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Robotic Process Automation (RPA) adoption: a systematic literature review

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ABSTRACT
Robotic process automation (RPA) is a recent technology that has recently become increasingly adopted by companies as a solution for employees to focus on higher complexity and more valuable tasks while delegating routine, monotonous and rule-based tasks to their digital colleagues. The increased interest, reflected in the increasing number of articles regarding approaches and test cases, has triggered the necessity for a summary that could extract the more generalisable ideas and concepts about these software robots. This paper used a Systematic Literature Review (SLR) approach to find and synthesise information from articles obtained on this subject. This research identified the most general implementation approaches of successful RPA adoption cases, observed benefits, challenges commonly faced by organisations, characteristics that make processes more suitable for RPA, and research gaps in the current literature. The findings presented in this paper have two purposes. The first is to provide a way for companies and organisations to become more familiar with good practices regarding the adoption of robotic process automation. The second is to foster further research on the subject by complementing the current knowledge and proposing new paths for research.

KEY WORDS
RPA, robotic process automation, software robot, digital worker, adoption, implementation

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Introduction

Robotic process automation (RPA) is a recent technology that promises to generate great returns on investment for companies and organisations (Hallikainen et al., 2018). For most, this concept may resemble physical robots wandering around offices performing human tasks and, as a result, contributing to job losses. In reality, it is a software solution that enables the automation of rule-based business processes and tasks by using software bots (Kregel et al.,

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2021; Lacity et al., 2015; Kokina & Blanchette, 2019). These bots work by imitating an employee's actions within one or several systems. They mimic what humans would do when entering or manipulating data using a computer (Januszewski et al., 2021).

The deployment of this virtual workforce to automate and streamline structured, manual, high-volume, repetitive, and routine tasks results in human workers delegating their tedious routine tasks to a digital worker, thus allowing them to focus on more difficult tasks (Choi et al., 2021; Hartley & Sawaya, 2019).

RPA is software that performs routine process tasks based on simple rules. Its umbrella of capabilities includes entering data, making simple calculations, reading and extracting data from Enterprise Resource Planning (ERP) systems, completing forms, responding to emails (Hartley & Sawaya, 2019), opening attachments, logging into applications, moving files or folders, scraping data from a webpage, extracting information from pdf files or images, and others. For physical documents, once scanned, both optical character recognition (OCR) and natural language processing (NLP) can be utilised to extract information for further processing (Hegde et al., 2018).

The use of robotic process automation (RPA) in organisations has rapidly increased in recent years and is projected to grow in the foreseeable future by 20–30 % per year, or USD 3.97 billion in 2025. RPA growth has also been predicted to happen at a rate of 32.8 % from 2021 to 2028. Organisations are adopting RPA with the motivation to reduce costs and improve efficiency, productivity, and service quality (Choi et al., 2021; Denagama Vitharanage et al., 2020; Harmoko et al., 2021).

As a result of this software implementation, productivity is expected to increase by 86 %, quality by 90 %, while office costs should reduce by 59 %. Due to these numerous benefits, robotics has become one of the main priorities for many organisations, also in the banking sector. As a result, it is indicated as a priority by 30 % of banks worldwide and by 45 % in Poland (Harmoko et al., 2021; Wojciechowska-Filipek, 2019).

Given the stated potential of RPA, it is paramount to understand how to adopt it in companies and organisations more efficiently. Therefore, it becomes necessary to further study and comprehend where its implementation is advisable, what challenges may arise and what benefits to expect from its adoption (Kokina & Blanchette, 2019; Parker & Appel, 2021). This paper seeks to collect and synthesise all available information on these topics, provide successful approaches to adopting robotic process automation within organisations, foster further research by exposing current research gaps and propose new directions for research.

This article is structured as follows: the background is given in Section 1, presenting the need for this review and providing a summary of previous reviews; Section 2 explains the planning, specifies each review question and defines data sources and search strategies; Section 3 explains data extraction and synthesis and presents the inclusion and exclusion criteria; Section 4 reports the key findings with strengths and weaknesses of the evidence in the current literature; Section 5 discusses this review against previous ones, considering differences in quality and results; and finally, Section 6 presents practical implications of this literature review for the RPA industry and unanswered questions and opportunities for future research.

1. Literature review

Companies using IT (information technology) or ICT (information and communication technology) are becoming exponentially more interested in RPAs (Marciniak & Stanisławski, 2021; Simek & Sperka, 2019). Also, the number of papers on this subject has also grown substantially (Fig. 1).

However, as the interest is so recent, there is an inherent lack of awareness or basic knowledge about the implementation resulting from the lack of theoretical foundations that allow for objective reasoning and the development of methodologies and frameworks (Marciniak & Stanisławski, 2021; Syed et al., 2020). Moreover, given the current increase in automation necessity driven by the pandemic, scientific research seems to be lagging behind, with a reduced number of articles discussing the role of RPA on organisations (Siderska, 2021).

The search found two literature reviews (Siderska,2020; Syed et al., 2020). This section summarises their content to be compared with this systematic review's findings. Both reviews refer to Lacity and Willcocks' definition of RPA as a software robot that mimics human actions allowing the automation of rules-based processes involving routine tasks, structured data, and deterministic outcomes. Other researchers go a step further into distinguishing between RPA and AI, with the former being more

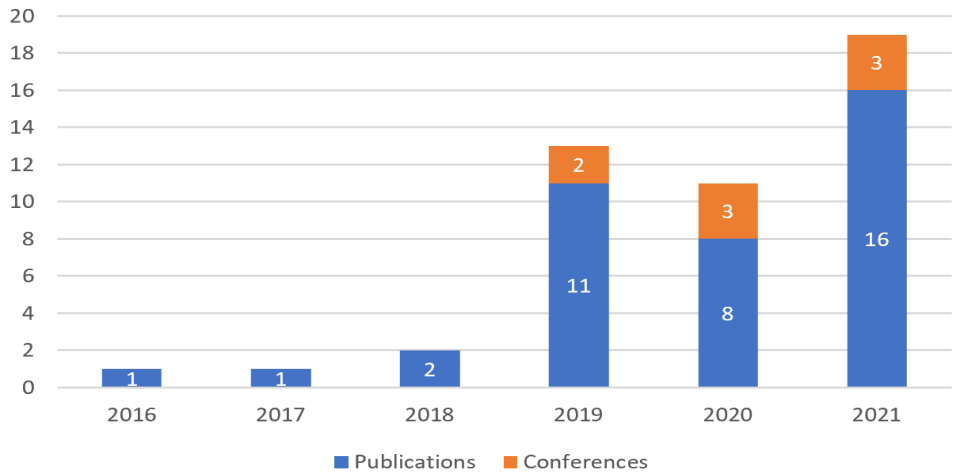

Fig. 1. Publishing year of articles selected for the literature review

rule-based and structured than the latter (Syed et al., 2020).

Other literature reviews studied methodologies for RPA adoption within organisations. As a result, these literature reviews provided company guidelines for approaching RPAs, approaches to initial task selection, reviews of frameworks for RPA roll-out, strategies for deployment and management of bots and plans for RPA's long-term success.

Other authors also presented literature summaries of the perceived potential capabilities of this technology. First, employee level capabilities are reviewed, presenting changes in their role and nature of their work. Next, organisation and process-related capabilities are discussed, including organisational changes. Also, several other types of capabilities are audited, such as process transparency, compliance, standardisation, organisation scalability, flexibility and control, and the ability to use process intelligence for decision making.

Both literature reviews evaluate the benefits of RPA adoption. While Siderska (2020) placed a greater emphasis on the positive impact of the technology by reshaping the work of the company's employees, Syed et al. (2020) focused more on the organisational repercussions of this adoption, for instance, higher efficiency, risk reduction, and compliance, quality of service, ease of implementation, and integration with company systems.

The two reviews also provide a bullet list containing all characteristics that cause some processes to be more suitable for automation than others. Both reviews state process complexity, frequency, and access to multiple systems as core factors for process fitness. Some authors go a step further and state other characteristics, such as data type and process maturity.

In other reviews, it is possible to find a summary of current leading RPA vendors and the technology positioning within the Open System Interconnection (OSI) model (Syed et al., 2020).

Finally, other researchers also discuss RPA integration with different technologies, such as artificial intelligence, natural language processing, process mining, big data, BPM/BPMS, and others.

2. Research Method

2.1. Research Questions

The aim of this systematic review goes beyond providing an overview of the current RPA landscape. It intends to answer how to efficiently implement this software, what benefits to expect from it, and what challenges may be needed to overcome. It also aspires to answer where RPA is most useful and what gaps in the literature still need to be filled. As a result, this research plans to answer the following questions:

- RQ1: Which are the approaches for successfully implementing RPA?
- RQ2: What are the benefits of implementing RPAs in organisations?
- RQ3: Which are the current challenges to RPA adoption?
- RQ4: Which process characteristics are more suitable for RPA implementation?

- RQ5: Which are the current RPA knowledge gaps in the literature?

2.2. Data sources and search strategy

A systematic literature review (SLR), or simply a systematic review, is a way to identify, evaluate and interpret all available research relevant to a particular research question, topic area, or phenomenon of interest. A literature review must be thorough and fair to be scientifically valuable. As it follows a predefined search strategy, a systematic review fairly synthesises existing work (Keele et al., 2007).

This SLR was conducted following Kitchenham's (2004) guidelines for systematic literature reviews. As a result, the process was divided into three stages: planning, reporting and conducting the review. During planning, the need for a review was identified, and the review protocol was clearly determined. In the case of this article, the literature was selected based on search criteria (Table 1).

A total of 486 studies were obtained as a result of this search.

3. Research results

The second phase of the SLR methodology focuses on selecting studies according to a given inclusion and exclusion criteria. Once the final studies are selected, data extraction, monitoring, and synthesis occur.

To obtain the final set of papers, a process with several filtering stages was executed over the first set of 486 collected papers (Fig. 2). After removing duplicates (184 papers), a total of 302 unique papers was obtained.

3.1. Inclusion and exclusion criteria

The titles and abstracts of these papers were read and led to their classification into three types: "accepted", "rejected", and "maybe". In total, 226 papers were excluded because they did not comply with the inclusion and exclusion criteria. Introductions of the remaining 76 papers, including types "maybe" and "accepted", were fully read and resulted in the further removal of 15 papers due to inaccessibility/an unknown language, five papers that casually mentioned RPA in a broad spectrum but did not fully explore the theme, and five papers that explored intelligent process automation (IPA).

A final set of 47 papers from different academic journals and conferences was obtained, including two literature reviews. The final collection had three articles published in the Journal of Information Technology Teaching Cases by SAGE. Other academic journals, such as Accounting Horizons by the Ameri-

Tab. 1. Search criteria

Element	Research Details
Source	EBSCO
Final Search String	AB ("Robotic Process Automation" or "Hyperautomation" or "Software Robotics" or "Software robot" or "Digital Worker" or "Business Process Automation" or "Process Automation") AND AB ("Implementation" or "Adoption")
Search Strategy	Articles in academic journals or conference materials without a date range limit
Results	486

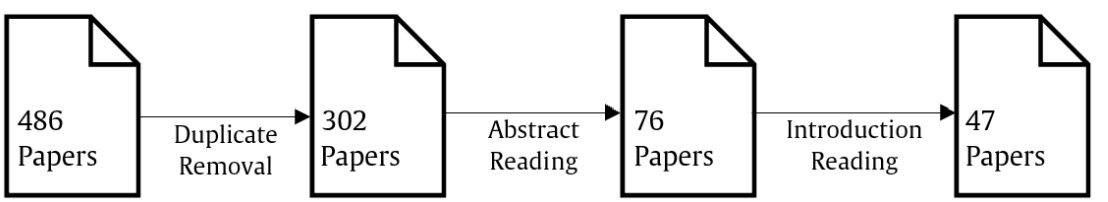

Fig. 2. Paper filtering process

can Accounting Association, International Journal of Accounting Information Systems by Elsevier, and MIS Quarterly Executive by Association for Information Systems and Sustainability by MDPI, contributed two articles each, while all the remaining articles were from distinct academic journals and conferences.

3.2. Key findings

3.2.1. RQ1: RPA implementation approaches

When analysing the selected set of articles, it was possible to identify that although RPA implementations differed from each other based on several factors, such as company size, maturity, and area of work, there were still some common denominators (Table 2).

Most companies followed a four-stage implementation framework consisting of identifying tasks, redefining processes from AS-IS to TO-BE, developing a bot, and, finally, monitoring its actions (Huang & Vasarhelyi, 2019). Other companies adopted a similar five-stage framework, including a testing phase after developing the bot and before its deployment (Gex & Minor, 2019).

Regarding regular approaches for adoption, most implementations started with a proof of concept (PoC), which intended to demonstrate RPA capabilities and potential for the company. Low-complexity, high volume/value processes were regularly chosen as PoC to achieve what some literature calls "quick wins" (Gex & Minor, 2019; Lacity et al., 2015; Flechsig et al., 2021).

A common solution in companies adopting RPA is a Centre of Excellence (CoE). When compared to outsourcing, a CoE provides critical benefits, such as familiarity with the processes, access to confidential information, and the environments where the robots will be implemented, facilitating bot testing and deployment (Vokoun & Zelenka, 2021; Huang & Vasarhelyi, 2019).

Research articles also highlighted the importance of RPA integration into the company's culture. Aiming to achieve this cultural shift, organisations hosted regular RPA Seminars, where RPA potentials and benefits were showcased through test cases, and appointed RPA Ambassadors, who would foster

Tab. 2. RPA implementation approaches

Approach	Sources
Proof of Concept	Huang & Vasarhelyi (2019); Raza et al. (2019); Gotthardt et al. (2020); Kokina & Blanchette (2019); Kossukhina et al. (2021); Hallikainen et al. (2018); Simek & Sperka (2019); Hegde et al. (2018); Carden et al. (2019); Lacity et al. (2015); Flechsig et al. (2021); Schuett (2019)
Center Of Excellence	Huang & Vasarhelyi (2019); Wojciechowska-Filipek (2019); Kokina & Blanchette (2019); Ågnes (2021); Kedziora & Penttinen (2021); Marciniak & Stanisławski (2021); Hegde et al. (2018); Flechsig et al. (2021); Schuett (2019)
Training	Wewerka et al. (2020); Wojciechowska-Filipek (2019); Kossukhina et al. (2021); Hallikainen et al. (2018); Viale & Zouari (2020); Fernandez & Aman (2018); Hegde et al. (2018); Willcocks et al. (2017); Flechsig et al. (2021)
RPA Ambassadors	Wewerka et al. (2020); Kedziora & Penttinen (2021); Hallikainen et al. (2018); Viale & Zouari (2020); Vokoun & Zelenka (2021); Gex & Minor (2019); Schuett (2019)
Removal of Fear of Job Loss	Wewerka et al. (2020); Ågnes (2021); Hallikainen et al. (2018); Simek & Sperka (2019); Lacity et al. (2015); Lemaire-Harvey & Harvey (2020); Siderska (2020)
RPA Seminars	Wewerka et al. (2020); Hallikainen et al. (2018); Parker & Appel (2021); Flechsig et al. (2021); Schuett (2019); Lemaire-Harvey & Harvey (2020)
Communication Expert-Developer	Huang & Vasarhelyi (2019); Wojciechowska-Filipek (2019); Ågnes (2021); Hallikainen et al. (2018); Hegde et al. (2018)
Data and Task Standardisation	Kokina et al. (2021); Kokina & Blanchette (2019); Fernandez & Aman (2018); Hegde et al. (2018)
Back-Up Strategies	Kokina et al. (2021); Kokina & Blanchette (2019); Hallikainen et al. (2018)

a positive outlook on the technology used at the company. It was also critical to remove the workers' fear of job loss, usually achieved by showing RPA benefits and reframing its implementation as a way to free employees from tedious tasks and allow them to work on higher complexity issues rather than as a means to replace them (Ågnes, 2021; Marciniak & Stanisławski, 2021).

Other recurrent characteristics of successful implementations include training employees to understand and work with RPA, focusing on good communication between process experts and RPA developers, standardising data and tasks, and having backup strategies in place if an RPA deployment fails.

3.2.2. RQ2: RPA benefits

Several benefits seem to arise from the successful adoption of these digital workers within an organisation. This section analyses the benefits found in the literature (Table 3).

The most mentioned benefit across the articles was RPA performing more tedious and monotonous work to allow workers to focus and invest their time in more complex, meaningful tasks that provide more value to the company (Kaya et al., 2019). Another observed benefit was that as a result of performing new or more meaningful tasks, employees would also invest more time in developing new skills to become more qualified at their specific job (Ågnes, 2021).

The handling of repetitive and tiring tasks by RPA also contributed to a lower error rate due to the eliminated human errors. Unlike humans, bots do not get tired and, therefore, are not susceptible to making the same mistakes as humans (Ketkar & Gawade, 2021). On the other hand, automated processes are vulnerable to systematic errors resulting from deficient RPA programming (Gotthardt et al., 2020).

The selected articles emphasise improved customer service and satisfaction. This benefit resulted from several factors, such as faster and smoother process execution, leading to rapid responses to customer requests and employees feeling less pressured to rush through interactions with clients (Parker & Appel, 2021).

An observable quantitative benefit of successful implementations was process efficiency, achieved through cost savings, with articles reporting between 25 % and 75 % (Wewerka et al., 2020; Wojciechowska-Filipek, 2019), and through process time reduction, with companies stating that some processes would take a 10th of the time of what they used to (Wojciechowska-Filipek, 2019). Not only did business processes become more efficient, but the articles also highlighted the ability of bots to work at any time. As a result, not only

Tab. 3. RPA benefits

Benefit	Sources
More Insightful Work	Kokina et al. (2021); Denagama Vitharanage et al. (2020); Kokina & Blanchette (2019); Ågnes (2021); Viale & Zouari (2020); Kaya et al. (2019); Marciniak & Stanisławski (2021); Gex & Minor (2019); Parker & Appel (2021); Fernandez & Aman (2018); Hegde et al. (2018); Willcocks et al. (2017); Arias et al. (2020)
Reduced Process Hours	Wewerka et al. (2020); Wojciechowska-Filipek (2019); Gotthardt et al. (2020); Kokina & Blanchette (2019); Simek & Sperka (2019); Parker & Appel (2021); Shwetha & Kirubanand (2021); Carden et al. (2019); Willcocks et al. (2017); Arias et al. (2020); Harmoko et al. (2021)
Lower Error Rate	Denagama Vitharanage et al. (2020); Wojciechowska-Filipek (2019); Gotthardt et al. (2020); Kokina & Blanchette (2019); Ketkar & Gawade (2021); Simek & Sperka (2019); Kaya et al. (2019); Vokoun & Zelenka (2021); Flechsig et al. (2021); Arias et al. (2020)
Cost Saving	Wewerka et al. (2020); Wojciechowska-Filipek (2019); Kokina & Blanchette (2019); Kaya et al. (2019); Marciniak & Stanisławski (2021); Gex & Minor (2019); Carden et al. (2019); Willcocks et al. (2017)
Customer Service and Satisfaction	Denagama Vitharanage et al. (2020); Viale & Zouari (2020); Parker & Appel (2021); Willcocks et al. (2017); Arias et al. (2020); Harmoko et al. (2021)
Working 24/7	Wewerka et al. (2020); Viale & Zouari (2020); Kaya et al. (2019); Marciniak & Stanisławski (2021); Flechsig et al. (2021)
Improvement in Staff Skills	Denagama Vitharanage et al. (2020); Ågnes (2021); Kaya et al. (2019); Parker & Appel (2021)
Standardisation	Wojciechowska-Filipek (2019); Marciniak & Stanisławski (2021)

do processes take less time, but the amount of time available to complete them also increases (Viale & Zouari, 2020). Most companies implementing RPA also felt the collateral benefits of standardising and improving their processes. It is necessary for documents to be structured and standardised and for processes to be stable and mature to integrate this technology. As a result, it is fair to classify standardisation as an advantage that emerges from the intent to adopt RPA (Wojciechowska-Filipek, 2019).

Other types of impact of these digital workers were the reduction in office space costs by 40 % (Wojciechowska-Filipek, 2019), more efficient coping with employee absence, as there was less redistribution of work because RPA could take over basic repetitive tasks, allowing for less office time and more remote work (Kossukhina et al., 2021), and business continuity during unexpected events, such as COVID-19 (Siderska, 2021).

3.2.3. RQ3: RPA challenges

The articles also reported on several challenges (Table 4), with some being more predominant than others and most originating from the newness of the technology.

As RPA is a recent technology, there is a lack of knowledge and experience in its implementation (Wewerka et al., 2020; Gotthardt et al., 2020). Not only do companies have issues with finding the right solutions for their situation, but there is also an internal resistance to adapting new culture. An example is the lack of employee awareness of the impact that this adoption may bring to their work (system, document structure and other changes) (Marciniak & Stanisławski, 2021).

The cultural resistance to change emerges on account of the lack of knowledge and experience with this software. Firstly, unless forced, some employees avoided implementing this new technology out of fear of losing their job, which led to less adherence (Fernandez & Aman, 2018). Secondly, some stakeholders failed to endorse and prioritise this adoption due to being comfortable with current work cultures (Viale & Zouari, 2020). Together, this lack of urge and desire to innovate poses a critical challenge to RPA implementation.

Although most companies have started to use digital documentation as a more flexible and modern way to store information, others are still lagging behind. The use of paper and unstructured documents is still a substantial impediment to RPA adoption in organisations (Wewerka et al., 2020). To automate any business process, companies must have structured documents stored digitally.

Understanding which processes are fit for automation is crucial for the success of the adoption of these digital workers. By contrast, attempting to automate unfit processes seemed to be a recurring challenge across organisations. Trying to automate manual, complex or highly fractional tasks (with multiple parties involved) is a challenge that companies face due to a lack of knowledge and preparation. In these cases, either redesigning the process or choosing a fitter process for automation appeared to be the best solution.

Tab. 4. RPA challenges

Challenge	Sources
Lack of Knowledge and Experience	Kokina et al. (2021); Saukkonen et al. (2019); Wewerka et al. (2020); Gotthardt et al. (2020); Kokina & Blanchette (2019); Marciniak & Stanisławski (2021); Hegde et al. (2018); Lacity et al. (2015); Flechsig et al. (2021)
Employee and Stakeholder Resistance	Saukkonen et al. (2019); Gotthardt et al. (2020); Viale & Zouari (2020); Marciniak & Stanisławski (2021); Fernandez & Aman (2018); Willcocks et al. (2017); Flechsig et al. (2021)
Access and Security Issues	Kokina et al. (2021); Raza et al. (2019); Gotthardt et al. (2020); Kokina & Blanchette (2019); Marciniak & Stanisławski (2021); Schuett (2019)
Data Incompatibility	Wewerka et al. (2020); Januszewski et al. (2021); Gotthardt et al. (2020); Hegde et al. (2018)
Lack of Documentation	Kokina & Blanchette (2019); Vokoun & Zelenka (2021); Schuett (2019)
Unfit Processes	Viale & Zouari (2020); Hegde et al. (2018); Siderska (2020)

Access and security are also among key issues for RPA implementations. Access to resources has always been managed by humans. However, with software robots, new measures must consider robots' access to information (Raza et al., 2019; Schuett, 2019). In the same way, current security practices do not consider the existence of digital workers, and successfully implementing a new security framework constitutes a significant challenge to organisations (Kokina et al., 2021). The novelty of the software and the resulting lack of documentation makes it challenging for companies to adopt RPA as there are currently no standards and methodologies in place (Vokoun & Zelenka, 2021).

3.2.4. RQ4: RPA suitability characteristics

In this section, the paper aims to answer what characteristics make a process suitable for automation according to the articles (Table 5).

The first suitability characteristic is for the process to be rule-based. Processes of this kind follow a concrete set of rules to achieve a given purpose. Decisions do not require judgment and can therefore be automated through if–then decision trees.

Another important feature for the automation of a process is maturity. The process should be subject to minimal changes in the near future. Outcomes and costs are easier to predict, and exceptions are less likely to arise. As a result, automation changes are also less likely, and benefits can be estimated by comparison with the process history.

Structured data and a standardised format for documents providing the information are crucial for processes to be suitable for automation. Structuring allows a software bot to find the required data expected for processing. Otherwise, it would be hard for the bot to fetch the data, and it would be prone to errors due to mistaking different information fields. Data should also be digital, through digitalisation if necessary, for the RPA to access and then process it. Although it is possible to read scanned documents using optical character recognition (OCR) this technology tends to have a more successful implementation with the digital format of data that eliminates the possibility of document misreading (Januszewski et al., 2021).

Routine processes that occur according to a given periodicity are more apt for automation. A given event that may be an action or a set moment in time (for example, every day at noon) can trigger the robot. As a result, without any human interference, the RPA may perform a given task automatically.

High volume processes are the ones performed frequently or by several people. Any organisation should consider such tasks a priority for automation as they yield the highest potential benefits and return on investment (ROI).

Tab. 5. RPA suitability characteristics

Characteristic	Sources
Rule-based	Kokina et al. (2021); Kokina & Blanchette (2019); Kedziora & Penttinen (2021); Hallikainen et al. (2018); Viale & Zouari (2020); Marciniak & Stanisławski (2021); Hegde et al. (2018)
Mature	Wewerka et al. (2020); Viale & Zouari (2020); Vokoun & Zelenka (2021); Hegde et al. (2018); Siderska (2021)
Structured Data	Kokina & Blanchette (2019); Simek & Sperka (2019); Vokoun & Zelenka (2021); Marciniak & Stanisławski (2021); Siderska (2021)
High Volume	Wewerka et al. (2020); Kokina & Blanchette (2019); Viale & Zouari (2020); Hegde et al. (2018); Siderska (2021)
Digital Data	Wewerka et al. (2020); Kokina & Blanchette (2019); Vokoun & Zelenka (2021); Siderska (2021)
Routine	Kokina et al. (2021); Wewerka et al. (2020); Choi et al. (2021); Marciniak & Stanisławski (2021)
Few Exceptions	Kokina et al. (2021); Viale & Zouari (2020)
Multiple Systems	Kokina & Blanchette (2019); Viale & Zouari (2020)

Process suitability for automation has several exceptions. Their automation often requires more time than their performance. Besides, the automation is more likely to fail and will need adjusting. Therefore, tasks with few exceptions are more suitable for automation as their RPA is easier to develop, monitor and maintain.

Another important characteristic of suitability is for the process to interact with multiple systems. As a result, the RPA implementation automates a part of the process and acts as a top layer providing integration between different systems.

3.2.5. RQ5: RPA research gaps

Like most technologies, RPA is in perpetual change, and consequently, new themes and questions arise, leaving research gaps to be investigated and filled. This section analyses potential areas for future research suggested in the literature that may help in further understanding of RPA (Table 6).

Regarding the impact of RPA on workers' skills, two common questions were frequently identified: capabilities needed to handle RPA and skills and knowledge obsolete due to this implementation (Kokina et al., 2021; Vokoun & Zelenka, 2021). As previously stated, most articles mention a shift in the worker's responsibility to more complex and creative tasks. However, they fail to provide a tangible description of what these new tasks embody.

Another opportunity for research lies in the RPA implementation. Being such a recent technology, RPA lacks concrete guidelines for implementation and follow-up procedures. Future research should seek to provide a framework for successfully implementing RPA in organisations in a way that follow-up procedures and monitoring are minimised (Wewerka et al., 2020; Siderska, 2021; Florek-Paszkowska et al., 2021).

Although RPA is among the most researched fields, its benefits still have room for investigation. Due to the growing body of research, companies are becoming more aware of factors that become critical for the success of this technology. As such, future research can try to understand how benefits from early adopters differ when compared to followers that are more aware of the technology's potential and downfalls (Wewerka et al., 2020; Vokoun & Zelenka, 2021).

The final identified research gap across the selected articles regards the future of RPA. There are significant research opportunities concerning what process, data, and integration-related functionalities are being developed and the future direction of RPA with AI incorporation (Kokina & Blanchette, 2019; Siderska, 2021).

4. Discussion

In this section, the paper compares the results of this systematic literature review with those of others. Relationships between the findings of this and other reviews are pinpointed, particularly considering the differences in the obtained results.

Given the recent increase in adoption and consequent stability of this new technology, the literature exposes new patterns emerging across all organisations. These patterns are observable when analysing the tables of key findings on each proposed research question. As a result of this literature review, it became clear that papers present converging opinions. A significant portion of the selected articles highlights similar adoption approaches, challenges, benefits, process characteristics, and research gaps.

With regard to implementation, as previously mentioned, organisational guidelines for adopting

Tab. 6. RPA research gaps

Research Gap	Sources
Further benefits research	Wewerka et al. (2020); Denagama Vitharanage et al. (2020); Kokina & Blanchette (2019); Januszewski et al. (2021); Vokoun & Zelenka (2021)
RPA impact on job characteristics	Kokina et al. (2021); Kokina & Blanchette (2019); Vokoun & Zelenka (2021); Siderska (2021)
Effective frameworks for RPA implementation	Vokoun & Zelenka (2021); Simek & Sperka (2019); Flechsig et al. (2021); Siderska (2021)
RPA evolution	Kokina & Blanchette (2019); Ketkar & Gawade (2021); Siderska (2021)

methodologies and frameworks, follow-up strategies, and plans for long-term success can also be found in other reviews. However, based on the most recent literature, this paper highlights the role of cultural changes in RPA implementation. As a result, this systematic literature review provides some additional implementation approaches to fostering the RPA adoption in the company's culture, such as removing the fear of job loss and promoting RPAs, whether through seminars or ambassadors.

Other reviews also evaluate the benefits of RPA adoption in the existing literature. As mentioned in the background, the former highlights the reshaping of work performed by company employees, while the latter places more emphasis on organisational benefits. Although approaching the same benefits, this SLR contributes by providing more recently discovered benefits resulting from the current COVID-19 pandemic panorama and, consequently, increased relevance of certain benefits. These benefits include the ability to work remotely, having more office space, and the capacity of companies to be functional despite employee absence.

As none of the selected reviews provided challenges for adopting RPA in an organisation, this SLR offered new information.

Characteristics that cause processes to be more suitable for automation are provided in both literature reviews. Although the results found in this and earlier reviews, this SLR goes a step further into laying out the reasoning for these characteristics to be suitable for automation.

Previous literature reviews date back to 2020 and 2019. Nineteen articles selected for this SLR were from 2021. As a result, the research gaps found in this and other literature reviews differed. With answers to previous research questions, the rapidly growing RPA exploration fosters new and more intriguing questions to be answered. Still, given how recent this technology is, the lack of a framework for companies to successfully employ RPA is a common denominator across the literature reviews for future research.

Conclusions

Recent implementations of RPA and consequent case studies provide a means to understand the potential impacts of software robots when successfully implemented and the mistakes that lead to their failure. RPA has provided organisations with clear resource benefits. RPA also upgraded the work of employees to more fulfilling tasks.

Although these digital workers provide many benefits, organisations still face various challenges due to a lack of frameworks and knowledge. This research sought to investigate the factors for successful implementations, benefits, challenges, and suitability of the technology. To conduct this research, a systematic literature review was adopted and a summary of the results. A table of sources for each concept was presented.

The analysis of 47 papers resulted in several main ideas:

- Overview of the adoption process of this technology across several companies mentioned in the test cases and several ideas for maximising the likeliness of its success.
- Analysis of RPA impacts and benefits in organisations where it was successfully implemented.
- Raising awareness of the biggest challenges to implementation for organisations to be ready to tackle them.
- A comprehensive summary of characteristics of suitable tasks and the reasoning behind them.
- Description of future avenues of research given the current RPA panorama and what remaining gaps in the literature.

The factors of successful adoption, challenges, benefits, and suitability characteristics of processes presented in this research can foster new research opportunities and provide organisations that struggle with innovation with a clearer understanding of the technology.

There seems to be a lack of guidelines for RPA implementation for smaller organisations. As they could reap the most rewards from task delegation to digital workers, this area could constitute crucial future research. Another opportunity for future work regards the applicability of the discussed frameworks by attempting to replicate them in an organisation.

Although process suitability for automation has been thoroughly researched, there is still room for future research to provide frameworks for process redesign with the goal of its automation.

Given that new frameworks and methodologies for RPA adoption continue being studied and improved, future work could potentially investigate new benefits that could arise from more efficient application and new challenges and threats to the current RPA landscape.

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