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# Robotic Process Automation as a Digital Transformation Tool for Increasing Organizational Resilience in Polish Enterprises

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**Abstract:** The current digital transformation (additionally accelerated by the COVID-19 pandemic) is causing profound changes across a number of industries. Part of this revolution is the spread of Robotic Process Automation (RPA), which enables the automation of business processes by replacing human work with advanced software robots. One of the goals of the conducted research was to develop a classification of approaches to RPA positioning in enterprises. The author also identified differences in RPA positioning between individual industries. Based on conducted literature research, the author has proposed a proprietary classification for approaches to RPA positioning: conservative, efficiency improving, and strategic. This was subject to verification based on the results of empirical research using multidimensional correspondence analysis. The survey was conducted by the author in 2020 using the CAWI method: Credible (reliable) results were obtained from 238 Polish enterprises. The multidimensional correspondence analysis, conducted on the basis of the results of the empirical research confirmed that the approaches to RPA positioning in enterprises proposed by the author did occur in business practice. The outcome of the RPA classification became the basis for qualitative research (in the form of semi-structured interviews with expert practitioners) aimed at answering the question as to whether enterprises that strategically position RPA and treat it as a tool for digital transformation increase their organizational resilience. Up until now, however, no study has been found that focuses on how RPA increases organizational resilience or what its consequences are both at the research and application levels. This article fills the research gap in this area.

**Keywords:** robotic process automation; digital innovation; organizational resilience; digital transformation; dynamic capabilities



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## 1. Introduction

A substantial number of organizations have started to rely more and more on digital technologies in recent years. The widespread use of such technologies often results in a profound transformation in the functioning of both individual entities as well as entire industries [1,2] and even the emergence of new types of entities within industry [3] (p. 57). Such changes are known as "digital transformation" [4]. Another common definition of digital transformation is as follows: a process that aims to improve an entity by triggering significant changes to its properties through a combination of information, computing, communication, and connectivity technologies [5,6].

According to a number of studies [7–10], this type of approach to transformation increases organizational resilience, which is defined as a "firm's ability to effectively absorb, develop situation-specific responses to, and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten organization survival" [11]. As emphasized in [9], "digital technology will be, tomorrow, an increasingly crucial aspect of business resilience, with every company having to rely on data analytics, digital tools, and automation".

In order to automate processes—which is the foundation of the digital transformation—more and more entities have implemented IT solutions, the key elements of which are software robots. Swan even points to the emergence of an automation economy, which focuses its considerations about the functioning of the economy in such conditions where robotic technology complements or replaces most of the demand for human labor [12].

The term "robot" emerged in the 1920s when it was used by Czech writer Karel Čapek in a play titled R.U.R. The term is derived from the Slavic word "robota", meaning effort, hard work [13]. However, the terms "robot" and "robotic automation" are used in this article in reference to a research trend that highlights the significance of metaphors in management sciences. According to this approach, metaphors referring to the processes taking place in the physical world have an impact on the specific understanding of reality through another part of it, as well as on the development of science and its language [14] (pp. 10–11). In this paper, the assumption is made that a software robot is a computer program operating on a predefined algorithm and used to automatically perform business processes, or parts thereof, and usually imitates human work.

The concept Robotic Process Automation (RPA) is directly related to the term "software robot." The concept is viewed in two different ways in the literature. According to a narrower view, RPA is software used to build software robots that replace human work [15]. Observation of the IT market indicates that, currently, RPA products are the fastest growing group of digital transformation tools [16]. In a broader sense, RPA implementation cannot be equated with software implementation; instead, it is necessary to consider it in the context of the implementation of a series of business changes and their results [17].

The research presented in this article had two main objectives: (a) to develop a classification of the approaches to RPA positioning within enterprises, based on literature studies and proprietary research, and to determine the consequences of choosing each of these approaches; and (b) to verify whether companies that strategically position RPA and treat it as a tool for digital transformation increase their organizational resilience.

A diverse set of research tools was applied in order to accomplish the objectives of the paper. These included literature research, creative thinking techniques, the Multidimensional Correspondence Analysis method, and semi-structured interviews with expert practitioners.

The following parts of the article are structured as follows. Section two presents selected theoretical aspects of the role of digital transformation in building organizational resilience and describes both RPA and the Multidimensional Correspondence Analysis. Section three discusses methodological and organizational aspects of the conducted survey, while section four presents the results. Section five and six presents, respectively, the methodological and organizational aspects of semi-structured interviews with expert practitioners and their results. Discussions, the limitations of the applied research procedure, and a summary of current considerations are presented in the last section, and potential directions for further research are presented.

## 2. Theoretical Background

### *2.1. The Main Concepts of Organizational Resilience and the Role of Digital Transformation in Building It*

There are many different approaches to the concept of resilience depending on the area of science in which it is explored. It occurs in the biological sciences (here, we talk about the resilience of living organisms), technical sciences (where we talk about the resilience of inanimate objects), and, finally, in social and economic sciences (here, we not only talk about the resilience of nations, regions, or countries but also organizations) [11].

Thus, the concept of resilience is a non-ambiguous construct. On the one hand, resilience means a certain set of features, the inherent properties of a subject or object, which render it non-susceptible, resistant, and insensitive to the influence of unfavorable factors. At the same time, this concept includes the ability of a subject or object to perform specific actions in response to the influence of unfavorable factors. Moreover, resilience can be formed consciously, i.e., it can be strengthened or weakened. Such actions change the level of resilience gradually [18].

Concurrently, when using the term "resilience", one should always specify what-in a given context-it refers to. This requires answering questions such as "whose?" and "of what's?" resilience we mean; "what?" is the current and, perhaps also, the desired level of resilience; and "against what" type of event is this resilience supposed to be working, or against "what?"event do we want to be resilient [19].

For the purposes of this article, the discussion will focus on the concept of resilience in management sciences and the concept of "organizational resilience." One of the more frequently cited definitions of this term is a firm's ability to effectively absorb, develop situation-specific responses to, and ultimately engage in transformative activities to capitalize on disruptive surprises that potentially threaten the organization's survival [11]. Referring to crisis management, in the work [20], the resilience of an organization is defined as the process by which an actor (organization) builds and uses its capability endowments to interact with the environment in a manner that positively adjusts and maintains functioning prior to, during, and following adversity. It is also worth noting that the concept of organizational resilience is found in the ISO business continuity management standards (such as, e.g., ISO 22316), where it is understood as the ability of an organization to absorb and adapt in a changing environment [21].

Finally, in [7], organizational resilience is characterized by capabilities related to the ability to successfully absorb, adapt to, and eventually capitalize on disruptive surprises that may threaten survival. This perception of organizational resilience is in line with the dynamic capability theory [22], which has been explored very intensely in recent years and explains how companies respond to rapid changes in technology and markets [23]. According to [24], dynamic capabilities are a particular type of business capability, taking the form of an organizational and strategic routine, according to which managers manage the resource base available in order to generate new value creation strategies, particularly to acquire, combine, reject, or integrate them. Based on this approach, these capabilities are keys to building a company's competitive advantage.

Simultaneously, according to [11], the dynamic capability view represents a suitable framework for investigating whether digital transformation could be leveraged to facilitate organizational resilience. In this approach, organizational resilience can be characterized by its three basic determinants [11,18–20]:

- Perception—the ability of enterprises to strive to discover adaptations to environmental changes;
- Integration and coordination—the enterprise's flexibility to mobilize internal and external resources to resist external crises;
- Reorganization—the ability to reconfigure resources and capabilities and complete necessary internal and external transformations.

An alternative method of perceiving digital transformation in the context of increasing organizational resilience is through a functional approach [7]. In this approach, digital transformation is an effective method for enterprises to avoid risks and facilitates the enterprise's ability to comprehend and adapt to changing environmental contexts [7]. This means that, for example, IT solutions in the field of data analytics (using Big Data or machine learning) help the organization make better decisions and respond to changes in their environment faster [25]. Another example is IT solutions in the field of supply chain that ensure continuity of supplies [10]. Yet another example is IT tools for automating business processes, which enable them to be implemented effectively with a minimum amount of staff (most of the tasks performed by employees are then only related to the work of supervising the operation of machines and responding to errors) [26]. This was clearly visible in the case of lockdowns and the occurrence of COVID-19 outbreaks in enterprises: companies that had highly automated processes operated continuously, while others had to limit or even suspend their work for some time.

*2.2. RPA's Main Distinguishing Factors from an Organizational and IT Perspective*

RPA tools are used to develop software robots [27] and are one of the fastest growing process automation software categories in the IT market. According to Gartner, the sales of solutions and services in this area rose 19.5% in 2020 compared to 2019, coming in at USD 1.9 billion [28]. Gartner also predicts that "90% of large organizations will have adopted RPA in some form by 2022 as they look to digitally empower critical business processes through resilience and scalability, while recalibrating human labor and manual effort" [28]. Moreover, according to markets and market analysts, the value of RPA licenses and services sold will reach USD 2.5 billion by 2022 [29].

However, as outlined in Lacity, Willcocks, and Craig [16] (p. 13), RPA implementation is not an IT undertaking; it is a business venture with a small IT component: Approximately 98% of the entire implementation is related to business rules, which means that, first and foremost, business process experts are needed for its implementation. Therefore, in a broader sense, RPA implementation cannot be equated with software implementation; instead, it is necessary to consider it in the context of the implementation of a series of business changes and their results. Hence, the above-mentioned second approach is a much broader one. According to this broader view, the author defined RPA as a construct that covers the process, content, and result of an organizational change, with the automation of business processes carried out using software robots at its core. These processes, contents, and result-related aspects can be outlined in the following manner:

- The process element of the implementation encompasses various operations, tools, human resources, and organizational structures that the organization needs in order to (a) prepare for the RPA and (b) build, implement, and develop, as well as maintain software robots. In this context, the robot automation project can be ongoing and, in fact, have no time limit.
- The content part of the organizational change covers the robotically automated processes themselves.
- The result element is, as the name suggests, related to the outcomes of the RPA implementation; that is, such things as those bodies put in place within the organization to carry out and run RPA, the tools that are used to develop the robots, the robots themselves, and, importantly, all the advantages derived from these.

The above understanding of the RPA concept has been assumed in this article. With such an approach, actions related not only to the technological perspective but also—and maybe even first and foremost—to the management and organizational and cultural standpoints require consideration.

Even so, RPA tools do not have a current coherent or universally applicable definition. The author has defined those things that differentiate this class of IT solution, and the following is a list of considerations resulting from this analysis [15,17,27]:

- The purpose of RPA is to develop software robots that operate the IT system's user interface directly; thus, in most cases, the software robots mimick the actions of the human operators who formerly carried out these tasks. The software robots automate tasks that are repetitive and/or have high volumes within set periods, for example, a month or a year.
- Normal coding methods are not required for RPAs to develop software robots; instead, a "developed by drawing" system, which is very similar to low-code tools, is used for the robot code. The system uses predefined code components in the form of graphical objects, each providing a particular functionality. These components can then be combined and configured either by logging the actions performed by human operators (such as mouse clicks) or by inputting specific parameters.
- In the process of deploying RPA and its resulting software robots, it is not necessary to optimize, reengineer, or otherwise alter business processes being automated; however, these procedures would be an advantage and are recommended.

- RPA does not need dedicated application programming interfaces (API) to communicate data between individual systems. The source code and application database are not altered or changed during the implementation or functioning of the RPA, suggesting that knowledge of the application's internal structure is not required—this is especially important for legacy systems.
- The applications to which the software robots will be applied have their own in-built business logic; this is used by the RPA system and, therefore, obviates difficulties that exist in the integration models of regular IT systems in reproducing these logic functionalities.

As other traditional automation processes exist, such as workflow type systems and BPMS (business process management system) [30] (pp. 92–94), it is essential to relate and compare these to RPA systems (although this is not necessarily in either situations, as some large organizations implement and use both BPMS and RPAs together). At the business concept level, it is reasonable to think that both traditional systems and RPA have a shared set of goals, that is, to increase efficiency while reducing business process performance costs, yet ensure that these processes deliver the highest quality products. However, the methods in which each of the systems achieve these goals is completely different. Implementing traditional solutions such as workflow systems or BPMS means interfering with the actual processes as well as carrying out post-implementation changes, which often requires programming tasks and, therefore, appropriate time and IT skills. RPA has a completely contrasting approach: The focus is on making the tools so intuitive that business unit operatives should be able to operate them themselves (e.g., developing software robots) with little or no IT support. In many cases, teams who make up "centers of excellence" perform these tasks [31].

Implementing RPAs does not come without potential risk factors. The following includes the most important risks from those that may be encountered when implementing RPAs: an incorrect interpretation of the goals of robotic automation, for example, implementation purely for reducing costs related to human resources; selecting the wrong automation process in relation to the organization or selecting the wrong robotic tool; choosing an inappropriate approach for changes within robotic automated processes; the potential for resistance from members of staff involved in the automation process; and the potential for having a gap in competences [32]. Apart from these, some other risk factors that may occur include the following: data in the form of hard-copy documents may still need to be inputted into the robotically automated system using time-consuming OCR processes; codified knowledge for business processes may be non-existent or not up-to-date, especially in relation to business process exceptions; and poor or non-existent coordination of changes being made to systems where robotic automation function, resulting in emergency stoppages.

### *2.3. RPA Implementation in the Context of Organizational Changes*

According to Schallmo and Williams, digitization means fundamental changes in the way business operations and the business models of enterprises are implemented and introduced thanks to the use of digital technologies and data that are both digitized and natively digital [33] (pp. 11–12). For the purpose of this article, the author has adopted as binding one of the most frequently quoted definitions of the business model, which is proposed by Osterwalder, Pigneur, and Tucci, according to which a business model is a conceptual tool that contains a set of elements and relations that enables the business logic of a given company to be expressed. It includes a description of the value offered by a company to a group or groups of buyers, a description of the enterprise's architecture and a list of its network of partners who co-create, offer, and deliver this value and relational capital, ensuring continuous revenues conducive to profitability [34] (p. 3).

Sundaram, Sharma, and Shakya emphasized that enterprises that have their roots in traditional industries can improve the quality of their customer experience, change the company's revenue structure, and transform their distribution channels by introducing digitization into their business models [35].

Bouwman et al. emphasized that the technological changes currently taking place in the market encourage companies to experiment with how new IT solutions will affect their business models and—based on research conducted among nearly 340 European enterprises—how it can very clearly be seen that such an impact exists [36] (p. 109).

RPA, one of the methods of implementing digital transformation, and its impact can be viewed from several different perspectives: macro, meso, and micro. The macro perspective covers the impact of robotic process automation on the entire economy; the meso perspective covers on a given industry; while the micro focuses on a specific enterprise.

A number of studies and reports have been compiled in recent years that have aimed at presenting the impact of robotic automation on the economy and the labor market, both worldwide and in individual regions and selected countries [37–39]. Most of these, however, have focused on production processes, while analyses of the impact on business processes, as discussed in this article, were definitely in the minority. In one of the papers dealing with business processes, Anagnoste indicated that the robotic automation of these processes would result in changes in employment structures. On the one hand, employees would be redeployed to perform more advanced tasks, generating higher added value, but on the other hand, it would result in the need to retrain a material portion of the workforce [40] (p. 685).

When considering the impact of robotic process automation on individual industries, and looking for those areas where the ongoing robotic automation has had the strongest impact, what should be mentioned first should be the banking and investment funds sector [41,42], as well as advanced business services (BPO—Business Process Outsourcing; SSC—Shared Services Centers) sector [43]. In the BPO and SSC sector, there has even been talk of cannibalizing the traditional method of conducting business [44] (p. 50). It should be emphasized that, currently, companies from other sectors, for example, utilities [45], use software robots.

In the case of the micro approach (i.e., for a single enterprise), robotic process automation is viewed, first and foremost, in the context of an organizational change. According to the opinion of Westerman, while technology is changing quickly, organizations are changing much more slowly; however, technology is not the problem. The core of the problem is the transformation itself. Therefore, in his opinion, the digital transformation of a company cannot be left only to IT specialists [46]. This means that people from business units must also be actively involved in the robotic automation process, or, to put it more bluntly, should even lead the changes, because such an approach is crucial for the success of the actions being taken.

Having assumed that the objective presented in the introduction to this article should be its main goal, the author will later focus on the micro level (individual enterprises) but will also refer to the impact of RPA positioning on individual industries.

As highlighted in the introduction, RPA should be viewed as a special type of organizational change that includes a technical component. A number of different change management classifications can be found in the literature on change management, which in itself demonstrates the complexity of this matter. A summary of selected organizational change classifications is presented in Table 1. The author has limited himself to the key classifications, those that are important from the point of view of further discussion.

**Table 1.** The classification of organizational change types that are important from the RPA perspective.

| Change Breakdown Criterion | Change Description |
|---|---|
| Purpose of the change | Conservative/Growth oriented (innovation oriented) |
| Scope of the change | Partial/Area-specific/Total |
| Magnitude of the change | Small/Medium/Large |
| Expenditure required | Small/Medium/Large |
| Approach to the change | Ad-hoc/Planned |
| Magnitude of benefits from implementing the change | Small/Medium/Large |
| Potential negative consequences of the change | Small/Medium/Large |

Source: compiled on the basis of [47].

Depending on the approach adopted, RPA's implementation in an enterprise can have various characteristics and take different courses: it may result in the transformation of only one of the organization's subsystems or several, but it may also affect the entire business model of the enterprise, that is, its improvement or expansion and, in extreme cases, the creation of a new business model.

*2.4. RPA Positioning in Enterprises*

Based on the literature studies [15–17,31,42,48–52] and personal practical experience (the author was involved in the implementation of several RPA projects in Polish financial institutions in 2018–2021), the author has identified three main approaches to RPA positioning in enterprises.

The first of these is **conservative positioning** in which the RPA implementation is viewed as a short term, small undertaking that can be interrupted at any time without incurring material financial losses and is aimed at finding a quick and temporary solution (at least according to the declarations made) to identified local problems (typically related to ineffective and usually partial manual integration of IT systems) or to reducing the costs of implementing one or several processes. In this case, the approach to robotic process automation usually occurs as an ad hoc task (without more extensive planning). The result of the completed works is the implementation of a robotic automation tool and the development of one or several software robots that fulfil the needs of a selected, single organizational unit within the enterprise. Organizations that apply this approach usually have a short (usually not longer than one year) RPA experience.

The second is **efficiency improving positioning.** Here, RPA implementation is viewed as a method of improving the operation of individual organizational units (departments or offices), usually those that do not deal directly with customers. Its main goal is to increase the efficiency of the operations of a part of the organization and improve the quality of work (usually by increasing the efficiency of the employees, relieving them of routine activities, and reducing the number of overtime hours). Robotic process automation is usually the implementation of a project, as part of which, a set of robotic automation tools put in place and several or several dozen software robots are built for the needs of one or two departments within the company. This approach is typically found in companies with between two and three years of RPA implementation experience.

**Strategic positioning** is the third and last of these approaches. In strategic positioning, RPA implementation is viewed as one of the main tools for digital transformation, and is used for changing the components of the company's business model, particularly the value proposition for its customers. In this approach, RPA-related works are carried out over a longer period of time (it is a long-term undertaking), usually in the form of coordinated initiatives. One of the results of such an approach is the implementation of a robotic process automation platform that allows the works to be scaled throughout the enterprise. The number of robots deployed by the enterprise usually tops 100. Organizations that employ this approach already have quite long-term (usually 3 or more years) experience in implementing RPA.

A comparison of the individual RPA positioning approaches from the micro perspective is presented in Table 2.

**Table 2.** Description of the individual RPA positioning approaches from the micro perspective (within an enterprise).

| | Conservative Positioning | Efficiency Improving Positioning | Strategic Positioning |
|---|---|---|---|
| Goal of robotic process automation | Solving a local business problem (most often associated with the high costs of implementing a single process), or a technical problem (most often resulting from gaps in inter-system integration) | Increasing the efficiency of the operations of a selected part of the organization (usually also aimed at reducing costs) and improving the quality of the processes. | Changing the company's business model or management system, with the aim of delivering value to customers |
| Scope of the change | Local | Selected parts (areas) of the organization | As total as possible (certain areas may be excluded for formal reasons) |
| Number of robots deployed | Small | Medium | Large |
| Approach to the changes related to robotic process automation | Ad-hoc | Planned | Planned |
| Expenditure required | Low | Medium | Large |
| Magnitude of benefits | Small | Small or medium | Large |
| Potential negative consequences | Lack of standards, security problems | Problems with scaling the robotic process automation (i.e., transition from several dozen to 100 or more robots) | Increased formalities during robotic process automation |

Source: compiled on the basis of [47].

In some organizations where there is a gradual change in RPA positioning (which involves transitioning between approaches in the following order: conservative –> efficiency improving –> strategic positioning), difficulties in dealing with the negative consequences of previous approaches arise, for example, a lack of robot development standards, problems with ensuring an adequate level of security, etc.

*2.5. The Homogeneity Analysis Method in the Context of Approaches to RPA Positioning in Enterprises*

Homogeneity Analysis Method (HOMALS) was used to confirm the use of particular types of RPA positioning in enterprises. Homogeneity analysis—a method that belongs to the group of incomplete taxonomic methods—is based on exploratory data analysis [53]. The goal of this type of analysis is to discover structures and patterns based on data collected during the research. This approach not only enables common factors that take the form of qualitative features to be identified (expressed on a nominal, ordinal scale) but also presents their full interpretation in a completely new light: It allows for the formulation of hidden variables based on qualitative features and their categories. This is why HOMALS analysis is perceived as an alternative analytical strategy, for example, in contrast to factor-based analysis [54] (p. 50).

The HOMALS analytical procedure involves quantifying the individual categories of the qualitative characteristics and quantifying the observations made in a database. As part of this approach, features/variables are initially regarded (before quantification) as fully nominal or ordinal. Then, the values of the points in the coordinate system are analyzed as values that are needed to construct a new dimension/common factor. HOMALS also allow for the projection of a multidimensional data set onto a two-dimensional, or more, space, although the most effective projection method should enable the researcher to retain (preserve) the maximum amount of initial information contained in the dataset, for example, within one of the dimensions (most often the first dimension—the common factor). In a coordinate system created in this manner, each category then assumes specific coordinates. Furthermore, it is assumed that objects with similar profiles are located close to one another and that individual categories of features with similar content are also located close to one another [55].

Thus, the main goals of the HOMALS analysis involve the following: (1) discovering hidden features (or feature, assuming the existence of only a single dimension), (2) identifying co-existing groups of feature categories, (3) identifying relationships between the examined features, and (4) visualizing the results in the form of a correspondence map [54].

## 3. Quantitative Research Methodology

### 3.1. Data Collection

In 2020, the author planned and carried out cross-sectional research concerning the state of RPA implementation in Polish enterprises [56] and its role in improving organizational resilience. The research comprised several elements: a questionnaire, case studies, assessment of the participants and their actions, and expert interviews.

The quantitative research consisted of two phases: the pilot phase and the main phase. In the pilot stage, which was aimed to verify the RPA questionnaire in preparation for the next phase, the questionnaire was sent to 15 organizations who were to be included in the main phase. It evaluated how understandable the questions were and the thoroughness of the answers received. As a result of this process, four questions were substantially changed. None of the results from the pilot phase were included the main phase.

The survey formed one of the main elements of the research project. For this phase of the survey, enterprises were chosen on the basis of their self-declared deployment of at least one software robot in a production environment. The survey was carried out online by using the CAWI (Computer Assisted Web Interviews) technique so that the respondents could fill out the questionnaire themselves [57]. This technique provided several advantages: It allowed respondents to fill out the questionnaire at their own convenience, made it more likely that more answers would be returned, and reduced both the time and cost of the survey yet still provided for high quality and complete answers. Answer quality, some of which was found to be poor during the pilot study, was improved greatly due to the use of the validation rules. These were applied to individual fields and across fields in the questionnaire. There were additional yet important factors for selecting the CAWI technique, and these included the fact that the online environment was very familiar to the respondents; thus, an online survey was a natural solution. Moreover, this method reduced the potential influence of the interviewer, which might have occurred in face-to-face interviews. Ultimately, the most significant factor was the pandemic, which severely limited direct communication.

### 3.2. Questionnaire Description

The questionnaire contained a total of 34 questions, of which the prime questions concerned the following factors:

- What conditions were required for implementing the RPA in enterprises?
- What was to be the status and scope of the RPA?
- What approach would be used to develop and maintain the software robots?
- How would the RPA be integrated with other process automation tools?
- What factors would establish the success of the RPA?
- Finally, what would be the impact of the RPA on the business model and management system of the enterprise?

There were some questions used to determine if elements or characteristics of the environment or industry might justify alternative explanations for this study's results (i.e., customer attitudes, the amount of competition, and the dynamics of the technological, market, and regulatory environments). Factors such as enterprise size (as number of employees) and the enterprise's sector or type of industry were obtained in the remaining control questions. One filtering question was added specifically to flag enterprises that, in fact, did not have any software robots deployed in their production environment; these enterprises were subsequently removed from the analysis.

Initially, the questionnaire used an extended Likert scale of seven points as opposed to the usual five points. This was intended to increase measurement accuracy, but following initial data analysis a decision was made, regardless of the seven-point scale's validity, to combine the answers for the categories at the extreme ends of the scale. The decision was made due to the low number of answers obtained for two of the categories in the seven-point scale: "2 = Disagree" and "6 = Agree." Thus, in the original seven point scale, "1 = Strongly Disagree" and "2 = Disagree" at the negative end were combined, as were "6 = Agree" and "7 = Strongly agree" at the positive end. This resulted in the following five-point scale: 5 point scale: "1 = Strongly disagree," "2 = Rather disagree," "3 = Hard to say," "4 = Rather agree," and "5 = Strongly Agree".

## 4. Data Analysis and Results of the Quantitative Research

### *4.1. Research Sample Characteristics*

There were a total of 294 questionnaires submitted, of which 238 qualified for analysis. The following is the list of requirements needed to qualify for the analysis:

- The enterprise was required to be from one of the industries selected for the study; with only a representative of that enterprise permitted to fill out the questionnaire (23 questionnaires were rejected);
- All mandatory fields had to be filled out (the validation rules ensured no rejections for this requirement);
- Complying with the validation rules was mandatory (26 questionnaires were rejected);
- The respondent was required to provide assistance via e-mail or interview in cases where the author had doubts or questions about the filling out of the questionnaire (seven questionnaires were rejected).

A rigorous review of the raw data was carried out, and where answers were not clear or consistent, an e-mail was sent to the respondent asking for clarification (note that a valid business e-mail address for the respondent was a prerequisite for inclusion in the study). Additionally, a phone call or Zoom or MS Teams teleconference was arranged if further clarification was needed.

From the data, it was evident that large enterprises (more than 250 employees) were overrepresented, consisting of 75% of all enterprises surveyed (Figure 1). This is in agreement with the literature, which also indicates that large businesses the greatest RPA potential. This is a result of the volume of these entities and the large number of types of processes being implemented [17].

These enterprises were from sectors such as shared services centers (SSC), the manufacturing industry, professional services centers for business (BPO), and banking and insurance companies (Figure 2). Again, this was in line with the literature research carried out by the author, demonstrating that these sectors were world leaders in implementing RPA solutions [14–17].

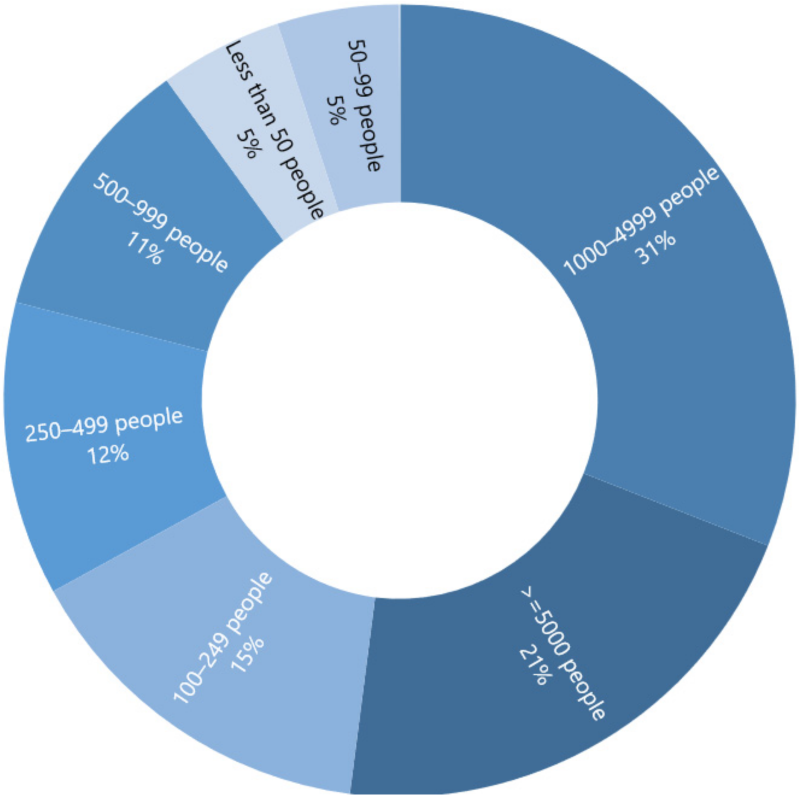


**Figure 1.** Size of enterprises taking part in the survey (N = 238). Source: [56].

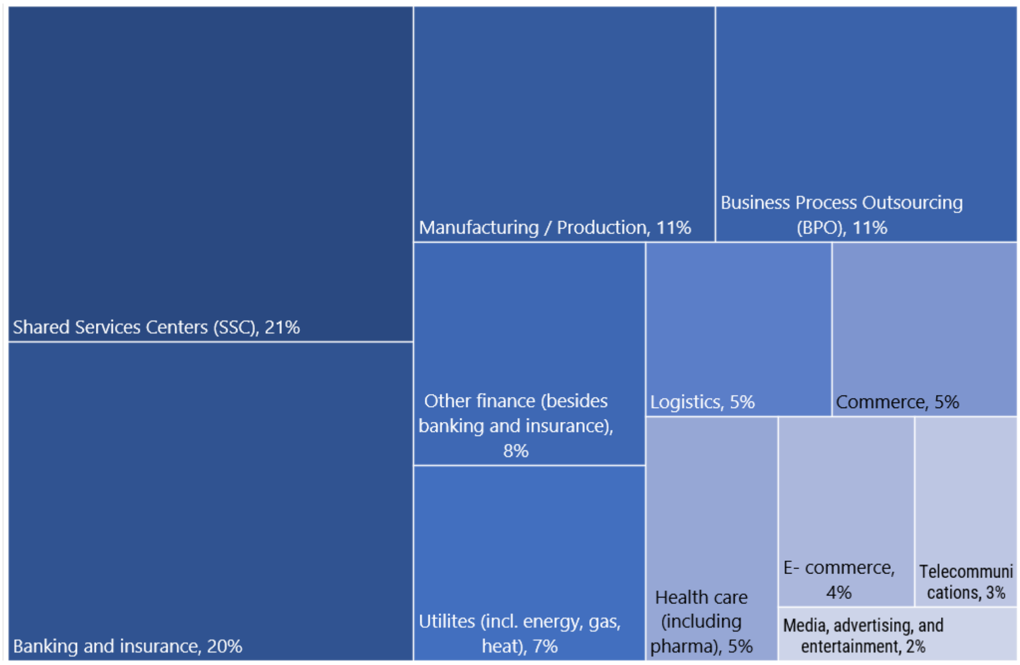


**Figure 2.** Industries included in the research (N = 238). Source: [56].

As the survey was chiefly concerned with intra-organizational RPA issues, IT and consulting companies were deliberately excluded from the study. Another sector that was not included in the study was public administration units. Currently, there is no large scale RPA implementation being conducted by these organizations. There are, in fact, only two Polish municipal units (city halls) that have reported RPA implementation projects, although there are a number of others in the process of considering this option. Moreover, this situation is not only restricted to Poland, as the literature reports very few references for the public administration deployment of RPAs (for example, [58–61]).

For most enterprises, according to the survey, RPA is something new (Figure 3). Almost a third of respondents indicated that their enterprises had spent less than a year implementing RPA. Some of the author's previous analyses have shown that, in Poland, RPA pilot implementations had only started in 2017/2018, and it was not until 2019 that RPA became more established.

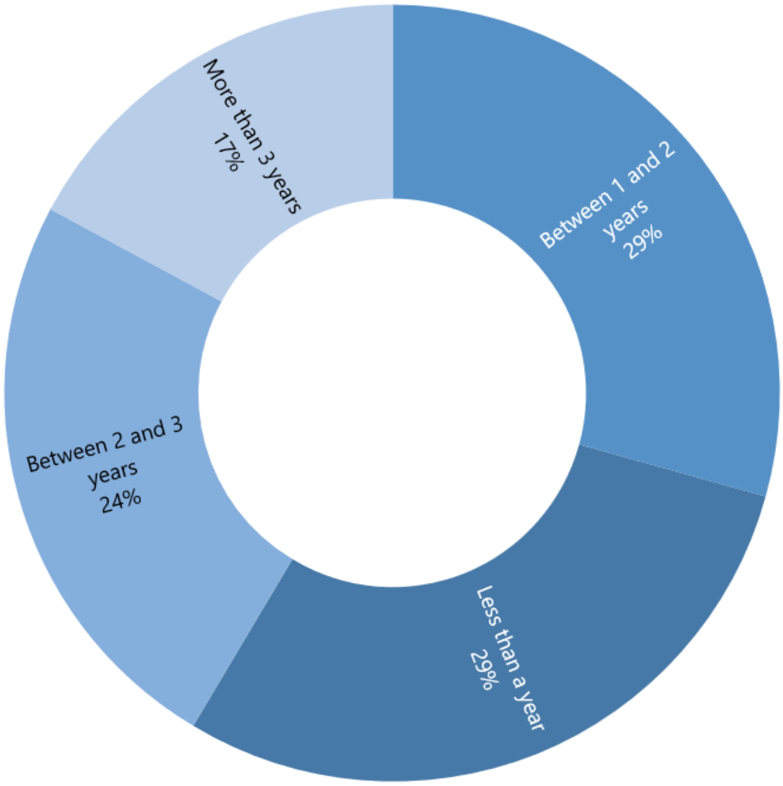


**Figure 3.** Time that enterprises have been implementing robotic process automation for (N = 238). Source: [56].

Placing RPA into effect in a series of small steps was the dominant method of implementation for most of the surveyed enterprises, with 66% reporting the use of this type of approach. The remainder reported that they had, instead, used significant undertakings in their approaches. In those that had taken small steps, it was found that usually no more than two processes or so were applied within a selected business area, meaning the scope of RPA was fragmentary in most cases (Figure 4). This implies that the surveyed enterprises were being very conservative or, one could say, cautious in their approaches to RPA; they only analyzed options currently available. Even so, for a number of the surveyed enterprises (31%), RPA was viewed as an extensive undertaking. These companies realized that RPA was becoming an important element of digital transformation and were planning implementations, or had already implemented, in as many business areas as possible.

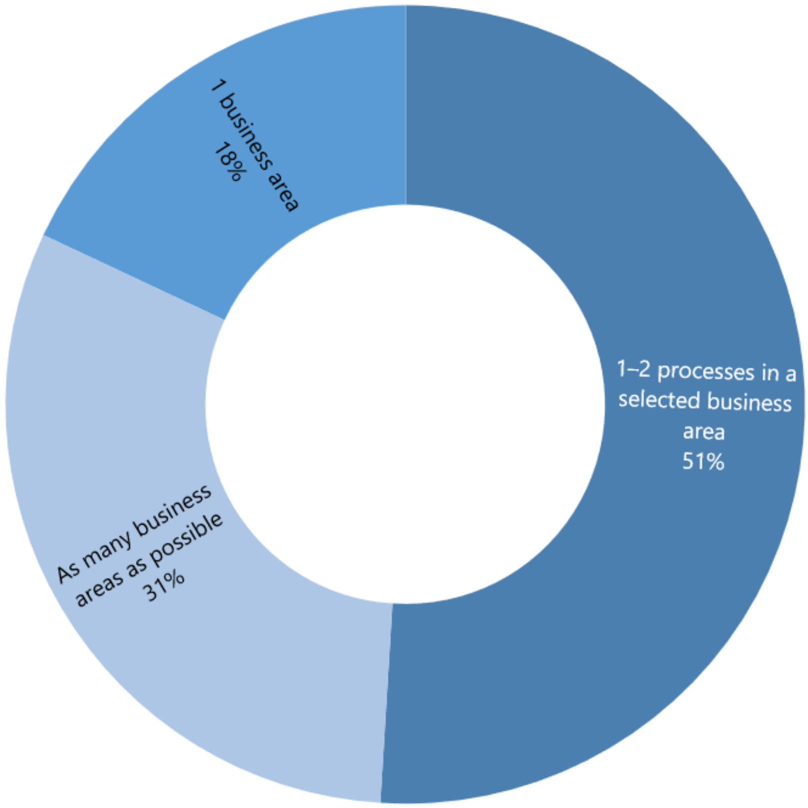


**Figure 4.** Scope of RPA in enterprises (N = 238). Source: [56].

*4.2. Benefits of RPA Implementation*

The author also assessed the approach to the benefits of RPA. While the literature on the subject most often emphasizes financial benefits, especially savings (important from the company perspective), the survey showed that, for respondents, the most important benefits were those for customers [15,17,44,48].

The results (Tables 3 and 4) demonstrate that a long-term and comprehensive approach to RPA (which is a distinguishing feature of the strategic positioning) delivers a number of non-financial benefits, such as increased innovativeness in the products and services provided by the enterprise (55% of respondents strongly agreed with this opinion), opportunities to enrich their offers (42% of respondents strongly agreed with this opinion), and an improvement in the quality of their product/services (58% of respondents strongly agreed with this opinion). An increase in the efficiency of products and services' delivery due to RPA was also important. The benefit related to better personalization of the company's products/services due to the implementation of RPA was assessed as moderate.

It is worth noting that, with respect to the financial benefits, the advantages of a long term and comprehensive approach to RPA were only partially applicable. According to the respondents, RPA implemented as a long term undertaking generates financial savings (49% of respondents strongly agreed with this opinion); however, for example, the implementation of RPA in individual business areas of the organization delivered greater financial savings than a comprehensive implementation for the entire enterprise (60% of respondents strongly agreed that the implementation of robotic process automation in individual business areas contributed to cost reductions versus 55% of respondents who strongly agreed that the implementation of a comprehensive robotic process automation contributed to cost reduction).

**Table 3.** Benefits of implementing RPA with respect to the approach to RPA implementation, and the scope of RPA implementation (N = 238).

| | | Approach to RPA Implementation | | Scope of RPA Implementation | | |
|---|---|---|---|---|---|---|
| | | **Ad-Hoc Activity** | **Long Term Activity** | **Fragmentary Robotic Process Automation** | **Robotic Process Automation of Selected Business Areas** | **Comprehensive Robotic Process Automation** |
| Non-financial benefits | | | | | | |
| Increase in the quality of the company's products/services | Strongly disagree | 14% | 6% | 12% | 2% | 3% |
| | Rather disagree | 5% | 3% | 5% | 2% | 1% |
| | Hard to say | 19% | 18% | 21% | 16% | 15% |
| | Rather agree | 32% | 25% | 29% | 23% | 23% |
| | Strongly agree | 30% | 48% | 33% | 56% | 58% |
| Increase in the innovativeness of the company's products/services | Strongly disagree | 16% | 9% | 16% | 2% | 7% |
| | Rather disagree | 5% | 9% | 9% | 9% | 8% |
| | Hard to say | 41% | 18% | 26% | 30% | 8% |
| | Rather agree | 14% | 19% | 18% | 14% | 22% |
| | Strongly agree | 24% | 44% | 31% | 44% | 55% |
| Increase in the delivery efficiency/effectiveness of the products/services | Strongly disagree | 11% | 2% | 7% | 0% | 1% |
| | Rather disagree | 5% | 3% | 5% | 2% | 1% |
| | Hard to say | 11% | 7% | 10% | 12% | 1% |
| | Rather agree | 8% | 21% | 18% | 26% | 16% |
| | Strongly agree | 65% | 67% | 60% | 60% | 80% |
| Ability to enrich products/services with an additional offering | Strongly disagree | 22% | 14% | 20% | 5% | 14% |
| | Rather disagree | 11% | 10% | 12% | 16% | 5% |
| | Hard to say | 38% | 27% | 34% | 28% | 20% |
| | Rather agree | 14% | 19% | 13% | 30% | 19% |
| | Strongly agree | 16% | 30% | 21% | 21% | 42% |
| Increase in the personalization of the company's products/services | Strongly disagree | 22% | 16% | 20% | 7% | 19% |
| | Rather disagree | 11% | 14% | 15% | 16% | 11% |
| | Hard to say | 35% | 31% | 39% | 30% | 22% |
| | Rather agree | 16% | 18% | 10% | 28% | 24% |
| | Strongly agree | 16% | 20% | 17% | 19% | 24% |

**Table 3.** *Cont.*

| | | Approach to RPA Implementation | | Scope of RPA Implementation | | |
|---|---|---|---|---|---|---|
| | | **Ad-Hoc Activity** | **Long Term Activity** | **Fragmentary Robotic Process Automation** | **Robotic Process Automation of Selected Business Areas** | **Comprehensive Robotic Process Automation** |
| Financial benefits | | | | | | |
| Reduction in the costs of the company's operations | Strongly disagree | 0% | 0% | 0% | 0% | 0% |
| | Rather disagree | 14% | 11% | 15% | 5% | 11% |
| | Hard to say | 14% | 11% | 12% | 14% | 11% |
| | Rather agree | 30% | 28% | 34% | 21% | 23% |
| | Strongly agree | 43% | 49% | 40% | 60% | 55% |
| Increase in revenue | Strongly disagree | 30% | 19% | 21% | 12% | 27% |
| | Rather disagree | 14% | 12% | 14% | 9% | 12% |
| | Hard to say | 32% | 33% | 36% | 23% | 34% |
| | Rather agree | 5% | 16% | 12% | 30% | 9% |
| | Strongly agree | 19% | 19% | 18% | 26% | 18% |
| Emergence of new revenue sources | Strongly disagree | 35% | 27% | 33% | 16% | 28% |
| | Rather disagree | 19% | 13% | 17% | 19% | 7% |
| | Hard to say | 24% | 31% | 32% | 30% | 26% |
| | Rather agree | 3% | 14% | 8% | 19% | 15% |
| | Strongly agree | 19% | 15% | 10% | 16% | 24% |

Source: proprietary research.

**Table 4.** Benefits of implementing RPA with respect to the number of years of experience implementing RPA, and the number of the software robots deployed (N = 238).

| | | Years of Experience in Implementing RPA | | | | Total Number of Robots Deployed | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Less than A Year** | **Between 1 Year and 2 Years** | **Between 2 and 3 Years** | **More than 3 Years** | **1–4** | **5–19** | **20–99** | **≥100** |
| Non-financial benefits | | | | | | | | | |
| Increase in the quality of the company's products/services | Strongly disagree | 9% | 10% | 5% | 2% | 9% | 10% | 5% | 0% |
| | Rather disagree | 4% | 3% | 4% | 2% | 3% | 6% | 2% | 3% |
| | Hard to say | 23% | 26% | 5% | 17% | 23% | 19% | 16% | 9% |
| | Rather agree | 29% | 29% | 32% | 10% | 25% | 29% | 28% | 22% |
| | Strongly agree | 36% | 33% | 54% | 68% | 40% | 37% | 49% | 66% |

**Table 4.** *Cont.*

| | | Years of Experience in Implementing RPA | | | | Total Number of Robots Deployed | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Less than A Year** | **Between 1 Year and 2 Years** | **Between 2 and 3 Years** | **More than 3 Years** | **1–4** | **5–19** | **20–99** | **≥100** |
| Increase in the innovativeness of the company's products/services | Strongly disagree | 13% | 14% | 7% | 5% | 12% | 12% | 11% | 3% |
| | Rather disagree | 11% | 7% | 11% | 5% | 8% | 6% | 16% | 3% |
| | Hard to say | 29% | 33% | 11% | 5% | 33% | 19% | 12% | 6% |
| | Rather agree | 17% | 16% | 28% | 12% | 14% | 19% | 23% | 22% |
| | Strongly agree | 30% | 30% | 44% | 73% | 32% | 44% | 39% | 66% |
| Increase in the delivery efficiency/effectiveness of the products/services | Strongly disagree | 4% | 9% | 0% | 0% | 5% | 8% | 0% | 0% |
| | Rather disagree | 7% | 0% | 4% | 2% | 5% | 2% | 4% | 0% |
| | Hard to say | 10% | 9% | 9% | 0% | 10% | 6% | 9% | 0% |
| | Rather agree | 21% | 20% | 14% | 20% | 18% | 21% | 21% | 16% |
| | Strongly agree | 57% | 63% | 74% | 78% | 62% | 63% | 67% | 84% |
| Ability to enrich products/services with an additional offering | Strongly disagree | 16% | 26% | 5% | 10% | 19% | 17% | 14% | 3% |
| | Rather disagree | 17% | 6% | 14% | 2% | 12% | 10% | 12% | 3% |
| | Hard to say | 29% | 37% | 30% | 12% | 33% | 35% | 25% | 13% |
| | Rather agree | 14% | 13% | 26% | 22% | 11% | 21% | 21% | 28% |
| | Strongly agree | 24% | 19% | 25% | 54% | 25% | 17% | 28% | 53% |
| Increase in the personalization of the company's products/services | Strongly disagree | 16% | 27% | 9% | 15% | 18% | 19% | 18% | 13% |
| | Rather disagree | 19% | 9% | 14% | 15% | 14% | 15% | 16% | 6% |
| | Hard to say | 37% | 31% | 40% | 12% | 39% | 31% | 28% | 19% |
| | Rather agree | 9% | 20% | 21% | 24% | 11% | 15% | 26% | 25% |
| | Strongly agree | 20% | 13% | 16% | 34% | 18% | 19% | 12% | 38% |
| Financial benefits | | | | | | | | | |
| Reduction in the costs of the company's operations | Strongly disagree | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Rather disagree | 16% | 11% | 11% | 7% | 13% | 13% | 11% | 6% |
| | Hard to say | 19% | 9% | 7% | 12% | 13% | 12% | 7% | 16% |
| | Rather agree | 31% | 27% | 32% | 20% | 32% | 31% | 26% | 16% |
| | Strongly agree | 34% | 53% | 51% | 61% | 41% | 44% | 56% | 63% |
| Increase in revenue | Strongly disagree | 26% | 21% | 18% | 17% | 22% | 21% | 25% | 13% |
| | Rather disagree | 11% | 11% | 14% | 15% | 11% | 13% | 16% | 9% |
| | Hard to say | 34% | 31% | 35% | 29% | 31% | 38% | 28% | 38% |
| | Rather agree | 13% | 16% | 18% | 10% | 14% | 15% | 12% | 16% |
| | Strongly agree | 16% | 20% | 16% | 29% | 22% | 12% | 19% | 25% |
| Emergence of new revenue sources | Strongly disagree | 34% | 34% | 19% | 22% | 34% | 27% | 26% | 19% |
| | Rather disagree | 16% | 16% | 12% | 10% | 14% | 17% | 12% | 9% |
| | Hard to say | 33% | 29% | 40% | 12% | 35% | 27% | 26% | 25% |
| | Rather agree | 7% | 10% | 12% | 24% | 6% | 13% | 16% | 22% |
| | Strongly agree | 20% | 13% | 16% | 34% | 18% | 19% | 12% | 38% |

Source: proprietary research.

The results showed that enterprises that positioned RPA using the conservative approach (ad hoc action, individual robotically automated processes) achieved significantly lower non-financial benefits, as opposed to organizations that implemented large-scale robotic process automation (i.e., deploying more than 100 software robots) and had started working in this area early (i.e., three or more years ago) who achieved above-average benefits with respect to both financial and non-financial benefits. The same applies to enterprises with a small number of robots deployed and with short term experience in RPA (which characterizes organizations that employ a conservative approach to robotic process automation); they achieved significantly smaller benefits from implementing robotic process automation.

### *4.3. Verifying RPA Positioning Approaches Using Homogeneity Analysis Method*

The Homogeneity Analysis Method (HOMALS) was used to verify whether the specific types of RPA positioning actually existed in business practice. Its features corresponded to the questions included in the research questionnaire mentioned earlier: "Since when has RPA been implemented by the enterprise?"; "What is the number of software robots deployed?"; "How is RPA positioned within the enterprise?"; and "What is the scope of RPA implementation in the enterprise?" Two segmentation features, "Industry" and "Employment," were also subjected to this analysis. The results of the analyses are presented on the correspondence map, which illustrates the relationships between them. The very process of scaling the categories for these features resulted in the identification of a hidden dimension (factor). The following categories were analyzed:

- Since when has RPA been implemented by the enterprise? Less than 1 year; between 1 and 2 years; between 2 and 3 years; more than 3 years;
- What is the number of software robots deployed? 1–4; 5–19; 20–99; 100 or more;
- How is RPA positioned within the enterprise? It is an ad hoc action; it is a long-term activity;
- What is the scope of the RPA implementation in the enterprise? Fragmentary robotic process automation (1–2 processes within 1 business area); robotic process automation of a selected business area; total robotic process automation of, possibly, a large number of business areas;
- Headcount: Less than 50 persons; 50–99 persons; 100–249 persons; 250–499 persons; 500–999 persons; 1000–4999 persons; 5000 or more persons;
- Industry: banking and insurance; other finance (apart from banking and insurance); Business Process Outsourcing (BPO); Shared Services Centers (SSC); e-commerce; trade; logistics; media, advertising, and entertainment; health care (including pharma); manufacturing industry; telecommunications; utilities (including energy, gas, and heat).

In postulating that features on the correspondence map have both logical and meaningful relations, the distribution should indicate that as companies develop increasing numbers of software robots, both the developmental period and the scope of the implementation should become greater.

It has also been assumed the same pattern could, most likely, be applied to the number of employees and the specific nature of the business' operations. Larger companies, due to their greater potential for robotic automation (understood as processes that can be robotically automated) and greater resources (financial, human resources, and competences) should naturally carry out more works related to robotic automation than smaller companies. This also applies to the broader scope of RPA and the positioning of robotic process automation within the organization.

The categories for the above-mentioned features were assessed not only in a descriptive sense (directly observable, based on percentage value distributions—see the beginning of this section) but also in a manner that gave them a deeper meaning, reflecting the hidden dimension. This is why the main statistical criteria used in the HOMALS analysis included the degree to which the homogeneity (internal consistency) of features was maximized and the degree to which the explained variance of the model and the degree of feature discrimination were maximized. The results of the analysis are presented in Table 5.

**Table 5.** HOMALS model—explained variance and discrimination measures of examined features (N = 238).

| Dimension | Cronbach's Alpha | Explained Variance | |
|---|---|---|---|
| | | Eigenvalue | Inertia (%) |
| 1 | 0.891 | 4.974 | 69 |
| 2 | 0.340 | 1.485 | 17 |
| Total | - | 6.459 | - |
| Average | 0.615 | 3.229 | 43 |
| **Analyzed Features** | | **Discrimination Measures** | |
| | | **Dimension 1** | **Dimension 2** |
| The number of years' experience in implementing RPA | | 0.709 | 0.165 |
| The number of robots deployed | | 0.754 | 0.209 |
| What is the scope of the RPA implementation? | | 0.833 | 0.101 |
| How is RPA positioned? | | 0.621 | 0.247 |
| Headcount | | 0.619 | 0.356 |
| Industry | | 0.591 | 0.241 |

Source: proprietary research.

The results indicate that the first dimension of the HOMALS model showed an eigenvalue of 4.574, which provided an explained inertia of 69% in total. The second dimension obtained 1.485 (with an explained inertia of 17%). The low eigenvalue for the second dimension compared to the first value (several times greater) means that it is possible to limit oneself to interpreting the results of the first dimension. Not only is the eigenvalue and its related inertia and variance important but so is the shape that individual categories of specific features take (Figure 5).

When the data's shape takes the form of a horseshoe, the data structure is one-dimensional. The second dimension is a mathematical artifact in this case and is not subject to further interpretation. From the theoretical point of view, for a "full horseshoe", the proportion of the first eigenvalue as part of the total inertia should be close to 100% (strong dominance of the first, main axis), which is, however, generally difficult to achieve in research practice [62] (pp. 79–111). The values of the individual discrimination measures indicate the "location" of the features being considered, which mainly corresponds most strongly to the first dimension. Overall, the results obtained from the analysis indicate a one-dimensional context for the features that diagnose robotic process automation.

When interpreting the relationships between the categories of the individual features, the following regularities (patterns) can be observed. The higher the level of employment for a given enterprise (large enterprises category: "5000 or more persons"), the earlier the work on robotic process automation was commenced (category: "More than 3 years"), and the more robots were deployed (category: "100 or more"). At the same time, the scope of the RPA implementation in such companies usually took the form of end-to-end robotic process automation, taking into account as many business areas as possible. This group of enterprises includes entities from two industries: "Telecommunications" and "Banking and insurance". According to the model proposed by the author, this reflects the "Strategic" approach to robotic process automation.

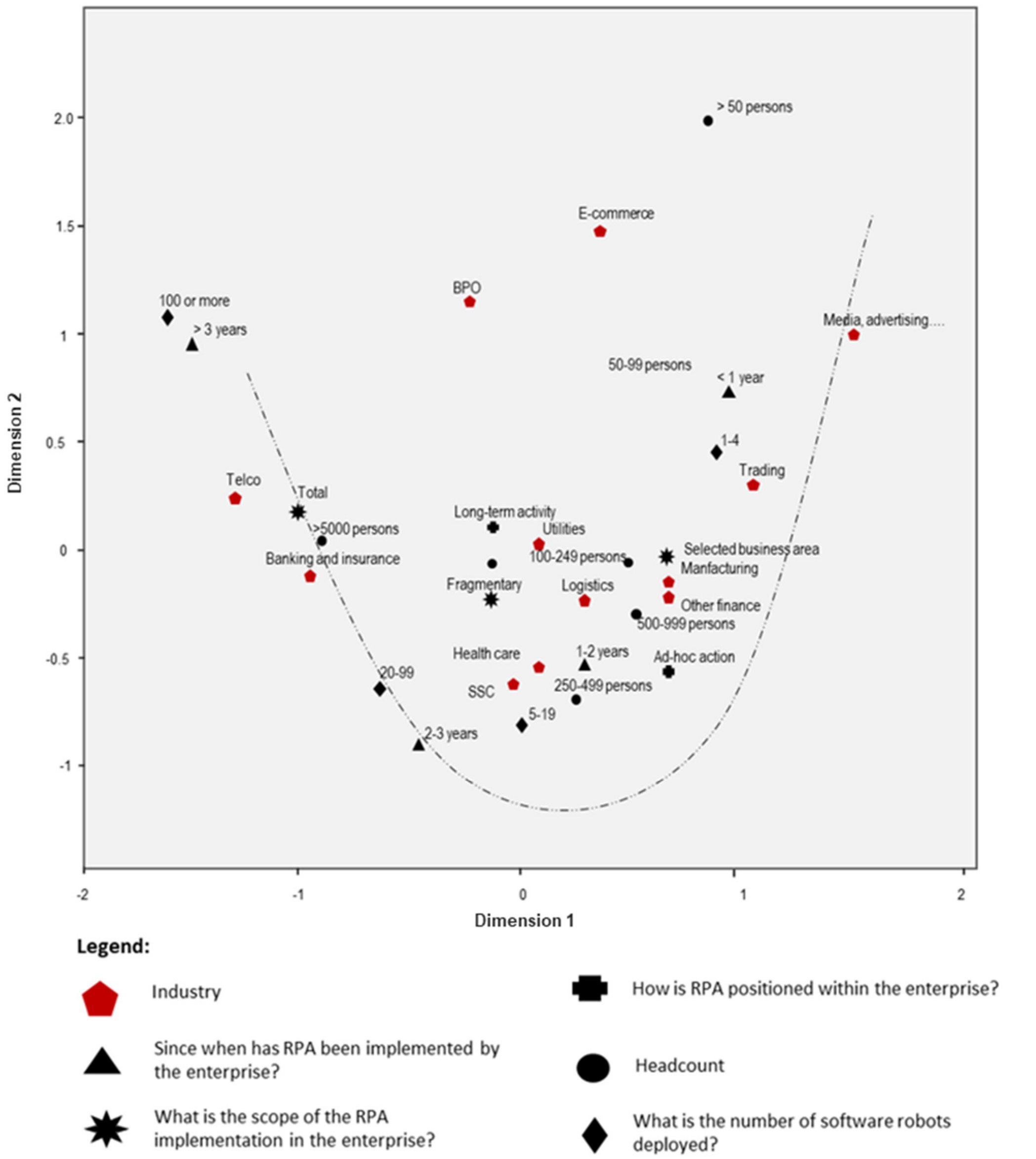


**Figure 5.** Correspondence map showing the relationships between quality features and the individual robotic automation factors in enterprises (N = 238). Source: proprietary research.

In the group of large companies employing between 1000 and 4999 persons, the dominant approach was for the deployment of between 5 and 19 software robots and between 20 and 99 software robots. This is within the range in which robotic process automation takes "2–3 years" and is most often focused on a "selected RPA area". Enterprises from this group conducted business operations in sectors such as "Business Process Outsourcing (BPO)," "Shared Services Centers (SSC)", "Healthcare (including pharma, broadly understood)", and "Utilities (including energy, gas, and heat)". According to the model proposed by the author, this is equivalent to the robotic process automation approach referred to as "Efficiency improving".

In the third group, which includes companies with headcounts in the range of "500–999 persons", "250–499 persons", "100–249 persons", "50–99 persons", and "Less than 50 persons", robotic process automation work did not last longer than two years. The number of software robots deployed was "1–4", while robotic process automation positioning was "ad hoc" (as opposed to the companies included in the first and second groups that conduct "long term activities"). It is also clearly visible that the scope of the RPA in smaller companies refers to "fragmentary robotic process automation covering

1–2 processes in 1 business area." The third group includes companies from the following sectors: "Other finance (beside banking and insurance)", "E-commerce", "Trade", "Logistics", "Media, advertising, and entertainment", and the "Manufacturing industry". According to the model proposed by the author, this is equivalent to the approach to robotic process automation referred to as "Conservative".

## 5. Quantitative Research Methodology

### *5.1. Data Collection*

After conducting quantitative research and analyzing and interpreting the obtained results, work began on answering the second research question, i.e., whether enterprises that strategically position RPA and treat it as a tool for digital transformation increase their organizational resilience. The author decided to carry out further research in the form of semi-structured expert interviews with practitioners.

Semi-structured interviews are not only a widely used format for interviewing individual experts but are, on occasions, also used even with groups of experts [63]. In order to make effective use of interview time, interviewers utilize a semi-structured interview guide. The guide is a schematic representation of all the subjects and questions the interviewer wishes to cover, and it is an effective method for maintaining the interviewer's focus on the line of enquiry and a useful means for investigating interviewees' opinions and knowledge more comprehensively and in a structured manner. The guide consists of a core question, which then branches out into a series of related subquestions. All questions are then refined by conducting pilot testing. The actual interviews are routinely recorded in order to maximize data gathering and to make it easier for the interviewer to concentrate on the line of enquiry and the verbal communication. From this recording, a transcriptionist will create a "verbatim transcript" of the interview.

In the author's opinion, at a time when only a small number of industries and a small number of companies position RPA strategically, semi-structured interviews are a better research tool than quantitative research. Additional arguments in favor of opting for this approach to the research on the use of RPA to improve organizational resistance were as follows:

- It is necessary to discuss the use of RPA tools in real conditions and not in laboratory tests; this takes into account not only technological aspects but also organizational (taking particular note of the process aspects) and cultural aspects.
- The implementation of RPA tools is a complex process involving many variables and elements; therefore, one cannot expect only a single result from an entire project.

In selecting experts for the interviews, the author made his choice bearing in mind the following principles:

- The experts had to be representatives of the managerial staff responsible for the implementation of RPA with at least two years of direct experience in this field;
- There must be indications that these people had significant knowledge about the implementation of RPA (e.g., their participation in specialist conferences, publication of articles in trade journals, etc.);
- They had to be people working in companies implementing RPA for their own needs, and not as consultants or suppliers of tools, for the robotization of business processes (most of the issues discussed in the interviews were related to the strategic determinants of robotization and the resilience of the organization, and it was important that these issues were considered from the internal organization perspective);
- The companies in which the respondents worked must have positioned RPA strategically as one of the tools of digital transformation. In order to meet the last condition, the author searched for respondents in companies from industries that, according to qualitative research, positioned RPA strategically, i.e., banking, insurance, and telecommunications.

The Robonomika.pl website keeps publicly available lists of companies that have implemented the robotization of business processes and for which their owners communicate this in the public space. The information collected on this website facilitated the selection of candidates for participation in this study.

Invitations to participate in the interviews were sent to 15 people. Ultimately, 12 specialists agreed to share their knowledge and experience (their profiles are presented in Table 6). The majority of these experts were people working in Polish branches (in the form of an enterprise registered in Poland) of international corporations, and only two people worked in other types of companies.

**Table 6.** Characteristics of the experts.

| Expert ID | Sex | Industry | Position | Total Number of Years of Experience in the RPA Area | Size of Enterprise |
|---|---|---|---|---|---|
| E1 | Male | Banking | RPA and Automation Director | 4 | >5000 |
| E2 | Male | Banking | AutomationManager | 4 | >5000 |
| E3 | Male | Banking | RPA Director | 3 | >5000 |
| E4 | Male | Banking | RPA Leader | 3 | >5000 |
| E5 | Female | Banking | RPA Director | 4 | >5000 |
| E6 | Female | Banking | RPA Manager | 2 | >5000 |
| E7 | Male | Banking | RPA Leader | 3 | >5000 |
| E8 | Male | Insurance | RPA Manager | 2 | 1001–5000 |
| E9 | Female | Insurance | Process Optimization and Automation Manager | 2 | >5000 |
| E10 | Male | Insurance | RPA Manager | 3 | 1001–5000 |
| E11 | Male | Telecommunication | RPA Manager | 3 | >5000 |
| E12 | Male | Telecommunication | RPA Manager | 3 | >5000 |

Note: experts E11 and E12 come from the same company, but it is so large and varied that it can be de facto transacted as two independent units. Source: proprietary research.

As recommended in research [64] with respect to sample sizes in qualitative research, recruiting experts and obtaining interviews should be carried out until data analysis and transcription attain saturation. However, it is apparent that the point of saturation varies with sample size and is dependent on the aims and goals of the research. It has been proposed that, after the twelfth interview, only limited new data are produced. Research indicates that, with heterogenous samples, larger samples can be used before reaching saturation. Taking this into consideration, the authors decided to conduct interviews until data saturation occurred. In the research conducted by the author, a total of 12 interviews were conducted; therefore, the lower threshold of saturation was achieved.

The interviews were conducted during conference calls (Zoom and MS Teams communicator were used), as direct contact was restricted due to the COVID-19 pandemic. All interviews were conducted in Polish. The interviews were held during October–November 2020 (Table 7).

As mentioned above, all interviews for this research were conducted using Zoom or MS Teams tools. These tools were also used to record the interviews, which were then transcribed to form a textual record. All interviewees agreed to be recorded so that all meaningful data could be gathered, and with respect to the confidentiality of the participants, the authors assert that all data that could identify the interviewees have been removed, thus preserving anonymity in each and every interview. The interviewees were also fully informed of the purpose of the research and had agreed to it.

In the next step, the interviews were encoded. The last step was the analysis of the obtained results.

**Table 7.** Description of the interviews.

| Expert ID | Date | Tool | Interview Duration |
|---|---|---|---|
| E1 | October | Zoom | 60 min |
| E2 | October | Zoom | 60 min |
| E3 | October | MS Teams | 45 min |
| E4 | November | MS Teams | 60 min |
| E5 | November | MS Teams | 60 min |
| E6 | November | Zoom | 60 min |
| E7 | September | Zoom | 60 min |
| E8 | September | MS Teams | 45 min |
| E9 | October | Zoom | 60 min |
| E10 | October | MS Teams | 60 min |
| E11 | November | MS Teams | 60 min |
| E12 | November | MS Teams | 60 min |

Source: proprietary research.

### *5.2. Interview Questionnaire Description*

The interview questionnaire contained one primary question and six subquestions. These were formulated on the basis of the literature analyzes presented in point 2 of the article. The primary question concerned the following problem: "Whether enterprises that strategically position RPA and treat it as a tool for digital transformation increase their organizational resilience?" and the primary question has been decomposed into the following:

- ○ Subquestion 1: Is RPA strategically positioned in the respondent's organization? What does this mean in concrete terms for the given organization?
- ○ Subquestion 2: Does the strategically positioned RPA actually generate non-financial benefits (savings)?
- ○ Subquestion 3: Is the strategically positioned RPA perceived by the company as an important tool for digital transformation?
- ○ Subquestion 4: Does RPA's strategic positioning allow enterprises to strive to discover adaptations to environmental changes?
- ○ Subquestion 5: Does the strategically positioned RPA provide corporate flexibility in order to mobilize resources to resist external crises?
- ○ Subquestion 6: Does the strategically positioned RPA allow resources and capabilities to be reconfigured and the necessary internal and external transformations to be completed?

All experts were asked the same open-ended questions. Before the above questions were used in the interviews with experts, their content was verified by two RPA specialists and one person from the academic community in order to ensure their clarity and ability to be understood by the respondents.

## 6. Results of the Semi-Structured Interviews

A summary of the results of the interviews with experts is presented below, and they have been broken down into individual subquestions:

- Subquestion 1: Is RPA strategically positioned in the respondent's organization? What does this mean in concrete terms for the given organization? In the interviews, all respondents confirmed that RPA was definitely positioned strategically in their organizations. This means that the RPA implementation takes at least three years (in the case of three organizations, the first pilot RPA implementations began over 4 years ago). Additionally, the number of robots in each organization exceeds 100. At the same time, it was very important to determine what a software robot was, because the respondents understood this concept in various ways (e.g., for one, a robot was a completely robotic process; for another, it was a virtual machine; and for yet another, it was a license). For the purposes of the study, it was accepted and communicated to experts that a software robot was a computer program operating on the basis of a given algorithm, created using one or more tools for building software robots or a programming language, used for the automatic implementation of business processes or parts of them, and, in most common applications, imitating human work. In the context of this definition, all respondents confirmed that they had about 100 or more robots implemented in their companies (several experts indicated 200 or more robots). In each of the respondent's companies, robots were used on a large scale, i.e., definitely in at least three or more business areas (such as post-sale service, debt collection, finance and controlling, and risk). Certainly, the situation with the pandemic (at the time of the interviews, the so-called third wave of the pandemic was ongoing) caused other areas of individual companies to begin taking an interest in the implementation of RPA on an even larger scale.

- Subquestion 2: Does the strategically positioned RPA actually generate non-financial benefits (savings)? All respondents presented a very similar perception of robotization in their organizations. During the first stage of RPA implementation (which depending on the organization lasted from 12 to 24 months), it was mainly perceived as a tool for reducing the costs of full-time jobs (the main key performance indicator was saved FTEs (Full Time Equivalent)). During the second stage (9–12 months), companies focused either on relieving their own employees from performing monotonous work or on improving the quality of processes and products/services by using robots in their provision. During the current third stage (which some companies are already at and some are just beginning), robotization is perceived as a tool for increasing product or process innovation. As indicated by some banking and insurance respondents, robotization facilitates, among others, the introduction of niche insurance products, and the bank may offer its products in consultation with an external partner.
- Subquestion 3: Is the strategically positioned RPA perceived by the company as an important tool for digital transformation? The respondents worked in industries where digital transformation is not a new concept but has, in reality, been carried out for several years. As with the answers to the previous questions, the respondents confirmed that digital transformation had definitely started to accelerate (more specifically: During the period March–June 2020, a very large number of many types of projects, including IT, slowed down within their enterprises; in the interviews, practically all experts emphasized that all suspended initiatives had been re-launched, and the lists of projects for 2021 were very extensive). With these conditions, the respondents emphasized that the introduction of software robots was a perfect complement to the large transformation projects implemented in the area of customer service. On the other hand, in the back-office area—as could be noted in many of the respondents' statements—processes that were rudimentarily automated (or not at all) suddenly "received a second life" thanks to RPA. In these areas, RPA had become a full-fledged tool for digital transformation.
- Subquestion 4: Does the RPA's strategic positioning allow enterprises to strive to discover adaptations to environmental changes? According to the respondents, this was the most difficult of all the questions that they had to answer. In the case of people employed in companies from insurance and telecommunications industries, there were no situations observed that would allow for an unambiguous answer to this question. The situation was similar in four out of the six banks for which its representatives participated in the survey. However, in two banks—after discussing this question—a similar pattern of behavior appeared. In March–April 2020 (at the beginning of the COVID-19 pandemic in Poland), the number of cash withdrawals from ATMs increased significantly (which is the natural reaction of bank customers in a situation of threat), which in turn generated an increased number of complaints in this area of banking operations (some card transactions resulted in errors for various

reasons). A significant scope of the complaint processes was handled by software robots, the load on which increased significantly and excessively. According to the respondents, this was early warning signal that a significant economic turmoil might be approaching Poland (which, fortunately, did not take place on a significant scale).

- Subquestion 5: Does the strategically positioned RPA provide corporate flexibility to mobilize resources to resist external crises? The respondents confirmed that RPA definitely increased the flexibility of an organization. This is due to the specificity of the technology on which RPA is based. This factor was strongly emphasized in the interviews by experts employed in banks and insurance companies who have key IT solutions (core systems) provided by external suppliers. Any change in these solutions requires long-term renegotiations with suppliers. In the case of implementing software robots, there is no such need, because they do not interfere with the systems on which they work as a substitute for humans. In addition, the time needed to implement a software robot is much shorter than that for creating a solution from scratch (experts indicated that the construction and implementation time for a robot was from 2 weeks to 2 months, while in comparison the fastest scenario involving the classic construction of an IT solution would be achievable within 3 to 9 months). The short *time to market* of the solution was of great importance during the pandemic, when it was necessary for banks to introduce support for additional banking products (related to the support, by the Polish government, of entrepreneurs who were clients of the banks). An additional advantage of RPA is its simple scalability; that is, if a given process is to be performed many more times within a given unit of time, it is very difficult to achieve this with a manual or only partially automated implementation (acquiring additional human resources with specific competences is needed). In the case of RPA, it is only necessary to expand the IT infrastructure (often virtualized) and, if necessary, to purchase or borrow a license for robots. As reported by a respondent, one such example was a situation that took place in a telecommunications company where, at the time of the COVID-19 pandemic, the number of customers served by the call center increased significantly (because traditional customer service offices were closed). In the case of the software robots supporting the call center employees, it was enough to expand the infrastructure in which the software robots were already operating.
- Subquestion 6: Does the strategically positioned RPA allow the reconfiguration of resources and capabilities and the completion of the necessary internal and external transformations? Virtually, all respondents emphasized that RPA enabled them to reuse IT resources already existing in their enterprises and to reconfigure them in a way that allowed for the delivery of new value. The experts pointed out that their companies had many complex IT systems, which, however, were often burdened with a large technological debt. This blocked or made it very difficult (as it increased costs and extended implementation time) for enterprises to introduce product or process innovations. Here, RPA becomes a catalyst for transformation. Moreover, as indicated by two experts, RPA made it possible to connect the internal systems of their organization (e.g., a bank or an insurer) with its business partners (e.g., an external sales network) in the easiest possible manner. That is why, thanks to RPA, it was possible to transform the entire value chain beyond the boundaries of one company.
- The analysis of respondents' feedback on the subquestions allows us to answer the main question of the semi-structured research: the enterprises that strategically position RPA and treat it as a tool for digital transformation increase their organizational resilience.

## 7. Conclusions

### *7.1. Summary of Findings*

As demonstrated by the research results, in Poland, RPA implementation is a new issue for many enterprises. It will undoubtedly be, however, one of the most important aspects of the digital transformation in coming years, and the coronavirus pandemic, as well as the related economic turbulence, will accelerate actions in this area.

The goals of this article were (a) to present the author's classification of the approaches to RPA positioning in enterprises and to outline the consequences of choosing each of these approaches; and (b) to answer the question of whether enterprises that strategically position RPA and treat it as a tool for digital transformation increase their organizational resilience.

The author accomplished the first goal by proposing three possible types of positioning for robotic process automation in enterprises: "Conservative", "Efficiency improving", and "Strategic". In the author's opinion (which has been confirmed by the results of the study), only in the last approach mentioned does RPA's implementation achieve material benefits that proceed beyond financial aspects, in particular, an increase in the quality of the company's products/services or an increase in the innovativeness of the company's products/services.

As the results of the study demonstrate, the strategic approach dominates in the telecommunications sector, as well as in banking and insurance. The author accomplished the second goal by verifying the role of RPA support in the improvement organizational resilience in enterprises from these three industries. As can be observed from semi-structured interviews, strategic RPA positioning (and, thus, an appropriate approach to the implementation and operation of software robots) ensures a high level of organizational resilience, which is demonstrated by the following:

- An ability to strive to discover adaptations to environmental changes, especially the ability to discover early warning signals in a crisis;
- Corporate flexibility to mobilize resources to resist external crises;
- The ability to reconfigure resources and capabilities and complete the necessary internal and external transformations.

### *7.2. Limitations of Research*

The author is aware of the fact that the research procedure presented here has a number of limitations. Some of these include a consequence of the complexity and the multi-faceted nature of RPA implementation. Other limitations stemming from the adopted research procedure have resulted from a range of sources.

One such source is that the conducted research was limited to enterprises operating in Poland; caution should, therefore, be exercised when it comes to generalizing the results to other countries. In the future, the author plans to carry out similar research covering at least two countries from other parts of Europe. Additionally, due to the limited size of both the survey and interview sample and the selection method used, the results cannot be considered representative or be generalized; they present the situation only within enterprises that were analyzed.

The subjectivity of the questionnaire respondents' assessments was another factor. In order to minimize this limitation, two decisions were made: first, to introduce, wherever possible, precise descriptions of the possible answers; and second, to select respondents with varying backgrounds.

However, using closed-ended questions with a finite number of potential answers introduced another limitation: the possibility of omitting important aspects of the RPA implementation. The author is aware of this limitation, but closed question solutions ensured that the obtained results were comparable; however, an option to provide a descriptive answer was introduced for two questions

Respondents not reflecting on the questions when filling out the questionnaires was also a risk. Here, verification questions were introduced in order to minimize this limitation, and in cases where doubts arose, they were clarified by e-mail or in an interview with the respondent. In order to reduce limitations concerning any potential difficulties in understanding the questions contained in the questionnaire, a pilot survey was carried out to assess the clarity of the questions, while a glossary of key terms was also created and attached to the questionnaire.

There was the possibility of the questionnaire being filled out by an enterprise from outside the pool of industries covered by the research or the possibility of a given company sending more than one questionnaire. This limitation was minimized by verifying each company, based on data retrieved from external services (LinkedIn, National Register of Courts).

At the same time, it could be possible for the wrong person (thus, not competent) to fill out the questionnaire; thus, in order to minimize this limitation, the obligation to provide a business e-mail for the person completing the survey was introduced, with the proviso that this person's details could be verified using data retrieved from external services (LinkedIn, KRS). If this was not possible, the author asked the respondent, by e-mail, to confirm that he or she was the right person from the company to complete the questionnaire. Only those questionnaires where such a declaration was obtained were included in the research pool.

In spite of the limitations indicated above, the procedure allowed the adopted research goal to be achieved.

### *7.3. Summary and Future Research*

It is also extremely important to make managers aware of the profound changes that RPA implementation will bring. Enterprises that currently neglect the implementation of RPA tools may expect a significant deterioration in their market position over the coming years [65]. In particular, it should be emphasized that, as shown in the research conducted by the author, organizations treating RPA from a strategic perspective achieved significant organizational resilience: as expressed by (a) a very high flexibility and a high speed introduction of the necessary changes (in response to external stimuli, such as the actions of competitors, changes in customer behavior, or changes in legal regulations); and (b) a high level of innovation particularly within the scope of offered products/services.

This is due to the fact that the application of RPA in business practice can be viewed from the perspective of digital innovations that may be crucial in achieving an organizational resilience. Such innovations can be understood as (a) digital technologies and (b) outcomes (result) generated as a consequence of the use of such technologies and (c) the manner processes are implemented using such technologies, thus changing the nature, structure, or method of delivering products/services (to both external and internal customers–author's note) or the way value is created for customers of these products/services [66] (p. 223), which results in the transformation of entire industries. RPA solutions meet all criteria for digital innovations: (1) they are classified as digital technologies, (2) they are changing the way services are delivered (in particular internal services), and (3) they can result in the transformation of entire industries (this is not only applicable, for example, to companies providing business process outsourcing services [67] but also to audit firms [67–69]).

Lacity and Willcocks indicate that the future of RPA tools is cognitive automation, i.e., one in which automation is implemented using software capable of operating effectively in unforeseen and uncertain situations [49] (p. 26). Equipping software robots with cognitive abilities will enable them to use the information they have access to in a manner similar to human reasoning; in particular, they will be able to autonomously evaluate and interpret knowledge. This will be possible thanks to the use of artificial intelligence mechanisms (in particular, machine learning) and providing access to sufficiently large data sets (which are required for machine learning processes). This will allow the use of software robots to an even greater extent than before. Increasing the scope will involve (a) building and using increasingly greater numbers of robots; (b) using software robots in yet newer areas of enterprises (not only in the broadly understood back-office, which is at this time the main focus); and (c) the robotization of processes as a whole (end-to-end). Combined with new trends in the area of blockchain [70], this can result in the emergence and spread of a completely new type of organization—a highly decentralized and practically fully automated one [71]. It seems that this will allow a completely different level of organizational resilience to be achieved, which is much higher than current possibilities. Of course, this will also bring a number of challenges, both in terms of technology, management, and research.

This is why the author intends to continue researching the RPA area. In particular, the author is planning to deepen the research on the assimilation factors of RPA in enterprises and the democratization model of RPA implementations (as part of IT democratization trend [72]).

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