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ROBOTIC PROCESS AUTOMATION AS AN EMERGING CAREER OPPORTUNITY: AN ANALYSIS OF REQUIRED QUALIFICATIONS AND SKILLS

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ABSTRACT

The automation of work by means of disruptive technologies such as Artificial Intelligence (AI) and Robotic Process Automation (RPA) is currently intensely discussed in business practice and academia. Recent studies indicate that many tasks manually conducted by humans today will not in the future. In a similar vein, it is expected that new roles will emerge. The aim of this study is to analyze prospective employment opportunities in the context of RPA in order to foster our understanding of the pivotal qualifications, expertise and skills necessary to find an occupation in a completely changing world of work.

This study is based on an explorative, content analysis of 119 job advertisements related to RPA in Germany. The data was collected from major German online job platforms, qualitatively coded, and subsequently analyzed quantitatively.

The research indicates that there indeed are employment opportunities, especially in the consulting sector. The positions require different technological expertise such as specific programming languages and knowledge in statistics.

The results of this study provide guidance for organizations and individuals on reskilling requirements for future employment. As many of the positions require profound IT expertise, the generally accepted perspective that existing employees affected by automation can be retrained to work in the emerging positions has to be seen extremely critical.

This paper contributes to the body of knowledge by providing a novel perspective on the ongoing discussion of employment opportunities, and reskilling demands of the existing workforce in the context of recent technological developments and automation.

Keywords: Robotic process automation, future of work, digital labor, qualification, skills, employment, job advertisements, Germany

INTRODUCTION

In their widely discussed study, Frey and Osborne (2013), indicate that almost 50 percent of total US jobs are facing the risk to get automated in the course of the following two decades. Although, the

impact of automation might be exaggerated, as indicated by Bonin *et al.* (2015), who transferred the results of Frey and Osborne (2013) to the contextual setting of Germany. They indicate that 12 percent of jobs in Germany are facing a high risk to get automated soon and see a marginal lower impact on the US labor market. Nevertheless, the results indeed show that recent technological developments will tremendously change the working world we currently know. Birchall and Giambona (2008), for instance, show how managers experience the use of information and communication technology tools and what the potential on innovation could be. Moreover, Morakanyane *et al.* (2017) indicate that especially operational processes are affected by digital transformation (see also Gimpel *et al.*, 2018) and Robotic Process Automation (RPA), as a key technology in this field, plays a major role in these developments (Osmundsen *et al.*, 2019; Deloitte, 2018; Roland Berger, 2018; Anagnoste, 2017). The automation of work with RPA, but also by means of complementing technologies such as Artificial Intelligence (AI) and Internet of the Things (IoT) is currently intensively discussed both in the academic community and the business world. At the same time, companies are investing heavily in the automation of their processes. According to Gartner (2018), estimated 680 million USD were spent on RPA software in 2018. Additionally, it can be assumed that consulting fees for the introduction of the tools and new processes substantially exceed the license fees so that the total investment in the technology is even more substantial. It is assumed that 85 percent of large organizations will use RPA by 2022 (Gartner, 2018) and the dissemination of RPA applications will continue to grow (Capgemini, 2016; Deloitte, 2018).

In the discussion of new automation technologies, both positive developments but also fears are intensively discussed (Cooper *et al.*, 2019; Madakam *et al.*, 2019; Mendling *et al.*, 2018; Moffitt *et al.*, 2018). The more negative voices emphasize negative employment effects, and focus on the idea that robots replace humans or that robots “take over.” On the positive side, opportunities for individuals, organizations, and society as a whole are mentioned, e.g., artificial intelligence liberating humans from tedious and meaningless administrative tasks. One of the uncontroversial points in the debate is certainly that today’s employees will require substantial training, and reskilling to meet the demands of new job profiles as existing jobs are vanishing. These reskilling requirements constitute a significant change and challenge in today’s business world.

While many previous studies (e.g. World Economic Forum, 2018; McKinsey Global Institute, 2017; Frey and Osborne, 2013) focus on the macro-economic level of analysis, this study focuses on the level of individual job opportunities and therefore has specific managerial implications. The study intends to underpin and illustrate the general discussion with real-life data on employment opportunities that emerge from one partial area of the latest automation trend.

The overall research objective of this study is to provide details on employment opportunities as well as specific skills and qualifications for future employment in the field of RPA. By doing so, the specific aims of the study are: First, to analyze whether new jobs are emerging from RPA (without quantifying the overall macro-economic employment effect). Second, to analyze what qualification and skills are required for the emerging job profiles. This study uses a content analytical research design to analyze job advertisements from different online job platforms.

This paper contributes to the body of knowledge by analyzing secondary empirical data providing a novel perspective on the ongoing discussion of employment opportunities, and reskilling demands of the existing workforce in the context of recent technological developments and automation.

The paper is structured as follows: In section 2, RPA is precisely discussed and defined. This is followed by a general discussion of the employment effects of automation, as well as, implications on qualification and skills. In section 3, the research methodology and design of this study is presented. Subsequently, in section 4, the results are presented. Finally, in section 5, the research results are summarized, discussed, and critically reflected against the literature.

LITERATURE REVIEW

Robotic Process Automation

The term RPA, as well as, accompanying graphical illustrations in publications by popular media and consulting firms nurture the notion that RPA involves humanoid robots or other hardware-based robotics technology. However, RPA is a software-based solution that performs tasks that have previously been conducted by humans (Willcocks *et al.*, 2015). Typically, RPA solutions are employed in processes where activities are performed across different user interfaces, and systems that are not integrated into the back-end, and thus, require manual steps. As Gartner (2018) describes, RPA tools “mimic the manual path a human worker would take to complete a task, using a combination of user interface interaction describer technologies.” Solutions can be employed both on individual desktops or operating on enterprise servers. In a similar vein, the IEEE defines RPA as “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). It is important to note that that automating business processes, which has been done for years and the implementation of RPA must not be understood as similar phenomena. RPA tends to be easily configured, is a software that is non-invasive, accessing systems like a human being would and is enterprise-safe, in terms of i.e. security (Lacity and Willcocks, 2016; Osmundsen *et al.*, 2019).

RPA has been classified as so-called “lightweight IT”. The term expresses the contrast to an increasing size and complexity of systems in the attempt to integrate different systems in heterogeneous landscapes (Penttinen *et al.*, 2018; Lacity and Willcocks, 2016). Provocatively, one could argue that RPA is the surrender in the battle against non-integrated system landscapes and a workaround replacing the human element in non-optimal processes instead of fixing the problem in the back-end.

Typical use cases for RPA are back offices of industries like financial services and utilities and telecommunications (Willcocks *et al.*, 2015; Gartner, 2018; Roland Berger, 2018). The reason is that the companies in these industries have many repetitive administrative processes, thus, employing RPA provides large cost saving potential. Processes which are standardized, routinized and have a high and predictable volume are considered to be most appropriate for the application of RPA (Osmundsen *et al.*, 2019), hence the identification of suitable processes is pivotal for a successful application (Leshob *et al.*, 2018). Van der Aalst *et al.* (2018) also state that the main motivation of companies employing RPA is achieving a high Return on Investment (RoI) and indeed studies indicate positive effects on economic performance indicators (Osmundsen *et al.*, 2019, Deloitte, 2018).

Besides RPA, there are more advanced forms of automation that are “cognitive,” or “intelligent” (Anagnoste, 2018; Willcocks *et al.*, 2015). A large potential might also lie in the combination of RPA with machine learning solutions to create “cognitive RPA solutions” (Reddy, 2018).

Employment Effects of Automation

Automation in general – including RPA and other forms of automation (Lacity and Willcocks, 2016) – have a large impact on jobs as work activities that humans perform are substituted by machines and algorithms. The possible negative effects associated with this development are raising public concern today and have done so in the past, e.g., in the industrial revolution of the early 19th-century when textile artisans were replaced by machines (Autor 2015). However, one has to differentiate between short- and long-term effects as in the long run new jobs might be created based on new technological possibilities (Bhattacharya, 2017, McKinsey Global Institute, 2017). As Autor (2015) points out, history shows that the unemployment rate has not increased in the long run despite automation and technological progress. However, automation does create large shifts between sectors and job profiles as shown with historical data by McKinsey Global Institute (2017).

These general effects also apply to the current wave of automation driven by technologies such as AI and RPA. This time, not only assembly and factory workers will be affected by the technological possibilities, but also professionals working as bookkeeping and payroll clerks, data entry clerks, or accountants (World Economic Forum, 2018; Cooper *et al.*, 2019). This is consistent to prior research that suggests a polarization of jobs as middle-wage jobs are most affected by automation while both low-level jobs that require lots of manual work (e.g., haircuts) and high-level jobs that require lots of

education are less subject to automation (Autor 2015), while contrary to that Frey and Osborne (2013) also see a high potential for automation in areas of low-skilled work. On the positive side, new roles are emerging such as data analysts and scientists, AI and machine learning specialists, information technology (IT) services, and process automation specialists (World Economic Forum, 2018). Less obvious positive employment effects might be related to new business models developed based on new technologies (Herbert *et al.*, 2017). Overall, experts estimate that the effects of emerging roles will offset the lower demand for other roles (World Economic Forum, 2018; Gartner, 2017).

Implications on Qualification and Skills

While on the macro-economic level the overall employment effect of automation might be neglectable, the situation on the level of individual employees is more complex as the new roles require a different set of skills and dedicated training. As both the McKinsey Global Institute (2017) and the World Economic Forum (2018) state, a large proportion of the global workforce will need to transition to new occupations, and thus, require significant reskilling. These estimates are accompanied by normative recommendations that individuals should get involved in educational activities, businesses should support the existing employees in their upskilling requirements, and governments should provide environments that enable the transition (World Economic Forum, 2018).

The relationship between new IT developments and the demand for new jobs and skills has been previously described and analyzed in the context of IT employees (Niederman *et al.*, 2016). When an organization adopts a new technology, there are two options: hire new employees or retrain existing employees. In other waves of introducing new technologies, these options might both have been feasible as the reskilling demands only were relevant for IT personnel that already have a general understanding of IT. However, for RPA, the situation is different: retraining a bookkeeping clerk that has no technical background at all to become a software developer is certainly more difficult, if possible at all. Therefore, in a first step, it is important to understand the specific new skills that are required to being able to evaluate the possibilities on a less abstract level.

The deployment of RPA in back-office functions might also further increase the occurrence of hybrid jobs that require expertise in both the technical and the business domain. As described by Niederman *et al.* (2016), there has already been the trend in the past that the use of technology that was previously restricted to the inner circle of IT has been moving to a larger number of users as the technology matures, which leads to more hybrid jobs.

Research Gap and Need for Research

The literature discussed above provide interesting contributions to knowledge: First of all, they explain the general relationship between automation and employment. Second, they provide insights on how

the current automation trend based on AI and RPA might influence employment. Third, they point out the general demand for new skills and reskilling requirement of the existing workforce.

However, previous research had a very broad scope in terms of industries and functions in organizations and do not focus on a particular area. Therefore, many of the findings are of a rather general nature and are not specific enough to provide guidance for organizations, managers and individuals on how they can adapt to the new reality. This paper intends to contribute to increase our understanding on these phenomena by an in-depth view on one specific area.

DESIGN OF THE STUDY

Research Methodology

This research is based on the collection of secondary empirical data, namely online job advertisements and has to be characterized as exploratory in its basic nature. Making use of secondary empirical data is common in business research (Blumberg *et al.*, 2011) and allows a standardized collection of data. The study applies a content analytical approach (Mayring, 2002), initially making use of a qualitative coding technique (Grbrich, 2013; Saldana, 2013) of job advertisements related to RPA in Germany and afterwards analyzing the findings by making use of simple quantitative statistics. The method is established and has been used in previous studies in the information systems discipline (Gallivan *et al.*, 2004; Todd *et al.*, 1995) as well as in other disciplines (i.e. Choi and Rasmussen, 2009). The major advantage of this method is the forward-looking nature as job advertisement reflect companies' predictions about what skills will be important in the future. Moreover, another advantage of the method over other methods such as interviews or surveys is not only the public availability of the data but also that data collection is not affected by socially desired answering biases, as potentially possible in interview studies (Kvale and Brinkmann, 2009). In order, to ensure credibility of this research the authors applied different mechanisms of reflexivity (Stokes, 2011; Stokes and Wall, 2014), such as procedures that both authors critically scrutinized, in a constant manner, the data collection and analysis approach by means of critical reflection and discussion.

Data was collected from the German website of the two online job platforms Stepstone (<http://www.stepstone.de>) and Indeed (<http://de.indeed.com>) on a specific date in September 2018. Both platforms are the most common job platforms in Germany. The decision was made to use several job platforms to reduce a selection bias if certain companies have a preference for a particular platform. Moreover, the sample size could be increased significantly by using more than one platform. On the other hand, when using several job platforms, redundant job ads have to be eliminated if they appear on both platforms. Based on a few exploratory search tests, it was decided that all postings that contain the exact term "Robotic Process Automation" are included in the first step. To reduce manual effort to

download and analyze the ads, we have used a web scraping technique based on a Python script and stored the data in a spreadsheet. In a second step, the records that met the following exclusion criteria were deleted: job advertisements for internships or student positions, job advertisements that were not written in German and redundant job advertisements. Moreover, search results that contained the term “Robotic Process Automation” in the advertisement but did not have a focus on RPA-related tasks were excluded manually, e.g., non-related positions in RPA software firms.

To derive the codes and categories for the content analysis, a combination of a deductive and inductive approach was used. On the one hand, certain codes were derived from theoretical considerations. For example, the most popular RPA software tools in the market were included as codes, as well as, common academic disciplines as study backgrounds. On the other hand, codes were collected inductively from the data to reflect the specific requirements formulated in the job advertisements.

Subsequently, the data records were coded in a semi-automated process with the help of spreadsheet functionalities. To assure proper data quality, the coding results were critically reviewed manually, and the search terms were adapted in a cyclical process. After the coding was completed, the data was analyzed with the help of a statistical software based on R, mostly descriptively, but also using non-parametric tests of association (Chi-squared).

Sample Descriptives

The final sample consists of 119 job advertisements. The sample contains advertisements from different industries with the majority from consulting and auditing firms (54.6 percent). Although it is acknowledged that the sample might not be representative in general, the over-proportional demand for RPA professional in the consulting sector seems plausible as many companies are implementing RPA-based processes with the help of external consultancies. Also, the large demand in the IT sector that might be related to the introduction of the tools is plausible. The strong representation of the financial services sector is consistent with the results of prior research (Willcocks *et al.*, 2015) in terms of relevant industries for deployment of RPA.

Industries	Counts	% of Total
Consulting & auditing	65	54.6 %
Information technology	13	10.9 %
Financial services	13	10.9 %
Transportation & logistics	8	6.7 %
Automotive	4	3.4 %
Diversified	4	3.4 %
Energy	3	2.5 %
Chemicals	2	1.7 %
Retail	2	1.7 %

Electronics	2	1.7 %
Machinery	1	0.8 %
Not specified	2	1.7 %

Table 1. *Industries in sample*

RESULTS AND DISCUSSION

Qualification

Stokes and Oiry (2012) highlight the importance and facets of competencies in the context of the workplace. As mentioned above, RPA involves both business and IT-related activities. Therefore, it is not surprising that companies are looking for graduates from different academic disciplines as shown in the table below. Interestingly, it can also be observed that most job advertisements mention several suitable disciplines, i.e., for the companies, it seems to be more important that the candidates have a degree at all than having it in a particular discipline. The most popular qualification, however, is an IT-related background which is mentioned in 71.4 percent of the job advertisements, followed by a business or economic degree (63.9 percent). Some of the companies (7.6 percent) do not specify the educational background and focus on required skills instead. Few companies are also satisfied with vocational training in Informatics instead of academic studies (not in table).

Disciplines	Counts	% of Total
Computer Sciences, Informatics, Business Informatics	85	71.4 %
Business, Economics	76	63.9 %
Mathematics, Natural Sciences	38	31.9 %
Engineering, Industrial Engineering	32	26.9 %
Other	6	5.0 %
Not specified	9	7.6 %

Table 2. *Academic disciplines*

Programming Skills

The data shows that many positions require programming skills. 52 companies (43.7 percent) request programming skills –general programming abilities or a specific programming language (31.9 percent). Table 2 shows specific programming languages that are mentioned in job advertisements. The most popular languages are Visual Basic, C/C++, JavaScript, and Python.

Languages	Counts	% of Total
Visual Basic	17	14.3 %
C/C++	14	11.8 %

JavaScript	14	11.8 %
Python	14	11.8 %
Java	10	8.4 %
HTML, CSS	9	7.6 %
R	7	5.9 %
Not specified	81	68.1 %

Table 3. *Programming languages**Software Knowledge*

Apart from programming expertise, many companies (65.6 percent) require expertise in particular software, including RPA software, and other software.

In terms of RPA software, 43 companies request skills in one or more particular tools. In Table 3, the particular tools mentioned in the advertisements are listed.

It can be seen in the figures that many of the 43 companies in the sample mention more than one tool. Although in many companies, only one type of RPA software might be in operation, the results are plausible due to the high number of consulting companies in the sample. The reason is that consulting companies do not employ the candidates for internal purposes, but for work at different clients where different RPA tools might be used. Indeed, a chi-squared test shows that among the companies that mention specific RPA tools, the consulting firms are more likely to mention several tools than the non-consulting companies ($p < 0.05$).

RPA tools	Counts	% of Total
Blue Prism	34	28.6 %
UiPath	30	25.2 %
Automation Anywhere	22	18.5 %
Other	9	7.6 %
Not specified	76	63.9 %

Table 4. *RPA software*

Concerning other software, 26.9 percent of the companies in the sample require their candidates to have skills in one or more Microsoft Office software, in SAP ERP (19.3 percent), or other particular software (10.1 percent) such as Tableau, PowerBI, or Qlik.

Other IT-related Skills

Additionally, the companies in the sample require other IT-related skills as shown in the table below. 28 companies (23.5 percent) have required expertise in artificial intelligence, machine learning, and related concepts. Second, database know-how was mentioned by approximately 20 percent of the

companies which includes both general experiences with databases and specific database types and languages such as SQL, Hadoop or MongoDB. Moreover, many companies look for candidates with experience in the Microsoft .NET technology, as well as, expertise in (Advanced) Analytics.

Other IT skills	Counts	% of Total
Artificial intelligence, machine learning	28	23.5 %
Databases (General expertise, SQL, Hadoop etc.)	24	20.2 %
Microsoft .NET	19	16.0 %
Analytics, Data Mining, Text Mining	10	8.4 %

Table 5. *Other IT skills*

Business and Sectoral Expertise

Besides the technical IT skills, many companies are also looking for employees with expertise in the business field to deal with RPA. The most important aspect is expertise in business process management as mentioned by 50 companies (42.0 percent). Moreover, functional expertise in finance & accounting is important which might be an indication that most RPA projects are currently conducted in the finance & accounting function. But also, other functional areas such as purchasing or human resources are mentioned by some companies (13.4 percent).

Business and sectoral expertise	Counts	% of Total
Expertise in business process management	50	42.0 %
Functional expertise in finance & accounting	36	30.3 %
Functional expertise in other areas (e.g. purchasing, human resources)	16	13.4 %
Industry expertise in financial services (e.g. banking, insurance)	34	28.6 %
Industry expertise in other industries (e.g. automotive, retail)	10	8.4 %

Table 6. *Business and sectoral expertise*

Also, some companies also prefer candidates with competencies related to a certain industry. Above all, specialized knowledge concerning the financial services sector is sought after by 34 companies. While 6 out of 13 companies from the financial services sector would like their candidates to have sectoral know-how, also 22 out of 65 consulting companies and 4 out of 9 IT companies have this preference. Overall, this is a strong indication that many RPA projects are currently conducted in the banking and insurance sector.

Other Requirements and Competencies

While many companies do not explicitly demand professional experience, one-third of the position requires several years of experience whereas candidates need leadership experience or competencies

for only 14 positions (11.8 percent). Expertise in traditional or agile project management methods are beneficial for 28 of the positions (23.5 percent). As also indicated by Lois *et al.* (2020), especially in the digital era, employees' skills and training can be seen as significant for the successful implementation and use of tools, while others indicate what the results of non-effective training and development approaches could be (e.g. Rowland *et al.*, 2017).

The companies also have requirements toward their candidates in terms of soft skills: more than half of the position requires strong communication skills (56.3 percent), as well as, team-orientation and capability to work in a team (53.8 percent).

Finally, mobility and willingness to travel are necessary for almost half of the positions (49.6 percent). A chi-squared test reveals that this effect is again due to a high number of consulting positions in the sample ($p < 0.001$).

CONCLUSION

Research synthesis

Many of this study's findings are in line with the existing literature. For example, prior studies (e.g., World Economic Forum, 2018, McKinsey Global Institute, 2017) mention finance and accounting as an area highly affected by automation. Also, the financial services industry was mentioned by Willcocks *et al.* (2015) as an example for RPA implementation. This study confirms that financial jobs are indeed most affected by RPA. Moreover, the finding by Autor (2015) that middle-wage jobs are most affected by automation, seems to be confirmed by this study. Also, the general tenor that automation does not only destroy jobs, but at the same time creates new job opportunities, can be confirmed, which seems to be typical for every technological or structural change of the economic system.

Hence, it can be summarized that this study confirms the general direction of prior studies but provides more detailed results on specific skills and qualifications for future employment in the field of RPA, which indeed is the key contribution of this research. Moreover, this research provides a number of implications, which will be discussed in the following.

Implications for business practice and professionals

Overall, it has to be emphasized that this research provides a novel and unique view on the required qualifications and expertise in the field of RPA, which provides important guidance for both business organizations and professionals in this area. It is undoubtedly, that the application of RPA will intensively grow in the future (Deloitte, 2018; Lacity and Willcocks, 2016). The study also provides an in-depth view on the German RPA labor market. Data indicate towards a number of important implications, which can be briefly summarized as follows.

First of all, it can be noted that RPA constitutes a new career opportunity for individual professionals. Although quantification of employment effects is not possible based on this study, it can certainly be said that RPA does provide an emerging career opportunity as there are many published job advertisements in this area. With 55 percent of job advertisements in the sample, the consulting sector seems to offer the most job opportunities in RPA. This is not surprising because consulting firms are often driving the adoption of new technologies in different industries. However, in terms of overall employment effects, this raises the question of whether the jobs will be permanent or only be limited for the period of the main wave of the introduction of RPA.

An implication for both individuals and organizations is that a strong IT background is required to succeed in the RPA field. Although many of the job advertisements are not very specific when it comes to particular skills requirements, it becomes apparent that a background in or at least an affinity for IT is required.

Furthermore, the study implies that finance and accounting are considerably affected. Based on both the industries in the sample and the skills mentioned in the job advertisement, it can be said that financial services sector and the finance and accounting function seem to be most affected by the changes. This does not only mean that skills in this area are relevant for prospective RPA experts, but also that people working in these areas today might be most affected by automation and reskilling requirements. This is in line with prior research that, in general, sees a huge impact of digital transformation on the finance function (Langmann, 2019; Greulich and Riepolt, 2018; Nuhn *et al.*, 2018). RPA and other automation technologies imply a major reskilling demand for the existing workforce in many organizations. However, considering the novel results of this research, the general idea and argument in many discussions, that individual employees that are affected by automation can be retrained to a position in which they supervise and operate “robots” has to be seen extremely critical. It is acknowledged that a certain percentage of the existing workforce might engage in tasks such as exception handling in an RPA ecosystem. However, most of the jobs identified in this study are in the consulting sector and thus related to the introduction of the software robot. A person that has been working as an accounting clerk for most of their lifetime will hardly be able to be trained into programming C#, for example. On the other hand, reskilling does not necessarily have to mean that the people still work in the same function (e.g. accounting) afterwards. A more realistic possibility might be to retrain an accounting clerk to work in other administrative areas, for instance in sales or HR (if these functions are not affected by automation in a similar intensity).

Implications for academic teaching

The results of this study emphasize the interdisciplinary nature of RPA, spanning for example accounting and IT. This will also lead to a further hybridization of employees' roles, that has already

been observed in the context of enterprise resource planning systems (Lois *et al.*, 2017). This interdisciplinarity should also be reflected in future curricula at universities, for example by integrating elements of the Information Systems discipline into business-related study programs and vice versa.

Continuous and lifelong learning, as well as openness towards changing circumstances will become even more important in the future. This will have a tremendous impact on educational systems and provide new opportunities for universities to offer for example part-time postgraduate programs as well as non-degree programs for employee development.

Limitations of the study and potential for further research

As every research, also this research has its limitations. First of all, this study is limited to RPA as one particular area of automation. That means that the findings might not be completely transferrable to the general discussion of the effects of automation but the authors believe that some arguments might be transferrable by means of logical reasoning. Second, the sample provides a snapshot on the labor market at a specific point in time in Germany, i.e., the results might not be generalizable beyond the temporal and geographical scope. Further sampling bias might arise from the selection of job platforms. Hence, comparative research approaches in different countries or regarding related technologies such as AI to corroborate the findings would further increase our understanding on the phenomena under study. The key findings discussed in this study can be used as research propositions or hypotheses for further studies.

Additionally, a longitudinal research design to identify further trends could be a promising avenue for further research, especially concerning the finding that the jobs seem to be largely consulting-driven, and the related question whether the career opportunities tend to be in their basic nature rather temporary or permanent. Additionally, alternative the collection of primary data, irrespective of underlying paradigms and concrete data collection methods, could considerably increase the knowledge in the field. It is beyond dispute that more research is needed, as the technological progress will continue to take place.

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