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Purchasing and innovation: Past, present and future of the field of research

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Purchasing and innovation: Past, present and future of the field of research

Abstract

This paper introduces the special topic forum (STF) on purchasing and innovation. Presenting the findings from a systematic literature review, we take stock of the current state of the field, delineating themes, theories and methods, and identifying key trends over time. Our study shows a take-off in research on purchasing and innovation during the last decade. This has predominantly focused on private sector manufacturing firms although a recent expansion into public sector research is evident. Large-scale surveys and case studies are still the dominant research methods where the unit of analysis is typically the 'firm' or 'project'. The findings also show how in the past the field was driven by questions on how purchasing can facilitate different types of innovation projects, seeking to derive practical implications, and rarely making explicit statements regarding theories applied; this still characterises much of the research but we find an increasing focus on theory development. We also see a shift in the type of technological innovation being investigated: past studies tended to focus on the role of purchasing in new product development (NPD) projects, which reflected a relatively low degree of technological uncertainty, but we see a trend towards innovation projects facing technological uncertainty. Research shows how this requires new ways of sourcing innovations and therefore new ways for purchasing to facilitate innovation sourcing. On the basis of the review, we offer our guidance for future research avenues to 1) carry out more research on procurement of innovation in the public sector; 2) consider new theories and research methods, and 3) go beyond firm-level or dyadic analysis to research networks and ecosystems. We conclude by introducing the papers in the STF.

1. Introduction: Innovation as a new objective of purchasing

Looking at trends across industries, it is easy to see why so many organisations, spanning commercial companies and not-for-profit public sector organisations, are under pressure to innovate. Consider how the automotive industry needs to innovate to transform itself from combustion engine power to electrification: a paradigmatic change that also affects other industries, such as, the aerospace and train industries. These are examples of industries that are literally in a race to develop new technological solutions to tackle sustainability challenges, but other industries face similar challenges to develop more sustainable product-service solutions (Sousa-Zomer and Cauchick Miguel, 2018). Development of radically new – or even disruptive – technologies (Christensen, 1997) and combining new and existing technologies in novel ways are key to innovating.

Few companies can manage innovation projects all on their own and instead rely on the wealth of resources that they can access through external partners. Indeed, a study conducted by McKinsey & Company (Russo et al., 2017) shows that with 25%-45% of revenues across all sectors coming from product innovation and up to 65% of innovations sourced from external partners, open innovation (Chesbrough, 2003) has become the norm. Suppliers are critical external sources of innovation and tapping supplier innovations is particularly important not only in new product development (NPD) but also in the fuzzy front end of innovation (Wagner, 2012). This may entail innovation *with* suppliers through co-development (Fliess and Becker, 2006; Le Dain et al., 2020) or innovation *from* suppliers, i.e. sourcing innovative solutions, where recent research points to a shift from sourcing from suppliers

within existing supply networks to scouting from new and distant suppliers, such as start-ups (Kurpjuweit et al., 2021; Legenvre and Gualandris, 2018; Narasimhan and Narayanan, 2013).

Traditionally, innovating with and from external partners has been the remit of R&D but it is increasingly recognised that purchasing, as external interface and process owner with suppliers, has a key role to play (Luzzini et al., 2015). Although innovation is not the primary objective for purchasing departments, it has become a strategic priority both in research (Spina et al., 2013) and practice (Deloitte, 2018). Although there is a long tradition of research into the involvement of purchasing in NPD projects (e.g., Atuahene-Gima, 1995; Wynstra et al., 2003), the need for purchasing to play an active role in innovation is more recent.

Recognising the increasing importance of purchasing for successful innovation, the IPSERA (International Purchasing & Supply Education & Research Association) SIG (Special Interest Group) was formed in 2017. This Special Topic Forum (STF) in the *Journal of Purchasing & Supply Management* is a strategic initiative by the SIG to encourage more research on purchasing and innovation. The STF aims to bring together articles on a range of themes related to purchasing and innovation research.

In this introduction to the STF, we take stock of the current state of the field of purchasing and innovation research. We do this by presenting a systematic review of the literature, characterising the nature of the field in terms of themes, theory and methods, and identifying key trends over time. On the basis of the review, we offer our guidance for future research avenues before we briefly introduce the papers in the STF.

2. A review of purchasing and innovation literature

2.1. Methodology: Keyword search in the Scopus database

To ensure a rigorous and systematic approach, we followed the guidance for systematic literature review prescribed by Tranfield et al. (2003) and Durach et al. (2017). Our ambition was to attain a comprehensive view of how research on purchasing and innovation has developed rather than a review restricted to certain academic journals. Therefore, we decided to conduct our search across a broad range of academic journals. Conference papers were not included to ensure that all papers included were peer reviewed. Figure 1 gives an overview of the 12-step process for identifying and coding articles and the resulting numbers of articles from each step.

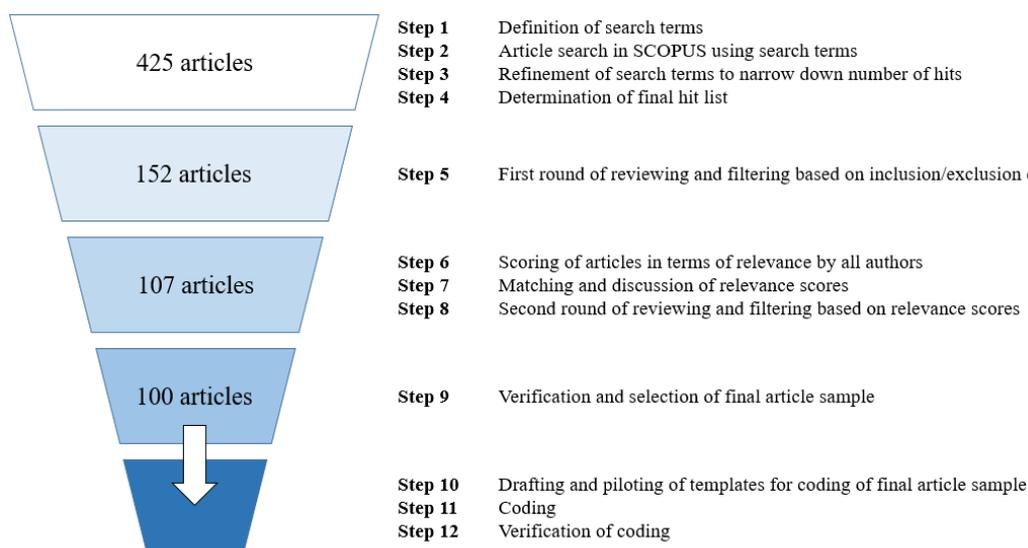


Figure 1 – Systematic literature search and coding process

Following Tranfield et al. (2003), an initial search in Scopus using the main search terms “purchasing AND innovation” complemented with “supplier AND innovation” resulted in a large number of hits (Step 1 and 2). In subsequent steps 3 and 4, we refined the search syntax by complementing the core keywords with appropriate synonyms to further reduce the number of hits to 647 and to eventually determine a final hit list of 425 articles for further processing (see Table 1).

Table 1 – Search terms and number of hits

Search terms	Number of hits
purchasing AND innovation	5163
AND supplier AND innovation	
purchasing AND suppliers AND innovation	647
OR purchasing AND suppliers AND "product development"	
OR buyer AND seller AND innovation	
OR buyer AND seller AND "product development"	
OR procurement AND suppliers AND innovation	
OR procurement AND suppliers AND "product development"	
OR customer AND seller AND innovation	
OR customer AND seller AND "product development"	
purchasing AND supplier AND innovation	425
OR purchasing AND supplier AND "product development"	
OR procurement AND supplier AND innovation	
OR procurement AND supplier AND "product development"	

Note: search log appearing in bold chosen for Step 5 in Figure 1

The rationale for selecting articles covered two angles: purchasing's relationship with internal stakeholders and purchasing's relationship with external stakeholders during innovation activities. Our main inclusion criterion for articles was thus that they concern the purchasing function's role in managing innovation internally or externally. Articles focusing exclusively on, for example, supplier involvement with no mentioning of the role of purchasing were excluded. This resulted in a pre-selection of 152 articles.

To further fine grain the search results, articles were rated with respect to the content's relevance for the STF theme at Step 6. All authors reviewed each abstract and scored its relevance using one of three categories (i.e., Yes, Maybe, No); scoring results then were matched and discussed in case of divergent scoring at Step 7. A second review round based on the relevance of articles round then further reduced the pool of articles to 107 in Step 8.

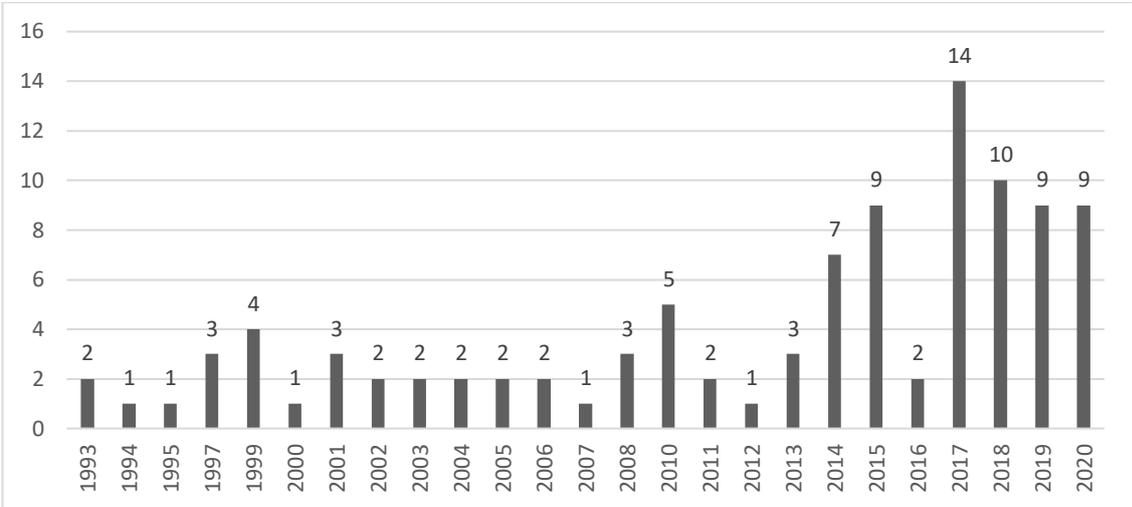
By means of a final verification round in Step 9, another seven articles – either duplicates, redundant or irrelevant – were removed to arrive at a final sample of 100 articles for further analysis. The categories and levels for coding were pre-tested with the first 20 articles and fine-tuned (Step 10). In order to increase the accuracy at the coding stage, all articles in the final sample were coded by at least two of the authors acting as first and second rater, respectively (Step 11). In cases of rater disagreement, a consensus and final code was reached via discussion among all authors (Step 12). These steps were essential to ensure inter-rater reliability (Voss et al., 2002).

2.2. Findings

2.2.1. Development in the field over time: take-off in the last decade

The descriptive analysis reveals an increasing number of papers published on the topic of purchasing and innovation (Figure 2). Whereas publications were sporadic during the 1990s and early 2000s, the number of published articles began to slowly increase from 2013 to peak in 2017 after a short drop in 2016. Since then, the theme of purchasing and innovation has been covered regularly and steadily by journals with around nine articles published per year.

Our analysis also reveals a dispersed journal universe, most prominent outlets for research about purchasing and innovation being *Industrial Marketing Management* (n=8) followed by the *International Journal of Innovation Management* (n=6) and then by the *International Journal of Operations and Production Management*, *International Journal of Procurement Management*, the *Journal of Purchasing and Supply Management* and the *Journal of Supply Chain Management* (n=5) as well as the *Journal of Business and Industrial Marketing* (n=4).



Figure

2 – Number of published articles on purchasing and innovation over time

2.2.2. Context: private, with a recent expansion into the public sector

Within the final sample of 100 publications, 80 of these relate to the private sector and 20 focus on the public sector, typically under the theme of public procurement of innovation. Research on public procurement of innovation is still in its infancy with 90% of the publications appearing from 2014 onwards.

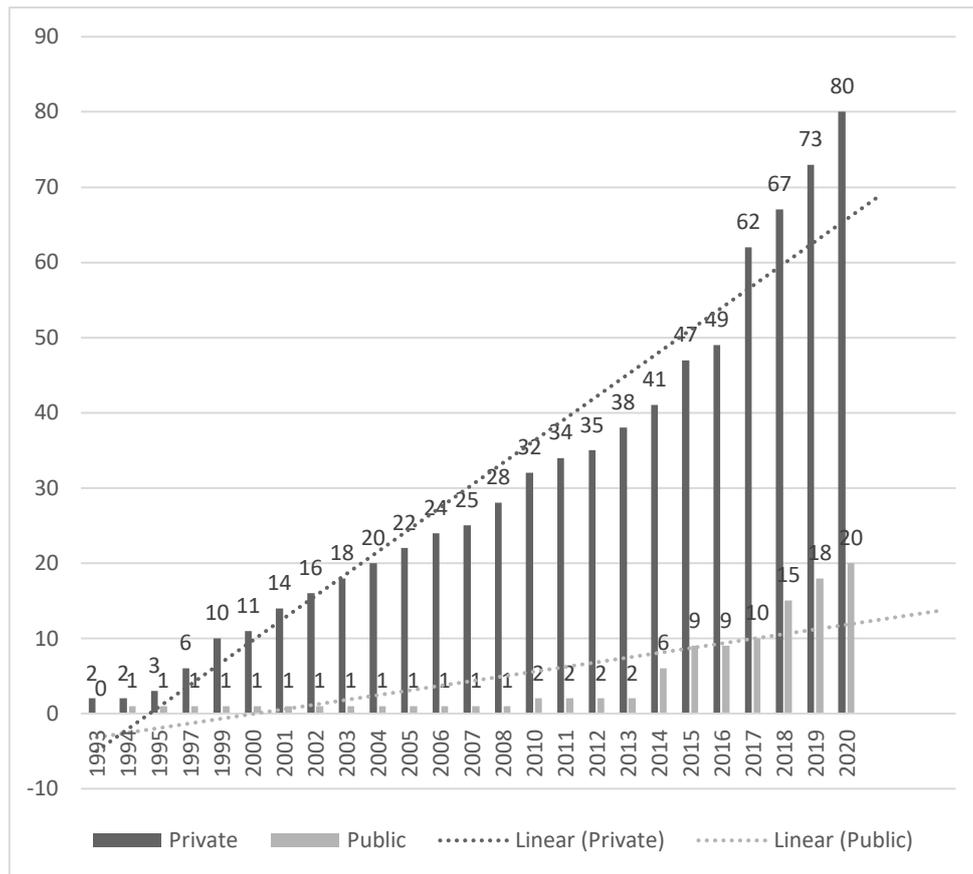


Figure 3 – Number of articles covering the private vs. public sphere over time

In the private sector, as can be seen in Figure 3, there has been a limited but constant number of publications since 1993. With roots in the International Motor Vehicle Programme (IMVP), the studies by Womack et al. (1990), Clark and Fujimoto (1991), Clark and Wheelwright (1992) and Lamming (1993) laid the foundation for a stream of research on lean production and supply in which supply partnerships was seen as a cornerstone. The IMVP research focused on the automotive industry, comparing Japanese automotive practices with those found in the European and North American automotive industry. Documenting how Japanese vehicle manufacturers achieved significant performance benefits through what became known as early supplier involvement in NPD, these studies were early reference points although, with the exception of Lamming (1993), they did not specifically focus on purchasing. The original IMVP studies were published as books, and therefore not part of our sample, although these are widely regarded as seminal.

Focusing on journal articles, the first authors identified to focus specifically on the role of purchasing in NPD were Hakansson & Eriksson (1993), who explored practices that purchasing needs to manage within collaborative network for technical development and O’Neal (1993) who suggested to integrate purchasing and suppliers early in a concurrent engineering approach. These studies gave limited details on the companies and industries they drew from but were both cross-sectional. Looking at all papers, it can be observed that 54% do not specify the sector and in the remaining 46% three main sectors were addressed, namely manufacturing industry (15 papers), automotive industry (7 papers) and electronics & telecommunication industry (7). Overall, it is clear that the early bias on the automotive industry is no longer in evidence.

Research on the public procurement of innovation was limited until 2014. From there on,

we see an emerging interest in public procurement as an innovation policy instrument although the number of publications remains limited and sporadic (Figure 3). The public sector research mainly focuses on the role of government procurement in facilitating and supporting innovation (Rampersad et al., 2020) or on the various perspectives of the different actors (procurers, clients, suppliers) involved for in tenders (Rocha, 2018). Most of the time, the specific public sector is not specified (70% of the cases). The two main sectors explored are healthcare (3 papers) and energy, water and oil & gas (3 papers).

2.2.3. Method & Analysis: focus on surveys and case studies

The research in the relatively young field of inquiry on purchasing and innovation is mainly based on case studies (40%), and surveys (40%). Other methods include consortium benchmarking (Schiele, 2010), expert interviews (Winter and Lasch, 2016), world cafés (Goldberg and Schiele, 2018) and action research (Billington and Davidson, 2013). A few papers report on design studies that aim, for example, to develop and test a web-based supplier evaluation tool (Humphreys et al., 2005) or implement a co-design risk measurement process (Le Dain et al., 2010). Comparing the first and the second half of the research period, no shift in methodological approach is apparent. In fact, the distribution of methods remains fairly stable over time.

We can discern a strong tradition of case study research, which often builds on cross-functional data collection from multiple interviews with purchasing, R&D and marketing informants. Moreover, where case studies have been used to research supplier relationship issues, interviews with suppliers have been used to reveal supplier perspectives (Melander and Lakemond, 2015; Wynstra et al., 2003). Regardless of the number of case studies reported in papers, an average of 29 interviews forms the basis of these although some build on a very large number of interviews, for example “over 100” in one longitudinal case study (Åberg and Bengtson, 2015). Many papers also use workshops to complement other sources of empirical data (Jääskeläinen et al.; Wynstra et al., 2003).

39 papers build on survey methods, drawing on an average of 222 respondents ranging from 40 (McIvor and Humphreys, 2004) to 800 (Uyarra et al., 2014; median 171). In terms of method of analysis, regression analysis (16 cases), often in combination with a CFA is the most popular, followed by PLS and co-variance-based structural equation modelling. PLS papers have been published since 2015, while co-variance based papers spread over the entire period, likewise regression analyses.

2.2.4. Unit of analysis: focus on ‘firm’ and ‘project’ with buyer perspective

Most literature review papers in purchasing and supply management distinguish between three inter-organizational units of analysis, i.e. dyadic buyer-supplier relationships, chains and networks, in addition to one intra-organizational unit i.e., the firm (Miemczyk et al., 2012; Spina et al., 2013). Focusing on innovation, we also coded for projects as a separate unit of analysis, as many studies refer specifically to innovation or NPD projects as their unit of analysis, often reporting on several projects within a single firm as part of embedded case studies (Melander and Tell, 2019; Picaud-Bello et al., 2019).

Regardless of the unit of analysis, 75% of the papers adopt the buyer’s perspective, which is partly due to our search and selection criteria as our interest is on the role of purchasing in innovation. However, 17% of the papers in our sample report the perspective of both buyers and suppliers, including Nellore and Balachandra, (2001), Croom (2001), Humphreys et al.

(2005) and, more recently, Patala et al. (2014) and Askfors and Fornstedt (2018). As shown by Croom (2001), gaining the views of suppliers can be instrumental to improve the understanding of mismatches in buyer-supplier perceptions on, for example, sourcing criteria in NPD projects. Likewise in their public sector study, Askfors and Fornstedt (2018) identify strong differences in perceptions where suppliers have the impression that price is the only determinant for winning bids despite procurement managers believing that price is not the primary focus.

We observe that in private sector studies, the most prominent unit of analysis is the firm (41 papers out of 83). At the firm level, most papers focus on how the purchasing function contributes to innovation in terms of organization (Schiele, 2010), process (Verrollot et al., 2017), methods and tools (Le Dain et al., 2010; Legenvre and Gualandris, 2018), as well as capabilities (Gualandris et al., 2018) or purchasing capabilities (Hanghøj and Mols, 2015).

The second most prominent unit of analysis is 'project' and is mainly adopted in private sector (24 papers in private 2 in public), and typically to better understand how purchasing is involved in specific NPD projects. Internally, most studies investigate collaboration between purchasing and other functions involved in NPD projects, such as marketing or R&D (Gonzalez-Zapatero et al., 2017; Melander and Tell, 2019). Externally, many studies have looked at how purchasing can facilitate supplier integration in NPD (Hartley et al., 1997; Le Dain et al., 2010; Ragatz et al., 2002).

'Buyer-supplier relationships' is the third unit of analysis adopted in both private (14 papers) and public sectors (7 papers) to explore the enabling factors of supplier contributions to buyer innovativeness, such as customer attractiveness (Steenstra et al., 2020) or trust (Bag, 2018), but also the potential tensions between partners around, for example, property rights (Heikkila et al., 2016) or opportunistic behaviour (Steinle et al., 2020).

2.2.5. Increasing focus on theory but still a practical field

Identifying the theories that are used to guide research on purchasing and innovation is not an easy task, because papers typically mention and/or reference theories without making explicit statements as to whether or not these were in fact adopted as theoretical lenses. As shown in Figure 4, the overall picture is that 2/3 of the papers are either not based on any theory or they adopt no specific theory, with the final third being explicitly based on theory. Those without any theory often have limited literature reviews. Those papers coded as "no specific theory adopted" typically have extensive literature reviews in which the authors refer to theories, but without choosing any specific theories as perspective or seeking to contribute to these. For example, even authors who refer extensively to theory, such as Dowlatshahi (1999) and Dowlatshahi and Contreras (1999) discuss theory building in general terms rather than in the context of specific theories to which they seek to contribute.

In particular, early papers from 1993 through to 2005 were not based on any theory. Many early contributions focused on practical framework development, such as the research by Ragatz et al. (1997), which identified success factors for integrating suppliers into NPD, or the research by Wynstra and colleagues (2000; 2003). However, this does not necessarily mean that the research projects upon which these papers were based were not guided by any theory. For example, Wynstra's early research on purchasing involvement in NPD was influenced by the industrial network perspective of the Industrial Marketing and Purchasing (IMP) group but this was not evident from the journal publications that resulted from this research that were instead focused on managerial framework development.

Popular theories include contingency theory and information processing theory but there is not one dominant theory. Even the resource-based view and knowledge-based view are relatively rarely applied and many papers still do not build on any theory, especially where these are published in more practitioner-based journals. Overall, the picture has traditionally been of a practical rather than a very theoretical field.

More recently, it is clear that authors refer much more explicitly to theory, either seeking to build, elaborate or test theory. This might reflect an increasing expectation amongst journal editors and reviewers that research may benefit from making significant contributions to theory rather than simply result in practical, managerial guidelines. However, in our view this trend also reflects a growing maturity of the field as researchers are more aware of the need to apply theories to better elucidate and explain particular issues.

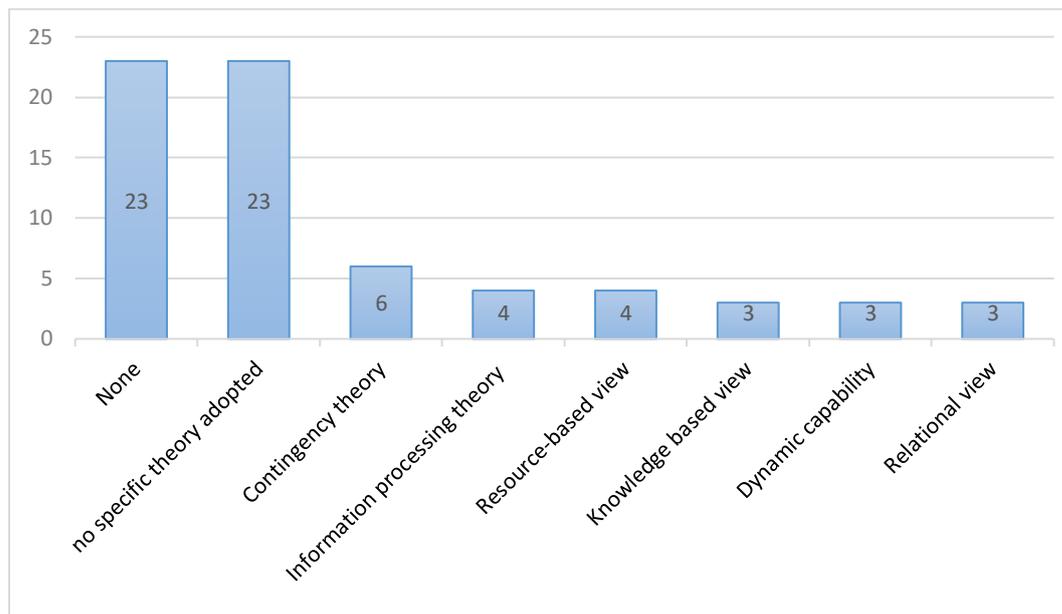


Figure 4 – Theories used

2.2.6. Type of innovation: increasing focus on technological uncertainty

Early studies (Atuahene-Gima, 1995; Hakansson and Eriksson, 1993; McGinnis and Vallopra, 1999; Wynstra et al., 2000) tended to focus on NPD projects in general terms without detailing the degree of technological change involved in NPD projects. Some of the early contributions to the field suggested that the degree of technological change could be important to understand the nature of purchasing involvement. For example, Van der Valk and Wynstra (2005) argued that purchasing involvement in NPD needs to be analysed from a contingency perspective, although van Echtelt et al. (2007) found that “project innovativeness would not require a differentiated approach in setting up supplier collaboration” (p. 656). Early studies therefore did not paint a clear picture of how technological uncertainty would affect purchasing involvement.

Another stream of research focused on project complexity and uncertainty. Lakemond et al. (2001) highlighted the importance of project size and complexity as driving factors requiring different configurations of purchasing involvement. Lakemond and colleagues later pursued the theme of technological uncertainty (Bengtsson et al., 2013; Melander and Lakemond, 2015), arguing that projects involving high technological uncertainty sees R&D take the lead on relational governance with purchasing’s involvement reduced to taking care of

transactional management, echoing Brattström and Richtner's (Brattström and Richtner) idea of purchasing as the "bad cop" with R&D as "good cop".

As the field has matured, we observe more studies that specifically focus on NPD projects involving a high degree of technological change, characterising these as *radical* (Åberg and Bengtson, 2015; Goldberg and Schiele, 2018), *discontinuous* (Picaud-Bello et al., 2019) or *breakthrough* (Cousins et al., 2011). Many studies simply refer to NPD projects that involve a high degree of technological *change* or *uncertainty* (Bengtsson et al., 2013; Melander and Lakemond, 2015; Mikkelsen and Johnsen, 2019).

Regardless of the conceptual language used to describe the projects being studied, it is clear that there is an increasing focus on innovations that involve a high degree of technological change. This should be seen in the light of the need for companies to push for new green technological solutions, which pushes companies to go beyond mere incremental change to develop new innovations that involve paradigmatic change as reflected in, for example, the automotive industry transitioning from fossil fuelled technology to electrification.

The latest research indicates that purchasing is moving on from its "bad cop" role that leaves relational governance to R&D, but that this requires a higher level of purchasing maturity, new capabilities and new sourcing – or scouting - and supplier relationship strategies to complement existing purchasing practices (Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2019; Picaud-Bello et al., 2019): what Schiele (2010) originally proposed as a new dual innovation- and cost-oriented role of purchasing. Recent studies find a new role for purchasing connecting R&D and purchasing becoming known as "innovation purchasing" (Servajean-Hilst and Calvi, 2018). This new duality has given rise to an emerging ambidexterity perspective that emphasises the opposite and potentially conflicting role of purchasing in having to balance the traditional cost-saving (exploitation) and new innovation-focused (exploration) roles (Andersen et al., 2021; Constant et al., 2020; Gualandris et al., 2018).

We also note that the literature is moving away from a pure product development focus to considering both products and services, including business model innovation (Billington and Davidson, 2013; Melander and Arvidsson, 2020). Billington and Davidson (2013) identify a need for new knowledge broker roles and the use of intermediary or "seeker-solver" networks for business model innovation. Research on intermediary roles is not new in the innovation literature but the use of such roles may be of growing importance when companies aim for innovations that transform existing product-service business models.

2.3. Reflections and directions for future research

Since the 1990s, there has been a large and growing body of research on supplier innovation and (early) supplier involvement in NPD as part of an open innovation process (Johnsen, 2009). Our study shows that research on the role of purchasing in innovation took off in the 1990s since when it has grown – although sporadically - since 2013. Where many early papers argued the benefits of involving purchasing in NPD projects and outlined managerial practices for how to ensure those benefits (Ragatz et al., 1997; Wynstra et al., 2003), more recent papers have become more theoretical in focus. In the following we outline the directions for future research that can be discerned from the review of the literature.

2.3.1. Context: more research on procurement of innovation in public sector

Our systematic literature review shows that most research has been conducted in the private sector, typically, within a manufacturing environment. Research on public sector is much rarer although we observed a growth in research on procurement of innovation since 2014. These were dominated by papers on healthcare and energy, water and oil & gas (Askfors and Fornstedt, 2018; Storsjö and Kachali, 2017).

It is widely acknowledged that public procurement can be an instrument of innovation policy (Georghiou et al., 2014). Under the Horizon Europe research programmes, there are frequent calls that relate specifically to public procurement for innovation. These include procuring innovation *from* suppliers, such as how to bridge the financing gap between R&D grants and private investment for scaling up innovative start-ups (what is known as the “valley of death” problem), and innovation *with* suppliers, such as pre-commercial procurement (PCP) or innovation partnerships (PI) (Iossa et al., 2018). There are not only funding opportunities (at least in Europe) for research into these public procurement issues but also real research gaps that provide excellent potential for publication and creating impact on public procurement practice.

The Covid-19 pandemic has shown a need for healthcare innovations to find their way into public healthcare systems. However, public sector innovation, is often hampered by myriad factors, such as the regulations and the multiple actors including politicians, with different perspective and goals who try to influence procurement processes (Askfors and Fornstedt, 2018). Our advice for researchers is to pick up this challenge to study how public procurement organizations at governmental and local levels can better innovate within their complex supply networks.

We also encourage researchers to move beyond product innovations to investigate the role of purchasing in the development of integrated digital product-service solutions (Kohtamäki et al., 2019). Digital servitization strategies require new capabilities and organizational changes (Sklyar et al., 2019). Future research could explore the need to interaction with new external actors to create and capture value from such these business innovation models (Freije et al., 2021; Kohtamäki et al., 2019). This may require more complex analysis, going beyond dyadic to triadic or even network and systems levels of analysis (Windahl and Lakemond, 2006; Wynstra et al., 2015).

2.3.2. Go beyond firm-level or dyadic analysis to networks and ecosystems

Our literature review shows that much research has focused on innovation characterized by a high degree of technological newness and uncertainty. The need for business to transition towards sustainable business models, may require radical, systemic innovation. However, there is still a relative lack of research conducted at the network level. We would advocate that future research adopt a network-level focus or explore ecosystem phenomena. Research in sustainable supply chain management has shown the importance of a wider ecosystems perspective to understand ecologically dominant logics (Montabon et al.) or circular supply chain creation (Batista et al., 2018; Sharma and Henriques, 2005). As innovations may originate from distant suppliers located in adjacent industries, the role of purchasing in accessing such suppliers and the role of intermediaries, including nexus suppliers (Yan et al., 2015) or start-ups (Kurpjuweit et al., 2021), is ideally suited to network or ecosystem research.

Going beyond firm-level or dyadic analysis to networks and ecosystems may require new research methods. Our analysis shows that case study and survey research methods dominate the field. Considering the fact that research on purchasing and innovation inevitably concerns

how purchasing can contribute to innovating with or facilitating access to supplier innovations, we would advise researchers to rely less on single-respondent survey research and instead employ either dyadic buyer-supplier surveys or case studies that build on data from across dyads to develop richer insights into collaborative practices (Flynn et al., 2018 2018). This is especially relevant where the subject concerns sourcing of innovations from wider supply networks or ecosystems (Legenvre and Gualandris, 2018; Narasimhan and Narayanan, 2013). We identified a few examples where supplier interviews highlighted differences in perceptions of, for example, customer sourcing criteria during collaborative NPD projects (Croom, 2001); researchers would be well-advised not only to interview buyers but also suppliers to gain richer insights into buyer-supplier collaboration issues. In fact, the supplier's perspective on buyers may play an important role we need to better understand, also to enable firms to access supplier innovations by being their preferred customers (Schiele, 2012).

Researchers might also want to be more innovative in their choice of research methods, using for example experimental methods (Yan et al., 2020). Experimental scenario-based methods have been used successfully to elaborate knowledge of buyer-supplier negotiations (Kaufmann et al., 2018) and could find wider use also in research on purchasing and innovation.

2.3.3. *Consider new theories*

Our analysis reveals also that the relative scarcity of theory-driven research could be a missed opportunity, respectively a chance for accelerating research progress. If purchasing involvement in innovation is to progress as a field of research it is imperative for researchers in this emerging field to more clearly adopt theoretical perspectives that will improve explanatory power and thereby give more substance to managerial guidance.

As our review has shown, there is still a dominance of traditional theories and we would encourage researchers to be more daring in their choice of theories in order to advance the field. In particular, we would encourage researchers to consider theories that have been developed for the study of complex systems. To highlight one theory: the complex adaptive systems (Georghiou et al., 2014) theory has proved to be useful in empirical studies to study issues of control and emergence in complex supply networks and how companies can use different strategies to reduce complexity and actor inter-dependencies such as modularization (Choi et al.; Matos and Hall, 2007) and delegation of tasks through tiering (Johnsen et al., 2019). Nair et al. (2016) applied CAS to study environmental innovations across supply networks, but use of CAS is otherwise rare despite the emergent themes in purchasing and innovations that clearly relate to these issues. The context of highly complex supply networks as can be found in, for example, the oil and gas or wind power would be especially suitable. There are many other non-traditional theories that are potentially useful; the recent handbook of theories for purchasing, supply chain and management research (Tate et al., 2022) should be a good source of inspiration.

Adopting theoretical perspectives from other fields, such as ambidexterity or absorptive capacity, can also open up new lines of inquiry and provide new evidence for the existence of this research field. For example, we can observe how the dual - and potentially conflicting - challenges for purchasing to contribute effectively to innovation exploitation and exploration (Schiele, 2010) can be usefully researched through an ambidexterity lens; recent publications have explored this theme (Andersen et al., 2021; Constant et al., 2020; Gualandris et al., 2018).

3. Articles in this STF

The STF includes three articles providing complementary insights to improve the understanding of the contribution of purchasing in innovation. The first article focuses on customer attractiveness as a crucial antecedent for producing open innovation. The two other articles address new actionable implications by exploring the possible use of digital tools to facilitate the purchasing integration in innovation projects and by proposing a framework of purchasing activities for managing external resources.

The first paper by Hanne Kragh, Chris Ellegaard and Poul Houman Andersen analyse the problem of customer attractiveness for low-leverage customers when seeking to mobilise supplier resources for the purpose of innovation. The authors show how low-leverage customer companies can make themselves attractive in the eyes of suppliers. The paper thus makes important contributions to the literature on the role of customer attractiveness in supplier resource mobilisation.

The paper by Manuel Wehrle, Hendrik Birkel, Heiko von der Gracht and Evi Hartmann, reports the findings from a Delphi study into the impact of digitalisation on the future of the PSM function managing new product development. Although digitalisation is widely viewed by procurement professionals as critically both now and in future, it is less clear how digitalisation can be applied to enable new product development and innovation. The findings show how experts in the field expect to see the application of different digital tools roll out over the next few decades and for what purpose. The authors outline ten projections organised into three clusters: supplier interface management, project and product management, and data and innovation management.

The paper by Ulrich Schmelzle and Wendy Tate applies a theoretical lens rarely used in purchasing and innovation research, resource orchestration theory (Kaufmann et al., 2018), to investigate purchasing's role in enhancing an organization's innovation performance. They introduce a purchasing-innovation framework and purchasing orchestration (PO) practices, which describe the activities involved in managing the acquisition, integration, re-configuration, and commercialisation of critical resources to enhance the innovation performance of an organisation. Building on case studies, they contribute to theory by developing the concept of PO and enhancing the theoretical understanding of its meaning.

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