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Robotic Process Automation and effectiveness of financial decisions: A critical review

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Abstract

Robotic Process Automation (RPA) has emerged over the last decade as an important tool for improving the effectiveness of many financial decisions through automation of several everyday financial tasks. According to optimists, this is a good thing for business. However, the skeptics believe that RPA will likely lead to a replacement of humans with machines. This study conducted a critical review of existing RPA empirical studies to shed more light on which party of the RPA debate is most supported by the evidence. The empirical evidence showed that RPA adoption leads to improved productivity and significant returns on investment. However, there is a need for a significant number of empirical studies to be carried out over the coming years before the RPA debate can be definitively settled.

Keywords: robotic process automation; corporate finance; opportunities; threats.

Introduction

Despite advances in technology, wearisome and repetitive tasks in vital business processes such as collecting, reviewing, and inputting information still exist in most corporations with corporate finance officers (CFOs) being consistently under pressure and always looking for ways to have higher efficiencies, lower costs and better reporting (Camerinelli, 2016; Davis et al., 2013; Dirican, 2015; Mateen & More, 2013; More & Basu, 2013). New developments in technology such as automation have been found to be instrumental in providing companies with opportunities to minimize cost and maximize value (Bekier et al., 2012; Dirican, 2015; Hendershott & Moulton, 2011; Lins et al., 2018).

In the past, business processes was automated through the application of general ledger and enterprise resource planning (ERP) systems, as well as with programs like Microsoft Excel, yet many highly-skilled, knowledge workers were still spending precious time in lower-level manual processes, taking valuable time away from higher-order strategic level tasks that were needed to drive their companies forward (Aguirre & Rodriguez, 2017; Fethi & Pasiouras, 2010). A form of automation that some scholars have argued can significantly assist knowledge workers in achieving efficiency in business processes is Robotic Process Automation (RPA) (Asatiani & Penttinen, 2016; Bi et al., 2015; Dirican, 2015; Hirsch, 2017; Van der Aalst et al., 2018; Willcocks, et al., 2017).

RPA is the technological substitution of human workers which has the goal of automating structured tasks in a fast and cost efficient manner (Llewellyn Evans, 2017; Slaby, 2012; Lacity & Willcocks, 2015). RPA is not a physical robot but a software-based solution that is configured to emulate human execution of repetitive operational tasks and procedures via user interface (Asatiani & Penttinen, 2016; Aguirre & Rodriguez, 2017). It is a robot that operates from the computer and performs as well as humans but controlled by business operation teams (Lacity & Willcocks, 2015; Van der Aalst et al., 2018). We can imagine that some highly structured, routine, and manual tasks could be handled by a robot, allowing employees to concentrate on more value-adding initiatives, which are imperative for the bottom line of the firm; this is the promise that RPA brings to corporate finance (Aguirre & Rodriguez, 2017; Willcocks et al., 2017).

Critical examination of prior studies indicated that RPA emerged in the last decade at an accelerated pace as corporations are becoming more aware of the need to align their technology investments to customers' needs and business outcomes, with some of its early adopters in markets such as the U.K. (Asatiani & Penttinen, 2016; Willcocks et al., 2017). Over the years, RPA applications have been utilized in business processes like accounts payable, accounts receivable, travel expenses, fixed asset accounting,

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master data management, billing, keeping employee records and many more back office processes (Aguirre & Rodriguez, 2017). In Africa, some corporations have adopted RPA essentially to help them in their financial processes, strengthening controls, reducing costs, reporting as well as in auditing processes (Mathu, 2017; Martins et al., 2013).

Similarly, this technological application that is said to be highly innovative and promising as it transforms the future of back office processes, has revealed various opportunities to corporate finance especially for organizations generally looking for ways to be cost efficiently (Asatiani & Penttinen, 2016; Van der Aalst et al., 2018). RPA can aid many financial analysis tasks, detect irregularities, predict default and bankruptcy in finance and account processes (Bahrammirzaee, 2010; Blue & Andoh-Baidoo, 2010). It could also be very helpful in assisting CFOs in investment decisions (Shukla et al., 2017; Willcocks et al., 2017; Klumpp, 2018; Van der Aalst et al., 2018).

However, while RPA represents potential innovation and advancement to corporate finance, there are some arguments made by the skeptics as to why RPA should not just be blindly adopted particularly concerning the dehumanizing of employees; it has been predicted to be able to reduce the number of people required to perform tasks by 75 per cent which is tantamount to making some employees redundant, and likely out of jobs (Chelliah, 2017; Chui et al., 2017; Hirsch, 2017; Shukla et al., 2017; Van der Aalst et al., 2018). Asatiani and Penttinen (2016) in their study concludes that in practice RPA may prove to be highly promising. However, it is still lacks of some credentials because it has a destructive impact on employee morale.

For the most part, prior studies on RPA have focused on what the technology is, its function, why it should be adopted especially in the fields of finance and accounting and how it could be useful for business processes in achieving strategic transformation, commercial success and sustainability (Aguirre & Rodriguez, 2017; Asatiani & Penttinen, 2016; Bi et al., 2015; Dirican, 2015; Fethi & Pasiouras, 2010; Willcocks et al., 2017; Van der Aalst et al., 2018), with very few of them discussing the negative impacts of the technology (Chelliah, 2017; Chui et al., 2017; Hirsch, 2017; Shukla et al., 2017). As far as the researchers are aware, no studies have actually been conducted to examine the existing body of empirical findings in order to determine whether the optimists are right in heralding the benefits of RPA for corporate finance, or if the skeptics have the weight of existing evidence behind them when they posit that the threats of RPA might outweigh the supposed benefits. This study aims to address this gap by doing just that, and hopefully providing some resolution to the RPA in corporate finance debate.

The review of RPA research reveals that there are very few empirical studies that have been carried out on the impact of RPA adoptions on organizations. However the few studies examined revealed that RPA leads to significant returns on investment, marked improvements in productivity and no actual loss of human jobs for now; this shows that the RPA optimists have the stronger claim based on limited empirical evidence for now.

The remaining part of this paper is structured as follows: the next section presents a literature review of the scholarly arguments regarding the opportunities and threats of RPA to corporate finance; in the third section, the methodology adopted by this study to identify and analyze empirical studies on RPA effectiveness is presented. This is followed by a discussion of the results of the findings of this empirical review. The next section discusses the policy and managerial implications of the findings and the paper ends with a concluding section.

Literature Review

In this section, the arguments for and against RPA adoption are presented. The first subsection provides the optimists' views of the opportunities that can be exploited if a company adopts RPA, while the second subsection provides the skeptic's views about the potential threats of RPA adoption

Opportunities of Robotic Process Automation to corporate finance

Many studies have been carried out to explore and evaluate the opportunities of RPA being a cutting edge technology in operations of corporate finance (Asatiani & Penttinen, 2016; Davis et al., 2013). Generally, RPA can be used to transform organizations that are looking for ways to cut costs and save time especially in terms of labor (Katsonis & Sfakianakis, 2016; Van der Aalst et al., 2018). This means that finance professionals will have enough time to undertake higher-level tasks and strategic initiatives, such as, marketing and customer interactions, while software robots can quickly and cheaply execute tasks that, in the alternative, would consume thousands of staff hours (Bahrammirzaee, 2010; Davis et al., 2013; Willcocks & Lacity, 2016; Aguirre & Rodriguez, 2017; Chui et al., 2017; Willcocks et al., 2017; Van der Aalst et al., 2018). The opportunity of cost reduction is an important target of most corporations who use RPA by increasing the integration and automation of finance and accounting tasks in order to meet up with

global competitiveness (Ivero, 2016; Katsonis & Sfakianakis, 2016). RPA will allow functions necessary for repetitive tasks, such as services consisting of repetitive data transactions, to be completed faster and more cost effectively (Dandapani, 2017).

Furthermore, some researchers have presented RPA as a replacement for offshore outsourcing (Pincus et al., 2017). It has been stated that the promise of RPA is not only to reduce costs even further, but also to help companies typically looking to outsource routine and non-core tasks requiring a lot of Full-time equivalent (FTEs), like invoice processing, bookkeeping or data entry which had several challenges such as, hidden cost of management, communication problems and overwhelmingly complex service level agreements (Asatiani & Penttinen, 2016; Llewellyn Evans, 2017). For example, The National Association of Software and Services Companies (NASSCOM) reported that adopting RPA can provide corporations with a “cost reduction of 35-65 per cent for onshore process operations and 10-30 per cent in offshore delivery and an investment recovery period as short as 6-9 months” (CiGen, 2018).

In addition, automation can not only enable a reduction in labour costs, it can also bring a range of other benefits related to performance improvements, such as greater throughput, reliability and quality improvement, significantly enhance capabilities of finance in providing analysis and insights to the corporation. Automation, especially those that are based on machine learning techniques such as deep learning, will improve performances of corporations over time when they have access to more data (Katsonis & Sfakianakis, 2016; Manyika et al., 2017). A classification was proposed by Bahrammirzaee (2010) to state that the following corporate finance applications can be significantly improved with the adaptation of RPA: financial simulation, predicting investor’s behaviour, financial evaluation, credit approval, security and or asset portfolio management, pricing initial public offerings and determining optimal capital structure. In corporate financial management, RPA can aid many financial analysis tasks such as credit authorization screening, mortgage risk assessment, project management and bidding strategy, financial and economic forecasting, fixed income investments, detection of regularities in security price movements and prediction of default and bankruptcy, and has been found to be very useful to CFOs in taking investment decisions, knowledge building and option pricing to establish a position, by estimating cash flows associated with a project, inputting working capital requirements, sales forecasting, project risk, tax and inflation considerations (Bahrammirzaee, 2010; Blue & Andoh-Baidoo, 2010).

Davis et al. (2013) state that RPA presents an opportunity to expand the role of ethics in finance beyond the domain of money managers, brokers and investment advisors to include “financial engineers”, software engineers, and computer engineers. When an organization adopts RPA, more jobs such as managing robots, consulting and analytics will be created because automated finance brings together members of different professions and has the potential benefit of avoiding counteraction by employing in an organization where processes are automated (Asatiani & Penttinen, 2016).

Similarly, RPA has been seen as a way to quickly achieve a high return on Investment (RoI), save cost for shareholders, improve profitability, give customers better services and make CFOs more competent, maximize their most productive ways of working and refocused on tasks that require creativity and emotional intelligence. (Shukla et al., 2017; Willcocks et al., 2017; Klumpp, 2018; Van der Aalst et al., 2018). RPA potentially can help mitigate financial risks as well as fraud by stopping erroneous payments and has high potentials of solving problems especially those associated with financial processes (Davis et al., 2013 ; Katsonis & Sfakianakis, 2016).

Paramount to RPA is its ability to significantly drive efficiency and effectiveness in corporate finance, since the manual system of clearing and settlement lengthens the financial transaction period (Dandapani, 2017; Willcocks et al., 2017; Shukla et al., 2017). CFOs, in particular, could relegate repetitive jobs to robots, which would boost the frequency and efficiency of necessary processes and help them achieve their performance goals (Simiyu et al., 2014). The RPA software has been identified as the most suitable for high degree of process standardization, transaction volumes, rule-based process, and process maturity (Willcocks et al., 2017). It could provide a competitive advantage by helping CFOs meet the key challenges of finance processes of their companies, increase market transparency and improve the expansion of foreign securities market (Ernst & Young, 2016).

The most interesting aspects of RPA to corporate finance are the statistics behind the rapid increase in the use of this technology which can be used to provide a clear and deep understanding of its opportunities such as statistics from Transparency Market Research and Institute for Robotic Process Automation which reveals that RPA has the potential to bring extraordinary transformation into financial processes of businesses (EY, 2016). In Nigeria, the Chief Executive Officer of Union Bank has announced the deployment of RPA, stating that the new technology will significantly enhance the company’s staff productivity, reduce process turnaround time and improved accuracy and compliance (Union Bank, 2018).

Threats of Robotic Process Automation to corporate finance

On the other hand, some scholars are sceptical that the RPA potential that the optimists have outlined can actually be achieved and these optimists are overlooking some likely threats that RPA adoption will pose (Bahrammirzaee, 2010). One major threat that has been identified by many researchers is the fact that in some occupations, such as finance and accounting, RPA has been predicted to be able to reduce the number of people required in the function by 75 per cent (Chelliah, 2017; Chui et al., 2017; Hirsch, 2017; Shukla et al., 2017; Sohn, 2016; Van der Aalst et al., 2018). According to van der Aalst et al. (2018), RPA is a real threat to many workers because it provides agents that interact with different information systems thereby partly replacing humans. This was also corroborated in a study by researchers from Oxford University, who predicted that robots might be able to do half of all jobs in the USA within the next two decades (Frey & Osborne, 2013). An interesting question is, if robots are responsible for increasing percentage of the value created in any specific work flow, what does this mean for human compensation and other rewards? (Hirsch, 2017)

According to Asatiani and Penttinen (2016), another source of scepticism is the impact of RPA on the employees of automated organizations who view RPA robots as their direct competitors for a job and this may create tensions between the management of an organization and its employees or even have a destructive impact on employee morale. In some cases, automated systems are already overtaking human competence and may entail risks, as unforeseen behaviour of automated systems may worry humans (Klumpp, 2018).

There is, however, no longer any reason to doubt the fact that, despite the numerous opportunities RPA could bring to corporate finance, it can have bad effects. According to Davis et al. (2013), automated systems can only provide liquidity during normal markets, only to disappear during extreme events, thereby creating liquidity vacuums and aggravating problems. For any organization, extracting value from automation often entails redesigning entire processes and not just automating individual components of the process. Therefore, any disruptive use of technology that can make a business model obsolete (Chui, et al., 2017).

Accordingly, with the forces of technology today, many professions, especially the accounting and finance profession have been significantly affected (Pincus et al., 2017). According to Hood (2015), there are three “nightmares” that can result from integrating automation technology such as RPA: the first is technology-induced changes can devalue longstanding core services of the profession; the second is the difficulty in finding new employees with the right mix of skills and retraining current employees who need new skills, and the third is the problem of keeping up with the pace of technology change. Consequently, the pace of technological progress, propelled by massive increases in the use of robots in financial processes, computer power and cloud storage, suggests the next frontier will soon be crossed (Chui et al., 2017). RPA can only be suitable for a particular type of processes that include clearly defined, rule-based tasks, devoid of subjective human judgment (Asatiani & Penttinen, 2016).

Research Method

The preceding section outlined the various arguments that RPA optimists and sceptics have propounded for and against RPA adoption respectively. It is only empirical evidence that can provide insight as to which party has the stronger arguments. In order to obtain such empirical evidence, this study adopted the Systematic Quantitative Assessment Technique (SQAT) developed by Pickering and Byrne (2014). The SQAT is systematic in the way papers are assessed to determine their inclusion or exclusion in the review process, and the focus is on peer-reviewed original journal publications so as to maintain a high quality of papers (Pickering & Byrne, 2013). For this study, empirical RPA studies were searched for using the Google scholar search engine.

SQAT recommends five important steps in conducting an effective review. Each step and how it was applied in this study is described in Table 1. A total of six peer-reviewed empirical RPA studies met the selection criteria for this study.

Result and Discussion

A review of the 9 RPA empirical studies (Lacity & Willcocks, 2015; Anagnoste, 2017; Stople et al., 2017; Fernandez & Aman, 2018; Aguirre & Rodriguez, 2019; Cooper et al., 2019; Balasundaram & Venkatagiri, 2020; Eikebrokk & Olsen, 2020; Vitharanage et al., 2020) revealed that these studies sought to investigate the impact of RPA adoption on an organization from three perspectives: 1) Return on investment, 2) Impact on productivity, 3) Impact on human employees. Each of these perspectives is discussed in the succeeding subsections.

Table 1: Description and application of SQAT

No	Step	Application in current study
1.	Define topic	Robotic Process Automation
2.	Formulate research questions	One research question: 1. What empirical evidence exists regarding the impact of RPA adoption on an organization?
3.	Identify key words	“Robotic Process Automation”
4.	Identify and search databases	“All in title” search using one search term: “Robotic Process Automation”
5.	Read and assess publications	1. Initial search returned 215 results 2. Abstracts of papers found were read to ensure that they were empirical studies investigating the actual impact of RPA adoption on organizations. 3. Only 9 papers were found to be peer-reviewed empirical RPA studies. The vast majority of RPA papers were conceptual in nature. 4. The findings of these 9 papers were synthesized and grouped based on kind of impact on RPA adoption found by these papers.

Return on investment

Lacity and Willcocks (2015) presented the findings of two UK-based case studies on the return on investment on the cost of RPA adoption: the first case study was of Telefonica O2, a telecommunications provider, while the second case study was a large utility company. Both companies showed a significant return on their investment in RPA within a short period of time, with Telefonica O2 achieving a 650% ROI within three years of RPA adoption, and the utility company was achieving a 200% ROI annually after adopting RPA (Lacity and Willcocks, 2015).

Impact on Productivity

Anagnoste (2017) presented two RPA adoption case studies in Romania. All showcasing the benefits these companies gained from RPA. The first company was a service provider that introduced RPA into its HR department; immediate time savings were observed with a task that took a human employee forty hours to complete, taking an RPA robot only four hours and free of errors (Anagnoste, 2017). The second company was an oil and gas company that introduced RPA into its finance department in order to relieve accountants from the tedious and time-consuming tasks of reconciling cash and bank accounts, and correspondingly leaving them with more time for higher-level tasks and developing reports and analyzing business trends; significant time savings were observed with the RPA robots completing tedious tasks that took seven accountants 11 hours to complete in only one hour (Anagnoste, 2017).

Fernandez and Aman (2018) investigated the impact of RPA adoption in a large oil and gas company in Malaysia which had integrated RPA into its accounting operations in 2015. The authors interviewed eleven middle-level and senior-level employees to solicit their informed opinions on the impact of RPA adoption and the employees unanimously agreed that RPA adoption had improved the company's productivity by reducing errors and sparing employees from time-consuming, laborious, and repetitive tasks; this freed employees to focus on more higher-level tasks which thus had a positive impact on their overall productivity (Fernandez & Aman, 2018).

Like Fernandez and Aman (2018), Cooper et al. (2019) also interviewed employees in firms that had adopted RPA to gauge their experience with the new technology; however, they focused on 14 accounting professionals working in the Big Four accounting firms in America. The professionals all confirmed “massive gains in efficiency and effectiveness from bot implementation” (Cooper et al., 2019). Aguirre and Rodriguez (2017) investigated the impact of RPA adoption on productivity in a Business Processing Organization (BPO) in Bogota, Columbia. The study adopted a post-test/control design by comparing the two customer service sections of the organization; one section utilized RPA to fulfil some tasks, while the second section relied only on human workers. After a one week evaluation period, the study found that the RPA group were able to handle 21% more cases than the control group. This provided further evidence of RPA's ability to improve an organization's productivity.

Balasundaram and Venkatagiri (2020) conducted a case study of an international service firm that recently adopted RPA. The case study revealed that the company experienced a pronounced increase in service quality and a deep reduction in error rates in a short period after RPA adoption

Eikebrokk and Olsen (2020) are sought to understand the impact of RPA adoption on private and public organizations in Norway. After interviewing 24 key stakeholders in these organizations, the study found that RPA adoption improved quality of service due to a large decline in errors.

Table 2: Summary of empirical findings regarding the impact of RPA adoption

S/N	Study	Type of impact	Nature of impact	Specifics of impact
1.	Lacity and Wilcocks (2015)	Return on Investment (ROI)	Positive	<ul style="list-style-type: none"> ✓ Telefonica O2 achieving a 650% ROI within three years of RPA adoption ✓ Large UK utility company achieved 200% ROI annually after adopting RPA
2.	Anagoste (2017)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ Robots completed tasks in 4 hours that normally took humans 40 hours in a service company in Romania. ✓ Robots completed tasks in 1 hour that took 7 accountants 11 hours to complete in an oil and gas company in Romania.
3.	Fernandez and Aman (2018)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ Managers in a Malaysian oil and gas company agreed that RPA adoption had led to time savings and dramatic reduction in errors in tasks completed.
4.	Cooper et al. (2019)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ Managers in four American accounting firms all confirmed increase in efficiency and effectiveness after RPA adoption
5.	Aguirre and Rodriguez (2017)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ Customer service group in a Columbian company that adopted RPA performed 21% more tasks than the group that had only human workers
6.	Balasundaram and Venkatagiri (2020)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ An international service company recorded improvement in service quality and dramatic decline in error rates after RPA adoption
7.	Eikebrokk and Olsen (2020)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ Improvement in service quality of firms in Norway who adopted RPA
8.	Vitharanage et al. (2020)	Impact on productivity	Positive	<ul style="list-style-type: none"> ✓ 97% data entry success rate since RPA was adopted in an Australian university
9.	Cooper et al. (2019)	Impact on human employees	Positive	<ul style="list-style-type: none"> ✓ RPA adoption was actually driven by lower-level employees who appreciated that RPA made their jobs easier, and that no employee had been replaced by robots

Source: Authors' review

Vitharanage et al. (2020) investigated the impact of RPA adoption on productivity in an Australian university by interviewing key stakeholders involved in the adoption and implementation process. The interviews revealed that productivity had risen dramatically due to the fact that the bots made no errors which humans made in the past during entering of student data.

Impact on human employees

Stople et al. (2017) in Norway, and Fernandez and Aman (2018) in Malaysia, both found that employees in the companies where RPA was introduced were initially concerned that the introduction of RPA was a threat to their jobs. Additionally, they expressed resistance to the new technology as they were already used to doing their jobs in a certain way (Stople et al., 2017; Fernandez & Aman, 2018). The head of human resources of the Malaysian organization admitted that the introduction of RPA in the oil and gas industry could cause human employees to lose their jobs, particularly less-skilled workers doing repetitive tasks, which the RPA robots can do faster and more efficiently (Fernandez & Aman, 2018); it is important to note though that this is just an opinion rather than tangible evidence of any actual job losses due to RPA adoption.

Unlike Fernandez and Aman (2018), Cooper et al. (2019) found that RPA adoption was actually driven by lower-level employees who appreciated that RPA made their jobs easier, and that no employee had been replaced by robots and the interviewees did not foresee any employees being replaced by RPA robots in the near future. RPA robots were seen as assistants rather than potential replacements (Cooper et

al., 2019). Perhaps the difference in sentiments between Malaysian and American employees regarding RPA adoption could be attributed to differences in attitudes towards new technologies with Americans generally more open to new technology adoption than their Asian counterparts (Shaikat & Zafar, 2010).

Table 2 presents a summary of the findings of these empirical studies regarding the impact of RPA adoption on organizations:

Settling the RPA debate – weighing the empirical evidence

To reiterate, the primary objective of this study was to examine the empirical evidence on the impact of RPA adoption on organizations, in order to try to settle the debate between RPA optimists and RPA skeptics. The paucity of empirical studies on the actual impact of RPA adoption on an organization makes it impossible for a definitive conclusion to be made regarding whether or not RPA adoption will ultimately good or bad for an organization.

However, based on the limited empirical evidence available (see Table 2), the RPA optimists have the weight of evidence on their side as all the empirical studies discussed in the preceding subsections revealed that RPA adoption had led to marked improvements in employee productivity as RPA adoption relieved them from repetitive, tedious and time-consuming tasks (Anagnoste, 2017; Fernandez & Aman, 2018; Aguirre & Rodriguez, 2019). Additionally, companies that adopted RPA were able to realize impressive returns on their investment within a short period of time (Lacity & Willcocks, 2015). On the other hand, there was a sense of unease regarding job security and resistance to change amongst some employees when RPA was introduced (Stople et al., 2017; Fernandez & Aman, 2018). This unease have proven to be unfounded so far, with no jobs reported to have been lost to the RPA adoption by an organization (Cooper et al., 2019).

Policy and Managerial Implications

In a business world characterized by ever-increasing competition, companies need to continually find innovative ways to creative competitive advantages in order to stay relevant; RPA represents an example of such an innovation. The findings of the few available empirical studies on the impact of RPA adoption on an organization has certain policy and managerial implications which will be discussed in the succeeding paragraphs.

RPA adoption has been proven to have a significantly positive impact on organizational productivity. This makes it important for senior management to critically assess whether or not RPA adoption is possible for them given their peculiar business climates. Certain questions need to be asked and answered: 1) Do we have significant amounts of repetitive tasks that RPA can effectively accomplish?, 2) Will RPA adoption enable our employees to spend more time serving customers and fulfilling other high-level strategic tasks? 3) Are our competitors already adopting RPA? 4) Can we currently afford to adopt RPA? These are just a few examples of questions that an organization needs to carefully consider, and the answers to these questions will determine if RPA adoption is the right fit. The reality is that integrating technology into existing business operations is something all organizations will have to venture into as efficiency and effectiveness become more and more important in global business today. The fact that organizations that have adopted RPA have been able to rapidly gain massive returns on their initial investments makes RPA adoption very compelling for organizations to seriously consider.

On the other hand, it is absolutely imperative that senior management consult with their employees before embracing RPA. This is in order to assuage their job security concerns as well as clearly explaining how they will benefit if RPA is adopted. This is particularly important for low-level employees who might view RPA as direct competition for their jobs. In the very possible event that some employees might have to be retrenched. If RPA is adopted, senior management has to critically weigh the pros and cons of RPA adoption and the possible negative backlash the organization might endure from the society whose family members might lose their jobs because of RPA adoption.

To conclude, RPA adoption has preliminary empirical evidence supporting its adoption by companies, but as with all technology investments that might impact human employees' lives. It is never a black and white issue. Senior management has to seriously examine all sides of the issue and make an informed decision that will secure the long-term sustainability of the business.

Conclusions, suggestions and limitations

As with any new innovation, RPA has its proponents and its detractors. The proponents claim that RPA adoption will free employees from the drudgery of repetitive lower-level tasks, freeing them to perform higher-level tasks that will improve the productivity of organizations. On the other hand, RPA detractors fear that it will lead to RPA robots replacing human employees and will reduce future

opportunities for humans to get jobs. This study sought to examine the empirical evidence in order to determine which side of the RPA debate had the weight of evidence in its favour.

A critical review of RPA research reveals that there is a great paucity of empirical research on the impact of RPA adoption on organizational performance. However, the few empirical RPA studies reviewed by this study revealed that RPA adoption had indeed increased productivity among organizations and they were able to attain significant returns on their RPA investment within a relatively short period of time. This shows that the RPA proponents currently have the weight of limited empirical evidence on their side. However, the empirical studies revealed that some employees felt concern for their job security when RPA was introduced into their organizations, and thus organizations must consult with their employees and weigh the pros and cons carefully before deciding whether or not to adopt RPA or not.

This study has revealed that there is an important need for researchers to conduct extensive empirical studies on the impact of RPA adoption on organizations from multiple points of view so as to provide holistic insight as to the long-term ramifications of RPA adoptions on all concerned stakeholders.

What cannot be denied is that in a business climate that grows more competitive with each passing day, organizations must constantly search for the latest innovations that will grant them the necessary competitive advantage to stay profitable for the long term; RPA has the potential to be a game-changing innovation for improved efficiency, effectively and productivity for companies worldwide.

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