INNOVATION IN THE PURCHASING AREA OF ORGANIZATIONS: A LITERATURE REVIEW

INOVAÇÃO NA ÁREA DE COMPRAS DAS ORGANIZAÇÕES: UMA REVISÃO DA LITERATURA

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A B S T R A C T

This paper investigates the academic literature on forms of innovation in the area of procurement in organizations. A literature review was conducted in three phases: planning the review, conducting the review, and dissemination. The first phase assessed the main authors, journals and chronology. The second phase involved exploratory investigation of the content of the articles. It is concluded that the area is heterogeneous and dispersed in journals concentrated in Western Europe and the USA. The selection of articles was defined by purposive sampling using the main databases as a source. It was observed a highlighted relevance of the technological innovation category. As social implications, it is considered that the organization of the articles content and chronology improves the understanding of the status quo of the literature in the area. It is considered as a point of originality of the research the identification of a new research area: the innovation procurement.

K E Y W O R D S

Advance Purchase. Business to Business Marketing. Marketing. Marketing Strategy. Innovation procurement.

R E S U M O

Este trabalho investiga a literatura acadêmica sobre as diferentes formas de inovação na área de compras das organizações. Foi realizada uma revisão da literatura em três fases: planejamento da revisão, realização da revisão, e divulgação. A primeira fase avaliou os principais autores, periódicos e cronologia. A segunda fase envolveu investigação exploratória do conteúdo dos artigos. Conclui-se que a área é heterogênea e dispersa em periódicos concentrados na Europa Ocidental e nos EUA. A seleção de artigos foi definida por amostragem proposital tendo como fonte as principais bases de dados. Foi observada uma relevância destacada da categoria de inovação tecnológica. Como implicações sociais, considera-se que a organização dos artigos de acordo com o conteúdo e a cronologia melhora a compreensão do status quo da literatura na área das compras organizacionais. Considera-se como ponto de originalidade da investigação a identificação de uma nova área de investigação: a das aquisições de inovação.

P A L A V R A S - C H A V E

Compras antecipadas. Marketing Business to Business. Marketing. Estratégia de Marketing. Aquisições de inovação.

INTRODUCTION

The purchasing area in organisations is responsible for finding, agreeing on terms and conditions, and purchasing goods and services from a supplier, seeking to ensure that the buyer contracts at the best possible price when comparing aspects such as quality, quantity, deadline, and location (VAN WEELE, 2010; GUPTA, 2019). The purchasing process today is increasingly complex due to globalisation, new technologies, and an increasing number of supply options, among others (GUPTA, 2019). Figure 1 shows the steps in the purchasing process.

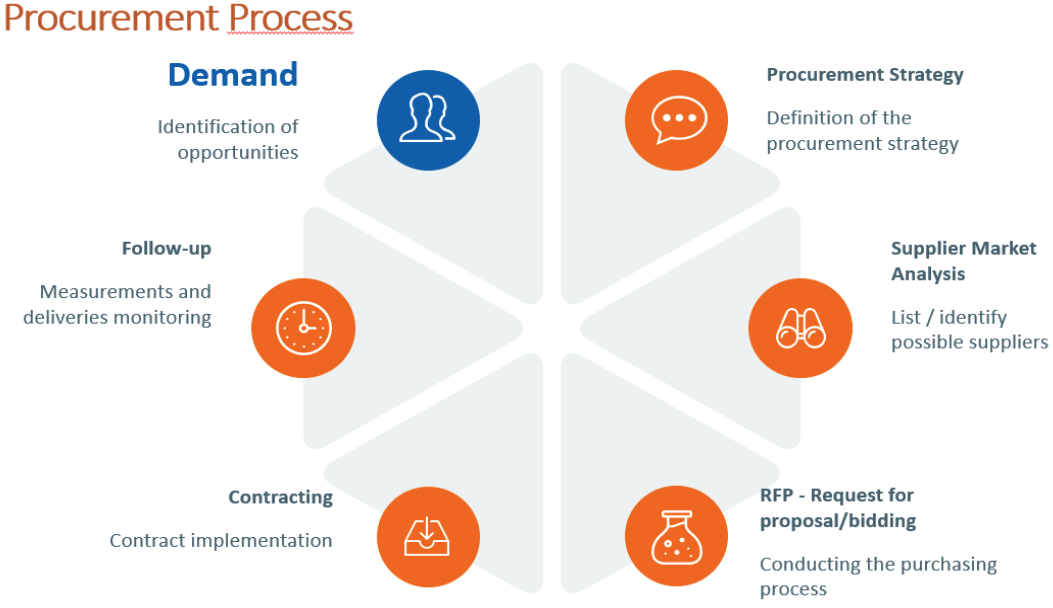


Figure 1: steps in the purchasing process. Elaborated by the authors

The purchasing area used to be seen as operational and inefficient, causing companies to have high costs in managing the purchasing cycle (RAI et al., 2006; RAI et al., 2009). In recent decades, it has evolved into a strategic area due to the growing recognition of the central role played by purchases in improving organisational performance and increasing shareholder value (CHEN, 2009). Purchasing as a strategic area must be aligned with the company's mission and objectives, resulting in an advantage over competitors for having purchased products or services at a lower price or differentiating advantage (GUPTA, 2019).

This study seeks to investigate the available literature on innovation in the purchasing area of organisations with the objective of identifying what the literature reveals about the different forms of innovation that would help transform the purchasing area into a more strategic area. The research method adopted is a review of the literature published in international vehicles, available on the main consultation platforms, with no date restrictions. However, it is noted that the theme is recent, so the first article mapped in our study dates back to 1996. The first stage of the analysis of the selected articles evaluated the main authors, journals, and chronology. In the second stage, exploratory research was conducted to qualitatively assess the content of the articles and identify and group them into categories.

The article is structured as follows: first, the research method is described; then the results and discussions of the literature review are presented; and, at the end, considerations and recommendations for future work are discussed.

RESEARCH METHOD

The literature review is a research tool used to manage the diversity of content in a given research problem. When using this method, the researcher explores the panorama of the available literature and investigates its content in search of knowledge about the research object (TRANFIELD et al., 2003).

According to Tranfield et al. (2003), the literature review should include three stages: planning the review, conducting the review, and disclosure. (1) In the planning stage, the aim is to identify and prepare for the review. (2) In the conduction stage, the articles are selected, and the quality of the selection is evaluated to extract, monitor, and synthesise the data. (3) In the dissemination stage, the author presents the importance of preparing and disseminating the final report of the study and recommendations as well as putting the evidence into practice. The author highlights the importance of clearly describing all stages of the process so that it can be validated and replicated (TRANFIELD et al., 2003).

Review planning

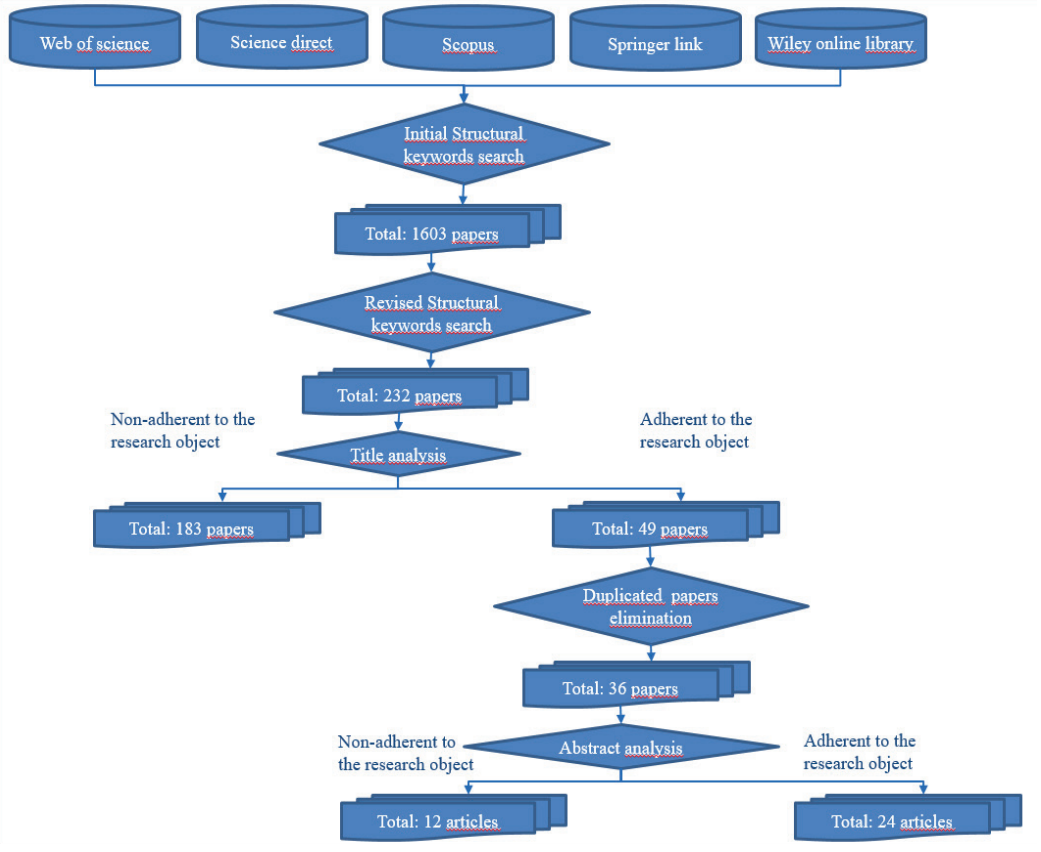
To identify articles related to innovation in the purchasing area of organisations, keywords were searched in five databases—Web of Science, Science Direct, Scopus, SpringerLink, and Wiley Online Library—because of their relevance to the academic literature of this study's research area.

Selection of articles

Initially, the following keywords were considered: innovation OR technological innovation AND procurement OR purchasing OR acquisition. As a result, 1603 papers were found. Analysing the titles of the archives found in this first search revealed that most of the articles referred to public purchases or innovations in the industrial and civil construction areas as well as sustainable purchases, themes that were not linked to the object of research. Therefore, the keywords were revised, limiting procurement and innovation, including mandatory word procurement in the title and listing words that should not be included in the search: public, civil, industrial, construction, and environmental. A total of 232 papers were found. Then, the title was analysed to identify the articles relevant to the topic, reducing it to 49 papers. The next step was to eliminate duplicate articles. After this, 36 papers remained, and analysis of the summary that concluded the selection of articles adhering to the research object resulted in 24 papers.

Only articles in English were considered, and there was no filter by date. There was an expectation that the theme of innovation in purchases was recent and, consequently, the literature would be limited to the last decades, but the field of the year of free publication was left so that this analysis could be confirmed. The flowchart below (Figure 2) represents the steps used for selecting the articles.

Figure 2: Article selection process, adapted from Araújo et al. (2017, p. 355)



RESULTS AND DISCUSSIONS OF THE LITERATURE REVIEW

First, publications selected by database were analysed, and then the main journals in which the articles were published were evaluated. The next step was to analyse the distribution of articles over the years. An analysis of citations was then performed to identify articles with the greatest impact. In the next step, an analysis by subject group was conducted, categorising these articles. A word cloud was created using the keywords of the articles in this study. Finally, a table was created summarising the articles by chronology, country, magazine, and categorization.

Publications by database

The selection process resulted in articles taken from three databases: Scopus with 9 articles, Web of Science with 10, and Springerlink with 5. It is important to highlight that, although the initial search also included the Science Direct and Wiley Online Library databases, the articles extracted from these did not advance in the steps of elimination of duplicates, title analysis, or summary analysis.

Publications by journals

When analysing the journals in which the articles were published, it was noted that 24 articles were distributed in 23 journals. Only the Electronic Commerce Research magazine had two articles selected in our study. This sample shows the dispersion of articles published on the topic of innovation in purchasing organisations.

Then, we analyse the impact of these journals based on the classifications Q1, Q2, Q3, and Q4 with Q1 being the most relevant journals in the scientific area, among the 25% with the greatest impact factor; Q2 had relevance between 25% and 50%m and Q3 had less relevance, between 50% and 75%. Q4 were the magazines in the last quadrant (http://researchassessment.fbk.eu/quartile_score). The H index was also evaluated. Both data were obtained from https://www.scimagojr.com/. It was identified that 70% of the journals were classified in Q1, 17% in Q2, and 13% in Q3. Table I presents a summary of the analysis.

Note the high prestige and impact of the journals where the selected articles were published with 87% classified as Q1 or Q2, which supports the importance of the topic for academic literature.

Table I: Impact and scientific prestige of the journals where the articles in this study were published. Created by the authors

Journal	SJR – Scientific Journal Ranking	Best Quartile Score	H Index	Country
MIS QUARTERLY	4,53	Q1	216	USA
INFORMATION SYSTEMS RESEARCH	3,24	Q1	151	USA

Journal	SJR – Scientific Journal Ranking	Best Quartile Score	H Index	Country
JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	2,86	Q1	137	USA
INTERNATIONAL JOURNAL OF PROJECT MANAGEMENT	2,66	Q1	134	United Kingdom
INFORMATION & MANAGEMENT	2,40	Q1	153	Netherlands
INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	2,38	Q1	172	Netherlands
INTERNATIONAL JOURNAL OF OPERATIONS AND PRODUCTION MANAGEMENT	2,19	Q1	129	United Kingdom
EUROPEAN MANAGEMENT JOURNAL	1,31	Q1	99	United Kingdom
JOURNAL OF INTELLIGENT MANUFACTURING	1,21	Q1	74	Netherlands
INDUSTRIAL AND CORPORATE CHANGE	1,12	Q1	104	United Kingdom
INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION	1,10	Q1	80	Netherlands
ELECTRONIC MARKETS	1,01	Q1	29	Germany
RESEARCH-TECHNOLOGY MANAGEMENT	0,84	Q1	63	United Kingdom
WIRTSCHAFTSINFORMATIK	0,81	Q1	37	Germany
BUSINESS PROCESS MANAGEMENT JOURNAL	0,73	Q1	76	United Kingdom
ELECTRONIC COMMERCE RESEARCH	0,65	Q1	37	Netherlands
INTERNATIONAL JOURNAL OF INNOVATION MANAGEMENT	0,49	Q2	39	Singapore
INTERNATIONAL JOURNAL OF PROCUREMENT MANAGEMENT	0,34	Q2	20	Switzerland

Journal	SJR – Scientific Journal Ranking	Best Quartile Score	H Index	Country
BENCHMARKING: AN INTERNATIONAL JOURNAL	0,31	Q2	13	United Kingdom
RUTGERS BUSINESS REVIEW	0,30	Q2	3	United Kingdom
INTERNATIONAL JOURNAL OF BUSINESS INNOVATION AND RESEARCH	0,29	Q3	19	United Kingdom
INTERNATIONAL JOURNAL OF INNOVATION AND SUSTAINABLE DEVELOPMENT	0,28	Q3	19	United Kingdom
OPERATIONS AND SUPPLY CHAIN MANAGEMENT—AN INTERNATIONAL JOURNAL	0,25	Q3	3	Indonesia

When analysing the countries of these internationally renowned magazines, the United Kingdom stands out with 10 journals; in second place is the Netherlands with 5 journals and, third, the United States with 3. Note the concentration of important publications in Western Europe with 91% of the journals analysed, the exception being the International Journal of Innovation Management, a Q2 magazine from Singapore, on the theme of innovation management and Operations and Supply Chain Management: An International Newspaper, which is a magazine focusing on supply chain operations in Indonesia. The insertion of new countries responsible for prestigious publications, going beyond the already established Western Europe and the United States, would be a possible suggestion for a future study to deepen the understanding of this scenario, its possible relationship with new focus of study, and financial incentives in science.

The three most impactful and prestigious journals in this study are MIS Quarterly (Management Information Systems Quarterly), Information Systems Research, and Journal of Management Information Systems. It is interesting to highlight that the three magazines have in common their American origin and focus on the topic of information technology. Their prestige reinforces the importance of the theme of innovation in purchases with a view to technological innovation.

Timeline

In table II are presented articles on innovation in purchasing in organisations were selected without date restrictions. The objective was to identify when the topic emerged in academic literature. The first article was published in 1996, mitigating procurement hazards in the context of

innovation. The second article was published in 1999. In the 21st century, there was an important increase in the number of publications, as shown in Table II. In the selected articles, the similarity in the number of articles published in the first and second decades of this millennium was highlighted (until 2009, 11 articles; from 2010 to 2020, 11 articles).

Table II: Chronology of articles in this study. Created by the authors

Year	Number of articles published
1996	1
1999	1
2002	1
2003	1
2006	4
2007	1
2008	1
2009	3
2010	2
2011	1
2013	1
2016	1
2017	3
2019	1
2020	2
Total	24

Citation analysis of articles

In this stage, we elaborated on the relevance and impact analysis of the articles based on the number of citations in Google Scholars. The most relevant article in this 650-cited literature review was published in 2003 by Antonio Davila, Mahendra Gupta, and Richard Palmer. The study used empirical research via questionnaires sent to 168 American organisations from different industries with the objective of mapping the main challenges in the implementation and assimilation of new technologies in the purchasing area of organisations.

The second most cited article, with 171 citations, was the 2009 study by Arun Rai, Paul Brown, and Xinlin Tang, 'Organizational assimilation of electronic procurement innovations'. The objective was to understand the factors that impact the assimilation and use of new technologies through research on 166 companies affiliated with the Institute of Supply Management. In 2006, this group of authors had already published an article that is the fifth most cited in our study, with 113 citations, 'Assimilation patterns in the use of electronic procurement innovations: a cluster analysis', demonstrating that there are important groups thinking about the issue of purchasing innovation in a systematic way.

The third most cited article was 'Technological frames, organizational capabilities, and IT use: an empirical investigation of electronic procurement' (2010), with 147 citations. Similar to the articles previously highlighted, this publication sought to

investigate technological innovation in purchases through an empirical approach.

Fourth was an article published in 2006, 'Incorporating software agents into supply chains: experimental investigation with a procurement task', with 120 citations. Through an experimental investigation, this study compares human performance with software when conducting a specific task in the purchasing area.

We can infer from the analysis of citations that there is concern about innovation in purchasing in organisations, especially in the area of technology, considering their challenges and benefits. Here, we highlight the beginning of a human-machine comparison that we believe is relevant to the area as a whole.

Categorization of articles by subject group

In this stage, an analysis of the content of the 24 selected articles was conducted to identify patterns and similarities:

i. Analysis of the purchasing area approach: Evaluation of whether the article referred to innovation in the purchasing area or the purchasing area as responsible for contracting the innovative solution required by the company

ii. Analysis of the type of innovation: Evaluation of the type of innovation studied in the article, driven by new technologies or process review

iii. Innovation in the area or in a specific process: Evaluation of the article's approach, contemplating a managerial or tactical view—that is, analysing the strategy of the area or a specific process

As a result, four categories were identified: technological innovation in purchasing, innovation in a specific task, transformation of the purchasing area, and purchase of innovation.

a) Technological innovation in purchases, 50% of the articles (12 articles): article on challenges and main drivers in the implementation and assimilation of new technologies in the purchasing area

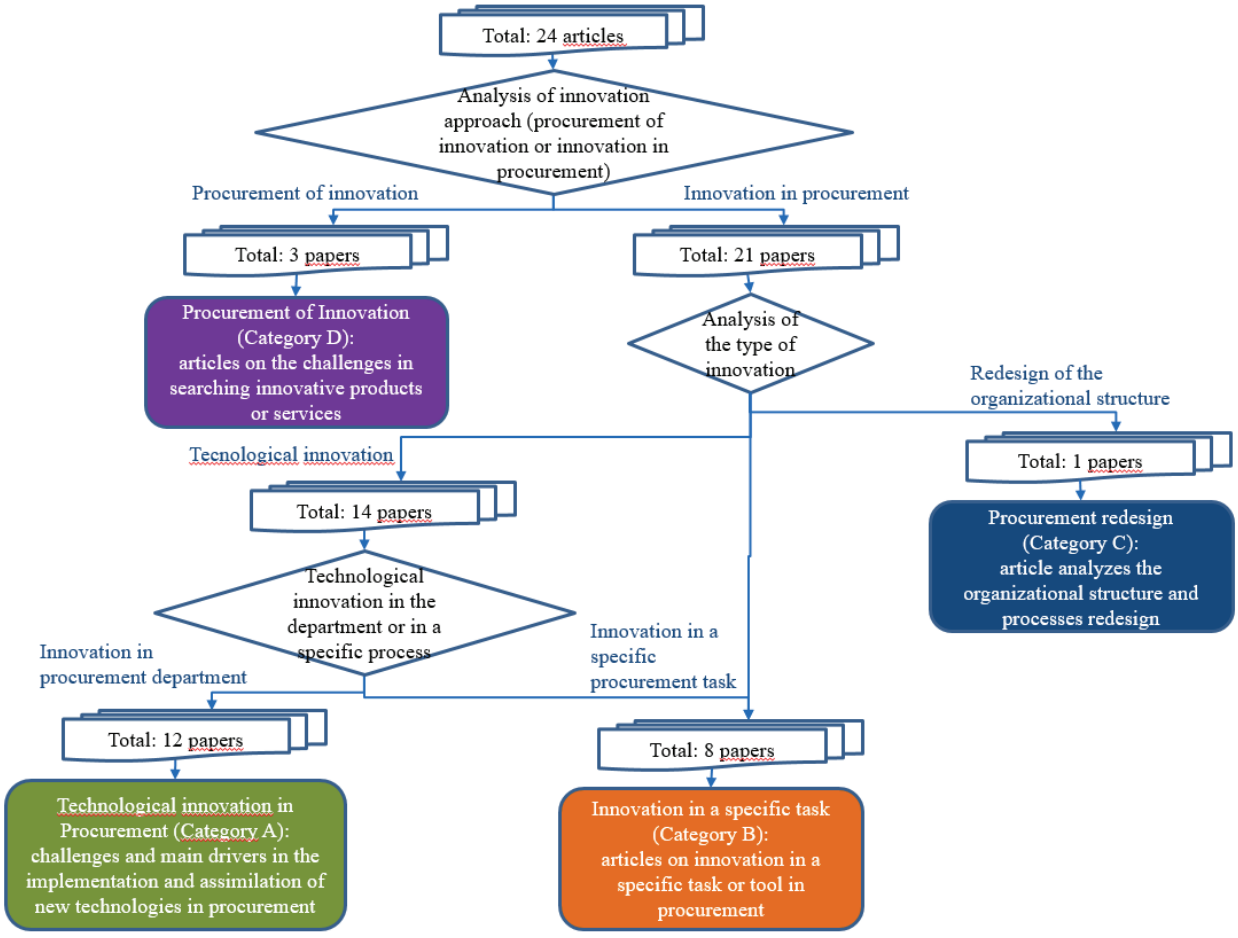
b) Innovation in a specific task, 33% of the articles (8 articles): article about innovation in a specific task or tool in the purchasing area

c) Redesign of the purchasing area, 4% of articles (1 article): article analyses the redesign of the organisational structure and processes of the purchasing area as a whole

d) Purchase of innovation, 13% of the articles (3 articles): article on the challenges of the purchasing area in search of the supplier that will best serve the innovation

The flowchart below (Figure 3) illustrates the process of creating the four categories considered in this study.

Figure 3: Categorization process. Created by the authors



Technological innovation in purchasing - Articles on challenges and main drivers in the implementation and assimilation of new technologies in the purchasing area

This category consolidates the articles identified in our selection, which cover the challenges and drivers in the implementation and assimilation of new technologies in purchasing.

We present the main points of convergence and the counterpoints identified in these articles. In this category, the article with the highest number of citations is 'Moving procurement systems to the Internet: the adoption and use of e-procurement technology models', published in 2003. This empirical research was conducted through questionnaires sent between the years 2000 and 2001 to 168 American organisations from various industries, mostly private but also capturing non-profit organisations, to present a map of technological adoption in purchases. The article with the second highest number of citations is 'Organizational assimilation of elec-

tronic procurement innovations', published in 2009, which is also an empirical study using a survey of 166 companies from various industries affiliated with the Institute of Supply Management. A few years earlier, Rai also led another study included in our literature review, 'Assimilation patterns in the use of electronic procurement innovations: a cluster analysis', in 2006, based on data from the same research.

Davila et al. (2003) use the term 'e-procurement', defining it as any technology designed to facilitate the acquisition of goods by a commercial or governmental organisation using the Internet, and highlight its importance in automating workflows, consolidating, and leveraging purchases and identifying new supply opportunities (Davila et al., 2003). Rai et al. (2006) define and classify technological procurement innovations as electronic procurement innovations encompassing the four main stages of the purchasing process: supplier selection, issuing a purchase order, delivery of the purchase order, and payment (RAI et al., 2006).

The main solution presented is e-procurement software, which is a tool where transactions between buyers and suppliers are conducted on the Internet. There are also solutions such as reverse auctions, auctions, catalogues, and marketplaces. Electronic reverse auctions or auctions are auctions in which buyers receive bids from potential sellers in a short period, stimulating competition and ensuring a fast process. An electronic catalogue is the provision of products or services offered by a supplier with more accurate and real-time information (DAVILA et al., 2003; RAI et al., 2006; RAI et al., 2009). There is also a marketplace (DAVILA et al., 2009; RAI et al., 2003), which is a community where there is more than one supplier offering goods and services, featuring a dynamic network of supply options. Another electronic solution is a consortium in which companies conduct their purchases jointly (DAVILA et al., 2003).

Literature (DAVILA et al., 2003; MISHRA; AGARWAL, 2010; YEN; NG, 2002; BEUKERS et al., 2006; AZADEGAN; ASHENBAUM, 2009) presents as the main benefits of adopting technological innovation in the purchasing area a reduction in administrative costs, cost of the purchase transaction, reduction of errors, more efficient processes, shortening the time of the purchasing process, reduction of the level of inventory or stock, competitiveness of the price paid for products or services, and reduction of the number of active suppliers. Yen and Ng (2002) add to the operational benefits the visibility of each stage of the purchasing process and, to the strategic benefits, the influence and control over the company's expenses. They also highlight the benefits of communication and inter- and intra-organizational visibility. Rai et al. (2009) also identify the benefits of the visibility of supply options and interaction with suppliers (BEUKERS et al., 2006; RAI et al., 2009).

Davila et al.'s research points to the fact that technological innovations in procurement were still at an early stage, covering less critical purchases such as office supplies and peripherals; therefore, the benefits may differ when scaling up to critical purchasing processes (DAVILA et al.,

2003). Azadegan and Ashenbaum (2009) converge when identifying in their study that the adoption of technological innovation would be more advanced in products than in services. In the article, the authors present as a possible recommendation to start by implementing technological innovation in less critical services to only then expand adoption. The research led by Rai et al. (2009) presents the same understanding of complexity when adopting technological innovation in a critical process. When adopting technological innovation in an organisation's key process, gaps are identified in their assimilation, which results in lower usage rates, which are more delayed than adoption rates.

On the other hand, in relation to implementation challenges, the literature presents technological and business challenges. Among the technological challenges, there is a risk of integration with the technologies implemented and in force in the company, integration with the systems of suppliers and customers, the importance of the quality and security of the system, and its friendly and easy interface also stands out so that its complexity does not inhibit its use (AZADEGAN; TEICH, 2010; DAVILA et al., 2003; MISHRA; AGARWAL, 2010; RAI et al., 2006; RAI et al., 2009; YEN; NG, 2002). Mishra and Agarwal (2010) present the risk related to the cooperation of suppliers in adapting to the new tools required by their customers. Azadegan and Teich (2010) highlight that there is a greater tendency to use technological innovation when the user identifies a relative advantage when using it. As for business challenges, the interaction with the current business model and workflow stands out in addition to the key aspects of security and control (DAVILA et al., 2003). In addition to these factors, Rai et al. (2006; 2009) identified the importance of support from senior leadership and the company's internal response—its organisational readiness. The importance of organisational readiness is also highlighted in the study by Azadegan and Teich (2010), who addressed the importance of human behaviour, skills and organisational motivation, openness to new technologies, organisational culture, and a structure that allows the introduction of innovations (AZADEGAN; TEICH , 2010). Schoenherr (2008) also reinforces the key role of organisational structure in the adoption of new technologies. The wrong choice of technological innovation could result in financial loss and a second future transition when adopting another technology that proves to be more appropriate (DAVILA et al., 2003).

The main problems for each of the four technological innovations contemplated in the study by Davila et al. (2003) are e-procurement, integration, marketplaces, sufficient number of suppliers, auctions, conceptual discomfort in contrast to the partnership posture between companies, and the price acquired via consortia not being substantially different than if there were no consortia.

According to Davila et al. (2003), in 2001, organisations stated that the implementation of e-procurement proved to be more complex, expensive, and time-consuming than initially planned. Rai et al. (2009) converge when stating that organ-

isations would be facing significant challenges to assimilate new technologies and, in fact, obtain the expected benefits.

Davila et al.'s research indicates that there are several technological solutions available and that, therefore, there are two profiles of companies: those that opt for aggressive adoption and that try different solutions until identifying the ideal one for their scenario and the conservative adoption companies that choose to wait and see how the market consolidates to migrate directly to the winning solution (DAVILA et al., 2003).

The research conducted by Davila et al. through a questionnaire identified, at the time, the initial stage of technological adoption in purchases. The survey considered four types of technological innovation: e-procurement software, marketplaces, auctions, and consortia. The survey found that most companies that had previously purchased e-procurement software or auction solutions were large corporations. On the other hand, non-profit organisations were the main users of marketplaces and consortia, indicating the differences between the needs of these two markets. E-procurement is the most popular solution and requires an average initial investment of USD 5.4 million while marketplaces, auctions, and consortia require USD 125 thousand, which substantiates the difference between the choices of large corporations and non-profit organisations. Reinforcing the technological innovation adoption curve for different company sizes, Schoenherr (2008) brings in his study, although he was specifically looking at the reverse auction tool, an important factor in the adoption of new technologies, which is the size of the company, stating that, in general, the largest corporations are more likely to adopt innovation because of having the necessary funds and human resources and being inserted in a more innovative environment (SCHOENHERR, 2008). In all cases, the return on investment is estimated to be around two years due to the expected savings after implementation (DAVILA et al., 2003).

Davila's research also identified that most companies adopted conservative adoption; that is, they chose to wait before acquiring technological innovation in purchases. Although aware of the available innovations, they preferred to invest punctually in some specific solution to try and invest in a peripheral process with less risk and less investment to wait for the winning model to be consecrated and then invest in a more complete solution. The authors also found that, among organisations with an aggressive strategy of technological adoption in purchases, more than 50% believed that their competitors would also be making the same movement, which could indicate, in the analysis of the authors, that this factor would have influenced the motivation for organisational response to innovations (DAVILA et al., 2003).

Innovation in a specific task - Articles about innovation in a specific task or tool in the purchasing area

In this category, the article with the highest number of citations within our selection is 'Incorporating software agents

into supply chains: experimental investigation with a procurement task', published in 2006. The article also stood out among the five most published articles in this study, seeking to examine experimentally the capabilities and limitations of technology in support of computer-based decision and automation in the purchasing area. This study sought to compare human and computer performance. The authors concluded that the software can positively impact the performance and management of the area; however, its limitations and risks stand out. It presents the repositioning of the use of software in the processes, previously used to support the decision, for software that makes the decision alone, reducing the role of people. The performance of the software depends on the complexity and ambiguity of the process. When low or moderate, the autonomous decision-making of the software is justified; however, situations of high complexity and ambiguity require human action. With software capable of making decisions without human intervention, the person's role in influencing, judging, and possibly changing positioning in time must be integrated into the process where decisions are complex or risky (NISSEN; SENGUPTA, 2006).

The human-machine interaction is also studied by Cerquides et al. (2007), who presents the use of technology in the process of negotiation and selection of suppliers as a way to guarantee a fluid interorganizational communication. They also highlight the importance of electronic tools as an aid to the decision-making process on supplier selection when presenting scenarios and comparing offers.

'Project procurement management: a structured literature review', published in 2017, stands out for using literature review as a research method, which is uncommon among the most cited articles. The study analysed methods for selecting and evaluating suppliers, the importance of this step in the purchasing process in the article by Chen (2009), which suggests an innovative supplier selection process based on multiple criteria and historical data. Rane et al. (2020) assessed the importance of agility in project management in purchasing to ensure results in the value chain.

This category includes articles published in the 20th century. The 1996 'Mitigating procurement hazards in the context of innovation' article addresses the pros and cons of hiring vertically integrated companies by centralising on a single supplier and the contractual risks in this innovation. The 1999 article 'A conceptual approach to modelling the procurement process of construction using Petri nets' studied the redesign of purchasing processes with the intention of improving their efficiency and effectiveness using the Petri-Nets mathematical methodology.

The articles in this category have in common their view on innovation in a purchasing process, whether with the use of new technologies or not, aiming to increase the efficiency and effectiveness of the area, supporting positioning in a more strategic area.

Transformation of the purchasing area—article analyses transformation of the structure and processes of the purchasing area as a whole

The article identified in this category covers the topic of analysis of the transformation of the structure and processes of the purchasing area as a whole. The article in question is 'Building a future-ready procurement organization', published in 2020, describing the changes that occurred in the purchasing area at Johnson & Johnson between 2014 and 2019 with a focus on making the organisation capable of adding value, flexibility, and capacity to generate results in the future. The article presented the main values to be implemented in the company: focus on people, processes, and technology to deliver a different experience to the company and the commitment of the purchasing area to understand what works and what needs to be improved (DECANDIA, 2020).

The procedures adopted were standardising and reinforcing the processes, implementation of a standard technological solution where the whole company could standardise its routines and procedures, and construction of a value case where the structure of the purchasing area was redefined, seeking to deliver the best experience to the customer (DECANDIA, 2020).

The purchasing area went through a process of centralisation and standardisation of its processes on a global scale. In addition to converting all employees in this segment to respond only to a responsible division, a convergent information system between the areas was also implemented. These changes, together with the change in the employees' mentality, which affected the improvement of the purchasing sector, make it a strategic sector of the company (DECANDIA, 2020).

The article converges with the two previous categories to support the transformation of the purchasing area into a more strategic area, addressing aspects from the implementation of new technologies to a new management format and structure of the area, identifying that the implementation of new systems or controls can be challenging and requires time to achieve the expected result (DECANDIA, 2020).

Purchasing of innovation—articles on the challenges of the purchasing area in search of the supplier that will best serve the innovation

Although this category has only three articles and has a low impact on the number of citations, it is important to highlight the relevance and novelty of the subject. Here, we discuss innovation purchases and the challenges of the purchasing area when faced with such diverse hires, where the supply market can present radically different solutions—In addition to the supplier analysis process, which may result in difficulties in approving the hiring of start-ups because of its robustness and risks to be avoided.

The article 'Identification and generation of innovative ideas in the procurement of the automotive industry: the case of Audi AG' is a case study in the automotive industry, published in 2017, that debates the key role of the procurement area when hiring open innovation and start-up suppliers. In the same year, the article 'Incentive and sampling effects in procurement auctions with an endogenous number of bidders' addresses the number of possible suppliers in a procurement process when innovation is contracted. The article Innovation Contests for High-Tech Procurement published in 2020 addresses the complexity of comparing possible competing innovative solutions, bringing a case study from NASA. The three studies converge on the understanding that hiring innovation requires a different look at the purchasing process due to its particularities.

Word Cloud

The Pro-Word Cloud tool was used to visualise the most used keywords. The following adjustments were made: the word auctions were replaced by the singular auction so that it counted in its sum, and contests were replaced by contest. The term 'electronic procurement innovations' (EPI) had its acronym removed. Business/IT alignment was replaced by IT/business alignment to unify both. The compound words were unified through a low line because of the limitations of the tool.

As the selection of articles provided for the keywords procurement and innovation, it was expected that these were precisely the most prominent words. Figure 4 shows the cloud that was created.

Figure 4: Word cloud created by the authors using the Word Pro Cloud tool, analysing the keywords of the 24 articles studied

The words found in the cloud reflect the objectives proposed in this study. The tool highlighted the words 'innovation', 'electronic procurement', 'e_procurement', and 'electronic commercer', reinforcing the category created in this study, Technological innovation in purchases. The words 'auction', 'supplier selection', and 'business process' are related to the category Innovation in a specific task. The categories Transformation of the purchasing area and Purchase of innovation are less representative, as the tool demonstrates.

Summary table of selected articles

Table III, shows the chronology, country, magazine, and categorization of the articles selected in this study.

The category of technological innovation in purchases, with articles on challenges and main drivers in the implementation and assimilation of new technologies in the area of purchases, was identified in this study as the most relevant category, regardless of the number of articles, with 50% of the articles in this study, by impact on citations. It should be noted that the articles were written mainly in the beginning of 2000 until the middle of 2010. While the most recent articles bring the categories Purchase of innovation, Redesign of the purchasing area, and Innovation in a specific process, it is possible that the category Technological innovation in purchases has already reached its contribution and attention to the theme, now directing to emerging themes in the last decade.

The theme Purchase of innovation, for example, is a current theme that brings developments in the area to meet the innovations required by organisations. A number of difficulties are identified, such as the response time that increasingly needs to be faster; innovative suppliers such as start-ups, which are not very solid in terms of financial risk; and the subjective aspect for analysing the price presented, often missing parameters for comparison by the buyer.

Table III: Chronology, country, magazine, and categorization of articles in this study. Created by the authors.

Year	Country	Journal	Title	Category
1996	United Kingdom	Industrial and Corporate Change	Mitigating procurement hazards in the context of innovation	Innovation in a specific task
1999	Netherlands	Journal of Intelligent Manufacturing	A conceptual approach to modeling the procurement process of construction using petri-nets	Innovation in a specific task

Year	Country	Journal	Title	Category
2002	Netherlands	Electronic Commerce Research	Migrating procurement onto the Internet	Technological innovation in procurement
2003	United Kingdom	European Management Journal	Moving procurement systems to the internet: the adoption and use of e-procurement technology models	Technological innovation in procurement
2006	Germany	Wirtschaftsinformatik	The procurement alignment framework	Technological innovation in procurement
2006	Netherlands	Information & Management	Assimilation patterns in the use of electronic procurement innovations: a cluster analysis	Technological innovation in procurement
2006	United Kingdom	International Journal of Business Innovation and Research	Innovation of e-procurement: a case study	Innovation in a specific task
2006	USA	MIS Quarterly	Incorporating software agents into supply chains: experimental investigation with a procurement task	Innovation in a specific task
2007	Netherlands	Electronic Commerce Research	Enabling assisted strategic negotiations in actual-world procurement scenarios	Innovation in a specific task
2008	United Kingdom	International Journal of Operations and Production Management	Diffusion of online reverse auctions for B2B procurement: an exploratory study	Technological innovation in procurement
2009	Netherlands	International Journal of Production Economics	A fuzzy-based decision-support model for rebuy procurement	Innovation in a specific task
2009	Switzerland	International Journal of Procurement Management	E-procurement in services: the lagging application of innovation	Technological innovation in procurement
2009	USA	Journal of Management Information Systems	Organizational assimilation of electronic procurement innovations	Technological innovation in procurement

Year	Country	Journal	Title	Category
2010	United Kingdom	Benchmarking: An International Journal	Effective benchmarking of innovation adoptions: a theoretical framework for e-procurement technologies	Technological innovation in procurement
2010	USA	Information Systems Research	Technological frames, organizational capabilities, and IT use: an empirical investigation of electronic procurement	Technological innovation in procurement
2011	United Kingdom	International Journal of Innovation and Sustainable Development	Electronic procurement of services and process innovation	Technological innovation in procurement
2013	Germany	Electronic Markets	Procurement maturity and IT-alignment models: overview and a case study	Technological innovation in procurement
2016	Indonesia	Operations and Supply Chain Management: An International Journal	Achieving e-procurement benefits in an aviation MRO environment	Technological innovation in procurement
2017	Netherlands	International Journal of Industrial Organization	Incentive and sampling effects in procurement auctions with endogenous number of bidders	Procurement of innovation
2017	Singapore	International Journal of Innovation Management	Identification and generation of innovative ideas in the procurement of the automotive industry: the case of AUDI AG	Procurement of innovation
2017	United Kingdom	International Journal of Project Management	Project procurement management: a structured literature review	Innovation in a specific task

Year	Country	Journal	Title	Category
2019	United Kingdom	Business Process Management Journal	Developing strategies to improve agility in the project procurement management (PPM) process perspective of business intelligence (BI)	Innovation in a specific task
2020	United Kingdom	Rutgers Business Review	Building a future-ready procurement organization	Procurement redesign
2020	United Kingdom	Research-Technology Management	Innovation contests for high-tech procurement	Procurement of innovation

CONCLUSIONS

Through a literature review, this study investigated articles on innovation in the purchasing area of organisations. The consistent importance of the theme in the literature over the years has been highlighted. Four categories were identified: technological innovation in purchases, innovation in a specific task, redesign of the purchasing area, and purchase of innovation. Technological innovation in purchases with a greater impact on publications stood out.

Analysing the journals, it was noted that the publications were dispersed: the 24 selected articles were published in 23 different magazines, covering management, operations, production, industry, and manufacturing. It was also possible to assess that the journals have prestige and international relevance; 70% of the journals were classified as Q1, which supports the importance of the topic for academic literature. The country analysis of these magazines also deserves to be highlighted because, although Western Europe and the United States are established, Singapore and Indonesia presented prestigious magazines. For a future study, it would be recommended to understand if this scenario is a trend and its possible relationship with new incentives to science in these countries.

As for the timeline, the articles were selected without date restrictions as it was desired to identify when the topic started in the academic literature. The first article was published in 1996, followed by another in 1999. The remaining 22 articles were published in this millennium, half in the first decade and half in the second decade.

The categorization of articles resulted in four categories: (A) technological innovation in purchasing is the most relevant category in the number of articles and the impact of citations on challenges and main

drivers in the implementation and assimilation of new technologies in the purchasing area; (B) innovation in a specific task or tool in the purchasing area, whether with the support of technological innovation or just reviewing processes; (C) redesign of the purchasing area analyses the redesign of the organisational structure and processes; and (D) purchase of innovation, the category emerging on the challenges of the purchasing area in search of the supplier that will best serve the innovation.

As a limitation of this work, we cite the scope of this selection, filtered by half of the databases; therefore, it is not possible to thoroughly evaluate the initial data. As a suggestion for future work, a specific view of innovation and globalisation in the purchasing area could be made, investigating how different regions of the world are adapting to access the global supply market through new technologies. We exemplify this by perceiving high-impact magazines from Singapore and Indonesia, suggesting a future study of these markets. An in-depth study in the area of innovation purchasing is recommended as a new and promising topic. Additionally, there is a lack of work on the moment after the adoption of technological innovations in purchases, analysing the benefits and challenges encountered, and capturing whether in fact it has resulted in advances in the area.

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