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Impact of digitalisation on procurement: the case of RPA

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Impact of digitalization on procurement: the case of Robotic Process Automation

Abstract

A profound digital transformation is now underway. As the implementation of digitalization in supply chain processes has accelerated rapidly, coupled with an ever-increasing level of competitiveness, traditional procurement is changing to adapt to this new paradigm.

Research on RPA (Robotic Process Automation) in buyers' practices is still in its infancy. The aim of the paper is thus to explore the practical implications and impact of RPA in the procurement function in order to improve our conceptual understanding of this recently introduced practice.

As first movers, seven case studies from various industries were selected based on their significant successes and experiences in the field of digitalization in the procurement sector. The findings confirm the relevance of some recognized attributes of procurement automation, while other attributes have also been explored. The study suggests that RPA impacts on procurement in operational, organizational and relational terms. Furthermore, we identify the motives and challenges when implementing this type of initiative in the field of procurement.

Key words: Digitalization in procurement, RPA, Operation management, Case studies.

Introduction

In recent years, organizations have had to follow the 4.0 industrial revolution, especially digitalization, very closely because of the impact it can have on the success or failure of organizational matters like profitability and competitiveness.

According to Bienhaus and Haddud (2018), digitalization has a real influence on organizations. In the context of strategic procurement initiatives, it presents new challenges and opportunities. Several authors have noted that digitization can play an important role, not only in aligning existing sourcing strategies but also in designing new sourcing strategies to achieve internal organizational growth and competitive advantage. Moreover, the procurement department acts as an interface between internal and external partners, and between inner capacities and external accomplices Van Weele (2010 and 2014) and (Kosmol et al., 2019).

Since information technology tools play a key leverage role in purchasing and procurement (Kache and Seuring, 2017), the aim of this paper is to broaden the field in research on digital procurement and to confirm previous findings on the topic.

While many advanced technology tools can be used to improve the procurement process, some of them, such as Robotic Process Automation (RPA), can be particularly useful in gaining a competitive advantage (Büyüközkan and Göçer, 2018). RPA technology not only gives these organizations an opportunity to improve their processes, but also helps them to simplify and rapidly streamline the end-to-end process even for those driven with high rules (Lacity *et al.*, 2015).

The purpose of the present paper is to provide a better understanding of the current issues in procurement from a technological point of view and to examine the suitability of a technology such as RPA in the procurement process. We identify the tasks in which RPA can be used and highlight the benefits and drawbacks that may result. The findings are also intended to assist and guide companies thinking of adopting this technology in the future.

The research problem consists of one main question followed by three sub-questions. To what extent can robotic automation of processes be used to improve the purchasing process?

- What attributes can help avoid failure in procurement automation?
- How does RPA contribute to traditional procurement activities?
- What motives and challenges are inherent to the implementation of RPA?

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2 We begin by identifying the tasks for which RPA can be deployed in procurement in order to
3 gain insights into the overall process and related tasks. By comparing these tasks with RPA
4 success factors found in the literature, potential new uses can be found.
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8 Secondly, we discuss RPA-related benefits. Investigating its benefits is important as it can
9 explain not only how, but also why RPA should be used. RPA as a tool for process
10 improvement is relatively new and therefore needs more validation and visibility in terms of
11 its functionality.
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15 We also investigate the difficulties and challenges related to RPA. This section seeks to ~~find~~
16 explain not only why RPA should be used, but also why it should not be used and the
17 problems and risks companies may face. When businesses look for new tools and solutions to
18 improve their current process, it is always crucial to examine the potential risks as well as the
19 benefits of the chosen solution, especially when dealing with novel solutions with no prior
20 knowledge, such as RPA.
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26 27 **1. Literature review**

28 29 **1.1. Theoretical background for Purchasing and Supply Management literature**

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31 While it is true that research in the field of Purchasing and Supply Management (PSM) is
32 increasing and growing importance and is gaining significant academic interest (Harland et
33 al., 2006), **Bentahar (2018)**, the field suffer from a lack of theoretical grounding robustness
34 (e.g. Chicksand et al., 2012; Spina et al., 2016). Since this research deals with the integration
35 of an advanced technology, here RPA, in the procurement function, we therefore place
36 procurement and digital procurement in their theoretical context.
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43 According to Barney (2012) purchasing, and supply chain management be sources of
44 sustained competitive advantage for a firm. Indeed, resource based view (RBV) contribute de
45 better understand the make or buy decision by distinguishing between critical activities and
46 non-critical and their contribution to have competitive advantage. In this way, critical
47 activities could be maintained in-house, while non-critical activities are outsourced to
48 external supplier. From the perspective of the RBV, the supplier is therefore seen as a
49 potential source of a scarce resource (Barney, 2012) and (Van Weele et al., 2014). In
50 addition, it is well known that Procurement is the discipline that is concerned with the
51 management of external resources (Van Weele, 2014).
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From the perspective of digitalization of purchasing and supply management Srari and Lorentz (2019) have proposed a framework for research on digital procurement. The framework proposes a grid with multiple dimensions for digital technologies include those that directly impact purchasing processes and changes to procurement items.

Based on these two theoretical backgrounds, we are building a framework that permits us to show what are the drivers to adopt RPA as an advanced digital technology in order to improve the procurement process.

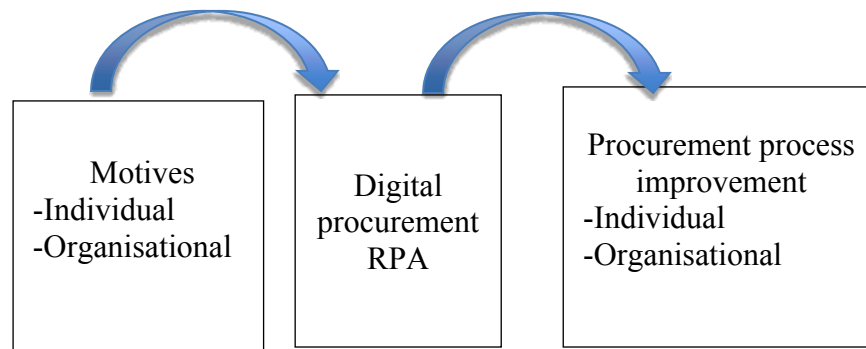


Figure 1. Research framework

1.2. Moving to digital procurement

The emergence of new technologies alters traditional ways of working and creates disruption across Supply Chain processes. In recent years, digitalization in the Supply Chain has attracted considerable attention from academic authors (Benzidia, 2013), Bienhaus and Haddud, 2018), and management practitioners. Indeed, the "Digital Supply Chain" (DSC) is considered as one of the hottest buzzwords in the industry (Büyükožkan and Göçer, 2018).

The technological disruption that has been observed of late affects not only the production process (Smart Manufacturing/industry 4.0) and logistics (Logistics 4.0), but all other functional areas in a company, especially procurement. The aim is to make procurement processes leaner, but also to take the opportunities offered by process automation into consideration.

Global supply chains have deployed procurement to engage with the global supply base, and the resulting globalization is the main source of digitalization.

The adoption of new technologies presumes that a company is ready "to embrace and use new technological assets" (Richey et al., 2007). The digitalization of procurement requires an information technology system adapted to digital procurement, and human resources with the

1 skills and knowledge required (Benzidia, 2013) who are ready to get embedded in this kind of
2 project (Venkatesh and Bala, 2012).
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7 The information technology (IT) infrastructure available to organizations is one of the most
8 important issues in digital procurement. This differs according to the organization due to
9 various issues like their level of IT transformation and the company's size (Kache and
10 Seuring, 2017).
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14 Electronic data interchange (EDI) is an IT process that permits helps to build a platform for
15 digital procurement practices by allowing information transfer within and across the firm's
16 boundaries (Liu *et al.*, 2016; Saldanha *et al.*, 2015).
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19 Integrated systems, such as the ERP system and data warehousing system, provide the "nerve
20 system" for digital procurement by connecting separate systems on shared platforms (Dong *et*
21 *al.*, 2009). Some types of IT infrastructure used in digital procurement like the source-to-pay
22 process are widely used in centralized IT and ERP systems.
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26 Mature technologies also include cloud computing, which is a virtualized IT resource and can
27 take the form of software as a service (SaaS), infrastructure as a service (IaaS), and/or
28 platform as a service (PaaS) (Wu *et al.* 2013).
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31 Emerging technologies, like Artificial Intelligence, Machine Learning, Chatbots, RPA and
32 Blockchain are only used in a small number of procurement processes, mainly in large
33 companies. However, as procurement advances as a strategic function (Chick and Handfield,
34 2014), it is essential to get the correct and appropriate information from the huge amount of
35 data available to support complex decision-making processes (Bienhaus *et al.*, 2018).
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38 Deloitte and Odgers Berndston (2018) identified key challenges to the effective application of
39 digital technology in procurement. In their global study, the authors showed that the main
40 drawbacks are a reduction in stakeholder endorsement and prioritization, as well as
41 difficulties in getting the right skills/capability of analytics resources.
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48 **1.3. RPA to improve procurement processes**

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51 Robotic Process Automation (RPA) is defined as "*a preconfigured software instance that*
52 *uses business rules and predefined activity choreography to complete the autonomous*
53 *execution of a combination of processes, activities, transactions, and tasks in one or more*
54 *unrelated software systems to deliver a result or service with human exception management*"
55 (IEEE Corporate Advisory Group, 2017, cited by Huang *et al.*, 2019 p. 3).
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RPA concerns tools “*designed to be used by subject matter experts to automate tasks that use rules to process structured data, resulting in a single correct answer and deterministic outcome*” (Lacity and Willcocks, 2017). RPA is not intended to disrupt existing information systems, but replaces a manual process with an automated one (Huang *et al.*, 2019).

According to a case study conducted in an energy services company (Lacity and Willcocks, 2015) before the rollout of RPA, an organization is unsuited for automation if the following attributes are not fulfilled:

- *Unambiguous rules*: as robots require precise instructions,
- *Limited exception handling*: exceptions mean the process is not worth automating and is better handled by humans.
- *High and predictable volumes*: no need to be stable, but predictable to control the average volume and performance
- *Operating in a stable environment*: otherwise the robot needs to be reconfigured
- *Access to multiple systems*: IT systems are faster than humans when moving from one system to another, so it reduces labor costs and time spent on the process.
- *Known costs*: evaluating the cost by considering the standard unit of “time/average” handling time it takes a human to achieve the process and resource costs (salary, wages, overheads, etc.)

In order to move forward with the digital agenda of tools such as RPA, AI and Blockchain, Harthley *et al.* (2019) recommends that companies ensure their readiness to adopt and effectively use one or more of these technologies. The process would involve: (1) identifying an SC technology visionary who can lead the way through the maze of technologies and the changing digital landscape, (2) developing a digital technology roadmap for the SC processes, and (3) updating foundation information systems.

By applying these rules, it is possible to avoid failure in the rollout of RPA in procurement centers. However, another key reason for failure in the implementation of RPA is that firms tend to overestimate the potential gains, and lack the organization and skills needed to implement the tool (Rutaganda *et al.*, 2017).

RPA is increasingly used in procurement organizations (Axcias, 2019). Taking buyers away from low value-added and often time-consuming tasks should enable them to be more focused and efficient in more complex operations, spending more time working with internal customers and suppliers. In concrete terms, thanks to RPA, buyers will be able to delegate order receipts to a software robot, or configure their software robot to place automatic orders based on stock levels, for instance.

Invoicing processes and supplier management are time-consuming activities for buyers. According to Wax Digital study (2019)¹, corporate financial controllers and buyers spend about 25% of their time trying to solve billing problems. Buyers are especially involved in this dispute resolution process as they are the first point of contact for suppliers.

In many organizations, tasks with low added value are outsourced. In a context of business strategies adopted to improve customer service, RPA helps organizations to save costs by no longer having to outsource (Lacity and Willcocks, 2015; Lacity *et al.*, 2017). A study conducted by PwC (2016)² estimated that 45% of business activities can potentially be automated, resulting in a potential saving of \$2 trillion of global labor costs. For buyers, this means that additional savings can be gained by using RPA instead of outsourcing activities.

In addition to saving buyers' time and company money, RPA minimizes human error as, if a robot is properly configured, it will not be inattentive, tired or subject to other errors (Asatiani and Penttinen, 2016; Alberth and Mattern, 2017). In addition, Willcocks *et al.* (2017) argue that programming skills are not necessary to implement RPA, and buyers and others involved in the procurement process can easily learn how to use RP robots.

Table 1, provides summary of extant research about motives and challenges that individuals and organizations could face in the context of RPA implementation.

Individual motives	To minimize or avoid human errors such as mistakes when confirming business information (amounts, contracts information...) (Huang and Vasarhelyi, 2019)
	Quality and work accuracy (Lacity and Willcocks, 2015) with procurement more focused on strategic decisions and activities (Bienhaus and Haddud, 2018).
	Save the accountant's time (Lacity and Willcocks, 2015)
	No computer programming skills are needed (Willcocks <i>et al.</i> , 2017)
	Multi-tasking and switching to other processes quickly (Lacity and Willcocks, 2015)
Organizational motives	Capacity to work at any time (Kanellou and Spathis, 2013)
	Widely adopted in many industries due to its low implementation costs and high potential benefits (Huang and Vasarhelyi, 2019)
	Reduces the number of workers (Lacity and Willcocks, 2015)

¹ Procurement is joining the dots with technology to achieve greater strategic benefits, Wax digital study 2018.

² Industry 4.0: Building the digital enterprise, pwc 2016.

	Organizations can deal with the rapidly increasing amount of data (Lacity and Willcocks, 2015)
Individual difficulties	Technology induces fears in workers (Smith and Anderson, 2014) Fear of sharing appropriate information with partners (concerns about falling behind their competitors or of being exploited by their partners), Preindl et al., (2020).
	Changing tasks and roles (IRPA, 2014)
Organizational challenges	Lack of planning (Büyüközkan and Göçer, 2018) Requires proactive planning (Lacity and Willcocks, 2015)
	The project needs to be supported by top management and information technology (Lacity and Willcocks, 2015) and Kosmol et al., (2019) Organizations need to consider their management and leadership as an essential function in the digital transformation process (Bienhaus and Haddud, 2018).
	The digital transformation roadmap requires involvement at all organizational levels and by all decision-makers (Issa et al., 2018).
	It needs to be both prepared and overseen by humans (Lacity and Willcocks, 2015)

Table 1 - RPA's individual and organizational issues

2. Research methodology

Digitalization in procurement, particularly RPA, has been little studied in the literature. The aim of our research paper is therefore to explore the practical implications and roles of these tools within the procurement function to improve the conceptual understanding of this contemporary issue. Case studies have been adopted as the most appropriate approach to exploratory qualitative research (Yin, 2009) as empirical research examines issues in a real-life context. Furthermore, we can justify the use of this qualitative method in the same way as the main research questions in 'how' form (Yin, 1994: 6).

We examined multiple examples to select typical cases within a certain domain (Eisenhardt, 1989). This research approach can make a useful contribution to both management practices and theory building in a relatively new research field (Seuring, 2005).

We conducted our analysis in seven firms Table.2, that were selected based on their significant interest and success stories on the impact of digitalization in the procurement department. We organized the case selection through a sampling approach using a comparable source (companies based in France) to ensure a uniform exogenous setting. The selected companies needed to have a recognized experience within digitalisation and more precisely RPA implementation in procurement department. We chose companies that differed

in terms of size and diverse products/ services. Thus, we were able to compare and generalise the results obtained. We identified the main actors in the digitalization process, and the participants in each function involved. For reasons of confidence, the names of the companies in the cases will remain anonymous.

<p>Firm A: Automotive</p> <p>Firm A belongs to the international Group, one of the world's leading manufacturers of heavy trucks and diesel engines.</p> <p>The procurement strategy aims to develop our suppliers as partners. The collaboration drives growth, profitability and continuous improvements with a focus on customer success. The development of digitalization is taking place at striking speed.</p> <p>Internal secondary sources (intranet and internal reporting project)</p>	<p>Firm B: Leader in sustainable mobility</p> <p>B specializes in the manufacture and marketing of tires. The company strives for operational excellence. The digitalization and simplification supported by competitiveness plans are powerful levers to improve operations (SCM, purchasing, production...). 85% of purchases are centralized and the function is seen as mature.</p> <p>Secondary sources (external website, internal reporting from intranet)</p>
<p>Firm C: European MRO and business supplies dealer</p> <p>The value of Firm C, as a distributor, is putting sincerity and responsibility at the heart of all our actions. C offers a wide range of quick and easy solutions based on select products and services. For C, technology frees up time for creating value throughout the procurement cycle.</p> <p>Secondary sources (external website, internal reporting from intranet)</p>	<p>Firm D: Pharmaceutical</p> <p>Firm D is fourth largest subsidiary of a biopharmaceutical company founded over 140 years ago. Digitalization is not new at D, automation systems that appeared in production in the 1980s, the company has been involved in electronic document management for more than 20 years. Digital projects are accelerating in purchasing processes.</p> <p>Secondary sources (external website)</p>

<p>Firm E: Energy</p> <p>E is the leading regional multi-energy company, a player in the energy transition and sustainable development, and places innovation and digitalisation at the heart of its activities. End 2018, the firm has launched a large-scale RPA project within procurement department. this has been successfully implemented.</p> <p>Internal secondary sources (intranet and internal reporting project)</p>	<p>Firm F: Consulting in procurement firm</p> <p>F offers a full range of services in various industries and more particularly, in procurement expertise. The expert and founder has carried out several missions to set up the RPA within purchasing departments.</p> <p>Secondary sources (external website and internal reporting project)</p>
<p>Firm G: Strategic IT consulting firm</p> <p>G is a European Leader in Digital Transformation. Its goal is to devise strategies that are truly actionable, with tangible results. G assists their customers in structuring their RPA approach, identifying and implementing automation and robotization projects.</p> <p>Secondary sources (external website, internal reporting from intranet, and sales presentation)</p>	

Table 1. Presentation of selected firms and experts

The data was gathered from primary and secondary sources. Our approach enabled us to obtain multiple views (procurement manager, buyer, project manager and leader, technical expert). It also provided us with more objective responses to the questions and allowed us to compare answers from different perspectives.

The secondary data came from the company websites as well as internal documents (project documentation, examples of success stories/quick wins, digitalization/RPA training materials). The data also covered field observations of the companies we visited. In addition, this process resulted in a verification study of the interviews. Secondary data can be helpful in the research design of subsequent primary research and can provide a baseline with which

the collected primary data results can be compared to. The combination of the data collected enables us to assume internal validity.

Company	Respondents' positions/Title	Sector / Firm Annual Sales 2018	Interview duration
Firm A	Procurement manager (direct)	Automotive / 309 millions euros	1h
Firm A	Project manager		1h15
Firm A	IT expert		2h45 (2 interviews)
Firm B	Global purchasing director	Leader in sustainable mobility / 22.03 billion euros	30 mins
Firm B	Expert in digitalization		50 mins
Firm C	Purchasing director	European MRO and business supplies dealer / 774 millions euros	1h15
Firm C	Procurement project manager		1h
Firm C	Purchaser		45 mins
Firm D	Head of site purchasing	Pharmaceuticals / 3,1 billion euros	1h15
Firm E	Purchasing director	Energy / 57 millions of euros	1h55 (2 interviews)
Firm F	Procurement expert and owner	Consulting in procurement / 3,5 millions of euros	1h
Firm G	Accounts director	Strategic IT consulting / 4,1 millions of euros	1h30
Firm G	IA project leader		2h30 (2 interviews)
Firm G	National sales director		45 mins
	14 respondents		17 interviews

Table 3. Respondents' individual profiles listed including title, sectors, annual sales and interview duration.

We conducted 7 semi-structured face-to-face interviews and 10 interviews by phone with the main actors involved in digitalization and RPA in the procurement process. Semi-directive interviews are useful to "*understand organizational reality from the point of view of the actors who experience it*" (Demers in Giordano, 2003, p. 174.). Each interview lasted an average of one hour. The interviews were recorded and fully transcribed. We followed the recommendations of Miles and Huberman (2003) and decided to stop the coding phase when we reached data saturation. The data was then analysed using an inductive approach. The semi-structured interview guideline was developed from the existing literature on digital procurement and included open-ended questions to enable knowledgeable respondents to describe events and processes. Some aspects of this interview were more or less developed depending on the interviewee knowledge and his position.

The interview guide is structured as follows:

General overview

- Brief overview about the company
- description of your role and your responsibilities

Digital procurement /RPA project

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- Major attributes and enablers for the procurement process automation
 - Company's motives in adopting RPA in procurement process
 - What are different challenges faced by the team / company before and during the implementation journey
 - Major impacts of RPA implementation on procurement activities and process

Closing Questions and summaries

3. *Research findings*

We summarized the results of our research as three main findings, in keeping with the key elements of the interview guide.

3.1. *Attributes for procurement automation*

Preparing the ground for the implementation of the automation process is essential. We tried to understand the necessary attributes prior to adoption of RPA in our interviews. The global purchasing director and the digitalization expert from Firm B indicated that the main attribute in the tool's implementation was the **use of clear, well-defined and immutable processes**.

All the respondents from firms A, B, C and D explained that their procurement department developed a **well-established digitalization plan for the procurement function**.

For example, Firm B created the position of Digital Chief Transformer (DCT) who is in direct contact with the company's management team and the developers. In this way, the DCT has a clear vision of the company's objectives and can thus use its network of developers to introduce digital tools best adapted to the company's needs.

Firm C also had a strong desire to digitalize. This was supported by the group's purchasing director who created a department dedicated to digitalizing some procurement activities and process improvements. Firm C shared some key documents from the project and related internal communication with us.

Many of the respondents emphasized the importance of the **involvement and leadership of the head of procurement in the digitalization project**.

"We always start from the user or the operational need to implement these solutions. Without strong leadership from the Purchasing Director, it won't work!" Accounts director, Firm G.

"Productivity gains can improve the legitimacy of procurement departments... and this legitimacy is strategic, so I am more than implicated in such transformation!".
Purchasing director, Firm C.

Finally, we should remember that in all the cases studied, **procurement is not an isolated field.**

"It's crucial, procurement is incorporated prior to rollout of the RPA project and works closely with all the main stakeholders every day." Project manager, Firm A.

The influence of the head of procurement on the success of digitalization was acknowledged, encouraging teams to be more committed and end-users to adopt the new tool.

"The tools are already quite complex. For us, it's important to get the user to enjoy the experience in order to accept it. Buyers can spend a lot of time on tasks that don't give them any real gains" Accounts director, Firm G.

The complexity of tools is clearly viewed as a potential barrier to their use, even if they can be a source of added value for buyers.

"Much more information is available just in time, and the head of procurement wants to deal with it instantly and be sure of getting the right data as well!" Procurement director, Firm A.

3.2. Contribution of RPA to the operational purchasing process

The interviewees raised the importance of the role played by RPA to improve the operational activities of procurement agents.

"RPA is like a digital staff member, it's able to use the work environment."
Purchasing director, Firm E.

"For me, process automation is part of a coherent strategy of operational excellence!" Strategic accounts consulting manager, Firm G.

- **Time management and optimization**

Management of non-productive tasks

When observing the **time saved** by the implementation of a robot, we can suppose that this could have an impact not only on recruitment strategy but also on potential job losses in some companies. To our surprise, this hypothesis has been strongly disproved by the interviewee.

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"The objective of the RPA implementation is really about the improvement of the process and we have no plans to reduce resources and save full time equivalent (FTEs)" Purchasing director, Firm E.

The head of site purchasing in Firm D and the purchasing director in Firm E pointed out that the cost of managing category C purchases is far too high in relation to the added value. Thus, the reduction in time and resources devoted to managing these purchase categories is a much appreciated gain for buyers.

"Priority is given to manual and redundant buyer tasks to offload the teams and allow them to concentrate on more value-added tasks." Secondary data: project documentation from purchasing director, Firm C.

The digitalization expert in Firm A noted that employees have to do difficult and non-productive tasks. Releasing staff from these tasks therefore frees up resources to concentrate on more value-creating jobs. Even though, RPA

"We start with RPA and always begin with the simplest buyer tasks, like creating supplier profiles on SAP, for instance." Account director, Firm G.

Processing times and flexibility

The procurement manager described the problems linked to the processing times of supplier invoices. The 2008 LME law obliges companies to pay their suppliers within 60 days to avert business failures.

"We set up a robot that could mimic the manual process of a person copying and pasting data from one source to another. With this technology, the processing time for supplier invoice payments was reduced from 24 hours to 1 hour." Secondary data: testimonial of the purchasing director from project documentation and communication, Firm C.

The respondents also explained that companies sometimes have difficulty speeding up the processing of supplier invoices, not because of unwillingness, but because of excessively long reception times (arrival time of letters via the post or because suppliers send their invoices too late) and the lack of technical and human resources.

Thus, financial transactions are time-consuming and expensive as they often require several intermediaries. Respondents from firms A, B and C felt that there is still a lot of progress to be made in this area.

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2 Back-end management of invoices can be done by the robot, thereby accelerating the process.
3 This improvement would also impact on the procurement agent's time management.
4 Moreover, robots can operate 24 hours a day, 7 days a week, and adapt to high workloads.
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- 8 • **Improvement/automation of internal processes**

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10 | *"Input errors are numerous and generate significant costs and expenses to correct*
11 | *them"* Purchasing director, Firm E.

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13 In addition to saving time for buyers and money for the company, **RPA helps to minimize**
14 **human errors if the robot is properly configured** as it will not make mistakes due to
15 inattention or fatigue.
16
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18 | *"Today, a buyer has no added value in processing invoices, when invoices can be*
19 | *processed by machines."* Account manager, Firm G.

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21 | *"With this technology, the accuracy rate increased from 97% to 100%."* Secondary
22 | data: testimonial of purchasing director from project documentation and
23 | communication, Firm C.
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29 • **Stakeholder satisfaction and quality of buyer-supplier relationship**

30 | *"Digitalization is transforming the way we work, innovate and collaborate. It allows*
31 | *to manage the company from more decentralized way and to maintain a richer*
32 | *relationship with our customers and suppliers."* Secondary data: public reference
33 | document posted in march 2019, Firm B.
34
35
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38 As invoice management, creation of supplier data on SAP and supplier base management in
39 general is managed through these systems, RPA speeds up processing and avoids human
40 error, so the operational quality of the process improves. This in turn has a strong impact on
41 the suppliers' perception of the quality of the buyer's company.
42
43
44

45 | *"In the end, it improves the perceived quality of service and therefore the satisfaction*
46 | *of stakeholders! Suppliers really appreciate it and feel that procurement agents are*
47 | *more professional."* Procurement expert and owner, Firm F.
48
49

50 The respondents highlighted some of the positive effects on supplier relationship
51 management due to the operational efficiency (data accuracy and integrity, just in time
52 information...).

53
54 | *"It helps to develop a trust-based relationship with our key strategic suppliers,*
55 | *particularly given the accuracy of the information we share."* Procurement project
56 | manager, Firm A.
57
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3.3. *Motivations to adopt RPA*

During the interview, the respondents noted that the motives behind RPA adoption are clear enough for companies. These motives differ from one organization to another, depending on each one's need.

- **Return on investment: Cost improvement**

According to the respondents interviewed, the main motives and challenges are economic. Moreover, some procurement heads expected to make a profit from investing in the technology.

“The advantage is that you only train the robot once! Moreover, there was no need to train 10 people.” Procurement, Firm C.

- **Reviewing and clarifying the procurement process**

Sometimes the procurement process is not clear internally or it changes and is not documented, and since RPA is a useful tool for process improvement, it can help managers to review their processes and standardize them.

“There's still no real process documentation in companies.” Accounts director, Firm G.

- **Sorting and accuracy of data**

The interviewees agreed that there is often a high volume of data to deal with and the activity done by employees may not have any added value. However, at the same time, keeping data on a system costs the company a lot of money as they pay an external provider for data maintenance. Stakeholders therefore realized that in addition to an acceptable ROI, RPA helps to clean the data, ultimately saving money.

“The CFO and the purchasing manager decided to review the dataset, although at the beginning that was not the objective... it was to relieve the person in terms of workload so that he could focus on his job.” Accounts director, Firm G.

“Surprisingly, ROI was not the sole driver in the end!” Global purchasing director, Firm B.

3.4. *Main difficulties encountered*

The interviewees pointed to the challenges regarding changing employees' habits and convincing them that robots would help them to do their job better. Also, most of the time, the business processes were partially described but not stable enough.

“But, we've always done it this way...” Purchaser, Firm C.

The fact that automation for the purchasing process is not applicable in all purchasing categories was mentioned. Some buying categories are complex due to the large number of suppliers. Most of the time, the focus is on strategic suppliers rather than suppliers that are often replaced.

“It works less well on indirect purchases because there are too many suppliers, it’s a much more complex process.” IT expert, Firm A.

4. Discussion

We remind that most studies are only beginning to explore the effects of advanced digital technologies on procurement field (e.g., Kache and Seuring, 2017). The attributes, motives and difficulties inherent in RPA adoption emerged from our case studies of companies using this process for procurement purposes.

The interviewees pointed to the importance of the preparation stage of RPA adoption, identifying certain factors that ensure successful procurement automation before RPA implementation. All the cases indicate that companies must have a certain degree of flexibility, but also an infrastructure that allows for the implementation of such tools. The potential of all their IT tool functions is not fully exploited, especially in RPA and IA in procurement.

Our findings show that process maturity is one of the key factors in the adoption of RPA. Procurement maturity is referred to as “*the professionalism levels of the procurement function*” Rozemeijer *et al.*, (2003). The procurement director’s involvement in the upstream process of project implementation is a sign of the function’s maturity in the company and appears to be a key requirement. Moreover, in order to succeed in this area, organizations need to provide training and define a common mindset towards the digital transformation (Bienhaus and Haddud, 2018). This helps to overcome individual challenges (trust in technology...) for the adoption of these digital tools Boughzala *et al.*, (2012).

Table 4. below demonstrates and summarizes the main results concerning individual motives and difficulties from a purchasing manager’s perspective as well as the organizational motives and challenges related to RPA implementation.

Individual motives	To minimize or avoid human errors such as mistakes when confirming business information (amounts, contracts information...) (Huang and Vasarhelyi, 2019)	Confirmed
	Quality and work accuracy (Lacity and Willcocks, 2015) with procurement more focused on strategic decisions and activities (Bienhaus and Haddud, 2018).	Confirmed

	<i>Focus on added-value tasks</i>	<i>Newly observed</i>
	<i>Helping in increasing buyer legitimacy</i>	<i>Newly observed</i>
	Save the accountant's time (Lacity and Willcocks, 2015)	
	<i>Save procurement agent's time</i>	Confirmed
	<i>RPA does not necessarily lead to job cut (FTE)</i>	Newly observed
	No computer programming skills are needed (Willcocks et al., 2017)	Not confirmed
	Multi-tasking and switching to other processes quickly (Lacity and Willcocks, 2015)	Confirmed
Organizational motives	Capacity to work at any time (Kanellou and Spathis, 2013)	Confirmed
	Widely adopted in many industries due to its low implementation costs and high potential benefits (Huang and Vasarhelyi, 2019)	Partly observed
	Reduces the number of workers (Lacity and Willcocks, 2015)	No evidence not the final objective
	<i>Help and relieve the procurement agent in terms of workload</i>	<i>Newly observed</i>
	Organizations can deal with the rapidly increasing amount of data (Lacity and Willcocks, 2015)	Partly observed
Individual difficulties	Technology creates fear in workers (Smith and Anderson 2014)	Issues in change management
	Fear of sharing appropriate information with partners (concerns about falling behind their competitors or of being exploited by their partners), Preindl et al., (2020).	Not confirmed
	<i>Fear of changing working habits</i>	<i>Newly observed</i>
	Changing tasks and roles (IRPA, 2014)	Partly observed
Organizational challenges	Lack of planning (Büyüközkan and Göçer, 2018)	Partly observed
	Requires proactive planning (Lacity and Willcocks, 2015)	
	The project needs to be supported by top management and information technology (Lacity and Willcocks, 2015) and Kosmol et al., (2019)	Partly observed
	Organizations need to consider their management and leadership as an essential function in the digital transformation process (Bienhaus and Haddud, 2018).	Partly observed
	The digital transformation roadmap requires involvement at all organizational levels and by all decision-makers (Issa et al., 2018).	Confirmed
	<i>Led by procurement director</i>	<i>Newly observed</i>
	<i>Maturity and recognition of procurement function is needed</i>	<i>Newly observed</i>
	It needs to be both prepared and overseen by humans (Lacity and Willcocks, 2015)	Partly observed

	<i>Change management applied to process and employees' habits</i>	<i>Newly observed</i>
	<i>RPA is less applicable in indirect procurement categories (due to complexity)</i>	<i>Newly observed</i>

Table 4. Individual and organizational motives and difficulties.

Our results are also closely linked to recent work on RPA implementation by Rutaganda *et al.*, (2017). The main reason for the failure of RPA input is that organizations overestimate the potential gains. Indeed, management is sometimes disappointed with the mismatch between the gains they expected and the actual gains. The second obstacle to the successful introduction of RPA, which we highlight in our research, is the need for clear and well-defined business processes. Further research on the upstream involvement of the procurement function in digitalization is therefore required.

The procurement manager highlighted the issues linked to the processing times of supplier invoices. The respondents also explained that companies sometimes have difficulty speeding up the processing of supplier invoices, not because of unwillingness, but because of excessively long reception times and a lack of technical and human resources.

This issue of payment delay is rarely raised in literature. However, professionals point to one of the problems that they believe impacts on their ability to pay on time.

The findings from the case studies reveal that RPA frees the buyer from non-value added tasks and improves their operational efficiency, but also their legitimacy. The following processes in the procurement function can be automated, such as, contract deployment, invoicing management or updating supplier data such as bank or address data. The RPA made it possible to formalize the process and keep the knowledge.

Beyond a function that can be seen as administrative, the Purchasing department plays the role of intermediary with suppliers, ensuring the conformity of offers with the initial specifications, negotiating and supervising the implementation of contracts (Van Weele, 2010). Many of the cases concur that RPA contributes to stakeholder satisfaction and the quality of the buyer-supplier relationship. As the respondents noted, in order to be strategic, procurement activities must include an analysis of market trends, providing an opportunity for procurement managers to act ahead of time and anticipate future innovations produced by suppliers.

However, it is well known that the quality of the buyer-supplier relationship is a crucial factor in meeting this challenging goal. The procurement department is particularly well positioned to identify new market ideas (Servajean-Hilst and Calvi, 2018) through their frequent

1 interactions with the supplier base. When a relationship of trust is established between buyers
2 and suppliers, and thanks to a recognized legitimacy, the latter are more likely to develop
3 new ideas with the buyer (Homfeldt *et al.*, 2017).
4

5
6
7 Through this study we expand to Srari and Lorenz (2019) research, which suggesting an
8 approach to designing digitalization interventions in Purchasing and supply management
9 functions, by defining why (here the motives) and how companies proceed to set up RPA in
10 the procurement function.
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14 15 **5. Conclusion, limitations and future avenue**

16
17 In order to summarize the findings of our research paper and move towards a future research
18 agenda, we first identify the implications from this study on digital procurement and then
19 consider its limitations.
20

21
22 With the emergence of new technologies, the buyer's activity is changing rapidly as a result
23 of digitalization. This led us to examine how digitization, and RPA in particular, can help
24 buyers to provide added value for their companies.
25

26
27 The study makes several contributions. First, it provides empirical evidence of the attributes
28 for procurement automation. Some attributes found in the literature have been confirmed
29 (like unambiguous rules, limited exception handling, high and predictable volumes, stable
30 environment, accessed multiple systems), while other attributes have been explored below:
31

- 32 -The project needs to be led by the procurement director,
- 33 -A well-established digitalization plan is required for the procurement function.

34
35
36 Second, we outline some of the major impacts of RPA on traditional procurement activities.
37
38 The study suggests that RPA has an impact on procurement from an operational (time
39 management and optimization, processing flexibility and improvement/automation of internal
40 processes), organizational (impact on the procurement team, new roles) and relational
41 (stakeholder satisfaction and quality of the buyer-supplier relationship) perspective.
42

43
44 Finally, the study offers clearer insights into the motives for adopting RPA through
45 important, newly observed aspects of the procurement process, such as:
46

- 47 -Allowing procurement agents to focus on value-added tasks and increase their
48 legitimacy,
- 49 -Helping and relieving the procurement agent in terms of workload,
- 50 -RPA does not necessarily lead to job cut (FTE),

51
52 We also explored the difficulties encountered by the project members:
53

- 54 -Some procurement agents are afraid of changing their working habits,

- Need to launch a change management program,
- Maturity and recognition of the procurement function is needed as a prerequisite.

However, the potential of all the tool functions has not been fully exploited, especially in RPA and IA in the procurement sector. O'Neal (1993) considers procurement agents as "informants" of potential innovative supplier projects. "*Marketing scans the environment in search of unfulfilled needs, R&D develops new techniques/technologies and Purchasing acquires, assimilates, digests and shares information on new and potential supplier developments*" O'Neal (1993, p 6). RPA and IA could help procurement agents to address this challenge. We believe that this could be addressed in future research.

Some limitations also need to be considered in this exploratory work. We recommend expanding the research focus by using longitudinal analyses and other cases for additional comparative studies. Furthermore, while we asked the main respondents about the challenges encountered, our research focused mainly on the positive impact of RPA in the procurement process. It would be useful to counterbalance these results in the light of negative impacts. Indeed, it would be interesting to focus on internal and external resistance to change management linked to RPA and IA. **Managing resistance to change can be considered as one of a key success factor for implementing purchasing groups (Bentahar, 2018).**

From a research design perspective, we did not ask the suppliers for their views on the question of RPA adoption and satisfaction. Even though the interviewees' perceptions were taken as 'a realistic view', this presents an unbalanced perspective of the research object, which could be perceived as biased.

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