

# Online reverse auctions research in marketing versus SCM: A review and future directions

Roberto Mora Cortez, Pablo Cabanelas<sup>\*</sup>, Jon Charterina

<sup>a</sup> Department of Entrepreneurship and Relationship Management, Southern Denmark University, Kolding, Denmark

<sup>b</sup> Department of Business Organization and Marketing, University of Vigo, Vigo, Spain

<sup>c</sup> Department of Business Economics and Commercialization, University of the Basque Country (UPV/EHU), Spain

## ARTICLE INFO

### Keywords:

Reverse auctions  
E-marketplace  
Procurement auctions  
Systematic review

## ABSTRACT

An online reverse auction (ORA) is a dynamic procurement mechanism that allows suppliers to compete in real time via a platform to gain a buyer's business. The ORA is a technological tool introduced in the late 1990s, gaining proponents and detractors among practitioners and academics. Remarkably, while practitioner interest in ORAs has grown, related marketing and supply chain management (SCM) research has declined. This contradiction between theory and practice suggests the need to conduct a systematic review to provide readers with a state-of-the-art understanding of ORAs and recommend fruitful avenues for further research. We focus on the marketing literature and contrast the findings with SCM literature, in such an analysis practical relevance is stressed. Our study offers three main contributions: (1) integration of the cumulative marketing knowledge on ORAs in the 2002–2020 period, (2) development of a three-layer framework of the ORA domain (i.e., conceptualization, ORA as a process, and research setting), and (3) construction of a new research agenda to deal with scholarly challenges and emerging trends.

## 1. Introduction

The marketing field has been interested in organizational buying behavior for several years, but research has become stagnant recently (Narus & Steward, 2017). A particularly interesting technological tool that deserves closer attention is the online reverse auction (ORA; Jap, 2003; Mora Cortez & Johnston, 2020; Muylle & Standaert, 2016). An ORA is “a real-time, dynamic procurement mechanism used by a buyer with multiple suppliers” (Sambhara, Rai, Keil, & Kasi, 2017, p. 1114). ORAs are intrinsically linked to the business-to-business (B2B) environment since they are not yet deployed in consumer settings. In brief, reverse auctions allow suppliers to compete on an online platform by reducing their bid price for industrial offerings to gain the buyer's business.

Extant B2B marketing research identifies ORAs as a relevant purchasing practice (e.g., Pedersen, Ellegaard, & Kragh, 2020). The primary motive for buyers to use ORAs is “to reduce procurement cost to achieve a cost benefit of 5–15%” (Sambhara, 2020, p. 1). For example, Google used reverse auctions to obtain the lowest price for 1.2 GW of renewable energy (Driscoll, 2019). While ORA usage has grown from 15% to 50% in the last two decades (Forde, 2019), research on ORAs is relatively scarce. If our understanding of ORAs were complete – and all firms

achieved satisfactory results following a “step-by-step recipe” – this topic would not be relevant. However, this is undoubtedly not the case. Indeed, recent research concludes that reverse auctions suffer from a disconnected conceptualization, calling for a systematic review to expand the field of B2B marketing (see Mora Cortez & Johnston, 2020, p. 561). Thus, the purpose of this study is to consolidate B2B marketing research into ORAs to recommend fruitful avenues for further research.

Recent studies indicate that the role of ORAs as an effective procurement mechanism has been questioned (e.g., Hanák, Marović, & Jajac, 2018). Despite the touted savings benefits for buyers, this internet-enabled setting triggers tension in buyer-seller relationships, fosters zero-sum negotiations, and may force sellers to reassess their established marketing activities (Jap, 2007; Standing & Standing, 2015). The complexity generated by ORAs has culminated in some firms increasing their implementation while other firms are discontinuing them (Sambhara et al., 2017). This evident contradiction requires conceptual coherence via further academic inquiry to bridge theory-practice gaps and provide richer comprehension of executing quality reverse auctions. Extant literature also suggests investigating how the understanding of ORAs in other fields can be integrated with what we know in B2B marketing (see Mora Cortez & Johnston, 2020, p. 561).

<sup>\*</sup> Corresponding author.

E-mail addresses: [rfmc@sam.sdu.dk](mailto:rfmc@sam.sdu.dk) (R. Mora Cortez), [pcabanelas@uvigo.es](mailto:pcabanelas@uvigo.es) (P. Cabanelas), [jon.charterina@ehu.eus](mailto:jon.charterina@ehu.eus) (J. Charterina).

<https://doi.org/10.1016/j.indmarman.2023.10.011>

Received 27 April 2023; Received in revised form 9 September 2023; Accepted 13 October 2023

Available online 1 November 2023

0019-8501/© 2023 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Since the marketing function creates demand for offerings and the SCM function fulfills that demand (Golgeci & Gligor, 2017, p. 473), we enhance our findings with a comparative analysis vs. SCM literature.

Better understanding of the state of knowledge and consolidation of emerging concepts that appeal to modern practices in the “real world” are drivers of meaningful theory development. One way to explore how research has approached this intriguing topic is through systematic reviews (Morgan, Whitley, Feng, & Chari, 2019). This is highly relevant for advancing marketing literature that stresses the controversial nature of the concept, but also demands enabling of cumulative knowledge development (e.g., Mora Cortez & Johnston, 2020). Since the first ORA marketing article published by Jap in 2002, several technological and marketplace changes have occurred, creating inherent research opportunities (Liang, Hong, Chen, & Shao, 2022).<sup>1</sup> In this way, our study addresses the following research questions: (1) How has the marketing literature on ORAs evolved during the 2002–2020 period?; (2) What conceptual model can capture such an evolution?; (3) What is the state of ORA research in the marketing field relative to the SCM field; and (4) What research agenda can stimulate relevant and rigorous research endeavors in the marketing field?

We contribute to research in three major ways. First, ORA research published in top-tier, reputable, and specialized (B2B) journals over the last 19 years (2002–2020) has been decreasing over time, focusing on partial mechanisms of the tool without monitoring for several factors (see Tayaran & Ghazanfari, 2020, p. 3) that could have affected the process. The literature lacks a more holistic approach to strategic sourcing, and there is very limited simultaneous scrutiny of all actors participating in an ORA (i.e., buyer, seller, and market-maker). This narrow view creates a significant gap in marketing knowledge since technology-based procurement tools seem to be expanding rapidly across buying centers in many industries (Cabanelas, Mora Cortez, & Charterina, 2023; Forde, 2019).

Second, we develop a new perspective on ORAs, identifying three key activities related in a process-based model (i.e., pre-, during-, post-auction). This represents the core of a new framework used to evaluate the state of the field, identifying theoretical gaps, and providing further research directions. We use it as a lens to analyze the literature from a time-driven structural motif, facilitating the recognition of interesting under-researched streams. For instance, we show that most studies either describe reverse auctions in a general manner or are focused on one or two of the identified activities, mainly the pre- and post-auction stages, by investigating how changes in the tool setup can generate different outcomes (e.g., price). Conversely, we find that no single marketing study longitudinally explores the ORA phenomenon to provide enough depth to all three stages. The emerging model is supported by managers, fostering practical validity (Web Appendix E).

Third, building over the most inspiring findings for furthering theory, we identify a new research agenda for future ORA studies in marketing. Integrating existing knowledge within a domain of inquiry and assessing the communal evidence in a specific area of marketing together form a significant phase in knowledge generation (Palmatier, Houston, & Hulland, 2018). The accumulation of knowledge serves as a response to the astronomical speed at which marketing practice is changing, driving the importance of academic research and its legitimacy to practitioners (Snyder, 2019). We, therefore, regard managerial utility as crucial to framing and selecting the directions for a thought-provoking research agenda that would contribute to updating the organizational buying-behavior research stream, last consolidated more than 25 years ago (see Johnston & Lewin, 1996).

## 2. Method

A review paper is a critical evaluation of material that has already

been published. This paper follows the systematic review approach (e.g., Snyder, 2019) to execute a domain-based review on ORAs to scrutinize, synthesize, and extend the body of literature in the same substantive domain (Palmatier et al., 2018). The aim is to “identify all empirical evidence that fits the pre-specified inclusion criteria to answer a particular research question or hypothesis” (Snyder, 2019, p. 334). Following literature review best practices, the process (see Fig. 2) was designed to provide an integrated overview of the current state of knowledge on reverse auctions, develop a conceptual framework to reconcile extant marketing research, and delineate future research directions.

The first step is *preparation*, which involves identifying target journals. Our review targeted peer-reviewed journals in the marketing field to provide focus (in line with Dekimpe & Deleersnyder, 2018). Thus, textbooks, conference papers, practitioner papers, and working papers were excluded.<sup>2</sup> As suggested by Morgan et al. (2019), we explored the most influential marketing journals in the field of strategic marketing: *Journal of Marketing* (JM), *Journal of Marketing Research* (JMR), *Journal of the Academy of Marketing Science* (JAMS), *Marketing Science* (MS), *Journal of Retailing* (JR), and *International Journal of Research in Marketing* (IJRM). Then, B2B specialized marketing journals were included (in line with Cabanelas et al., 2023): *Industrial Marketing Management* (IMM), *Journal of Business and Industrial Marketing* (JBIM), *Journal of Business-to-Business Marketing* (JBBM), and *Journal of Business Market Management* (JBMM). In addition, we included marketing journals ranked equal to or above 3 by the Chartered Association of Business Schools (Chartered Association of Business Schools (CABS), 2018) to ensure coverage and high quality: *European Journal of Marketing* (EJM), *International Marketing Review* (IMR), *Journal of Advertising* (JA), *Journal of Advertising Research* (JAR), *Journal of Consumer Psychology* (JCP), *Journal of Consumer Research* (JCR), *Journal of Interactive Marketing* (JINTM), *Journal of International Marketing* (JIM), *Journal of Public Policy and Marketing* (JPPM), *Marketing Letters* (ML), *Marketing Theory* (MT), *Psychology and Marketing* (PM), and *Quantitative Marketing and Economics* (QME). Finally, the *Journal of Business Research* (JBR) was included due to its importance for marketing strategy research (Kienzler & Kowalkowski, 2017).

Next, to provide a comparative analysis with the literature on the demand side of business, we explored the most influential SCM journals. We followed the CABS 2018 ranking, selecting those ranked equal to or above 3. We streamlined the selection by asking a panel of 14 SCM scholars to identify and rank the key outlets for reverse auctions literature (agreement reached at Kendall's  $W$ : 0.58,  $p < 0.01$ ): *Journal of Business Logistics* (JBL), *Journal of Operations Management* (JOM), *Management Science* (MAS), *International Journal of Operations and Production Management* (IJOPM), *Operations Research* (OR), *Journal of Supply Chain Management* (JSCM), *Production and Operations Management* (POMS), *International Journal of Production Research* (IJPR), and *Journal of Purchasing and Supply Management* (JPSM). The rationale for the comparative analysis is that marketing and SCM functions represent different communities of practice (Wenger, 2004). Thus, each function develops a shared practice for their managers, creating boundaries and establishing unique mental models affecting knowledge management (Rook, 2013). In an ORA context, buyers and sellers are counterparts trying to control information flows (Sambhara, 2020). If more knowledge is produced by one of the supportive disciplines for buyers (SCM) and sellers (marketing), a potential practical imbalance can be generated. Thus, contrasting both research streams seems pertinent.<sup>3</sup>

The second step is *articles pre-selection*. It entails identifying the search approach and search databases. The selected keywords were:

<sup>2</sup> Relevant content published in such sources is added throughout the text but not included in the summary tables.

<sup>3</sup> 73.9% of 134 US marketing managers surveyed during a B2B Summit, preferred a separated analysis for SCM and marketing literature in order to better represent the “business reality.”

<sup>1</sup> An initial summary of ORA marketing research is presented in Appendix A.

“auction,” “e-procurement,” “e-marketplace,” “electronic markets,” “reverse auction,” “online reverse auction,” “procurement auction,” and “electronic auction.” Following prior B2B systematic reviews, we selected the title, abstract, and keywords as the paper areas to execute the search (e.g., [Mora Cortez, Gilliland, & Johnston, 2019](#)). The search used leading electronic databases (like [Watson, Wilson, Smart, & MacDonald, 2018](#)): EBSCO, ABI/INFORM, ProQuest, Scopus, and Google Scholar. We cross-checked the search using the journals’ website search mechanisms and its timeframe was open but limited to the moment when writing began on the manuscript (i.e., early 2020). The papers were deemed published if they were at least available online. This procedure generated a total of 74 marketing articles and 139 SCM articles that were retained in an Endnote file. We extracted their bibliometric details into Excel.

The third step is *articles selection*. This stage involves two experienced researchers (an author and a senior marketing scholar) independently examining all 213 articles to carefully screen them with the purpose of detecting the centrality of “ORAs.” The coders, by reading the whole paper, assessed qualitatively whether reverse auctions were a central element. *Centrality* refers to the extent to which the domain (i.e., ORA) plays a key role in the argumentation throughout the text ([Pedersen et al., 2020](#)). The coders evaluated the centrality using a screening metric (like [Watson et al., 2018](#)), assigning 0 (not at all), 1 (medium), or 2 (totally) points in this evaluation. An article with a score  $\geq 2$  (by adding both coders’ scores) was retained. The inter-rater reliability analysis was assessed with the proportional reduction of loss method, reaching an excellent level of 0.94 ([Rust & Cooil, 1994](#)). The result was 24 marketing and 50 SCM articles for review (see Web Appendices A and B) as the final sample for analysis. This set of articles was retained in an Endnote file.

The fourth (final) step is *articles analysis*. It involves developing a protocol for coding and summarizing the articles and developing an integrative framework to advance ORA research. We created an Excel document to code (1) the purpose of the study, (2) main perspective(s) analyzed (i.e., buyer, seller, market-maker), (3) how the paper relates to reverse auctions, (4) paper categorization (i.e., conceptual, analytical, qualitative, quantitative), (5) argumentation approach (i.e., single theory, multiple theories, atheoretical), and (6) key findings. One senior marketing scholar coded a randomly selected sample of five articles using the initial protocol. The reviewer suggested the inclusion of more details based on: (1) sector (i.e., private vs. public actors), (2) geographical scope (i.e., local vs. international), and (3) data analysis approach for empirical papers (e.g., regression, correlation, analysis of variance [ANOVA], descriptive statistics). To ensure the trustworthiness of the revised protocol, a marketing researcher reviewed 10 randomly selected articles. The expert indicated high validity of the protocol. We also discussed the protocol with 15 managers in both sales/marketing and procurement. Overall, the researcher and managers agree with the final proposed protocol.

Three experienced marketing researchers coded each of the 74 selected articles. Any difference in the coding was solved through discussion. To enhance the trustworthiness of the coding, two independent B2B marketing scholars from an R1 US university in the Carnegie Classification of Institutions of Higher Education coded the raw data of eight randomly selected articles, reaching a satisfactory inter-rater reliability (proportional reduction of loss method) of 0.80 ([Rust & Cooil, 1994](#)). The coding outcomes were similar, with just minor differences in the writing style (e.g., word selection). The final coding scheme supports the validity and reliability of our findings. The resulting integrative framework followed an inductive content analysis approach (e.g., see [Watson et al., 2018](#)). This procedure entailed a dynamic iteration between the raw data and the emerging framework. In other words, the articles shape the framework, which, in turn, shapes the comprehension of the articles. The proposed framework both synthesizes literature and organizes the concepts consistently ([Watson et al., 2018](#)). Finally, we conducted qualitative interviews to assess the

findings validity by contrasting our emerging model to successful ORA applications (see Web Appendix E).

### 3. Findings: Descriptive analysis

#### 3.1. Marketing gap and publications over time

As usual for systematic literature reviews, we provide descriptive statistics (e.g., [Morgan et al., 2019](#)), which contribute to identifying future research opportunities. [Fig. 1](#) shows an evident downward slope for both marketing and SCM publications on ORAs, contradicting the growing interest in ORAs by practitioners ([Forde, 2019](#)). In addition, there is a significant difference in the number of publications in the 2002–2020 period between SCM and marketing ( $t = 2.24$ ,  $df = 34$ ,  $p < 0.05$ ). The marketing field has published significantly fewer articles than the SCM field, providing initial evidence to the idea of SCM managers being better prepared to deal with ORAs than business managers. This gap in the number of publications has grown over time (see Web Appendix C), which is alarming because the benefits to suppliers are less obvious than to buyers ([Tassabehji, Taylor, Beach, & Wood, 2006](#)) and calls for more marketing-oriented research.

Following [Kienzler and Kowalkowski \(2017\)](#), we classified the articles in the final sample into three balanced time periods: 2002–07, 2008–13, 2014–20, allowing a more concise analysis. As shown in [Table 1](#), IMM (37.5%) and JM (12.5%), which account for 50% of the total publications, are the main outlets for ORA research. Then, MS and JMR (as top-tier journals), JBR (as reputable journal), and JBIM (as B2B journal) account for 33.3% of the publications. B2B journals represent 54.2%, top-tier journals 33.3%, and reputable journals 12.5% of the total publications, respectively. Regarding time periods, 2002–07 is the most productive period (62.5%), followed by 2008–13 (20.8%), and last, 2014–20 (16.7%; see [Table 1](#)). It seems that marketing scholars are abandoning ORA research, possibly because of the lack of clarity on how to conduct research on ORAs. Hence, the directions for further research delivered in this article are valuable for academics to advance ORA research. The following domain-based findings section can motivate scholars to design research endeavors on ORAs, even if this topic falls outside their area of specialization ([Palmatier et al., 2018](#)).

#### 3.2. Article focus

We assessed whether the marketing papers related to one or more specific stages of a reverse auction (i.e., pre-auction, during-auction, post-auction) or ORAs were analyzed in *general* (e.g., comparing them with other purchasing approaches, describing the approach’s general nuances). The most identified article focus is *general* with 11 papers, indicating that 45.8% of the sample is relatively favoring breadth over depth. This should be deemed a latent research opportunity for marketing scholars. Regarding the articles that focus on one or more stages, the most common phase is *post-auction* with 10 papers discussing it alone or accompanied by another stage, while *pre-auction* and *during-auction* are only covered by five papers each. Because some articles focused on more than one stage, the most common combination is *pre-* and *post-auction* with four papers. It is important to highlight that none of the marketing articles focuses on the three stages simultaneously with a minimal degree of depth. Conversely, SCM literature has been able to be (relatively) more integrative in its analysis (see [Carter & Stevens, 2007](#); [Tassabehji et al., 2006](#)). Overall, researchers have been interested in the results obtained by running an ORA, with marked emphasis on buyer’s transaction savings.

In addition, a non-parametric analysis assessed the relationship between article focus, CABS journal ranking (coding 2, 3, 4, and 4\* levels) and time period. Based on Spearman’s correlation, marketing research covering more stages of an ORA is significantly more likely ( $r = 0.403$ ,  $n = 24$ ,  $p < 0.1$ ) to appear in higher ranked journals than those focusing on a single stage or general issues. Also, articles focusing on the *pre-auction*

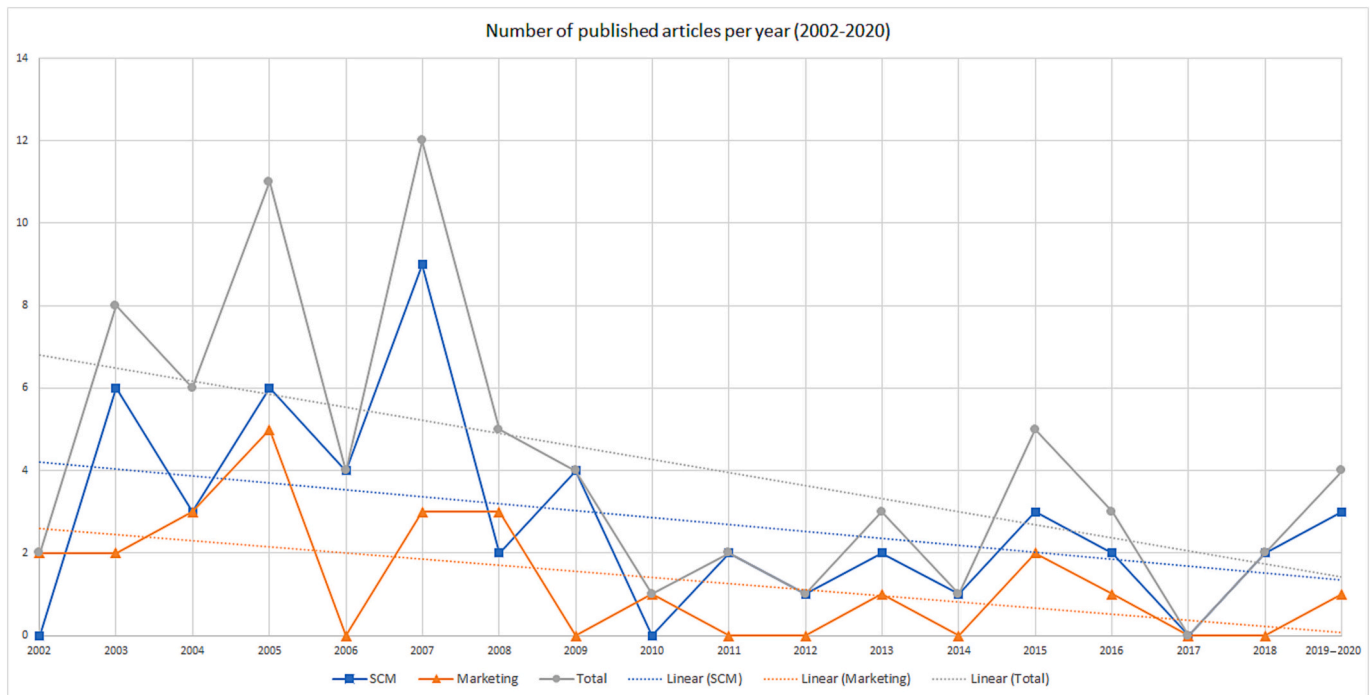


Fig. 1. ORA publication trends in marketing and SCM.

stage are less likely ( $r = -0.387$ ,  $n = 24$ ,  $p < 0.1$ ) to be more recent in terms of publication year. Overall, marketing literature is missing *during-auction* articles that explore this stage thoroughly or connect the stage with pre- and/or post-auction factors.

### 3.3. Type of research

We classified the type of research into (1) analytical, (2) conceptual, (3) qualitative, and (4) quantitative (Morgan et al., 2019). Most of the marketing articles are quantitative (eight) or conceptual (eight), accounting for 66.7% of the final sample. The quantitative studies use empirical data in the form of descriptive statistics, econometric models, structural equation models, and experiments. The conceptual studies mainly describe the ORA approach as a purchasing tool or discuss its introduction to the marketing field. Qualitative (four) and analytical (four) studies are less represented in the review (33.3% of the final sample). The qualitative studies are conducted via in-depth interviews and case studies. The analytical studies entail complex mathematical models based on optimization techniques, commonly tested with instrumental cases or small-sample experiments.

In addition, a cross-tabulation analysis of the type of research design in marketing articles and the three time periods indicates a significant association between the factors (*Likelihood ratio* = 10.73,  $df = 6$ ,  $p < 0.1$ ). Notably, the different tendencies are (1) conceptual research moving from seven articles in 2002–07 through one in 2008–13 to zero in 2014–20; (2) analytical research represented by three articles in 2002–07, one in 2008–13, and zero in 2014–20; (3) quantitative research accounting for three articles in 2002–07, three in 2008–13, and two in 2014–20; and (4) qualitative research represented by two, zero, and two articles, respectively. In short, the dominance of quantitative and conceptual studies suggests that marketing scholars have prioritized concerns about generalization issues<sup>4</sup> rather than the richness of contextual scenarios when running an ORA.

<sup>4</sup> Quantitative studies usually generalize on specific themes, while conceptual studies provide broader overviews. We thank an anonymous reviewer for this clarification.

Similarly, the select SCM literature shows that most studies are quantitative (52%), but in second place are analytical studies (36%). Then, qualitative studies represent 10% of the sample, and finally conceptual studies only represent 2% (see Web Appendix C). SCM researchers seem to prefer analytical approaches versus conceptual approaches, which indicates an inclination to communicate via mathematical expressions instead of argue using words. The trends by period for SCM literature are clearly downward for all approaches, except for analytical manuscripts (see Web Appendix C).<sup>5</sup>

## 4. Findings: domain-based analysis

Fig. 3 depicts the framework for our analysis, following a time-based process. The model builds on the systematic literature review and represents considerations managers should account for when thinking of and after deciding on participating in an ORA. The discussion of the emerging findings follows this framework. The model consists of three layers (conceptualization, ORA as a process, and research setting). The main feature is the three-stage process, which involves a step-by-step view on ORAs, arising from the 2002–2020 reviewed marketing and SCM literature. We attempt to discuss the three focal actors' views, but the market-maker perspective is almost inexistent (see a summary of the domain-based findings in Web Appendix F).

First, firms are called to *conceptualize reverse auctions*, which involves grasping (1) a clear definition of the ORA concept (general idea, origin, and main tenets) and (2) a thorough understanding of the main actors and their roles (buyer, sellers, and market-maker). Once that is done, sellers can be actively or passively implicated in the *pre-auction* stage, (1) constructing expectations and rationales for participation, (2) making market decisions, and (3) establishing process control. Then, if sellers decide to participate in an ORA, firms are influenced by the (1) risks and uncertainty, (2) emotions, and (3) behaviors in the *during-auction* stage. All these elements can pertain to the focal firm or other stakeholders in the ORA system. Finally, in the *post-auction* stage (1) supplier(s) can be

<sup>5</sup> We also examined the theoretical foundation of marketing and SCM literature (see Web Appendix D).



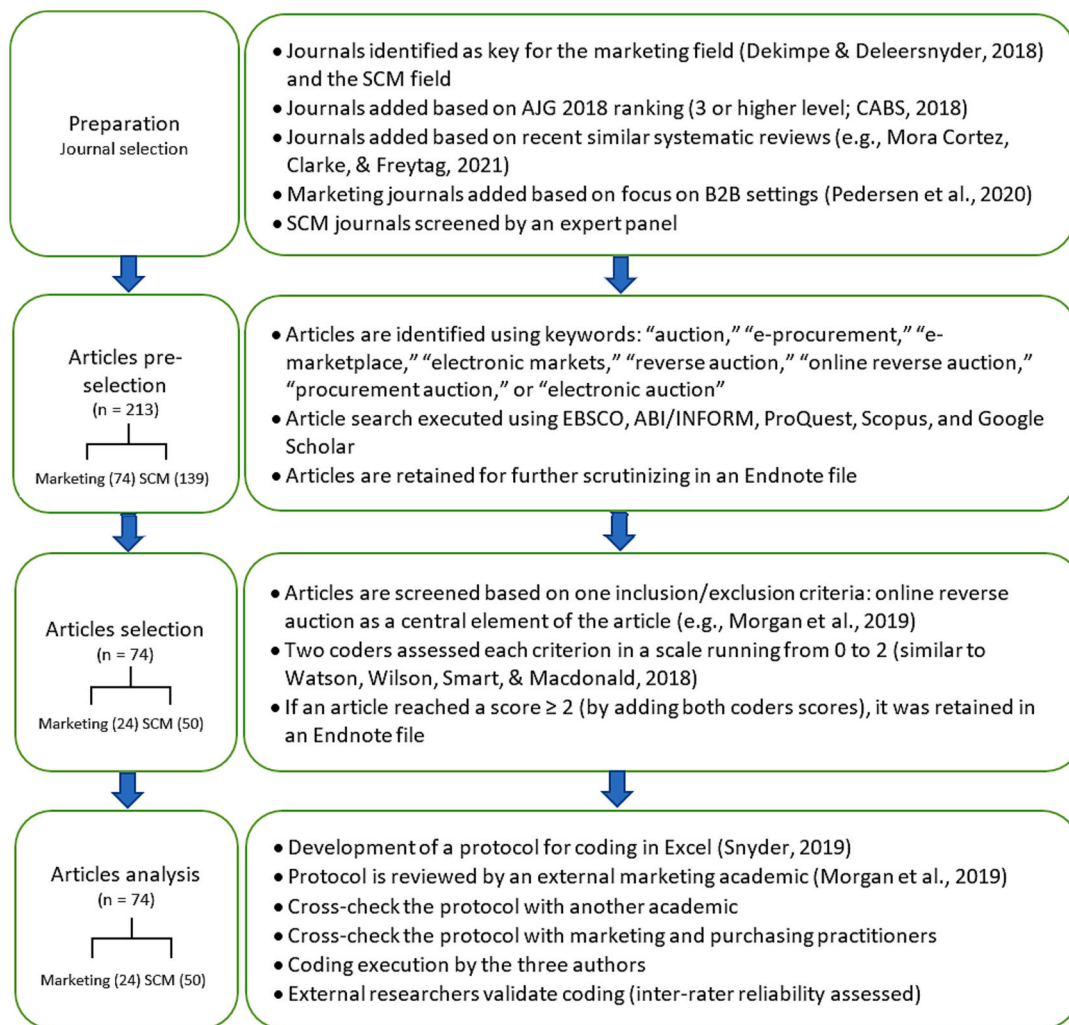


Fig. 2. Review process.

selected, and (2) offering (i.e., product/service) quality, (3) relationship quality, and (4) economic performance can be assessed. This whole reverse auction system is influenced by (1) sector (public vs. private) and (2) geographical scope (local vs. international).

#### 4.1. Conceptualization of online reverse auctions (ORAs)

##### 4.1.1. Definition: general idea, origin, and main tenets

An auction is defined as “a market institution with an explicit set of rules determining resource allocation and prices on the basis of bids from market participants” (Jap, 2002, p. 507). The *reverse* factor implies that the company holding the auction is the buyer and the companies that bid are the sellers (Sashi & O’Leary, 2002). This auction format is commonly known as the Dutch auction and opposes the most traditional forward format (i.e., English auction) where buyers bid, and the seller’s goal is to push the price up (Jap, 2002). The overarching goal of reverse auctions is to push the price down (Jap, 2007; Sambhara et al., 2017). The *online* feature involves bringing buyer and sellers together via the internet or through a private network (e.g., Smeltzer & Carr, 2003), commonly managed by a third party (Grewal, Chakravarty, & Saini, 2010). Hence, we define an *online reverse auction* (ORA) as a *real-time, dynamic market institution based on an online platform where a buyer allows bids from multiple sellers* (Grewal et al., 2010; Jap, 2002, 2003; Sambhara et al., 2017).

The origin of online reverse auctions is attributed in the literature to General Electric (GE) as a tool to help expand its markets (Emiliani,

2005). In 1995 one of GE’s employees recognized the new e-marketplace as an emerging concept to drive a new business model for B2B firms and left GE to found [Freemarkets.com](http://Freemarkets.com) (Sashi & O’Leary, 2002), which was acquired by Ariba in 2004. [Freemarkets.com](http://Freemarkets.com) developed proprietary software and managed to convince some of the largest firms in the US, such as General Motors, Westinghouse, Procter & Gamble, United Technology Corp., and Whirlpool, to adopt this new e-marketplace (Emiliani, 2000; Muylle & Standaert, 2016). Over time ORAs have been implemented in several industries, including aerospace, automotive, communications, consumer products, mining, pharmaceutical, technology, government, and military (Jap, 2003; Mora Cortez & Johnston, 2020). The companies that provide ORA services are also known as “market-makers” (Emiliani, 2004).

Studies in the marketing literature often discuss the main tenets related to conducting and participating in an ORA. The most mentioned tenet is the *technology* involved. Schrader, Schrader, and Eller (2004), for example, emphasize that implementing a reverse auction site implies a variety of resources ranging from outsourcing all functions to a market-maker, through purchasing off-the-shelf auction software, to developing a fully in-house programmed website. Similarly, Jap (2002) suggests that the technology behind an auction format is not complex and, consequently, has led to many firms offering an ORA as part of their sourcing solutions or software. Also, Sashi and O’Leary (2002) noted that ORAs depend on the internet. In this vein, Grewal et al. (2010) state how challenging ORA governance is because of the lack of tangibility and visibility of a physical infrastructure. The second tenet is *information*

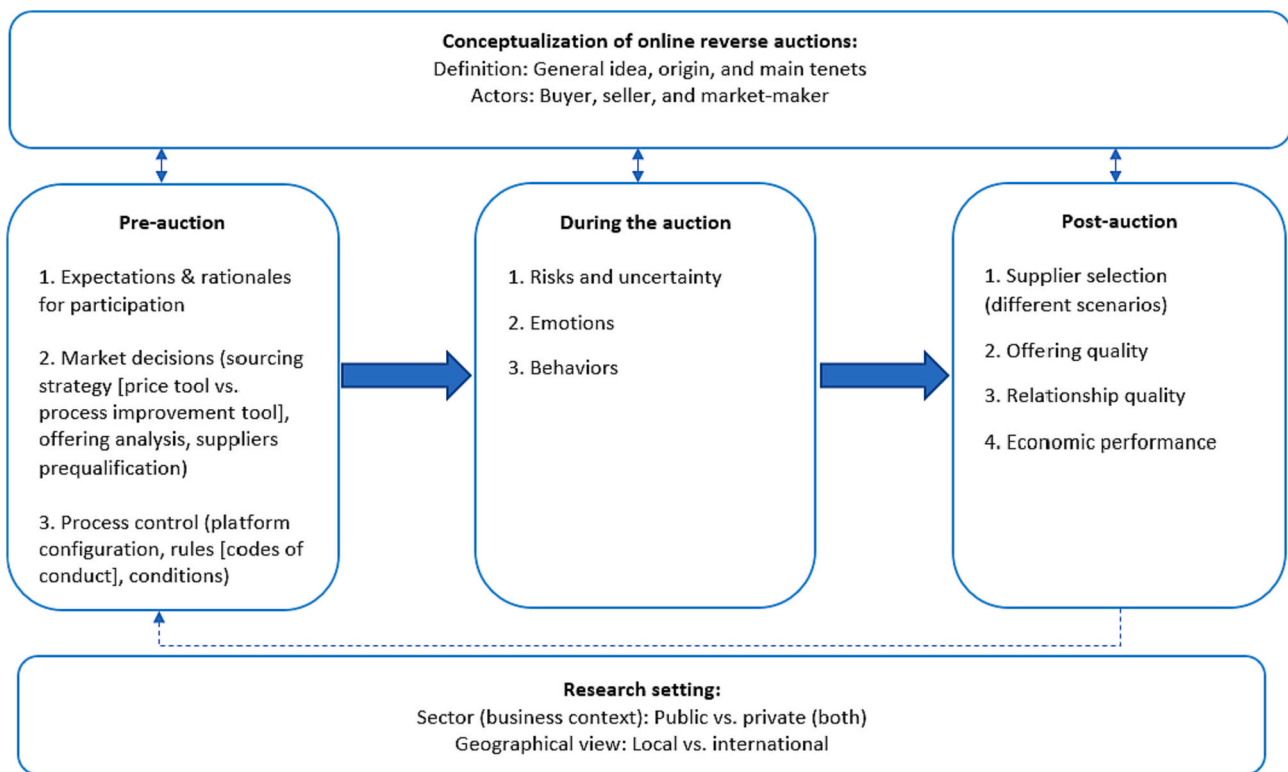


Fig. 3. Overview of online reverse auctions.

**Table 1**  
Marketing sample overview by journal and period\*.

Journal	Group	2002–07	2008–13	2014–20	Total (n)	Total (%)
IMM	B2B	9	0	0	9	37.5%
JBIM	B2B	0	0	2	2	8.3%
JBBM	B2B	1	0	0	1	4.2%
JBMM	B2B	1	0	0	1	4.2%
JBR	Reputable	0	1	1	2	8.3%
PM	Reputable	0	0	1	1	4.2%
JAMS	Top-tier	1	0	0	1	4.2%
MS	Top-tier	1	1	0	2	8.3%
JMR	Top-tier	0	2	0	2	8.3%
JM	Top-tier	2	1	0	3	12.5%
Total		15	5	4	24	100%

\* Missing journals did not publish a single article on ORAs.

*disequilibrium*. Although the level of information disequilibrium depends on the auction format, several studies acknowledge this imbalance as always present. This represents a key challenge for suppliers and a potentially beneficial feature for buyers (e.g., Jap, 2007). In an ORA, the buyer is controlling what type of information is available to suppliers. Grewal et al. (2010) indicate that anonymity among supply-side participants can leverage price concessions. Likewise, Schrader et al. (2004) argue that a buyer can use the lack of information managed by suppliers to obtain supranormal returns. The third tenet is *dynamic pricing*. A basic idea in ORAs with multiple suppliers is the possibility to respond to competitor prices (e.g., Engelbrecht-Wiggans, Haruvy, & Katok, 2007). Hence, dynamic pricing “simply means that the price for the item being auctioned changes on an instantaneous basis because of the electronic format” (Smeltzer & Carr, 2003, p. 482). Commonly, the price decreases until a low bid is reached and there are no more offers in a pre-specified time window (Sashi & O’Leary, 2002).

The SCM literature characterizes ORAs similarly to marketing (e.g., Smart & Harrison, 2003), but places more emphasis on comparing the

tool with other approaches. For example, Pinker, Seidmann, and Vakrat (2003) offer a classification matrix to contrast bilateral negotiations, web-based sales auctions, web-based exchanges, and web-based reverse auctions. In this vein, Cullen and Webster (2007) suggest sorting selling/purchasing mechanisms by the number of buyers and suppliers, with the ORA representing a scenario with one buyer and several (all) suppliers (p. 210). Hence, future marketing research could better understand the nature of reverse auctions by exploring likeness and unlikeness in both offline and online selling/purchasing mechanisms.

#### 4.1.2. Actors: buyer, seller, and market-maker

ORAs comprise three groups of actors: (1) *buyer*, (2) *sellers*, and (3) *market-makers*. Even though buyers could also be market-makers by developing their own systems, the marketing literature considers (empirically) market-makers as a third party (different from the buyer). There are distinct approaches in terms of goals, behaviors, and outcomes for each of these actors. Table 2 reports the distribution of articles among ORA actors. 37.5% of the articles studied the buyer, 12.5% the seller, while only 8.3% the market-maker. The remaining 41.7% studied multiple actors via both a dyadic buyer-seller view (33.33%) and a triadic ORA view (8.33%). The papers studying the whole ORA system focus on a general description and guidelines for conduct, with both studies published in the initial period (i.e., 2002–07 period). No empirical study has dealt with all actors simultaneously.

The buyer has the role of initiating the auction process by contacting a market-maker to design the ORA or by accepting a market-maker

**Table 2**  
Online reverse auction (ORA) researched actors in marketing.

	2002–07	2008–13	2014–20	Total (n)	Total (%)
Buyer	8	0	1	9	37.50%
Seller	1	1	1	3	12.50%
Market-maker	0	1	1	2	8.33%
Dyadic	4	3	1	8	33.33%
Triadic	2	0	0	2	8.33%

proposal to work during a specific time period (Daly & Nath, 2005a; Dixit, Whipple, Zinkhan, & Gailey, 2008). The marketing literature has explored the buyer role as one-sided (i.e., one buyer), but hypothetically an ORA could be expanded to multiple buyers. The ORA process typically begins with the buyer posting a request for quote (RFQ) to a website or sending the information directly via email to specific suppliers (Jap, 2003). The seller role is usually activated after receiving notice from the buyer about launching an ORA. Sellers are persuaded to participate in an ORA since the possibility to gain business depends on it. Emiliani (2005) notes that sellers characterize ORAs as an unfair bidding process used by firms as a substitute for poor purchasing practices. The market-maker role is played by several firms such as Ariba, A.T. Kearney, EASiBuy, eBridge, EMEX, Oracle, and Proactis (Mora Cortez & Johnston, 2020). These market-makers assist the buyer in creating a detailed RFQ to facilitate price estimating and online bidding (Emiliani, 2004). They also provide technical support during the auction and are responsible for the ORA working satisfactorily (Standing & Standing, 2015). Undoubtedly, marketing research needs to pay more attention to market-makers since they provide a B2B service.

The SCM literature identifies the same actors when characterizing an ORA. Nevertheless, the focus on both sellers and buyer is much greater than in the marketing literature, with two papers discussing the market-maker or its characteristics. For example, Karabağ and Tan (2019) investigate the impact of reverse auction platform ownership on the procurement prices. They proposed that price diminishing is higher for auctions conducted through a market-maker auction provider than through a private (buyer-owned) platform, though no significant effect was found. Overall, the market-maker is a “black-box” in both SCM and marketing literature.

## 4.2. Pre-auction

### 4.2.1. Expectations and rationales for participation

There are expectations and reasons ruling why buyers and sellers decide to participate in ORAs. In general, the buyer expects net gains in the form of reduced purchase prices, administrative costs, and inventory levels at the cost of potentially eroding the incumbent selling firms' profit (Emiliani & Stec, 2005; Jap, 2003; Schrader et al., 2004). The most compelling argument for buyers is the likelihood of reducing tag prices by 5–15% (Jap, 2002; Smeltzer & Carr, 2003). All expected benefits are emphasized by the market-maker in its communication with buyers and represent the core of its value proposition. For market-makers, an ORA is simply a service to be sold. Extant literature is silent about how market-makers develop expectations on market penetration.

Furthermore, ORAs are also regarded as bringing some advantages to selling firms like increased business and information about the market, more market penetration, reduced time in the bidding process, less paperwork, and improved inventory management (Smeltzer & Carr, 2003). Moreover, bidders other than well-known suppliers could initiate a relationship with out-of-sight buyers (Haruvy & Jap, 2012). However, suppliers (especially the incumbent one) perceive reverse auctions as an aggressive purchasing tool designed to drive down unit prices without adequate consideration of other relevant elements of performance or production capability (Emiliani, 2004; Schrader et al., 2004).

SCM literature also discusses the nature of ORAs as part of a “competitive” instead of a “collaborative” purchasing strategy (e.g., Smart & Harrison, 2003). Moreover, SCM studies raise ethical considerations about ORAs. For example, Hartley, Lane, and Duplaga (2006) argue that sharing suppliers' confidential information (e.g., prices) is unethical and can lead to a distorted “bidding-war.” Further marketing research could explore whether suppliers perceive ORAs as unethical versus simply a cost-oriented behavior and how this perception may influence participation. Scholars should also investigate how buyers can present ORAs as part of a collaborative strategy.

### 4.2.2. Market decisions

An important market decision for buyers is to clearly define how an ORA relates to the firm's sourcing strategy (Úbeda, Alsua, & Carrasco, 2015). Jap (2002) states that the number of sourcing strategies depends on the ultimate goals of a firm, and, consequently, an ORA can be used as a single sourcing approach or as one that accompanies other approaches. Moreover, Smeltzer and Carr (2003) stress that reverse auctions should be considered a tool within the strategic sourcing process (p. 486), which involves managers having a comprehensive market knowledge and technical understanding to develop total cost models. Jap (2002) suggests that the goal of a strategic sourcing process is to reduce the total cost of ownership of serving every specific need. The literature posits ORAs as being used more as a price (reducing) tool than as an approach for strategic sourcing (or process improvement; Schrader et al., 2004; Agndal, Axelsson, Lindberg, & Nordin, 2007). This is consistent with the suppliers' view on ORAs. It would be interesting to have more knowledge on how different buying center members face this dilemma, which is currently unavailable in extant marketing literature.

Another important decision for the buyer is to select the offering to be reverse auctioned. The literature agrees on identifying commodities (i.e., homogeneous offerings for which the purchase price constitutes the largest component of value) as the most appealing type of offering (e.g., Schrader et al., 2004). Jap (2002) notes that when products are commoditized, the capabilities of ORAs enable unprecedented temporal and geographical conveniences for both buyer and supplier. In this vein, Sashi and O'Leary (2002) point toward maintenance, repair, and operating (MRO) items that are largely homogenous being adequate candidates to be reverse auctioned. Agndal et al. (2007) stress that services in general are difficult to specify and price, probably making reverse auctions primarily relevant for highly standardized services with high total value (p. 195). However, branded goods and non-standardized services are also purchased via reverse auctions (Emiliani, 2005). From the suppliers' perspective, there is a risk of disassociating a product from its brand in the reverse auction environment (e.g., Schrader et al., 2004). Hence, managers should consider buying or setting up a subsidiary if incremental sales are relevant for a vendor to participate in an auction (Schrader et al., 2004). Regarding the market-maker, the literature is silent on its guidance for offering selection.

Furthermore, a key buyer decision is how to conduct suppliers' pre-qualification (Haruvy & Jap, 2013). Jap (2002) indicates that buyers should consider only suppliers that have been pre-qualified and can fulfill the purchase contract. Otherwise, the buyer risks generating meaningless bids and the possibility of nonqualified suppliers placing undue price pressure on the qualified suppliers (Jap, 2002). Interestingly, Schrader et al. (2004) note that buyers can purposely invite suppliers to an auction who are not prequalified to provoke a disequilibrium situation. Sashi and O'Leary (2002) state that the prequalifying activity can be delegated to an internal department or outsourced to a third party. The prequalifying process is labor-intensive and costly, forcing the auction result to exceed this cost to make it worthwhile (Sashi & O'Leary, 2002). Prequalification includes, but is not limited to, manufacturing tolerance capabilities, volume capabilities, financial capabilities, and certifications such as ISO 9000 (Schrader et al., 2004, p. 71). Extant marketing literature does not offer detailed discussion on when or how a prequalified supplier may decide not to participate in an ORA, nor the consequences of this.

SCM literature also considers supplier qualification a key aspect. Buyers who conduct thorough supplier evaluations before the auction are more likely to achieve successful auction outcomes (Scott, 2018; Wan & Beil, 2009). Moreover, SCM research proposes two complementary topics to extant marketing knowledge. On one hand, market decisions on the a priori number of winners are thoroughly scrutinized. Wang, Feng, Jiang, and Xie (2019) show that increasing the number of winners encourages experienced suppliers but discourages inexperienced suppliers from participating in an auction. In this vein, Chaturvedi, Katok, and Beil (2019) indicate that when the cost distribution



of suppliers is regular (e.g., normal), the most cost-efficient split happens with the buyer allocating the maximum possible business sequentially, starting from the lowest-bidding supplier and moving toward higher bidding. On the other hand, market decisions on sourcing multiple components associated with an end-product are not trivial. For example, Jiang (2015) notes that, compared with simultaneously auctioning the components, a sequential auctioning process can improve the profit for the buyer and all suppliers. Hence, future ORA marketing research could explore situations where related offerings need to be auctioned (e.g., testing simultaneous vs. sequential auctions) and multiple winners can be assigned.

#### 4.2.3. Process control

Buyers establish a series of definitions in the platform configuration to control the running of an ORA (Haruvy & Jap, 2013). Daly and Nath (2005b) note that an important element is the event/lot size, proposing that price is a decreasing function of lot size. Similarly, Jap (2007) indicates that the larger the contract value, the greater a supplier motivation to participate in an ORA. Several lots can be set up for independent bidding before a reverse auction. The offering lot is a grouping of items typically organized according to the suppliers' capabilities to bid on or produce each lot (Jap, 2007, p. 150). A lot can include a combination of more homogeneous/heterogeneous offering types and, while the number of lots increases, the buyer provides more varied opportunities for suppliers to win a part of the total contract (Daly & Nath, 2005a; Jap, 2007). Another factor is the price visibility (i.e., the extent to which suppliers can see competing bids). Extant literature suggests that full price visibility is risky; thus, buyers have implemented a partial price visibility format, in which suppliers are not told the actual price levels but are informed about their relative rank or the lowest bid price in real time (Jap, 2007, p. 150). Furthermore, the marketing literature also contrasts the consequences of sealed-bidding (only the buyer has access to a bid using an asynchronous process) versus open-bidding (all suppliers and the buyer view the bids at the same time). For instance, opportunism suspicions do not change in sealed-bid but increase in open-bid auctions, while no difference in buyer savings or supplier willingness to make investments occur because of the auction types (Charki, Josserand, & Charki, 2011; Jap, 2003).

Another nuance in the auction format is the time selection and auction run time. The former is relevant due to potential participants being anywhere in the world (Schrader et al., 2004). The latter is more controversial and can be managed using a fixed time (i.e., hard close; generally, one or two hours) or continuing past the deadline as long there is bidding activity (i.e., soft close; Daly & Nath, 2005b; Jap, 2002). The soft close involves setting up an elapsed time (to respond to rivals), commonly ranging from one to five minutes (Mora Cortez & Johnston, 2020; Schrader et al., 2004). The literature also stresses defining a large enough decrement (i.e., minimum reduction in bid) to run the ORA efficiently. Schrader et al. (2004) tell a story from GE in which a novice buyer allegedly set a \$100 decrement on a \$2 million auction, requiring about 17 hours to close the event.

The literature also points toward reviewing more general conditions in the market and drawing codes of conduct to ensure a successful ORA deployment and outcome (Muylle & Standaert, 2016). Smeltzer and Carr (2003) state that appropriate market conditions must exist. The supply market should be somewhat fragmented to increase the number of potential bids, but more importantly *excess supply capacity* in the form of economies of scale is needed so that suppliers are motivated to pursue extra business, and *supply market price elasticity* is required to drive prices downward by an increase of demand (Jap, 2007; Smeltzer & Carr, 2003). Moreover, Emiliani (2005) suggests “*guidelines for conduct*” for developing an ORA where buyers and sellers can participate in a fair and equitable electronic procurement auctioning process (p. 529). These documents are typically one to five pages and summarize the expected behaviors of market-makers, buyers, and sellers related to: (1) transparency of bidders, (2) acceptance criteria, (3) specifying

product/services, (4) terms and conditions, (5) security and confidentiality, (6) supervision, and (7) auditing (Emiliani, 2005). The very fact that codes of conduct and guidelines are in place indicates that ORAs suffer from many serious shortcomings in practice (Muylle & Standaert, 2016; Úbeda et al., 2015). Further research could reunite most market-makers to develop a standard code of conduct for all ORA stakeholders.

SCM literature empirically discusses additional *process control* topics associated with (1) price acceptance and (2) information availability on quality. On one hand, scholars found mixed results regarding what pre-defined bidding price optimizes the cost savings for the buyer. While Aloysius, Deck, Hao, and French (2016) find that first-price (i.e., lowest) auctions generate lower prices (in comparison with second-price auctions) regardless of market composition, Chang, Chen, and Salmon (2015) find the average bid mechanism to be more successful when accounting for the winner's curse (i.e., seller underestimating the cost to serve and failing to comply). On the other hand, setting up whether to share information on offering/supplier quality during an auction is an emerging idea. For example, Haruvy and Katok (2013) indicate that an open-bid format is highly sensitive to quality transparency, generating significantly lower buyer surplus levels when the information about bidder quality is public. Hence, future marketing research could explore situations with multiple price acceptance points (e.g., first, second, and middle) and different levels of quality information (e.g., offering, people, and brand).

#### 4.3. During-auction

##### 4.3.1. Risks and uncertainty

The marketing literature describes several risks and uncertainties when conducting and participating in an ORA. First, Jap (2003) stresses that a perceived lack of transparency about an ORA leads suppliers to be suspicious about the buyer being opportunistic (i.e., self-interest-seeking with guile). If a supplier participates in an ORA under the strong suspicion of opportunism, there is a huge risk of misconducting or substantially limiting its participation. Daly and Nath (2005a) indicate that procedural fairness (i.e., fairness of the procedures through which decisions are made or rules applied) is key *during the auction* and can be demonstrated when explicit efforts are made to communicate during auction implementation. Even if rules were sent prior to auction execution, a very clear explanation of the norms and conditions and a context for the need to conduct an ORA at the beginning of the bidding can help sellers to diminish their perception of opportunistic buyer behavior.

Second, Grewal et al. (2010) discuss the behavioral uncertainty of market participants during an ORA due to dynamic pricing. These authors argue that the reputation of the market-maker should help to “retain the trust” of buyer and sellers and “*sustain the electronic market's performance*” (p. 47). Another problematic scenario derives from the sellers inferring that a reverse auction is simply a negotiation ploy. In other words, the buyer may be trying to get an existing supplier to lower its price and not award business to the suppliers participating in the bid process (Smeltzer & Carr, 2003, p. 487). If this assumption is not true, buyers can benefit from working on ORAs with highly reputable market-makers. In addition, for buyers, there is a risk associated with lack of dynamism in the bidding price. Even if the pre-qualification of suppliers is conducted correctly, not necessarily all of them will participate in the ORA. Kauffman and Leszczyc (2005) indicate that the right auction dynamism in one-time purchase situations requires about nine sellers and a repeat purchase situation requires about 12 sellers. In this vein, Smeltzer and Carr (2003) note that at least four or five sellers are needed to begin the bid process.

Third, Dixit et al. (2008) state that many sellers suffer a disadvantage during their first auctions since they often fail to develop a well-thought-out strategy. Inexperienced suppliers could display their best price at the beginning of the auction or fail to establish their lowest possible price.



Overall, inexperienced suppliers negatively affect the running of an ORA; experience provides maturity to all participants (Standing & Standing, 2015). However, not only beginners may behave erratically; if a pre-designed strategy is not followed in detail, there is a risk of over-bidding only to discover “when trying to fulfill the contract that they did not take into account unforeseen events like bad weather, union strikes, or transportation problems” (Sashi & O’Leary, 2002, p. 106). Sellers should stick to a pricing strategy during the entire ORA and hold internal alignment in the auction team to prevent non-rational biases (e.g., Dixit et al., 2008; Haruvy & Jap, 2013; Mora Cortez & Johnston, 2020).

Interestingly, SCM literature has additionally studied the idea of suppliers’ collusion during a reverse auction, which, in the marketing literature, is merely noted as a potential factor to be discussed in future research (cf. Schrader et al., 2004). In this vein, Fugger, Katok, and Wambach (2016) analyze the possibility of suppliers winning at high prices. They found that collusion at high prices becomes less likely if the number of bidders increases, if reserve prices decrease, and if uncertainty about the decision criteria decreases. Thus, future marketing research could investigate what suppliers’ ex ante characteristics and beliefs lead them to consider the option of collusion during an ORA.

#### 4.3.2. Emotions

The ORA dynamics can trigger emotional distress among supplier managers. For example, Jap (2003) describes a case study where “the managing director became caught up in the auction dynamic as he did not want to lose to other bidders” (p. 151) and, by the end of the auction, the supplier’s lowest bid had crossed the pre-established minimum price, potentially resigning 7% of net profit. Jap (2003) also indicates that this manager took about two weeks to get over losing the business. This scenario demonstrates how ORA dynamics can distress and demotivate sellers at an emotional level. Indeed, Mora Cortez and Johnston (2020) show that the auction experience is psychologically overwhelming and requires emotional intelligence to nurture effective control during the event. In addition, marketing ORA research points out that the excitement of the reverse auction can foster the supplier to offer an unrealistic price to the buyer and later lose business by trying to back out of the agreement (e.g., Smeltzer & Carr, 2003; Sashi & O’Leary, 2002). The literature also acknowledges that the emotional frustration can be deeper for high quality suppliers since they need to deal with discontent during the auction due to the unaccounted value in the bidding (e.g., Mora Cortez & Johnston, 2020).

SCM literature on emotions is scarce but complements marketing studies. For example, Ding, Eliashberg, Huber, and Saini (2005) show that emotions are an integral component of a bidder’s decision state and bidding strategy during a six-session ORA. The authors validate the excitement emotion of winning and the frustration emotion of losing, and that such emotions change dynamically as a function of the outcome of the previous bid. Further marketing research could track the emotions of buying center members and explore their consequences during a *real-setting* reverse auction.

#### 4.3.3. Behaviors

Literature on what happens *during the auction* is limited in the reviewed marketing research. As usual, the marketing scholars have focused primarily on the supply-side of the system (i.e., neglecting the behaviors of both buyer and market-maker). However, Jap and Haruvy (2008) stress that “the theory of how and why bidders bid as they do is still emerging” (p. 551). These authors also claim that extant research is missing a connection between how bidder behaviors are related to internal (seller) or context events outside the auction. Mora Cortez and Johnston (2020) indicate that sellers’ organizational dynamics during the auction have not been studied, but they offer initial support to the importance of achieving unity among the diverse individuals participating in an ORA and argue in favor of the inputted numbers to the auction system representing the overall agreement in the seller auction team. If all participants are responsible for the actual decisions *during the*

ORA, there are fewer chances of pointing a finger at someone (Mora Cortez & Johnston, 2020).

On the bright side, marketing literature has explored some key behaviors during a reverse auction such as (1) total number of bids submitted, (2) speed of response, and (3) level of price concessions. All these variables can be considered measures of bidder aggressiveness. For example, Jap and Haruvy (2008) found that sellers willing to make specific investments (i.e., adaptations representing a credible sign of a supplier’s commitment to the buyer) bid less aggressively, which is also true of sellers with a high relationship propensity (i.e., propensity for developing a relationship with the buyer). Similarly, Haruvy and Jap (2013) identified that high quality (in terms of product and service) bidders react more aggressively to non-aggressive bids than to aggressive bids. Furthermore, higher quality bidders perform less frequent bids and show a divergent behavior from lower quality bidders. The behavior of higher quality sellers is typically represented by 38.5% of their bid during the first quintile of time, 27.7% spread evenly over the next three quintiles, and 33.5% of their bids in the last quintile (Haruvy & Jap, 2013). Moreover, the incumbents show a less aggressive competitive response compared with non-incumbents, consistent with the idea of incumbents being of higher quality. Overall, these results indicate that bidders take into consideration the way they would prefer to conduct business, perceptions about their relative quality, and the effect on their ability to learn from other sellers’ behavior during an auction.

Surprisingly, SCM literature is almost barren regarding behaviors of the actors *during* a reverse auction. However, two ideas are discussed in this arena: (1) negotiation and (2) relationship governance. On one hand, Kaufmann and Carter (2004) are critical about the negotiating possibilities of reverse auctions. Particularly, they state that *during* an ORA the buyer-seller interaction is rather impersonal and strictly fact-based, leaving almost no room for personal interventions. On the other hand, Percy, Giunipero, and Wilson (2007) suggest that a relational governance structure between buyer and seller during an auction provokes a less aggressive bidding. Overall, future marketing research could investigate opportunities (if any) for increasing actors’ interaction during an auction.

#### 4.4. Post-auction

##### 4.4.1. Supplier selection

A very interesting stream in ORA literature is that related to doing the math; that is, once the auction has finished. The first tenet in the post-auction analysis is *supplier selection*. All actors should reflect in advance on the different scenarios that can surface. Emiliani and Stec (2005) note that for the buyer, the most pressing matter is to implement the reverse auction results. The literature acknowledges the *supplier selection* task as highly difficult, and its complexity emerges from the buyers’ decision to not necessarily assign the business to the lowest bid (e.g., Jap & Haruvy, 2008). Of course, when the buyer decision is to “reciprocate” with the lowest bid supplier by assigning the business, the *supplier selection* becomes a trivial action (Eng, 2004). Extant research suggests selecting the “winner” via the lowest bid approach (in comparison with a multi-attribute approach) when the number of bidders is small and the correlation between cost structures and the quality offered by bidders is negative or undetermined (e.g., Engelbrecht-Wiggans et al., 2007).

Although *supplier selection* (as a buyer action) in the reviewed literature is scarce and generally not central in the discussion, it represents the “moment of truth” for the buyer. Further research is needed to formalize a categorization of the multiple scenarios of *supplier selection*. Broadly, extant research ranges from the relationship management in a scenario of failed reverse auction (Mora Cortez & Johnston, 2020) to the trade-off between profiting from a contract and the probability of being selected through a specific price (Jap & Naik, 2008). In reality, the ORA itself provides an interesting learning opportunity for participants on both the demand and supply sides. For example, themes such as delivery

time, quality, and quantity are issues that both buyers and suppliers should consider to open renegotiation scenarios (Daly & Nath, 2005b). In such renegotiation scenarios, Mora Cortez and Johnston (2020) identify two possible paths: (1) full renegotiation and (2) discrete step-by-step reconsideration. The former involves not assigning the business to the lowest bid suppliers, the buyer accepting an ORA as an ineffective tool (in the specific case), and opening buyer-seller information sharing to clarify ambiguity and mutual concerns. The latter involves the buyer assigning the business to the lowest bid suppliers, more often letting go an experienced, reliable supplier, but gradually returning to interact with this incumbent supplier (from the prior procurement cycle) and reestablishing a partial commercial buyer-seller relationship without further argument. The experience, thus, becomes an important factor for taking advantage of the outcomes associated to ORAs from a selection standpoint (for both buyer and suppliers).

SCM literature adds to reverse auctions marketing research on *supplier selection* by studying (1) post-auction negotiations and (2) learning about bidders' marginal costs. On one hand, Shachat and Tan (2015) show justification (i.e., increased buyer surplus and no seller concerns) for the practice of engaging in post-auction negotiations when qualifying additional suppliers is not feasible. On the other hand, Eckhaus, Kogan, and Perlman (2013) find that auction data can be used to learn about the suppliers' marginal costs. Thus, the buyer can enhance follow-up negotiations with the supplier by contrasting the model's estimates of the marginal costs with the supplier's inefficiencies. Future marketing research could investigate different degrees of convergence in the marginal costs of bidders and conduct an aggressiveness-variant negotiation (i.e., low, medium, and high levels).

#### 4.4.2. Offering quality

The quality of the offering is another key idea in the literature. Quality refers to the extent to which the supplier specifications for its offering are adequate to attend the demand of a buyer (Muylle & Standaert, 2016). Sometimes, the application of ORAs does not satisfy buyers *ex post* in terms of quality; then, both buyers and sellers (particularly those excluded) should be prepared to deploy new strategies, generating an opportunity to recover a theoretically lost customer (Emiliani, 2005; Jap, 2007). Of course, sellers with high quality products should consider this chance only if renegotiating seems pertinent. Once the auction has finished, buyers should assess the criteria applied to select the bidders to anticipate future changes, particularly to make the operation more attractive for winners (assigned suppliers) and avoid operational risks (Kauffman & Leszczyc, 2005). Hence, offering quality becomes a dynamic variable over time (e.g., short- vs. long-term).

The reviewed literature indicates that buyers should revisit the suppliers' pre-qualification once the auction is finished, since the market is evolving and financial ratings and ISO ratings can expire or be updated (Mora Cortez & Johnston, 2020; Smeltzer & Carr, 2003). Another complication for buyers emerges from information asymmetry: the auction winner may not have full information on all aspects of the job and, therefore, not be able to complete the contract (Sashi & O'Leary, 2002, p. 107). In addition, as B2B contracts tend to be assigned for several years (from one to five commonly) and ORAs can be conducted in sequence, there is a latent risk of the assigned supplier decreasing quality over time, reducing services and technical support, as well as eliminating idiosyncratic investments, such as R&D (e.g., Jap, 2003). Further, Engelbrecht-Wiggans et al. (2007) suggest embarking on continuous buyer-seller interaction during offering deployment, if these relationships can be translated into higher quality offerings.

SCM literature identifies one topic associated with *offering quality* that may help in advancing marketing research into ORAs: complex/incomplete contracts. For example, Fugger, Katok, and Wambach (2019) note that when the buyer can identify a price that is not the lowest but represents a compromise, it increases a supplier's willingness to provide costly quality that benefits the buyer and is not specified in the contract. Thus, future marketing research could study the supplier features that

foster a non-opportunistic behavior (related to quality) with the buyer in case of an incomplete contract.

#### 4.4.3. Relationship quality

The consequences of ORAs related to buyer-seller relationships is a topic of interest in B2B marketing literature since Jap (2003) introduced the first warning to deem auctions as potentially destructive for industrial relationships. Indeed, *relationship quality* has been one of the main derivatives in the literature, as its application seems to collide with the postulates of relationship marketing, that is, "all marketing activities directed towards establishing, developing, and maintaining successful relational exchanges" (Morgan & Hunt, 1994, p. 22). Some authors consider the ORA as a regression on the power equilibrium between buyer and sellers; a situation that can be positive in the short-term but negative in the long-term (Schrader et al., 2004). Hence, the overall evaluation after the auction can favor a relational ORA (Mora Cortez & Johnston, 2020). The perception about *relationship quality* is not independent from specific features of an ORA itself or participating actors (Jap, 2007).

An outstanding point about *relationship quality* in the literature is the discussion in 2005 on how to manage relationships resulting from an ORA, between Daly and Nath (2005a, 2005b) and Emiliani and Stec (2005). In a series of three documents, those authors discuss how to improve relationships after an ORA has been conducted. Daly and Nath (2005a) suggest subsidizing relational partners, payment for losing bidders, or re-negotiation of final contracts, among other specifications, to make auctions more relational to favor long-term investments. This idea was not shared by Emiliani and Stec (2005) who suggest that buyers use ORAs to achieve a better price from suppliers through coercive bases; the only possibility is to expand value propositions instead of subsidizing suppliers, since this will be burdensome to manage for both suppliers and buyer. Finally, Daly and Nath (2005b) responded by emphasizing the need to enhance interpersonal trust as a valid way to develop positive impacts on productivity through ORAs while improving relationship quality. A buyer-seller relationship requires a mutual understanding and commitment that could impact productivity (Daly & Nath, 2005b). Overall, the literature shows an intense debate on how to develop a more relational outcome, which does not have to be an oxymoron (Muylle & Standaert, 2016).

SCM literature contributes in several ways to *relationship quality* in ORAs. First, scholars emphasize the role of trust in buyer-seller relationships. Gattiker, Huang, and Schwarz (2007) indicate that the greater the complexity of the purchase in an ORA, the lesser the supplier trust in the buyer, which, in turn, negatively affects the supplier's desire to deal with the buyer in the future. Second, research indicates that suppliers are less sensitive to ORAs than buyers from a relational perspective. Lösch and Lambert (2007) note that using a reverse auction influences buyers' perception and drives a feeling that their relationship becomes more negative (e.g., reduced commitment). Third, scholars mention that suppliers are more sensitive to not winning a contract than the fact of participating in an ORA. Engelbrecht-Wiggans and Katok (2006) state that suppliers prefer hybrid mechanisms to pure auctions. Similarly, Smart and Harrison (2003) indicate that the effect on relationships will depend on the extent to which buyers employ the auction as a price weapon. Future marketing research could consolidate the SCM additional findings via multiple case studies adopting a comparative analysis.

#### 4.4.4. Economic performance

Among the four post-auction tenets, economic performance plays a prominent role in the reviewed articles dealing with consequences. Economic performance refers to any kind of commercial advantage achieved through ORAs with its subsequent effects on financial accounts. The underlying reason is that it is closely related to pricing and the achievement of cost savings during organizational buying processes across different scenarios (Agndal et al., 2007; Dixit et al., 2008; Muylle & Standaert, 2016). This type of performance was analyzed from the

buyer and seller perspective (Jap, 2007; Muylle & Standaert, 2016) but also from the market-maker perspective (Grewal et al., 2010). However, most articles do not offer clear calculations of economic benefits and inform general conclusions from the actors. In addition, the literature suggests other economic-related benefits such as flexibility in managing the orders, lowering inventory costs, and improving safety stocks (Schrader et al., 2004). Although this economic gain is usually linked to the buyer, it opens an opportunity stream for new suppliers as they can gain new customers (Jap, 2003) and expand to new markets (Emiliani, 2004). Commonly, the literature identifies the incumbent suppliers as the most affected actor from an economic perspective (e.g., Jap & Haruvy, 2008).

Several studies criticize the economic performance of an ORA (and its strategic effects), since it can be overrated in comparison with collaborative cost reduction initiatives and knowledge sharing across networks (Emiliani, 2004). Research still struggles to account for the benefits of running an ORA. For example, Úbeda et al. (2015) indicate that a reverse auction is a valid alternative in industrial procurement, but with no positive consequences on *economic performance* (relative to other purchasing approaches). An opportunity in the economic performance spectrum is to further explore the time savings for both buyer and seller. In this vein, Standing and Standing (2015) reflect that “a good negotiator could do just as well (as an ORA), the challenge is do they have the time to negotiate all the contracts they have to manage?” (p. 727). Furthermore, for market-makers it is important to follow a value-based approach to consider how benefits are disseminated across all actors in an ORA (e.g., Eng, 2004). Therefore, the governance mechanism depending on the environmental conditions will be key for reaching desired outcomes (Grewal et al., 2010).

SCM literature is highly consistent with marketing research. However, three novel ideas provide a more nuanced perspective on ORAs: (1) relationship orientation, (2) supplier's capacity constraints and future costs, and (3) multi-attribute auctions superiority. First, Percy et al. (2007) indicate that a relationship orientation negatively influences short-term price reductions and time savings generated via an ORA. The rationale is that, under a relationship orientation, the primary concern is long-term cost reduction and time investments are required to develop and maintain buyer-seller rapport. Second, Gallien and Wein (2005) note that minimizing buyer's cost under the suppliers' capacity constraints entails allocating the procurement contracts only after the entire bidding event is completed, and the lowest bidder may not be awarded a contract. Third, Chen-Ritzo, Harrison, Kwasnica, and Thomas (2005) showed that multi-attribute auctions are superior to price-only auctions. The authors demonstrate that a multi-attribute auction increases buyer utility and does not degrade – and occasionally increases – seller profits. This idea is supported (from the buyer's view) in the marketing literature only when the number of bidders is high (cf. Engelbrecht-Wiggans et al., 2007). Further marketing research could explore whether a relationship orientation is related to conducting multi-attribute auctions and what drives a supplier to expand its installed base.

#### 4.5. Research setting

##### 4.5.1. Sector: public versus private

The context underlying an ORA is a relevant element to consider due to the interesting nuances noted in marketing literature. This research stream suggests that both the public and private sectors can benefit from their implementation. Particularly, the private industry view is dominant in marketing research due to the cost-saving effects in the buyer accounts (Jap, 2002). Private usage of ORAs includes the analysis of auctions in specific industries or individual firms. Conceptual articles highlight the importance of integrating different methodologies (including an ORA) for supply chain management in the private sector, emphasizing the importance of developing awareness of strategic sourcing in organizational buying behavior (Agndal et al., 2007; Úbeda et al., 2015). This implies improving buyer professionalization with the

application of new strategies and methods. Empirical ORA studies tend to analyze the behavior of actors in specific industries, such as the automotive industry (Haruvy & Jap, 2013; Jap, 2003; Jap & Haruvy, 2008; Jap & Naik, 2008) and retailing (Eng, 2004), or in a set of industries, including chemicals and high-tech products (Jap, 2007). Overall, marketing literature made it possible to identify a series of suggestions for ORA design and deployment to improve outcomes. Furthermore, other more specific approaches emerge from the literature analysis, such as how General Electric Appliances (in the US) manage to buy effectively, saving more than \$50 million per year (Schrader et al., 2004); or the expected consequences for the global aerospace industry clusters (Emiliani, 2004).

Public industry also has its quota in general business research since governments are important buyers with sophisticated buying processes (Dixit et al., 2008; Engelbrecht-Wiggans et al., 2007). Nonetheless, a public setting is scant in the ORA literature. This gap offers research opportunities for investigating all ORA actors and their interactions with government agencies. Extant research highlights military procurement as a rich ORA setting to be further explored since major projects (e.g., aircraft, ships, and tanks) rarely come up and are enormous in scale (Daly & Nath, 2005a, p. 163). Moreover, the literature acknowledges the potential benefits of ORAs for centralized state or country level purchases (e.g., Standing & Standing, 2015).

The SCM literature is more enthusiastic in noting the relevance of ORAs for the public sector. However, most of the empirical analyses are conducted via private firm-based datasets. Basically, scholars have limited the attention to the public sector to brief reviews in their manuscripts. For example, Karabağ and Tan (2019) indicate that prior research found that the price paid by the public sector decreases with each additional bid submitted in the auction, the number of bidders, and/or the number of auctioned items. Overall, we conclude that research into public sector ORAs is still in its infancy and needs much further attention. For instance, future marketing research could study whether buyer's savings and rationale for participation are consistent across sectors (i.e., private vs. public).

##### 4.5.2. Geographical view: local versus international

Since reverse auctions might be conducted by firms operating in global markets, many studies possess an international scope. Other studies, meanwhile, are local (Smeltzer & Carr, 2003; Schrader et al., 2004; Mora Cortez & Johnston, 2020), because the research was conducted on a national scale without any reference to foreign players. However, an ORA, as a digital tool, is conceived to be global (Sashi & O'Leary, 2002), and even though a study's research setting can be limited to a certain country, the results might be expanded to other regions because the market contingencies barely influence its deployment (as a purchasing tool). From the buyer perspective, there is great interest in the participation of firms, regardless their origin, if they can provide a quality product at a reasonable price. For suppliers, it can be an opportunity to gain new customers or market access. A problem emerges when ORA application causes supplier churn, generating an unsatisfactory bidders' critical mass (Jap & Haruvy, 2008). For instance, local suppliers can be uninterested in participating in an ORA if international low-cost suppliers are part of the procedure. The literature considers the origin of the actors as less critical than those issues related to an ORA's design, its dynamics, and the positive results for every actor participating in it (e.g., Standing & Standing, 2015).

SCM literature does not differentiate bidders or buyers in ORAs by country of origin either. A possible explanation is that subjects in SCM studies are often undergraduate and master students in the US (e.g., Carter & Stevens, 2007). Investigating the nuances linked to foreign bidders is key to advancing theory on ORAs. For example, future marketing research could explore the cultural differences across foreign bidders and their influence on price concessions. In addition, further research could consider conducting an ethnography study on international bidders' experience.



## 5. Research agenda

To enhance the article's contribution, we have identified opportunities for further research. We acknowledge that the B2B marketing field is eager for an ORA perspective facilitating deployment and management, by enhancing the knowledge of all actors in the system (i.e., buyer, seller, market-maker). There is a latent need to study those triadic actors independently and their interaction across all the stages in the process model (i.e., pre-auction, during-auction, post-auction). Based on the reviewed literature, ORAs are greatly influenced by the business context and current (buyer) purchasing strategy, which favor qualitative research (Möller & Parvinen, 2015). The process model also suggests moving toward a longitudinal understanding of what happens throughout an ORA in an integrative manner (e.g., using hidden Markov models [HMM]; see Zucchini, MacDonald, & Langrock, 2016). In this section, we summarize and discuss the most relevant domains requiring further research for each stage by focusing on each actor independently and their interactions.

### 5.1. Opportunities for pre-auction

From the buyer perspective, prior research in this stage is abundant in capturing (quantitatively) the effect of the ORA platform setup on performance (mainly economic results). However, the literature needs to better understand the strategic nature of ORAs. In this regard, understanding how contextual factors, either internal (e.g., type of product/service, experience, organization of buying activities) or external (e.g., sector, economic situation), motivate buyers to adopt an ORA will favor its evolution; that is, assuming a strategic sourcing approach instead of a price reduction tool perspective in future literature (Grewal et al., 2010). This strategic perspective is critical for the success during its application, and it will benefit a more open and collaborative approach instead of a competitive, zero-sum approach which would reduce suppliers' negative perception on ORAs (Muyllé & Standaert, 2016; Úbeda et al., 2015).

From the suppliers' perspective, there is not enough understanding of why they become involved in an ORA; that is, what is the rationale behind participating and the different factors that motivate their willingness to get involved. Also, how this participation fits with their market-orientation and potential conflicts of interest. Another important element that should be considered in the literature is the decision of prequalified suppliers not to take part in an ORA, a situation that often occurs in practice; the underlying reasons that substantiate this decision and also the consequences are missing from extant marketing research.

Specifically, the market-maker is usually considered a black-box in the ORA related literature. Although for market-makers the ORA could be simply a service to be sold, the literature must progress in how they create expectations to engage in an ORA for buyers and sellers. Hence, it would be valuable in future research to detail a series of recommendations and activities to be performed by market-makers, particularly in a highly digitalized world. Moreover, there is a gap in the marketing literature regarding the potential situation of co-creating an ORA format including all actors' views. This would contribute to enhancing ORA multi-actor favorability, reducing the perception of opportunistic behavior and potential conflict among the actors.

Finally, there are two questions that require an integrative approach considering all actors simultaneously. Firstly, the dynamic nature of markets and the growing presence of *servitization* in every area of marketing (Rust, 2020). The literature stresses the importance of the nature of the offering dealt with by the ORA, and the difficulty of applying an ORA to complex or very specific offerings. Thus, more research is required to adapt the basis of an ORA to current business reality and to ease the adaptation of this strategic sourcing approach in buying situations where it was not usual. Secondly, business is evolving to account for higher-order market structures (e.g., ecosystems). Thus, future research might examine designing an ORA to supply *networks* (Haruvy &

Jap, 2012). In Table 3, we draw up representative research questions to advance these areas.

### 5.2. Opportunities for during-auction

The focus of marketing research in this stage is on constructing a theory of bidders' behavior. Nevertheless, extant literature only accounts for a reduced number of variables (e.g., total number of bids submitted, speed of response, and level of price concessions), while the understanding of what happens during the auction is still limited. In this regard, the buyer-oriented literature is silent on what occurs in social interactions within an ORA team; this point is particularly relevant since there are managers with divergent roles and interests in the buying center that could participate (Cabanelas et al., 2023). The identification of those individuals who are part of an ORA and why they are involved in it is worthy of interest from a marketing perspective. Furthermore, it would also be important to comprehend what features of the context drive the unethical use of an auction during the event. Therefore, an understanding of the characteristics surrounding this behavior can mitigate its impact through a preliminary action by the market-maker or through some demands by suppliers with respect to the ORA's code of conduct.

From the suppliers' perspective, both the connection between bidder behaviors and internal organization or contextual events (Jap & Haruvy, 2008), and the organizational dynamics of the seller participation (Mora Cortez & Johnston, 2020) have not been studied. In this regard, it is necessary to pay specific attention to these issues, with special emphasis on how the information is managed during an ORA (i.e., how the privacy statements are accomplished to have fair competition). This element is extremely important to generate confidence in the system and foster the participation in future auctions. In this vein, the understanding of the main fears of suppliers would be relevant to facilitate their integration into auctions, which are designed by both buyer and market-maker.

The market-maker possesses a central role during the auction, particularly in the dynamics between actors (e.g., seller-market-maker). Its role should be precise; for example, if suppliers use the helpline to reach out to market-makers, is it important to realize why are they calling? How long does the call last? Are they satisfied with the market-maker help? Moreover, the literature is silent on the market-maker support to buyers during a reverse auction. Thus, the role of the market-maker should be studied from a dynamic perspective, particularly identifying their participation in the functional and social management. Another potential avenue for further research is the growing usage of artificial intelligence (AI), which could be applied to ORAs (Rust, 2020). This opens questions related to the incorporation of algorithms or computationally intensive methods to improve decision-making. Similarly, AI could assess and integrate prequalification issues in the algorithms applied during an auction.

The last domain should consider all participants to deploy a map of the emotions that emerge during an ORA, because unmanaged emotions can interfere with effective information processing (Haruvy & Jap, 2013; Yenyurt, Watson, Carter, & Stevens, 2011). This mapping of emotions would facilitate the anticipation of problems and potential solutions. Also, empathy becomes a valuable issue when understanding the human effect on this process. The answers to the research questions raised in Table 3 should foster improvement of future ORA processes.

### 5.3. Opportunities for post-auction

This stage is the most important one from a managerial decision-making perspective. In this stage, the goal of selecting a supplier is potentially accomplished. However, "*the vast majority of auctions in the marketplace today do not determine a winner ... and the buyer may reserve the right to select a winner on any basis*" (Jap, 2002, p. 510). Further research from the buyer perspective could explore the effect of expectations and brand attitudes emanating from previous relationships on

**Table 3**  
Further research agenda.

Research domain	Actor(s)	Illustrative research questions	Concept(s)
Pre-auction	Buyer	<ul style="list-style-type: none"> <li>What are the contextual factors that foster ORA selection as strategic sourcing approach?</li> <li>How can buyers present ORAs as a collaborative strategy?</li> </ul>	<ul style="list-style-type: none"> <li>Expectations &amp; Rationale, Research setting</li> </ul>
	Seller	<ul style="list-style-type: none"> <li>How is the seller understanding on an ORA before becoming involved?</li> <li>Why do prequalified suppliers not participate in an ORA?</li> </ul>	<ul style="list-style-type: none"> <li>Market Decisions</li> </ul>
	Market-maker	<ul style="list-style-type: none"> <li>What is the role of market-makers during the configuration of the ORA?</li> <li>How can a market-maker include all actors' views in the co-creation of codes of conduct to reduce unfair perception and disequilibrium sensation?</li> </ul>	<ul style="list-style-type: none"> <li>Market Decisions</li> <li>Expectations &amp; Rationale, Process Control</li> </ul>
	Multiple actors	<ul style="list-style-type: none"> <li>What challenges are ORAs facing in a higher servitization context?</li> <li>What characteristics should be considered to adopt ORAs in supply networks?</li> </ul>	<ul style="list-style-type: none"> <li>Market Decisions, Process Control</li> <li>Process Control</li> </ul>
During-auction	Buyer	<ul style="list-style-type: none"> <li>How are social interactions within the buyer team?</li> <li>What during-auction context drives “shilling” (i.e., buyer unethically bidding to boost the event)?</li> </ul>	<ul style="list-style-type: none"> <li>Behaviors</li> <li>Risks and uncertainty</li> </ul>
	Seller	<ul style="list-style-type: none"> <li>How are behaviors associated to internal characteristics and contextual events? What are the main concerns of suppliers on privacy during the ORAs?</li> <li>What topics drive the seller and market-maker interaction during an ORA?</li> </ul>	<ul style="list-style-type: none"> <li>Risks and uncertainty</li> <li>Behaviors</li> </ul>
	Market-maker	<ul style="list-style-type: none"> <li>How do the dynamics between seller and market-maker affect the ORA deployment?</li> <li>What computationally intensive methods and algorithms based on AI can be integrated in during-auction decision-making? How can they include prequalification issues? How to apply other ORA appealing research methods (e.g., Bayesian models, HMM)?</li> </ul>	<ul style="list-style-type: none"> <li>Behaviors</li> <li>Risks and uncertainty</li> </ul>
	Multiple actors	<ul style="list-style-type: none"> <li>What emotions emerge during an ORA? How can empathy (towards other actors) shape these interactions?</li> </ul>	<ul style="list-style-type: none"> <li>Emotions</li> </ul>
Post-auction	Buyer	<ul style="list-style-type: none"> <li>How do personality, emotions and relational antecedents influence the suppliers' selection?</li> <li>What are the main factors for selecting the supplier from a total cost of ownership view?</li> </ul>	<ul style="list-style-type: none"> <li>Supplier Selection, Relationship Quality</li> <li>Supplier Selection, Economic Performance</li> </ul>

**Table 3 (continued)**

Research domain	Actor(s)	Illustrative research questions	Concept(s)
	Seller	<ul style="list-style-type: none"> <li>What are the influences of “shilling” on the ORA outcome?</li> <li>How does the participation of a supplier in an ORA affect them in future relationships with buyers (different from the ORA executor)?</li> </ul>	<ul style="list-style-type: none"> <li>Economic Performance</li> <li>Relationship Quality</li> </ul>
		<ul style="list-style-type: none"> <li>What is the divergence between prequalification and behavior after the reverse auction (for the assigned supplier)? What is the impact of such a divergence?</li> </ul>	<ul style="list-style-type: none"> <li>Offering quality, Relationship Quality</li> </ul>
	Market-maker	<ul style="list-style-type: none"> <li>What are the common situations with multiple price acceptance points and different levels of quality information?</li> </ul>	<ul style="list-style-type: none"> <li>Supplier Selection, Offering Quality</li> </ul>
	Multiple actors	<ul style="list-style-type: none"> <li>What are the potential categories and the specific characteristics of and alternatives to the multiple scenarios that can occur after an ORA?</li> <li>How does the interaction among parties and the offering of the supplier evolve longitudinally during the supplying lifetime after the ORA?</li> </ul>	<ul style="list-style-type: none"> <li>Supplier selection</li> <li>Offering quality, Relationship Quality</li> </ul>
Whole-auction	Multiple actors	<ul style="list-style-type: none"> <li>How should an ORA be approached from a holistic perspective considering the dynamics and interactions among all participants?</li> <li>How are the costs associated with pre-auction linked to the costs associated with during-auction? How are the costs associated with during auction linked to the costs associated with post-auction?</li> </ul>	<ul style="list-style-type: none"> <li>All concepts</li> <li>All concepts</li> </ul>
		<ul style="list-style-type: none"> <li>How do firms account for learning throughout an ORA? How can the emerging knowledge be used in a future ORA?</li> </ul>	<ul style="list-style-type: none"> <li>All concepts</li> </ul>

selecting a supplier or defining paths to follow. This perspective is particularly interesting once the auction closes as buyers sometimes conduct an audit before making a final decision (Haruvy & Jap, 2012). It is also worthy to better understand what the influential factors are when selecting the best potential supplier from a total cost of ownership view, and the factors considered for this decision after an ORA. Additionally, empirical studies could compare the drivers of selecting low-tag price suppliers versus low-total cost of ownership suppliers. Moreover, in this step it would be valuable to study, as it is neglected in current literature, the influence of “shilling” (i.e., purchasing manager bidding against suppliers in the auction) in the definition of an ORA outcome (Sambhara et al., 2017). This behavior could modify the final decision through the unfair influence of bidders.

The supplier perspective in extant research is more limited in the post-action than that of the buyer, and including it would contribute to a more holistic analysis. Thus, the participation decision can affect the future relationship with a buyer, and it is important to reflect on a potential situation where an incumbent supplier is not on the list of selected companies. The possible reactions from them should be

investigated in the literature to provide potential alternatives for firms to manage this threat in a soon-to-be-ended relationship (Mora Cortez & Johnston, 2020).

The current literature is silent on post-auction analysis from the perspective of the market-maker. In this regard the evaluation of the divergence between the prequalification assessment and the result of the ORA could be of interest, as it would open avenues for the improvement of the pre-auction process. A quantitative and qualitative evaluation of the divergence would offer interesting perspectives for the decision-making of ORAs. Moreover, in some circumstances buyers might prefer the acceptance of multiple price points due to different levels of quality information; but they should be objectivized as much as possible to reduce the subjectivity in the decision-making of the buyer. The integration of AI-based algorithms for monitoring the post-auction process can provide interesting insights that are absent from the literature.

Finally, an integrative approach, considering all actors, is needed to identify confounding factors during supplier selection (Mora Cortez & Johnston, 2020). It means identifying the potential characteristics that buyer, sellers, and market-maker can face, and the different courses of action that apply depending on the circumstances. A clear example of a series of roadmaps that depicts a buyer's decision tree would be highly useful for practitioners. Furthermore, there is scarce literature describing the post-auction interaction between a buyer and seller, and it is simply nonexistent for the buyer and market-maker dyadic interaction and intra-actor dynamics. This endeavor demands a longitudinal approach during the supplying lifetime that emerges once the ORA is over. Table 3 includes a series of research questions in each of these areas.

5.4. Opportunities for the whole-auction perspective

In the previous subsections a series of ideas were included for the different steps, either from a single-actor and a multiple-actor approach. However, current literature is also limited in the analysis of all steps of the ORA as a whole, neglecting the tenets of complexity-based theories. In this regard, the application of principles of Complex Adaptative System or Theory of Systems (Cabanelas et al., 2023) could be helpful to adopt a holistic perspective that drives understanding of the dynamics and interaction of the ORA's different steps. This is particularly relevant due to the participation of companies in higher-order organizations and supply networks embedded in global value chains, since this would allow more comprehensive understanding of the puzzle.

Another direction for further research is related to the costs of the process. It is relevant to understand how the investment in previous steps during the development of an ORA favors cost savings throughout the process. Therefore, it is interesting to explore how the ex-ante configuration of an ORA helps optimize the evolution of the during-auction activities. But also, how the during-auction activities condition the costs related to the decisions and deployment in the post-auction stage.

Finally, the organizational learning about ORAs is another research direction. The capacity to integrate prior experiences from buyers, suppliers, and market-makers can directly affect future decisions, reinforcing an adaptative behavior of participants. The procedures, objectives, and actors can change after conducting an ORA (Tayaran & Ghazanfari, 2020). Further research could study how ORA participants learn from previous participations and what factors catalyze that learning.

6. Limitations and concluding remarks

First, it is relevant to note that, as with any other integrative work, our systematic review does not claim to incorporate each publication in the ORA field. The analyses are based on a selection of articles from high ranked marketing journals (like Khamitov, Grégoire, & Suri, 2020), and

consequently more topical research findings might emerge from lower ranked marketing journals. Future research could integrate such findings and compare them with ours.

Second, we compared ORA marketing literature with the SCM literature. However, future studies could consolidate both research streams to conduct a unified analysis. Moreover, reverse auctions have attracted the attention of research across many disciplines. A significant stream of ORA literature is produced by the information systems field (Sambhara, 2020). Complementing our findings with those from information systems might enhance the discussion on ORAs, especially by exploring the intersection between decision-making and technology usage.

Finally, while we focused on ORAs as a purchasing tool used in organizational buying behavior (Pedersen et al., 2020), we did not explicitly add our findings to such a research stream. We acknowledge that integrative endeavors in organizational buying behavior are relatively old (e.g., Johnston & Lewin, 1996). Thus, understanding ORAs might enrich organizational buying behavior theory, which simultaneously may enhance ORA legitimacy in the marketing literature.

All in all, our systematic review accounts for the scholarly work on ORAs in rigorous marketing and SCM outlets in the 2002–2020 period and assesses the current state of the literature. We provide a new theoretical lens by assimilating three relevant layers of reverse auction research: (1) conceptualization, (2) ORA as a process, and (3) research setting. We discuss intriguing gaps in the literature, while proposing numerous opportunities for future research in the B2B field. The research agenda provides direction for authors, editors, and reviewers in the development of ORA studies. Successful implementation would bring more in-depth scrutiny into how firms are currently selecting suppliers. We thus hope our study provides impetus for quality ORA research.

Appendix A. Brief summary of marketing literature on ORA.

Characteristic	Description	Supportive literature
Primary goal of research	Identifying ORA features and measuring consequences	Kauffman and Leszczyc (2005); Jap and Naik (2008); Muylle and Standaert (2016)
Actors	Buyer, seller, and market maker	Emiliani (2004); Mora Cortez and Johnston (2020) Smelzer & Carr (2003); Emiliani and Stec (2005);
Market philosophy	Competition (among sellers)	Agndal et al. (2007)
Managerial requirement	Internet access and a platform	Sashi and O'Leary (2002); Eng (2004); Dixit et al. (2008); Grewal et al. (2010)
Key managerial output	Supplier selection & purchasing price	Jap (2002, 2003); Úbeda et al. (2015)
Focus of research analysis	Beneficial impact of ORAs for buyers and the adverse consequences for sellers	Schrader et al. (2004); Daly and Nath (2005a); Jap (2007) Engelbrecht-Wiggans et al. (2007); Haruvy and Jap (2013)
Main challenge	Equilibrium between offering quality and price	

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.indmarman.2023.10.011>.

Data availability

No data was used for the research described in the article.

Acknowledgements

We appreciate the help of Jorge Seborga, Raquel Piñán, Ixone Ingunza, María Garate, Iban Ibáñez and Rafael Quintanilla in their professional advice on the defined model. We also value the comments from the anonymous reviewers, the editor and the guest editor. The



current research has received support from Xunta de Galicia (grant GPC-ED431B 2022/10). Funding for open access charge: Universidade de Vigo/CISUG.

## References

- Agndal, H., Axelsson, B., Lindberg, N., & Nordin, F. (2007). Trends in service sourcing practices. *Journal of Business Market Management*, 1(3), 187–208.
- Aloysius, J., Deck, C., Hao, L., & French, R. (2016). An experimental investigation of procurement auctions with asymmetric sellers. *Production and Operations Management*, 25(10), 1763–1777.
- Cabanelas, P., Mora Cortez, R., & Charterina, J. (2023). The buying center concept as a milestone in industrial marketing: Review and research agenda. *Industrial Marketing Management*, 108, 65–78.
- Carter, C. R., & Stevens, C. K. (2007). Electronic reverse auction configuration and its impact on buyer price and supplier perceptions of opportunism: A laboratory experiment. *Journal of Operations Management*, 25(5), 1035–1054.
- Chang, W. S., Chen, B., & Salmon, T. C. (2015). An investigation of the average bid mechanism for procurement auctions. *Management Science*, 61(6), 1237–1254.
- Charki, M. H., Josserand, E., & Charki, N. B. (2011). Toward an ethical understanding of the controversial technology of online reverse auctions. *Journal of Business Ethics*, 98, 17–37.
- Chartered Association of Business Schools (CABS). (2018). Academic Journal Guide. Retrieved from <https://charteredabs.org/academic-journal-guide-2018/>.
- Chaturvedi, A., Katok, E., & Beil, D. R. (2019). Split-award auctions: Insights from theory and experiments. *Management Science*, 65(1), 71–89.
- Chen-Ritzo, C. H., Harrison, T. P., Kwasnica, A. M., & Thomas, D. J. (2005). Better, faster, cheaper: An experimental analysis of a multiattribute reverse auction mechanism with restricted information feedback. *Management Science*, 51(12), 1753–1762.
- Cullen, A. J., & Webster, M. (2007). A model of B2B e-commerce, based on connectivity and purpose. *International Journal of Operations & Production Management*, 27(2), 205–225.
- Daly, S. P., & Nath, P. (2005a). Reverse auctions for relationship marketers. *Industrial Marketing Management*, 34(2), 157–166.
- Daly, S. P., & Nath, P. (2005b). Reverse auctions and buyer–seller relationships: A rejoinder to Emiliani and Stec's commentary. *Industrial Marketing Management*, 34(2), 173–176.
- Dekimpe, M. G., & Deleersnyder, B. (2018). Business cycle research in marketing: A review and research agenda. *Journal of the Academy of Marketing Science*, 46(1), 31–58.
- Ding, M., Eliashberg, J., Huber, J., & Saini, R. (2005). Emotional bidders—An analytical and experimental examination of consumers' behavior in a priceline-like reverse auction. *Management Science*, 51(3), 352–364.
- Dixit, A., Whipple, T. W., Zinkhan, G. M., & Gailey, E. (2008). A taxonomy of information technology-enhanced pricing strategies. *Journal of Business Research*, 61(4), 275–283.
- Driscoll, W. (2019). Google's reverse auctions net 1.2 GW of renewables in 60 minutes. In *PV Magazine*. Retrieved on May 21st, 2020 from <https://www.pv-magazine.com/2019/11/01/googles-reverse-auctions-net-1-2-gw-of-renewables-in-60-minute-s/>.
- Eckhaus, E., Kogan, K., & Perlman, Y. (2013). Enhancing strategic supply decisions by estimating suppliers' marginal costs. *Journal of Supply Chain Management*, 49(4), 96–107.
- Emiliani, M. L. (2000). Business-to-business online auctions: Key issues for purchasing process improvement. *Supply Chain Management: An International Journal*, 5(4), 176–186.
- Emiliani, M. L. (2004). Sourcing in the global aerospace supply chain using online reverse auctions. *Industrial Marketing Management*, 33(1), 65–72.
- Emiliani, M. L. (2005). Regulating B2B online reverse auctions through voluntary codes of conduct. *Industrial Marketing Management*, 34(5), 526–534.
- Emiliani, M. L., & Stec, D. J. (2005). Commentary on “reverse auctions for relationship marketers” by Daly and Nath. *Industrial Marketing Management*, 34(2), 167–171.
- Eng, T. Y. (2004). The role of e-marketplaces in supply chain management. *Industrial Marketing Management*, 33(2), 97–105.
- Engelbrecht-Wiggans, R., Haruvy, E., & Katok, E. (2007). A comparison of buyer-determined and price-based multi-attribute mechanisms. *Marketing Science*, 26(5), 629–641.
- Engelbrecht-Wiggans, R., & Katok, E. (2006). E-sourcing in procurement: Theory and behavior in reverse auctions with noncompetitive contracts. *Management Science*, 52(4), 581–596.
- Forde, M. (2019). Reverse auctions on the rise among younger procurement professionals. In *Supply Chain Dive*. Retrieved on May 21st, 2021 from <https://www.supplychaindive.com/news/reverse-auctions-rise-younger-procurement-professionals/558582/>.
- Fugger, N., Katok, E., & Wambach, A. (2016). Collusion in dynamic buyer-determined reverse auctions. *Management Science*, 62(2), 518–533.
- Fugger, N., Katok, E., & Wambach, A. (2019). Trust in Procurement Interactions. *Management Science*, 65(11), 5110–5127.
- Gallien, J., & Wein, L. M. (2005). A smart market for industrial procurement with capacity constraints. *Management Science*, 51(1), 76–91.
- Gattiker, T. F., Huang, X., & Schwarz, J. L. (2007). Negotiation, email, and internet reverse auctions: How sourcing mechanisms deployed by buyers affect suppliers' trust. *Journal of Operations Management*, 25(1), 184–202.
- Golgeci, I., & Gligor, D. M. (2017). The interplay between key marketing and supply chain management capabilities: The role of integrative mechanisms. *Journal of Business & Industrial Marketing*, 32(3), 472–483.
- Grewal, R., Chakravarty, A., & Saini, A. (2010). Governance mechanisms in business-to-business electronic markets. *Journal of Marketing*, 74(4), 45–62.
- Hanák, T., Marović, I., & Jajac, N. (2018). Effect of electronic reverse auctions on competition and abnormally low bids in public construction procurement. *Technical Gazette*, 25(Suppl. 1), 144–148.
- Hartley, J. L., Lane, M. D., & Duplaga, E. A. (2006). Exploring the barriers to the adoption of e-auctions for sourcing. *International Journal of Operations & Production Management*, 26(2), 202–221.
- Haruvy, E., & Jap, S. (2012). Designing B2B markets. In G. L. Lilien, & R. Grewal (Eds.), *Handbook of business-to-business marketing* (pp. 639–656). Cheltenham, UK: Edward Elgar.
- Haruvy, E., & Jap, S. D. (2013). Differentiated bidders and bidding behavior in procurement auctions. *Journal of Marketing Research*, 50(2), 241–258.
- Haruvy, E., & Katok, E. (2013). Increasing revenue by decreasing information in procurement auctions. *Production and Operations Management*, 22(1), 19–35.
- Jap, S. D. (2002). Online reverse auctions: Issues, themes, and prospects for the future. *Journal of the Academy of Marketing Science*, 30(4), 506–525.
- Jap, S. D. (2003). An exploratory study of the introduction of online reverse auctions. *Journal of Marketing*, 67(3), 96–107.
- Jap, S. D. (2007). The impact of online reverse auction design on buyer–supplier relationships. *Journal of Marketing*, 71(1), 146–159.
- Jap, S. D., & Haruvy, E. (2008). Interorganizational relationships and bidding behavior in industrial online reverse auctions. *Journal of Marketing Research*, 45(5), 550–561.
- Jap, S. D., & Naik, P. A. (2008). Bidanalyzer: A method for estimation and selection of dynamic bidding models. *Marketing Science*, 27(6), 949–960.
- Jiang, L. (2015). Managing supplier competition and sourcing sequence for component manufacturing. *Production and Operations Management*, 24(2), 287–310.
- Johnston, W. J., & Lewin, J. E. (1996). Organizational buying behavior: Toward an integrative framework. *Journal of Business Research*, 35(1), 1–15.
- Karabağ, O., & Tan, B. (2019). An empirical analysis of the main drivers affecting the buyer surplus in E-auctions. *International Journal of Production Research*, 57(11), 3435–3465.
- Kauffman, R. G., & Leszczyc, P. T. P. (2005). An optimization approach to business buyer choice sets: How many suppliers should be included? *Industrial Marketing Management*, 34(1), 3–12.
- Kaufmann, L., & Carter, C. R. (2004). Deciding on the mode of negotiation: To auction or not to auction electronically. *Journal of Supply Chain Management*, 40(1), 15–26.
- Khamitov, M., Grégoire, Y., & Suri, A. (2020). A systematic review of brand transgression, service failure recovery and product-harm crisis: Integration and guiding insights. *Journal of the Academy of Marketing Science*, 48, 519–542.
- Kienzler, M., & Kowalkowski, C. (2017). Pricing strategy: A review of 22 years of marketing research. *Journal of Business Research*, 78, 101–110.
- Liang, C., Hong, Y., Chen, P. Y., & Shao, B. B. (2022). The screening role of design parameters for service procurement auctions in online service outsourcing platforms. *Information Systems Research*, 33(4), 1324–1343.
- Lösch, A., & Lambert, J. S. (2007). E-Reverse auctions revisited: An analysis of context, Buyer–Supplier relations and information behavior. *Journal of Supply Chain Management*, 43(4), 47–63.
- Möller, K., & Parvinen, P. (2015). An impact-oriented implementation approach in business marketing research: Introduction to the Special Issue on “Implementing Strategies and Theories of B2B Marketing and Sales Management.”. *Industrial Marketing Management*, 45, 3–11.
- Mora Cortez, R., Gilliland, D. I., & Johnston, W. J. (2019). Revisiting the theory of business-to-business advertising. In *Industrial Marketing Management (published online)*.
- Mora Cortez, R., & Johnston, W. J. (2020). How to recover B2B relationships after a failed online reverse auction. *Journal of Business & Industrial Marketing*, 35(3), 551–563.
- Morgan, N. A., Whitley, K. A., Feng, H., & Chari, S. (2019). Research in marketing strategy. *Journal of the Academy of Marketing Science*, 47(1), 4–29.
- Morgan, R. M., & Hunt, S. D. (1994). The commitment trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38.
- Muyile, S., & Standaert, W. (2016). The use of procedural fairness in electronic reverse auctions to enhance relationship quality. *Psychology & Marketing*, 33(4), 283–296.
- Narus, J. A., & Steward, M. (2017). The challenges online supply management tools pose for B2B marketers. In *The thriving marketer conference*, State College, PA.
- Palmatier, R. W., Houston, M. B., & Hulland, J. (2018). Review articles: Purpose, process, and structure. *Journal of the Academy of Marketing Science*, 46, 1–5.
- Pearcy, D., Giunipero, L., & Wilson, A. (2007). A model of relational governance in reverse auctions. *Journal of Supply Chain Management*, 43(1), 4–15.
- Pedersen, J., Ellegaard, C., & Kragh, H. (2020). The praxis of studying interorganizational practices in B2B marketing and purchasing—a critical literature review. *Industrial Marketing Management*, 85, 7–20.
- Pinker, E. J., Seidmann, A., & Vakrat, Y. (2003). Managing online auctions: Current business and research issues. *Management Science*, 49(11), 1457–1484.
- Rook, L. (2013). Mental models: A robust definition. *The Learning Organization*, 20(1), 38–47.
- Rust, R. T. (2020). The future of marketing. *International Journal of Research in Marketing*, 37, 15–26.
- Rust, R. T., & Cooil, B. (1994). Reliability measures for qualitative data: Theory and implications. *Journal of Marketing Research*, 31(1), 1–14.
- Sambhara, C. (2020). Information management challenges and the adverse consequences of using reverse auctions. *Information & Management*, 57(8), Article 103363.

- Sambhara, C., Rai, A., Keil, M., & Kasi, V. (2017). Risks and controls in internet-enabled reverse auctions: Perspectives from buyers and suppliers. *Journal of Management Information Systems*, 34(4), 1113–1142.
- Sashi, C. M., & O'Leary, B. (2002). The role of internet auctions in the expansion of B2B markets. *Industrial Marketing Management*, 31(2), 103–110.
- Schrader, R. W., Schrader, J. T., & Eller, E. P. (2004). Strategic implications of reverse auctions. *Journal of Business-to-Business Marketing*, 11(1–2), 61–82.
- Scott, A. (2018). Carrier Bidding Behavior in Truckload Spot Auctions. *Journal of Business Logistics*, 39(4), 267–281. <https://doi.org/10.1111/jbl.12194>
- Shachat, J., & Tan, L. (2015). An experimental investigation of auctions and bargaining in procurement. *Management Science*, 61(5), 1036–1051.
- Smart, A., & Harrison, A. (2003). Online reverse auctions and their role in buyer–supplier relationships. *Journal of Purchasing and Supply Management*, 9(5–6), 257–268.
- Smeltzer, L. R., & Carr, A. S. (2003). Electronic reverse auctions: Promises, risks and conditions for success. *Industrial Marketing Management*, 32(6), 481–488. [https://doi.org/10.1016/S0019-8501\(02\)00257-2](https://doi.org/10.1016/S0019-8501(02)00257-2)
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333–339.
- Standing, S., & Standing, C. (2015). Service value exchange in B2B electronic marketplaces. *Journal of Business & Industrial Marketing*, 30(6), 723–732.
- Tassabehji, R., Taylor, W. A., Beach, R., & Wood, A. (2006). Reverse e-auctions and supplier-buyer relationships: An exploratory study. *International Journal of Operations & Production Management*, 26(2), 166–184.
- Tayaran, H., & Ghazanfari, M. (2020). A framework for online reverse auction based on market maker learning with a risk-averse buyer. *Mathematical Problems in Engineering*, 5604246, 1–13.
- Úbeda, R., Alsua, C., & Carrasco, N. (2015). Purchasing models and organizational performance: A study of key strategic tools. *Journal of Business Research*, 68(2), 177–188.
- Wan, Z., & Beil, D. R. (2009). RFQ Auctions with Supplier Qualification Screening. *Operations Research*, 57(4), 934–949.
- Wang, Q., Feng, J., Jiang, X., & Xie, J. (2019). Multiple-winner award rules in online procurement auctions. *Production and Operations Management*, 28(10), 2533–2551.
- Watson, R., Wilson, H. N., Smart, P., & Macdonald, E. K. (2018). Harnessing difference: A capability-based framework for stakeholder engagement in environmental innovation. *Journal of Product Innovation Management*, 35(2), 254–279.
- Wenger, E. (2004). Communities of practice and social learning systems. In K. Starkey, S. Tempest, & A. McKinlay (Eds.), *How organizations learn, managing the search for knowledge* (2nd ed.). London: Thomson Learning.
- Yeniyurt, S., Watson, S., Carter, C. R., & Stevens, C. K. (2011). To bid or not to bid: Drivers of bidding behavior in electronic reverse auctions. *Journal of Supply Chain Management*, 47, 60–72.
- Zucchini, W., MacDonald, I. R., & Langrock, R. (2016). *Hidden Markov Models for Time Series An Introduction Using R*. In (Second Edition). Routledge.