A mixed-methods approach to identifying buyers' competencies for enabling innovation

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Abstract

Purchasing and supply management (PSM) plays a pivotal role in increasing overall competitiveness as buyers interact with innovative suppliers and internal teams. The competence-based view encourages buyers to specialise in a few core competencies, but less is known about the range of competencies needed for innovation. Thus, this article aims to understand the individual competencies that PSM professionals need to bring added value to innovation. To address this gap, our research is first based on the findings of the state of the art. Then, mixed-methods research is conducted. It consists of exploratory analysis based on five in-depth case studies including 23 interviews complemented with an extended survey of 138 PSM professionals highly experienced in innovation. These professionals rated the importance of 31 competencies, out of which 18 were revealed thanks to the qualitative phase. The results of the second phase highlighted and expanded some competencies known and shown new ones.

Keywords: Competencies; Innovation; Purchasing and supply management; Procurement; Mixed methods research; competence-based view

1. Introduction

Considered as a protean concept, innovation can be of several types, product, process or organisational innovation. Innovation is now occurring rapidly that firms can no longer do everything internally and have little choice but to rely on strategic external resources (Castaldi et al., 2011; Chick and Handfield, 2015). From this perspective, the purchasing department, which manages external resources, has a vital role in stimulating innovation in the internal supply chain and externally through coordinating supplier networks (Legenvre and Gualandris, 2018). The integration of external resources requires specific capacities from

buyers within the firm (Koufteros et al., 2005) to be held by the purchasing department (Van Echtelt et al., 2008; Luzzini et al., 2015).

Legenvre and Gualandris (2018) describe three essential capacities for buyers during an innovation process: to explore unmet needs and anticipate future competitive advantages by working closely with other functions and clients; to investigate external opportunities beyond first-tier suppliers to engage with outsiders and new players/suppliers effectively, and to involve suppliers in innovation projects that consistently deliver results over time. There is a lack of knowledge regarding capturing and managing new ideas and, above all, how the purchasing department can help the company improve the innovation process (Legenvre and Gualandris, 2018). To fill this gap, Pihlajamaa et al. (2019) focus on the levers that buyers can use to guide and encourage suppliers to undertake and share the fruits of their creations. For a company, this requires developing its attractiveness as a customer and necessitates a greater focus on suppliers (Tanskanen and Aminof, 2015).

Some studies point out that competencies are critical factors to drive innovation performance (Thai, 2012). More precisely, West et al. (2006) consider the individual elements on a research agenda because individuals are supposed to substantially affect innovation processes' success.

Attention is drawn to the fact that there is a lack of consensus around the terminology of ‘skills’, ‘competencies’ and ‘knowledge’ in similar studies on purchasing and supply management (PSM) (Giunipero et al., 2006; Bals et al., 2019). This conceptual ambiguity has also been underlined in other related supply chain management research studies (Thai, 2012; Derwik and Hellström, 2017). To maintain consistency in this study, we adopt the term "competencies", as the authors Heide et al. (2008) and Bals et al. (2019) do. Competencies include knowledge and skills.

Bals et al. (2019) consider that PSM practitioners need a set of competencies to manage this function in the future. However, given the growing importance of innovation for most companies, the authors do not specify the same set of required competencies for innovation. To address the expectations of organisations in terms of innovation, and focus their efforts on value creation through purchasing rather than on cost reduction alone (Constant et al., 2020), it would be useful for purchasing managers to know what competencies are needed.

The literature has already explored to a limited extent the context of innovation for the purchasing function. Some research addresses this issue in single case studies in large firms from the automotive and electronics industries (Wynstra et al., 2003; Homfeldt et al., 2017; Servajean-Hilst and Calvi, 2018), or by conducting multiple case studies in large companies from several industry sectors (Legenvre and Gualandris, 2018). Although necessary when the subject was emerging, this exploratory research does not provide an accurate understanding of the skills needed by buyers to manage innovation.

Drawing from the resource-based view (RBV) and competence-based view, the objective of this article is to address the research gaps mentioned earlier. Therefore, it aims at answering the following main research question: What are the individual competencies that PSM professionals need to bring added value to innovation? To achieve this goal, we first focus on the concepts of the required competencies in PSM, the competencies necessary to deal with tasks and challenges in innovation teams, and the competencies needed by buyers to innovate. We approach this through an interdisciplinary review of the state of the art, which aims to construct a competence profile that could serve as a framework to categorise and analyse the empirical data gathered in this study. We then describe the methods based on qualitative data collection (case studies) to update the list of competencies in the innovation context. Secondly, to extend our results in the broader scope thanks to a quantitative data collection (an extended survey of 138 PSM professionals) based on the previous results. This approach is described as a "modification of theory" (Seuring et al., 2020). The results are then reported, followed by a discussion, conclusion, limitations and opportunities for future research.

2. Theoretical background

2.1 The resource-based view and competence-based view

To consistently perform better and more effectively than their competitors, RBV posits that companies need to identify tangible and intangible resources and capabilities (Wernerfelt, 1984; Barney, 1991). The RBV lens has been the most general theoretical framework of study in the fields of purchasing and supply management (Wynstra et al., 2019) and the involvement of purchasing in innovation (Luzzini et al., 2015).
Le Deist and Winterton (2005, p. 39) define competence as "*the competences required of an occupation include both conceptual (cognitive, knowledge and understanding) and*

operational (functional, psycho-motoric and applied skill) competences". From an individual effectiveness perspective, the competences are also "*both conceptual (meta-competence, including learning to learn) and operational (social competence, including behaviours and attitudes)*" (Le Deist and Winterton, 2005, p. 39).

According to Grant (1991), competencies are potentially more sustainable than resources. The competence-based view (CBV) encourages buyers to specialise in a few core competencies (Li, 2011) to achieve competitive advantages (Freiling et al., 2008). Sanchez et al. (1996) define a terminology corresponding to the fundamental objectives of explanation as to the competence-based view. Competence is "*the ability to sustain the coordinated deployment of assets in ways that help a firm achieve its goals*" (Sanchez et al., 1996, p. 8). Sanchez (2004, p. 531) underlines that increasing managers' own cognitive flexibility impacts creating and realizing new kinds of value-creating product offers and new ways of managing innovation processes.

There is a lack of empirical evidence to support the theory and one of the limits of CBV is his lack of theoretical transparency. Freiling et al. (2008) call for clarification of these capabilities and competencies' nature and strategic value.

Furthermore, Van Weele and Van Raaij (2014) acknowledge a lack of research focused on the "strategies and competences to manage external resources" (p. 60). The literature remains very limited on leveraging purchasing and supply knowledge and expertise (Van Weele and Van Raaij, 2014). Whether PSM is strategic depends on its ability to develop superior PSM competencies, capabilities, and experience of PSM professionals, develop and sustain special knowledge of markets and supply chains, and secure and protect superior procurement competence (Van Weele and Van Raaij, 2014). The CBV is efficiently implemented about PSM (Sergeeva, 2019) to remain a strategic function and justify why some buyers search for know-how in their suppliers (Li, 2011).

2.2 Competencies needed in Purchasing and supply management

Let's start by stating that the PSM field is "*the discipline that is concerned with the management of external sources – goods, services, capabilities, and knowledge – that are necessary for running, maintaining and managing the primary and secondary support processes of a firm at the most favourable conditions*" (Van Weele, 2010, p. 8). While competencies (based on capabilities and knowledge) seem essential in this definition, there has been very little research on competencies related explicitly to PSM (Mulder et al., 2005;

Tassabehji and Moorhouse, 2008; Bals et al. 2019). One of the latest systematic literature reviews is indicating a lack of consensus around general skillsets for PSM professionals (Stek and Schiele, 2021). Bals et al. (2019) highlight the gap regarding the lack of a list of up-to-date competencies in the field of PSM.

The recruitment of competent PSM agents is essential because, according to Feisel et al. (2008), the satisfaction of both end customers and internal customers will depend first and foremost on the competencies and know-how of the buyers; in particular, their ability to anticipate needs (Mulder et al., 2005). This upstream approach, consisting of economic intelligence and technology watch, will enable buyers to be informed about the components of the microenvironment and the developments and innovations in supplier markets and then inform stakeholders in innovation projects. The role of these particular competencies is also highlighted in the study of Mulder et al. (2005), which includes all the buyer's key competencies such as: Integral thinking, analytical abilities, generalising, information management, financial management, customer orientation, negotiating, advising, networking and legal-solving abilities.

As the purchasing function evolves, so do the competencies expected of buyers (Giunipero et al., 2006; Prajogo and Sohal, 2013). Buyers are now responsible for managing and implementing new initiatives and innovations to meet current challenges, such as global procurement, the development of information technology and increased awareness of green and socially sustainable procurement (Karttunen, 2018).

Building on previous works in the field of PSM, supply chains and human resource management, Bals et al. (2019) identify the most important new areas of competence for purchasers in the coming years. The ability to manage digitisation (Sergeeva, 2019; Viale and Zouari, 2020), innovation (Servajean-Hilst and Calvi, 2018), and sustainability has been underlined as essential. Furthermore, Bals et al. (2019) summarise and classify competencies into the following categories: technical competencies (product knowledge, etc.); interpersonal competencies (leadership, etc.); internal and external organisational competencies (openness, customer focus, relationship management, etc.); and strategic competencies (risk management, critical thinking, global view, etc.). However, this classification is not focused on innovation and does not enable PSM agents to identify the competencies required for innovation versus other purposes.

2.3 Competencies needed to innovate

Generally speaking, creativity requires something appropriate – an idea, an insight or a solution – that solves a problem, and innovation requires that this idea be implemented, in the sense of making progress and being operational. Indeed, innovation requires overcoming several obstacles or steps to be implemented, including analysing and evaluating problems and implementing solutions (Nakano and Wechsler, 2018). It can be stated that creativity leads to innovation (Lawson et al., 2015), that it is the first step. However, other authors believe that creativity comes from intrinsic motivation, whereas innovation results from extrinsic motives and seeking to go beyond practice norms (Antonites and Van Vuuren, 2005). Therefore, creativity is considered a core competence.

Many authors (Cerinsek and Dolinsek, 2009; Gupta and Barua, 2018) consider that employees are the most critical resource and the leading force for innovation. Cerinsek and Dolinsek (2009) define several levers to facilitate a corporate culture that stimulates people to innovate and undertake innovation for their company. To innovate, firms now need different employee competencies and know-how to identify these competencies. For example, companies must recruit people who lead and think 'outside the box' (Cerinsek and Dolinsek, 2009). Chatenier et al. (2010) complete those results and highlight the essential competencies professionals need to participate in a successful innovation team. Individuals are deemed to be the key to creating and sharing knowledge in teamwork (Jordan and Bak, 2016). Their study aimed to draw up a competency profile that companies can use to select and train professionals to include innovation teams. The study highlighted three key competencies: creating a win-win situation, understanding social situations and listening to maintain networks. Those skills could be useful for buyers, but the number of skills set seems to be limited.

2.4 Competencies needed by buyers to innovate

Van Weele and Van Raaij (2014) see 'innovation and competence management' as one of the four critical developments of PSM in the strategic management literature. The PSM team can start expanding internal collaboration and understanding needs in order to be recognised as "competent internal partners" (Legenvre and Gualandris, 2018).

As innovation is considered a strategic matter for firms, the key competencies of a strategic buyer are, therefore, to be managerial to work and integrate within all departments and be sociable to maintain a good relationship with a supplier (Castaldi et al., 2011).

Homfeldt et al. (2017) examine the contributions of the purchasing function to the innovation process in the automotive industry and the methods and practices used to benefit from the innovative capacity of key suppliers. They find that purchasers contribute to the innovation process in three capacities (which are competencies according to the CBV): the capacity to identify innovative ideas in the supply market and promote these ideas internally, the ability to manage the business and economic activities, and the capacity to manage the supplier base (Homfeldt et al., 2017).

2.4.1 The capacity to identify innovative ideas in the supply market and promote these ideas internally

The purchasing department is well-positioned to identify market ideas (Servajean-Hilst and Calvi, 2018; Legenvre and Gualandris, 2018) through frequent interactions with the supplier base. When a relationship of trust is established between buyers and suppliers, the latter are better able to approach a buyer with ideas (Homfeldt et al., 2017). In a second step, the purchasing department can make these ideas known internally and then help to integrate them into new innovation projects or products (Hartmann et al., 2012).

2.4.2 The capacity to manage the business and economic activities

To turn an idea into an innovation, the idea must meet a market, the innovation must be financially viable (Antonites and Van Vuuren, 2005). As the financial aspect is significant, the purchasing department has a full place thanks to its role of ‘managing economic activities’ (Homfeldt et al., 2017).

2.4.3 The capacity to manage a supplier base

Organisations depend on their internal abilities and external linkages for innovations (Lawson et al., 2015; Gupta and Barua, 2018). Those authors consider that selecting the best suppliers is a prerequisite for the success of the whole supply chain. Researchers recognise the purchasing function as the most relevant for selecting and integrating innovative and available suppliers into an innovation process (Schiele, 2006; Van Echtelt et al., 2008; Legenvre and Gualandris, 2018). Servajean-Hilst and Calvi (2018) show that buyers also motivate their supplier panels to develop specific knowledge for innovation in addition to 'new' suppliers.

Pihlajamaa et al. (2019) define how a company can strengthen the innovation capacity of its suppliers, guide its suppliers' innovation processes and/or encourage its suppliers to share

their innovations. The article notes that when the relationship between customer and supplier is based on common needs and expectations, stimulating innovation is easier for both parties. It is understood that the higher the key supplier's rate of innovation and the greater the balance between the buyer's innovation needs and the key supplier's innovation goals.

Table 2 gives an overview of the main categories identified by Tassabehji and Moorhouse (2008) and considered the most elaborately categorised model by Bals et al. (2019). These coherent categories include the technical competencies, as '*fundamental administrative skills necessary for any procurement professional also category management, global sourcing development, detailed cost driver analysis necessitating advanced analytical capabilities essential to create value',* the interpersonal competencies as '*necessary for interaction with people in teams and on an individual level including written and oral communication, conflict resolution, influencing and persuasion, leadership and cultural awareness'*, the internal enterprise '*relate to the overall business and how the different functions interaction*', the external enterprise '*relate to the supply chain/network and its stakeholders*' and the strategic business '*relate to broader strategic issues and how procurement can impact on overall organisational value such as planning and managing strategic partnerships, risk management*' (Tassabehji and Moorhouse, 2008, p. 59).

As we have seen, previous exploratory research, although necessary when the subject was emerging, does not provide an accurate understanding of the skills needed by buyers to manage innovation. Based on the state of the art above from the fields of PSM and innovation, Table 2 builds on an overview of the competencies that might enable PSM professionals to create value during innovation.

Articles were selected thanks to a keyword-based search. Keywords cover the core contents of PSM/SCM and Innovation. The column N1 of Table 2 is focused on the PSM/SCM field (authors and journals from those fields), we also looked at studies that focused particularly on procurement/SCM professional skills. We used keywords like “competencies” “competency” “competence” “skills” “procurement” “purchaser” “buyer” and “innovation” “new product development” “innovation process” “open innovation”.

The column N2 of Table 2 is focused on the innovation field particularly (authors and journals from those fields) with keywords “competencies” “competency” “competence” “skills” “innovation” “new product development” “innovation process” “open innovation” without specifically focusing on procurement / purchasing agents.

Table 2. Overview of competencies that might enable professionals to innovate.

Categorisation	N1		N2	
	1. Competencies required (strategic, best in class and future) by PSM	1. PSM Field Authors	2.Competencies needed during innovation without focusing on purchasing agents.	2.Innovation Field Authors
Technical competencies	Innovation sourcing Innovative sourcing approaches Product knowledge Project management	Tassabehji and Moorhouse (2008); Prajogo and Sohal (2013); Homfeldt et al. (2017); Shou and Wang (2017); Karttunen (2018); Legenvre and Gualandris (2018); Bals et al. (2019)	Project management	Antonites and Van Vuuren (2005) Lawson et al. (2015)
Interpersonal competencies	Curiosity Dealing with ambiguity Leadership Openness Passion Self-management Teamwork	Giunipero et al. (2006) Mulder et al. (2005) Tassabehji and Moorhouse (2008); Jordan and Bak (2016) Shou and Wang (2017) Bals et al. (2019)	Creativity Curiosity Openness Teamwork Understanding social situations	Antonites and Van Vuuren (2005) Friedman and Antal (2005); Cerinsek and Dolinsek (2009) Chatenier et al. (2010); Lawson et al. (2015); Nakano and Wechsler (2018)
Internal enterprise competencies	Building trust Communication competencies Change management Marketing Networking R&D Sales Stakeholder relationship	Mulder et al. (2005); Giunipero et al. (2006); Tassabehji and Moorhouse (2008); Feisel et al. (2008); Van Weele, and Van Raaij (2014); Jordan and Bak (2016); Homfeldt et al. (2017); Bals et al. (2019); Pihlajamaa et al. (2019)	Creating a win-win situation Networking Communication competencies Building trust	Friedman and Antal (2005) Chatenier et al. (2010) Midler et al. (2012); Damanpour (1991) Fay et al. (2015) Lawson et al. (2015)
External enterprise competencies	Communication competencies Change management Customer focus Networking Stakeholder relationship	Mulder et al. (2005) Giunipero et al. (2006); Tassabehji and Moorhouse (2008); Feisel et al. (2008); Van Weele, and Van Raaij (2014); Prajogo and Sohal (2013); Jordan and Bak (2016); Homfeldt et al.	Creating a win-win situation Networking Communication competencies	Chatenier et al. (2010) Friedman and Antal (2005) Damanpour (1991)

		(2017); Legenvre and Gualandris (2018); Bals et al. (2019); Pihlajamaa et al. (2019)		
Strategic business competencies	Critical thinking Holistic view Risk management Taking risks Understanding and managing complexity Sustainability	Giunipero et al. (2006) Yen-Chun et al. (2013) Karttunen (2018); Legenvre and Gualandris (2018); Bals et al. (2019)	Critical thinking	Nakano and Wechsler (2018)

We can note that the following competencies 'Marketing, R&D and Sales' have been considered by Mulder et al. (2005), Tassabehji and Moorhouse (2008) and Bals et al. (2019) as potential competencies for the buyer. They argue that cross-functional skills are needed to "engage and interact with constituents across marketing, sales and R&D" (Bals et al., 2019, p.3). 'Selling' means to be able to "sell purchasing internally" (Mulder et al., 2005, p. 191).

3. Research Methodology: Mixed methods approach

The mixed methods are helpful for researchers seeking a "modification of theory" (Seuring et al., 2020). The use of mixed methods across business and management disciplines is growing (Cameron and Molina-Azorin, 2011). Mixed methods research is defined as mixing qualitative and quantitative data in one research study (Harrison and Reilly, 2011; Johnson et al., 2007) and is based on a pragmatic ground (Creswell et al., 2003) aimed at finding the most effective way to answer a research question (Harrison and Reilly, 2011; Johnson and Onwuegbuzie, 2004; Molina-Azorin, 2012). According to Fitzgerald and Howcroft (1998) and Teddlie and Tashakkori (2003), combining research methods enables their complementary strengths to be maximised and brings a complete picture of the phenomenon studied (Morse, 2003). Thus, mixed methods draw on multiple data sources (Bazeley, 2008). As a result, mixed methods research can answer research questions that other methodologies can not (Molina-Azorin, 2012). Since our research question aims to identify the purchasing competencies required for innovation, we decided that answering it first needed a qualitative study in a very innovative industry and then quantitative data collection and analysis to expand the scope. Golicic and Davis (2012) highlight the benefits of implementing mixed methods research in supply chain management and related fields (e.g., purchasing and logistics). This approach can advance knowledge due to better ideas initiation or development or even more robust analysis with complementary data or interpretation.

Moreover, our research question aims to identify the purchasing competencies required for innovation and since the variables are unknown and there is no model from the literature to use as a guide, therefore, this study is based on an exploratory sequential methods design mixing both qualitative and quantitative methods (Creswell and Clark, 2018). An exploratory sequential mixed methods design begins with a qualitative phase involving the collection and analysis of qualitative data. In the qualitative phase, various qualitative methods can be used, including interviews, grounded theory, case studies or thematic content analysis. The results of this first phase are used to develop or inform the subsequent quantitative phase, which can involve a survey or other type of quantitative data collection (Creswell and Clark, 2018). The main purpose is to evaluate the possibility of extending qualitative findings to a larger sample.

As our research explores a terrain where there is very little empirical research in existence today, case studies provide input to the deeper exploration. Golicic and David (2011, p. 732) mentioned "*When the phenomenon of interest is new or complex, relevant variables are not easily identified and extant theories are not available to explain the phenomenon. In this situation, a qualitative approach is often the preferred starting point in order to build an understanding grounded in a detailed description of the phenomenon generated by collecting field data. The qualitative approach provides researchers with access to deeper levels of understanding of new or complex phenomena by yielding a high level of detail*". Therefore, we choose to adopt this approach and start with the qualitative phase in order to learn from agri-food firms considered as pioneers.

We believe that case study research enables us to better grasp reality (Seuring, 2005). Indeed, we have visited the factories and we have been able to challenge what was said during the interviews based on our presence "on the field". Thus, we think that case studies were the right way to overcome some limitations that may appear in qualitative studies based on interviews. In addition, the possibility to interview and visit/observe factories helps us triangulate our results which reinforced the results validity (Stuart et al., 2002).

4. Qualitative design and data analysis (Phase 1)

4.1 Data collection and analysis

As part of our explorative approach, we contacted the French national professional association of buyers and purchasing managers called CNA (which represents around

150,000 PSM professionals in France), in particular a Regional President and the National Vice President. To present them our research and ask them who would best lead to an answer to our research question: "Which individual competencies do PSM professionals need to add value during innovation?".

According to the CNA and the French national association of food industries (ANIA), the agri-food sector is particularly dynamic in innovation. It could be an inspiring lever for other sectors. From an academic perspective, the agri-food sector is faced with an unprecedented acceleration of new products and offers (Tripoli and Schmidhuber, 2018). More than 69% of agri-food firms in France are constantly innovating (in terms of products, processes or organisation), far superior to other sectors (Viale, 2019). Indeed, as stated by the Ministry of Agriculture and Agri-food industry (2020), the food industry has historically been one of the most innovative of all manufacturing industries (62% for other manufacturing industries and 51% for all sectors)[1]. In this industry, innovation processes tend to accelerate and open up by involving stakeholders outside the companies. We contacted ANIA to access well-known innovative firms. The initial list of 17 firms was contacted by phone and asked to participate in the study; 9 firms agreed to participate. With the support of experts in ANIA, we selected five agri-food firms that differed in size, based on significant and recent innovations and the purchasing department's involvement in strategic decisions during innovation.

Since a multi-case study is based entirely on the value of each case, the question of case selection remains fundamental to ensuring the scientific contribution of the research. As stipulated by Miles and Huberman (2003), sampling decisions are made by looking only at "certain actors" (in our case, buyers) confronted with "certain problems"; in our paper, the activities are related to innovation in a specific context: the agri-food industry.

Proof of expertise in PSM and innovation was to be reflected by our respondents' role in their organisation. We asked the actors we met who were involved in the innovation process and who would best answer our research question. It is important to question different practitioners within a company to triangulate (Myers and Newman, 2007). According to Karsenti and Demers (2000), this research method allows the in-depth study of individuals and the detailed description of their specificity and the context in which they evolve. A multi-case study enables the emergence of convergences between cases. Eisenhardt and Graebner (2007) consider that an appropriate number of cases depends on the existing knowledge of

[1] French Ministry of Agriculture and Agri-food industry (2021), Panorama des IAA 2020 : la fiche « Les facteurs de production de l'entreprise » https://agriculture.gouv.fr/enjeux-des-industries-agroalimentaires (Accessed 7 May 2021)

the theme studied, the theme of the study and the possibility of obtaining information, adding that between four and ten cases can be considered valid research. We gathered data from primary and secondary sources. Thus, our approach enabled us to obtain a triadic view (marketing, purchasing and R&D/innovation) (Table 3). This allowed observing the problem from different angles to extend the understanding and improve the accuracy of the outcomes. Furthermore, PSM professionals with various hierarchical and functional roles were included to ensure a more holistic view of the research topic.

The interview guide is based on the following themes: Presentation of the company and the place of innovation, the organisation of the PSM department, background information of the interviewee, the involvement and contributions of purchasing to innovation, the key skills needed by purchasing in order to succeed (split in categories: Technical competencies, Interpersonal competencies, Internal enterprise competencies, External enterprise competencies, Strategic business competencies).

We conducted face-to-face interviews and tape-recorded 23 semi-structured interviews with the main actors involved in the innovation process. Each interview lasted, on average, for 1 hour. All the interviews were transcribed and the transcripts were sent to the industry participants for their comments and approval (code names were used to protect identity). This approach should also provide more objective responses to our questions and allow us to compare answers from different points of view.

Table 3. Agri-food firms' and interviewees' profiles and job titles.

Presentation of agri-food firms	**Code**	**Interviewee's job title**	**2019 Annual turnover (million €)**
Firm A: Vegetable raw materials, flavouring, colouring and technological ingredients. Alpha is an independent family-run business. This SME has managed to industrialise the dehydration of local products. Alpha produces and markets ingredients for culinary preparations for restaurants and raw vegetable materials and technological components for the food industry and the B2C industry (own-brand products). Number of employees = 252[2]	A1 A2 A3 A4 A5 A6	CEO Innovation Director Supply Chain and Purchasing Director Marketing Director Purchasing Manager (raw materials) Direct Procurement Agent	47
Firm B: Fruit drinks manufacturer. A SME	B1	CEO	174

[2] Based on firms' annual reports 2019

with solid expertise in the fruit juice market. In line with consumer expectations, the consumption of organic juices and nectars has increased by more than 62% in five years. This is an underlying trend and the format of fresh fruit juice has become increasingly popular. Number of employees = 490 (part of a group of 6500 employees)	B2 B3	Supply Chain and Procurement Director Head of R&D	
Firm C: Premium chocolate. A company that makes seasonal chocolate, mainly for Christmas and Easter. Their liqueur chocolates feature in a niche market, in which Gamma is the clear leader in France. Number of employees = 120	C1 C2 C3 C4	Purchasing Director Head of R&D/Innovation Operational Director Marketing Manager	17
Firm D: National firm specialised in the processing, preparation and distribution of meat products. Delta specialises in cutting, processing and preparing fresh and cooked meat, as well as prepared products. Number of employees = 5380	D1 D2 D3 D4	Purchasing Director Purchasing Manager Marketing Manager R&D Manager	385,9
Firm E: A multinational firm specialising in chocolate confectionery and food for human consumption. Strong values guide this company, referred to as the "five principles": Quality, Responsibility, Mutuality, Efficiency and Freedom. The founder strove to adopt an economic model inspired by the "mutuality of benefits" for all stakeholders: employees, customers, and suppliers. Number of employees = 4250 (part of a group of 130 000 employees)	E1 E2 E3 E4 E5 E6	Packaging Buying Manager Head of Innovation and R&D Head of Logistics Buying France Head of Marketing France Project Manager for Innovation Lead Buying Manager	778,7

Note: B2C = business-to-consumer; SME = small and medium-sized enterprise

The secondary data collected consist of publicly available materials (e.g., company websites and documents provided by the interviewees). These data are mainly annual reviews of projects and success stories and insights into main areas for development in the future. The various documents allowed us to gather historical and background information about the firms. The data also cover our field observations from the production lines and offices of the companies we visited.

The combination of data collected enables us to triangulate several sources and ensure internal validity. The unit of analysis is the purchasing agent during innovation. We used NVivo software for the coding process, assigning codes to the primary and secondary data.

Coding was completed when data saturation occurred, in line with Miles and Huberman's (2003) description.

This first phase provided an in-depth view of PSM competencies required in innovation projects in each organisation and allowed us to collect data about the subject. This initial qualitative stage helped prepare for the second phase: a quantitative study with a methodological framework and questionnaire.

4.2 Presentation of qualitative results

Our 23 in-depth interviews allow us to present the set of competencies that, according to the respondents, buyers need to contribute to the innovation process. To identify the competencies that professionals consider necessary in the innovation process, we asked participants to discuss their key contributions and the competencies that helped them succeed in this specific innovation context (Table 4). The respondents identified a total of 31 competencies. They were ranked according to the number of people who cited each of them in the different interviews. 31 out of 42 competencies were mentioned during the explorative interviews. Below, we present some verbatims for the main competencies according to the number of times they were cited by respondents, starting with the most frequently mentioned.

***Innovation sourcing*:** All respondents provided us with many examples. The buyer develops the ability to find new materials, products and suppliers:

> *"Purchases are important for the sourcing of novelties, to have samples to elaborate the recipes, in line with the specifications, with a back-up solution. For example, we ask for basil powder, and he offers us an extract. He also brings his knowledge of the market (problems with harvesting certain fruits, sometimes less known) and the price, of course, according to the volume."* (B3)

***Advanced technical competencies in products and/or services*:** According to most respondents, PSM involves sharing their technical competencies upstream of the innovation process, at innovation meetings, in steering committees and with R&D, product, marketing and sales departments. PSM professionals also provide technical support for the supplier in the manufacturing and prototyping process. This process innovation of the supplier, in which the procurement director is a direct player, leads to product innovation within Delta:

"*We found the technical solution together, so that the pocket does not pierce, we put two ribs opposite each other in the cooking pocket, normally the buyers say 'figure it out, I want that!'*" (D2)

Technical competencies led to the following procurement director joining prestigious professional associations (packaging, raw materials, etc.), being recognised by peers and having an influence in the market:

"It is me who represents Alpha at the European Spice Association, there is no other specialist like me, because I spend ten hours a day there, and for personal interest ... I must be able to explain to the sales representatives the 'product' characteristics, the market characteristics (raw material market, pepper)." (A3)

***Personal credibility within the firm*:** Beyond having internal legitimacy, the buyer below tries to be credible in giving his word about the feasibility of a future innovation project:

"Recognition comes from the seriousness that we put into the follow-up. When you succeed, you are credible. When we tell the team 'go to work', it is not to tell them 'stop' two weeks later!" (D2)

***Perseverance*:** A company's ability to innovate goes through successive stages of trial and error:

"You don't have to be afraid of failure to innovate and persevere! We have kept our childlike spirit." (B1)

Research takes place within all our case study firms, whether in R&D, marketing, or the PSM departments, where ideas and innovations can sometimes be implemented without being an intentional process or expected by a particular customer. Sometimes, an idea is 'accidental' or is obtained following an error. This phenomenon is close to serendipity.

***Weak signal detection*:** The buyer develops an ability to detect weak signals from various sources, such as suppliers, internal-external customers, the environment and technology. For example:

"*I have several sources, specialised magazines, trade shows, my network, suppliers. I accept a lot of prospects, even if I know I won't buy from them. It's just to know, to anticipate, the benchmark. I have many appointments!*" (A5)

"We are the eyes and ears of the outside world and, if we have a 'gut feeling', we bring ideas in." (B2)

The goal will be to transform these environmental signals into signs for stakeholders and intelligible information and insights, and then share them for decision making.

***Capacity to federate*:** The following extract represents the buyer's ability to federate internal customers (i.e., any internal actor participating in the innovation process):

"Ability to lead R&D through purchasing, to mobilise and federate several functions around an innovation project. Then it will be necessary to dedicate the necessary resources to minimise the time needed to implement the innovation." (E3)

***Adaptation*:** Buyers adapt to be able to work with their interlocutors (internal and external) and so that they can anticipate the transformations needed in innovation projects (adaptation of specifications, unpredictable difficulties, etc.):

"Whether internally or externally, faced with the difficulties, if I don't deploy an unparalleled ability to adapt to my interlocutors and changes, I cannot succeed in such strategic innovation projects." (C1)

***Entrepreneurship*:** According to some examples identified by respondents, it appears that buyers develop entrepreneurial competencies by proposing multiple ideas and leading the project. In the example of a new pork-based product, the buyer initiated the idea and managed the project:

"In the example of the pork tomahawk, a particularly innovative project, the genesis of the project came from the thinking of our Meat Buyer, who, using his knowledge of beef, drew inspiration from the cutting of the beef tomahawk to transpose it to pork. This idea was therefore used as a basis for working with our suppliers." (D4)

A firm capable of identifying and motivating PSM agents in innovation projects would maintain or even create a competitive advantage.

Table 4. Case study interviews compared with the state of the art: an overview of competencies needed for PSM during innovation highlighting previous findings and those newly added/expanded (*New*)

Categorisation	**Competencies from the state of the art**	**Competencies coded from case studies** (Number of people citing the competence n = 0,1…,

	(Number of people citing the competence n = 0,1…, N)	N) ● **Cited (in bold)** ● *New or added/expanded by respondents (New)*
Technical competencies	Innovation sourcing Innovative sourcing approaches Product knowledge (0) Project management	**Innovation sourcing (23)** **Innovative sourcing approaches (15)** *Advanced technical competencies in products/services (22) (New)* **Project management** *(focused on innovation) (15) (New)*
Interpersonal competencies	Creativity Curiosity Dealing with ambiguity Leadership Openness (5) Passion (2) Self-management (3) Teamwork (5) Understanding social situations (0)	**Creativity** (7) **Curiosity** (22) **Dealing with ambiguity** (6) **Leadership** (8) *Adaptation (to people, organisational and market changes) (21) (New)* *Entrepreneurship (20) (New)* *Weak signal detection (19) (New)*
Internal enterprise competencies	Building trust Communication competencies Change management (4) Creating a win-win situation (3) Marketing (2) Networking R&D (1) Sales (5)	**Building trust** (10) **Communication** (16) **Networking** *(management and development of an internal network) (19) (New)* *Anticipating internal client needs (11) (New)* *Attractiveness regarding internal partners (13) (New)* *Capacity to federate (21) (New)* *Personal credibility within the firm (23) (New)* *Open-mindedness (to new ideas from colleagues, new methods by management team...) (18) (New)* *Perseverance (22) (New)* *Proactivity (12) (New)*
External enterprise competencies	Communication competencies Creating a win-win situation (3) Stakeholder relationship (5) Customer focus (4) Networking	**Communication** (13) **Networking** *(management and development of an external network) (19) (New)* *Anticipating market needs (9) (New)* *Attractiveness regarding external partners (15) (New)* *Capacity to develop supplier relationships (20) (New)* *Open-mindedness (to new ideas, methods from suppliers, etc.) (18) (New)*
Strategic business competencies	Critical thinking Holistic view Risk management Taking risks (4) Understanding and managing complexity (3) Sustainability	**Critical thinking (15)** **Holistic view (19)** **Risk management (10)** **Sustainability (8)**

Within Table 4, the number of people mentioned in brackets is the number of respondents that identified the competence mentioned. We have selected the competences as items for Phase 2 according to the number of occurrences in the interviews. Some of them had not been cited whereas others were very often mentioned (e.g., innovation sourcing, curiosity).

Looking at the occurrences, we define a minimum threshold of 25% otherwise the competence was too marginal. We realised that the first competence selected for Phase 2 was at 6 occurrences (26%), namely "Dealing with ambiguity". Any competence that was cited by the respondents above the 25% threshold has been therefore selected.

5. Quantitative design and data analysis (Phase 2)

5.1 Data collection and analysis

In this second part, we decided to take advantage of the wealth of data from an innovative sector such as agri-food and complement our results in a wider scope and with an extended survey of 138 PSM professionals highly experienced in innovation. This also intends to corroborate findings generated through the qualitative phase (i.e: triangulation) (Teddlie and Tashakkori, 2009). As mentioned by Sanders et al. (2016), today's research questions are of a considerably higher complexity than in the past, calling for multiple data sources and methods to triangulate and provide richer explanations. Recently, Goldsby and Zinn (2018) and Van Hoek (2021) encourage using multimethods, including qualitative/survey combinations, to address complex and nascent phenomena. In their study on "Researching the future of purchasing and supply management", Knight et al. (2020, p.6) incite researchers to "engage with new and/or complex problems; develop innovative research methods".

The quantitative study, aiming at exploring deeper (De Beuckelaer and Wagner, 2012) our research question in a mixed-methods approach (Teddlie and Tashakkori, 2009), was conducted using a questionnaire administered by email from 30th June until 31st July 2020. We performed five pre-tests to validate the questionnaire. The pre-testing was useful in identifying some irrelevant questions and allowed us to improve the questionnaire before its administration in the main study.

The target sampling frame of this study was that the respondent participates actively within procurement and innovation simultaneously, without any restriction about the industry. Since this research aims to identify the PSM competencies needed to innovate, it was a prerequisite that all the respondents had participated in an innovation project. Each person was contacted by email explaining the aim of the research and restrictions linked to the specific PSM profile. In total, 1090 surveys were sent to PSM profiles in different firms, 138 responded with complete information. The response rate is 12.66%; according to Dillman (2000), a range from 6% to 16% is considered acceptable.

The study sample consists of 138 respondents, 36% of whom worked in firms with more than

500 employees. Our sample mainly contains respondents with significant responsibilities in purchasing (57.89% directors or chief purchasing officers) and considerable experience in their respective positions (51.88% of the sample had more than 20 years of experience in the field of PSM). Men contributed 64.66% of our sample. Additionally, 100% of the respondents took part in one or more types of innovation in their company.

Since this research aims to identify the PSM competencies needed to innovate, it was a prerequisite that all the respondents had participated in an innovation project: 34% had participated in a product or service innovation project, 32% in a process innovation project, 29% in an organisational innovation project, and 5% in all three types of innovation.

Our sample mainly contains respondents with significant responsibilities in PSM (57.89% directors or chief purchasing officers) and considerable experience in their respective positions (51.88% have more than 20 years of experience). Descriptive information and sample statistics are included in Table 5.

Table 5. Quantitative study sample description

Innovation type participated to	%	**Company size (nb. Employees)**	%
Process	31.4	<10	6.5
Product or services	35.0	[10-249]	18.8
Organisational	28.5	[250-4999]	37.7
All three types	5.1	5000 or more	37.0
Idea holder		**Industry**	
Respondent	52.9	Construction/Materials	9.4
Other people	47.1	Chemistry/Parachemistry	5.1
Gender		Energy/Water/Environment	4.3
Male	63.8	Aerospace industry	5.1
Female	36.2	Agri-food industry	15.2
Experience in PSM (nb. years)		Automobile industry	5.8
<5	13.8	Luxury industry	5.8
[5-9]	11.6	Metal industry	10.1
[10-20]	24.6	Pharmaceutical industry	9.4

>20	50.0	Transport/Logistics	3.6
Job title		Consulting	4.3
VP Purchasing	4.3	Other secondary industries	12.3
Purchasing Director	25.4	Other tertiary industries	9.4
Purchasing Manager	21.0		
Buyer	29.7		
Purchasing consultants	19.6		

The questionnaire is divided into the five categorisations defined by Tassabehji and Moorhouse (2008): We have asked the following question: "We are interested in managers' perceptions concerning the PSM competencies needed to innovate. Please indicate how important you think each of the following skills is". All items are measured by evaluating the level of importance through statements based on a five-point Likert scale, ranging from 1 (not at all important) to 5 (strongly important).

To analyse the 138 surveys collected, we calculated the means and standard deviations for each of the 31 competencies in line with previous research studies (e.g., Lokshin et al., 2009; Thai, 2012; Pang et al., 2019). However, as a statistical tool to measure a central tendency, the mean shows the disadvantage as being influenced by extreme scores, which is not the case of the median (Field, 2013; Martin, 2016). Additionally, the mode is a useful tool because it enables to spot which score occurred most frequently in the dataset (Field, 2013). Finally, the maximum and minimum scores from the dataset are helpful because they can nuance any result based on a central tendency by pointing out the extreme scores and indicate the range of variation between respondents (Makar and Confrey, 2005).

To produce the most complete possible descriptive statistics for this exploratory quantitative study, we calculated the mean, standard deviation, median, mode and indicated minimum and maximum scores for each competency.

5.2 Presentation of quantitative results

5.2.1 *Description of technical competencies*

Table 5 shows the descriptive statistics for the ranking of each item of technical competencies. 'Innovation sourcing' and 'Management of innovations projects' were deemed by the respondents to be the most critical competencies needed to innovate. However, we

note that the other two competencies have scores close to 4.

Table 5. Quantitative results for technical competencies.

Technical competencies	N	Mean	Standard deviation	Rank	Median	Mode	Max	Min
Innovation sourcing (ability to find innovations and integrate them into the firm)	138	4.255	0.738	1	4	4	5	1
Management of innovation projects	138	4.036	0.752	2	4	4	5	1
Advanced technical competencies in products/services	138	3.927	0.944	3	4	5	5	1
Innovative sourcing approaches (digitisation, supplier selection, etc.)	138	3.920	0.986	4	4	4	5	1

5.2.2 Description of interpersonal competencies

Table 6 shows the complete descriptive statistics for the ranking of each item of interpersonal competencies.

We note that "Curiosity" is ranked first, so it clearly matters as the Median and Mode have been quoted as 5 and minimum 3. We can argue that there is a consensus on this competence. Managers in innovation projects need to seek information and ask questions to avoid any kinds of judgement. This competence could be a catalyst for "Creativity", ranked fifth in this competency category. A capacity for "Adaptation" seems to be necessary. The Median and Mode have been quoted as 5 and minimum 2. Indeed, managers should be able to adapt and make the needed adjustments linked to innovation projects.

Table 6. Quantitative results for interpersonal competencies.

Interpersonal competencies	N	Mean	Standard deviation	Rank	Median	Mode	Max	Min
Curiosity	138	4.635	0.541	1	5	5	5	3
Adaptation	138	4.482	0.676	2	5	5	5	2
Detection of weak signals from the environment	138	4.255	0.653	3	4	4	5	2
Leadership	138	4.211	0.718	4	4	4	5	2

Creativity	138	4.073	0.792	5	4	4	5	1
Entrepreneurship	138	3.912	0.870	6	4	4	5	2
Dealing with ambiguity	138	3.708	0.876	7	4	4	5	1

5.2.3 Description of intra-organisational competencies

Table 7 shows the complete descriptive statistics for the ranking of each item of intra-organisational competencies.

We note that the competence ranked 10 ('Attractiveness regarding internal partners') has a mean greater than 4. We can thus conclude that all competencies which belong to 'intra-organisational competencies', are essential. The first four competencies have the Median and Mode have been quoted as 5 and minimum 3. We can argue that there is a consensus on these competencies.

The three most relevant competencies in the innovation context are "Perseverance", "Capacity to federate" and "Personal credibility within the firm"; these three competencies come from the qualitative phase of the study. According to the respondents, "Perseverance" is considered the essential competence in innovative projects. Indeed, managers in such a context can face several types of problems, so perseverance is important to avoid dropping a project despite the obstacles and difficulties encountered. For managers, personal credibility is a vital element of effective leadership. When managers are viewed as highly credible, they are seen as an asset to the company and people feel motivated to work with them. Lateral linkages involve an effective internal communication that "*facilitates dispersion of ideas within an organisation and increases their amount and diversity, which results in cross-fertilisation of ideas*" (Damanpour, 1991; p. 559).

Table 7. Quantitative results for intra-organisational competencies.

Intra-organisational competencies	N	Mean	Standard deviation	Rank	Median	Mode	Max	Min
Perseverance	138	4.584	0.577	1	5	5	5	3
Capacity to federate	138	4.577	0.552	2	5	5	5	3
Personal credibility within the firm	138	4.569	0.526	3	5	5	5	3
Communication	138	4.504	0.620	4	5	5	5	3

Open-mindedness (to new ideas from colleagues, new methods proposed by the management team ...)	138	4.409	0.601	5	4	4	5	3
Proactivity	138	4.321	0.696	6	4	4	5	2
Anticipation of internal customers' needs	138	4.314	0.683	7	4	4	5	2
Building trust	138	4.204	0.608	8	4	4	5	3
Management and development of an internal network	138	4.161	0.688	9	4	4	5	2
Attractiveness regarding internal partners	138	4.109	0.734	10	4	4	5	2

5.2.4 Description of inter-organisational competencies

Table 8 shows the complete descriptive statistics for the ranking of each item of inter-organisational competencies.

The role of the PSM agent is to answer internal needs, which must pass through the development of relationships with suppliers (the Median and Mode have been quoted as 5 and minimum 2). This is confirmed in Table 8, as buyers place great importance on a buyer's ability to develop this skill. Indeed, inter-company solid linkages fuel innovations that improve both quality and cost (Giunipero et al., 2006).

Respondents also pointed to the importance of open-mindedness in the context of innovation. Indeed, an open-minded position relates to receptivity to new and possibly different ideas, fostering innovation project success.

Table 8. Quantitative results for inter-organisational competencies.

Inter-organisational competencies	N	Mean	Standard deviation	Rank	Median	Mode	Max	Min
Development of the supplier relationship	138	4.613	0.546	1	5	5	5	2
Open-mindedness (to new ideas, methods from suppliers, etc.)	138	4.387	0.656	2	4	5	5	2
Attractiveness regarding	138	4.277	0.683	3	4	4	5	2

external partners								
Communication	138	4.263	0.667	4	4	4	5	2
Anticipation of market needs	138	4.190	0.648	5	4	4	5	2
Network management and development (professional associations, networks, universities or research institutes)	138	3.920	0.832	6	4	4	5	2

5.2.5 Description of strategic competencies

Table 9 shows the complete descriptive statistics for the ranking of each item of strategic competencies. As shown in the table, buyers should have the most holistic view of their supply chain partners and the market. This competency has the Median and Mode have been quoted as 5 and minimum 3. This competency allows them to think and act holistically, negotiate better, and select the most appropriate suppliers for an innovation project. Buyers should plan a risk mitigation strategy so that they can control the entire supply chain management. The capacity to manage risks permits buyers to reduce or eliminate dangerous potential risks and generate both time and cost savings.

The competence related to sustainability comes last in the ranking in Table 9. This suggests that environmental or sustainable competencies are not seen as a priority in considering innovation. This is in contrast to the findings in Bals et al. (2019).

Table 9. Quantitative results for strategic competencies.

Strategic competencies	N	Mean	Standard deviation	Rank	Median	Mode	Max	Min
Holistic view	138	4.445	0.617	1	5	5	5	3
Risk management	138	4.328	0.719	2	4	5	5	2
Critical sense	138	4.146	0.659	3	4	4	5	3
Sustainability	138	3.971	0.766	4	4	4	5	2

6. Discussion

Based on the qualitative phase, we identified an additional 18 competencies to those previously established in the literature (see Table 4).

Concerning technical competencies, our cases show the need for strong competencies at the technical level, which is usually the domain of the R&D Department. In the cases observed, PSM agents have a high level of expertise in the purchasing areas for which they are responsible, both in terms of raw materials and packaging (e.g., to preserve flavours or reduce the weight of containers). This result complements the work of Karttunen (2018) and an interest in the setting up of cross-functional teams. Indeed, it is unlikely that a single person will master the technological specifications, the management of the purchasing process and the project management.

Regarding intra-organisational competencies, linking to credibility competence, Faes et al. (2001) propose recruiting buyers who are likely to be on good terms with internal clients to develop relational qualities. Being able to interact well with others would facilitate a better understanding of the other functions of the firm, thus increasing the impact of the buyer and the credibility competence. This way, would help PSM promote ideas internally (Homfeldt et al., 2017) and integrate them into new innovation projects (Hartmann et al., 2012).

According to the respondents, 'Perseverance' is considered as one of the most relevant competencies. Persistence is an expression of motivation. Sustained commitment and perseverance despite failures is probably the most decisive determining factor in creativity. As pointed out by Ribeiro and Furtado (2015, p. 267), '*the risk of failure is a necessary element of any innovation project. Therefore, it cannot be said to invalidate the deployment of an innovative procurement policy*'.

As we noted, the competence ranked 10 'Attractiveness regarding internal partners' has a mean greater than 4. We can thus conclude that all the competencies constituting 'Internal organisational competencies' are important. This could be explained as these competencies have an impact on teamwork. Fay et al. (2015) consider that capacity to work together, and communication causes the flow of ideas among team members, leading to the enhancement of innovation activities and helps develop mutual trust.

Regarding interpersonal competencies, our results highlight that the underlying characteristic 'curiosity' influences the individual's innovation behaviour. This result complemented Cerinsek and Dolinsek (2009) work who defined the importance of the competence 'curiosity' from the innovation field point of view, not on a specific PSM.

According to Antonites and Van Vuuren (2005), an entrepreneur can achieve a specific vision from virtually anything and possesses the following core competencies: creativity and

innovation. Firms need to recruit people who lead and think 'outside the box' because employees are the most important resource and the leading force for innovation (Cerinsek and Dolinsek, 2009).

In the third place of the interpersonal competencies as per our respondents, 'weak signals detection', prospective in nature (Julien et al., 2004), can bring new knowledge. The weak signals detected by buyers can be transformed into insights, as, at some point, these flashes of ingenuity or inventiveness allow buyers to propose something new. In an interview given by Konno to Fayard (2003, p. 6), he explains that "the difference and complementarity that exists between, on the one hand, the capture of weak signals that refer to a fuzzy receptivity without a priori, to tacit professional know-how and intuitions, and on the other hand, rational and explicit knowledge". With few exceptions, firms respond urgently to the occurrence of an unforeseen event, often by suddenly adjusting their value chain (Bohn, 2000). The availability of information with a very high degree of prospective power avoids/reduces the uncertainty that contributes to paralysing rapid decision making.

Regarding inter-organisational competencies, the 'Network management and development' comes last for our respondents (Table 8). This result is in line with the discussion about the gap between theory and practice and the difficulties of bridging the gap between the different worlds.

'Holistic view' is at the first place of the strategic competencies as per our respondents. The responses tended to show that buyers must have the ability to adopt a systemic approach, which confirms the need for these competencies in the future (Bals et al., 2019).

Surprisingly, the low ranking of ‘Sustainability’ (see Table 9) suggests that this issue is not an absolute priority when considering competence in innovation. Many players – such as research institutes and marketing departments – have been emphasising, for several years, some of the same evidence regarding strategic competencies: the search for meaning, the need for a societal role, ecology and biodiversity. This low ranking may have several interpretations. The data were collected during the COVID-19 pandemic outbreak, which had significant impacts on firms' performance. Because of the financial consequences of the sudden drop in business activity worldwide, many companies have had to react by focusing first on their performance (or even survival) in the concise term (Ivanov and Dolgui, 2020). However, environmental and social sustainability issues often take a back seat (Seuring, 2013) when companies are experiencing economic difficulties.

7. Conclusion, research limitations and future directions

A competence profile can be described as the overview of the essential elements of professional competence required for effective performance (Chatenier et al., 2010). Based on a combination of state of the art and rich empirical data, the study provides new insights into the constituent resources, and more specifically, competencies required for purchasing manager participation during innovation to achieve sustainable competitive advantage. It consists of interview-based research (n = 23) in five in-depth case studies complemented with an extended survey of 138 PSM professionals highly experienced in innovation. From our best knowledge, our research is the first to add specific, empirically grounded competencies to the PSM literature in this specific and strategic context.

We used an exploratory case study approach and conducted case studies using a cross-sectional survey to substantiate insights from the qualitative stage. Following the categorisation of competencies by Tassabehji and Moorhouse (2008), we can complement the results by specifying them in the context of innovation.

The case studies extend the literature review findings, as 18 new competencies were added and ranked by the number of people who cited them (e.g., adaptation, advanced technical competencies in products/services, capacity to detect weak signals, perseverance, capacity to federate, personal credibility within the firm, etc.). In the quantitative study, the 138 professionals also emphasised some of the competencies set including those identified through the qualitative phase. In particular, the participants also underlined the high importance of the following competencies: 'perseverance', 'capacity to federate', 'personal credibility within the firm', 'curiosity', 'communication' and 'holistic view'. In particular, the first three competencies come from the qualitative phase.

To create value throughout a chain, PSM actors must be integrated, recognised and have the opportunity to be listened to and followed in their recommendations. This is not possible if the buyer is not credible. It is then necessary to prepare an upstream action plan to achieve this competence. This result echoes a previous study from Midler et al. (2012, p. 168), that "*It is by solving problems at home that one makes oneself credible and readable for possible innovative cooperations*" and recalls the weight of managing intra-organisational activities.

Concerning strategic competencies, all the responses tended to show that buyers must have the ability to adopt a systemic approach, which strengthens the need for these competencies in the future (Bals et al., 2019). Under their capacity to detect weak signals, buyers can anticipate future needs through numerous interactions with stakeholders.

Taking a CBV of the firm and empirically grounded competencies, this research contributes to closing some of the gaps identified by Freiling et al. (2008). We argue the specific competencies identified have an impact on innovation performance and operational efficiency.

From a managerial perspective, this study can show that the purchasing function is in continuous evolution following current contexts. The needs of companies are no longer those of a few years ago. In this way, combining different competencies could help managers evaluate their current competencies and give an idea about the possible improvements. The results provide a basis for human resources managers to determine the required competence for a job description in innovation projects and any staff development processes.

Furthermore, one of the tasks for higher education is to foster innovation and creativity in society according to the declaration of the ministers of education from European countries (Leuven/Louvain-la-Neuve Declaration, 2009). We believe that our research might help.

This study intends to generate insights into the breadth and relevancy of the competencies needed for innovation and develop an overall PSM competency framework. There are, however, limits to this exploratory work. We conducted a state of the art on this nascent research object. An extensive systematic review of the existing literature could be carried out and in order to synthesize the research on PSM competences on the one hand and innovation competences on the other, and therefore shed light on the evolution of the topic.

It might be insightful to integrate the views of suppliers, human resource managers and specialised recruitment firms by asking what they consider to be the most relevant competencies in the context of innovation. This would help to multiply the angles of understanding of the subject and refine the results.

Without wishing to be exhaustive, we present the other different perspectives that would be relevant to explore.

Previous studies (Becheikh et al., 2006) indicate a positive effect of firm size on innovation: large firms can use more resources to innovate and support risky activities than SMEs, and large firms can benefit from economies of scale in R&D, production and marketing (Stock et al., 2002). It might be wise to compare these results by focusing on SMEs. SMEs represent a vital source of economic growth due to the overwhelming majority of their numbers in this industry (Agostini and Nosella, 2018). SMEs have been playing an increasing role in innovation (Chesbrough et al., 2006) and are deliberately engaging in innovation-seeking

strategies and searching for ideas from various external innovation partners, including suppliers, consumers, and other external partners (Brunswicker and Vanhaverbeke, 2011). We can contribute to the sparse literature on PSM in SMEs by identifying relevant competencies needed to innovate. Furthermore, it might be interesting to pursue research with comparative tests of samples to compare the priority of the required competencies according to the type of innovation and the seniority of the PSM.

Insofar as this research is purely exploratory, we suggest that a confirmatory approach be deployed in the future to verify the classification of competencies. This would require conducting a confirmatory factor analysis (CFA) on a new independent sample.

It further appears fruitful to extend the initial results on the competence 'weak signal detection' enriched when cross-referenced with intuition (Kaufmann et al., 2017) and investigate its usefulness in innovation supply management situations to improve decision making.

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