausen, A. S. "The individually focused interview: Methodological quality without transcription of audio recordings.," *Qualitative Report*, vol. 17, pp. 37, 2012.

Coombs, C., Hislop, D., Taneva, S. K., & Barnard, S. (2020). The strategic impacts of Intelligent Automation for knowledge and service work: An interdisciplinary review. The Journal of Strategic Information Systems, 29(4), 101600.

Corbin, J.M. and A. Strauss, "Grounded theory research: Procedures, canons, and evaluative criteria," *Qualitative Sociology*, vol. 13, no. 1, p. 3–21, 1990.

Dellermann, D., Ebel, P., Söllner, M., & Leimeister, J. M. (2019). Hybrid intelligence. Business & Information Systems Engineering, 61(5), 1–7.

Dumas, M., La Rosa, M., Mendling, J., Reijers, H. A., & others. (2013). Fundamentals of business process management (Vol. 1). Springer.

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? Technological Forecasting and Social Change, 114, 254–280.

Gerber, A., Derckx, P., Döppner, D. A., & Schoder, D. (2020). Conceptualization of the Human-Machine Symbiosis – A Literature Review. https://doi.org/10.24251/HICSS.2020.036

Gnambs, T., & Appel, M. (2019). Are robots becoming unpopular? Changes in attitudes towards autonomous robotic systems in Europe. Computers in Human Behavior, 93, 53–61.

Granulo, A., Fuchs, C., & Puntoni, S. (2019). Psychological reactions to human versus robotic job replacement. Nature Human Behaviour, 3(10), 1062–1069.

Hofmann, P., Samp, C., & Urbach, N. (2020). Robotic process automation. Electronic Markets, 30(1), 99–106.

Javed, A., Sundrani, A., Malik, N., & Prescott, S. M. (2021). Robotic Process Automation Using UiPath StudioX. Springer.

Kane, G. C., Phillips, A. N., Copulsky, J. R., & Andrus, G. R. (2019). The Technology Fallacy: How People Are the Real Key to Digital Transformation. MIT Press.

Kedziora, D., Leivonen, A., Piotrowicz, W., Öörni, A., & others. (2021). Robotic Process Automation (RPA) Implementation Drivers: Evidence of Selected Nordic Companies. Issues in Information Systems.

Kedziora, D., & Penttinen, E. (2021). Governance models for robotic process automation: The case of Nordea Bank. Journal of Information Technology Teaching Cases, 11(1), 20–29.

Kedziora, D., & Smolander, K. (2022). Responding to Healthcare Emergency Outbreak of COVID-19 Pandemic with Robotic Process Automation (RPA). Proceedings of the Hawaii International Conference on System Sciences. http://hdl.handle.net/10125/80092

Kitsios, F., & Kamariotou, M. (2021). Artificial Intelligence and Business Strategy towards Digital Transformation: A Research Agenda. Sustainability, 13(4), 2025. https://doi.org/10.3390/su13042025

Kozanoglu, D. C., & Abedin, B. (2020). Understanding the role of employees in digital transformation: Conceptualization of digital literacy of employees as a multi-dimensional organizational affordance. Journal of Enterprise Information Management, 34(6), 1649–1672. https://doi.org/10.1108/JEIM-01-2020-0010

Liermann, V., & Stegmann, C. (2021). The Digital Journey of Banking and Insurance, Volume I: Disruption and DNA. Springer Nature.

Mason, J. "Semistructured Interview". in *The SAGE Encyclopedia of Social Science Research Methods*. (Michael, S., Lewis-Beck, A., Bryman, and Futing Liao, T., eds.), Sage publications. 2004.

Mendling, J., Decker, G., Hull, R., Reijers, H. A., & Weber, I. (2018). How do machine learning, robotic process automation, and blockchains affect the human factor in business process management? Communications of the Association for Information Systems, 43(1), 19.

Mökander, J., Morley, J., Taddeo, M., & Floridi, L. (2021). Ethics-based auditing of automated decision-making systems: Nature, scope, and limitations. Science and Engineering Ethics, 27(4), 1–30.

Orlikowski, W. J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. Organization Science, 11(4), 404–428.

Osmundsen, K., Iden, J., & Bygstad, B. (2019). Organizing robotic process automation: Balancing loose and tight coupling. Proceedings of the 52nd Hawaii International Conference on System Sciences.

Polak, P., Nelischer, C., Guo, H., & Robertson, D. C. (2020). "Intelligent" finance and treasury management: What we can expect. AI & SOCIETY, 35(3), 715–726.

Rajesh, K., Ramesh, K., & Rao, H. (2018). Robotic Process Automation: A Death knell to dead-end jobs. CSI Communications-Knowledge Digest for IT Community, Volume, 42, 10–14.

Romao, M., Costa, J., & Costa, C. J. (2019). Robotic process automation: A case study in the banking industry. 2019 14th Iberian Conference on Information Systems and Technologies (CISTI), 1–6.

Sampson, S. (2020). Predicting automation of professional jobs in healthcare. Proceedings of the 53rd Hawaii International Conference on System Sciences.

Santos, F., Pereira, R., & Vasconcelos, J. B. (2019). Toward robotic process automation implementation: An end-to-end perspective. Business Process Management Journal.

Sarker, S., Chatterjee, S., Xiao, X., and Elbanna, A. "The sociotechnical axis of cohesion for the is discipline: Its historical legacy and its continued relevance*," MIS Quarterly,* vol. 43, pp. 695–719. 2019.

Schenk, B., & Dolata, M. (2020). Facilitating digital transformation through education: A case study in the public administration. Proceedings of the 53rd Hawaii International Conference on System Sciences.

Siemon, D. (2022). Let the computer evaluate your idea: Evaluation apprehension in human-computer collaboration. Behaviour & Information Technology, pp. 1-19

Siemon, D., Strohmann, T., & Michalke, S. (2022). Creative Potential Through Artificial Intelligence: Recommendations for Improving Corporate and Entrepreneurial Innovation Activities. Communications of the Association for Information Systems (50:1).

Smeets, M., Erhard, R., Kaußler, T., & others. (2021). Robotic Process Automation (RPA) in the Financial Sector. Springer.

Utesheva, A., Simpson, J. R., and Cecez-Kecmanovic, D. (2016). Identity Metamorphoses in Digital Disruption: A Relational Theory of Identity. European Journal of Information Systems (25:4), pp. 344–363. (https://doi.org/10.1057/ejis.2015.19).

Wagner, H.-T., & Weitzel, T. (2007). Towards an IT production function: Understanding routines as fundamental for IT value creation. Journal of Enterprise Information Management.

Wessel, L., Baiyere, A., Ologeanu-Taddei, R., Cha, J., & Blegind-Jensen, T. (2021). Unpacking the difference between digital transformation and IT-enabled organizational transformation. Journal of the Association for Information Systems, 22(1).

Willcocks, L., Lacity, M., & Craig, A. (2016). Robotic process automation at telefónica O2. MIS Q Exec, 15(1), 21–35.

Yin, R. K. (2009). Case Study Research: Design and Methods. SAGE.

Zhang, N., & Liu, B. (2019). Alignment of business in robotic process automation. International Journal of Crowd Science.