PhD Thesis

Purchasing’s role in contributing to innovation exploration: examining awareness, motivations and new capabilities

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“Rather than simply demanding that their key suppliers cut costs overnight, as GM is now doing, Chrysler enlisted supplier support to make design and engineering changes that would add value and boost productivity. As a result, Chrysler’s parts suppliers have turned in 3,900 suggestions that have saved the company an estimated $156 million in production costs.”

(McWhirter, 1992).

“One emerging challenge for firms is how to obtain innovation from suppliers. This goes above and beyond what current studies have termed as early supplier involvement in new product development initiatives.”

(Schoenherr, 2013)
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ABSTRACT (English)

This study is focused on the management of the innovation process by the firm and the role of purchasing during this process. Facing an increasingly fast-paced environment and new forces such as digitalization, corporate social responsibility practices and multiple risks, purchasing functions are under high pressure to discover and exploit external ideas, knowledge and innovations that can bring value to the buying firms (Handfield et al., 2015; Choi et al., 2015). In the specific research field of purchasing and supply management (PSM), innovation is identified as being the second most competitive priority among 1,055 academic papers published between 2002 and 2012 (Spina et al., 2013), representing 25% of the total interest in strategic purchasing, right after costs management. Thus, despite purchasing traditionally not being regarded as a key contributor to the innovation process, the topic matters.

In highly dynamic environments, sustainable competitive advantage is often driven by the capability to involve suppliers as an important support for innovation (Li and Vanhaverbeke, 2009; Schiele, 2010; Narasimhan and Narayanan, 2013; Bogers, 2014). Purchasing has a premium role in sourcing capabilities from outside the firm (Handfield et al., 2015). This role, say to explore external sources, has been investigated widely mainly in the context of New Product Development (NPD), linking innovation capabilities and purchasing involvement in the NPD process (Benton and Maloni, 2005; Chen et al., 2004; Handfield et al., 1999; Petersen et al., 2003, 2005; Prahinski and Benton, 2004; Ragatz et al., 1997; Johnsen, 2009). Although these papers focus on how suppliers can foster innovation in project development stages in a low-uncertainty context (Van Echtelt et al., 2008; Afuah, 2000), little research exists on how suppliers support firms in the context of higher uncertainty (Johnsen, 2009).

In this research, innovation is seen as a process (Tidd and Bessant, 2018). The first stages of the process are related to scouting, detecting and assessing an innovation, namely innovation exploration. The next stages of the process consist of acquiring, executing, launching and sustaining the innovation, namely innovation exploitation. Innovation exploration, which is the focus of this study, occurs in a context of high uncertainty. It is about finding external capabilities which are new to the firm and new to the existing supply network. Under high technological uncertainty, firms may scout for innovations which are not available within the buying firm’s existing environment (Melander, 2014; Narasimhan and Narayanan, 2013). In this case, innovation exploration is defined as the search for distant, new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar & Roberts, 2004). Considering the premium function purchasing has in sourcing external capabilities (Handfield et al., 2015), this research develops the argument here that purchasing could play an important role in innovation exploration. This has been rarely studied, although this is becoming an important role, with a growing academic and managerial interest.

Shifting the focus from relatively low technological uncertainty to high technological uncertainty requires a change in sourcing strategies (Mikkelsen and Johnsen, 2018) emphasizing the importance of exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018). To succeed in exploring innovations within new markets and under high uncertainty, companies need to develop new capabilities, i.e. to implement changes in their strategies, organizational structures, processes, management resources and culture (Slater et al., 2014). The functions which are traditionally devoted to sources innovation such as R&D are left alone when external solutions appear to be better, faster and more competitive. This creates tensions within the firm. The point here is therefore that uncertain environments require organizations to modify their approach to innovation sourcing and this calls for a new
role of the purchasing function and the creation of new linkages with other functions (Narasimhan and Narayanan, 2013). Despite the traditionally passive role of purchasing in innovation exploration, the latest research suggests that purchasing can play a key role in this process (Gualandris et al., 2018), but the understanding of these changes is still limited.

Thus, a legitimate question is to know why and how purchasing contributes to innovation exploration and succeeds in mitigating these tensions. This research builds on the awareness-motivation-capabilities (AMC) framework as it provides a framework to identify business cooperation and behavioural drivers in an organization (Chen and Miller, 2015; Chen, 1996). The AMC framework has never been used in the purchasing field (Schwei, 2015) but provides a novel framework to analyse cognition and behavioural causes. Adapting the AMC framework, this research suggests that purchasing’s contribution to innovation exploration is enabled by purchasing’s awareness, purchasing’s motivation to explore innovation, in addition to purchasing’s capabilities. For analysing purchasing’s capabilities, this research draws from dynamic capability (DC) theory, which suggests that an innovation can be developed from outside the firm (Teece et al., 1997): that it can be “innovated outside” and that contributing to a firm’s innovativeness through the sourcing relationship is considered a dynamic capability in the literature (Weeks, 2009), although DC does not explain how this process works from a purchasing perspective.

This research reports on two in-depth case studies involving 28 semi-structured interviews. The findings highlight various enablers that facilitate purchasing’s contribution to innovation exploration including 1) a specific purchasing unit dedicated to exploration tasks full time; 2) a specific function taking on a “champion’s role” to liaise and orchestrate innovation exploration activities within and around the purchasing department; 3) purchasing integration with business development and R&D; 4) new skills, such as the purchasers’ experience and creativity as key factors influencing innovation exploration capabilities; and 5) purchasing ambidexterity as a capability needed to facilitate innovation exploration.

Additionally, this study focuses on one particular capability, purchasing ambidexterity, which is “the extent to which a purchasing function simultaneously pursues exploratory and exploitative activities within supply networks” (Gualandris et al., 2018, p. 667). This study illustrates how purchasing ambidexterity develops and contributes to manage tensions between exploitative and exploratory innovation. It describes the four types of purchasing ambidexterity (structural, sequential, contextual and managerial ambidexterity). Among other findings, this research describes how contextual and managerial ambidexterity supports structural and sequential ambidexterity.

This study focuses on organizational innovation (at the firm, function, and individual levels of analysis), with the aim to investigate elements which are arguably under the control of the firm. Including industry level, network or global levels of analysis would have resulted in lower practical implications for managers, because these aspects would have involved elements which are beyond the control of the firm. By targeting the firm level, this research can support professionals in shaping purchasing organizations, assigning new roles to buyers and finding new methods or processes to improve purchasing’s contribution to the firm’s innovations capabilities.
ABSTRACT (Français)

Cette étude est centrée sur la gestion du processus d'innovation par l'entreprise et le rôle des achats dans ce processus. Face à un environnement de plus en plus complexe et de nouvelles forces telles que la numérisation, les pratiques de responsabilité sociale des entreprises et les risques multiples, les fonctions achats sont soumises à une forte pression pour découvrir et exploiter des idées venant des fournisseurs, des connaissances et des innovations pouvant apporter de la valeur aux entreprises acheteuses (Handfield et al., 2015; Choi et al., 2015). Dans le domaine de recherche spécifique de la gestion du management des achats, l’innovation est identifiée comme la deuxième priorité en importance parmi les 1 055 articles scientifiques publiés entre 2002 et 2012 (Spina et al, 2013), ce qui représente 25% de l’intérêt total porté aux stratégies achat, juste après la gestion des coûts. Ainsi, bien que les achats ne soient traditionnellement pas considérés comme un élément clé du processus d’innovation, le sujet est important.

Dans les environnements très dynamiques, l'avantage concurrentiel durable est souvent motivé par la capacité d'impliquer les fournisseurs en tant que soutien important à l'innovation (Li et Vanhaverbeke, 2009; Schiele, 2010; Narasimhan et Narayanan, 2013; Bogers, 2014). Les achats jouent un rôle primordial dans les capacités d'approvisionnement en dehors de l'entreprise (Handfield et al., 2015). Ce rôle, par exemple pour explorer des sources externes, a été largement étudié, principalement dans le contexte du développement de nouveaux produits (NPD), liant les capacités d’innovation et la participation des achats dans le processus des NPD (Benton et Maloni, 2005; Chen et al., 2004; Handfield et al., 1999; Petersen et al., 2003, 2005; Prahinski et Benton, 2004; Ragatz et al., 1997; Johnsen, 2009). Bien que ces études traitent de la manière dont les fournisseurs peuvent encourager l’innovation dans les étapes de développement de projet dans un contexte de faible incertitude (Van Echtelt et al., 2008; Afuah, 2000), il existe peu de recherches sur la manière dont les fournisseurs aident les entreprises dans le contexte d’incertitude élevée (Johnsen, 2009).

Dans cette recherche, la gestion de l'innovation est considérée comme un processus (Tidd et Bessant, 2018). Les premières étapes du processus sont liées au dépistage, à la détection et à l'évaluation d'une innovation, à savoir l'exploration de l'innovation. Les étapes suivantes du processus consistent à acquérir, exécuter, lancer et maintenir l’innovation, à savoir l’exploitation de l’innovation. L’exploration de l’innovation, objet de cette étude, se déroule dans un contexte de grande incertitude technologique et incertitude des sources d’approvisionnement. Il s'agit de trouver des capacités externes nouvelles pour l'entreprise et nouvelles pour le réseau d'approvisionnement existant. Dans un contexte d'incertitude technologique élevée, les entreprises peuvent rechercher des innovations qui ne sont pas disponibles dans l'environnement existant de l'entreprise acheteuse (Melander, 2014; Narasimhan et Narayanan, 2013). Dans ce cas, l’exploration de l’innovation est définie comme la recherche de nouvelles capacités distantes, qui offre à l’entreprise des possibilités de réaliser des innovations nouvelles dans le monde (Nerkar et Roberts, 2004). Considérant que la fonction primaire des achats est de rechercher des capacités externes (Handfield et al., 2015), cette recherche développe l’argument selon lequel la fonction achats pourrait jouer un rôle important dans l’exploration de l’innovation. Cela a rarement été étudié, bien que cela devienne un rôle important, avec un intérêt académique et managérial croissant.

Pour passer d'une incertitude technologique relativement faible à une incertitude technologique élevée, il faut modifier les stratégies d'approvisionnement (Mikkelsen et Johnsen, 2018), en soulignant l'importance de l'exploration sur des marchés d'approvisionnement lointains (Phillips et al., 2006; Legenvre et Gualandris, 2018). Pour réussir à explorer les innovations sur de nouveaux marchés et dans un climat d'incertitude élevé, les entreprises doivent développer
de nouvelles capacités, c'est-à-dire mettre en œuvre des modifications de leurs stratégies, structures organisationnelles, processus, ressources de gestion et culture (Slater et al., 2014). Les fonctions traditionnellement consacrées aux sources d’innovation telles que la R&D sont laissées pour compte lorsque les solutions externes semblent meilleures, plus rapides et plus compétitives. Cela crée des tensions au sein de l'entreprise. Le point ici est donc que les environnements incertains obligent les organisations à modifier leur approche en matière d’approvisionnement en innovation, ce qui appelle un nouveau rôle de la fonction achats et la création de nouveaux liens avec d’autres fonctions (Narasimhan et Narayanan, 2013). Malgré le rôle traditionnellement passif des achats dans l'exploration de l'innovation, les dernières recherches suggèrent que les achats peuvent jouer un rôle clé dans ce processus (Gualandris et al., 2018), mais la compréhension de ces changements est encore limitée.

Une question légitime est donc de savoir pourquoi et comment les achats contribuent à l'exploration de l'innovation et permettent d’atténuer ces tensions. Cette recherche s'appuie sur le modèle conceptuel « Awareness-Motivation-Capabilities » (AMC), car il fournit un cadre permettant d'identifier la coopération entre entreprises et les facteurs de comportement dans une organisation (Chen et Miller, 2015; Chen, 1996). Le modèle AMC n'a jamais été utilisé dans le domaine des achats (Schweig, 2015), mais fournit un nouveau cadre pour analyser les causes cognitives et comportementales. En adaptant le cadre AMC, cette étude suggère que la contribution des achats à l’exploration de l’innovation est rendue possible par la prise de conscience d’une opportunité, sa motivation à explorer les innovations, en plus des capacités à explorer. Pour analyser ces facteurs, cette recherche s’inspire de la théorie de la capacité dynamique (CD), qui suggère qu’une innovation peut être développée de l’extérieur de la société (Teece et al., 1997). La capacité « d’innover à l’extérieur » peut contribuer à la capacité d'innovation de l'entreprise acheteuse par le biais du sourcing, ce qui est considéré comme une capacité dynamique dans la littérature (Weeks, 2009), bien que DC n'explique pas comment ce processus fonctionne du point de vue de la fonction achats.

Cette recherche présente deux études de cas approfondies comprenant 28 entretiens semi-structurés. Les résultats mettent en évidence divers outils facilitant la contribution des achats à l’exploration de l’innovation, notamment: 1) une unité d’achat spécifique dédiée aux tâches d’exploration à temps plein; 2) une fonction spécifique assumant le rôle de « champion » pour assurer la liaison et orchestrer les activités d’exploration de l’innovation au sein et autour du service des achats; 3) l’intégration des achats avec le marketing et la R&D; 4) de nouvelles compétences, telles que l’expérience et la créativité des acheteurs, et de nouveaux outils digitaux, en tant que facteurs déterminants des capacités d’exploration en innovation; et 5) l'ambidextrie managériale, qui représente la capacité à équilibrer les activités d’exploration des innovations et celles d’exploitation, et de réduire les tensions inhérentes à cet équilibre.

De plus, cette étude se focalise sur une capabilité particulière, l’ambidextrie de la fonction achats, qui est définie comme « l’aptitude de la fonction achats à gérer simultanément des activités d’exploration et d’exploitation dans les réseaux de fournisseurs » (Gualandris et al., 2018, p. 667). Cette étude montre comment l’ambidextrie de la fonction achats se développe et permet d’atténuer les tensions créées par la participation de l’acheteur à des activités d’exploration et d’exploitation des innovations. Il est notamment suggéré comment les quatre types d’ambidextrie (ambidextrie structurelle, séquentielle, contextuelle et managériale) peuvent expliquer l’ambidextrie de la fonction achats. Parmi les autres conclusions, cette recherche décrit comment l’ambidextrie contextuelle et l’ambidextrie managériale soutiennent l’ambidextrie structurelle et séquentielle.

Cette étude se concentre sur l'innovation organisationnelle (au niveau de l'entreprise, de la fonction achats), dans le but d'analyser des éléments qui sont sans doute sous le contrôle de
l’entreprise. C’est pourquoi cette étude a des implications concrètes pour les entreprises, notamment pour les managers souhaitant faire évoluer la maturité de leur département achats. En ciblant le niveau de l’entreprise, cette recherche peut aider les professionnels à structurer leurs organisations achats, à attribuer de nouveaux rôles aux acheteurs et à trouver de nouvelles méthodes ou de nouveaux procédés pour améliorer la contribution des achats aux capacités d’innovation de l’entreprise acheteuse.
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Chapter 1. INTRODUCTION

This chapter introduces the whole research project. It starts by presenting the personal motivation of the researcher for the subject of this study (Section 1.1 “Personal roots of the research journey”). Then, it introduces the academic relevance of the research (Section 1.2 “Academic relevance of this research”). This is followed by a presentation of the current gaps in the literature which this research aims to fill, and the three research questions, which are listed in Section 1.3 (“Overall objective of this research and research questions”). It presents briefly the research approach, method and process (Section 1.4 “Overview of the research approach, method and process”). This chapter also gives the overall structure of the thesis (Section 1.5 “Thesis outline”) by explaining how the PhD is designed and how the appended papers are linked to the main covering essay.

1.1 Personal roots of the research journey

It all started with a simple ball bearing, in the early 2010s. At that time, I was the purchasing director for a Japanese company in the automotive sector, dealing with air conditioning (A/C) systems for cars and other electronic systems. It is worth saying that my official role was limited to reducing costs for the European business unit, leveraging resources such as the budget (about 200 million euros of annual purchased value), and utilising 20 buyers located in various places in Europe. One day, one of my suppliers, an international leader in the ball bearing industry, came to the traditional yearly cost reduction meeting and presented their plan to achieve ambitious cost reduction targets. Surprisingly, the sales representative was accompanied by a technical engineer from one of its partner companies. When the discussion came to the point of ball bearing prices, I did not get the usual minus 1% or 1.5% that I expected as a yearly price reduction. This minus 1% used to be part of the “cat and mouse game” between the buyer and supplier, where both find some (shameful) pleasure in discussing miniscule percentages and amounts of money. Frankly speaking, minus 1% will not erode a supplier’s health very much but counts towards the buyer’s end-of-year bonus, which is of high interest, of course! Anyway, this supplier announced to me that in the coming years I could count on minus 40% in one shot, rather than the miserly minus yearly 1%. It was a fantastic surprise!

They explained to me that their alliance benefited from a co-innovation process which had resulted in a radical product change affecting not only the ball bearing itself, but also the function surrounding the ball bearing: the engine pulley and the entire rotation transmission unit. Of course, it is not the aim of this essay to discuss the technical advantage of having a ball bearing over-moulded by synthetic pulleys in a car A/C system, rather the point here is that the innovation would create a total cost reduction of 40%. It was a great deal (and a great bonus for me at the end of the year). More than happy with this opportunity, I started to investigate who, among my colleagues, could lead the introduction of this innovative solution.

I talked to R&D, escalated the case to the management, flew to Japan to present the concept to Japanese engineers, etc. To cut a long story very short, I could not get anyone to take the innovation seriously. I heard phrases such as “It’s just fake savings,” or people saying, “It’s not compatible with our technological path,” or “What a crazy idea!” Everyone I spoke to made negative a priori assumptions about the opportunity and closed the discussion as fast as they could. I kept pushing strongly for 6 months to get it adopted, but, finally, it was dropped. The pain was that another company adopted the same innovation just a year later. Unfortunately, this was our direct competitor. This resulted in an explosion in my naïve perception of the business world. Not to say a revolution in my consideration of purchasing’s role towards the firm’s innovation capabilities. After this, I started to investigate the topic from an academic
perspective, trying to shed some light on my “ball bearing” story and to understand how to develop the role of purchasing in innovation.

1.2 Academic relevance of this research

1.2.1 The imperative to innovate

“Innovative firms outperform, in both employment and sales, firms that fail to innovate” (Tidd and Thuriaux-Alemán, 2016). The literature reports that companies which are steadily successful in managing innovation outperform their competition in sales growth, overall performance, employment and even in social benefits (Tidd and Thuriaux-Alemán, 2016). Since Schumpeter (1942), innovation has widely been regarded as a critical source of competitive advantage in a fast-changing environment (Tidd and Bessant, 2018; Dess and Picken, 2000; Tushman and O’Reilly, 1996).

Corporate directors and executives unanimously recognize that today’s fast-paced environment continues to accelerate and that firms need to innovate to stay ahead. However, a recent survey of 5,000 board members highlighted that innovation no longer ranks as a top strategic challenge for most of them (Cheng and Groysberg, 2018). This report suggests that concerns about innovation fall behind other issues for most directors, such as such as attracting and retaining top talent and complying with the regulatory environment. Surprisingly, the same respondents estimate that keeping on top of new technologies is the second most difficult task right after managing risks. This contrasting result reflects a lack of coherence in the way innovation is perceived strategically: this encourages further investigation into how to develop innovation management performance also from a practitioner’s perspective.

1.2.2 The increasing necessity of acquiring innovation from outside the firm

In the 1990s scholars started to demonstrate that innovations can be acquired from outside the firm (Cohen and Levinthal, 1990; Teece et al., 1997). Technology is running so fast that companies are unable to maintain the rhythm of innovation and therefore look increasingly beyond their own borders for inspiration and innovation (Cavusgil et al., 2003). Researchers have underlined that closely working between a firm and its suppliers may engender innovation (Von Hippel, 1988; Coombs and Metcalfe, 2000). In this case, suppliers become a key source of innovation and may suggest new ideas to their customers. It has been widely explained that the pursuit of technological innovation comes mainly from close partnerships and the development of strategic alliances between a customer and its suppliers (Lamming, 1993; Spekman et al., 1998; Cavusgil et al., 2003). Several approaches have been suggested, from joint innovation to the most recent calls for open innovation (Chesbrough, 2003).

Nowadays, firms are used to acquiring knowledge and technology from external sources (Yan and Azadegan, 2017, Henke and Zhang, 2010; Lau et al., 2010). External sources include suppliers, who are now additionally considered as sources of innovation and competitive advantage (West and Bogers, 2014, Narasimhan and Narayanan, 2013; Schiele, 2010; Li and Vanhaverbeke, 2009; Grimpe and Sofka, 2009). These external sources are referred to as the supply network in this research, building on Choi and Krause’s definition of a supply network as “the possible network of upstream suppliers in the firm’s value system directly or indirectly,” Choi and Krause (2006, p638). This includes suppliers, sub-suppliers, service providers, universities, consulting firms, etc. A firm’s ability to source innovation from the supply network is becoming a key factor in successfully staying ahead of the competition (Narasimhan and Narayanan, 2013). Companies “need to excel at capturing innovation opportunities with existing and potential supply chain members” (Legenvre and Gualandris, 2018, p. 95).
The supply chain management field has stressed the importance of leveraging the supply network’s innovation capabilities to increase the firm’s innovation performance (Narasimhan and Narayanan, 2013; Van Echtelt et al., 2008; Choi & Krause, 2006; Henke & Zhang, 2010). Most of the current literature in this field has investigated the role of supplier integration in specific innovation efforts (Song & Di Benedetto, 2008). However, the role of the interfirm network in innovation has been identified as an important gap in the literature (Narasimhan and Narayanan, 2013).

1.2.3 Purchasing as a work boundary spanner for sourcing innovation from the supply network

Traditionally, much attention has been paid to the R&D function’s role in capturing sources of innovation, while past studies perceived “purchasing’s concern for innovativeness is a far cry from its former role” (Gadde and Håkansson, 1994, p34). Purchasing is often in charge of external resource management but is traditionally not regarded as a key contributor to the technological development (Mikkelsen and Johnsen, 2019). An important stream of literature reports that purchasing is a neglected function as far as contributing to the firm’s innovativeness and new product development (NPD) (Schiele, 2006). Some authors suggest that purchasing has a limited contribution to innovation: purchasing is rarely seen as a real technology importer (Melander, 2014). Despite purchasing’s responsibility for sourcing, it is usually R&D and not purchasing that is seen as the key contributor to innovation exploration (Gualandris et al., 2018; Damanpour and Aravind, 2012).

Nevertheless, the purchasing function is positioned to perform a boundary spanning role that enables it to access technology and knowledge through supplier relationships and networks. Leveraging its role to effectively manage the supply base (Monczka et al., 2010), purchasing can, for example, screen a firm’s supply network, have informal discussions with suppliers, participate in joint supplier events and use Internet platforms to collaborate with suppliers (Winter and Lasch, 2011) to source external knowledge. The importance of the sourcing process is recognized in the literature in achieving product innovation (Monczka et al., 2015). Sourcing refers to finding external resources via a set of activities implemented in purchasing such as specifying needs, surveying the market, selecting a supplier and contracting (Wynstra et al., 1998). There is extensive literature reporting on the processes, skills, tactics and strategies needed in purchasing to perform efficient sourcing and to bring new knowledge back to the firm (Hesping and Schiele, 2016; Chen et al, 2016; Luzzini et al., 2015). A few studies highlight innovation as an outcome of the sourcing process (Hesping and Schiele, 2016; Hesping and Schiele, 2015), but not many.

1.2.4 Purchasing’s contribution to innovation

Thus, little research has analysed purchasing’s contribution to innovation in a strict sense. Existing literature focuses more on purchasing as a common interface with supply base (Araujo et al., 1999) which is known to be the most proficient external source of ideas (Laursen and Salter, 2006). Recent research has shifted the focus of how the purchasing function can contribute to innovation. The field now presents purchasing’s contribution to innovation as a “dual role” (Schiele, 2010), but also distinguishes purchasing’s contribution to innovation exploration from purchasing’s contribution to innovation exploitation. (Gualandris et al., 2018).

This research builds on a clear distinction between innovation exploration and innovation exploitation, because innovation is seen as a process (Tidd and Bessant, 2018). Innovation exploration describes the first stages of the innovation process, such as scouting, detecting and assessing an innovation. Innovation exploitation includes the next stages of the innovation
which consist of acquiring, executing, launching and sustaining the innovation. The literature has emphasized the importance of exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018). For purchasing, innovation exploration relates to finding external capabilities which are new to the firm and new to the existing supply network. Innovation exploration involves the search for distant, new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar & Roberts, 2004). Considering the premium function purchasing plays in sourcing external capabilities (Handfield et al., 2015), this research develops the argument here that purchasing could play an important role in innovation exploration. This has been rarely studied, although this is becoming an important role, with growing academic and managerial interest.

Innovation exploration, which is the focus of this study, is characterized by a context of high uncertainty. The specific context of high technological uncertainty forces firms to scout for innovations which are not available within the buying firm’s existing environment (Melander, 2014; Narasimhan and Narayanan, 2013). To succeed in exploring innovations in new markets and under high uncertainty, companies need to develop new capabilities, i.e. to implement changes in their sourcing strategies (Mikkelsen and Johnsen, 2018), organizational structures, processes, management resources and culture (Slater et al., 2014). The functions which are traditionally responsible for developing innovation such as R&D are left out when external solutions appear to be better, faster and more competitive. This creates tensions within the firm. The point here is therefore that uncertain environments require organizations to modify their approach to innovation sourcing and this calls for a new role of the purchasing function and the creation of new linkages with other functions (Narasimhan and Narayanan, 2013). Despite the traditionally passive role of purchasing in innovation exploration, the latest research suggests that purchasing can play a key role in this process (Gualandris et al., 2018), but the understanding of these changes is still limited.

Thus, a legitimate question is to know why and how purchasing contributes to innovation exploration and succeeds in mitigating these tensions. This gap is confirmed by most recent publications highlighting the need to better understand the role of purchasing in contributing to the management of innovation (Mikkelsen and Johnsen, 2018). The gap in the existing research on purchasing’s contribution towards innovation is supported by a range of systematic literature reviews that have been published in purchasing and supply management or technology sourcing related fields, such as supplier involvement in NPD and innovation (Johnsen, 2009), sourcing and acquiring innovation through open innovation (Dahlander and Gann, 2010); leveraging external sources to source innovation (West and Bogers, 2014), or sourcing innovation through alliances and joint ventures (Gnekpe and Coeurderoy, 2017), but none of them analyse the purchasing function’s contribution to innovation. Hence, the topic matters academically and calls for further research.

1.3 Overall objective of this research and research questions

This study is focused on the management of the innovation process by the firm and the role of purchasing during this process. A literature review highlighted that purchasing’s contribution to innovation exploration is far less researched than the innovation exploitation phase and needs further work. Consequently, this research aims to develop knowledge on how purchasing can contribute to advanced phases of the innovation process, innovation exploration.

In this research, a framework is designed to investigate how and why purchasing can contribute to innovation exploration. This objective calls for the investigation of the precedents enabling purchasing’s contribution to innovation exploration. The framework chosen requires examining
purchasing’s awareness of the need to assume such a role, its incentives or motivations, and the required capabilities. Thus, this research has three main objectives.

The first objective is to understand **Purchasing Awareness**, which concerns the visibility of innovation opportunities in the firm’s ecosystem; these may come from the firm’s supply network or from within the firm.

*RQ1: How is purchasing made aware of opportunities to contribute to the firm’s innovation exploration?*

The second objective is to understand **Purchasing Motivations** to contribute to innovation exploration, which represents purchasing’s willingness to explore supply networks to detect new sources of innovations, or to find suppliers who are able to execute innovations designed in the buying firm.

*RQ2. What motivates purchasing to contribute to innovation exploration?*

The third objective is to investigate **Purchasing Capabilities** making purchasing able to contribute to innovation exploration. Purchasing functions are often not evaluated according to innovation but based on cost savings, and these do not traditionally match the role of innovation exploration. This question is important, as very few papers have provided insights on this topic. Additionally, a specific capability, namely purchasing ambidexterity, will also be scrutinized because it might have an influence on how purchasing succeeds in contributing to innovation exploration. This aspect reflects the capability to mitigate tensions appearing when purchasing starts to become involved in innovation exploration. The emerging concept of purchasing ambidexterity aims to provide some bases to describe how the purchasing function develops this specific capability and can balance innovation exploration and innovation exploitation.

*RQ3: Which capabilities are required to enable purchasing to contribute to innovation exploration?*

### 1.4 Overview of the research approach, method and process

The research approach adopted in this thesis is the philosophy of moderate constructionism. Moderate constructionism considers that reality can be perceived from multiple perspectives and that the perception of reality depends on the interaction of the researcher with the research subject (Järvensivu & Törnroos, 2010). Moderate constructionism suits exploratory research well, and matches the complex web of interactions in an organization.

This research project is complex in the sense that it includes complex business relationships due to interactions between purchasing and other functions within and outside the firm. This complexity encouraged a case study method, as suggested by Stuart *et al.* (2002). The research investigates a new phenomenon, because no clear body of theory has clearly reported purchasing’s contribution to innovation exploration. An investigation of a new phenomenon requires the collection of all the necessary contextual insights into the topic (Halinen and Törnroos, 2005). Case studies “capture the dynamics of a studied phenomenon and provide a multidimensional view of the situation in a specific context” (Järvensivu and Törnroos, 2010). Furthermore case-study research fits well with operations and supply chain research (Voss, 2010). The purpose of this case study is in line with the principle of theory elaboration (Ketokivi and Choi, 2014) and follows a rigorous process (Stuart *et al.*, 2002).

This research followed the logic of abduction, which is characterized by an iterative process of going back and forth from empirical observations and theory (Dubois & Gadde, 2014; Järvensivu & Törnroos, 2010). The preliminary step of conducting a literature review to
understand the theory was an important starting point to achieve the objective of theoretical development. For this reason, the first stage of this research was a literature review, combined with explorative pilot cases.

Thus, the process in conducting this research has not been linear. Several round trips from empirical data collection and examining the academic literature have been taken. Said shortly, to answer the 3 research questions introduced above in section 1.3, this research had two main phases involving empirical data collection, intertwined with searches in the literature:

- Phase 1 of the empirical data collection: a pilot case study. This exploratory part of the research helped to narrow down the research topic, to fine-tune the objectives of the research, and to start building the research. The observation of four companies revealed the phenomenon in real life and allowed the topic to be narrowed down by collecting the preliminary data. This phase also helped to investigate the constructs found in the initial literature review and to check the relevance of the potential managerial implications of the research topic. Moreover, the data found in the pilot case study was used to identify emerging practices which were finally eligible to become the key constructs of the main research.

- Phase 2 of the empirical data collection: two in-depth case studies to examine the topic and the research questions. This phase is described extensively in this covering essay. Focusing on intra-organizational relationships and dynamics, the unit of analysis was the purchasing function. Twenty-eight interviews were conducted in several departments in each firm. The interviews were collated, transcribed, and coded according to DeCuir-Gunby et al. (2011), then analysed using Miles and Huberman matrices (Miles and Huberman, 1994).

The abductive approach necessitates a continuous journey between empirical data collection and theory. This has been done in this research. Various stages of the literature review occurred throughout the research, before and/or after empirical data collection. It started with an initial literature review, to assess the potential academic contribution of this research. This aim of this first review was to determine established research on the topic, and to start building the constructs for the research or to identify emerging patterns. Then, a second literature review was performed after the pilot study, to investigate the constructs which emerged from the pilot case. This second stage was a systematic literature review. A third literature review was done to search for a relevant conceptual model, which would be able to support the investigation of constructs such as motivations and capabilities.

This research project has been conducted over a period of 4 years, from September 2015 to September 2019. Figure 1 below presents the flow of the abductive research process, reflecting the stages of the research as they were done over this period of time.
Figure 1: Structure of the covering essay and the three appended papers (source: Author)
1.5 Thesis outline

1.5.1 Thesis structure

This thesis consists of this covering essay and 3 appended papers. The whole body of work together constitutes the research itself and addresses the research questions. The overall logic of the covering essay is to present the research as a storyline, from the early stages of the research to the final stages, reflecting on the progressive construction of the findings. This covering essay summarizes the articles and their publication status, to show and discuss the overall findings of the research. More than this, the covering essay aims to present how the various studies relate to one other. The articles themselves are in the appendix section. Strong links are made continuously between the covering essay and the articles, so that the overall progress of the research can be understood.

This covering essay consists of the following chapters:

- **Introduction (Chapter 1):** this (current) section presents the overall topic, its objectives and discusses its relevance. It provides a brief explanation of the gap found in the literature and presents the questions asked in the thesis. It outlines the covering essay chapter by chapter and introduces the overall research structure. It also introduces the research methodology, and the main findings.

- **Initial Literature review (Chapter 2):** this chapter provides an overview of the key academic articles this research is built on. It focuses first on the field of innovation that needs to be defined properly as a process, then it narrows the focus down to innovation sourcing which is also defined from different perspectives. Keeping one of these perspectives, i.e. purchasing’s contribution to innovation sourcing, it shows how the topic evolved in the recent decades and how important it is to further understand why and how purchasing can contribute to innovation. The review finally explains why this research focuses only on purchasing’s contribution to innovation exploration and highlights some gaps in the literature that this research wants to further investigate.

- **Research philosophy and strategy (Chapter 3):** This chapter presents the way the research has been conducted, including: the research philosophy, research strategy, research approach. It explains why the abductive approach suits the objectives of this research well.

- **Pilot study (Chapter 4):** This chapter presents the early stage of the research: the pilot case study. It shows how it helped to fine tune the unit of analysis of the main research to make the focus narrower and clearer. This chapter introduces the context of the pilot study, the initial research questions, the methodology adopted and the findings. It shows how motivations and capabilities (MC) emerged as strong themes from the pilot. The findings of the pilot study gave rise to an initial conceptual framework, which was used as a basis for the following step: a systematic literature review.

- **Systematic literature review (Chapter 5):** The initial conceptual framework introduced in the pilot study was used as a basis for reviewing the literature focusing on the motivations and capabilities (MC) that purchasing needs to contribute to the innovation process. This literature review explores innovation as phases of exploration, assimilation and exploitation and examines purchasing’s motivation and capabilities (MC) at each phase of the process: exploration, assimilation and exploitation.

- **Conceptual framework (Chapter 6):** working with the initial literature reviews and the findings from the pilot, MC are of central interest in this research. At this stage appeared to need to find something helpful to frame the findings to date. This section presents the awareness-motivation-capability framework (AMC framework) which
provides the main framework for this research, adding awareness (A) as a core precedent. The base foundation of this framework is to introduce drivers enabling an action in the form of three main drivers. These are: the awareness of an opportunity, the motivation to move and the capabilities to move. The AMC framework comes from the strategic management literature: it has never been imported into the purchasing and supply management (PSM) field before.

- **Developing main research questions (Chapter 7):** In this section, the literature on purchasing’s contribution to innovation exploration is presented in the light of the AMC framework, highlighting gaps and research questions. An AMC-based conceptual model and the three research questions are introduced.

- **Presentation of the two in-depth case studies (Chapter 8):** This chapter aims to introduce the two in-depth case studies, the methodology used to select the cases, to collect and analyse the data. It also discusses the validity and the generalizability of this research.

- **Findings from the case studies (Chapter 9):** This chapter presents the findings emerging from the analysis of each single case independently from the other. The “within-case findings” are split into the three main constructs under focus: purchasing’s awareness, purchasing’s motivation and purchasing’s capability. Prior to reporting on these findings, a brief introduction of each company background is made, so that the reader can have a better understanding of each firm’s environment, strategy and business orientation. This background includes also a quick overview of the types of innovations which are dealt with in both companies. This section includes a lot of quotes and detailed qualitative findings. It shows in-depth findings related to each respective case.

- **Cross-case analysis (Chapter 10):** This chapter presents the findings from a “cross-case perspective”. It provides some evidence of the coding and the analysis undertaken in the form of analysis matrices to provide the different views of the interviewees. It attempts to highlight common patterns emerging from the two cases. Each section ends with a summary table presenting the key patterns emerging from the cross-case analysis, including a comparison between the two cases. In these tables, the importance given by the interviewees to the detailed patterns are displayed. It draws out two key contextual factors and presents the refined theoretical model.

- **Two propositions (Chapter 11):** Two main themes emerged from the analysis of the two cases described in chapters 9 and 10, which gave rise to two propositions. These are presented in this section. **Proposition 1** is that purchasing’s contribution in terms of AMC relates to market and technological uncertainty. A 2x2 matrix of market and technological uncertainty from the literature is used. Proposition 1 also argues that a circularity exists between the three precedents A, M and C. The findings highlight that purchasing capabilities are preceded by motivation, which in turn is preceded by awareness. In this context circular means that purchasing first develops capabilities then becomes motivated and finally increases its awareness of innovation opportunities. This circularity is not found in Chen and Miller’s AMC framework, so this appears to be a clear contribution of this study. **Proposition 2** is that purchasing ambidexterity is a required capability to balance innovation exploration and exploitation. Purchasing ambidexterity is a recent concept introduced in the literature (Legenvre and Gualandris, 2018), and is defined as “the extent to which a purchasing function simultaneously pursues exploratory and exploitative activities within supply networks” (Gualandris et al., 2018, p. 667). Proposition 2 also introduces purchasing ambidexterity as a combination of four different types of ambidexterity found in the literature and presents some complementarities between the types of ambidexterity.
• **Final conceptual model (Chapter 12):** This chapter aims to back link the findings with the literature. Propositions 1&2, the systematic literature review and the AMC-based conceptual model give rise to the developed conceptual model presented in this chapter. This chapter takes also some key emerging themes and discusses them in light of the literature, grounding these aspects with interesting discussions found in current publications. It demonstrates some of these connections in the form of an illustration.

• **Conclusion and future research directions (Chapter 13):** The final sections of this covering essay summarize the empirical and managerial implications of the research, presenting the research limitations and introducing potential future avenues of research.

1.5.2 Appended papers

The three papers are attached in the appendices. They complete the covering essay, by providing a deeper investigation of the topic. Figure 1 illustrates the relationship between all three papers and this covering essay.

Paper 1 “Purchasing’s contribution to innovation: A systematic literature review and future research directions” investigates the motivations and capabilities of the purchasing function to contribute to innovation in 74 peer-reviewed publications across disciplines, published between 1976 and 2018. It identifies three precedents of purchasing’s contribution to innovation and identifies two gaps in the current research. The paper concludes by outlining future avenues of research, which are the pillars of our current research.

Paper 2 “Purchasing’s contribution to innovation exploration: Awareness, Motivation and Capabilities (AMC)” investigates purchasing’s contribution to innovation exploration. The study builds on the awareness-motivation-capability (AMC) framework to investigate how purchasing develops its awareness of innovation opportunities, how purchasing is motivated to explore innovation, and the capabilities needed to enable purchasing to contribute to innovation exploration. It adopts an in-depth qualitative case study strategy, focusing on two case studies of companies that have involved purchasing in innovation exploration. The findings illustrate how a differentiated purchasing unit focused on exploration, strong integration into innovation clusters and new individual orchestration capabilities are employed to facilitate purchasing’s contribution to innovation exploration. The study offers two main theoretical contributions: first, we expand and refine purchasing and supply management (PSM) theory with a more comprehensive set of precedents for purchasing’s contribution to innovation; second, we show how the AMC framework can be applied to research into purchasing’s contribution to innovation. The study suggests ways for managers to shape, adapt or redesign their purchasing organizations to better support innovation exploration processes.

Paper 3 “Managing tensions between exploitative and exploratory innovation through purchasing function ambidexterity” builds on the emerging concept of purchasing ambidexterity. The paper aims to explore how purchasing contributes to the firm’s innovation capabilities. It identifies four types of ambidexterity (structural, sequential, contextual and managerial ambidexterity) and discusses the tensions and complementarities between these. It presents an in-depth case study of a large firm (S Corp) which has implemented ambidexterity to enable purchasing to contribute to innovation. All the four types of ambidexterity were observed in this case. The findings illustrate how contextual and managerial ambidexterity support structural and sequential ambidexterity. The paper also highlights some complementarities between the types of ambidexterity which S Corp leveraged to mitigate tensions created at various levels. It enriches the understanding of purchasing’s role in innovation and provide insights into how managers can develop ambidextrous purchasing.

Table 1 below represents how the research questions are answered in the appended papers:
<table>
<thead>
<tr>
<th>#</th>
<th>Article title</th>
<th>RQ2 / How is purchasing made aware of opportunities to contribute to the firm’s innovation exploration</th>
<th>RQ2 / What motivates purchasing to contribute to innovation exploration?</th>
<th>RQ3 / Which capabilities are required to enable purchasing to contribute to innovation exploration?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper 1</td>
<td>&quot;Purchasing contribution to innovation: A systematic literature review and future research directions&quot;</td>
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<tr>
<td>Paper 2</td>
<td>&quot;Purchasing’s Contribution to Innovation Exploration: Awareness, Motivation and Capabilities (AMC)&quot;</td>
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<td>Paper 3</td>
<td>&quot;Purchasing ambidexterity: how it contributes to firm’s innovation exploration capabilities&quot;</td>
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Table 1: Research questions in relation to the appended papers (source: Author)
Chapter 2. Initial literature review

This chapter presents the literature about the concepts that are involved in this research: innovation, innovation sourcing from outside the firm, and purchasing’s contribution to innovation. The first part Section 2.1 “Defining Innovation” helps to clarify the “relevant unit of adoption” (Zaltman and al., 1973) in this research. Then, section 2.2 “Sourcing innovation from outside the firm” focuses on the various forms of innovation sourcing from the most traditional to the open innovation concept. Section 2.3 “Purchasing’s contribution to innovation” narrows down the purchasing function, which is our focus, and provides an overview of the existing literature on purchasing’s contribution to innovation. Overall, this section serves to identify the gap in the existing literature, building on the fact that the literature on purchasing’s contribution to innovation is limited and fragmented, especially the specific phases of innovation exploration and detection.

2.1 Defining Innovation

2.1.1 Definition

Looking at the etymology of the word “innovation”, the original meaning comes from the Latin term “novare”, which basically means to provide a novelty or introducing something that did not exist before. The most frequent definition we can find in the business literature is related to the work by Schumpeter, in which innovation is the action to develop and to bring new technologies to the market (Schumpeter, 1942). Schumpeter argued that firms must permanently revolutionize their economic structure, which means innovating with more effective processes products and forms of market distribution. He assessed that economic growth is driven by innovation. He was the first to introduce innovation as a dynamic process where new technologies replace old ones, terming it “creative destruction”. In his view, innovations may be either radical when they create major disruptive changes, or incremental in the case of continuous change. This study will build on this dichotomy.

Many scholars have widely used Schumpeter as a foundation to describe innovation, investigating all dimensions related to the concept. In this study, we will use the term innovation to refer to technological innovation. In their attempt to provide an operational definition of technological innovation, Garcia and Calentone (2002) suggested the following definition: “Technological innovation is an iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production and marketing tasks striving for the commercial success of the invention” (Garcia and Calentone, 2002, p112). This highlights the technological nature of innovations, in contrast to innovations which do not embody any invention from “industrial arts, engineering, applied science, and/or pure science” (Garcia and Calantone, 2002, p112).

It is important to consider what an innovation is, as there are many other definitions coming from engineering, marketing, management and economics fields. When investigating innovation-related fields on a firm level, the use of the concept of innovation cannot stay on a generic level because it suffers from clarity in its definition (Garcia and Calantone, 2002). Table 2 below presents the main definitions.

<table>
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<tr>
<th></th>
<th>Author</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Schumpeter, 1942</td>
<td>Innovation is the action to develop and to bring new technologies to the market.</td>
</tr>
<tr>
<td>2</td>
<td>Zaltman et al, 1973</td>
<td>Innovation is made of any idea, practice, or material artefact perceived to be new by the relevant unit of adoption.</td>
</tr>
<tr>
<td></td>
<td>Author, Year</td>
<td>Definition</td>
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<td>3</td>
<td>Teece, 1986</td>
<td>An innovation consists of certain technical knowledge about how to do things better than the existing state of the art.</td>
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<td>4</td>
<td>Damanpour, 1991</td>
<td>Innovation is the generation, development, and adaption of novel ideas on the part of the firm.</td>
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<tr>
<td>5</td>
<td>OECD “Oslo Manual”, 1991</td>
<td>Innovation is an iterative process initiated by the perception of a new market and/or a new service opportunity for a technology-based invention which leads to development, production and marketing tasks striving for the commercial success of the invention.</td>
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<tr>
<td>6</td>
<td>Maranville, 1992</td>
<td>Innovation is seen as better solution that meets new requirements, uncovered customer needs, or existing market needs.</td>
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<tr>
<td>7</td>
<td>Malerba and Orsenigo, 1995</td>
<td>An innovation is a financially viable implementation of a creative idea into a product, service, material or process.</td>
</tr>
<tr>
<td>8</td>
<td>European Commission, Green Paper on Innovation 1995, p. 9</td>
<td>Innovation is the successful production, assimilation and exploitation of novelty in the economic and social spheres.</td>
</tr>
<tr>
<td>9</td>
<td>Smith and Barfield, 1996</td>
<td>Innovation includes not only basic and applied research but also product development, manufacturing, marketing, distribution, servicing, and later product adaptation and upgrading.</td>
</tr>
<tr>
<td>10</td>
<td>Nohria and Gulati (1996)</td>
<td>Innovation includes any policy, structure, method or process, or any product or market opportunity that the manager of an innovating unit perceives to be new.</td>
</tr>
<tr>
<td>11</td>
<td>Freeman and Soete, 1997</td>
<td>It is important to distinguish innovation from invention. Invention refers to the discovery of new methods and materials, which means new knowledge. Innovation reflects the business aspect of an invention and focuses on its commercialization and acceptability in the market.</td>
</tr>
<tr>
<td>12</td>
<td>Chandy and Tellis, 2000</td>
<td>Innovation incorporates a substantially different core technology relative to the previous product generation.</td>
</tr>
<tr>
<td>13</td>
<td>Garcia and Calantone, 2002</td>
<td>An iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention.</td>
</tr>
</tbody>
</table>
| 14 | Hauschield, 2004 | Something being new to the firm, “regardless of being new to the competitors or not”.

Table 2: Definitions of the concept “innovation” found in the literature (source: Author)

Because each definition of innovation utilizes the concept of newness (Johannessen et al., 2001), this research needs to clarify questions such as “new for whom?”, “how new?”, “what is new?”, in order to better specify the unit of analysis.

The question concerning the beneficiaries of an innovation (“new for whom?”) can be easily answered. The literature considers the minimum impact for an innovation is to be new to the firm (the firm as a unit of analysis, usually one company): an innovation may be new to the firm, but not necessarily to the competition (Kotabe and Swan, 1995; Hauschield, 2004). An innovation is new to the market when the firm is the first to introduce it on its market (the firm’s historical geographical area, product line or service portfolio). Both dimensions (newness to the firm and to the market) can be investigated together in order to evaluate the impact of the innovation (Kotabe and Swan, 1995). This research will consider the newness for both dimensions.
2.1.2 Types of innovations ("what is new?")

It is worth saying that innovations can be found in a great variety of domains. Garcia and Calantone (2002) highlighted the different types of innovations, reporting on product, process and business model innovation.

- **Product innovation** is either the invention of new goods or services, or the introduction of an improved version of existing goods or services (Frankelius, 2009). Product innovation is defined as “a new technology or combination of technologies introduced commercially to meet a user or a market need” (Utterback and Abernathy, 1975). It is considered to be a primary means of corporate renewal (Dougherty, 1992). Product innovation might incorporate new or a mix of existing technologies (Danneels, 2002). This includes improvements in user experiences, technical and functional specifications, hardware and software, etc.

- **Process innovations** do not systematically imply a change in the nature of the product itself, but are more focused on the management of resources, equipment, work forces, task specifications, material inputs, work, information flows and so forth that are needed to produce or deliver a product or a service (Utterback and Abernathy, 1975). Process innovation can reduce the cost of production or improve the efficacy of production (Wheelwright and Clark, 1992). It might be possible to enhance existing activities to streamline, digitalize or automate the existing processes and as a result may lead to a reduction in costs and labour, and increases in capacity, flexibility and quality (Edquist, 2001). Product and process innovations are interrelated. Process innovation can enhance the firm’s ability in production innovation.

- **Business model innovation** happens when a firm adopts unprecedented ways of commercializing its current assets (Gambardella and McGahan, 2010).

The term “innovation” will be used in this study to refer to all technological innovations, which include both the product and process innovations described above. It builds on the original Schumpeterian definition of a technological innovation, i.e. a change in one or more of the inputs, processes, techniques, or methodologies that improves the measured levels of performance of a product or process (Schumpeter, 1942).

2.1.3 Degrees of innovation ("how new?")

Although an abundance of classification types can be found in the literature, scholars seem to find a consensus on the two main classes of degrees of innovation: (1) revolutionary, discontinuous, breakthrough, radical, emergent or step-function technologies; (2) evolutionary, continuous, incremental or hybrid technologies (Utterback 1994; Garcia and Calantone, 2002). Garcia and Calantone (2002) confirmed that the Schumpeterian dichotomy, introducing incremental and radical degrees of innovation, is enough to scale the degree of change which is created by the innovation. This is still today the widely agreed distinction made between these two concepts.

The distinction between incremental and radical innovation can be represented in a 2x2 matrix (Figure 2), also called a tetra-categorization matrix (Garcia and Calantone, 2002). Ansoff (1965, 1988) was the first to represent an uncertainty matrix, followed by Moriarty and Kosnik (1990) and Lynn and Akgün (2001). In their approach, differences are given in terms of degree of change introduced by the innovation to the market or to the technology, where the degree of innovativeness increases with market and technological uncertainty.
Scholars report that both incremental and radical innovations have specific characteristics. Incremental innovation is related to improvements within a given frame of solutions (i.e. doing better what we already do) aiming to reduce costs, improve production efficiency and profits (Norman and Verganti, 2014). They are usually related to “a very low level of uncertainty both in terms of the technology to produce the innovation as well as the market that will use it” (Lynn and Akgün, 2001, p 75). Radical innovations “sweep away much of a firm’s existing investment in technical skills and knowledge, designs, production technique, plant and equipment”. (Utterback, 1994, p114). An innovation can be defined as radical from the knowledge standpoint, but not necessarily from the success of its commercialization. “Radical innovation involves methods and materials that are novel to the incumbents” (Hill and Rothaermel, 2003, p258), and tend to be competence destroying (Tushman and Anderson, 1986). Radical innovations have a higher market and technological uncertainty and consist of new-to-the-world products (Holahan and al, 2014), for which “the ultimate customer was unclear as were their specific needs and wants” (Lynn and Akgün, 2001, p 75). Firms investing in radical innovations take higher risks compared to those betting on incremental innovation only. Risks are related to the level of assets needed, internal knowledge and complexity of the process. The main reasons for this complexity are related to the more uncertain development process, more complex customer behaviour towards the innovation, and also the more difficult go-to-market process with the promise of uncertain profits (Leifer et al., 2000; Danneels and Kleinschmidt, 2001; Garcia and Calantone, 2002).

Hence, even the most recent publications such as Norman and Verganti (2014) have confirmed that major differences between incremental and radical innovations exist, and that the distinction has to be made. This research will take all degrees of innovation into account and will collect empirical data including various examples of innovation degrees. In other words, the study will attempt to capture all the degrees of market/technological uncertainties in its data. The distinction between innovation degrees has been used to analyse the data and find interesting patterns.

However, proceeding to the distinction between innovation degrees is quite difficult. First, because there is a continuum between the different degrees of innovation it is difficult to assess precisely “whether the innovation is perceived as a continuous modification of previously accepted practices or whether it is new, unique, and discontinuous” (Norman and Verganti,
2014, p82). Indeed, some technological changes are quite similar but can be perceived from a different degree of radicalness depending on the assessor and the context. Rosenkopf and Nerkar even considered this distinction to be “socially constructed” (Rosenkopf and Nerkar, 2001, p289). Thus, there is a potential bias in the interpretation of the findings. Second, because the focus of this study is innovation exploration it has to make very clear that the exploration outcomes can be either incremental or radical innovations. It is confusing to segregate incremental/radical innovations as a result of activities respectively named innovation exploitation and innovation exploration. For this reason, it is more suitable for this research to consider innovations from a process perspective, i.e. innovation exploration is supposed to come prior to innovation exploitation. The distinction between radical and incremental will appear again later in this research.

2.1.4 Innovation seen as a process

Most of the publications in the field of innovation management investigate a single product (Garcia and Calantone, 2002), a project (Von Hippel, 1990), or the actors involved in the innovation and their strategies (Mahdi, 2003). Research into the innovation process goes beyond the study of one product innovation and does not take a tangible product as a unit of analysis. The study of innovation processes focuses more on activities, routines and resources needed to manage an innovation, focusing on the firm. Seminal publications in the field of innovation, such as Rothwell (1994) present how an established firm proceeds to manage innovation in light of a process, however, they focus on activities of product innovation rather than really investigating the innovation processes themselves. A typical recent example of this deviation is the “product development as a phased process” (Biemans, 2018, p95) which describes activities such as product development, trial and error, experimentation, product improvement, adoption and diffusion as the focus. However, this does not address the question of who contributes to the process within the firm or how the organizational design and structure are shaped.

The literature has introduced many different models of the innovation process. The simplest model presents innovation phases in a form of linear sequences: starting with idea generation and ending with the innovation success, going through a series of intermediary steps. These models build on the logic that once the innovative idea is identified, the implementation phases are managed sequentially, one at a time, with no overlap and no possible come-back (Kline & Rosenberg, 1986). This is a “need pull-technology push” process (Rothwell, 1994). This model has some drawbacks: it suggests that the idea, the invention, the technology is fully formed since the beginning and that a “magic” process will turn it into a marketing success. It might also create some practical problems, such as companies putting all their resources or efforts into the earliest stages of the process (idea generation), creating a “fuzzy front-end” problem. This linear model is misrepresentative of how the innovation process really occurs (Tidd and Bessant, 2018).

There are hundreds of other innovation models trying to replicate how the innovation process occurs. Some are simplistic such as the former linear model, others oppositely attempt to replicate reality, but are criticized because they are too complex (Tidd and Bessant, 2018). Most of the recent models reject the sequential approach and suggest that there are iterations between phases (Garcia and Calantone, 2002; Crossan and Apaydin, 2010). Garcia and Calantone (2002) define innovation as: “an iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention” (Garcia and Calantone, 2002). This definition insists on the iterative nature of the process, suggesting that innovation is not just a linear flow. Iterations mean that interactions occur between
innovation phases, feed en-back loops able the innovation to be adjusted throughout the process, for instance according to changes in the targeted customer base. This reflects Rothwell’s third generation of innovation processes (Rothwell, 1994). Moreover, it presents the first phase of the innovation process through the notion of the perception of an innovation opportunity, providing clear support for this study, which focuses on the earliest stages of the process.

As introduced in Section 1.2.3, this study builds on Narasimhan and Narayanan’s (2013) definition of the innovation process, because it includes the supply network as a potential contributor of innovations to the buying firm. This definition also considers two main phases of the innovation process, namely innovation exploration and innovation exploitation, which reflect two radically different types of activities in terms of the nature of the activities, the degree of uncertainty in the two phases, and the capabilities needed to execute the process phase. Because of the strong differences between these two phases, tensions occur in organizations involved in innovation exploration and innovation exploitation. These tensions are investigated in the research field of ambidexterity.

2.1.5 Measuring innovation performance

Measuring the contribution to innovation is not easy, and it is even more difficult when trying to link highly advanced innovation phases, such as innovation exploration, to commercial success or profit impact. Patents acquired over a given period are a frequent metric used to measure innovation (Azoulay and Lerner, 2012) because there is a substantial micro evidence that patent counts are associated with a firm’s value and industry dynamics (Azoulay and Lerner, 2012). Another metric is to measure R&D expenditures, although a review by Griliches (1990) suggested that patent counts can better explain firm market value even beyond R&D expenditure.

The literature supports the view that some innovations that are technologically and even economically superior fail to be marketable, or ultimately accepted by customers (Rogers 1995). This study focuses on the discovery of an innovation as the result of the innovation exploration process, so it follows the idea that the success of innovation discovery is proportional to the level of exploration effort made to discover it (Azoulay and Lerner, 2012). In this study, the assessment of the quality of the innovations has been excluded, although there is a clear correlation between the quality of the innovation and a firm’s value (Hall et al., 2005), although it is extremely hard to assess it in respect to the measurement characteristics specified by Jaffe (2008).

2.2 Sourcing innovation from outside the firm

2.2.1 Acquiring innovation: a dynamic capability perspective

Dynamic capability (DC) theory can shed some light on issues related to innovation and knowledge transfer (Weeks, 2009). DC is the “firm’s ability to integrate, build, and reconfigure internal and external competences to address a rapidly changing environment” (Teece et al, 1997). The DC approach takes its main advantage compared to other theories from the process of capability development (firms can develop or acquire a capability which will provide a competitive advantage), providing that an innovation can be acquired from outside the firm (Teece et al, 1997). This is a concrete attribute of DC theory, which broadly opens the possible investigations of its application to the field of purchasing. Managing relationships with suppliers (referring to concepts such as communication, integration, coordination) can be considered a dynamic capability itself. As Spina et al. (2016) state, “Both capabilities on the supplier and the buyer side can be studied as a source of competitive advantage”. Contributing
to firm’s innovativeness through a sourcing relationship is also considered a dynamic capability in the literature (Weeks, 2009).

Although DC theory is relevant to external source acquisition, it does not refer to any degree of uncertainty. The literature suggests DC is about changes in the resource base via routines, processes and capabilities (Helfat and Peteraf, 2003). The term “dynamic” calls for the study of firms’ adaptation, and it is relevant to investigating a fast-paced and ever-changing environment, i.e. a context of high technological and market uncertainty in which detecting an innovation outside the firm becomes necessary. It is therefore important to describe DC as a result of a firm’s constant adaptation, but Teece’s et al.’s (1997) paper is not clear on how firms should adapt over time. It does not explain the transformation path firms should follow with these resources (how they should proceed), neither does it present factors other than capabilities which could influence firms’ performance (i.e. other drivers). For instance, it is unclear how resources, routines, assets, capabilities and knowledge relate to dynamic capabilities and how managers can make good strategic decision based on this theory. DC authors say that performance results from organizational capabilities developed by individual organizations, but the literature has extensively highlighted the weaknesses of the DC theory. For this reason, and to increase managerial implications of our research, this study needs to complement DC with another theoretical frame, namely the absorptive capacity theory.

2.2.2 Absorbing innovation

DC theory suggests that a firm’s capability to access innovations from external sources depends on its absorptive capacity (AC). Cohen and Levinthal (1990) explain that AC is “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal, 1990, p. 128). AC enhances a firm’s interaction with its external environment (Rosenkopf & Nerkar, 2001) and facilitates the exploration of emerging technologies and market opportunities (Cohen & Levinthal, 1990, Rothaermel & Alexandre, 2009).

AC theory mentions three dimensions (sometimes four, as of Zahra and George, 2002), which comprise a firm’s ability to acquire and deploy knowledge: innovation acquisition (named the innovation exploration phase by Narasimhan and Narayanan, 2013), innovation assimilation and innovation exploitation.

- Innovation exploration is defined as the ability to generate ideas that create customer value (Narasimhan and Narayanan, 2013). This involves scouting for unfamiliar, distant and remote knowledge (Ahuja and Lampert, 2001; Rosenkopf and Nerkar, 2001; Nerkar, 2003) and innovation detection. This refers to scouting innovations outside the existing supply base and calls for a distant search with the new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar and Roberts, 2004). This phase also includes innovation value recognition, which is about valuing the opportunity, seizing and understanding the potential of an innovation (Todorova and Durisin, 2007; Cohen and Levinthal, 1990).

- Innovation assimilation comes after innovation detection and constitutes a prerequisite for innovation exploitation. It includes “a firm’s routines, and processes that allow it to analyse, process, interpret and understand the information obtained by external sources” (Zahra and George, 2002, p6). Innovation assimilation is a critical stage. Regardless of the great potential of an innovation, if the firm is unable to assimilate it, the work to explore and recognize its value will be in vain. Assimilation represents a firm’s capability to absorb the innovation without transforming it, or a firm’s ability to adapt the internal context and to transform the innovation before exploiting it (Zahra and
George, 2002). This includes a decision phase, during which the firm decides to invest resources to exploit the innovation.

- Lastly, innovation exploitation consists of benefiting from the innovation and commercializing it: exploiting the innovation means using it in a project or developing a new product. It is about the application of the innovation (Cohen and Levinthal, 1990). The ultimate goal of the innovation process is commercialization. Exploitation is “an organizational capability based on routines that allow firms to refine, extend and leverage existing competencies or to create new ones by incorporating acquired or transformed knowledge into their operations (Zahra and George, 2002).

AC, defined by Cohen and Levinthal (1990) or by more recent publications in the field (Todorova and Durisin, 2007; Zahra and George, 2002) takes strong R&D for granted and a good knowledge base as prerequisites for enabling a high AC (Deeds, 2001; Cohen & Levinthal, 1990). Indeed, an active purchasing department can recognize an opportunity within the supply network, as far as it is well trained to scout the supply network and recognize an opportunity. AC theory argues that this maturity is supposed to be developed prior to considering any successful absorption phase. The current study follows AC views, in the sense that it investigates the development of this maturity to a certain extent.

2.2.3 Innovation in networks

The most common economic model suggests that the innovation comes from the incumbent firm (Foster, 1986; Freeman and Soete, 1997; Henderson and Clark, 1990; Tripsas and Gavetti, 2000; Utterback, 1994). Much attention has been payed to firms’ R&D capabilities, from which innovation is supposed to emerge (Freeman, 1982). R&D work is carried out on patents and other scientific innovations that lead to productive growth and profit for the incumbent firm.

The firm where the historical product/service has been developed and commercialized has the knowledge to innovate and it is commonly accepted that innovation emerges from research and development (Damanpour and Aravind, 2012), especially under high technological uncertainty (Oh and Rhee, 2008).

However, technology is running so fast that companies are unable to keep up the pace of innovation and therefore look increasingly beyond their own borders (Cavusgil et al., 2003). Indeed, Håkansson (1987) notes, “An innovation should not be seen as the product of only one actor but as the result of an interplay between two or more actors; in other words, as a product of a ‘network’ of actors.” In the 1990s scholars started to demonstrate that innovations can be acquired from outside the firm (Cohen and Levinthal, 1990; Teece et al, 1997) and that firms acquire knowledge and technology from external suppliers (Yan and Azadegan, 2017, Henke and Zhang, 2010; Lau et al., 2010).

External sources of ideas are often more valuable than internal ones (Sakkab, 2002). External sources include suppliers that are now considered to be sources of innovation and competitive advantage (West and Bogers, 2014, Narasimhan and Narayanan, 2013; Schiele, 2010; Li and Vanhaverbeke, 2009; Grimpe and Sofka, 2009). Companies “need to excel at capturing innovation opportunities with existing and potential supply chain members” (Legenvre and Gualandris, 2018, p. 95). Furthermore, firms need to gain external technological know-how from suppliers located outside the industry, such as unfamiliar suppliers (Phillips et al, 2006).

In his seminal work, Rothwell (1991, 1992, 1994) argued that “customers can play an important role in pulling innovations from their suppliers, both large and small” (Rothwell, 1991, p126). The growing complexity of industrial, technological change forces companies to build new, vertical, inter-firm alliances and, to some extent, to use a “sophisticated electronic toolkit” (Rothwell, 1994). Rothwell presented the “fifth generation of innovation” and emphasized the
creation of a process of systems integration and networking made of twenty-four factors making firms more successful in industrial innovation (Rothwell, 1994). Several of these factors reflect the need for close linkages with primary suppliers, although this work mainly investigates collaboration between small or medium-sized enterprises and their network.

More recently, researchers have analysed the role of firm’s external networks to complete and leverage internal innovation capabilities (Chuma, 2006; Laursen and Salter, 2006; Witzeman et al., 2006; West and Bogers, 2014). This external network consists of various stakeholders. First, it has been extensively suggested that the pursuit of technological innovation comes mainly from close partnerships and the development of strategic alliances between a customer and its suppliers (Lamming, 1993; Spekman et al., 1998; Cavusgil et al., 2003; Coombs and Metcalfe, 2000). Then, universities can also be considered sources of innovation (Fabrizio, 2009). Sometimes the end user is involved in the innovation generation process. In this case, the innovation may come from an individual person or a company who develops an innovation for their own use because existing products do not meet their needs (Von Hippel, 1988). The individual user can even develop their own innovation for their own usage, using their own knowledge. Here, the firm’s support is absent during the birth of the innovation (Von Hippel, 2007; Bogers et al., 2010). Innovation may also arise from networks of players, communities or freelance innovators: in such cases, firms collaborate with the innovators, organize and produce the innovation for their own profit (Prahalad and Ramaswamy, 2004). Open systems and web platforms can be used to detect an innovation outside the firm: this refers to the open innovation concept.

2.2.4 Open innovation

In the 70s, scholars understood that innovative ideas were often found outside a firm (Freeman, 1982; Gibbons and Johnston, 1974). In 1977, T. J. Allen used the term “open system” for the first time, when he studied the knowledge transfers between R&D labs (Allen, 1977). Many side studies were made about non-integrated models of innovation (Cohen and Levinthal, 1990; Rosenberg, 1990), investigating how firms can innovate and commercialize their innovations, if they did not have the relevant internal R&D structure to feed their innovation capacities (Teece, 1986). The findings highlighted that outsourcing the commercialization of innovations required a business partner for such activities. This was the early birth of open innovation, but the term was coined by Chesbrough in 2003.

In his fundamental work, Chesbrough (2003) introduced the ‘new era of open innovation’, highlighting how companies could conduct little or even no research with their own resources, but could obtain innovative ideas through an alternative process. He stated, “We define open innovation as a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization’s business model,” (Chesbrough and Bogers, 2014). Open innovation combines internal and external ideas to build a common concept, and to create value for all stakeholders in a real ecosystem composed of customers, suppliers, complementors, competitors, and research institutions (Adner & Kapoor, 2010). Some authors have investigated different applications and practices of OI. Co-development and co-creation are the most common, but other models can also be found, such as crowdsourcing, R&D strategic alliances, out-licencing, spin-off activities, joint-ventures and donations. (Huston and Sakkab, 2006). Crowdsourcing consists of fostering creativity by soliciting contributions from a large group of people, and especially from an online community (Jeppesen and Lakhani, 2010; Dalhander and Wallin, 2006).
However, it remains unclear “how external innovations travel from the outside to a commercial product through the firm’s business model and to what extent it requires distinct innovation strategies” (West and Bogers, 2014). This calls for the consideration of the role of purchasing in this process, which is precisely the focus of this research.

2.3 Purchasing’s contribution to innovation

2.3.1 The old school of purchasing

Literature often reports that purchasing is a neglected function as far as contributing to a firm’s innovativeness and new product development (NPD) is concerned (Schiele, 2006). Traditional studies perceive that “purchasing’s concern for innovativeness is a far cry from its former role” (Gadde and Håkansson, 1994, pp34). Through purchasing, companies are aware of suppliers who are “[...] relatively close in terms of product type, geography, and other salient characteristics” (Peteraf and Bergen, 2003). As a corollary to this assumption, companies tend to ignore suppliers who are more distant from them in terms of product type, geography and other knowledge (Livengood and Reger, 2010). Even the most recent research suggests that purchasing makes a limited contribution to innovation: purchasing is rarely seen as a real technology importer (Melander, 2014), and purchasing is not seen as a key contributor to innovation exploration (Gualandris et al, 2018).

2.3.2 Early stages of purchasing involvement in innovation

Research on purchasing’s contribution to innovation can be traced to the 1970s when an article by Mogee and Bean (1976) reported the link between innovation and purchasing agents. Mogee and Bean’s paper suggested that the “purchasing department is one of the mechanisms for incorporating an innovation into the routine functioning of an organization” (Mogee and Bean, 1976, p227). Prior to this paper, nothing had been published on the topic. A later paper by Williams and Smith (1990) suggested that “with encouragement and support, purchasing personnel can make a real contribution in continuous and discontinuous innovations”. In the seminal paper about the changing role of purchasing, Gadde and Håkansson (1994) already suggested that “the transitions in purchasing and buyer-seller relationships also influence the nature of innovation and innovativeness” (Gadde and Håkansson, 1994, p34).

Since then, the literature was fairly limited until the late 2000s. The purchasing function has now been gradually perceived not as a purely a cost-saving function, but also as a facilitator to access to new technologies through supplier relationships and networks. Leveraging its role to effectively manage the supply base (Monczka et al., 2015), purchasing can, for example, screen a firm’s supply network, hold informal discussions with suppliers, participate in joint supplier events and use Internet platforms to collaborate with suppliers (Winter and Lasch, 2011). Other fundamental studies have suggested that the high involvement of procurement in the innovation process has a positive impact on innovation performance (Nijssen et al., 2002; Hartmann et al., 2012). We can see a clear increase in interest concerning the role of purchasing in innovation since Schiele (2010) introduced the concept of the “dual role of purchasing” (Schiele, 2010), and presented purchasing’s involvement in innovation development.

2.3.3 Growing interest towards purchasing involvement in innovation sourcing

The last decade or so has seen an increased interest in the role of purchasing in innovation (Spina et al., 2013). A new stream of research has begun to extensively examine purchasing role in innovation (Luzzini et al., 2015). The most recent research highlights the need to better
understand the role of purchasing in contributing to the management of innovation projects (Mikkelsen and Johnsen, 2018).

Although the R&D function has traditionally captured sources of innovation, recent research has shifted the focus to the purchasing function and its potential contribution to innovation. Several publications have analysed purchasing’s contribution to innovation, building on the fact that purchasing is the common interface with the supply base (Araujo et al., 1999), which is a source of innovative knowledge. Research has shown that innovation is now considered as the second most important challenge for purchasing after cost reductions (Spina et al, 2013).

Recent attempts related to purchasing’s contribution to innovation have focused on project management (Borges et al, 2017), NPD (Van Echtelt et al., 2008, Gonzalez-Zapatero, 2016), early supplier involvement (ESI) (Johnsen, 2009), supplier collaboration (Patrucco et al., 2017; Kähkönen, 2017), innovation outsourcing (Un C, 2017) and open innovation (Brunswicker and Vanhaverbeke, 2015). Some recent publications suggest that purchasing can be involved in innovation acquisitions from external suppliers (Henke and Zhang, 2010). Purchasing can facilitate involvement and collaboration with suppliers early in the NPD process to benefit from the joint R&D (Johnsen, 2009; Patrucco et al., 2017). Several studies suggest that enhancing purchasing knowledge about innovation can facilitate decisions concerning internal operational capabilities and external supplier relationship in NPD process (Luzzini et al., 2015; Najafi Tavani et al., 2013). Purchasing can also use open innovation practices within the buyer-supplier relationship to leverage external sources of innovation (West and Bogers, 2014).

Publications related to purchasing’s contribution towards innovation or innovation sourcing have focused on project management or NPD (Van Echtelt et al., 2008, Gonzalez-Zapatero, 2016); early supplier involvement (ESI) (Johnsen, 2009), supplier collaboration (Patrucco et al., 2017; Kähkönen, 2017), innovation outsourcing (Un C, 2017) and open innovation (Brunswicker, 2015).

2.3.4 Shifting the focus to innovation sourcing under high uncertainty

The studies presented in the paragraph 2.2.2. mainly investigate purchasing’s role in the context of New Product Development (NPD), linking innovation capabilities and purchasing involvement in the NPD process (Benton and Maloni, 2005; Handfield et al., 2015; Petersen et al., 2005; Prahinski and Benton, 2004; Ragatz et al., 1997; Johnsen, 2009). Although these papers focus on how suppliers can foster innovation in project development stages in a low-uncertainty context (Van Echtelt et al., 2008; Afuah, 2000), little research exists on how suppliers support firms in the context of higher uncertainty (Johnsen, 2009). Shifting the focus from relatively low technological uncertainty to high technological uncertainty requires a change in sourcing strategies (Mikkelsen and Johnsen, 2018) emphasizing the importance of exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018).

Moreover, several systematic literature reviews have been published on purchasing and supply management or technology sourcing related fields, such as supplier involvement in NPD and innovation (Johnsen, 2009), sourcing and acquiring innovation through open innovation (Dahlander and Gann, 2010), leveraging external sources to source innovation (West and Bogers, 2014), or sourcing innovation through alliances and joint ventures (Gnekpe and Coeurederoy, 2017), but none of them analyse the purchasing function’s contribution to innovation. This gap is confirmed by recent publications highlighting the need to better understand the role of purchasing in contributing to the management of innovation projects (Mikkelsen and Johnsen, 2018).
Chapter 3. Research philosophy and strategy

This chapter explores the “research onion” (Saunders et al, 2008) to present the research philosophy and its strategy. It starts with the description of the research philosophy used in this research (section 3.1), which introduces moderate constructionism as an alternative to other philosophies found in case-based research. Then, it presents the research approach and abductive process (section 3.2). The section about research strategy shows arguments about the choice of why choosing a case-based research (section 3.3). It ends by a transition to the pilot study, which is the first stage of an abductive approach (section 3.4).

3.1 Research philosophy: moderate constructionism

Explaining the research philosophy adopted in this study is important to show how the research questions were answered, and how the researcher proceeded to create new knowledge. Choosing from a wide set of research philosophies is often tricky for doctoral students (McLachlan & Garcia, 2015), but experienced researchers argue that the best way to make a relevant choice of research philosophy is to make a strong bridge between the research the topic under study and the research philosophy. The next paragraphs broach the most often used philosophies in management research and explains the rationale behind why moderate constructionism has been chosen and not the others.

3.1.1 Positivism

In the positivist approach, researchers use hard science, statistics and quantitative methods to explore their field, formulate a theoretical argumentation and finally test the argumentation with empirical data collected via surveys. This philosophy is by nature the most frequent approach used in natural science. It aims to explain and predict what happens in the observed case by searching for regularities and causal relationships in its population (Burrell & Morgan, 1979). Objectivity and the justification of causalities which are statistically tested make this research philosophy highly generalisable. Positivism leverages quantitative studies which try to demonstrate a theory through evidence, measurements and variables. In its extreme form, positivism argues that there is only one single and true reality, and that it is objectively possible to know exactly what this reality is.

The positivist approach is not suitable for this research for three main reasons: 1) the purchasing field is a fairly new field of research and too few papers exist to adopt a theory-testing approach. The field of purchasing needs further exploration and theory building instead of theory testing (Järvensivu and Törmroos, 2010). 2) The social world is a complex web of interactions, influences, human behaviours and irrational decisions. The focus of this research on the management of the innovation process by the firm and purchasing’s role during this process makes the capture of the complex web of these interactions between stakeholders difficult, calling more for the observation of the phenomenon rather than the testing of a well-established theory. 3) Positivism “believes in a mind-independent reality” (McLachlan & Garcia, 2015, p200), but this study builds on the fact that there is no unique reality as reality depends on who observes or describes the phenomenon, i.e. reality is mind-dependent to some extent.

Thus, for all these reasons, this research has left aside the positivist approach.

3.1.2 Constructionism

Constructionism recognizes that reality is a construct of the human mind, therefore it emphasizes that our understanding of the reality is subjective. This is a radically opposite view from positivism, which argues that knowledge is generated by a scientific and rational
approach. Constructionism has made inroads into interpretivist research philosophy, which allows researchers to interpret the elements of the study. The extreme form of constructionism suggests that there are many different realities, all constructed by the human interpretation (Järvensivu and Törnroos, 2010). The risk of including bias in the interpretation of the data is the main limitation of the constructionism. Data analysis is highly impacted by the researcher’s own knowledge, values and experiences. Constructionism has been criticized because it over-emphasizes that all the interpretations of reality are equally acceptable (Reed, 2005).

Between the two opposed poles of the philosophical continuum described above, critical realism and moderate constructionism lie at the centre (Järvensivu & Törnroos, 2010). These two moderate approaches are presented in the following two sections.

3.1.3 Critical realism

Critical realism is located in the centre ground between the two opposite poles described above: positivism and constructionism (McLachlan & Garcia, 2015). The view of critical realism is often seen as a viable and accepted perspective to build or to generate a theory (Easton, 2010). Cases studies are most likely to be the relevant methodology used in critical realism (Eisenhardt, 1989). Critical realism has ontological and epistemological dimensions which make it close to a realist approach (objective reality and objective knowledge). However, social reality is subjective, independent from existing knowledge: subjectivity comes from multiple individual realities.

This ontological dimension has some limits, mainly because one cannot develop managerial implications based on multiple individual subjective views. This pushes researchers to adopt a more relativist position rather than a realist one. Additionally, from an epistemological perspective, objective observations of reality are not possible, but in contrast observations always come from a subjective vision and interpretation of the social world (again a more relativist position). So, this research relies more on Järvensivu and Törnroos’ (2010) approach who suggest that critical realism is not enough to consider multiple perspectives of the reality that different business communities have.

3.1.4 Moderate constructionism

As a philosophical approach, moderate constructionism is better suited to this research. The purpose of moderate constructionism is to generate a local and historically context-specific understanding of the social world, using case studies. Moderate constructionism involves multiple constructs and community-bounded realities that are expected to be more relevant to the cases studied. Communities in moderate constructionism refer to either the research objects or the way the research is conducted to investigate these objects: the data is collected throughout active interviewing, which treats the interview as a social event where knowledge is jointly constructed by the interviewer and the interviewee. The interviewee and the interviewer are intertwined: they both contribute to create the meaning of the data collaboratively and actively. Moderate constructionism has therefore a significant exploratory dimension, which permits the researcher to start investigating the social world without prior supposed conclusions.

The moderate constructionism approach is very close to critical realism in the sense that both consider reality as a creation emerging from the interaction between the interviewee and interviewer. However, data collection in the critical realism approach has specific features such as searching for the most valid and reliable information held in the interviewee’s mind, looking to reduce the distortions of interviewee’s knowledge, and controlling the interview process as much as possible to mitigate potential sources of bias, error and misunderstanding.
Moderate constructionism allows a higher quality of dialogue between the interviewee and interviewer, enabling a deeper understanding of a complex organizational context. Thus, this research follows the philosophy of moderate constructionism to build a path progressively, according to the intermediary findings and the living characteristics of the phenomenon under consideration. This implies moving boundaries in the research: Dubois and Araujo (2007) suggested that “boundaries and context are often emergent outcomes of the research process”. However, this does not necessarily mean that the unit of analysis is not well defined. Yin (2003) emphasized that each study must be clearly defined and delimited. Hence, in this study, the moderate constructionism philosophy has been adopted so it suits the context of the research better. Here, the unit of analysis is delimited by the purchasing function itself, where the purchasing department is represented and also other stakeholders involved in sourcing external innovations.

This research uses qualitative methods to explore the social world and investigate the links between the social world and theory. It starts with an exploration phase through a pilot case study which helped to better define the focus of the research, then aimed to elaborate new concepts and academic suggestions. The strong connection of this research with empirical reality could facilitate the development of relevant findings which could be tested and could become a valid theory in future research (Glaser and Strauss, 1967).

3.2 Research approach and abductive process

Järvensivu and Törnroos (2010) argued that moderate constructionism follows the logic of abduction, which is a form of logic which moves from observation to theory (theory is therefore dependent on the context of the observations). In abduction, knowledge is elaborated from empirical data observations. It enables data-driven theory generation and is particularly suitable for case studies (Dubois and Gadde, 2002). This approach was the most appropriate in this research, which used the process of “casing” (Dubois and Araujo, 2007): research is seen as an iterative process balancing empirical and theoretical analysis. Thus, the door is kept open to eventually reconsider the focus of the case study, knowing that the boundaries of the case are malleable throughout the investigation (Dubois and Araujo, 2007).

This was an interesting journey moving between observations, descriptions and reflections. In the process of this research, different phases and various sequences were iterated back and forth from empirical observations to theory and from theory to empirical observations. In doing so, it was a mix of abductive, inductive and deductive sub-process, as suggested by Järvensivu and Törnroos (2010).

3.3 Research strategy

The finalization of the pilot case helped to design the main research strategy. The main research is built using in-depth case studies. Case studies are useful for exploring business relationships and networks, because “they capture the dynamics of a studied phenomenon and provide a multidimensional view of the situation in a specific context” (Järvensivu and Törnroos, 2010). Case studies call for a very different approach or research tasks compared to a positivist philosophy. They take the complexity of a phenomenon into account by screening out all the characteristics of the case background, looking at the situation including its spatial and temporal context as well as multiple parameters potentially influencing the data. As Ragin (1997) suggested, this may keep the intrinsic character of the social phenomenon and may foster the identification of relevant theoretical concepts in it. Case studies support a systematic exploration and explanation of the phenomenon studied. They are recommended for the study of complex frameworks which have several variables (Merriam, 1998) and they are compatible
with the investigation of how supply networks work in a specific context (Easton, 1995). Several scholars recommend this method when trying to understand a complex phenomenon (Strauss & Corbin, 1998; Yin, 2009). The aim of case studies is first to observe and understand the phenomenon, but they may be used also to refute or to suggest a theory (Stuart et al. 2002). Researchers might adopt a case study when they want to further investigate an existing theory or to illustrate a concept (Siggelkow, 2007).

Two in-depth case studies were conducted in two different firms in order to take a close look at practices already implemented in these firms. As Järvensivu and Törnroos (2010) suggested, moderate constructionism is not only focused on single case studies and multiple case studies are also relevant in this approach. The depth of the observations is a key success factor, and multiple angles of observation are also important to create rich findings. Conducting multiple case studies does not increase the generalisability of the findings but still it contributes to a better understanding of the reality in its context, from multiple perspectives.

Looking in-depth at specific cases and considering immediate connections outside the cases allows researchers to develop an analytical understanding of the organization. To be as relevant as possible, this research investigated different stakeholders within the supply network of both buying firms: suppliers, internal customers and other departments. This method should emphasize multiple respondent’s perspectives and validate the nature of the resulting influence of ambidextrous purchasing on the studied firms’ innovation.

3.4 The first step of the abductive approach: a pilot study

The aim of a pilot study method is to show that a phenomenon exists and that interesting theoretical perspectives are to be investigated (Siggelkow, 2007). This usually helps to fix the main research questions and to highlight patterns and emerging themes that could guide the main research. Exploring the relevance of a topic makes sense in an abductive approach, to refine the scope and validate the potential managerial applications of the research. Hence, this research started with a pilot study, presented in the next chapter.
Chapter 4. Early exploratory stage: the pilot study

The first step of this research consisted of investigating the topic of interest through a pilot case. The aim of this pilot study was to investigate “why” and “how” the purchasing function could be involved in the sourcing of technological innovation outside the buying firm’s boundaries. In the first stage of the research project, the main research questions had not yet been thoroughly identified, and the topic had not been determined precisely. The pilot case study helped to fine tune the unit of analysis of the main research and to make the focus narrower and clearer. This chapter presents the pilot case study. It introduces the context of the pilot study, the initial research questions and the methodology adopted. In the findings, it is shown how motivations and capabilities (MC) emerged as strong themes from the pilot study. It also highlights that innovation is a process with different stages, in which purchasing can take on a different role at each stage. Two contingent factors appeared as critical to the involvement of purchasing in innovation: market uncertainty, technology uncertainty. The findings of the pilot study gave rise to an initial conceptual framework, which is presented at the end of this chapter.

4.1 Pilot study presentation

4.1.1 Focus of the pilot study

Considerable literature exists on the notion of firms’ network boundaries. The conventional way to define boundaries is to consider the lens of transaction cost economics and to present the firm as a set of assets commonly shared with existing partners. The control of the assets is distributed between the partners (Hart and Moore, 1990). “Inside boundaries” defines internal capabilities, currently active suppliers, or non-active suppliers from the same sector. The “outside boundary” is defined as a “nexus” of suppliers (Yan et al. 2015), i.e. “suppliers who can come from anywhere in a multi-tier supply network and are critical due to their network position and the resultant portfolio of inter-organizational ties” (Yan et al. 2015, p52). Figure 3 below shows the firm’s boundaries with a blue dotted line, and the various paths the incumbent firm (i.e. the buying firm) can follow to reach distant suppliers outside its network boundaries.

![Figure 3: Model of supply network boundaries, adapted from Yan et al. (2015)](image-url)
This model shows three distinct paths for reaching suppliers’ knowledge:

a) Direct close suppliers (such as “Supplier A”). These suppliers belong traditionally to the existing supply base and are well known by the buying firm. Access to the capabilities of these suppliers is relatively easy because network connections already exist, in the form of meetings, or visits to the supplier’s premises. Even indirect suppliers, i.e. tier-2 suppliers, who are accessible through a tier-1 supplier are considered part of the immediate supply network (Yan et al., 2015).

b) Indirect “nexus” suppliers (such as “Supplier B”). From a multtier network perspective, scholars have observed that suppliers can have a determining impact on purchasing’s and innovation’s performance depending how they are embedded in inter-organizational networks (Yan et al., 2015). Supplier integration is a key determining factor for a firm’s innovativeness (Narasimhan and Narayanan, 2013): in this case suppliers can deliver radical innovations, where new technology is implemented using external support (Soosay et al., 2008).

c) Direct “nexus” suppliers (such as “Supplier C”). These new suppliers are located outside existing boundaries, but they may be directly absorbed into the supply network as a result of sourcing exploration. These suppliers are capable of delivering innovations which are new to the world.

The direct network partners (such as “Supplier A”) can also be a source of innovation (Schiele, 2011). However, the existing supply network is most likely expected to deliver incremental innovations such as product improvements (Soosay et al. 2008) when collaborating with the buying firms.

Although there is a growing trend to consider open innovation within the buyer-supplier relationship (West and Bogers, 2014), most studies focus on existing supply networks and scholars have argued that close contacts must preliminarily exist between buyers and suppliers in order to foster new solutions. There is a clear interest in investigating the network boundaries to better understand implications for purchasing in sourcing innovation from outside firms’ existing supply networks.

The following initial questions were considered as a first perspective to investigate the topic:

1. What enables purchasing to explore sources of innovation outside the supply network’s boundaries?
2. What challenges does purchasing face when sourcing innovation outside the existing supply network’s boundaries?”

4.1.2 Empirical data collection

To answer these questions, interviews were undertaken in four different firms in the US over a period of 3 months. These companies were selected according to four criteria: 1) the innovativeness of their product (new to the market), 2) their age, in that they should have existed for more than 3 years and less than 10 (which excludes “start-ups” but focuses more on emerging companies), 3) their funding level, which was expected to be more than USD 10 Million, and 4) their profit ratio, in that they should not have reached their break-even point. Thus, they had all built their business model on technological innovation.

These firms were not just starting up neither were they mature in their sector. They were more considered “fluid emergent companies” as defined by Johnsen et al. (2006). Within this type of firm, “no industry standard emerged and none of the companies had an established supply base” (Johnsen et al., 2006, p674), meaning that the degree of uncertainty in which they evolve is still
very high. In this case, the supply relationships were not developed: they were based on early exploration of a viable supply chain model. Selecting such firms made the role of purchasing visible, as well as the degree of uncertainty in their respective context. The four companies are described in the table 3 below:

<table>
<thead>
<tr>
<th>Firm’s core business</th>
<th>Date of Creation</th>
<th>Innovative Product considered</th>
<th>Profit on this product</th>
<th>Product on the market since</th>
<th>Funding level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Develops, manufactures and markets water treatment equipments using Bioelectrochemistry</td>
<td>2006</td>
<td>World’s first bioelectrically-enhanced wastewater treatment solution. Innovation comes from the size and portability of the station (in a single 40’ container).</td>
<td>negative</td>
<td>2009 USD 30millions + since 2006</td>
</tr>
<tr>
<td>Company B</td>
<td>Develops, manufactures and markets hemodialysis equipments and products for the treatment of End-Stage Renal disease and acute kidney failure.</td>
<td>1998</td>
<td>Portable hemodialysis equipment for home use. Innovation comes from the portability of the equipment: people can make their treatment at home and stop coming to frequent, long and tiring visits to hospital.</td>
<td>negative</td>
<td>2004 USD 100millions + since 1998</td>
</tr>
<tr>
<td>Company C</td>
<td>Develop, manufacture and market innovative windgen turbines</td>
<td>2008</td>
<td>Compact windgen turbines, offering 60% higher return and less nuisances compared to trad gens. Innovation comes from the size of the turbine, and its shape (shroud and vortex) which allow the generator to support fast winds.</td>
<td>negative</td>
<td>2014 USD 100millions + since 2008</td>
</tr>
<tr>
<td>Company D</td>
<td>Pioneer in the development of a new class of drugs made of messenger RNA (modified RNA). This allows the treatment of new diseases such as cancer, violent viruses such as chungungua, etc...</td>
<td>2011</td>
<td>Machines and manufacturing Equipments. The innovation comes from the fact that they can send to any US hospital the expected DNA formul within 48hours.</td>
<td>negative</td>
<td>N/A USD 1000millions + as of June 2016</td>
</tr>
</tbody>
</table>

Table 3 : Description of the companies used in the pilot study

The respondents were chosen from various key managers and executives in these firms with a wide range of knowledge of purchasing, innovation and supply network themes. Their profile is described in the table 4 below:

<table>
<thead>
<tr>
<th>Interviewer’s position</th>
<th>Brief description of purchasing’s organization</th>
<th>Interview duration</th>
<th>Type of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Purchasing Director</td>
<td>Purchasing department is limited to one buyer, in charge of all contracts and negotiations. Characteristics of the needs are like high mix/lo volumes, because the company has limited sales.</td>
<td>1h30 face-to-face</td>
</tr>
<tr>
<td>Company B</td>
<td>VP Purchasing</td>
<td>Purchasing department has been recently staffed and structured: the need for cost reduction is put as a top priority, while the company doen’t make profit. The purchasing needs for manufacturing plants are covered by local buyers, whereas the strategic purchasing is under Purchasing Manager’s responsibility.</td>
<td>1h30 face-to-face</td>
</tr>
<tr>
<td>Company C</td>
<td>Purchasing Manager</td>
<td>Purchasing department is made of 4 people, mainly with engineering background. Classic organisation project/category but the purchased components are highly technical.</td>
<td>2h00 face-to-face</td>
</tr>
<tr>
<td>Company D</td>
<td>Operations Director</td>
<td>No purchasing department. The purchasing function does not exist: users in operation department are allowed to buy in autonomy. The reason announced is that the sourcing must be very fast: the need for speed in the sourcing is a key success factor for this company. Cost is the second</td>
<td>2h00 face-to-face</td>
</tr>
<tr>
<td>HR Director</td>
<td></td>
<td></td>
<td>45 min face-to-face</td>
</tr>
</tbody>
</table>

Table 4 : Details of the interviewees’ profiles (source: Author)

To collect the data, five semi-structured interviews with open-ended questions were conducted, in the form of informal discussions with the stakeholders. The interview questions are listed in the table 5 below:
Secondary data obtained on company visits completed the understanding of the respective contexts. The interviews were recorded and transcribed when possible. The interviews were analysed by listening and by reading the transcriptions and notes several times, before coding. In this pilot study, the complete data analysis resulted in the creation of a codebook (DeCuir-Gunby et al., 2010), meaning that various categories were created to present the emerging themes or patterns.

The coding exercise along with a thematic approach helped to reveal five themes which emerged from the study. These themes appeared repeatedly during the discussions with the interviewees: they are presented in the next section.

4.2 Lessons from the pilot case study

This pilot case study provided an initial understanding of how, under high market uncertainty, the purchasing function proceeds to explore innovation outside the existing supply network. The following sections present the three main findings in a synthetic form.

4.2.1 Purchasing can be an “importer” of innovation from outside the firm.

All the interviewees reported on the importance of the dual role of purchasing. In their view purchasing was expected to scout for innovative suppliers, to identify innovations and to assess them. The interviewees reported that purchasing could identify innovations from existing or potentially new supply chain members, because purchasing is well positioned in the supply network to scout for innovations. The excerpts below from the interviews illustrate these views:

“Purchasing’s role is two-fold: number one is to support existing products and take costs out of them. The second role is to look at next generation products.” (VP Purchasing company “B”).

“That’s procurement’s role to bring technology to R&D, and the way we do it is that we are constantly looking at market dynamics and market analysis to figure out the next generation of technology to bring into R&D. The purchasing folks are the interface with suppliers and technology in the market (Purchasing Director “A”).

“This role is not properly funded and resourced in most industries. Purchasing has a role to bring true innovation to R&D and then let the R&D and the commercial folks to make the right decisions.” (VP Purchasing company “A”).

Table 5: Pilot study – Interview protocol (source: Author)
This new role of purchasing was recognized as a new process by several interviewees during the pilot case, but they also reported that involving purchasing in the innovation process was a challenging objective. This confirms that the focus of this research has potential managerial and practical implications and calls for further understanding.

4.2.2 Innovation is often seen as a process with 3 phases

In the cases studied, purchasing was involved in various innovation phases. Three distinct phases were often discussed by the interviewees: the search for an innovation, the acquisition-development of the innovation and the commercialization-exploitation of the innovation. Although purchasing is traditionally involved in the development phase through NPD or contract management, a surprising finding emerged from the discussions with the four firms: purchasing is now increasingly expected to be involved in the earliest stages of innovation: innovation search and detection. In a sense, purchasing can contribute to the access of outside knowledge and then can leverage innovative suppliers. In all the case studied, there was a clear distinction of the detection phase from the more traditional development and exploitation phases.

Scholars have investigated innovation as a process (Tidd and Bessant, 2018) or distinguished the absorption phase from the exploration and exploitation phases (Cohen and Levinthal, 1990). In the literature, innovation is often seen as a process consisting of three sequential phases: innovation exploration, assimilation and exploitation. However, this calls for further investigation to complete the focus of this research.

4.2.3 Purchasing must be motivated and capable to contribute to innovation

The interviewees reported that purchasing could contribute to innovation exploration and could become an “innovation importer”. They unanimously explained that this new role requires new capabilities to identify innovations outside the firm, to understand them, to communicate them internally and to implement the necessary tasks to acquire the innovation and absorb it. For instance, one of the capabilities highlighted concerned the purchasing organization: company “C” had implemented a specific purchasing function inside the purchasing department which was capable of exploring innovation opportunities outside traditional firm’s boundaries and to support the incumbent firm’s innovativeness. In this company, a team was created with two purchasing professionals who were tasked to screen the market and find opportunities to reduce cost using breakthrough innovations. The excerpts below illustrate this:

“We are a really smart team of people trying to find something really impactful for the firm. We present and promote our business to suppliers. This allows them to unleash some of their own creativity. We actively solicit the supplier’s feedback into the design. Sometimes it will happen in this version, sometimes it will happen in the next version, but it’s a very important aspect.” (Purchasing Manager, company “C”).

“Capabilities to source outside the firm’s traditional network and to explore new technologies is a strategic advantage, but very few companies have this knowledge.” (Purchasing Manager company “C”).

The interviewees also reported that purchasing is naturally not focused on innovation sourcing. Motivating the involvement of purchasing in the search for innovations is a critical managerial factor for three of the five people interviewed. One interviewee explained:

“Purchasing is naturally required to reduce costs. Searching for innovation is more long-term and calls for non-immediate profits. This time frame disrupts the traditional horizon purchasing has on cost reductions. So, you need to incentivize purchasing to start exploring innovations otherwise they’ll stay short-term oriented.” (VP Purchasing company “A”).

Motivations and capabilities appear to be critical factors to move purchasing forward in the innovation exploration process.
4.2.4 Several contingent factors appeared

In company “D”, the speed of sourcing is a key success factor in responding to market penetration constraints. Although purchasing is expected to source from a stable supply base to mitigate the risk of shortages, it is not always possible because current suppliers do not offer the right product/service immediately. The high uncertainty concerning the supply base forces purchasing to search beyond the existing supply base to detect potential suppliers far in advance, so that it is ready to deliver the expected product/service on time to the firm.

Sometimes, the buying company does not even know what kind of technology it will require from suppliers to develop and sell its own product. This proactive behaviour implies that prices are rarely discussed, whereas delivery speed is the main criterion. The supplier was awarded based on its capability to react very fast, as one of the interviewees states below:

“The technological uncertainty is very high, and historical suppliers may not be able to respond to our needs, therefore maintaining fast exploration capabilities, fast market screening outside the supply network’s boundaries is a core element of success in purchasing,” (Operations director, Company “D”).

The two factors moderating purchasing’s effectiveness in the innovation process appeared repeatedly during the interview. They were kept as key contingent factors for the main research.

4.3 Summary of the themes emerging from the pilot study

The five themes emerging from the pilot are described in Table 6 below:

<table>
<thead>
<tr>
<th>Themes emerging from the pilot study</th>
<th>Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing’s motivation to explore innovation outside existing network boundaries</td>
<td>Motivation</td>
</tr>
<tr>
<td>Purchasing’s capability to explore innovations outside existing network boundaries</td>
<td>Capability</td>
</tr>
<tr>
<td>Innovation is seen as a process with 3 main phases: exploration, assimilation, exploitation</td>
<td>Innovation process</td>
</tr>
<tr>
<td>Technological uncertainty moderates purchasing contribution to innovation</td>
<td>Technological uncertainty</td>
</tr>
<tr>
<td>Supply market uncertainty moderates purchasing contribution to innovation</td>
<td>Supply market uncertainty</td>
</tr>
</tbody>
</table>

*Table 6 : 2 constructs emerging from the pilot study (Source: author)*

4.4 Conceptual framework emerging from the pilot study

Purchasing will not be able to contribute to innovation if it is not motivated (i.e. incentivized) and capable of contributing. In this pilot study, purchasing will contribute to innovation if it is motivated and capable of contributing to the three phases of the innovation process. Thus, the conceptual framework emerging from the pilot study represents purchasing’s motivations and purchasing’s capabilities as precedents of purchasing’s contribution to the three stages of innovation, as shown in Figure 4 below. These two constructs are positioned on the left side of the framework.
These emerging themes became the fundamental themes of the main research, calling for an extensive literature review and further empirical data collection, which is the focus of the next chapter.
Chapter 5. Purchasing’s required motivations and capabilities to contribute to the innovation process: a systematic literature review

This initial conceptual framework presented Table 4 is used as a basis for searching in the literature for the motivations and the capabilities purchasing requires in order to contribute to the innovation process. This is the aim of Paper 1: “Purchasing’s contribution to innovation: A systematic literature review and future research directions” (François Constant, Thomas E. Johnsen). This literature review explores innovation as phases of exploration, assimilation and exploitation and examines purchasing motivation and capabilities (MC) at each phase of the process.

5.1 Literature review

5.1.1 Sourcing innovation from the supply network: a process model

Innovation is often represented as a process which includes several phases: searching, selecting and implementing the innovation (Tidd and Bessant, 2018). The last phase, implementing, further includes sub-activities such as acquiring, executing, launching and sustaining the innovation. Tidd and Basset (2018) state, “Innovation is more than simply coming up with good ideas; it is the process of growing them into practical use” (Tidd and Bessant, 2018, p85). Considering sourcing innovation as a process allows us to distinguish the different phases of the innovation process instead of only considering the outcomes of the innovation (Crossan and Apaydin, 2010; Maital & Seshadri, 2012), or the invention.

This research builds on the definition of innovation provided by Narasimhan and Narayanan (2013) stating that innovation is “the process of making changes to products, processes, and services that results in new value creation to the organization and its customers by leveraging knowledge efforts of the firm and (or) that of its supply network partners” (Narasimhan and Narayanan, 2013). This definition provides several interesting dimensions. First, it presents innovation as a process, which fits with seminal research in the field of innovation (Tidd and Bessant, 2018). Second, it recognizes that the supply network has a key role in the process, as a provider of innovations. Third, it is neutral regarding the type of the innovation (product, process or service) and the degree of the innovation (incremental, radical, discontinuous).

As Narasimhan and Narayanan (2013) did, this research considers that the innovation process has two macro phases. This refers to two closely related research frameworks which leverage the two main phases of the innovation process. The first is the theory of absorptive capacity (Cohen & Levinthal, 1990) and the second is ambidexterity (Gibson & Birkinshaw, 2004). Absorptive capacity is defined as the firm’s “ability to recognize the value of new external information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990, p128). Ambidexterity is defined as the capacity to “simultaneously demonstrate alignment and adaptability across an entire business unit” (Gibson & Birkinshaw, 2004, p209). Considering these two fields of research allows us to disaggregate exploration and exploitation as constituents of the organizational innovation process (Narasimhan and Narayanan, 2013). The supply network becomes a potential source of innovation opportunities in these two phases of the innovation process. As Narasimhan and Narayanan state, “In each of the innovation typologies [exploration and exploitation], suppliers are equally likely to be innovation enablers,” (Narasimhan and Narayanan, 2013).
The earliest phase of the innovation process, innovation exploration, relates to the search for unfamiliar, distant and remote knowledge (Ahuja and Lampert, 2001; Rosenkopf and Nerkar, 2001; Nerkar, 2003; Atuahene-Gima, 1995). “Innovation exploration” involves a distant search for new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar and Roberts, 2004). In contrast, the other phase of the innovation process concern the application of the innovation, or the “innovation exploitation” (Crossan and Apaydin, 2010): exploitation involves innovations that build on a firm’s existing technological capabilities, providing the firm with advantages for making incremental innovations (Nerkar and Roberts, 2004).

A long tradition of research into organization theory suggests that, at the firm level, pursuing exploration and exploitation goals simultaneously may require structures and actions that are fundamentally at odds, making it difficult to pursue both simultaneously without acting on organization processes (March, 1991; Tushman and O'Reilly, 1996). Because the benefits of exploration are distant and uncertain, managers tend to put more resources into exploitation than into exploration (March, 1991). This dilemma is particularly important in technological innovation management because firms need to exploit their existing competencies while trying to avoid dysfunctional rigidity effects by renewing and replacing them with entirely new ones (Atuahene-Gima, 2005; Leonard-Barton 1992). The idea of balancing innovation exploration and innovation exploitation comes from the literature of organizational ambidexterity introduced by Duncan (1976). Ambidexterity refers to the firms’ ability to do two things equally well: adapt and develop in their environment (Duncan, 1976), and to succeed at both exploration and exploitation (Tushman and O’Reilly, 1996; Raisch and Birkinshaw, 2008). This dilemma is also highlighted as a major concern in the purchasing literature. Gualandris et al. (2018) suggested that “a purchasing function should be concerned with achieving a balance between exploration and exploitation, as well as attempting to maximize both simultaneously,” (Gualandris et al, 2018, p3).

Hence, the current research calls for the consideration of a narrower focus on one part of the supply chain: the purchasing function. The literature suggests a need to manage innovation exploitation activities along with exploration activities through the purchasing function (Gualandris et al, 2018). Among the multiple stakeholders of the supply chain, purchasing plays a key role in managing the upstream side of the entire chain, including the procurement of goods and services from suppliers. This role is the focus of this research, including the procurement of innovation.

5.1.2 Purchasing’s involvement in innovation process

The first publication introducing the notion of purchasing’s contribution to the innovation process reported on the “dual role of purchasing” (Schiele, 2010): meaning that purchasing can be involved in a dual innovation and cost-oriented role (Schiele, 2010). This introduces the effective dichotomy of one role which is cost-oriented, and the other role which is innovation-oriented (Schiele, 2010; Oosterhuis et al., 2005). Another stream of research investigates the notion of the ‘dual role’ through the opposite challenges of innovation and rationalization, as described in the industrial network approach (Gadde and Wynstra, 2017), in the context of managing interfaces with suppliers (Araujo et al., 1999). This duality is also emphasized through the need to reconcile innovation exploration and exploitation through purchasing operations (Chanal and Mothe, 2005).

The first role, the contribution of the purchasing function to innovation exploitation, has received extensive interest under the banner of purchasing involvement in new product development (NPD) (Wynstra et al., 2003; Van Echtelt et al., 2008, Schiele, 2010). These tasks
occur mainly in a project context when the company is looking for external support in order to
design new products or services based on existing technological capabilities. Purchasing
involves key suppliers early in the NPD process to benefit from joint R&D (Johnsen, 2009; 

The second role concerns how purchasing may contribute to innovation exploration
(Narasimhan and Narayanan, 2013) by searching for new and distant capabilities that bring
opportunities to the firm to achieve more radical innovations (Nerkar and Roberts, 2004).
Innovation exploration is typically characterized by high degree of technological uncertainty
(Melander and Lakemond, 2014; Narasimhan and Narayanan, 2013), higher risks (O’Connor 
and Rice, 2013) and the need for new capabilities (Slater et al., 2014). While the exploitation
phase occurs mainly in a context of low technological and market uncertainty, shifting the focus
from relatively low technological to high technological uncertainty requires a change in
sourcing strategies (Mikkelsen and Johnsen, 2018) that emphasizes the importance of
exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018).

This study focuses on the second role, i.e. purchasing’s contribution to the innovation
exploration phase. It also investigates the balance between the two phases, because the literature
already reports that tensions may occur in the organization when managing both innovation
exploitation and exploration simultaneously. The success of innovation exploration depends on
how the firm succeeds in balancing the two phases of the innovation process. Purchasing, as it
is involved in both phases, is also concerned by these tensions.

5.1.3 Purchasing’s contribution to innovation exploitation

The exploitation phase has been extensively researched and there is no doubt that purchasing
can contribute to innovation in this phase. These publications discuss purchasing’s involvement
in the use of an innovation through a project or the development of a new product, for instance
when it is expected to source an innovation designed inside the buying firm. Indeed, purchasing
is involved in the application of the innovation, according to the definition of exploitation by
Cohen and Levinthal (1990). In this phase, purchasing starts being involved when the
innovation needs to be incorporated into firm’s operations.

There is a clear dominance of studies in contexts of low uncertainty, represented by a large
number of publications on NPD, with a particular emphasis on innovation benefits. The NPD
and ESI literature demonstrate the role purchasing can play in innovation by collaborating with
suppliers and co-developing products. The emphasis on this phase may be because it directly
matches the strategic challenges identified in the field of purchasing, such as cost reductions,
early purchasing involvement in NPD, early supplier involvement, co-development, etc. Or it
may be because the outcomes of purchasing’s contribution to innovation are easily measured if
we consider traditional purchasing metrics.

Under low technological uncertainty, the literature suggests that the best process to enhance
purchasing’s contribution to innovation is to involve buyers in new product development. This
is about aligning internal development activities with suppliers’ development activities, in
which purchasing’s role is to exploit the supplier’s technical competencies (Wynstra et al.
2003). Strong integration between purchasing and R&D can lead to a better NPD
innovativeness (Van Echtelt et al., 2007). Some authors suggest that a detailed process with
purchasing inclusion would ensure purchasing’s regular participation in NPD (Schiele, 2010).
Others recommend setting innovation-related tasks as routines, such as specific processes,
managerial systems, metrics (Charterina et al., 2016).

5.1.4 Purchasing’s contribution to innovation exploration
The literature review emphasized that purchasing’s contribution to innovation exploration is far less researched than the innovation exploitation phase described above. Very few publications exist about purchasing’s contribution to the innovation exploration phase (Table 7e7). There is an intense debate about purchasing’s role in this exploration phase, especially when market and technological uncertainty are high: Melander and Lakemond (2015) have argued that purchasing’s influence is limited as far as the product has a high degree of innovation. Oppositely, several researchers have argued that purchasing can contribute to innovation exploration (Legenvre and Gualandris, 2018, Mikkelsen and Johnsen, 2018; Narasimhan and Narayanan, 2013), but they have highlighted the need of further research on this matter. These discussions became the cornerstone of this research, demonstrating the range of opportunities to contribute to the field.

In the context of purchasing and supply management, innovation exploration requires working with new markets, new routes of sourcing and innovations which bring higher uncertainty and risk (O’Connor and Rice, 2013). Innovation exploration refers to scouting for innovations outside the existing supply base and calls for a distant search for new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar and Roberts, 2004). This definition has been used more recently in the purchasing and supply management field (PSM), suggesting that under high technological uncertainty, firms may scout for innovations which are not available within the buying firm’s existing environment (Melander, 2014; Narasimhan and Narayanan, 2013), adding the notion of the network to the former definition.

Table 7: Papers reporting on purchasing’s contribution to innovation exploration (source: Author)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Year</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legenvre H., Gualandris J.</td>
<td>Innovation sourcing excellence: Three purchasing capabilities for success</td>
<td>2018</td>
<td>Business Horizons</td>
</tr>
<tr>
<td>Billington C., Davidson R.</td>
<td>Leveraging open innovation using intermediary networks</td>
<td>2013</td>
<td>Production and Operations Management</td>
</tr>
<tr>
<td>Luzzini D., Ronchi S.</td>
<td>Organizing the purchasing department for innovation</td>
<td>2011</td>
<td>Operations Management Research</td>
</tr>
</tbody>
</table>

5.1.5 Purchasing’s adaptation to innovation exploration

Innovation exploration is a managerial opportunity and a critical necessity in the context of technological uncertainty. Exploration “entails a shift away from an organization’s current knowledge base and skills” (Lavie et al., 2010, p 114). Research has demonstrated that the nature of these shifts is related to new technical skills, market expertise, or external relationships (Lavie and Rosenkopf, 2006). To succeed in managing within a highly uncertainty context, companies need to develop new capabilities, changing their strategies, organizational structures, processes, management resources and culture (Slater et al., 2014).

Purchasing is not left aside of this need for a radical adaptation, also concerning the type of the supply base it will address. Exploration relates to a high degree of uncertainty and involves
suppliers that are distant from the incumbent firm: this requires working with new markets, new routes of sourcing and innovations which bring higher uncertainty and risk (O’Connor and Rice, 2013).

Organizations that are willing to modify their approach to innovation sourcing may consider adopting a new role for the purchasing function and the creation of new linkages with other functions (Narasimhan and Narayanan, 2013). However, the literature is limited in the understanding of the adaptation needed to succeed in involving purchasing in innovation exploration. Understanding the drivers of innovation exploration is of high interest, because it is an important component of the innovation exploration success, especially in large firms (Kelley et al., 2011; Stringer, 2000).

5.1.6 Organizational tensions created by purchasing’s involvement in both exploration and exploitation activities

Another reason justifying the need for adaptation is because innovation exploration in a context of high technological uncertainty means facing unexpected challenges, tensions, and disillusion. Explorers need to manage unanticipated obstacles, learn a lot from what they discover, and have a creative mindset (Day, 1994). This makes it more difficult to keep motivation alive in such a context (Kelley et al., 2011). Exploring supply networks to find innovations is highly demanding because of the high uncertainties and unpredictable discoveries. The current literature has reported that “lack of motivation” can be an obstacle to innovation in a context of high uncertainty (Alexander and van Knippenberg, 2014). Thus, adopting an innovation explorer mindset may create tensions and difficulties within a purchasing function.

Tensions occur when other functions do not recognize purchasing’s role in innovation exploration: as mentioned above, purchasing is not seen as an innovation importer in many organizations. Some scholars have suggested that tensions can come from a dual strategy, one cost-oriented and the other innovation-oriented (Oosterhuis et al., 2005). Tensions might occur between exploration and exploitation activities, generating conflicts due to different time horizons, different project constraints and other pressures.

Tensions might appear between different departments within a firm, most probably between R&D and purchasing, because R&D plays a premium role in innovation exploration and may not be willing to share this monopoly. In addition to this, we should not under-estimate tensions that can occur within the purchasing function itself, when purchasing management assigns innovation exploration tasks to buyers in addition to their traditional role of sourcing and cost reduction. In this case, the way purchasers deal simultaneously with exploration and exploitation is sensitive. Purchasing team coordination is difficult because managing the balance between both innovation exploration and short-term activities is tricky. Mitigating inconsistencies between these two activities is under the responsibility of senior management. Birkenshaw and Gupta (2013) have argued that each level of hierarchy within the organization is supposed to make trade-offs individually and solve these dilemmas, while dealing a little bit with exploration as well as exploitation (Birkenshaw and Gupta, 2013).

5.2 Paper 1: “Purchasing’s contribution to innovation: A systematic literature review and future research directions” (François Constant, Thomas E. Johnsen)

This paper investigates the contributions of purchasing functions to innovation. It is based on a systematic literature review of 74 peer-reviewed publications in multiple disciplines, published between 1976 and 2018. The aim of this paper is threefold. First, it systematically reviews the
literature related to purchasing’s contribution to innovation, focusing on purchasing’s motivations and capabilities. Second, it analyses the literature to identify activities and processes that facilitate purchasing’s contribution to different phases of innovation (exploration, assimilation and exploitation). Third, it presents the contingencies that drive the need for purchasing’s contribution to innovation.

The research methodology followed the process proposed by Durach et al. (2017) to ensure a structured process of literature searching, screening, and reporting. The key rationale for using the methodology by Durach et al. (2017) is that it provides a specific process adapted to supply chain related fields. The principle of the systematic literature review by Durach et al. (2017) is a continuous refinement of a conceptual model, starting from an initial framework proposition and resulting in a revised model. Durach’s process is based on six pre-defined steps which allow the researcher to achieve a comprehensive search. One of the critical steps consisted of carrying out a quality and relevance check of each article under focus, by progressively narrowing down the list of articles through the reading of abstracts and core texts. Once the list of articles had been designed, a structured coding process was engaged to find relevant patterns. The idea behind the coding is to develop “schemes” to extract relevant details from the papers under focus and to refine the theoretical model based on evidence from the base articles. The classification of “thematic findings” came up with an initial raw list of motivations and capabilities.

The refined analysis of the extant literature resulted in the identification of two gaps in current research. The first gap is a lack of research on purchasing’s contribution to exploration. The second gap is a lack of research on the micro level of individual purchasing skills and competences required for purchasing employees to effectively contribute to innovation within firms. The paper developed two systems for classifying the findings: the first adopted a multilevel approach consisting of motivations and capabilities (individual/firm/network levels) based on Rothaermel and Hess (2007). This might provide us with a distinction on the nature of the motivations and capabilities. The second system of classification presents purchasing’s motivations and capabilities to contribute to innovation in the different phases of the innovation process: innovation exploration, assimilation, exploitation.

Finally, the paper identifies three precedents and contingencies for purchasing’s contribution to innovation: first, purchasing’s organizational design; second, purchasing’s integration with other internal functions; third, a champion and boundary-spanning role. The paper concludes by outlining future avenues of research that include the investigation of individual skills to explore innovation, the purchasing function’s work boundaries, purchasing’s integration with the marketing function and studying firm size as a contingent effect.
5.3 The MC-based conceptual framework

![MC-based conceptual framework](image)

*Figure 5: The MC-based conceptual framework (source: Author)*

5.4 Paper 1 publication status

This paper was presented for the first time at the R&D Management conference in Milan in July 2018. It received some interesting verbal comments, mainly related to the structure of the paper and the need for a comprehensive link between the constructs and the findings. The current version presented in this covering essay includes some important modifications made after the conference review but needs further work to be ready for a submission to a journal. The sharpness, consistency, and organization of the findings must still be improved. Thus, this paper has not been submitted yet. Considering the nature of this paper, a valuable target journal could be JPSM.

5.5 The need for a stronger conceptual model

Working with the initial literature review and the preliminary findings from the pilot, purchasing’s motivations and capabilities became the central interest of this research. This is highlighted in the MC-based conceptual framework. At this point of the research, after having done a pilot study and identified several factors, a search for finding helpful theories to ground the framework in theory was needed. Following this search, the awareness, motivation and capabilities (AMC) framework (Chen and Miller, 2015) was found to be the most appropriate, thereby introducing awareness (A) as a new construct.
Chapter 6. Importing a conceptual framework from cognitive sciences: the awareness, motivation, capabilities framework

This section presents the awareness-motivation-capability framework (AMC framework) and how it provides the main framework for this research. It first describes the roots of the AMC framework, and then it justifies the use of the AMC framework in this research. Third, it presents the literature about purchasing’s contribution to innovation exploration in the light of the AMC framework, reporting on the literature gaps and introducing the three research questions. The section ends with a presentation of the initial conceptual model supporting this research.

6.1 Searching for a relevant conceptual framework

There is no consensus about the adequate base theory involved in the research into purchasing’s contribution to innovation. Patrucco et al. (2017) built on the resource based view, Pihlajamaa et al. (2017) based their approach on absorptive capacity, van Echtelt et al. (2007) leaned on resource dependency theory, while Melander and Lakemond (2015) used transaction costs, etc. However, none of these theories provide the necessary constructs to investigate the enablers of purchasing’s contribution to innovation exploration. Despite several papers identifying enablers to allow purchasing to make a contribution to innovation exploration (Mikkelsen and Johnsen, 2018; Legenvre and Gualandris, 2018; Homfeldt et al., 2017), the literature lacks a structured set of precedents.

As presented above in sections 2.2.1 and 2.2.2, the main theoretical grounds of this research are dynamic capability and absorptive capacity. These theories are based on economic performance, an analysis of the competitive advantage and performance efficiency. However, these theories are not relevant enough to explain firms’ behaviour in a specific context and must be complemented. Resource scarcity and agency theory cannot explain why an organization or a sub-section of an organization (i.e. a function) starts adapting to a new practice (Eisenhardt, 1989), and therefore are not relevant in the context of this research either. Thus, the need to complement with theories helping to analyse drivers of actions and cognitive components supporting an action is necessary. Exploring the literature around the themes found during the early stages of this research forces consideration of the awareness-capability-motivation framework, or AMC framework, found in the strategic management literature.

6.2 Building on the awareness-motivation-capability (AMC) framework

This research builds on the awareness-motivation-capabilities (AMC) framework to investigate precedents of purchasing’s contribution to innovation exploration. The AMC framework provides a frame to identify business cooperation and behavioural drivers in an organization (Chen and Miller, 2015; Chen, 1996). Originating in cognitive theories and general management, the AMC framework provides a novel perspective of purchasing and supply chain management. Adapting the AMC framework, this study argues that purchasing’s contribution to innovation exploration is enabled by purchasing’s awareness, motivation, and capabilities. The AMC framework was first used to investigate interfirm tensions and competitive dynamics (Chen, 1996), but it has also been applied to studying perceived and objective relationships between companies (Chen et al, 2007, 2015). This cooperation perspective reflects companies’ ability to collaborate. It has been published recently that the AMC framework can be a “useful framework for identifying not only competitors but cooperative partners” (Chen & Miller,
Within the competitive dynamics, cooperation between firms can be investigated using the AMC perspective (Chen and Miller, 2015). This latest development is of high interest for the current research, because it reports on cooperative and non-market decisions between business partners. Although this framework has not been widely studied in the literature, it is highlighted as an excellent approach for the analysis of decisions and managerial tensions in the supply chain management field (Schweig, 2015).

Chen and Miller (2015) argue that the AMC framework is “supposed to facilitate the comprehension of reasons, sources, concerns and consequences of competitive actions” (Chen & Miller, 2014). It is focused on behavioural drivers to act or respond to an external factor of a competitive tension (Chen, 1996). It analyses “the extent of awareness, the level of motivation, and, finally, the capability to respond” (Livengood and Reger, 2010). Awareness is defined as the accessibility to knowledge about the firm’s rivals and its competitive environment; capability represents the firm’s resources to move and make a competitive decision, and motivation is about the firm’s willingness to react and respond to its competitor’s actions (Chen et al., 2007). It has also been noted that “awareness and motivation are conditioned mainly by market relationships, and capability depends largely on strategic or resource endowments” (Chen, 1996).

AMC derives from cognitive science and is now part of the strategic management field. The principle of the AMC framework is to build on cognitive components to explain why an action occurs, leveraging a set of clear constructs. The action considered here is “to contribute to innovation exploration”. Using the AMC framework is an interesting complement to AC and DC perspectives to investigate precedents of this action, i.e. how purchasing contributes to innovation exploration.

6.3 What the AMC framework brings to this research

The AMC framework has never been used in the PSM field. However, it provides interesting concepts and hypotheses derived from the strategic management literature, which can be imported into the PSM field. The reasons are explained in this section.

The main cornerstone of the AMC framework is that it has to be used in a competitive, dynamic context (Chen et al., 1992). The competitive context refers to the nature of the market in which the company evolves and to the nature of the competitive pressures the company faces from outside. It is worth saying that today’s fast-paced environment creates higher competition between firms and exposes companies to the need for adaptation to remain competitive. A precondition for using the AMC framework is therefore to investigate firms evolving in a market where competitive dynamics exists. Purchasing is exposed to the firms’ environment and is in a perfect position to identify external opportunities, supporting companies’ adaptation to competitive dynamics. Any single company is exposed to the competitive environment of its sector, in which purchasing has a role to play. In this respect, AMC is useful to analyse such contexts.

This competitive dynamic calls for firms’ reactions: firms must initiate fast competitive actions to remain competitive within the market in question (Chen & Miller, 2012). Chen et al. (1992) defined a competitive action as a “specific and detectable competitive move, such as a new product introduction, initiated by a firm to improve or defend its relative competitive position” (Chen et al., 1992, pp. 440). The action considered in my research is the action to move towards innovation exploration (and ultimately, to contribute to innovation exploration). This specific action aims to bring innovation capabilities to the firm, and consequently a competitive advantage. Involving purchasing in innovation exploration is a strategic decision which can be

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considered as a competitive move. This focus fits with the scope of firms’ reactions described by Chen and Miller (2012) in the AMC framework.

The AMC framework mainly supports the understanding of drivers of actions, behaviours driving these actions, and reactions to a competitive environment (Chen et al., 2007). The AMC framework “is central to our understanding of the sources and consequences of both competitive actions and a wide range of other types of firm actions” (Chen & Miller, 2015, pp. 759-760). The three dimensions awareness, motivations, capabilities represent variables, supporting the identification of drivers of the actions. awareness, motivations and capabilities are precedents which influence firms’ strategic and managerial decisions to adapt to a competitive environment (Livengood and Reger, 2010). This brings the main frame of the theoretical model: the three dimensions A, M, and C can be represented as precedents to “purchasing’s contribution to innovation exploration”.

The AMC framework has been initially designed to analyse offensive or defensive competitive actions in a dynamic market. However, the most recent developments of the framework have introduced the cooperation perspective, enlarging the framework to include collaboration between companies. The four possible types of possible actions which can be analysed through the perspective of the AMC framework can be listed as the following:

- Competitive actions (Chen & Miller, 2012)
- Competitive responses (Chen & Miller, 2012)
- Intensity of action attack (Chen & Miller, 2012)
- Cooperation (Chen & Miller, 2015)

This study did not consider the competitive perspective of the framework but more the cooperation. The new orientation consists of identifying cooperative partners and not only competitive partners (Chen and Miller, 2015). This dimension of the framework can help to identify cooperative partners, driving a better company performance (Chen and Miller, 2015). This new orientation is a key interest for this study, because it justifies the usage of the AMC framework in a context of collaboration between a buyer and a supplier in search of an innovation partnership.

Finally, the AMC framework brings forth some interesting details about the characteristics of the three dimensions [Awareness, Motivations, Capabilities], supporting purchasing’s contribution to innovation exploration. This provides a pattern of codes or themes which are useful in this research, mainly to design the data collection method and to analyse the data collected. The early stages of the AMC framework emphasized that “Awareness and Motivation are conditioned mainly by a market relationship, and Capability depends largely on strategic or resource endowments” (Chen, 1996, p. 105). However, more recently, Chen and Miller (2015) presented these patterns in the form of a multi-level matrix which expands on the features of an organization which enable a firm to adopt a cooperation approach with its partner.

The multi-dimensions of the AMC framework

The relational view of the AMC framework presented by Chen and Miller (2015) classifies awareness, motivation and capabilities into three main origins: organization, industry and culture. Table 8 presents the 3x3 matrix and the 9 constructs are defined below.

Awareness is defined as accessibility to knowledge (Chen et al., 2007) and is conditioned mainly by market visibility (Chen, 1996). In a collaborative context, this is about understanding the firm’s environment to obtain suppliers’ support and cooperation (Donaldson and Preston, 1995; Freeman et al., 2010). Chen and Miller (2015) emphasize the importance of
organizational structure and systems to acquire knowledge from the firm’s environment and to manage boundary-spanning activities, considering that organizational design (centralized/decentralized) or decision-making processes can facilitate environmental scanning. The physical proximity to potential partners has a role to play in enhancing awareness of opportunities and interaction (Glaeser et al., 1992). Socialization, i.e. participation in clusters, start-up incubators or trade associations facilitates the discovery of potential suppliers, whereas a firm’s culture and reputation facilitate its visibility to potential partners (Chen and Miller, 2015).

Motivation is defined in the AMC framework as the firm’s willingness to engage in a relational approach with its partners, including suppliers, fostering innovations and a long-term mindset (Chen and Miller, 2015). The AMC framework presents various dimensions which drive motivation including the firm’s governance and culture. Furthermore, incentive systems can influence motivation at the organization level, whereas individual values and mindset are cultural drivers of motivation (Chen and Miller, 2015). At the industry level, scarcity of outside resources or an industry crisis may force companies to build proficient relationships or renew technologies. This aspect is named by Chen and Miller (2015) as “crisis and birth”.

Capability represents the firm’s resources to engage in a collaborative approach (Chen and Miller, 2015). Similarly to awareness and motivations, capabilities are described on three levels in the AMC framework. At the organizational level, core capabilities include superior technical equipment and skilled human resources that enhance the firm’s ability to engage external partners in a cooperation approach (Chen and Miller, 2015): strong organizational capabilities attract outside partners (Dyer and Chu, 2011). At the industry level, the nature of the firm’s environment, i.e. a rich business environment, is a capability (Chen and Miller, 2015): having a fruitful environment facilitates the discovery of potential partners and new knowledge. At the cultural level, people’s experience and practice are a core capability which can be utilized to develop cooperation.

A singularity must be noted in the literature: Cohen and Levinthal (1990) considered awareness as a capability that individuals must possess: “critical knowledge includes awareness of where useful complementary expertise resides within and outside the organization,” (Cohen and Levinthal, 1990, p133). However, for the clarity of this thesis and the compliance with Chen and Miller (2015) framework, the difference between awareness and capability will be left to the next sections.

<table>
<thead>
<tr>
<th>Awareness</th>
<th>Motivation</th>
<th>Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>Organizational structure and systems</td>
<td>Firm governance, culture, incentives</td>
</tr>
<tr>
<td>Industry</td>
<td>Physical proximity</td>
<td>Crisis and birth</td>
</tr>
<tr>
<td>Culture</td>
<td>Upbringing and socialization</td>
<td>Values and mores</td>
</tr>
</tbody>
</table>

Table 8: Key constructs of the AMC framework (Chen and Miller, 2015)

Table 6 presents key features of the A, M, C dimensions within a multi-dimensional frame. Chen and Miller (2015) argued that “a number of dimensions contribute to the awareness of opportunities […] to the motivation and capability” (Chen and Miller, 2015, p766). According to their framework, the decision to perform an action is driven by stakeholders’ awareness of the opportunities and risks relatively to this action, which are emphasized by “organizational processes and structures, industry characteristics, or factors relating to cultural socialization” (Chen and Miller, 2015, p766). Stakeholders’ motivations are driven by “organizational
incentives, industry crises and transformations, and cultural mores” (Chen and Miller, 2015, p766). Lastly, stakeholders’ capabilities “will be a function of organizational (or industry) resources and experience, as well as cultural and social connections” (Chen and Miller, 2015, p766).

These constructs support the design of our research, because they emphasize key directions which must be investigated during the data collection. Such a multi-dimensional approach might provide a comprehensive overview of the enablers enabling purchasing’s contributing to innovation exploration. The next section presents a review of these enablers found in the existing literature, focusing on purchasing, and introduce the AMC-based conceptual framework.
Chapter 7. Developing research questions and the AMC-based conceptual framework

7.1 Shifting the focus to purchasing’s contribution to innovation exploration

There is an emerging debate about purchasing’s role in the exploration phase, especially when market and technological uncertainty is high. Melander and Lakemond (2015) have argued that purchasing’s influence is limited as far as the product has a high degree of innovation. In contrast, others have argued that purchasing can contribute to innovation exploration (Legenvre and Gualandris, 2018, Mikkelsen and Johnsen, 2018). Organizations willing to modify their approach to innovation sourcing may consider adopting a new role for the purchasing function (Narasimhan and Narayanan, 2013). However, existing research is limited on the understanding of the adaptations needed to succeed in involving purchasing in innovation exploration.

Purchasing’s contribution to innovation exploration is particularly pertinent in contexts of high technological uncertainty because this requires a change in sourcing strategies that emphasizes exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2019). In the context of high technological uncertainty, exploration means sourcing or scouting distant capabilities that are likely to be found outside the firm’s existing environment (Narasimhan and Narayanan, 2013). Sourcing new capabilities brings opportunities to the firm for achieving innovations (Nerkar and Roberts, 2004). However, this implies evolving with higher degrees of uncertainty and higher risks (O’Connor and Rice, 2013). Narasimhan and Narayanan (2013) suggest that uncertain environments require organizations to modify their approach to innovation sourcing to involve a new role for the purchasing function.

Companies need to develop new internal capabilities, change their strategies, organizational structures, processes, management resources and culture (Slater et al., 2014). Recent research suggests that purchasing can play a key role in this process (Gualandris et al., 2018), but the understanding of the required changes for purchasing to be able to perform this role is still limited. In fact, purchasing is not traditionally equipped to perform a role in innovation exploration as this is normally not within its remit. Furthermore, purchasing may not have any incentive to explore innovation as this is commonly viewed as R&D’s territory (Damanpour and Aravind, 2012).

Thus, this research aims to develop insights into how purchasing can contribute to innovation exploration and therefore requires unpacking purchasing’s awareness of a need to assume such a role, its incentives or motivations, and the required capabilities.

7.2 Measuring purchasing’s contribution to innovation exploration

The first mean to assess purchasing’s contribution to innovation is to refer to purchasing maturity or development models. Purchasing maturity models reflect the evolutionary process of purchasing and serve as a mean to assess how purchasing is becoming more developed and integrated into business plans (Úbeda et al., 2015). Purchasing maturity models often consist of stages reflecting purchasing’s development towards a strategic function. They are “helpful not only in classifying organizations in terms of their current position but are especially relevant for determining the possible directions for strategic change in a systematic way” (Rozemeijer, 2008, p206). Several maturity models can be found in the purchasing and supply management literature, representing purchasing’s development toward a strategic business function (Freeman and Cavinato, 1990; Van Weele, 2005; Schiele, 2007; Cavinato 1999).
Few of these models mention innovation as part of the purchasing development stages. Only Cavinato (1999) describes purchasing development with five stages, among which innovation is mentioned in stage 5. Cavinato (1999) emphasizes that the highest stage (stage 5) is characterized by “organizations [which] value people, whether insiders or outsiders, who can assemble creative packages of products and services for competitive advantage. They also reward innovation,” (Cavinato, 1999, p77). However, this is not precise enough to make a fine distinction between a firm which has a very high degree of maturity in managing innovation sourcing from suppliers, leveraging purchasing, or another firm which simply involves suppliers’ innovations in NPD. Thus, this research requires leveraging other theories to assess purchasing’s contribution to the innovation process.

In this research, the measure of purchasing’s contribution is not related to economic success, but more on the effort to detect (find) the innovation and to communicate it internally. This statement is important to make, otherwise, key outcomes of the process would remain under-examined. As stated above, this study builds on Azoulay and Lerner (2012), who consider the success of innovation discovery to be proportional to the level of exploration effort made to discover it (Azoulay and Lerner, 2012). Thus, in this study, the overall success of purchasing’s contribution to innovation exploration is measured through the assessment of the fair estimation of the efforts made by purchasing to contribute to innovation exploration, through a count of the innovations discovered by purchasing versus other departments (R&D, etc.), or through the assessment of occurrences in which purchasing is involved in innovation phases, from the scouting phase to the contracting phase. The consideration of these tensions can also help to assess the depth of involvement purchasing has had in innovation activities; because traditional organizations do not consider purchasing to be a key contributor to innovation, tensions appear as soon as the purchasing department is involved in the advanced phases of the innovation process.

7.3 Purchasing’s awareness of the existence of an innovation

The AMC framework helps to define the dimension of awareness. Awareness is defined as the accessibility to knowledge (Chen et al., 2007) and is conditioned mainly by a market relationship (Chen, 1996). Purchasing’s awareness is defined as purchasing’s capability to be aware of (i.e. to detect, or to identify) an innovation “designed outside” or any external knowledge (here knowledge concerns suppliers’ innovations). If purchasing is aware of a source of innovation within the extended supply network, then it can decide whether to act or not to study this innovation in deeper detail, or to leave the opportunity aside. Additionally, purchasing’s awareness may concern the need to find external knowledge to develop an innovation “designed inside”, for which the firm wants to outsource the execution and search for a supplier. In a context of rivalry, the literature notes that awareness drives the visibility of the action (Chen and Miller, 1994).

Thus, awareness is about visibility: and thus purchasing will increase its contribution to innovation exploration once it increases its market visibility. Few scholars have investigated purchasing’s visibility in the supply network. Purchasing has better visibility in the supply market by increasing supplier integration (Ragatz et al., 2002; Petersen et al., 2005). Supplier integration includes the timing of the supplier involvement in a new program, the degree of supplier design responsibility, and the frequency of buyer/supplier communications (Hartley et al., 1997). The firm size may increase the action visibility (Chen and Miller, 1994), and applied to purchasing this means better market knowledge. Purchasing’s integration with R&D also enables the awareness of needs for innovation. The literature suggests that accessibility to external knowledge depends on the structure of the organization: the literature highlights that
the firm’s structure may influence its performance in respect to explorative tasks (Boumgarden et al., 2012).

However, no comprehensive studies exist that consider where purchasing develops its awareness of innovation opportunities. Thus, this study aims to investigate the following question in light of the AMC framework:

- **RQ1: How is purchasing made aware of innovation opportunities?**

7.4 Purchasing’s motivations to contribute to innovation exploration

Innovation development under high uncertainty is a process which depends on motivation (Alexander and van Knippenberg, 2014). Motivation here refers to drivers fostering an action and calling for the acquisition and use of specific skills and abilities (Locke and Latham, 2004). Motivation fosters tasks which enhance innovation performance, such as idea creation and taking initiatives outside the traditional barriers of the firm. Thus, purchasing motivation represents purchasing’s willingness to explore supply networks to detect new sources of innovations, but this requires specific skills and abilities. “Motivating innovation” is an important concern in many incentive problems (Manso, 2011).

Motivation theory helps to define motivational drivers and to narrow down specific drivers that purchasing may encounter to increase its contribution to innovation exploration. Pihlajamaa (2017) has suggested purchasing’s key motivations to explore innovations in a context of high uncertainty in that motivations may come from the setting of moderately challenging goals, and moderately specific goals. He reported that conflicting goals may reduce the motivation for innovation (Pihlajamaa, 2017). Explicit incentives, such as bonuses and rewards, may push purchasing to create market opportunities and to seek innovation (Amabile et al., 1996). Purchasing can explore how to gain better visibility in the supply network (Ragatz et al, 2002) or to increase firm visibility (Chen and Miller, 1994). A recent study has highlighted the importance of rewards to increase employees’ motivation especially in a context of high uncertainty (Sergeeva, 2015). The motivation to explore can be also exacerbated by the territorial interests in different markets (Gimeno, 1999), or cost reduction targets. Obtaining or sharing the rights to use the innovation patent may increase purchasing motivation, as well as the wish to capture long-term relationships with a supplier.

Innovation champions, i.e. managers intensely interested in new ideas, have a strong influence because they spread enthusiasm to other employees and facilitate the development process (Gemünden et al., 2007). Attitudes towards risk taking and creativity are widely influenced by the organizational culture in a context of high technological uncertainty (Slater et al., 2014; O’Connor and Ayers, 2005). The organizational culture consists of concepts, values and beliefs in a company (Schein, 2010). A motivating culture does not only tolerate risk taking but encourages it, accepts failures (Kyriakopoulos et al., 2016) and allows individual to try out their ideas (Green and Cluley, 2014). Furthermore, companies whose governance and culture build on long-term views will promote a relational approach with suppliers rather than rivalrous competition (Chen and Miller, 2015). This will enhance the motivation to build a relationship with the suppliers. In light of the above, this study aims to answer the second research question:

- **RQ2: What motivates purchasing to contribute to innovation exploration?**

7.5 Purchasing’s capabilities to contribute to innovation exploration

Any function has a limited set of capabilities, representing “a collection of knowledge, skills, abilities, and other characteristics that are needed for effective performance in the jobs in
question” (Campion et al., 2011). First, this calls for the consideration of capabilities from a skills perspective. The PSM literature mentions an extensive set of skills and competencies for purchasing. Tassabehji and Moorhouse (2008), proposed a multilevel framework and categorization of purchasing’s skills into five sections: technical skills, interpersonal skills, internal enterprise skills (referring to interactions between a firm’s own functions), external enterprise skills (referring to the richness of the supply chain network) and strategic business skills. In this framework, Tassabehji and Moorhouse (2008) develop a taxonomy of purchasing’s skills, including “new” skills which are necessary for preparing the buyer for the 21st century such as product knowledge, computer science proficiency, total quality management and government legislation. From this framework, we recognize some key capabilities described later in this paper.

Surprisingly research on purchasing skills has not yet examined skills related to innovation. Only recent studies have begun to explore the core capabilities of purchasing to succeed at innovation sourcing: gathering unmet needs, involving suppliers in innovation projects and exploring external opportunities (Legenvre and Gualandris, 2018). Second, following the definition of core capabilities as “a set of differentiated skills, complementary assets, and routines that provide the basis for a firm’s competitive capacities and sustainable advantage in a particular business” (Teece et al., 1990), this study has considered the capabilities from the perspective of the firm’s internal environment. This includes the firm’s processes and managerial systems (Leonard-Barton, 1992), and forces the consideration of purchasing budgets and policies for seeking innovations (Pihlajamaa, 2017). Third, scholars also consider that the nature of firm’s external environment, i.e. a rich business environment, is a capability (Chen and Miller, 2015). This includes how suppliers are integrated, how purchasing performs in the “assimilation and dissemination of information on suppliers and markets and [its] relationship-building capabilities” (Quintens et al., 2006). Relationship-building capabilities are relevant in our case, when considering close partnerships involved in new product development and innovation (Cavusgil and Zou, 1994). These aspects lead to the third research question:

- RQ3: Which capabilities are required to enable purchasing to contribute to innovation exploration?

### 7.6 AMC-based conceptual framework

Purchasing will not contribute to any innovation if it is not aware the innovation exists and is motivated (i.e. incentivized) and capable of contributing. “Contributing” is an action, a move towards a potential benefit in return for something else. Any action is naturally enabled by various precedents: extensive literature examines the reasons why an action occurs, reporting that an action is enabled by “the extent of awareness, the level of motivation, and, finally, the capability to respond” (Livengood and Reger, 2010).

As stated above, this research builds on the AMC framework which introduced three constructs that precede an action: awareness, motivation and capability. Applied to purchasing’s contribution to innovation, this becomes: purchasing’s awareness, purchasing’s motivation and purchasing’s capabilities, as precedents to enable purchasing’s contribution to innovation.
Although this study emphasizes that the three precedents are critical for the understanding of purchasing’s contribution to innovation exploration, another question concerns the moderators. An important aspect is to know whether it is sufficient for firms to simply adapt their purchasing department according to established processes, whatever the context is. Purchasing’s awareness, motivation and capabilities are more complicated than simple enactment in this model. Market and technological uncertainty represent a potential moderator in the relationship between purchasing’s contribution to innovation and purchasing’s awareness, motivations and capabilities. In sum, the enabling level of purchasing’s awareness, motivations and capabilities on purchasing’s contribution to innovation will be moderated by market and technological uncertainty. Whereas motivation and capabilities are key enablers to purchasing’s contribution to innovation, a critical question is whether it is enough for purchasing to simply get incentives and implement processes to make it happen. This research argues that purchasing’s contribution to innovation is more complex than a simple enactment of these practices. Keeping the scope of analysis wide open to all possible types of innovations calls for the consideration of contingent factors related to technological and market uncertainty in the relationship between motivation, capability and purchasing’s contribution to innovation. For instance, purchasing can support the co-development of an innovation “designed inside” by internal R&D under low business uncertainty, or could source and acquire a “finished, turnkey” innovation from any external partner including start-ups under high technological and market uncertainty. Furthermore, purchasing could also procure inventions directly from their inventors under high technological uncertainty, or could search for an innovation responding to a customer complaint, etc. All these cases have a specific market/technological level of uncertainty. This agrees with the distinction between incremental innovations, radical and architectural innovations. The search for “turnkey innovations” in the supply base (which are often more radical) may require different approaches than those needed to co-develop an innovation in collaboration with a supplier in the context of NPD. Here, high market/technological...
uncertainty is characterized by a high degree of novelty for the buying firm and its market with regards to the product functionality, architecture, or manufacturing technologies used. Oppositely, low market uncertainty is regarded as involving less innovative products because it calls for slight adaptations of a firm’s existing products. A clear stream of research suggests that when firms evolve under high technological uncertainty, they will preferably use their internal capabilities to develop innovations rather than rely on suppliers (Oh and Rhee, 2008), which means that purchasing’s contribution is limited to exploitation in this instance. This research aims to bring some clarification to this aspect and therefore posits that the relevance of the motivation and capabilities purchasing has concerning its contribution to innovation is contingent upon technological and market uncertainty.
Chapter 8. In-depth case study – Methodology

This chapter aims to introduce the two in-depth case studies, including the methodology used to select the cases, and to collect and analyse the data. It also discusses the validity and the generalizability of this research. The two cases investigated are presented in section 8.1, and the reasons justifying the relevance of these cases are shown as well. Section 8.2 presents the type of data collected, the data collection method and the origin of the data. Section 8.3 explains how this research has made sense of the empirical data collected during the two case studies: it shows the data analysis process (i.e. the coding phase) and introduces the themes which emerged from the coding process (section 8.4: analysis matrices as of Miles and Huberman). Last, section 8.5 discusses the research validity and generalizability.

8.1 Case selection

Case selection is the most important methodological decision (Dubois and Araujo, 2007). The literature reports that some cases are more relevant than others and that the selection of appropriate cases allows control of extraneous factors (firm size, sector, etc.) and the clarification of the limits of generalization. For instance, companies where the specific outcome of the planned research occurs will be more suitable for a case study. Thus, the cases selected here were not chosen randomly. The two cases were chosen in relation to the current research focused on purchasing’s contribution to innovation.

The first case involves an organization where the purchasing department is deeply involved in the process of innovation exploration. This exceptional maturity is rare, and this research follows Pettigrew (1988), who suggested that it makes sense to select such rare cases where the process of interest is “transparently observable”, though not to say exacerbated. The second case represents the mainstream of a firm’s maturity, i.e. organizations which do not deeply involve purchasing in their innovation processes. In this second case, purchasing struggles to initiate innovation exploration and has no success in innovation exploration. A comparative study of both cases (successful-unsuccessful) highlighted the drivers of success. The investigation of the same topic through the exploration of multiple stakeholders is a good way to increase the validity of the research.

These two cases are presented in Table 8. The two cases are suitable for investigating the purchasing function’s involvement in innovation exploration: they represent two companies which have already started to involve purchasing in the innovation exploration process, with different levels of success. These companies were chosen because of the similar nature of their businesses (industrial but innovation intensive), their respective sizes (the two firms were of very different sizes, ratio x20) and their maturity degree (the a-priori was different as well). Moreover, studying two companies where the specific outcome of the planned research occurs is rare especially in the field of purchasing and innovation exploration, because few companies have started to investigate this topic. In-depth case studies “capture the dynamics of a studied phenomenon and provide a multidimensional view of the situation in a specific context” (Järvensivu and Törnroos, 2010).

The unit of analysis was the organization where the purchasing function was the centre of an internal network defined by other functions within the firm. The focus was on organization-level factors, excluding the suppliers themselves: studying buyer-supplier relationships is beyond the scope of this research because it might force the data collection to be extended to the suppliers’ perspectives on the same topic (and consequently to interview them), while the main aim of this research is to capture firm’s perception within purchasing.
a) **S Corp overview**: S Corp is an international group, worldwide leader in connected solutions for building, infrastructures and industry. On a corporate level, the S Corp culture is oriented towards long-term views where innovation is a priority.

b) **D Corp overview**: This family-owned company designs, manufactures and sells electronic products for home applications and buildings. In 2013, the managing director decided to nominate the R&D director as the head of the purchasing department. This move has been significant: the idea was to benefit from this organizational change and to ask purchasing to become more involved in R&D, and vice-versa.

<table>
<thead>
<tr>
<th>Firm's core business</th>
<th>Date of Creation</th>
<th>Country of origin</th>
<th>Employees</th>
<th>Total nb of patent (as of 2016)</th>
<th>Innovations developed in 2016</th>
<th>Innovation in which purchasing contributed (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S Corp</td>
<td>1836</td>
<td>France</td>
<td>150 000 (among which 1 800 employees in purchasing dept = 1,2%)</td>
<td>20 000</td>
<td>115</td>
<td>40 (35%)</td>
</tr>
<tr>
<td>D Corp</td>
<td>1998</td>
<td>France</td>
<td>800 (among which 15 employees in purchasing dept = 1,8%)</td>
<td>350</td>
<td>25</td>
<td>1 (4%)</td>
</tr>
</tbody>
</table>

Table 9: Description of the two cases selected (source: Author)

8.2 Data collection

The empirical data collection for this research was done by conducting interviews. As this study follows moderate constructionist philosophy, the interviews were designed accordingly, meaning that the method involved active interviewing. This treats the interview as a social experience in which knowledge is jointly created by the interviewer and the interviewee (Holstein & Gubrium, 2004). The interviews are considered to be a tunnel into the interviewee’s mind. The objective of an interview is to obtain as much specific, neutral, reliable and useful information as possible. The goal was not to minimize distortions of what the interviewee knew, as in critical realism, examining exact valid and reliable data from the interviewees’ minds. Here, the interviews were a tool to support the active construction of knowledge where both the interviewer and interviewee have a role to play and a possible influence.

8.2.1 Interview protocol

All the interviews were conducted with one individual person at a time, and never with a group of people. This was decided in order to facilitate access to the interviewee’s view of the topic during a confidential discussion. Thus, very personal answers were gathered, and people spoke freely about their own views without being influenced by any hierarchical or interpersonal constraints.

In this study, the aim was to proceed with face-to-face interviews. This choice was preferred because it allowed better inter-personal interaction between the interviewee and the interviewer. Thus, the interviews were conducted face-to-face in most of the cases. However, meeting people face-to-face was not possible all the time, and this happened mainly with S Corp. Due to distance constraints with S Corp, skype or phone calls replaced the face-to-face interviews in several interviews.
Most of the interviews were recorded with a digital recorder, enabling good quality recordings. Skype Recorder was used for the Skype interviews. People were asked for their permission to record the whole discussion before the interview started. In some cases, the interviewee refused to be interviewed, for various reasons. The main (official) reason was the degree of confidentiality of the topic. When recording was not possible, notes were taken and reorganized after the interview.

All the interviewees were invited to the interview about 2 months before the meeting. Due to the hierarchical position of many interviewees, it has been quite tricky to find a slot in their busy agendas. As soon as they accepted the interview, they received a synthetic A4 document describing the context of the interview, its objectives and expectations.

Recorded interviews (or notes) were transcribed and sent back to the interviewees for a compliance check. This increased the validity of the case data.

8.2.2 Selection of the interviewees

The exploratory nature of the research called for the choice to “interview a broad spectrum of people with regard to their role within the company and their experiences” (Dubois and Araujo, 2007, p175). The use of multiple respondents appeared to be a good choice to capture a variety of perceptions and meanings, which constituted the interpretation of the context by the interviewee. A multiple respondent approach is “seen as vital to understanding complex business relationships” (Dubois and Araujo, 2007, p175). Various stakeholders were selected within the two firms to provide a multi-layered analysis to increase the validity: the interviewees were selected from the purchasing department of the incumbent firm (from 3 different hierarchical positions), and other departments in the firm’s core business (4 peripheral departments). For each type of stakeholder, between 2 and 5 people were interviewed. In total, 28 people were interviewed (18 at S Corp and 10 at D Corp, see Table 10) including multiple stakeholders from various departments in each firm: the purchasing department (various hierarchical positions from director’s level to operational, but also each function within the purchasing department: project purchasing, category purchasing, innovation purchasing), other departments (R&D, business development, research and innovation).

The interviewees presented in Table 10 were selected because of their involvement in innovation and/or purchasing. They all knew the firm very well, and the firm’s challenges. Their seniority in their current position consisted of a minimum of 3 years and a maximum of 20 years, with an average of 8 years for S Corp and 3.5 years for D Corp. In both cases, the initial set of respondents was chosen with the support of the purchasing director. However, a snowball approach was adopted to complete this first set of interviewees, because several opportunities emerged during the interviews. The interviewees’ functional heterogeneity allowed the researcher to develop a 360° overview of the topic, considering the assumption that people belonging to a specific function may not have the entire understanding of the capabilities needed to succeed in this function. The individual position of the respondents is presented in Table 10.
## Table 10: Overview of all the interviews conducted (source: Author)

<table>
<thead>
<tr>
<th>Position in the firm + comments</th>
<th>Purchasing (Senior level)</th>
<th>Purchasing (Operations)</th>
<th>Innovation Purchasing</th>
<th>R&amp;D or R&amp;I</th>
<th>Business Devpt</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S Corp</td>
<td>D Corp</td>
<td>S Corp</td>
<td>D Corp</td>
<td>S Corp</td>
<td>D Corp</td>
</tr>
<tr>
<td>Nb Interviews (recorded)</td>
<td>2 (2)</td>
<td>2 (2)</td>
<td>6 (2)</td>
<td>3 (1)</td>
<td>6 (6)</td>
<td>0</td>
</tr>
<tr>
<td>Interview dates</td>
<td>08/11/2017 23/02/2018</td>
<td>N/A</td>
<td>22/09/2017</td>
<td>22/09/2017</td>
<td>22/09/2017</td>
<td>N/A</td>
</tr>
<tr>
<td>Average interview duration (hour)</td>
<td>0h45</td>
<td>1h36</td>
<td>1h48</td>
<td>1h24</td>
<td>N/A</td>
<td>1h54</td>
</tr>
</tbody>
</table>

**Position in the firm + comments**

- **A:** VP Purchasing Strategy, Innovation, Effectiveness. 15 years at S Corp. Has created R&I function, was first at S Corp to involve purchasing in innovation.
- **B:** VP Innovation, 20 years at S Corp. Previously held various R&D positions.
- **C:** Global category Director
- **D:** Senior purchasing manager
- **E:** Director, Procurement master data governance
- **F:** VP purchasing (BU level)
- **G:** Advanced category buyer (BU level)
- **H:** Chief Purchasing Officer
- **Procurement Director - Co-Innovation (in the position for about 2 years) + 3 interviews**
- **Purchasing project manager (part time R&I)**
- **VP Technology and Innovation R&D**
- **Open Innovation Europe Director**
- **Technology and IP Director (also in charge of contracting with start-ups)**
- **Mechanical and CAD Engineering Manager**
- **Technology and Quality Director**
- **Product Development / Software**
- **BU Director, technology and Innovation**
- **Marketing Director and Product Development Director**
8.2.3 Interview guide

The interviews were semi-structured. The topic was fixed but the scope was kept quite broad, and the focus was on processes and events. This allowed flexibility and follow-up questions throughout the interview. This is an important feature of the theory building (Eisenhardt, 1989). The interview guide is available in Appendix 1. Questions were asked at the macro-level (firm’s environment), within-firm level (firm’s organization) and individual level to increase the depth of the observations and the understanding of the context.

The interview guide included questions about how the firm measures purchasing’s contribution to innovation and how purchasing’s performance in contributing to innovation is assessed. Questions were asked to estimate the number of innovations discovered by purchasing, and to have a fair understanding of the frequency of purchasing’s involvement in the innovation process, from scouting to contracting phases.

It happened several times that the interview guide was adapted during the interviews, according to the profile of the interviewee. When this occurred, the questions were slightly modified or even added to the predefined interview guide, so that the interviewer could follow an interesting or particularly relevant discussion about the topic of the research.

Observations of the interviewee’s behaviour were also noted sometimes when face-to-face interviews were possible. However, it was not possible to perceive behaviour by phone. Face-to-face interviews were not possible all the time because of the geographical distance, but perceiving the behaviour of the interviewees was not the primary focus of the study.

8.3 Data analysis

The aim here is to make sense of the empirical data collected during two case studies. A process of coding was used to analyse the interview data following the process described by DeCuir-Gunby et al. (2011). Coding is the process of “assigning units of meaning to the descriptive or inferential information compiled during a study” (Miles and Huberman, 1994). This section presents how this coding phase was carried out. A preliminary step of the process was to transcribe the interviews into written text, recording and writing the text exactly similar to the wording used by the interviewee. Transcriptions were made for about 70% of the interviews, while the others were not recorded. For these cases, only the notes taken by the interviewer were kept and analysed.

The first step of the coding process is to identify theory-driven codes. The literature review presented above in Chapter 2 was used to identify these theory-driven codes. These codes emerge from the articles read, being relevant a priori to the field of investigation. The theory-driven codes were developed from innovation theory, PSM theory and the AMC framework. The idea was to explore the relationships between innovation theory, the PSM field and the AMC framework to formalize the relationships into codes. This exercise was not easy because it is difficult to summarize two large fields of research into a few words in a table. The use of the AMC framework helped to identify the key constructs, which were pre-selected and operationalizable.

The second step aimed at revisiting these theory-driven codes under the light of the empirical data. The goal was to keep concise words, which reflected the theory and were close to the data (close in the sense that we can find close meaning within the data collected). For instance, a code was described as: purchasing internal integration, following a concept found in the PSM literature reflecting a specific organizational design. Under the light of the AMC framework, this code was categorized under the main theme of Awareness, knowing that Chen and Miller
(2015) reported that “Organizational structure and systems” are key to developing the awareness of an opportunity (Chen and Miller, 2015). A quick look at the transcriptions the verified that this code was relevant in the context of both cases.

Finally, the third step was to find definitions for each of the theory-driven codes, linking these definitions with academic references. The definitions were revised until a fair explanation of the code was found: interpretation was reduced as far as possible. The result was the creation of a “code-book” including theory-driven codes, as well as code coming from the context itself (Ragin, 1997). This codebook is summarized in Table 11 below. All steps of the data analysis process are represented in Figure 7 below.

A triangulation approach was not chosen, as critical realism would have required. Although this research does not claim triangulation, secondary data about both companies was collected, from the web, annual reports and industry associations, to complete the primary data. The fine understanding of the two firms’ contexts came mainly from the exhaustive reporting of the respondents.

8.4 Analysis matrices following Miles and Huberman

In this research, no IT tools such as NVivo or CAQDAS Software have been used, because it has been considered that the manual coding is more precise and relevant. Taking a human look at the transcribed text provides a perspective and a depth of knowledge about the data which cannot be offered by computer software. The drawback is that it takes longer to come up with a codebook, but the analysis is presumably faster.

Once the codes were initially established and well defined, the transcribed texts were scrutinized to detect sections reflecting the codes in question. Each interview transcript was read again, under the light of the defined codes. The aim here was to identify words, lines, paragraphs, or sections that had a single unit of meaning which could be linked to the code description. Matrices following Miles and Huberman (2003) were filled (partly reproduced in Appendix 2). The purpose of these matrices is to create and disseminate trustworthy and credible analysis using condensed and distilled data in a synthetic table. The display of data in the form of matrices is to support the presentation of the transcriptions so that the researcher can draw conclusions. In this study, 28 interviews represent more than 250 pages of full text. It is very difficult to screen these texts and to extract relevant patterns, just by reading them. Thus, matrices following Huberman and Miles (2002) helped the researcher to analyse the material, representing the data and to make actions. The aim of this phase was to identify themes that came up repeatedly during the interviews.
Research validity and generalizability

The key question is to know whether this research will be accepted among peer reviewers and to scientific world. The validity of a theory is a term derived from positivist philosophies of research, when the researchers’ aim is to develop a universal theory. In the context of moderate constructionism, the term “validity” has a different meaning from that used in the positivist approach (Järvensivu and Törnroos, 2010), and the way to assess relevant research in the post-modern era should be adjusted (Järvensivu and Törnroos, 2010). Lincoln and Guba (2000) have argued that from a constructionist perspective, research must be “authentic and fair”, meaning that all stakeholder voices must be heard in the analysis and considered in the result. This research adopted this view and kept the interviewees’ perspectives as much as possible. This may be the first step towards increasing validity in a moderate constructionist approach.

Additionally, the generalisability can be improved by processing multiple cases (Eisenhardt, 1989), although other scholars have claimed that multiple case studies are not “multiple in-depth case studies” (Dyer and Wilkins, 1991). Conducting two case studies will increase, to
some extent, the generalisability of the findings (Eisenhardt, 1989), and will contribute to a better understanding of the reality in its context, from multiple perspectives. However, as said above, the goal of this research was not to construct a generalisable theory from a positivist perspective, but to explore and understand a phenomenon in its specific context. The decision to proceed with two in-depth cases was taken, knowing well that positivist researchers would not see the findings to be generalisable. The observational richness of the case studies can be also leveraged to argue that the findings provide a good means to refute an existing theory, or a relevant way to extend an existing concept (Stuart et al., 2002).

In moderate interpretivist philosophy, generalizing from case studies is an analytical process, not a statistical process (Dubois and Araujo, 2007). This case research reports on causal relationships within each case rather than making a comparison of attributes between cases. So, this study does not conclude with a quasi-statistical generalisation.
Chapter 9. Findings from the two case studies

This chapter presents the findings emerging from the analysis of each single case independently from the other. The “within-case findings” are split into the three main constructs: purchasing’s awareness, purchasing’s motivation and purchasing’s capability. Prior to reporting on these findings, a brief introduction of each company background is made, so that the reader can have a better understanding of each firm’s environment, strategy and business orientation. This background also includes a quick overview of the types of innovations which are dealt with in both companies. The chapter starts by reporting on the within-case findings related to D Corp (section 6.1) and carries on with the findings related to S Corp (section 6.2). For each construct, a table is presented (Tables 12 to 16) showing the different views from the respondents, summarizing discrepancies in how the interviewees perceive the topic.

9.1 Case 1 - D Corp background

D Corp is a family company created in the early 70s. D Corp leads the smart home building solutions business in Europe. It develops and produces technological solutions to support the energy transition and personal comfort both at home and at work. D Corp’s product range consists of energy control, shutters, lighting, doors and multimedia products for consumers. They also respond to business needs providing innovative applications such as IoT-ready platforms for industry (boilers, heaters, roller shutters, windows) and for the service sector (energy operators, banks and insurance companies). Overall, D Corp’s business concerns the smart building industry and associated services.

D Corp suffers from management in “silos”, where a strong “designed-inside” R&D culture is still dominant among the departments. Recently, D Corp faced drastic changes in its core market, forcing the firm to adopt new technologies which are not well known inside, such as cloud services and IoT: traditionally D Corp used to manage low-service products (electrical and mechanical components), and was not used to dealing with connected products. To complement the R&D function, the firm has implemented another department supporting innovation, called the Research and Innovation (R&I) department, which is expected to explore market or technological changes and to push new strategic orientations to other departments, including purchasing. Thus, the technical departments (R&D and R&I) have still a strong position, whereas purchasing is seen as a follower. In 2013, the managing director nominated the R&D director as the head of the purchasing department. This move proved significant, signalling that purchasing would now be involved in R&D and innovation.

Purchasing must adapt to these new types of sourcing, under a strict timing constraint. This is far from successful. It is worth noting that purchasing is not expected to detect innovations but is encouraged to disclose good practices identified within the existing supply base. Purchasing is therefore implicitly more an executant than an importer of the innovations, because of the powerful technical departments. However, D Corp executives have understood the opportunities that lie in obtaining complementary assets from suppliers, and have asked purchasing to start exploring innovations outside the current supply base. This approach has not proved a clear success yet.

Until recently, the dominant type of innovation that was dealt at D Corp was incremental. The adoption of new technologies in the home appliance industry has consisted of low innovative improvements so far. For instance, D Corp uses to upgrade its range of products by changing remote controls for heating systems from analogic to a digital version including an LCD screen. This type of change added some value to the end customer in the sense that the user interface...
was friendlier, the ease of use increased, and the number of product functions could be increased as well. However, recently, drastic market changes appeared to be putting huge pressure on the strategic position of the firm. Minor product improvements were no longer sufficient to capture new market share, or even to hold on to the existing market position. The market has been disrupted by small firms offering apps for smartphones capable of entirely replacing the products sold by D Corp. This type of disruption calls for an immediate adaptation of the strategy and a quick reaction, if this is still possible. Thus, as a good follower, D Corp has started to consider a switch from a product design, manufacturing and distribution model to a new business model in which services are offered in addition to the products. Cloud services, smartphone apps and connectivity are the new targets. Innovations can be still considered incremental, because replacing a digital remote control with “virtual” remote control based on a smart app is just following what has already been successfully implemented in other sectors. The point here is to highlight that D Corp is continuously running behind the most advanced technologies, following market changes and customer trends. Purchasing is expected to source new technologies, although it struggles to adapt to these new expectations (sourcing a cloud service is definitely not the same as sourcing a printed circuit board). The challenges in purchasing are related to the adaptation to new technologies in a context of low technological and market uncertainty, rather than being proactive and looking for disruptive technologies for the firm.

9.1.1 Purchasing’s awareness of innovation at D Corp

At D Corp, purchasing can be made aware of an innovation in various ways. The first source of awareness arises when purchasing is solicited by the technical departments (R&D and R&I) who can detect innovations in the market. Once R&D or R&I decide to develop an innovation found outside the firm, they direct purchasing to source the innovation in question so that the innovation can be produced and then commercialized. Purchasing is seen as an internal support for the technical functions, and the supplier is an executor, even if the supplier is the innovator. The following interview excerpt illustrates this aspect:

“Purchasing acts as a postal service between suppliers and R&D,” (D Corp Purchasing Director).

It can happen that purchasing identifies an interesting innovation within the supply base: if so, then purchasing informs R&I who takes the lead to assess the opportunity in question, as mentioned in the interview excerpt below:

“I work a lot with R&I. When we share our views, I can show suppliers’ technological road maps, analyse costs and risks, whereas R&I provides feedback about the potential performance of suppliers’ innovations. Purchasing acts as a filter between the suppliers and R&I,” (D Corp Purchasing Director).

The second source of awareness is the supply base itself. Purchasing integrate suppliers early in the development of new products to foster information sharing at the earliest point in a project. If purchasing identifies an interesting innovation within the supply base, purchasing informs R&I who then take the lead in assessing the opportunity. However, purchasing does not actively manage this. The following expert describes this:

“It is a permanent technological market survey within the existing supplier base, but quite passive: I ask my suppliers to inform me when they have something innovative. If one of my suppliers shows me something strange or supposedly innovative, then I take a picture, make a note and send it to R&D,” (D Corp purchaser).

However, purchasing can take on a more active role and organize “tech days” on D Corp’s own site. During these events, suppliers are supposed to advertise their innovations and current
strategic and non-strategic suppliers are invited to come and present their new ideas. The tech
days take place on a yearly basis. For D Corp purchasing, this is a good means of staying close
to suppliers’ innovations. In doing so, purchasing has a better chance of advertising suppliers’
innovations to the D Corp R&D and R&I departments, but this is not always a success. The
excerpt below describes this:

“We have organized this event since 2013, but we hardly ever succeed to get our [D Corp employees]
staff come and attend. Even if we insist, even if we impose, it remains very hard to make people join
in. They always have a good excuse to avoid coming, although the suppliers are here with very
interesting things to share with us,” (D Corp Purchasing Manager).

The third source of awareness relates to various connections with the firm’s external network,
for instance through service providers who are solicited by purchasing to scout the supply
market and find innovative technologies when needed. Purchasing also attempted to build
partnerships with universities, but this was not successful. Non-regular contact with innovators
during exhibitions and trade shows also occur and could provide opportunities, but this is rarely
done by purchasing. This is explained by one of the interviewees below:

“Apart from innovations designed internally that we need to source from outside, it remains a
coincidence when purchasing discovers an innovation outside and brings it back into the firm, and
it is even rarer to get it accepted by our internal teams,” (D Corp R&D Manager).

The fourth source of innovation awareness comes from the information systems used at D Corp.
Purchasing has implemented a procurement suite, which includes a module for technological
sourcing. This allows purchasing to access technologies which are not yet well known
internally. The limitations of this tool are related to the very small number of real opportunities
offered by the system.

9.1.2 Purchasing’s motivations to explore innovations at D Corp

D Corp’s purchasing is motivated to explore innovation in the supply base because of the need
to source new technologies. Radical market changes have forced purchasing to adapt to new
needs including cloud and data services, integrated software, and immaterial products, while
they used to purchase electro-mechanical components. This is explained below:

“We are struggling to source what is expected from us since these radical market changes. We are
not trained yet to find innovative suppliers in the fields of data management, smartphone apps, etc.
but we must adapt quickly,” (D Corp Purchasing Manager).

D Corp’s governance and corporate culture seem to have little influence on purchasing’s
motivation to explore innovation as top management keeps asking the technical teams to
develop innovations and not purchasing. Management incentives have more impact, because
innovation sourcing is part of the mission written officially in the purchaser’s statement of
work. This important element is described by one of the interviewees below:

“The motivation to explore innovations is not a wish, because it is a part of the mission. It is written
in the buyer’s mission profile, so they’re forced to keep surveying the market for innovations,” (D
Corp purchasing Director).

The motivation is more opportunistic when a buyer meets a supplier and starts an informal
discussion. For example, one D Corp buyer stressed repeatedly during our interview that:

“Individual creativity about what is feasible to do with suppliers is exacerbated during informal
discussions with our traditional partners,” (D Corp buyer)

At the individual level, buyers have limited intrinsic motivation to move naturally towards
innovation exploration. Some of them have personal interests in certain technologies and
attempts to transpose external ideas into professional knowledge. Such personal knowledge is acquired through personal investigations, interest, reading and participation in social networks. However, personal sources of knowledge are not enough to provide sufficient innovation opportunities for the firm. Indeed, there is no clear evidence of any positive individual contribution showing that the origin of the innovation is derived from personal knowledge. Moreover, buyers receive little consideration from the technical departments if they come up with something potentially valuable.

9.1.3 Purchasing’s capabilities to explore innovations at D Corp

Several interviewees reported that the main capability purchasing should develop to make a real contribution to innovation would be technical knowledge. This is because more technical knowledge would allow better communication with the technical departments (R&D and R&I), and with suppliers. Furthermore as mentioned in the following extract, an individual ability to interact with others is key:

“The buyer must have soft skills such as communication skills and a good aptitude for managing interpersonal relations. This is key to me, right after technical skills,” (D Corp Purchaser).

The capability to motivate suppliers and to convince people seems to be important for D Corp purchasing as well. As one of interviewees noted:

“We will motivate our traditional suppliers to go and explore new technologies, so that we can all get things moving. This said, it is mainly our personal willingness to look outside the box and to convince people internally that determines our contribution to the firm’s innovativeness,” (D Corp Purchaser).

From the organization design perspective, D Corp is a smaller company and cannot implement a specific purchasing team to focus on innovation exploration. This is explained in the excerpt below:

“Due to our limited size, we cannot create specific positions focused entirely on innovation exploration. Our buyers used to spend a limited portion of their time to stay tuned with the market, but we know it has a limited impact,” (D Corp purchasing Director).

Consequently, purchasers have to balance daily tasks and innovation explorations, as explained below:

“I definitely need more time devoted to searching for innovations and screening the supply base for new technologies. Of course, this is finally a question of budget and cost: if my working time assigned to traditional purchasing tasks is reduced, then my management has to hire more people in the department to take over the rest of my work. But hiring people is far from the current plan,” (D Corp Purchaser).

Purchasing considers that the richness of the firm’s supply network is a competitive resource, and a capability to better source innovations. This is explained in the following expert:

“A resource-rich environment contributes to providing idea generation,” (D Corp R&I director).

The ever-changing technological environment makes D Corp consider individual technical knowledge as a core capability in purchasing to better contribute to innovation exploration. One of the interviewees explained:

“Purchasers must have a minimum of technical background, a good understanding of the firm’s processes for developing technological innovations. Purchasers must be curious, and must be capable of learning from new technologies in a very fast-changing environment,” (D Corp Purchasing Director).
9.1.4 Tensions with purchasing and other peripheral departments

Tensions at D Corp occur between the purchasing and other functions, mainly because of the historical type of governance. The “design inside” syndrome is still strongly present in the company. The technical departments hardly ever accept that an innovation can come from outside their firm. Tensions also relate to R&D’s acceptance of purchasing becoming involved in innovation-related areas. This was explained by the Purchasing Director:

“We have to manage susceptibilities. This is a revolution for us to challenge internal solutions with external innovations. However, R&D and R&I feel that there is competition and are more likely to close the door immediately to any external option,” (D Corp Purchasing Director).

Purchasing is often considered as a function mainly interested in opportunistic cost reductions, even if internal solutions are better and more qualitative: cheaper solutions can be sourced externally but R&D takes this as interference with its own capabilities. Consequently, as soon as purchasing asks for detailed inputs about the technological needs from R&D or R&I, then these departments are reluctant to disclose the data necessary for supplier sourcing. This was explained by the Purchasing Director in the excerpt below:

“As soon as we talk about doing something externally, people are afraid, and the doors are closed,” (D Corp Purchasing Director).

There is no recognition of purchasing as a proactive function to import innovations from outside. This was further explained by the Purchasing Director:

“There is something missing in our relationships, like a piece of trust. It lacks a binder in our relationship. Most of the people see purchasing as a function which just negotiates a price, full stop,” (D Corp Purchasing Director).

So, there are no real conflicts, but more a latent lack of “team spirit” towards innovation sourcing through purchasing.
<table>
<thead>
<tr>
<th>Codes emerging from data</th>
<th>D Corp : different views from various departments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buying Awareness</strong></td>
<td><strong>R&amp;D or R&amp;I</strong></td>
</tr>
<tr>
<td><strong>Main internal source of innovation awareness</strong></td>
<td>R&amp;I first, then R&amp;I. Never purchasing. R&amp;I does permanent surveys of the market needs, including suppliers. It remains a coincidence when purchasing discovers an innovation outside and brings it back to us.</td>
</tr>
<tr>
<td><strong>Ratio of innovations designed in/outside</strong></td>
<td>Designed mainly inside, rarely sourced from suppliers (less than 10%)</td>
</tr>
<tr>
<td><strong>Formulation of the needs</strong></td>
<td>Precise and detailed tech datasheets, rarely functional specs.</td>
</tr>
<tr>
<td><strong>Supplier integration</strong></td>
<td>Yes we organize tech days (=innovation event) 1x year</td>
</tr>
<tr>
<td><strong>IT tools and Information Systems</strong></td>
<td>Never used open innovation tools. We do not use IS nor patent analysis systems to scout innovation opportunities. We have our internal ERP but it is useless as soon as innovation are concerned.</td>
</tr>
<tr>
<td><strong>Information accessibility</strong></td>
<td>Unformal process to share data between Purchasing and R&amp;D, R&amp;D benefits more from this communication.</td>
</tr>
<tr>
<td><strong>Connection with innovation ecosystems and external networks</strong></td>
<td>D Corp has limited contacts with start-ups. D Corp is not involved in innovation clusters. But we have some good connections with various consulting firms which can provide us some support.</td>
</tr>
<tr>
<td><strong>Purchasing internal integration</strong></td>
<td>D Corp is a traditional firm, where purchasing is seen as a function to implement transactions with suppliers. They are not supposed to contribute to innovation roadmap, although sometimes suppliers can offer good opportunities.</td>
</tr>
<tr>
<td><strong>Distance with innovative suppliers</strong></td>
<td>Large. Current innovative base is mainly our internal R&amp;D, or can be made of traditional and strategic suppliers.</td>
</tr>
</tbody>
</table>
### D Corp: Different views from various departments

<table>
<thead>
<tr>
<th>Codes emerging from data</th>
<th>R&amp;D or R&amp;I</th>
<th>Purchasing</th>
<th>Marketing and Business Development</th>
<th>Top Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm historical culture, values and positioning</td>
<td>Firm oriented towards technology development (market follower)</td>
<td>We have a long history in designing products inside, because our founder had a technological background.</td>
<td>D Corp has a long history towards innovation, as a strategic focus.</td>
<td></td>
</tr>
<tr>
<td>Governance, corp strategy and management incentives</td>
<td>Corp strategy reports on a clear mission towards innovation, but no incentive process apart for R&amp;I.</td>
<td>We have to adapt our purchasing strategy according to corporate strategy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market shifts</td>
<td>Market impose changes, firm follow the competition. We have huge changes coming soon.</td>
<td>Need to adapt our department to new categories of sourcing, which are unknown to us: cloud services, softwares, etc.</td>
<td>We follow market trends and we check whether they are aligned with our internal R&amp;D/R&amp;D roadmaps.</td>
<td></td>
</tr>
<tr>
<td>Solicitation by another department</td>
<td>When we need to source an innovation, we involve purchasing. Sometimes we ask them to source a turnkey innovation which we identified.</td>
<td>We are solicited by R&amp;I, this is a strong incentive for us to start working with our suppliers.</td>
<td>No we rarely consult purchasing but it is a pity because suppliers can also provide innovation roadmaps.</td>
<td></td>
</tr>
<tr>
<td>Metrics, KPIs to measure contribution to innovation</td>
<td>We (R&amp;I) measure the innovation performance, none else in the company.</td>
<td>No we do not measure our implication into innovation process. But we still track our QCD performance, which reflects our innovativeness to some extent.</td>
<td>Exploring innovation is not a question of short term gains. But more a long term view towards</td>
<td></td>
</tr>
<tr>
<td>Individual incentives</td>
<td>We feel that purchasing attempts to get more influence internally, since our former R&amp;D director moved to a purchasing position. We have to manage this.</td>
<td>We are motivated to better contribute to innovation, because this changes our routines and traditional tasks. But we struggle to find time to do this. Some of us have intrinsic motivations and an attraction to technologies, so they keep an eye on innovations through reading articles.</td>
<td>We have recently upgraded the purchasing mission profile so that they feel involved in innovation process.</td>
<td></td>
</tr>
<tr>
<td>Intrinsic motivation to be part of innovation process</td>
<td>We feel that purchasing attempts to get more influence internally, since our former R&amp;D director moved to a purchasing position. We have to manage this.</td>
<td>We are motivated to better contribute to innovation, because this changes our routines and traditional tasks. But we struggle to find time to do this. Some of us have intrinsic motivations and an attraction to technologies, so they keep an eye on innovations through reading articles.</td>
<td>We have no plan to build a different structure in purchasing org. Purchasing function has to deal with existing resources</td>
<td></td>
</tr>
<tr>
<td>Organizational structure design</td>
<td>Organization is not differentiated: same purchasing unit to develop/explore innovations. It seems to be hard to find time to explore innovations.</td>
<td>No specific unit focused on innovation exploration: D Corp is too small. This is a question of cost because we cannot hire anyone else for this function.</td>
<td>We have no plan to build a different structure in purchasing org. Purchasing function has to deal with existing resources</td>
<td></td>
</tr>
<tr>
<td>Routines and processes</td>
<td>R&amp;I has implemented routines and processes to scout innovations, but purchasing is rarely involved.</td>
<td>Nothing is implemented yet. Only the process to be formally involved early into the NPD process.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richness of the supply base</td>
<td>A resource-rich environment contributes to provide idea generation. But current strategic suppliers are best placed to innovate</td>
<td>The richness of firm’s supply network is a competitive resource</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual capabilities</td>
<td>Good technological background, knowledge about firm process, curiosity, openness to new tech, learning capabilities</td>
<td>Technical knowledge, soft skills such as communication skills and a good aptitude to motivate suppliers to innovate.</td>
<td>Expertise and technical background is the key.</td>
<td></td>
</tr>
</tbody>
</table>

Table 12: Summary of the within-case findings at D Corp 1/2 (source: Author)
9.2 Findings within S Corp.

S Corp has a long history of innovation because technology has driven the firm’s development for decades. S Corp used to have R&D deeply involved in providing new technologies for the firm. The “innovation push” model was the sole valid strategy until recently: R&D designed innovations internally and pushed these innovations onto the market. However, consumer adoption was not guaranteed, and this strategy resulted in many financial failures. For about a decade, this kind of strategy evolved, moving S Corp from an “innovation push” towards an “innovation pull” model. In this new process, a need for an innovation is identified within the customer base (S Corp refers to it as the “customer pain point”), where business development teams or the marketing function contribute to identify a “pain” explicitly or implicitly raised by a customer. Then internal teams explore ways to respond and provide solution for this pain point. At S Corp, purchasing has a lot of interaction with the business development function, which is considered to be a better source of innovation detection than R&D. The Purchasing Manager explains this below:

“We are not in a context where the needs are created and pushed onto the market, rather we are in a context where marketing creates the needs, once they have identified a customer pain, calling for an action to mitigate it through an innovation.” (S Corp Purchasing Director).

At the corporate level, S Corp is deeply committed to innovation and technological progress and the purchasing department is involved in the process of innovation exploration. However, involving purchasing in innovation exploration is a recent change at S Corp. Until recent years, S Corp thought that innovations should come only from inside the firm (R&D). Traditional purchasing is involved in NPD, where purchasers look at their network to find suppliers capable of executing an innovation designed inside, and, as one of the interviewees put it, to:

“develop reliable and robust products, designed inside, because S Corp has a heritage of safety-related products. To do that, we need experts and a good capacity to listen to internal needs, where purchasing is expected to source what is designed internally.”

This culture which considers innovation to be “designed inside” is still present in the company, but has started to change, while innovations coming from outside are increasingly considered valuable. Thus, two years ago, S Corp implemented a specific function “purchasing & innovation”, which was independent from the rest of the purchasing department (purchasing operations, projects and category management) but reported to the Chief Purchasing Officer. This entity remains small (5 full time workers) compared to the rest of purchasing department (1,800 people in total) but has a degree functional management concerning about 50 people inside or outside the purchasing department. This team keeps listening to the market to detect any innovation which could be valuable to the firm and they carry out innovation exploration full-time.

Purchasing’s involvement in the process of innovation is a recent change. In the past, S Corp’s purchasing had unsuccessful experiences of innovations pushed onto the market, when purchasing imported innovations based on requests from R&D, which turned out not to be marketable innovations. Now, purchasing is involved in the innovation “pull” and is expected to explore and detect innovations. Innovations coming from outside are increasingly considered valuable. At S Corp, 35% of the total innovation “sourced externally” came from purchasing in 2017 (the rest came through R&D), whereas purchasing had zero contribution before 2014. However, this is a challenge for purchasing as explained like this by one of the interviewees:

“The whole challenge is to precisely balance a more supportive mission where we are still asked to exploit our current resources and to respond to an internal demand, with the challenge to propose suppliers’ innovations. It's like killing two birds with one stone,” (Purchasing & Innovation - Project Purchasing Manager).
The types of innovations S Corp used to deal with were either incremental or radical. The degree of innovativeness varied according to market and technological uncertainties. The first example of S Corp’s innovation concerns an incremental innovation, in the field of intelligent public lighting. S Corp’s Business Development department identified a “customer pain”, which consisted of reducing electricity consumption in the streets. The customer (a large city) expected to achieve automatic public lighting systems, connected with sensors capable of detecting movement in the streets. This is an evolution of an existing system for which the architecture is already available on the market for other applications. S Corp’s R&D could not respond to this request for various reasons, mainly because one of the technologies used in the sub-system was not core to the internal R&D knowledge and was patented. The final solution was supposed to replace the current patented smart lighting management which used consumption management through tiltable LED modules. To this aim, S Corp’s Business Development department requested the Purchasing & Innovation department to explore and find a solution. The Purchasing & Innovation department already had a start-up in mind who developed an innovative product, available as a “turnkey” solution. This new system used waterproof motion sensors to increase the lumen intensity for 30 seconds once movement was detected in the street. S Corp “incubated” the start-up using a specific contract and started to buy the modified product from the start-up in question 12 months after, under a shared patent. In this case, the degree of market uncertainty was low, because the “market” had already called for the innovation. The technological uncertainty was low as well, because the architecture of the innovation existed in another sector: it was all about transferring the technology from a different sector to the S Corp business environment.

The second example of an innovation managed at S Corp is more radical. In this second case, the degree of market and technology uncertainty were higher. The context concerned connected water management systems (Industrial Internet Of Things - IIOT - applied in domotic [home automation] systems). S Corp was not an expert in water management systems, while the market evolved very fast. The forecasted potential market needs called for better water resource monitoring and management processes, using connected control platforms to provide better insight into operations, and to reduce the time for invoices, and so on. S Corp realized the urgent need to adapt to a fast-changing market, although concrete potential market benefits were not really tangible. During a morning coffee brainstorming session involving Purchasing & Innovation and the Advanced Innovation department, both realized that they should work together to scout for external capabilities to develop this innovation. In this case, the R&D department was bypassed by the direct contact between the Advanced Innovation department and Purchasing & Innovation department. To explore the field, Purchasing & Innovation wrote a 10-line project datasheet and posted it on an open innovation web platform. The basic principle was a call for competence from those who could support S Corp in responding to this urgent need. After this call, 3 offers were pre-selected by the Purchasing & Innovation department and transferred to the Advanced Innovation department for assessment. One of the three solutions was selected and incubated. It included the use of IoT-ready products, edge control, software suites, and digital services. At the time of the publication of this study, the adoption was not entirely decided, considering the large investment needed to industrialize the idea and the considerable market uncertainty. However, regardless of whether this innovation is adopted or not, the Purchasing & Innovation department did succeed in exploring outside the current supply network and finding various opportunities.
9.2.1 Purchasing’s awareness of innovation at S Corp

At S Corp, departments surrounding purchasing are the first means of detecting an innovation: purchasing is strongly integrated into the business development function and R&D, who are both sources of innovation awareness. The purchasing team’s objective is:

“to first understand market and R&D needs and then match them with the supply network capabilities. Therefore, we have trained our team to talk to R&D, but it is also capable of listening to the marketing, sales, business units, etc... because we want to pull the knowledge up from the market.” (S Corp Purchasing & Innovation Director).

It is a process where a need for an innovation is identified within the customer base (S Corp named it a “customer pain”), where business development teams or the marketing function identify a “pain” explicitly or implicitly raised up by a customer. Purchasing is solicited to check whether the supply market can provide a solution for this “pain” and starts exploring. This integration avoids purchasing exploring irrelevant areas and new technologies that do not match the current S Corp business needs. More than 80% of the S Corp interviewees reported that awareness stemmed mainly from “the understanding of customer market needs” rather than “receiving a technical demand from R&D”. The reason for this is that in the past, S Corp had unsuccessful experiences of innovation sourcing, when purchasing imported too many innovation opportunities but few were true marketable innovations.

A second means of identifying innovation opportunities is R&D, which also detects technological risks or opportunities, follows technological market, attends trade shows and exhibitions and engages with start-up clusters. In this case, purchasing works with the supplier (often a start-up) to set up a contractual framework for the business relationship. Another path of awareness is when S Corp R&D uses functional datasheets to search for an innovation from the supply base: purchasing transmits the request to suppliers in the form of a functional framework. Thus, purchasing is never left alone to explore innovations: S Corp has a clear emphasis on integration between the Business Development function (to better understand the customer market) and R&D (to get technological input). Purchasing needs therefore to build a solid internal network made of formal or informal links between the community of colleagues working closely with customers and engaged in technological topics. The aim of this network is twofold: 1/ purchasing becomes aware of customer needs and potential innovations that need to be sourced outside and 2/ this network is also capable of developing an understanding of the exploration phase when purchasing comes back with an innovation. This is explained in the excerpt below:

“We have about 20 people from various departments working full time on innovation exploration, making an internal community, but we have also contributors working part-time on the issue,” (S Corp Purchasing and Innovation Director).

The third source of awareness comes from the physical proximity to the supply network (proximity in the sense of close distance to any stakeholder engaged in innovative activities). The quality of the ties between purchasing and the “geography” of the supply network has an influence on purchasing’s awareness of new opportunities. Purchasing endeavours to stay close to the sources of innovations because the distance to innovative suppliers seems to be a key parameter. For example, S Corp’s purchasing function is involved in various innovation clusters, because “clusters provide new opportunities of sourcing innovation. It makes us aware of an unknown firm’s strength, product or service”. These clusters attract specialized suppliers, start-ups and new entrants. Clusters consequently become a source of knowledge and a facilitator of complementary alliances. S Corp is also interested in trade associations or start-up incubators. This is explained in the following extract from one of the interviews:
“These sources all serve as platforms to share data, to enlarge the scope of supply network. We find opportunities for exploring new technologies, to communicate our needs, and to interact with our partners,” (S Corp Strategy and Innovation Purchasing BU Director).

9.2.2 Purchasing’s motivations for exploring innovations at S Corp

At S Corp, culture and strategic priorities related to innovation are shaped by those who govern, and this is spread throughout the firm’s values and missions to all employees. S Corp’s culture is oriented towards long-term views where innovation is a priority. S Corp’s CEO, who has been in this position for more than a decade, spearheads the vision of innovation, as noted by one of the interviewees, who states:

“Innovation comes first from the CEO. Our CEO has an excellent strategic vision and has inspired many transformations in the company since he arrived. He can anticipate the market and push innovation forward, guiding us in the right direction,” (S Corp Purchasing-Innovation Director).

The focus on innovation comes therefore from the top management and it impacts employees’ motivation to align functional strategies with the corporate strategy. This was explained by one of the interviewees in the extract below:

“The corporate strategy is clearly oriented towards innovation, which facilitates alignment with functional and operational tasks and makes people move forward. It is a coherent approach,” (S Corp Innovation Director).

At S Corp, another incentive for purchasing is that buyers are also solicited by other departments to support them in tricky relationships with innovative suppliers. This was explained by one of the interviewees in the extract below:

“We realized that innovations which are dealt with suppliers directly by R&D would come back under purchasing management. Therefore, it is logical to involve purchasing early in these activities, to avoid discovering problems later in a programme,” (S Corp Purchasing & Innovation Director).

Purchasing is increasingly expected to be involved early in innovation programmes (which are different from development programmes), to know what has happened and to be part of the decisions. The was explained by one of the interviewees:

“Our motivation comes from the incentive that purchasing must be involved in everything concerning supply relationship management. So, let’s apply our best practices to innovation sourcing as well,” (S Corp Purchasing & Innovation Director).

S Corp has implemented a few metrics to measure innovation sourcing performance, and one of the interviewees explained that: “we count the number of suppliers’ innovations that have been adopted”. This provides a strong incentive to find innovation opportunities. However, they still struggle to measure the impact of suppliers’ innovations, although they feel the impact is continuously progressing. It was noted during the interviews that measuring the adoption is a first step. It is the most important motivation factor, because we measure purchasing work. S Corp has two other metrics measuring the level of collaboration with strategic suppliers, where contribution to innovation is also assessed.

Motivations are also from extrinsic origins. Until recent years, S Corp was seen as a technological company, targeting product performance, reliability and safety. A recent shift of market expectations towards service-integrated products, which was not the core technology in these firms, imposed a new product positioning and re-birth of the company. S Corp reported that a huge change in the market associated with sales warnings, could force the company to “partner” with suppliers in order to innovate and “renew technologies” very fast. Motivations are expected to evolve according to the market calling for new innovative products. Drastic
changes in the market are an extrinsic motivation to engage the firm’s adaptation, and to increase the risks taken. This is explained in the interview excerpt below:

“It is sometimes better to arrive first on the market with an imperfect product, rather than being second with a perfect product: the first launch will shape the market and establish the position. For us, perfect means “the best”, this was the only market approach we had. Launching an innovative but imperfect product is really a huge cultural change, while we used to launch only mature products with fully certified performances. We are starting to understand that de-segmenting the product portfolio is necessary to adapt our performance to the market” (VP Technology and Innovation R&D).

S Corp has also understood the opportunity to get complementary assets from suppliers. This was explained in the excerpt below:

“We have a strong conviction that suppliers can contribute to our firm’s innovation capabilities, but that this resource is under-exploited. Ten years ago, suppliers were expected only to execute innovations designed inside, or to contribute to product/process performance improvement” (S Corp Purchasing and Innovation).

Finally, motivations can be found at the individual level (intrinsic motivation). At S Corp, the main intrinsic motivation comes from the willingness to influence strategic decision related to outside supplies (incl. innovation). This was explained by one of the interviewees as follows:

“We [purchasing] want to be associated with an innovation and we accept limited control over decisions, rather than being involved late or at the end of the product development, i.e. when the product is mature. The problem of being involved late is that we discover the context of the innovation too late and therefore our contribution is very limited. We want to be involved as early as possible and, at least, to know what’s happening. We want to influence decisions, raise alerts or identify risks in the relationship with an external partner” (S Corp Purchasing & Innovation Director).

9.2.3 Purchasing’s capability to explore innovations at S Corp

S Corp has well understood the complementarity between sourcing traditional strategic resources (core capabilities) and sourcing new core capabilities: on the one end, purchasing is involved in sourcing traditional strategic resources:

“We use to develop performing, reliable and robust products, designed inside, because we have a heritage of safety-related products. To do that, we need experts in various engineering domains, and a good capacity to develop what the market demands, where purchasing is expected to source what is designed inside” (S Corp VP Innovation development R&D).

In this phase, purchasing is traditionally involved during new product developments, when purchasers look at their network to find suppliers capable of executing an innovation designed inside the organization.

But S Corp managers reports that “Traditional capabilities have a reverse effect that inhibits innovation” (S Corp Open Innovation Europe Director). Due to this, they have developed a second set of capabilities, i.e. new core capabilities, to explore innovation designed outside the firm. This adaptation concerns the organization level, the individual level, but also some of the functions within the firm (at the managerial level).

One of the biggest changes is that they have implemented a specific purchasing function to explore innovation (“Purchasing & Innovation”), which is capable of focusing on innovation exploration. This unit was created three years ago and is structurally separated from the rest of the purchasing organization (made of purchasing operations, projects and category management). This explorative unit is smaller, more decentralized, and more flexible than the core purchasing team. It is independent from purchasing category management but still belongs
to the purchasing organization and reports to the Chief Purchasing Officer, who described it as follows:

“The CPO’s objective is first to understand market needs, then R&D needs and then match both with the supply network capabilities. Therefore, I have trained our team to talk to R&D, but they are also capable of listening to marketing, sales, business units, etc… because I want to pull the knowledge up from the market,” (S Corp Purchasing & Innovation Director).

This team keeps listening to the market to detect any innovation which could be valuable for their firm. The team remains small (5 people full time) compared to the rest of the purchasing department (1,800 people in total), but cumulates in functional management of about 50 people inside or outside the purchasing department, for an equivalent workload of 12 full-time employees. This was explained by one of the managers:

“If I consider the entire purchasing workforce, then you may have 100 buyers for category management and daily operations, 10 advanced buyers working on new projects and only 1 exploration buyer. This is the ratio: 1 to 100” (Strategy & Innovation, NPD Manager).

This unit is focused on innovation exploration, scouting for new opportunities and listening proactively to new customer needs. To justify the implementation of this specific purchasing unit, S Corp emphasized the opposition of traditional strategic resources (core capabilities such as R&D and category purchasing) and new core capabilities:

“Traditional organizations [i.e. without this flexible unit] have a reverse effect that inhibits innovation,” (VP Purchasing & Innovation).

Even S Corp’s engineering unit considers that this structural differentiation is the best way to achieve concrete results in innovation. However, they also emphasize the importance of strong linkages between the explorative unit and the rest of the firm. This is ensured by a set of routines and directives, also enhanced by resource sharing, coordination and control, which are part of the core capabilities at S Corp.

The second key capability emerging from the analysis of the transcriptions is related to the orchestration of innovation-related activities between purchasing and other functions. S Corp has implemented a single position, which functions like a unique “champion”: the Purchasing & Innovation Director, who is in charge of the orchestration of all innovation-related tasks in purchasing. This position is described as “the architect of the innovation activity with suppliers” (S Corp Purchasing & Innovation Director). The term “architect” is used to do with its coordination dimension, meaning its role is to provide support and to connect suppliers’ innovations with internal stakeholders. This was explained as follows:

“My role is first to detect the innovation, but the more difficult task is to coordinate the absorption and the assimilation of the innovation. During the detection phase, I have to assess whether the innovation is relevant and makes sense from technological and business perspectives. If yes, I need to challenge the adoption, which means I need to convince internal stakeholders that this innovation is interesting. The transition between exploration and exploitation is tricky, because prior to the exploitation of the innovation, I [Purchasing & Innovation] need to provide strong arguments using our best leadership skills in order to get other people on board with us. Once the decision to adopt the innovation is made, our role is also to support the development and exploitation,” (S Corp Purchasing & Innovation Director).

During the interviews, various people confirmed that leadership skills were a key success factor in the Purchasing & Innovation position. Credibility is gained because the “champion” has a strong ability to assess the relevance of an innovation, prior to pushing other stakeholders to adopt it. This was explained as follows:
“The challenge is to reconcile the historical requirement with the need to reinvent ourselves with slightly more modern, agile offers with different market positions, market segments or competitors on the market,” (S Corp VP Purchasing & Innovation).

Thus, the leading role of the Purchasing & Innovation buyer relates to specific skills and knowledge. This study needs to investigate further the leadership skills of this Purchasing & Innovation “champion”, because this was repeatedly considered to be a key role by various interviewees. For example one interviewee noted:

“It is necessary that the Purchasing & Innovation Director takes risks, influences and convinces, develops arguments, to pull the innovation from outside to inside our company”. (S Corp VP Purchasing & Innovation).

These leadership skills are necessary to challenge the adoption of an innovation. S Corp does not expect the Purchasing & Innovation “champion” to be innovative him(her)self, but he/she has to devote his/her time to innovation exploration, and also the innovation assimilation. Leadership is key in the transition between the innovation phases, because he/she will motivate other stakeholders involved in the innovation and stimulate individuals. This was explained as follows:

“I have built a community and I animate it throughout the entire purchasing organization and possibly also with the other functions. Basically, it’s all about creating interfaces with people from technology and marketing, people from open innovation, people from operations, on the innovation topics.” (S Corp Purchasing & Innovation Director).

At some point the Purchasing & Innovation “champion” needs to limit exploration and must switch to assimilation or to support the exploitation phase.

The third capability that emerged in the study was the way purchasing is connected with its supply network. Purchasing’s exploration capabilities are enhanced if the firm has good access to abundant and various innovation providers. The following excerpt explains this aspect:

“At S Corp, the external environment supporting innovation is made of four different layers: 1) Existing strategic suppliers with whom we already have a partnership, 2) known suppliers but not previously identified as innovators, 3) large ecosystems, clusters of innovations, some geographical regions where innovators are more concentrated (two zones in the US) and 4) universities and academics.” (S Corp Purchasing & Innovation Director).

Purchasing is therefore connected with start-up incubators and accreditation and award schemes such as “French Tech” in France. S Corp considers also that purchasing must be able to investigate distant but localized innovative ecosystems (i.e. the same as the French Tech scheme but in other countries). It was felt that this might depend on state policies, but innovative clusters are present in many countries. However, S Corp’s purchasing function had very few contacts with academics and universities.

The fourth capability concerns individual capabilities. This is all about individual skills, culture and values. Innovation purchasers are curious, listen to multiple sources of potential innovations. This was explained as follows:

“This is a non-ending process of surveying the market outside the firm, to take notes of each and every little sign of opportunity, and to think permanently of the potential use and benefit for S Corp, even at home when reading a magazine”. (S Corp Purchasing & Innovation Director).

Furthermore, being involved in innovation activities calls for specific individual skills. This was described as follows:

“Of course, they do not dedicate 100% of their time to innovation exploration because they are also involved in project development, not innovative programmes, but they still have the training and
background and fundamentals to speak fluently about innovation and innovation management with suppliers,” (S Corp Purchasing & Innovation Director).

S Corp highlighted the importance of human resources in hiring from other industrial sectors and merging external knowledge with existing “traditional” knowledge. Hiring, training and exploiting talented people from other industries is considered as a new core capability, because it brings a real competitive advantage. People have a different mindset and another business perspective compared to the traditional S Corp view. S Corp explained:

“We hire people from other industries, such as IT, to bring fresh blood into our company and to boost our ability to explore markets”. (S Corp VP Purchasing strategy).

To complete this extraordinary view, S Corp invests heavily in training to help new employees merge their view with the firm’s own culture.

The fifth capability concerns S Corp’s internal process. At S Corp, the innovation process is organized in three different phases, reflecting the fact that the exploration phases come prior to the exploitation:

“I have divided our life cycles into three distinct phases. The first is a very upstream and advanced, which corresponds to the phase of technological exploration and innovation exploration: when there is no final product, I have no project open, I do not know yet what I will do but I know that it's something I need to investigate. The second phase is when I develop offers and products, and the last phase is about the maintenance of the offers. Purchasing is involved in the three phases but being involved in technological exploration is quite recent.” (S Corp Purchasing & Innovation Director).

Purchasing needs to alternate longer periods of exploitation with shorter periods of exploration. For instance, there are sometimes innovations that are already identified internally, connected with a project or a “customer pain”. In such cases, Purchasing & Innovation buyers know what they are searching for, they know what technological subject they are going to dig for or what sort of innovation result they are expecting. The following excerpt from one of the interviews illustrates this aspect:

“This is the best possible case because there is a strong organization around the project, the innovation is very visible. Usually it concerns our core business, and this calls for a very sequential implementation path in which I am deeply involved” (S Corp Purchasing & Innovation Director).
Table 14: Summary of within-case findings at S Corp (Awareness)

<table>
<thead>
<tr>
<th>Codes emerging from data</th>
<th>S Corp: different views from various departments</th>
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</thead>
<tbody>
<tr>
<td><strong>Main internal source of innovation awareness</strong></td>
<td><strong>R&amp;D and Innov depts</strong></td>
</tr>
<tr>
<td>We use to develop innovations ourselves, because we had a lot of expertise in various domains. But today we must count on our external partners as well. Now the first source of innovation is external, but is still under-exploited.</td>
<td>Departments surrounding purchasing are the first mean to be aware of an innovation. First: Business dev and BU, then R&amp;D. But we can actively contribute, because we are structured in this aim.</td>
</tr>
<tr>
<td><strong>Ratio of innovations designed in/outside</strong></td>
<td>We use to have 100% of our innovations coming from inside, but today we tend to have a balance 40/60 between internal / external.</td>
</tr>
<tr>
<td><strong>Specific Process</strong></td>
<td>The main process is still internal: we are our own innovation center. But it can be that marketing identifies a “pain” raised up by a customer, so we can support them to solve it.</td>
</tr>
<tr>
<td><strong>Purchasing integration to marketing and R&amp;D</strong></td>
<td>We must keep an eye on P&amp;I to avoid time lost in assessing supplier opportunities which are not technically viable.</td>
</tr>
<tr>
<td><strong>IT tools and Information Systems</strong></td>
<td>Very reluctant to use open innovation platforms because of confidentiality issues. IP is a key. Having suppliers involved into our innovations, means that we open our doors to leakages. We can use platforms like DYNERGIE, or ADOCTA where confidentiality is better managed.</td>
</tr>
<tr>
<td><strong>Connection with innovation ecosystems and external networks</strong></td>
<td>Do not think that P&amp;I can identify properly good opportunities in trade shows and exhibitions. Because P&amp;I has different objectives than us (QCD), whereas we are looking for 3 or 4 precise technologies.</td>
</tr>
<tr>
<td><strong>Formulation of the needs</strong></td>
<td>We use traditional tech specs, but also functional specs</td>
</tr>
<tr>
<td><strong>Distance with innovative suppliers</strong></td>
<td>Physical proximity with supply network is key. We even own an incubator.</td>
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S Corp: different views from various departments
<table>
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<tr>
<th>Codes emerging from data</th>
<th>S Corp: different views from various departments</th>
</tr>
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<tbody>
<tr>
<td><strong>Purchasing Motivations</strong></td>
<td>R&amp;D and Innov depts</td>
</tr>
<tr>
<td><strong>Firm historical culture, values and positioning</strong></td>
<td>R&amp;D and Innov depts</td>
</tr>
<tr>
<td><strong>Management incentives</strong></td>
<td>Early purchasing involvement in development projects.</td>
</tr>
<tr>
<td><strong>Strategic influence</strong></td>
<td>Increase department status and recognition within the organization, increase its strategic influence internally, increase visibility on the firm’s business and technology road maps.</td>
</tr>
<tr>
<td><strong>Sollicitation by another department</strong></td>
<td>We ask for support as soon as we need to contract with a start-up or any new partner. For instance to protect our IP.</td>
</tr>
<tr>
<td><strong>Metrics, KPIs to measure contribution to innovation</strong></td>
<td>P&amp;I has implemented a few metrics to measure innovation sourcing performance: count the number of suppliers’ innovations that have been adopted.</td>
</tr>
<tr>
<td><strong>Individual, intrinsic motivations (incentives)</strong></td>
<td>Purchasing must be involved in everything about supply relationship management that makes sense to involve purchasing early in these activities, to avoid discovering problems later in a program.</td>
</tr>
<tr>
<td><strong>Extrinsic motivations</strong></td>
<td>Supplier pushing an innovation. The discovery of a start-up with a very innovative product/process. Turnkey solutions discovered during exhibitions.</td>
</tr>
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</table>
Table 16: Summary of within-case findings at S Corp (Capability)

<table>
<thead>
<tr>
<th>Codes emerging from data</th>
<th>S Corp : different views from various departments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational structure design</strong></td>
<td>S Corp engineering considers that the structural differentiation in purchasing function (explore/exploit) is the best way to achieve concrete results in innovation, but it also emphasizes the importance of strong linkages between explorative unit and the rest of the firm. This is ensured by a specific set of routines, also enhanced by resource sharing, coordination and control. Specific purchasing function to explore innovation (&quot;Purchasing Innovation&quot;), capable to focus on innovation exploration. It is smaller, more decentralized, and more flexible than the core purchasing team. This organization is interesting but they are &quot;not purchasing&quot;. They are too far from our daily QCD concerns.</td>
</tr>
<tr>
<td><strong>Champion's role</strong></td>
<td>Good orchestration of innovation-related activities between purchasing and other functions through the implementation of a single position, like a unique &quot;champion&quot;. Institutionalize a new purchasing role (= champion's role), which is new but very efficient so far. Purchasing&amp;Innovation &quot;champion&quot;, has a key role in the company, to bridge between us and the R&amp;D. Sometimes we even deal straight with P&amp;I without even involving R&amp;D, who is too slow to react.</td>
</tr>
<tr>
<td><strong>Routines and processes</strong></td>
<td>Innovation process is organized in three different phases, reflecting the fact that exploitation phases come prior to the exploitation: upstream (advanced), then development, and finally exploitation. Implementation of specific tools/processes to listen to suppliers and assess suppliers' innovative suggestions. We interact very often to screen new opportunities. Some of us are involved in meetings, and we feed a database with all innovations collected from suppliers.</td>
</tr>
<tr>
<td><strong>Richness of the supply base</strong></td>
<td>Purchasing is connected with start-ups incubators and competitive poles, such as &quot;The French Tech&quot; in France. But we are faster than they are to detect an innovation, because we know what to search and where to search. For instance, purchasing has very few contacts with academics and universities. 1/ Richness of the supply network (active + potential partners) 2/ Attractiveness (as a customer) or being supplier preferred customer 3/ Ability to reach a strategic fit with external partners (strategic agility) 4/ Connectedness to the supply network: exploration capabilities are enhanced if the firm has a good access to abundant and various innovation providers</td>
</tr>
<tr>
<td><strong>Capability to manage tensions</strong></td>
<td>At some point the Purchasing&amp;Innovation &quot;champion&quot; needs to stop exploration and switch to assimilation or to the support of exploitation phase. These transitions are tricky. Tensions at the our level due to the tricky balance between daily tasks and exploration activities (contextual ambidexterity) because we are supposed to increase category performance for the current year, not to look 10 years from now.</td>
</tr>
<tr>
<td><strong>Individual capabilities</strong></td>
<td>We have the technological expertise, but what they need is more an innovation development mindset. Leadership skills (for the champion) Innovation purchasers are curious, able to listen to multiple sources of potential innovations. We need them to have a &quot;Business development&quot; orientation, more than &quot;technology development&quot;</td>
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Chapter 10. Cross-case analysis

This chapter presents the cross-case analysis. It reports on the main themes emerging from the two cases about purchasing’s contribution to innovation exploration: purchasing’s awareness (section 10.1), purchasing’s motivations (section 10.2) and purchasing’s capabilities (section 10.3). This section attempts to highlight common patterns emerging from the two cases. Each section ends with a summary table presenting the key patterns emerging from the cross-case analysis, including a comparison between the two cases. In these tables, the importance given by the interviewees to the detailed patterns are shown. Section 10.4 presents the 2 key contextual factors found in this study and shows how the purchasing’s maturity towards innovation can be distinguished in the two firms following the uncertainty matrix by Lynn and Akgün, 2001 (previously introduced in section 2.1.3).

10.1 Purchasing’s awareness of innovation

10.1.1 Purchasing integration

Purchasing’s awareness of an innovation might come from various origins, but is facilitated by purchasing integration with the business development function in addition to the integration with R&D. Both companies studied have evolved in a fast-paced environment and ever-more demanding markets, they must stay very close to their customers and adapt their products to potential future customer needs. In both companies, suppliers’ resources are increasingly considered as potential providers of innovation, but the two firms have different approaches to bridging their suppliers’ capabilities and meeting their customers’ future needs. At D Corp, purchasing is assigned by technical departments to locate resources to develop an innovation internally, whereas at S Corp, purchasing works closely with business development and marketing to better understand future business needs and bridge them with supply network capabilities. At S Corp, linking business development (marketing) functions with the purchasing function facilitates information sharing and decision making.

S Corp is a more mature company in terms of purchasing’s contribution to innovation management: purchasing collects data from customers through the Business Development department and in doing so it avoids the need for purchasing to explore irrelevant areas and technologies. In the past, S Corp had unsuccessful experiences of innovation sourcing, because purchasing imported too many innovation opportunities and few were real marketable innovations. However, now more than 80% of S Corp interviewees reported that awareness comes mainly from “the understanding of customer market needs” rather than “receiving a technical request from R&D”. Therefore, purchasing needs to build a solid internal network made of formal or informal links within a community of colleagues working close to the customers, in other terms business and marketing functions. Thus, it shows that integrating purchasing into business functions is a fundamental approach to increase purchasing’s awareness of customers’ unmet needs and contributes to the innovation exploration process. Reviewing technological roadmaps with R&D is not sufficient to acquire the necessary understanding of which innovations are likely to be marketable after they are absorbed by the firm.

10.1.2 Purchasing’s connection with its network

Another pattern emerging from the cross-case analysis relates to the physical proximity to the supply network (the suppliers and any stakeholder engaged in innovative activities). The quality of the ties between purchasing and the geography of the supply network influence purchasing’s
awareness of new opportunities. Purchasing makes an effort to remain close to sources of innovations because the distance to innovative suppliers seems to be a key parameter. For example, S Corp’s purchasing is involved in various innovation clusters, because as one of the interviewees noted:

“Clusters provide new opportunities of sourcing innovation. It makes us aware of an unknown firm’s strength, product or service” (S Corp Purchasing and Innovation Director).

These clusters attract specialized suppliers, start-ups and new entrants. Clusters consequently become a source of knowledge and a facilitator of complementary alliances. S Corp’s purchasing also considers trade associations or start-up incubators as relevant sources of innovations. This was explained as follows:

“These sources all serve as platforms to share data, to enlarge the scope of supply network. We find opportunities for exploring new technologies, to communicate our needs, and to interact with our partners.” (S Corp Purchasing and Innovation Director).

As stated in the section “within-case findings”, D Corp’s purchasing organizes “Tech Days” on a yearly basis to stay closer to their suppliers’ innovations: S Corp also organizes regular events with suppliers, to enable the promotion of potential innovations. Another source of knowledge is via external service providers, who may disclose market studies. Both companies emphasized the use of scientific knowledge and building partnerships with universities. Informal contact with innovators during exhibitions and trade shows may also provide opportunities, but this is rare. Individual culture can enable a better knowledge of the distant sources of innovations. Both companies agreed that if purchasing is involved in innovation, then people must be curious, and must listen to multiple sources of potential innovations on a regular basis, even at home when reading magazines.

However, a clear distinction concerning the treatment of current or potential suppliers is made in both cases. First, purchasing’s connectivity to the current supply base is considered to be key in both cases, although the processes, resources and methods are different in both companies. For instance, the organization of “Tech Days” is promoted at D Corp as an extraordinary source of awareness, whereas S Corp considers this event now to be routine treatment of current supplier relationships. Second, the connections with potential (new) partners is also treated differently in both cases. These differences reflect the difference in the maturity in both firms.

D Corp is not as efficient as S Corp in scouting the firm’s external environment: this company considers traditional suppliers to be the main source of innovation, from which they expect to receive proposals on innovative ideas. S Corp emphasizes a proactive approach and has developed an extensive process to identify start-ups and innovative companies: with them, they incubate the ideas and co-develop the innovation until a point which is considered the minimal level of maturity for absorption into the firm. Evidence of this difference in maturity represents an interesting finding of this study.

10.1.3 Purchasing’s information systems and tools

Surprisingly, neither S Corp nor D Corp have emphasized the importance of information systems in purchasing to increase awareness of innovations. D Corp has simply no system implemented, apart from the traditional internal ERP and a few connections to e-sourcing platforms. D Corp has implemented collaborative tools to share data internally between project buyers and development teams, but R&D benefits more from this tool than purchasing. S Corp, is supposedly more mature, and has many more systems implemented, but these systems are process-oriented: they are used to improve process efficiency, quality, flows, etc. Until recently, data management was not considered strategic at S Corp. This aspect was explained as follows:
“Five years ago, we carried out a survey among purchasing professionals, to investigate pain points and opportunities for improvement. The first topic which came up, way above the others, was data reliability. Even purchasing complained about the reliability of prices filled in the system, and we discovered a lot more deviations. So, you can easily understand that innovation sourcing was far from being a concern at that time: we had no idea about how to deal with data related to suppliers’ innovations,” (S Corp Purchasing Director, in charge of information systems).

In 2018, S Corp invested in data management systems, but these systems do not contribute to innovation scouting. The corporate department in charge of information systems is still orienting the strategic investments in IS tools, and purchasing is the “poor child” of the story. However, S Corp’s purchasing is starting to keep an eye on machine learning, artificial intelligence, and other useful systems. But again, this is more with the objective of automatizing internal processes and optimizing labour costs than to increase purchasing’s awareness of suppliers’ innovations.

10.1.4 Summary of the cross-case findings on purchasing’s awareness of innovation

The table below (Table 17) presents the findings in a form of a comparative matrix, showing some key differences between the cases.

<table>
<thead>
<tr>
<th>Emerging Patterns</th>
<th>Detailed Patterns</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
</table>
| Purchasing integration | 1/ Purchasing integration to R&D  
2/ Purchasing integration to marketing and business development  
3/ Purchasing involvement into innovation-related topics | +++    | +      |
| Purchasing connectedness to firm's external network | 1/ Physical proximity with innovation clusters (orgs, universities, practitioners' associations, etc.)  
2/ Purchasing involvement into start-ups incubators  
4/ Develop specific processes to scout new technologies, suppliers, and markets | +      | +++    |
| Purchasing connectedness with current supply base | 1/ Organization of tech days  
2/ Attendance to exhibitions, fairs, trade shows  
3/ Regular proactive formal discussions with suppliers  
4/ Unformal discussions with suppliers representatives  
5/ Change traditional segmentation from "category mgmt" to a classification based on functions | +++    | +      |
| Purchasing Information Systems and tools | 1/ Use of scouting systems, and e-sourcing services  
2/ Use of collaborative tools (web platforms, open innovation apps, etc)  
3/ Strategic consideration of data management softwares  
4/ Use of machine learning, big data and AI to scout innovations | +      | +++    |

Table 17: Patterns emerging from the cross-case analysis on PURCHASING’S AWARENESS (source: Author)

This table (and the following Table 18 and Table 19) highlight key differences between the two companies. The study of detailed patterns allows a sufficient level of investigation and to draw the list of emerging patterns. These emerging patterns will be used later to refine the theoretical framework, by highlighting enablers preceding purchasing’s contribution to innovation exploration.

10.2 Cross-case findings on purchasing’s motivations to exploring innovations

10.2.1 Motivations from outside the firm

Motivations which come from outside the firm are related to market changes (market evolution, incentives from customers). Radical technological shifts in the market forces purchasing to adapt and to renew knowledge. The market and technological uncertainty influences purchasing’s contribution to innovation, provided that these changes are important and put the firm’s market at risk. At D Corp, for instance, the firm’s traditional market is at risk because
now customers expect smart services in addition to the product (connectivity, cloud services, data management, customizability). At S Corp, solving “customers pains” represents the main motivation. In both cases, a supplier “pushing” to present an innovation is considered as an extrinsic motivation.

10.2.2 Organizational motivations

Purchasing’s motivation to contribute to innovation exploration comes first from firm related factors: values, culture, managerial targets.

A highly important driver is found in the corporate vision and drive. It is about a strong customer orientation v/s technology driven strategy. Both are opposite in terms of orientation and call for opposite motivations as well. The influence of the corporate strategy is great, as are the CEO values and mindset. The firm’s governance is considered key by both firms, because it incentivizes purchasing by providing a robust pathway.

The purchasing function can be incentivized by having its views voiced inside the firm. This could increase the department’s status and recognition within the organization, and finally increase purchasing’s strategic influence internally.

S Corp is successful in implementing KPIs or specific metrics to measure purchasing’s contribution to innovation, whereas D Corp has not implemented such metrics so far. Both firms have established specific processes in which purchasing is involved, whereby purchasing is solicited by other departments (R&D, Business Development, etc…) mainly for contracting reasons (e.g., R&D may come and ask for contract with a start-up).

From the firm’s perspective, the short-term benefits provide a good incentive: to gain from short-term performance (cost, quality, delivery, project lead time, etc.), to gain stronger arguments to negotiate with suppliers, to obtain a long-term contract with a supplier (a hook strategy). Purchasing is incentivized to increase the buying firm’s business visibility and to refine technology road maps.

10.2.3 Individual motivations

Intrinsic motivations consist of human factors such as curiosity and experience. Out of the two cases studied here, S Corp has been more successful in involving purchasing in innovation exploration because purchasers felt engaged in the process and they were intrinsically motivated to leave their comfort zones, take risks and explore. HR management and the hiring process are critically important in this respect.

Individual incentives can facilitate purchasing’s contribution to innovation exploration. First, individual recognition (bonus, rewards…), but also non-tangible benefits such as individual knowledge increase motivation. Self-interest in different markets has a limited impact, although this seems to be the only real motivational factor at D Corp (own skills development).

10.2.4 Summary of the cross-case findings on purchasing’s motivations to explore innovation

The table below (Table 18) shows the findings in the form of a comparative matrix, showing some key differences between the cases.
10.3 Cross-case findings on purchasing’s capabilities to explore innovation

10.3.1 Organizational capabilities

In both firms, a big difference resides in the purchasing function’s organizational structure, and the way purchasing deals with tasks related to innovation exploration: at S Corp, there is a specific unit dealing with exploration full time, whereas this specific unit does not exist at D Corp. By comparing the two cases, this study highlights that purchasing’s contribution to innovation exploration is more successful in firms which set up a dual functional structure within the purchasing function. In this company, one functional structure oversees “traditional” exploration, i.e. supports R&D in new product development and sources “innovation designed internally”; the other functional structure is clearly distinct because it is in charge of connecting with start-ups, surveying the market to get permanent access to clusters of innovators, and sourcing new innovative concepts that can be incubated internally or outsourced.

10.3.2 Individual skills

Purchasers’ individual qualities such as experience are key factors influencing innovation exploration capabilities. This refers to people’s culture, background, experience, creativity, and their agility to explore innovation. This topic emerged during several discussions with both firms. This dimension is related to knowledge and skills embodied in people. Our findings report a clear distinction between traditional individual capabilities, and specific individual capabilities needed for innovation exploration. At S Corp, traditional capabilities remain in peoples’ heads for a long time and reflect the accumulation, codification and structuration of knowledge. The traditional approach is focused on technology developed inside the company, when purchasing raises expectations in suppliers and expects an answer. This was explained as follows:

<table>
<thead>
<tr>
<th>M</th>
<th>Extrinsic pressures</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Radical market evolution</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>2</td>
<td>Customer pains solving process, customer incentives</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td>3</td>
<td>Push from a current supplier</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Push from a new potential partner</td>
<td>-</td>
<td>++</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>Company strategic orientation towards innovation</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Customer-driven v/s Technology driven firm</td>
<td>-</td>
<td>+++</td>
</tr>
<tr>
<td>2</td>
<td>Influence of the Corporate Strategy</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>3</td>
<td>CEO values and mindset</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>4</td>
<td>Firm’s governance</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>Willingness to increase purchasing influence within the firm</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To voice purchasing views in the firm</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>2</td>
<td>Increase department status and recognition within the organization</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>3</td>
<td>Increase its strategic influence internally</td>
<td>+</td>
<td>+++</td>
</tr>
<tr>
<td>4</td>
<td>Increase visibility on the firm’s business and technology road maps</td>
<td>+++</td>
<td>+++</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>Within-firm specific incentives</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KPIs, specific metrics to measure purchasing contribution to innovation</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>2</td>
<td>Specific processes in which purchasing is involved</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>3</td>
<td>Solicitation by another department (R&amp;D, bizdev, etc...)</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>4</td>
<td>Need to contract with a start-up or a new partner</td>
<td>-</td>
<td>+++</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>Individual motivations</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Individual recognition (bonus, rewards...)</td>
<td>-</td>
<td>++</td>
</tr>
<tr>
<td>2</td>
<td>Individual knowledge and self-interest in different markets</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>3</td>
<td>Own skills development</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>4</td>
<td>Personal wish to expand work boundaries</td>
<td>++</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M</th>
<th>Purchasing short-term benefits</th>
<th>D Corp</th>
<th>S Corp</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To gain from short-term performance (cost, quality, delivery, project lead time, etc.)</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>To get a leverage to deal with current suppliers</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>To obtain long-term contract with a supplier (hook strategy)</td>
<td>++</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 18: Patterns emerging from the cross-case analysis on PURCHASING’S MOTIVATIONS (source: Author)
People have a monocultural approach to product innovation: always the same methods ("designed inside"), with the same focus on “product performance and safety” and the same typology of response to the market”.

One challenge is to change this culture, and to develop new individual behaviours, without jeopardizing the brand image if it fails. This was expressed in the following:

“It depends on people’s culture, their exposure to outside the firm, and their background, and on their position inside the firm. The better push comes from people that are not coming from R&D or technical functions, because they are more used to exploration techniques.”

Better opportunities to source innovations are given to those who can evolve from the historical behaviour of “make or buy, but design inside”. This was aptly expressed in the following excerpt from one of the interviews:

“We’re tempted to make everything ourselves, and to buy only if we have no other choices. You can imagine that asking our suppliers to support our manufacturing is quite common but asking them to support R&D as well as innovation is quite disruptive for our R&D.”

Another difference is about the sourcing practice: purchasing has to look for suppliers based on functional specifications, not technical ones, where the needs are precisely explained. Also, purchasing needs to show the ability to convince others. This was explained by one of the interviewees who said: “our challenge is to convince our internal partners that our suppliers are not only executants but can also innovate”.

10.3.3 Capability to manage tensions and trade-offs

Various tensions are noticeable when considering purchasing’s contribution to innovation exploration. The first tension relates to the fact that buyers involved in innovation exploration are not dedicated full time to explorative tasks. The is explained in the following:

“... the best would be to have fully dedicated teams, because I have well understood that I cannot explore innovation only working 5% of your time on this topic. The reason is that if you are too deeply involved in daily operational tasks and programme development, the priority will be operational or programme related emergencies. There is a critical involvement to reach, let’s say the minimum is 50% of your time devoted to innovation, the better is full time of course. Today I struggle to spend enough time on exploration phases”.

Some consequences can be seen at the individual level according to the NPD Strategy and Innovation Director, when purchasers “we’re unable to choose between the search for innovations and the traditional purchasing approaches.”

Second, tensions can arise from the organizational design and can occur between functions. Various people question the creation of a specific purchasing unit focused on technological innovation exploration. This was explained as:

“Normally purchasing has not to deal with innovations because they are not expert in technologies,” (R&D Strategic Innovation Manager).

“Considering that our firm has a long tradition in technology and innovation, I hardly accept to see one of our suppliers being capable to do something better or quicker than us”. “Purchasing is supposed to find innovations from their familiar suppliers. But even this is not always done, because the buyer who goes to see a supplier has objectives in mind relating to a contract, a harsh negotiation, or end-of-year rebate and all these aspects will take the priority above an open discussion about innovations. So, you can imagine that purchasing has not to deal with new technological partners such as start-ups or universities.”

Third, the consideration of innovation as a sequential process (first I explore, then I exploit), implies a difficult transition between the exploration and exploitation phases. These tensions
are supposedly solved at the managerial level (e.g. by the “champion”, or Purchasing & Innovation Director) but the differentiated organizational structure does not facilitate that. Several interviewees reported that purchasing needs to challenge internal stakeholders to adopt an innovation from a supplier:

“To convince our teams that the innovation is not necessarily an internal innovation but can also come from our suppliers is a difficult task. And this generates internal tensions,” (Purchasing & Innovation - Project Purchasing Manager).

“What is difficult in innovation sourcing, at least for those I have to manage, is not to find the supplier, the start-up or the partner providing a very high-tech solution which will help us to develop an innovation for our customers, no, because in this case the answer is quite simple: it is to implement scouting processes and market screening activities so that you find a needle in a hay stack. Our main concern is that I don’t know how to convince internal functions that they will have to develop this innovation. Compared to innovation detection, the absorption problem is ten times trickier”.

The absorption phase, which is the phase coming after the detection of an innovation opportunity, seems to pose numerous problems internally.

Fourth, tensions appear within the purchasing organization itself, as category buyers struggle to succeed in innovation exploration because category buyers are more adapted to scouting for technologies rather than functions. This was explained as follows:

“By working in categories, I know the supply market well. But dealing with innovations, I cannot stick to categories because I talk about a function, or an entire product. And for this, purchasing is not well equipped. I need strong links with Business Development and marketing departments. And also, I need to entirely change our way of thinking in categories and this is a radical change”.

The need to solve tensions through the implementation of strong links with the rest of the company was also noticed by other interviewees:

“Today there are many buyers working on topics related to innovation, but it is not meshed enough around a common process, to consolidate all the efforts that I make there”.

This highlights the need to have a structured process to manage these structural tensions.

Other tensions appear first at the business unit (BU) level. BUs are expected to manage projects, i.e. to develop new products in a context of a project and work closely with the business development function. Project buyers belong to the BU and can also belong to the purchasing and innovation community in a matrix organization. These project buyers are mainly involved in innovation exploitation (when the innovation is “translated” into a new product going through project milestones) but are also supposed to contribute to innovation exploration. This was explained as follows:

“I [a project buyer] am involved in the three phases of the innovation process. I contribute mainly to the short-term project development, for which the time to market is important because I have to push the product onto the market as quickly as possible. Then there is the medium term, in which I contribute through advanced projects. In this 2-3-year term, and I have to be prepared with new and marketable technologies. And then I am expected to contribute to the vision for the next 10 years, because I work with the Innovation & Technology department,” (Purchasing and Innovation Manager, BU level).

The findings also highlighted tensions at the category purchasing level, which is a cross-BU function. Category buyers must define sourcing strategies, which means developing in-depth knowledge of the supply market and new technologies. These buyers are also involved in innovation scouting in addition to the work on category management. This was explained as follows:
“The Purchasing & Innovation department buyers work on innovation topics for a purchasing organization that has more than 1,800 people. You may understand that their contribution is very limited, and they don’t provide enough visibility to the category buyers. Thus, category buyers need to explore and find innovations on their own. Normally, innovation is not our main objective at all, I am not challenged for this by our management. It is not this driver that necessarily motivates us. So, it is extremely important to have some personal motivations regarding these topics as well.” (Category Manager).

This point of view is shared by the Purchasing & Innovation Director as well, who notes:

“The category buyers’ job is to manage the suppliers concerning operational, strategic or even innovative aspects. I have them in my core team even if innovation is far from being 100% of their activity. When you manage a category, this split is important because you must understand the scope of the supplier relationship, from very transactional to very advanced aspects, including innovations,” (Purchasing & Innovation Director).

This example illustrates how difficult it is to balance schizophrenic tasks, such as daily project tasks and innovation scouting activities.

10.3.4 Summary of the cross-case findings on purchasing’s capabilities to explore innovation

The table below (Table 19) presents the findings in a form of a comparative matrix, showing some key differences between the cases.
Table 19: Patterns emerging from the cross-case analysis on PURCHASING’S CAPABILITIES (source: Author)

<table>
<thead>
<tr>
<th>Emerging Patterns</th>
<th>Detailed Patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purchasing function specific capabilities</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>1/ Institutionalize a new purchasing role (= champion’s role)</td>
<td>-</td>
</tr>
<tr>
<td>2/ Adaptation of supplier selection criteria, new contracting practices.</td>
<td>-</td>
</tr>
<tr>
<td>3/ Adaptation of sourcing group categorization process</td>
<td>-</td>
</tr>
<tr>
<td>4/ Ability to manage tensions created by the involvement into innovation-related topics (within purchasing)</td>
<td>-</td>
</tr>
<tr>
<td>5/ Ability to challenge the assimilation phase (i.e. convince other internal departments to adopt an innovation) and to support the adoption.</td>
<td>++</td>
</tr>
<tr>
<td>6/ Involvement into technology push and technology pull to/from outside the firm</td>
<td>++</td>
</tr>
<tr>
<td>7/ Implementation of specific tools/processes to listen to suppliers and assess suppliers’ innovative suggestions.</td>
<td>+</td>
</tr>
<tr>
<td><strong>Firm-specific organizational capabilities</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>1/ Specific purchasing unit dedicated to innovation (organization design)</td>
<td>-</td>
</tr>
<tr>
<td>2/ Purchasing integration and cross-functional processes with other departments</td>
<td>++</td>
</tr>
<tr>
<td>3/ Implementation of data sharing systems</td>
<td>-</td>
</tr>
<tr>
<td>4/ Ability to manage the change behaviours from designed-inside to designed-outside (internal processes)</td>
<td>++</td>
</tr>
<tr>
<td>5/ Innovation cycles well structured in distinct phases with distinct processes and routines</td>
<td>+</td>
</tr>
<tr>
<td><strong>Ability to manage tensions and trade-offs</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>1/ Tensions at the individual level due to the tricky balance between daily tasks and exploration activities</td>
<td>+</td>
</tr>
<tr>
<td>2/ Tensions created by purchasing involvement into innovation-related topics (tensions with other functions like R&amp;D, etc)</td>
<td>+++</td>
</tr>
<tr>
<td>3/ Tensions created during the transition between innovation detection and assimilation (i.e. decision to adopt or not)</td>
<td>-</td>
</tr>
<tr>
<td>4/ Tension appearing within purchasing function between people who work on innovation exploration and those focused on innovation development</td>
<td>-</td>
</tr>
<tr>
<td><strong>Firm’s external capabilities</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>1/ Richness of the supply network (active + potential partners)</td>
<td>+++</td>
</tr>
<tr>
<td>2/ Attractiveness (as a customer) or being supplier preferred customer</td>
<td>-</td>
</tr>
<tr>
<td>3/ Ability to reach a strategic fit with external partners (strategic agility)</td>
<td>+</td>
</tr>
<tr>
<td><strong>Individual skills</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>1/ Natural tendency to go beyond work boundaries</td>
<td>++</td>
</tr>
<tr>
<td>2/ Creativity, curiosity, individual experience</td>
<td>+</td>
</tr>
<tr>
<td>3/ Individual informal social networking activities outside of the workplace</td>
<td>++</td>
</tr>
<tr>
<td>4/ Ability to listen to others (suppliers), to &quot;smell&quot; the invention (and its innovativeness potential)</td>
<td>-</td>
</tr>
<tr>
<td>5/ Sense of working without knowing what is searched (functional specs)</td>
<td>++</td>
</tr>
<tr>
<td>6/ Soft skills: ability to create and sustain a partnership. No longer only hard transactional skills</td>
<td>++</td>
</tr>
<tr>
<td>7/ “Business development” orientation, more than &quot;technology development”</td>
<td>-</td>
</tr>
<tr>
<td>8/ No technological expertise, but more an innovation development mindset</td>
<td>-</td>
</tr>
</tbody>
</table>

Legend: - : no mention or clear mention of limited importance       + : little importance       ++ : medium importance        +++ : high importance
10.4 Findings on the two key contextual factors

In the light of what has been presented in sections 10.1 to 10.3, this study can draw out two key contextual factors. Above all, the obvious difference in maturity and firm size between the two companies suggests the need to consider the “maturity level” or “firm size” as factors moderating purchasing’s contribution to innovation exploration. S Corp’s purchasing has the highest maturity level in many of the themes emerging from all the cross-case findings: there is a clearer organizational structure, better overall capabilities and the readiness to contribute to innovation, deeper inter-connectedness with the supply network, more efficient internal integration with other departments (R&D and business development), self-sustained motivations in the purchasing department, etc. Conversely, D Corp struggled to promote a positive contribution from purchasing during innovation exploration, due to various reasons: e.g. the contextual need to deal with both daily tasks and innovation-related topics, no shared vision of purchasing’s role in innovation exploration and detection, limited coherence of organizational cross-department integration, latent conflicts, as well as the relatively high level of manipulation to maintain (resp. acquire) the monopoly of the firm’s innovation capabilities, etc. All these call for the consideration of the “maturity level” as a contextual factor.

However, it is not entirely clear how the “level of maturity” can be assessed and precisely measured. D Corp has a different positioning and strategy in terms of innovation compared to S Corp. The point here is that D Corp is more oriented towards incremental innovations, and addresses markets characterized by a low technological uncertainty. D Corp is successful in this positioning and can be considered mature to a certain extent. It “pushes” innovations to the market rather than “pulling” innovations from their customer base, and this has satisfied its customer base so far. Hence, this study cannot confirm that the “maturity level” affects purchasing’s contribution to innovation exploration.

Also, it must be noted that the “firm size”, as initially suggested, has not been confirmed to be a moderating factor affecting purchasing’s contribution to innovation exploration. Although D Corp has emphasized that it is costly to implement a dedicated structure to deal with innovation-related topics, it is worth saying that this study contains no evidence that the firm size has any moderating effect. The two firms investigated are of different sizes, and they have differentiated purchasing practices, but nothing can correlate the two. This point will be discussed later in the section on “research limitations”.

However, the cross-case findings can be read in the light of a differentiation between market uncertainty and technological uncertainty. On the one hand, the moderating factor “technological uncertainty” is confirmed as a key factor moderating purchasing’s contribution to innovation. The cross-case findings show that both companies do not respond to the same type of technological uncertainties. S Corp’s purchasing is structured to manage both high levels and low levels of technological uncertainty, with an extensive process to explore distant knowledge through purchasing and to incubate new technologies. Conversely, D Corp’s purchasing is devoted to managing incremental innovations at a low-level of technological uncertainty without scouting the supply network to find radical innovations. In this case, innovation exploration is more about finding suppliers who are capable of executing an innovation designed internally, with a low level of technological risk because the supplier in question is supposed to be capable of proceeding to the delivery of what is expected.

On the other hand, the moderating factor “market uncertainty” was also confirmed as a key factor moderating purchasing’s contribution to innovation. More precisely, this refers to “supply market uncertainty”, i.e. the distance from the existing supply base. The cross-case analysis has highlighted that the two companies have evolved at two different levels of supply market uncertainty: S Corp leveraging its current supply base but also capable of adapting an
innovation found in one of the incubated start-ups. Purchasing’s contribution is about exploring the supply base to find turnkey inventions that can be adapted or even used to respond to the customer pain. S Corp is also structured to leverage purchasing to find radical innovations from the supply base: in this case, both the supply market uncertainty and technological uncertainty are high. From its side, D Corp has no evidence that an innovation “pushed” onto the market will be successful. The risks taken to push this innovation onto the market are higher, considering the uncertain level of market adoption.

This study uses the uncertainty tetra-categorization matrix (Lynn and Akgün, 2001) (Figure 8), to illustrate how the two moderating factors presented above can support the mapping of the purchasing function in the two companies on a 2x2 matrix:

![Figure 8: Positioning of the 2 companies on a quadrant matrix acc. to Lynn and Akgün (2001) (source: Author)](image-url)
Chapter 11. Two propositions

11.1 Proposition 1: Purchasing’s contribution to innovation exploration (in terms of AMC) relates to market and technological uncertainty.

11.1.1 A 2x2 matrix to represent purchasing’s contribution to innovation exploration on 2 axes

The previous sections 9 and 10 highlighted that the two companies display different degrees of purchasing maturity relative to the contribution to innovation exploration. Both firms have evolved in different environments, and have faced different degrees of market and technological uncertainty. To adapt to these different degrees, the purchasing function in both companies has developed a set of AMCs to implement innovation exploration. Considering the moderating effects of market and technological uncertainty and the results of the cross-case analysis, this research came up with a first proposition:

Proposition 1: Purchasing’s contribution to innovation exploration (in terms of AMC) relates to market and technological uncertainty.

This proposition suggests that it is no longer valid to consider only one single set of AMC characteristics invariably for any degree of market and technological uncertainty. Precedents to purchasing’s contribution are moderated by the degree of supply market uncertainty and technological uncertainty. Figure 8 represents the position of the two firms on a 2x2 matrix, which is adapted from Lynn and Akgün (2001).

Consequently, this study suggests that there are four different sets of AMC drivers, one for each quadrant of the matrix characterized by the two axes: 1) supply market uncertainty and 2) technological uncertainty, enabling purchasing’s contribution to innovation exploration. This is illustrated in Figure 9.

The distinction into four different quadrants will make the definition (and the naming) of four different types of innovation exploration feasible: purchasing can contribute to innovation exploration in four different contexts:

- **Low market and low technological uncertainty**: this quadrant is labelled as “Incremental”. Purchasing can effectively contribute to this quadrant by exploring the existing supply base, existing technologies that are new to the firm, scouting the supply base using traditional methods such as attending exhibitions and trade shows, organizing tech days, etc. Purchasing is involved in NPD but is not considered a key innovation importer. As this study focuses all its attention on purchasing and on the two cases studied, it considers scouting the supply base without boundary-spanning to be a form of exploration. Exploration results are found in the form of incremental innovations.

- **High supply market and high technological uncertainty**: in contrast, on the opposite side of the diagonal, the “Radical” aspect concerns distant technologies that can be found outside the firm, and with uncertain availability in the supply market. Both boundaries (supply market and technology) are spanned. Purchasing can contribute to innovation exploration but this calls for a very specific set of AMC enablers.

- **Low market and high technological uncertainty**: the other diagonal offers two separate quadrants which represent extremes of incremental and radical exploration. The first is the exploration of “Evolutionary technological innovations”, which means that purchasing contributes to innovation by spanning the current technology boundary. In such cases, purchasing explores the existing supply base to detect turnkey innovations.
(or adaptable innovations) from incubated start-ups, innovation clusters, etc. which are really new to the firm and to the market from a technological perspective. This means that the technology is very different from the traditional technology used by the firm but can be obtained from the existing supply network.

- **High market and low technological uncertainty**: this last quadrant comes oppositely to the former. “Evolutionary market innovation” exploration is related to the exploration of distant supply bases, scouting new suppliers to push an innovation which is “designed inside” the company. The firm utilizes a well-known technology but expects purchasing to obtain the innovation from a distant partner by spanning the supply market boundary.

This research argues that purchasing can to contribute to the four different types of innovation exploration and considers that this contribution necessitates different sets of AMC for each quadrant. By analysing the findings, this research suggests the following summary and populates the 4 different sets of AMC precedents (Figure 10).

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**Figure 9: 4 different types of innovation exploration in a quadrant matrix acc. to Lynn and Akgün (2001) (source: Author)**

This research argues that purchasing can to contribute to the four different types of innovation exploration and considers that this contribution necessitates different sets of AMC for each quadrant. By analysing the findings, this research suggests the following summary and populates the 4 different sets of AMC precedents (Figure 10).
Purchasing CAPABILITIES:
- Integration to NPD and R&D, attendance to exhibitions, fairs, trade shows, organization of tech days with suppliers, Individual self-interest in innovation-related topics, informal discussions with suppliers.

Purchasing MOTIVATIONS:
- Market evolution, willingness to increase visibility on the firm's business and technology road maps, Individual motivation to increase his/her knowledge, willingness to have short term gains, to build a partnership with a supplier.

Purchasing AWARENESS:
- Use of collaborative tools (web platforms, open innovation apps, etc.), Use of machine learning, big data and AI to scout innovations. Connected to e-sourcing web platforms.

Purchasing MOTIVATIONS:
- Solicitation by another department (R&D, bizdev, etc...). Specific processes in which purchasing is involved, KPIs, specific metrics to measure purchasing contribution to innovation, Individual recognition (bonus, rewards...).

Purchasing CAPABILITIES:
- Strong purchasing category department, skills in sourcing processes, Adaptation of sourcing group categorization process, Implementation of data sharing systems, Innovation cycles well structured in distinct phases with distinct processes and routines. Tensions at the individual level due to the tricky balance between daily tasks and exploration activities (contextual ambidexterity), Purchasing ambidexterity (manage tensions, balance exploring/exploiting).

Purchasing MOTIVATIONS:
- Customer pains solving process, Customer incentives, Customer driven development, ESI, richness of the supply network (active + potential partners), Attractiveness (as a customer) or being supplier preferred customer, Natural tendency to go beyond work boundaries, creativity, curiosity, individual experience, "Business development" mindset, more than "technology development" mindset.

Purchasing CAPABILITIES:
- Implementation of specific tools/processes to listen to suppliers and assess suppliers' innovative suggestions. Richness of the supply network (active + potential partners), Force to convince other internal departments to adopt an innovation, Individual uniform social networking activities outside of the workplace.

Purchasing MOTIVATIONS:
- Purchasing integration into start-ups incubators, Change traditional segmentation from "category mgmt" to a classification based on functions.

Purchasing AWARENESS:
- Integration to NPD and R&D, attendance to exhibitions, fairs, trade shows, organization of tech days with suppliers, Individual self-interest in innovation-related topics, informal discussions with suppliers.

Purchasing MOTIVATIONS:
- Market evolution, willingness to increase visibility on the firm's business and technology road maps, Individual motivation to increase his/her knowledge, willingness to have short term gains, to build a partnership with a supplier.

Purchasing CAPABILITIES:
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Purchasing MOTIVATIONS:
- Purchasing integration into start-ups incubators, Change traditional segmentation from "category mgmt" to a classification based on functions.
Proposition 1 has been used to write Paper 2, focusing more on the upper right quadrant of the 2x2 matrix: with a high degree of technological and supply market uncertainty. The next section presents Paper 2, which has been developed based on this proposition.

11.1.2 Paper 2: “Purchasing’s Contribution to Innovation Exploration: Awareness, Motivation and Capabilities (AMC)” (François Constant, Thomas E. Johnsen)

This paper (Paper 2) is based on the proposition described in the former section. It investigates how purchasing can contribute to innovation exploration under conditions of high technological and high market uncertainty. Until recently, the role of purchasing in the sourcing of innovation has been investigated mainly in the context of new product development (NPD) (Van Echtelt et al., 2008). Shifting the focus from conditions of relatively low technological to high technological uncertainty requires a change in sourcing strategies (Mikkelsen and Johnsen, 2018) which emphasizes the importance of exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018). Yet, despite its responsibility for sourcing, the purchasing function is not seen as a key contributor to innovation exploration (Gualandris et al., 2018), as this is commonly viewed as R&D’s territory. However, Dynamic Capability (DC) theory suggests that an innovation can be imported from outside the firm (Teece et al., 1997): that it can be “innovated outside” and that contributing to a firm’s innovativeness through sourcing relationship is considered a dynamic capability in the literature (Weeks, 2009). However, DC is not sufficient to explain how this process works from a purchasing perspective.

Built on cognitive theories, this paper uses the awareness-motivation-capability (AMC) framework to examine innovation exploration as a process in which purchasing can contribute to enhance the firms’ innovation. This framework provides relevant constructs to identify business cooperation and behavioural drivers in an organization (Chen and Miller, 2015; Chen, 1996). The AMC framework has rarely been used in the purchasing field (Schweig, 2015) but provides a novel framework to analyse cognition and behavioural causes. Adapting the AMC framework, this research argues that purchasing’s contribution to innovation exploration is enabled by purchasing’s awareness, purchasing’s motivations to explore innovation, and purchasing’s capabilities.

It attempts to respond to the following three research questions:

1. How is purchasing made aware of opportunities to contribute to the firm’s innovation exploration?
2. What motivates purchasing to contribute to innovation exploration?
3. Which capabilities are required to enable purchasing to contribute to innovation exploration?

It reports on two in-depth case studies involving 28 semi-structured interviews. First, this paper briefly reviews the literature on cognitive sciences, the AMC framework, and literature concerning purchasing’s contribution to innovation. The first section concludes by presenting definitions of the AMC framework adapted to purchasing and introduces our conceptual model. The second section explains our methodology: two contrasting in-depth case studies. Then it presents the two cases and their contexts, organized in two separate sections: within-case findings and cross-case findings. The final conclusion section outlines the theoretical and managerial implications and the limitations of our study.

The findings highlight four necessary enablers that facilitate purchasing’s contribution to innovation exploration under conditions of high technological or market uncertainty: 1) purchasing’s cross-functional integration with marketing and business development functions, 2) a distinct organizational structure dedicated to exploring innovation, 3) extrinsic motivations such as market evolution, and incentives from customers to source new categories of purchases.
and 4) specific purchasers’ individual particularities including their skills, culture, background, experience, and creativity in exploring innovation. This research offers two main theoretical contributions: first, it expands and refines Purchasing and Supply Management (PSM) theory with a better understanding of purchasing’s contribution to innovation; second, it demonstrates the need to further investigate the conceptualization and operationalization of purchasing-marketing integration. It also has implications for managers intending to shape, adapt or redesign their purchasing organizations to better support innovation exploration processes.

11.1.3 Paper 2 publication status

This paper was first presented to IPSERA in 2018 as a competitive paper where it received valuable comments. After IPSERA 2018, it has been invited for submission in a JPSM special issue by Wendy Tate and Mihalis Giannakis who were the 2 special issue editors (the invitation is shown in Appendix xx). Following this invitation, the paper has been revised according to the comments received from the IPSERA 2018 conference reviewers. It has been submitted for the JPSM special issue in June 2018. The paper was finally rejected for the JPSM special issue in October 2018. The main reasons of the rejection were presented by the two JPSM reviewers who requested major changes. The editors noted that: “Reviewer 1 mentions the need to reconsider the chosen methodology and research strategy. They feel that there is a disconnect between the chosen theories and research design. Reviewer 2 is concerned primarily with the novelty of the topic, mentioning the plethora of studies that deal with the role of purchasing in new product development and innovation processes. They also mention the need to conceptually ground the moderating role of the selected variables in your framework. Finally, they also mention that the framework, as it is presented, points to a research design with hypotheses testing. In addition, they also mention that it does not reflect the nature of the research questions that are raised.”

These comments are very valuable in the sense that they highlight the perceived weaknesses of the paper. The special issue editors suggested to revise the paper and re-submit it to JPSM for a normal issue after the major changes have been implemented. They noted: “After careful consideration with the other SI editors, we agree with the reviewers’ reservations and have decided that, in its current form, the paper is not suitable for publication in the IPSERA 2018 special issue of JPSM. However, we agree that there is a great potential in the paper and would like to invite you to submit a revised version of the manuscript for potential publication in the regular issues of the JPSM, that addresses both reviewers’ criticisms.”

A new version of the article is presented in this cover essay. It is planned to work on this paper again and to resubmit to the JPSM normal issue beginning of 2020.

11.2 Proposition 2: purchasing ambidexterity is a required capability to balance innovation exploration and exploitation.

The analysis of the two cases reflected the tensions which occur when purchasing is involved in innovation exploration. The consideration of organizational ambidexterity theory as an additional stream of literature emerged as a necessary aspect to explore in order to enhance and develop the research approach. The abductive process led to the research moving in a slightly unexpected direction, but one which finally revealed a good potential way of further understanding purchasing’s ability to explore innovations. In the next sections, the literature on ambidexterity is reviewed, and Paper 3 is presented.

11.2.1 Ambidexterity as an antecedent to innovation performance
Ambidexterity explains a firm’s capacity to do different things equally well: manage the short and the long term, make trade-offs between resource allocations, explore and exploit innovations or mitigate tensions between two competing objectives. Ambidexterity by simultaneously exploring and exploiting innovation is key to improving technological innovation performance (He and Wong, 2004). Exploitation involves a local search that builds on a firm’s existing technological capabilities, providing the firm with advantages in making incremental innovations. In contrast, exploration involves a distant search for new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar and Roberts, 2004).

Although achieving high levels of exploration and exploitation simultaneously is a common challenge for many organizations, the literature reminds us that this outcome is not easily achieved (Brion et al., 2008; Boumgarden et al., 2012; Birkinshaw and Gupta, 2013). Ambidextrous organizations create tensions that should be solved at the functional and management levels (Raish et al., 2009). Often, organizations “divide their time between conflicting demands for alignment and adaptability” (Gibson and Birkinshaw, 2004, p. 210) and managers fight against organizational routines, with invisible forces influencing decisions, calling for new technical skills, market expertise, or external relationships (Lavie and Rosenkopf, 2006).

Birkinshaw and Gupta (2013) argue that we need more insight into managerial capabilities to understand how ambidexterity is achieved. The state that, “We know some organizations are more ambidextrous than others, but for this insight to be valuable we have to take a more detailed look at the way they make their decisions, who gets involved in those decisions, and how those decisions are implemented” (Birkinshaw and Gupta, 2013, p. 293). This view is shared by Turner et al. (2013) who suggest that ambidexterity reflects a capability of a managerial activity because “Instead of being something that managers ‘do’, it is a way of looking at what they do” (Turner et al., 2013, p. 319).

The literature distinguishes between four types of ambidextrous organizations, differing in the way they shape the organization and operationalize their exploration and exploitation activities (Table 20). The most common distinction is structural ambidexterity versus contextual ambidexterity (Bonesso et al., 2014), but the literature also mentions two other forms: sequential ambidexterity and managerial ambidexterity (Mom et al., 2009).

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<tr>
<th>Structural ambidexterity</th>
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<th>Sequential ambidexterity</th>
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*Table 20: Four types of ambidexterity. Source: Author*

**Structural ambidexterity:** Early research on ambidexterity reported the necessity to design ambidextrous firms with two distinct and autonomous units: one dealing with exploration and another with exploitation (Tushman and O’Reilly 1996; Boumgarden et al., 2012). One unit would enable the efficient execution of exploitation routines whereas the other unit would focus on the execution of non-routine tasks such as exploration and innovation (Raisch and Birkinshaw, 2008).
Tushman and O'Reilly (1997) argue that a structural separation between exploration and exploitation activities is key to a successful ambidextrous organization. The main argument in favour of a differentiated organization is that exploration and exploitation tasks are not compatible and trying to balance them within one single unit is impossible (Christensen, 1997; Bower and Christensen, 1996) or might create strategic tensions (March, 1991). Separating exploiting and exploring activities allows organizations to develop incremental changes in exploitative units and radical changes in explorative units (Tushman and O'Reilly, 1996).

**Contextual ambidexterity**: Gibson and Birkinshaw (2004) argue that reconciling exploration and exploitation activities is feasible. Contextual ambidexterity implies that the same people combine exploration and exploitation activities so that both coexist instead of being mutually exclusive (Turner et al. 2013).

In the last decade, studies about ambidexterity predominantly concluded that organizations dealing with exploitation and exploration simultaneously are more successful than others (Lavie et al., 2010). For instance, Birkinshaw and Gupta (2013) argued that if an organization put in place dual structures to deal with exploitation and exploration, then “there is no unit of the organization that does only one thing” (p.294). In such a case, each level of hierarchy within the organization is supposed to make trade-offs individually and solve ambidextrous dilemmas, while dealing simultaneously with exploration as well as exploitation.

However, Raish et al. (2009, p. 687) point out the difficulty of individuals to manage explorative and exploitative tasks simultaneously: “Because the need for exploitation and exploration can vary across initiatives as well as over time, managing the differentiation-integration tensions is likely to be an important dynamic capability for creating and sustaining organizational ambidexterity.”

The success of this type of organization implies the creation of a supportive context that stimulates individuals to simultaneously manage ambidextrous trade-offs. This context would be made of systems, processes or incentives which would encourage individuals to optimally allocate their workload to exploitation or exploration (Gibson and Birkinshaw, 2004). Thus, one main difference with structural ambidexterity is the focus on individuals rather than organizations, functions or projects (O'Reilly and Tushman, 2013).

**Sequential ambidexterity**: In this type of ambidexterity, exploitation and exploration are sequenced over time and constitute a natural cycle (Rothaermel and Deeds, 2004). Due to a permanent change of environmental conditions or strategies, firms need to adapt their structures and processes, alternating longer periods with a main focus on exploitation with those of exploration (Raisch and Birkinshaw, 2008; O'Reilly and Tushman, 2013).

Some researchers argue that dealing alternatively with both types of activity is more likely to be a guaranty of success (O'Reilly and Tushman, 2013) as the same unit shifts over time between different organizations to focus alternatively on exploration and then exploitation. Keeping one single formal unit and making it regularly switch from exploration to exploitation is easier than adapting the culture and informal organization (Nickerson and Zenger, 2002; Boumgarden et al., 2012). The drawback would be that the members of such an organization would alternate longer periods of exploitation with shorter periods of exploration and would be more likely to allocate less focus on explorative needs (Gupta et al., 2006). This type of organization would also be less effective in a context of rapid change (Tushman and O'Reilly, 1996).

**Managerial ambidexterity**: Aggregating various fragments of the literature, Mom et al. (2009, p. 812) define managerial ambidexterity as a “manager’s behavioural orientation toward combining exploration and exploitation related activities within a certain period of time”. In the
three previous types of ambidexterity, organizational tensions were due to trade-offs occurring between exploration and exploitation activities. However, managers can also exhibit personal ambidexterity and behave ambidextrously, by resolving trade-offs at the management level (Raish et al, 2009, Mom et al., 2009). For instance, managers can build strong links between explorative and exploitative units, to foster complementarities and to reach a balance in execution (Boumgarden et al., 2012; Raish et al., 2009). Linkages between both are ensured by a set of routines and directives, and enhanced by resource sharing, coordination and managerial control systems (Raish et al, 2009). Furthermore, senior managers support the implementation of sequential, structural and contextual ambidexterity (Raisch and Birkinshaw, 2008).

Birkinshaw and Gupta (2013) argue that managerial capability is central to the contextual ambidexterity perspective, whereas O’Reilly and Tushman (2011) suggest that management controls and culture can support workers to combine contradictory goals within one unit, such as efficiency and control versus creativity.

Although managerial ambidexterity and contextual ambidexterity are closely related, there is one clear difference between them: contextual ambidexterity implies that employees individually combine exploration and exploitation themselves, whereas managerial ambidexterity investigates how managers can choose and allocate resources between exploration and exploitations tasks, through integration mechanisms, connectedness to other organizational members and by orchestrating activities. However, it remains unclear how senior management’s behaviour can overcome the contradictory demands of exploration and exploitation (O’Reilly and Tushman, 2013).

11.2.2 Solving organizational tensions created by balancing exploration and exploitation activities: purchasing ambidexterity as a precedent to innovation exploration.

Tracey and Neuhaus (2013) suggested a first step forward to resolve the tensions between innovation exploration and innovation exploitation, building on the idea that cost-oriented strategy and innovation-oriented strategy are not mutually exclusive (Tracey and Neuhaus, 2013; Hayes and Pisano, 1996). Other scholars have investigated the field of ambidexterity to better understand how to solve these tensions and balance the exploration and exploitation phases (Narasimhan and Narayanan, 2013).

Thus, this research needs to further investigate why purchasing must adapt to succeed in balancing these tensions, i.e. identifying new capabilities, motivations to make purchasing involved in innovation exploration.

11.2.3 Complementing purchasing’s capabilities with purchasing ambidexterity

In the field of supply chain management, scholars have highlighted the critical role of organizational ambidexterity as an enabler of innovation and cost performance (Blome et al., 2013). This is of high interest for the purchasing function as it is in charge of cost reduction but also responsible for innovation as a second priority (Spina et al, 2013). This importance surprisingly contrasts with the lack of attention that purchasing ambidexterity usually gets in the research. Only one recent paper defined purchasing ambidexterity as a promising field to study (Gualandris et al, 2018). Prior to this, other scholars have introduced the “dual role” of purchasing, one is cost-oriented and the other is innovation-oriented (Schiele, 2010; Oosterhuis et al., 2005) but without naming it “purchasing ambidexterity”.

Purchasing ambidexterity involves the balance between purchasing’s contribution to innovation exploration and purchasing’s contribution to innovation exploitation. These two phases of the innovation process have been diversely researched concerning purchasing. On one side, an extensive literature examines innovation exploitation capabilities through purchasing
involvement in new product development (NPD) (Van Echtelt et al., 2008). In this role, purchasing identifies innovative suppliers in the context of NPD (Wynstra et al., 2003), or exploits resources in the context of a new project under timing constraints (Le Masson et al., 2006). This is also referred to as co-development cooperation (Midler et al., 2007). These tasks occur mainly in the context of projects, where exploitation involves a local search that builds on a firm’s existing technological capabilities, providing the firm with advantages in making incremental innovations. Purchasing can facilitate involvement and collaboration with suppliers early in the NPD process to benefit from joint R&D (Johnsen, 2009; Patrucco et al, 2017), or can use open innovation practices within the buyer-supplier relationship to leverage external sources of innovation (West and Bogers, 2014).

Few papers argue that purchasing can contribute to innovation exploration (Narasimhan and Narayanan, 2013). Innovation exploration involves a distant search for new capabilities, bringing opportunities to the firm to achieve new-to-the-world innovations (Nerkar and Roberts, 2004). Innovation exploration is typically characterized by high technological uncertainty (Melander and Lakemond, 2014; Narasimhan and Narayanan, 2013), higher risks (O’Connor and Rice, 2013) and the need for new capabilities (Slater et al., 2014). This is called co-innovation cooperation (Midler et al., 2007). Exploration “entails a shift away from an organization’s current knowledge base and skills” (Lavie et al., 2010). The literature has demonstrated that the nature of these shifts is related to new technical skills, market expertise, or external relationships (Lavie and Rosenkopf, 2006).

Finally, the literature provides limited insights into how purchasing balances innovation exploration and innovation exploitation. A recent contribution presents purchasing ambidexterity as a promising field (Gualandris et al., 2018), but insists on the need to have complementary case studies on the topic. Ambidexterity theory will help to better explain purchasing’s capability to contribute to innovation exploration, i.e. to understand how purchasing succeeds to keep control of exploration activities while daily emergencies and traditional tasks (i.e. exploitation tasks) overbook the resources. Overall, purchasing’s ability to balance innovation exploitation and exploration (namely purchasing ambidexterity) has rarely been studied in the literature (Blome et al., 2013; Kristal et al., 2010; Gualandris et al, 2018). Many studies on NPD describe purchasing’s role in exploring the supply base to find opportunities, and to exploit resources (Schiele, 2010; Van Echtelt et al., 2008). However, little is known about how organizational designs and control systems facilitate purchasing to combine exploration and exploitation activities. Gualandris et al. (2018) emphasized the need to more deeply investigate “how ambidextrous purchasing functions become organized to facilitate adjustments in their mix of exploration and exploitation activities” (Gualandris et al., 2018, p17), calling for further case studies on this matter. The Paper 3 builds on Gualandris et al. (2018), and aims to achieve a better understanding of how purchasing is organized to balance exploration and exploitation activities.
11.2.4 Paper 3: “Managing tensions between exploitative and exploratory innovation through purchasing function ambidexterity” (François Constant, Richard Calvi, Thomas E. Johnsen)

This paper aims to better understand how purchasing contributes to a firm’s innovation capabilities through the lens of the investigation of the recent concept of purchasing ambidexterity. The term purchasing ambidexterity has been recently coined in the literature, defining “the extent to which a purchasing function simultaneously pursues exploratory and exploitative activities within supply networks” (Gualandris et al., 2018, p 667). This concept bridges two fields, one is ambidexterity theory which has been shown in the literature to be positively associated with firms’ innovation (Tushman et al., 2010), the other is purchasing’s contribution to innovation capabilities, which is a growing field (West and Bogers, 2014) but which needs further examination (Mikkelsen and Johnsen, 2018). The purchasing function’s role in which it needs to balance both innovation exploration and exploitation, namely purchasing ambidexterity, has rarely been studied in the purchasing literature (Blome et al., 2013; Kristal et al., 2010).

Organizational ambidexterity refers to the ability of firms to adapt and develop in the environment (Duncan, 1976), and to succeed at both exploration and exploitation (Tushman and O’Reilly, 1996; Raisch and Birkinshaw, 2008). Exploitation is the “refinement, choice, production, efficiency, selection, implementation and execution,” and exploration refers to “search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation” (March, 1991). Additionally, innovation is one particular field where ambidexterity is often required (Duncan, 1976). Exploration and exploitation are two distinct phases of ambidexterity and can jointly influence firm performance in the context of the firm’s quest for technological innovation (He and Wong, 2004; Benner and Tushman, 2003). Ambidextrous organizations create tensions which need to be solved at the functional and management level (Raisch et al., 2009). Analysing ambidexterity at the organization level is therefore not enough to embody all the antecedents of ambidexterity at a functional level. For instance, little research exists on “how managers orchestrate exploitation and exploration” (Turner et al., 2013, pp328).

Literature on ambidexterity reports on 4 different types of ambidexterity which can be used to investigate ambidexterity at a function level: structural, sequential, contextual and managerial ambidexterity (Raisch and Birkinshaw, 2008; O’Reilly and Tushman, 2013). Researchers have recently claimed that academic publications tend to examine only one specific type of ambidexterity (O’Reilly and Tushman, 2013). They have also highlighted the need for more investigations of the combinations of these types of ambidexterity (Turner et al., 2013), aiming to better understand this concept from a multi-level organizational perspective, such as its application to a function (Raisch et al., 2009) and at an individual level (Rogan and Mors, 2014). Hence, this paper attempts to fill in this gap by investigating ambidexterity within a function such as purchasing, because purchasing is also confronted with multiple forms of ambidextrous tensions in its search for innovation.

By conducting a single case study, this paper examines the combination of the four types of ambidexterity within the purchasing function. This case study focuses on one large multinational company (S Corp) and reports on findings derived from 18 interviews of people holding various positions in the firm. The purchasing function is scrutinized from two perspectives: inside the function, i.e. various sub-functions such as category purchasing, innovation purchasing, project purchasing and development purchasing, but also from a cross-functional perspective, i.e. purchasing’s interactions with R&D, business development, strategy and innovation departments, etc. The key advantage of the case is that it investigates a company which has started a major organizational change very recently by implementing a “Purchasing
& Innovation” function. This new function oversees the exploration for innovations, whereas other purchasing functions remain oriented towards innovation exploitation. Understanding why and how this company has implemented this new function helped us to answer our research questions.

This research investigates how the four types of ambidexterity (structural, sequential, contextual and managerial ambidexterity) can explain purchasing ambidexterity. It assesses the tensions and the complementarities between different types of ambidexterity that can be found in a purchasing function, through the in-depth examination of a large firm (S Corp) which successfully achieves purchasing ambidexterity, enabling purchasing to contribute to innovation. Among other findings, it describes how contextual and managerial ambidexterity support structural and sequential ambidexterity, and it suggests some practical managerial implications accordingly.

This research supports the view that (1) purchasing ambidexterity is a combination of structural, sequential, contextual and managerial ambidexterity, (2) combinations of different types of ambidexterity support overall purchasing ambidexterity, e.g. the combination of contextual and managerial ambidexterity facilitates purchasing ambidexterity through structural and sequential ambidexterity. It also provides further empirical evidence that (3) managerial ambidexterity should be considered as a full fourth type of ambidexterity in future research. The managerial implication of this research might support professionals in shaping purchasing organizations, distributing new roles to buyers, and finding new methods or processes to improve purchasing’s contribution to the firm’s innovation capabilities.

Additionally, this paper shows that the development of purchasing’s ambidexterity is a staged process. S Corp has developed its purchasing ambidextrous structure in two stages. The first two types of ambidexterity were implemented 15 years ago on the former CEO’s initiative, namely in stage 1. This was seen as a good solution for a decade, but the new CEO wanted to strengthen this structure by adding new processes, tools and skills. Creating a dual structure and a sequential organization of innovation processes, S Corp completed its development by improving the supportive context of innovation orchestration (the P & I champion’s role, and coordination mechanisms), namely stage 2. These two stages reveal a diachronic vision of purchasing ambidexterity development, reflecting S Corp’s way of combining the four types of ambidexterity over time (Figure 11):

![Figure 11: Complementarities between four types of ambidexterity and the diachronic implementation of purchasing ambidexterity at S Corp (source: Author)](image)
11.2.5 Paper 3 publication status

Investigating the concept of purchasing ambidexterity has been a focus since the beginning of this PhD, without naming it “ambidexterity”. At the beginning of 2018, the concept of purchasing ambidexterity was at its earliest stages and no article had been published on it. The first draft of this paper has been presented at an IPSERA 2017 doctoral workshop, where it received comments and encouragements. In its initial form, the paper theoretically investigated the concept of purchasing ambidexterity in the context of innovation sourcing within supply networks. However, the topic was too broad, and the comments unanimously highlighted the need to narrow the focus down to a smaller unit of analysis and to examine ambidexterity enablers or outcomes. The seminal paper by Gualandris et al. (2018) entirely changed the perspective of this research, by providing clear avenues of research and opportunities to further investigate the topic.

The second form of this paper was discussed during an IPSERA 2018 doctoral workshop. At that stage, the empirical data analysis was still limited, and the paper failed to consider a combination of four types of ambidexterity. The doctoral workshop audience provided valuable comments among which was the idea to consider various types of ambidexterity and a combination of them. This called for an extensive revision, after which the paper incorporated the consideration of firstly three and finally four types of ambidexterity.

The paper has now been presented to IPSERA 2019 as a competitive paper. The paper received encouraging comments from 2 reviewers, reported below:

Reviewer 1: “Overall, I am quite positive on this paper. It seeks to infuse PSM research with an external, ‘grand’ theory, to further enrich our understanding of the role of purchasing in innovation. Especially the integrated analysis of different forms of ambidexterity is an interesting angle, which could deliver contributions to the field of PSM research but also to ambidexterity research in general. I do believe that the paper can be further developed, particularly in terms of the clarity of the contribution”.

Reviewer 2: “This is an interesting and useful paper, but it would be even better if the balance of the discussion could be shifted away from the background theory (which is well-established, and well-covered elsewhere) and towards a more detailed description of the case. The case material is presented well, but I was left still wondering exactly what activities and practices were going on in the firm; what were the innovations in question, and how did the procurement activity handle the trade-offs of ‘better’ and ‘cheaper’. Were the innovations about cost reduction, or innovations in new processes, or innovations which prompted changes to the balance of make-buy... or what? The quotes presented are useful, but sometimes raise many questions. For example [...] this makes we want to know: what ‘internal stakeholders’ we are talking about. And what kind of ‘adoption’ is this? Is a supplier providing an enhanced service? Or has a new technology changed the way the buying firm is doing business? What's the balance of pain and gain between buyer and supplier in this innovation? So - great paper, but more detail and more precision in the discussion is needed.”

After the IPSERA2019 conference, the paper was invited for the JPSM special issue. It was revised and sent to this journal at the beginning of July in 2019. The feedback from the guest editor of this special issue was positive: on September 18th, he confirmed that the paper was accepted in the review process, and that a major revision was needed. A major revision is currently in progress at the time this text is being written. The latest version is attached to this thesis in Appendix.
11.3 Developed conceptual framework

Propositions 1 and 2, Figure 10 and the work on Papers 2 and 3 have led to the developed conceptual framework (Figure 12). This conceptual framework populates the three precedents of AMC and highlights several important factors that reflect how and why purchasing can contribute to innovation exploration under conditions of high technological and market uncertainty. These factors are described in the first sections below: 1) a differentiated purchasing unit focused on exploration, 2) strong integration into innovation clusters and 3) new individual orchestration capabilities. Furthermore, the developed conceptual framework presents how the precedents of purchasing’s ambidexterity can enable to make a better contribution to innovation exploration, by reducing tensions and facilitating a good balance between innovation exploration and innovation exploitation.

11.3.1 A differentiated purchasing unit focused on exploration

The most influential factor found in our research related to the firm’s organizational design. Exploring innovations through the use of a distinctive unit appear to be effective at S Corp, whereas D Corp struggled with only one unit. Schiele (2010) argued that a dedicated scouting unit must be distinct from the strategic unit (Schiele, 2010), which has since been suggested by other scholars (Mikkelsen and Johnsen, 2018; Maier et al., 2017; Luzzini and Ronchi, 2011). Such an organizational separation was also examined by Melander and Lakemond (2015), who considered that the separation between transactional and relational governance is mainly prevalent in projects with a high degree of uncertainty. S Corp differentiates traditional functions of category and project purchasing from the P&I function which contributes largely to innovation exploration. Both structures are separated structurally and are independent functions with independent routines and objectives. This structural differentiation creates tensions mainly between S Corp’s P&I and technical functions (R&D): P&I faces resistances from R&D when P&I brings innovation opportunities from the supply base into the buying firm.

This differentiated purchasing unit is made aware of a need to contribute to innovation through integration with technical functions. “Functional integration” refers to “intra-firm alignment and information sharing activities across functions” (Swink and Schoenherr, 2015, p71). For instance, involving purchasing in NPD makes it aware of the need to source an innovation designed internally (Schiele, 2010, Wynstra et al., 2001; Legenvre and Gualandris, 2018; Van Echtelt et al., 2007). Purchasing’s integration with R&D facilitates purchasing’s involvement in innovation activities within the buying firm (Jansen et al, 2009; Legenvre and Gualandris, 2018). The two firms we have studied have implemented inter-dependent tasks between purchasing, project teams and R&D, which Gonzales-Zapatero et al. (2017) named a bi-dimensional process; involving shared and understood information or aligned decisions between these functions.

This research highlights how this differentiated purchasing unit is made aware of innovation through integration with marketing and business development functions. This functional integration allows purchasing to learn about customers’ innovation needs. The literature supports this idea with the notion of marketing and purchasing co-management synergies (Lindgreen et al., 2016). This co-management calls for the continuous alignment of customer needs with supply network capabilities, sequentially or simultaneously (Wagner and Eggert, 2016), and has a positive influence on the speed of product development (Gonzalez-Zapatero et al., 2017). In this research, the purchasing functions in charge of innovation exploration and business development functions are deeply inter-connected at S Corp: both functions often exchange information about customer needs and suppliers’ capabilities, developing purchasing
awareness of innovation opportunities. These findings are also compatible with those by Gonzales-Zapatero et al. (2017), providing insights into the benefits of purchasing-marketing integration for product development. The benefits of this integration also concern the suppliers’ creativity and innovation capabilities (Schoenherr and Swink, 2012).

11.3.2 Strong integration into innovation clusters

This study suggests that purchasing needs to have strong connections with innovation clusters to increase the number of innovation opportunities detected. These clusters can be of various nature. S Corp and D Corp attempted to stay strongly connected with potential new suppliers, trend-scouts, incubators and technology centers, and both firms keep start-ups on their radar. S Corp also leverages close relationships with universities. Then literature endorses the need for a scouting supply network to source complementary capabilities under conditions of high uncertainty (Philips et al., 2006; Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2018; Gonzales-Zapatero et al, 2016). External partners are significant innovations providers, even more than a firm’s internal resources (Hartmann et al., 2012). This type of connection development is also found in other sectors, such as the automotive industry, where purchasing uses open innovation tools to find innovation opportunities from non-traditional suppliers (Homfeldt et al., 2017).

Purchasing’s integration with innovation clusters is facilitated by specific methods, and tools to scout for new technologies, suppliers, and markets to identify new opportunities are necessary. The two cases studied here shed light on the usage of information systems in purchasing to scout and acquire innovations: information-processing tools such as open-innovation intermediary platforms (Homfeldt et al., 2017; Sjödin and Eriksson, 2010), IT tools (Kim and Chai, 2017; Spring and Araujo, 2014), web-based supplier’s web suggestion platforms (Homfeldt et al., 2017), and patent analysis tools (Trautrims and MacCarthy, 2017; Cox, 2015; Trautrims et al., 2017) to support innovation exploration. With new solutions and technologies offered to purchasing professionals, procurement can tap opportunities for performance improvement and innovation (Wyman, 2018).

This study reports that the capability to develop purchasing’s integration into innovation clusters is facilitated by individual purchasing capabilities such as the ability to scout the universe of partners to detect opportunities and innovations, as well as creativity, curiosity-driven behaviour and an innovation-oriented mindset. This is also found in the literature (Luzzini et al., 2015; Kähkönen et al., 2017; Hartmann et al., 2012; Schiele et al., 2011). However, the findings of this research contrast with the seminal stream of literature reporting on purchasing skills and capabilities, which does not report on specific skills to contribute to innovation (Tassabehji and Moorhouse 2008, Knight et al., 2014; Giunipero and Pearcy, 2000).

11.3.3 New individual orchestration capabilities

This study also highlighted the importance of the role of champions tasked with orchestrating activities related to innovation exploration within the purchasing function and peripheral departments. Although the concept of champions is well known in the wider literature, very little research in purchasing has examined this (Maier et al., 2017; Narasimhan and Narayanan, 2013). A champion can be considered as a “liaison person” to facilitate the exchange of knowledge across internal functions (Gupta and Govindarajan, 2000). “Innovation champions” can spread enthusiasm to other employees and facilitate the development process (Gemünden et al., 2007). In our cases, the P&I Director’s role as a champion was to understand the market and customer needs and then organize the assessment, absorption and development of a supplier’s innovative solution. One of the major roles for the champion is also to integrate
innovative suppliers with the firm’s internal R&D function, often contracting start-ups or new suppliers. The purchasing champion needs to have multiple capabilities such as good market knowledge together with excellent leadership skills. They should also have a strong technical background so that they understand the technicality of the requirements and can engage in healthy discussions with stakeholders. As we saw at S Corp, a purchasing champion orchestrated the matchmaking between all parties, so that the assimilation of the innovation could succeed.

Last, this study shows also that orchestration capabilities are facilitated by cultural and individual factors. The willingness to span work boundaries increased awareness in both firms and enabled better orchestration of the innovation process. The literature has neglected to investigate links between purchasing individuals’ self-motivation and innovation, although other fields have demonstrated that informal social interactions outside work boundaries have a positive influence on innovation (Liu et al., 2017). Our two cases showed that middle management’s self-motivation to act influenced the ability to explore outside traditional boundaries, which fits with the findings by Wooldridge et al. (2008). Middle management can play a role in building and leading informal strategic networks in and across firms for open innovation (Kodama, 2005), or for informal social networking activities outside of the workplace (Liu et al., 2017).

11.3.4 The developed conceptual framework

In the light of the previous discussion, this research presents a conceptual model which includes various developments compared to the initial version. First, it populates the set of precedents in the three axes of AMC according to the main patterns emerging from the findings. These precedents are split into the three categories of AMC. They represent the key enablers of purchasing’s contribution to innovation exploration. Also, it modifies the way the precedents are represented: each respective precedent is no longer represented individually with an arrow going to the right of the figure, but they are now grouped inside a block from where a single arrow goes from the block itself to the right side of the figure. This means that the consideration of a single set of precedents is important, and that this set is moderated by the key contextual factors: market and technological uncertainties.

Second, it adds a block titled “Purchasing ambidexterity”, as an outcome of the successful management of tensions held when purchasing is involved both in innovation exploration and innovation exploitation. There is a consensus in the literature on the need to achieve a good balance between innovation exploration and innovation exploitation. The block titled “Exploration-Exploitation balance” is, in turn, moderated by another contextual factor: the “mode of balancing”. This factor is made of various types of ambidexterity or any combination of these types of ambidexterity. There is some agreement about how to reach the balance in question. This study suggest that purchasing can cope with conflicts and succeed in balancing innovation exploration and innovation exploitation by implementing a mix of 4 types of ambidexterity.

Third, it shows that the development of purchasing’s ambidexterity is a staged process. S Corp has developed its ambidextrous purchasing structure in two stages. These two stages reveal a diachronic vision of the development of purchasing ambidexterity, reflecting S Corp’s way of combining the four types of ambidexterity over time.

It results in the following refined theoretical model, displayed in Figure 12: Developed conceptual framework (source: Author)
Figure 12: Developed Conceptual Framework (source: Author)
Chapter 12. Discussion

The main objective of this research was to examine the precedents of purchasing’s contribution to innovation exploration under conditions of high technological and market uncertainty, through the lens of the AMC framework. Chapters 9 and 10 scrutinized the two cases in depth to find common themes in awareness, motivations and capabilities, as precedents to purchasing’s contribution to innovation exploration. The categorization of these themes has facilitated the emergence of several thematic patterns and two key contextual factors: market and technological uncertainty. In this chapter, emerging patterns are discussed in the light of the academic literature, to ground the emergent themes in the literature. It presents a final table of the emerging themes and the literature.

12.1 Purchasing’s awareness of an innovation opportunity

The first way in which purchasing becomes aware of an innovation opportunity is to be connected to the supply market. Purchasing can sustain a dynamic network and must investigate new means to stay connected. In the literature, a consensus has emerged showing that it is important to consider new suppliers rather than existing suppliers to source complementary capabilities under conditions of high uncertainty (Phillips et al., 2006; Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2018; Gonzales-Zapatero et al., 2016; Billington and Davidson, 2013). Scouting methods such as the use of trend-scouts, incubators and technology centers targeting mainly start-ups are reported to be efficient (Homfeldt et al., 2017), but the literature still lacks an explanation of purchasing’s role in these processes.

The literature often suggests that scouting for innovation requires strong purchasing integration with other functions. Gonzales-Zapatero et al. (2017) describe the functional integration mechanisms as a bi-dimensional process, which needs sharing and understanding of information as well as aligned decisions. For instance, purchasing can be integrated into the R&D function, because purchasing may receive clear technical requests to source from outside the firm (Gonzales-Zapatero et al., 2017). The literature often mentions purchasing’s integration into the R&D function (Legenvre and Gualandris, 2018), as an enabler for purchasing’s contribution to innovation. This capability emerged also in my cases, where D Corp interviewees mentioned that purchasing’s integration into the R&D function was necessary. However, some recent publications mention how critical purchasing’s integration with marketing and business development functions is: it allows an in-depth understanding of the market and market intelligence (Pihlajamaa et al.; 2017). It facilitates activities such as “sharing information on customers and suppliers and understanding its implications for the other function would reduce uncertainty and lead to an optimal alignment of both functions' resources and requirements” (Gonzales-Zapatero et al., 2017) and avoids the exploration of non-marketable product and services. This is more in line with my findings at S Corp, where purchasing integration into marketing seems to be a key success factor: the S Corp Purchasing & Innovation Director explained to me that keeping the purchasing and business functions close together made purchasing really efficient in exploring innovations. This dual integration is discussed already in the literature: a strong integration between purchasing and R&D can lead to better NPD innovativeness (Van Echtelt et al., 2007), whereas integration with marketing is preferred for fostering innovation in a context of high market uncertainty (Gonzales-Zapatero et al., 2017). To succeed in integrating purchasing with other functions, some authors suggest that a detailed process with purchasing inclusion points ensures purchasing’s regular participation in NPD (Schiele, 2010), while others recommend setting innovation-related tasks as routines, such as specific processes, managerial systems, or metrics (Charterina et al., 2016).
This study also highlighted the importance of the role of a champion in the purchasing organization, increasing purchasing’s visibility of innovations opportunities. This role is to orchestrate all activities related to innovation within the purchasing function and peripheral departments. In the literature, we can find related topics, but very few in the purchasing literature. A champion is an individual who possesses good technical understanding that can help to resolve technical problems and who has comprehensive market knowledge (Chakrabarti, 1974). They can be considered “liaison personnel” in charge of exchanging knowledge between internal functions (Gupta and Govindarajan, 2000). In these cases, the Purchasing & Innovation Director’s role was to understand the market and customer needs and then map it to innovative solutions, keeping the technical capabilities of the firm in mind. The interviewees reported that a champion can have multiple roles to play and also they can positively influence the success of an innovation project. One of the major roles for the champion is to integrate innovative suppliers with firms’ internal R&D functions. Therefore, they need multiple capabilities such as possessing good technical and market knowledge with very good communication skills. They should also have a technical background so as to understand the technicality of the requirements and to be able to hold healthy discussions with R&D and suppliers. A champion must first understand the R&D requirements and then commence scouting for suppliers. Once this matchmaking is done, a champion will establish a connection between R&D and the newly found suppliers. From the purchasing literature perspective, only one recent paper has introduced the role of the purchasing champion: the institutionalization of a new purchasing’s role enabling the open innovation process calls for the creation of a formal role of a “champion”, who will have a positive impact on overall company’s innovativeness (Maier et al., 2017).

12.2 Purchasing’s motivations to explore innovations

The scarcity of internal knowledge motivates the consideration of external partners, who provide access to opportunities for many more strategically significant innovations than companies could achieve alone from exploiting internal resources (Hartmann et al., 2012). To identify these partners, the exploration phase entails specific motivations, Pihlajamaa et al. (2017) suggested that purchasing’s motivations come from the setting of moderately challenging goals, and moderately specific goals (Pihlajamaa et al., 2017), enabling the exploration. One strong motivation is the strategic pressure purchasing can receive, in case the firm has demanding expectations to source innovations from external partners (Wynstra et al., 2003; Hartmann et al., 2012). Incentives to explore can come from outside the firm, when market changes call for the sourcing of innovation (Williams and Smith, 1990; Gonzalez-Zapatero et al, 2013), or when purchasing is tempted by an innovation identified far outside the firm’s current boundaries (Hofmefldt et al., 2017).

This study confirms that purchasing can have cross-functional incentives to start exploring, such as being invited by other departments to take part in the development of technology and marketing roadmaps, providing support in innovation exploration (Legenvre and Gualandris, 2018) or being nominated by the organization to implement some form of open innovation (Maier et al, 2017). Purchasing can gain motivation to contribute to innovation exploration due to the desire to increase the department’s status within the organization, or to increase its strategic influence (Luzzini and Ronchi, 2011). Motivations can come from the supply network itself: learning from suppliers or accessing supplier knowledge through the use of an innovation they have presented to the market (van Echtelt et al.; 2007, Schiele, 2006), enhancing joint value creation through co-development, mitigating the risk of opportunism (Clauss and Spieth, 2016).
Incentivization to be involved in innovation exploration can also emerge from the motivation to reduce costs, improve quality, reduce development time (Hüttinger et al., 2014; Homfeldt et al., 2017; Bengtsson et al., 2013), or even reduce sourcing lead times (Gonzalez-Padron et al., 2008). Under conditions of low technological and market uncertainty, innovation-related activities are more rooted in project and product development. Innovation exploration here is limited to the search for short-term, not to say opportunistic solutions. The literature frequently cites motivations that come from the firm level, and incentivize purchasing to take actions towards innovation. For instance, explicit incentives such as metrics can be imposed by the firm and used as enablers to get purchasing involved in innovation activities (Patrucco et al., 2017). The willingness to promote the corporate reputation can push purchasing to exploit turnkey innovations found in the supply base (Williams and Smith, 1990) during supplier workshops or conversations (Homfeldt et al., 2017), which is even more true in the case of innovative ecological product sourcing (Preuss, 2007). The literature investigating the effect of early purchasing involvement (ESI) on product development demonstrates the positive contribution purchasing has on innovation (Schiele, 2010). In that case, purchasing is incentivized by a project team who expects purchasing to proceed to advanced sourcing of innovations in a context of a well-defined project. By sourcing innovations, purchasing might gain better control of strategic in/out decisions within the firm, such as whether to make or buy technology (Castaldi et al., 2011).

There is only one study reporting on the need to implement explicit individual incentives such as bonuses, rewards (Gonzalez-Zapatero et al., 2016) to enable innovations, although this contradicts S Corp’s Purchasing & Innovation Director who emphasized that traditional rewards such as bonuses linked to a KPI are not suitable when creative activities and innovation are involved. The purchasing function can be in a quest for a better recognition within the firm (Luzzini and Ronchi, 2011), using innovation as a mean to increase its influence, increasing the visibility of the firm’s business and technology road maps. Several scholars have recognized the effect of incentives on purchasing’s motivation to maintain relationships with suppliers, with the aim of innovation enhancement (Gonzalez-Zapatero et al., 2016; Corsten and Felde, 2005), but they do not describe the types of incentives. Motivation can emerge from individual knowledge and self-interest in creating market opportunities to source innovation (van Echtelt et al., 2007), or individual willingness to enlarge work boundaries through informal social networking activities outside of the workplace (Liu et al., 2017). On this matter, my findings on individual motivations contrast with the adjacent research investigating “work boundaries” in the field of strategy, which investigates intra-organizational processes underlying middle managers individual behaviours. This field of research demonstrates for instance that middle management “job enrichment” (i.e. self-motivation to do something not formally expected) has a strong influence on the ability to explore outside traditional boundaries (Wooldridge et al., 2008), as does middle management’s role in building and leading informal strategic networks in and between firms for open innovation (Kodama, 2005). This might be an interesting pre-condition to investigate, but it has been rarely covered in the literature except Liu et al. (2017).

If purchasing is convinced by the great potential of an innovation but has no support to bring it into the firm, then that could break the opportunity to benefit from the exploration. In this case the assimilation of the innovation is hardly feasible. Assimilation, as Cohen and Levinthal (1990) suggested, can be done either by adapting the internal context and keeping the innovation found as a turnkey in the supply base, or by transforming the innovation before exploiting it (Zahra and George, 2002). Both cases call for different purchasing motivations. Acquiring a turnkey innovation is likely to speed up the innovation process and reduce the time-to-market, because acquiring a turnkey innovation avoids developing it in house, but in most the cases it needs adaptation. The literature presents cases where these innovations come from
start-ups, who help to increase the competence base of the buying firm, to stimulate creativity and the capability for generating new ideas for competitive advantage (Homfeldt et al., 2017) and can often provide disruptive innovations. Purchasing’s contribution to innovation can be motivated by a set of clear objectives towards innovation acquisition, but pre-conditions have to be met, such as purchasing’s involvement in the innovation processes, participation in the organization’s improvement programs, and a long-term focused strategy (Patrucco et al., 2017). Acquisition implies difficulties of assimilation into the buying firm, for instance the “not designed here” syndrome, and might kill purchasing’s motivation if purchasing does not have a strong position within the firm (Mogee and Bean, 1976; Patrucco et al., 2017).

12.3 Purchasing new capabilities to explore innovations

The literature examining purchasing’s contribution to innovation exploration provides a rich and common view of the capabilities needed, which allows a comparison and discussion of the findings. Not surprisingly, the literature emphasizes the need for a knowledgeable, mature and skilled purchasing function which is capable of scouting the supply network to detect opportunities and innovations (Luzzini et al., 2015). This was confirmed by this study. To increase the clarity of the discussion, there is a need to classify these capabilities in a multilevel approach starting from the individual level, then progressively broadening the scope to the organization capabilities, and finally to the capabilities related to the entire supply network.

12.3.1 Individual’s purchasing capabilities

A set of individual capabilities emerged from the two cases and most of them are aligned with the literature. Purchasing professionals must have specific individual skills such as a creative and innovation orientated mindset and curiosity-driven behaviour, which facilitate the contribution to innovation exploration (Kähkönen et al., 2017; Hartmann et al., 2012; Schiele et al., 2011). However, the findings of this research contrast with the seminal stream of literature reporting on purchasing skills and capabilities, which does not report on specific skills that contribute to innovation (Tassabehji and Moorhouse 2008, Knight et al., 2014; Giunipero and Pearcy, 2000). This research highlighted that the ability to convince internal stakeholders is an important skill to make the innovation known internally. This is aligned with the literature found in the absorptive capability field “the knowledge of who knows what, who can help with what problem, or who can exploit new information” (Cohen and Levinthal, 1990, pp133), but this has been rarely investigated in the purchasing field. Before contracting for acquiring the innovation, purchasing must convince the firm internally that the opportunity is real, and find the relevant support to get it assimilated (Patrucco et al., 2017). Another theme emerging from this research which can be found in the literature is that purchasing needs to develop skills to interact with R&D (Mikkelsen and Johnsen, 2018). The literature also examined how informal buyer-supplier employee interactions and influences are a good means to enhance buying a firm’s innovation capabilities: some of them suggest that the ability to build formal and informal social interaction enables knowledge acquisition (Liu et al., 2017), which is also aligned with my findings.

12.3.2 Organizational capabilities

- Organizational design

The first organizational capability is related to the effectiveness of the firm’s organizational design and how this related to exploring innovations. When studying the two cases, it appeared that exploring innovations through the use of two distinctive units demonstrated its
effectiveness at S Corp. Schiele (2010) first argued that a dedicated scouting unit must be distinct from the strategic unit (Schiele, 2010). This is followed by Luzzini and Ronchi who suggested that a “dedicated configuration is clearly the one that seems more suitable to deal with technological uncertainty” enhancing innovation capabilities from the supply base (Luzzini and Ronchi 2011, p 24). This is exemplified as the role of “purchasing engineering” unit (Luzzini and Ronchi, 2011). This organizational separation is examined as well by Melander and Lakemond (2015), who considered that the separation between transactional and relational governance is mainly prevalent in projects with a high degree of uncertainty, although this last article does not mention “innovations” specifically. Few other papers have confirmed the necessity to implement an organizational differentiation between the explorative unit and the exploitative unit (Maier et al., 2017; Mikkelsen and Johnsen, 2018). However, this theme is extensively studied in the literature on ambidexterity; it reports on the necessity to design ambidextrous firms with a specific organization: two distinct and autonomous units, one dealing with routine tasks efficiently and the other to realize non-routine tasks and innovation (O’Reilly and Tushman, 2011; Raisch and Birkinshaw, 2008; Benner and Tushman, 2003; Tushman and O’Reilly 1996). The basic assumption is that exploration and exploitation tasks are not very compatible, but not impossibly so (March, 1991), and therefore organizations must adapt and treat exploration and exploitation activities differently (Boumgarden et al., 2012). In this research, a similar type of organization has been found at S Corp: traditional functions of category and project purchasing were focused on efficient daily tasks, whereas the newly introduced purchasing and innovation function contributed largely to innovation exploration. Both structures were separated structurally, meaning they were independent functions with independent routines and objectives. The presence of the purchasing and innovation function specialized in innovation exploration with its own structure and formalized processes supports earlier research suggesting that separation between innovation exploration and innovation exploitation tasks is efficient (O’Reilly and Tushman, 2004).

Although the most recent publications on purchasing insist on the effectiveness of this dual structure, a debate has been raised in the literature about ambidexterity on this matter: the structural differentiation creates tensions between structures. This fits with the findings of the current cases: it was noticed that inevitable tensions occurred at S Corp when purchasing contributed to innovation, for instance in the relationship between purchasing and innovation and R&D. The purchasing and innovation function struggled to unravel the tricky balance between exploration and exploitation in the innovation assimilation phase. It faced resistance from other departments. To solve these tensions, some scholars have considered that the best means is to design an organization which would be capable of simultaneously exploring and exploiting innovations within the same unit, which is the opposite of having two differentiated units. Employees who are individually involved in both innovation exploration and exploitation would have to alternate between long periods of exploitation and short periods of exploration. This is aligned with the conclusions by Brown and Eisenhardt (1997), and also confirmed by Gupta et al. (2006) arguing that employees in traditional organizations are more familiar with and more focused on exploitation (Gupta et al., 2006). In the literature, seminal articles suggest that switching alternatively between exploration and exploitation is far easier than changing the culture of the organization (Nickerson and Zenger, 2002; Boumgarden et al., 2012). This reflects what has been found in this research. Others have suggested that the successful achievement of ambidexterity arises from the leaders’ ability to manage tensions between exploration and exploitation tasks, which can make some organizations more ambidextrous than others (O’Reilly and Tushman, 2013; Birkinshaw and Gupta, 2013).

- Organizational processes
Capabilities may arise from organizational processes themselves: the literature suggests that specific methods and tools to scout for new technologies, suppliers, and markets are necessary to identify new opportunities (Pihlajamaa et al., 2017). The outcome of innovation exploration is the detection of an innovation. An interesting list of screening instruments so-called “pull/push” tools to explore innovations from external sources has been published by Homfeldt et al. (2017) but without a clear explanation of how purchasing is involved in their usage. This case study has shed some more light on the necessary usage of information systems in purchasing to scout for and acquire innovations, which is also emphasized in the literature: information-processing tools such as open-innovation intermediary platforms (Homfeldt et al., 2017; Billington and Davidson, 2013; Sjödin and Eriksson, 2010) or IT tools (Kim and Chai, 2017; Spring and Araujo, 2014) might help to support the transaction. Acquisition can occur faster through the use of web-based idea platforms, where suppliers upload and sell their innovative ideas online (Homfeldt et al., 2017). This said, this case confirms a critical trend faced in purchasing management: “purchasing faces a wake-up call as the change in technologies threatens to completely alter the function, leading eventually to its automation” (Easton et al., 2018). Also, we need to understand that with these new start-ups, the purchasing function is facing a wave of innovation. This environment is changing rapidly and dynamically. With new solutions and technologies offered to purchasing professionals, procurement can tap extraordinary opportunities for performance improvement and innovation (Wyman, 2018). For example, big data and machine learning technologies can be combined and used as patent analysis tools to identify and select innovative suppliers and partners. Patent analysis tools not only help to scout for new innovative partners but also help to identify product categories with high importance for supplier-led innovations (Trautrim and MacCarthy, 2017). By this we get to know which tier in the supply/value chain is active in innovation practices. Moreover, the use of patent analysis as a tool is to support procurement, sourcing and investment decisions including ‘make or buy’ decisions. This takes a strategic view on the sourcing portfolio (Cox, 2015).

The use of a “patent analysis” tool to support procurement and sourcing will help the strategic management of the supply base: it provides a quantitative indicator to identify innovative suppliers and to support supplier selection decisions (Trautrims et al., 2017). However, the use of specific contracting and governance mechanisms to deal with innovative entrepreneurial companies in order to succeed in the acquisition phase are needed (Pihlajamaa et al., 2017). However, very few papers examine purchasing’s involvement in explicit contract design and licensing agreements with external partners. The literature also lacks a discussion of the challenges related to the management of an intellectual property protection regime in which purchasing may have a role to play. As this study did not cover the contractual side of purchasing’s contribution to innovation, it cannot compare the findings to this topic.

There is a clear dominance of academic studies reporting on purchasing’s contribution to innovation exploration in a context of low uncertainty, mainly those related to NPD. The NPD and ESI literature demonstrate the role purchasing can play in innovation exploration by collaborating with suppliers and co-developing products. This is about aligning internal development activities with suppliers’ development activities, in which purchasing’s role is to exploit the supplier’s technical competencies (Wynstra et al. 2003). The importance given to this type of process may be because it directly matches the strategic challenges identified in the purchasing field, such as cost reductions, early purchasing involvement in NPD, early supplier involvement, co-development, etc. Or it may be because the outcomes of purchasing’s contribution to innovation are easily measured if we consider traditional purchasing metrics. Capabilities to effectively manage relationships with suppliers are often highlighted in the literature to have a positive influence on innovation sourcing in NPD (Sjoerdsma and van
Weele, 2015). Purchasing has to develop governance mechanisms between the supplier and the buying firm (Liu et al., 2017; Tracey and Neuhaus, 2013) to increase innovation capabilities. The way purchasing builds long-term supplier relationships/collaboration to engage in innovation projects (Patrucco et al., 2017), and in more general terms the relationship-building capabilities are often cited as a core capability to develop innovations with the supply network (Sjoerdsma and van Weele, 2015; Bengtsson et al., 2013, Schoenherr et al., 2012). Innovation exploration typically necessitates the creation of new relationships with existing suppliers or with new partners, rather than the refinement of existing partnerships, although this was also considered a promising route by several interviewees at S Corp.

12.3.3 Purchasing ambidexterity

The previous literature on ambidexterity has suggested that resources and capabilities are effectively used when people, structures, processes and cultures from different units are merged or integrated (Tushman and O’Reily, 1996). Integration mechanisms are defined in the literature as common strategic intents, overarching sets of values and targeted linking mechanisms (O Reilly and Tushman, 2004), strong organizational culture (Lin and McDonough, 2011) and leadership-based antecedents (OReilly and Tushman, 2013). It calls for inter-dependant tasks, specific processes, what scholars term “functional integration”, referring to “intra-firm collaboration and information sharing activities” (Swink and Schoenherr, 2015). Recent literature describes functional integration as a bi-dimensional process, which requires shared and understood information as well as aligned decisions (Gonzalez-Zapatero et al., 2017). These mechanisms enable organizational effectiveness for structurally or sequentially separated exploration and exploitation of innovations. In this case, the presence of these integration mechanisms demonstrates a certain organizational maturity at S Corp, or lack of maturity at D Corp. For instance, S Corp’s purchasing and innovation function is closely integrated with the business development and marketing functions. This integration comes from the individual behaviour and networking ability purchasers exercise to become aware of customer needs and “pain points”. This ability is confirmed by Gonzales-Zapatero et al. (2017), who provided insights into the benefits of purchasing integration with marketing, which bridges the idea that integration supports suppliers’ innovation and creative capabilities (Schoenherr et al, 2012). This is aligned also with the literature discussing contextual ambidexterity, enabled at the individual level, focusing on integration mechanisms.

At S Corp, explorative and exploitative units have cross-functional interfaces such as specific teams, in addition to a “champion” who facilitates knowledge exchanges between units. This is aligned with Gupta and Govindarajan (2000), who argue that “liaison personnel” facilitate transitions between exploration and exploitation. At S Corp, these links represent bridges that are artificially created during meetings, between functional teams such as R&D and purchasing or between marketing and purchasing, during which distinct or complementary knowledge is shared. Cross-functional interfaces allow people from different structures or departments to better understand the stakes that the other unit is facing, and to reach a common understanding on objectives and methods. Scholars have presented cross-functional interfaces as mediators of the relationship between structural differentiation and ambidexterity (Jansen et al., 2009). Lastly, integration is also related to the organizational culture and context. Gibson and Birkinshaw (2004) argued that the capacity to become ambidextrous is facilitated by the creation of a particular type of organizational context at the business-unit level, what they call the “social context”. They think that the organizational culture, administrative mechanisms fostering certain behaviours, incentives, career management and other tangible systems might call for better equilibrium in exploitation and exploration activities. They also argue that when a supportive organizational context is created, individuals engage in both exploitation-oriented
actions (geared toward alignment) and exploration-oriented actions (geared toward adaptability), and this results in capabilities that support ambidexterity.

O’Reilly and Tushman (2013) noticed a lack of research clarifying how sequential ambidexterity, and more especially the transition between exploration and exploitation, occurs at the managerial level. This study highlighted how S Corp interviewees at the management level insisted on the fact that this transition was sensitive. It was noticed as well how the purchasing and innovation function contributed to this transition by effectively balancing decisions to absorb and assimilate an innovation on behalf of other functions, such as R&D. One contribution of this case study is to highlight how the combination of purchasing’s managerial ambidexterity and contextual ambidexterity at individual levels facilitates sequential ambidexterity through the creation of cross-functional contacts and incentives. These stimuli motivate co-workers and enable the innovation process to go a step towards innovation absorption. Moreover, this study suggested that the purchasing and innovation functions, when managing these transitions, require special skills. This is in line with some researchers who have suggested that exploration and exploitation require different organizational mindsets (Gupta et al., 2006), and have indicated that individual knowledge or a specific process are necessary to combine or switch between routines of exploration and exploitation. This research reported that contextual antecedents came from S Corp’s governance: the CEO promoted a new culture oriented towards innovation and spread the firm’s values and mission to all employees, making S Corp’s culture oriented towards long-term views in which innovation is a priority. This shows how contextual antecedents created a supportive context that allowed individuals to simultaneously handle ambidextrous requirements within the same function and even to succeed in dealing with the transitions between phases of sequential ambidexterity. This was in line with Raish et al. (2009), who argued that ambidexterity at a functional level might support a firm’s innovativeness through the individual ability to deal simultaneously or sequentially with innovation exploration and exploitation.
CHAPTER 13. CONCLUSION

This research has investigated three research questions: RQ1) How is purchasing made aware of innovation opportunities? RQ2) What motivates purchasing to contribute to innovation exploration? RQ3) How does the need for purchasing to balance exploitation and exploration call for new purchasing capabilities? The study has built upon the AMC framework and the analysis of two in-depth case studies to understand why and how purchasing contributes to innovation exploration and solve tensions between innovation exploration and innovation exploitation. This research has suggested various precedents enabling purchasing’s contribution to exploration, among which five major enablers are likely to be considered: 1) purchasing’s integration into business development, in addition to integration into R&D, 2) extrinsic incentives (technological shifts in the market), 3) a specific purchasing unit dedicated to exploration tasks full time, 4) new skills, such as purchasers’ experience and creativity, as well as mindset, as key factors influencing innovation exploration capabilities, and 5) purchasing ambidexterity as a capability to facilitate innovation exploration. This research suggests that these five factors are valuable for research purposes, because they do not appear in any literature on the field and might open future investigations into purchasing involvement in innovation exploration.

13.1 Theoretical implications

This research contributes to academic research in several ways. First, it supports the view of a possible contribution by the purchasing function in innovation exploration, while traditional thinking is to consider R&D as the main contributor (the “designed inside” model). A few publications report on the possible role purchasing plays in innovation, but this is mainly in a context of low-technological and low-market uncertainty. This study suggests that there is a need to distinguish four types of exploration which depend on degrees of uncertainty, in order to better differentiate the precedents to purchasing’s contribution to a certain type of exploitation. This means, for instance, that purchasing’s contribution to innovation exploration in conditions of low-market and low-technological uncertainty calls for a specific set of precedents (enablers) which are different from those needed to analyse purchasing’s contribution to innovation exploration in a context of high-market and high-technological uncertainty.

Second, this work highlights the need to expand and refine the understanding of purchasing integration with marketing and business development functions. This study has reported that purchasing integration is a strong enabler contributing to firms’ innovation exploration capabilities. This idea is supported as well by the notion of marketing and purchasing co-management synergies (Lindgreen et al., 2016). Co-management calls for continuous alignment of customer needs with supply network capabilities, sequentially or simultaneously (Wagner and Eggert, 2016), and provides a positive influence on the speed of product development (Gonzalez-Zapatero et al., 2017). This calls for inter-dependant tasks, specific processes, what scholars name “functional integration”, which refers to “intra-firm collaboration and information sharing activities” (Swink and Schoenherr, 2015). Gonzales-Zapatero et al. (2017) described functional integration as a bi-dimensional process, which needs shared and understood information as well as aligned decisions. This study highlighted that the purchasing function in charge of innovation exploration and business development functions were highly inter-connected, exchanging information about customer needs and suppliers’ capabilities. This provides an efficient stream of communication which improves the efficiency of the innovation exploration process within the supply market. These findings suit those raised by Information Processing Theory, in which scholars suggest that companies in a context of uncertainty must
organize themselves into specialized but inter-dependant sub-units and build information processes between sub-units to better deal with the uncertainty (Tushman and Nadler, 1978). These findings are also compatible with those by Gonzales-Zapatero et al. (2017), providing insights into the benefits of purchasing-marketing integration on product development. The benefits of this integration also concern the suppliers’ creativity and innovation capabilities (Schoenherr and Swink, 2012).

Third, this analysis suggested that bridging cognitive sciences and purchasing is relevant, because it might help to understand the drivers of decisions in purchasing. Cognitive sciences have been rarely used in purchasing, but this study confirmed that importing one of the frameworks to the purchasing field makes sense, mainly because we can use the constructs found in this field and apply them to purchasing context. This study demonstrated that the use of these constructs can support the creation of a rich framework supporting actions related to innovation exploration. For instance, this study emphasized that purchasing’s motivations to move towards innovation exploration are rarely intrinsic, which is in line with the cognitive science literature and the AMC framework (Chen and Miller, 2015) suggesting that managers of large corporations often complain that it is hard to induce their employees to be more innovative (Manso, 2011). This research indicates also that the AMC framework has good potential in the purchasing and supply management field to incorporate precedents for purchasing’s contribution to innovation exploration.

Fourth, this research reinforces the existing academic literature about purchasing ambidexterity. In Paper 3, it was suggested that the structural ambidexterity of purchasing at the organizational level is an efficient way to facilitate purchasing’s contribution to innovation exploration. This organizational design involves two factors: (1) a differentiated, autonomous, smaller unit which can more efficiently control exploration activities, and (2) infrastructural elements, i.e. incentives and organizational promotion of a valuable context to promote contextual ambidexterity. The effectiveness of organizational structure differentiation has already been found in the literature (Boumgarden et al., 2012). This suggestion was never confirmed in the purchasing field, and this case study has shed more light on how the purchasing function might better contribute to innovation exploration with a distinct and autonomous unit focused on exploration in addition to the traditional purchasing function focused on projects and category management. Paper 3 emphasized that this structure needs complementarities and strong links with the rest of the firm to achieve a balance in execution. For instance, it needs a very strong internal network. Linkages between explorative structures and the rest of the firm are ensured by a set of routines and directives, which can also be enhanced by resource sharing, coordination and control (Boumgarden et al, 2012). Looking at the findings of this research, it is suggested that the organizational structural differentiation enables purchasing’s contribution towards innovation exploration, but that it needs strong complementarities with other types of ambidexterity. Purchasers, if they deal with daily tasks as well as explorative tasks in the same time, are not efficient enough. At S Corp, we saw that the purchasing function needed to be at the heart of an ecosystem to succeed in explorative tasks. This confirms recent views from the literature (Gualandris et al., 2018). Additionally, this matches the need for a “smaller, more decentralized, and more flexible unit”, if companies want to better explore (Raish et al. 2009).

Another important contribution of this case study is that managerial ambidexterity is effective in combination with contextual ambidexterity to facilitate structural and sequential ambidexterity. Complementarities between managerial ambidexterity and contextual ambidexterity at the individual level enable better success in structural and sequential ambidexterity within the purchasing function. In this research, detailed in Paper 3, it was suggested that managerial ambidexterity is a type of ambidexterity in itself, which is not just dependent on managerial capabilities but needs to be considered together with other
ambi
dexterity types. Last, but not least about purchasing ambidexterity, this case study clarifies how contextual and managerial ambidexterity, i.e. individual levels, support sequential and structural ambidexterity, i.e. the organizational level. This case study calls for further research, to complement these findings through additional case studies. For instance, further research could focus again on the purchasing function, providing multiple levels of analysis and clarifying who ends up taking responsibility for managing the tensions between exploration and exploitation. Furthermore, some additional insights are necessary to examine in more depth the “Purchasing & Innovation” manager’s role as a “champion”.

Fifth, last but not least, this study reported also on new capabilities needed in purchasing to better contribute to innovation. From the purchasing skills perspective, the literature reports on traditional purchasing skills needed to execute operational and strategic purchasing tasks (Tassabehji and Moorhouse, 2008). Very few papers report on the need to adapt purchasing skills to those needed to explore innovations. This study has suggested new skills needed to involve purchasing in the innovation exploration process. This is in line with some recent studies (Project PERFECT and related conference publications done in 2018: see Bals et al., 2018), which confirm that the needs for new purchasing skills are evolving very fast.

13.2 Managerial implications

Companies face new challenges, ever new risks, digitalization, and fast-paced market changes. These “new global forces” are impacting business practices (Dobbs et al., 2015). The purchasing function must adapt, and innovation exploration is part of this adaptation. The four enablers presented above provide some insight to managers on how to facilitate purchasing’s contribution to innovation exploration. At first, our view offers to practitioners an opportunity to consider changing the purchasing operating model: involving purchasing in innovation exploration is a company-wide strategic transformation, which might provide a competitive advantage to the firm, but is also a challenge. Our study may help practitioners intending to shape, adapt or redesign their purchasing organizations to better explore innovations. For instance, we would encourage practitioners to modify their purchasing organization by setting up a specific unit to manage innovation exploration.

Second, considering these enablers, firms can start involving purchasing in advanced innovation projects. Managers can think of the way they integrate purchasing into other functions, meaning how they facilitate cross-disciplinary bridges so that purchasing can be involved in a better understanding on market needs. In doing so, they support purchasing to better tune sourcing strategies, and enhance internal purchasing collaboration and integration with business development. Consequently, purchasing can better explore innovations which are adapted to company needs.

Third, we found that the traditional approach to “innovate inside” is questionable. Of course, R&D and technical functions have still a large degree of control over innovations and product development, but working in silos is not an option for companies willing to maximize their chances to identify an innovation providing a competitive advantage. Purchasing has access to the existing supply base, and this function has capabilities to explore and to facilitate innovation exploration outside this supply base. Managers should invest in these capabilities, and let purchasing explore innovations, in particular when there are significant changes in the market needs, and when the firm faces technological uncertainties. In sum, we think that any improvement in purchasing’s contribution to innovation exploration might increase firms’ visibility, innovativeness and cross-disciplinary interactions.

Fourth, a purchasing organizational design is not unique, it depends a lot on firms’ maturity, sector, level of market uncertainty, level of supply market uncertainty, level of technological
uncertainty, etc. A unique model suggesting precedents to purchasing’s contribution to innovation exploration is useless. However, one of the findings of this study is that the use of 2 key contextual factors, i.e. 2 important moderators of purchasing’s contribution to innovation exploration, can help to adjust the model. Thus, one of the managerial contributions of this research is to use these 2 moderating factors to segregate 4 sets of precedents, supporting each type of exploration. According to the degree of uncertainty they are facing on a specific case, managers can adjust the set of precedents prior to engaging purchasing in a strong innovation exploration process.

Last but not least, managers are likely to implement new job positions in their organizations: they have recently started to post job offers describing “purchasing-innovation” positions, including an emphasis on an innovation mindset, innovation scouting and innovation detection. This is really new for purchasing positions. All of these job characteristics refer to innovation exploration. This motivates a better understanding of this recent trend from an academic perspective, because research is obviously running behind the industrial practices on this matter and could provide valuable managerial implications. Thus, this research can help practitioners to identify key capabilities, skills and motivations, in order to hire the best candidates.

13.3 Future research directions

This section presents potential directions for future research, based on various gaps found in the literature and the findings of this study. The investigation of these future topics could increase the academic knowledge of purchasing’s contribution to innovation and provide additional managerial implications. These opportunities are presented in the form of a list including key references which could help researchers to start investigating the field.

The need for a holistic investigation of purchasing’s role in innovation: The literature on purchasing has elaborated several ways to present purchasing’s involvement in innovation, and this has led to a better understanding of purchasing’s potential contribution. As key publications on the matter, this study has referred to seminal articles from Schiele (2010), Luzzini and Ronchi (2011), von Hartmann and Bengtsson (2015), Homfeldt et al. (2017), Legenvre and Gualandris (2018), etc. Combined, these studies provide an interesting research base, trying to demonstrate the outcomes of purchasing’s contribution to innovation. These scholars undertook in-depth cases or built on a quantitative approach to better generalize their findings prior to providing their propositions. This has helped to broaden our understanding of the field. However, the coherence seemingly found in existing publications is not apparent in most of the literature concerning purchasing’s role in innovation. From the limited role of purchasing agents (Weigand, 1968) to a potential strategic contribution to innovation (Schiele, 2010), the existing research does not provide a common view of purchasing’s role. The research has attempted to isolate the functional role but has overemphasized the firm’s and the supplier’s perspectives. Many other authors have developed and described “buying firm” roles or the “suppliers’ contribution to innovation”, examined “sourcing” or “knowledge acquisition” from external partners without mentioning purchasing. When cited, purchasing’s role is investigated widely in NPD, but not in other phases of innovation. Multiple theories and methodologies are involved, thereby reducing the transparency and linkages between studies.

Future research, therefore, could build on investigating a holistic view of purchasing’s contribution to innovation, focusing on the purchasing function as a unit of analysis. What is needed at this point is a theory-based approach that provides a consistent and deep understanding of purchasing’s role in innovation. To this end, future research could benefit from bridging the gap with fundamental theories, such as absorptive capacity theory (Cohen and Levinthal, 1990), using the evidence that purchasing is nowadays involved in all phases of
the strategic process, and consequently also in the innovation process. For instance, research might ground the conceptualization of purchasing’s role in innovation during the three distinct innovation phases: exploration, assimilation and exploitation.

The need for greater insight into purchasing’s contribution to the innovation exploration and absorption phases: The strong disequilibrium between the number of articles reporting on the innovation exploitation phase, assimilation phase and exploration phase, calls for future examination of the earlier phases of the innovation process. This is reinforced by the fact the exploration phase has been much more researched in the five past years, but still too few papers cover the topic. Although existing research identifies purchasing as a contributor to innovation (Luzzini et al, 2011), and more precisely to innovation exploration (Legenvre and Gualandris, 2018), there are still too few studies that investigate the role purchasing has in the early phases of innovation, exploration and acquisition, characterized by high market and technological uncertainty. Consistent with early studies (Miekelsen and Johnsen, 2018), future research might investigate why and how purchasing contributes to innovation under conditions of high technological uncertainty, aiming to explore underlying motivations, resources, skills, and specific capabilities needed to succeed in the innovation exploration and acquisition phases.

The need for links between antecedents, resources, and outcomes:
As a growing field, it is fundamental to better develop the understanding of the conditions leading to and the outcomes flowing from purchasing’s contribution to innovation. This study presented some key elements enabling the involvement of purchasing in innovation exploration: the list seems to grow after each publication. One way to better structure these findings would be to organize them using a multilevel approach, where the firm (as a center of decision making), the function (as a group within the firm), the individual (as a single position within the stakeholders) and the supply network (as a universe of potential partners) could be used as units of analysis. Such distinctions would provide clarity and structure to the investigation of this topic, mainly because it would highlight the numerous interactions and influences of each unit of analysis (Rothaermel and Hess, 2007). For instance, our study shows that past studies have neglected to consider the individual level and over-emphasized the understanding of the firm level (i.e. the “buying firm”). The literature has also neglected to investigate links between purchasing individuals’ and self-motivation towards innovation (i.e. purchasing individuals pursuing initiatives in various innovation phases), although some scholars have demonstrated that informal social interactions outside work boundaries have had a positive influence on innovation (Liu et al., 2017). Thus, future research could focus more deeply on purchasing from the individual perspective (the buyer/purchaser as a unit of analysis), and further consider how individual skills, background, self-interest, or a creative mindset could influence innovation through purchasing. For instance, an examination of work boundary theories is likely to be a good start to further explore how purchasing individuals could enable purchasing’s contribution to innovation.

In addition, future research should investigate in more depth how the purchasing function must be designed to better enable purchasing’s contribution to innovation. Although the literature has demonstrated that purchasing’s organizational design is a precondition to enable innovation, existing studies have failed to find a consensus on the best structure to facilitate all the phases of the innovation process and the transitions between them. The existing purchasing literature suggests that a distinct purchasing organization to explore innovation is more efficient than a single unit which does both exploration and exploitation tasks (Schiele, 2010), but little is known about the emergence and the settings of such organizations. This might be bridged with the stream of research about ambidexterity theory, which investigates the balance between exploration and exploitation phases. The literature on ambidexterity suggests that ambidextrous
firms have two distinct and autonomous units, one dealing with innovation exploration, another with innovation exploitation (Boumgarden et al., 2012). More precisely, future research could investigate how purchasing organizations could be shaped to align and balance exploration and exploitations activities, and to smoothen the transitions between innovation phases. Good starting points could be either the R&D literature on how the R&D function adapts to both explorative and exploitative tasks (Kuittinen et al., 2013), or the literature on ambidextrous organizations (Raish et al, 2009) or purchasing ambidexterity (Gualandris et al, 2018).

The development of a deeper understanding of the purchasing function’s contribution to innovation also requires additional research into the champion’s role (Maier et al., 2017). Existing theory on innovation has provided evidence that having a champion within the organization to deal with innovation exploration facilitates the detection and implementation of innovations (Howell and Higgins, 1990), but no literature exists on the role played by this specific position in purchasing. Thus, building on champion theory, scholars should investigate why and how the differentiated role of a champion might facilitate purchasing’s contribution to innovation. Further research might investigate personality characteristics, leadership behaviours, tactics and any other enablers that purchasing might develop to better contribute to innovation, starting from the extensive literature published on the topic in innovation theory.

Lastly, our study revealed the need for a continuous alignment between customer needs and supply network capabilities. However, I have found very few articles examining purchasing’s integration with marketing and business development functions, although it is highlighted as a very important enabler of innovation in a context of high uncertainty. This study has suggested concentrating future efforts in this direction, building upon Gonzales-Zapatero et al. (2017), who provided empirical evidence of the benefits of purchasing-marketing integration on innovation capabilities. To this aim, future research could look in more depth at purchasing integration with marketing and business development, building on organization-level absorptive capacity and the related interaction between individuals (Volberda et al., 2010). The examination of different constructs of absorptive capacity could help to link antecedents, resources, and outcomes of purchasing integration to marketing, by studying the effect of these interactions on innovation.

The need for the investigation of other contingent factors:
Firm size may be an additional moderator to consider when examining innovation performance (Camison et al, 2004, van Echtelt et al., 2007). The literature is not always aligned on the moderating effect of firm size. Some scholars have suggested that large firms have more advantages to develop innovations (Schumpeter, 1942; Dewar and Dutton, 1986; Pisano, 2015). In the opposite perspective, researchers argue that large firms may have more trouble to react and innovate in fast-paced environments where speed and agility are key success factors (Dougherty and Hardy, 1996; Stringer, 2000). Although the inclusion of this moderating factor is questionable, it could be included in a refined model after having checked its influence on purchasing’s contribution to innovation.

The need for considering public procurement as a means to broadening this review:
One of the limitations of this study is the absence of the consideration of public procurement within the scope of the selected articles. This study has focused its analysis on publications related to the private sector. Many interesting articles report on how public procurement contributes to innovation. Recent publications have investigated public procurement’s contribution to innovation, some of them focusing on SMEs (Saastamoinen et al., 2018), public procurement’s strategies fostering innovation (Patrucco et al, 2017), public procurement’s incentives towards innovation, and the role of intermediation (Edler and Yeow, 2016). Including such articles in a systematic literature review extended to public procurement could
create another perspective and provide better insights into purchasing’s and procurement’s motivations and capabilities.

13.4 Research limitations

This research encounters some limitations. First, the AMC framework suffers from a lack of credibility, reliability and validation in the literature (Schweig, 2015). It is difficult to limit the understanding of purchasing’s contribution to just three factors (A, M, C), and even more difficult to attempt generalizing, but this model can be used more broadly in the purchasing field. This study could open future avenues of research and attempts to empirically validate the AMC framework in purchasing.

Second, although we compared two cases in depth and succeeded in reporting key enablers, the number of cases studied is relatively small (only two). We might consider a testing process using a larger sample size and a quantitative approach. For instance, the impact of the firm size is not understood well enough. It could be a coincidence in our case that the largest firm was more mature in its innovation exploration: we may easily find counter examples. This relatively low number of cases makes the validity dependent on a specific context, or a specific sector. Of course, the aim of an explorative work like this and a qualitative approach does not aim for generalizability, but more cases would provide additional value.

Third, this study focused on the purchasing function without considering suppliers or the public sector: this choice has some consequences, such as reducing the literature in the PSM field in private sector.

All these limitations are well known, and Chapter 12 of this research has suggested some future avenues of research to investigate other directions which could mitigate them.
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APPENDIX

APPENDIX 1: Interview guide

Semi-structured interview guide

Themes explored:

- Purchasing awareness
- Purchasing capability
- Purchasing motivations
- New routes of sourcing
- Exploration/exploitation balance

Introduction: Hi, my name is François Constant and I am PhD candidate at Politecnico di Milano. Thank you for participating in this interview. I appreciate your help and the time you are giving me today.

- Introduce the purpose of the interview, general topics to be discussed, and the expected length of the interview (about 60-90 minutes).
- Define innovation. We’ll talk about incremental and radical innovations.
- Define exploitation/exploitation.
- Define technological uncertainty

I would like to ask your authorization to record this interview. I need to do so to analyse the data for research purposes. I guarantee complete confidentiality of the data collected, which will only be reported in anonymous form in research publications.

Interview guideline:

A. To begin, I would like to hear about the corporate culture in your firm. How is it turned towards innovation and creativity?
   Prompt ideas: how do you assess the level of failure acceptance in your organization? How do you support creative initiatives, and do you encourage the risk taken, even if the employee failed once?

B. Is your company more oriented towards incremental or radical innovations?
   Prompt ideas: how do you leverage on your internal R&D knowledge? How do you consider market and technological uncertainties?

Innovation process

C. Describe the innovation process in your firm.
   Prompt ideas: describe various process steps, such as idea exploration, idea identification, decision to integrate this idea, idea exploitation.
D. Who are the main stakeholders of this innovation process?
   Prompt ideas: who are the stakeholders of the innovation management system? Make sure to get exhaustive answers. Pay special attention to stakeholders’ activities. Who they are? How important are they and what about prioritization? What is their contribution? What do you do to bring them value back?

E. Describe purchasing’s contribution to technological innovation within your firm.
   Prompt ideas: is purchasing involved in R&D outsourcing activities? Is purchasing involved in the topic of IP and patenting?

F. Can you tell me how many innovations have been sourced from purchasing over last decade?
   Prompt ideas: Does purchasing have a special KPI to track innovations? What do you think about purchasing maturity in innovation sourcing?

G. Take an example of a product innovation in which purchasing contributed. Describe the innovation value, its degree of newness and its relative market uncertainty, as well as the purchasing’s contribution.

New Routes for sourcing innovation

H. Can you shape your supply network on this blank page, using circles, dots, ties, dotted lines and nodes? Please represent the existing network and outside stakeholders. Represent the boundary between the existing (well known) network and external stakeholders.
   Prompt ideas: first, position your own company in the centre. Then represent existing external partners in your supply network: suppliers, universities, start-ups, incubators, web communities, innovation clusters, etc. Third, highlight potential new partners, etc.
I. Where are innovation opportunities located in the overall network? Point them out on the previous map.  
*Prompt ideas: This can be also your own company.*

**Purchasing’s awareness**

J. Idea identification: How does purchasing identify potential innovative ideas within the supply network?  
*Prompt ideas: Where did you get inspiration from? How do you collect information from the outside world? How are you aware that this innovation exists (tools, processes...)? Where did you encounter this as part of your professional life? Personal life? Do you talk to people? Did one of your team member/employees brought up something that inspired it?*

K. How does purchasing identify opportunities outside your existing supply network?  
*Prompt ideas: talk about VISIBILITY (increasing visibility on the market). Exhibitions, fairs, trade shows, web, open-innovation platforms, innovation clusters, collaboration with consulting firms, idea management platforms, supplier roadmaps, supply market intelligence, etc...*

L. How do you manage innovation scouting among existing suppliers?  
*Prompt ideas: Do you proactively organize meetings with tier 1, 2 ... n suppliers to scout innovations? or do you attend industry meetings, do you involve suppliers in some of your internal events? Do you have special ranking systems for innovative suppliers?*

**Purchasing’s capabilities**

M. What type of knowledge and skills does purchasing need to contribute to the firm’s innovation?  
*Prompt ideas: you can classify these capabilities into three categories: organizational capabilities, individual capabilities, market capabilities (suppliers’ capabilities).*

N. What are the resources needed to succeed in innovation exploration outside the existing supply network?  
*Prompt ideas: resources can be internal or external, based on human skills or means of capital, related to organizational design/processes, specific unit to explore, different set of people, etc...*

O. What kind of special resources does purchasing need to manage the exploration of innovations  
*Prompt ideas: time allowed, budget, human resources…*

**Purchasing’s motivations**

P. How do you encourage purchasing to explore innovations?  
*Prompt ideas: what kind of incentives do you have to go for innovation exploration? Do you reward purchasing’s involvement in firm’s innovation process?*

Q. Does your corporate culture spread the “failure acceptance atmosphere” among managers?
R. What drives purchasing to investigate an innovation and suggest it to R&D?

Prompt ideas: How do you assess the potential impact of this innovation on your profit? Try to get at the cognitive micro-foundations of the entrepreneur’s decision-making process vis-à-vis innovation.

Balancing

S. How do you expect purchasing to balance exploration and exploitation activities?

Prompt ideas: do the same people respectively manage exploitation and exploration? Or do you have differentiated structures to explore innovation in purchasing department?

T. Let’s say the time allowed for purchasing is 100. Where would you say the time to explore new technologies stands today versus other tasks? 30/70? 40/60? 50/50?

U. Does your purchasing department suffer from tensions with other departments?

Prompt ideas: R&D? other purchasing entities? Marketing? Tensions within their own department because they struggle to do both exploration and exploitation?
## APPENDIX 2: Presentation of the Data analysis matrices (partial reproduction)

<table>
<thead>
<tr>
<th>AMC?</th>
<th>Code</th>
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<tbody>
<tr>
<td>A</td>
<td>Positionnement dans l'entreprise: Achats en contact avec l'extérieur</td>
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<tr>
<td></td>
<td>C'est notre rôle de dialoguer avec les clients et de vivre avec les clients, pratiquement un peu dans</td>
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<td></td>
<td>Achats en contact avec l'extérieur, donc bien placés pour connaître ce qui se fait dehors</td>
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<td>A</td>
<td>Innovations apportée par des fournisseurs traditionnels</td>
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<td>Visiblement la première source d'innovation venant de l'extérieur, mais sous-exploitée. &quot;Je</td>
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<td>peux aussi des dispositifs comme des poles de compétitivité, des organisations plutôt</td>
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<td>de compétitivité, des organisations plutôt</td>
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<td>institutionnelles telles que PactePME, DPI, etc.</td>
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<tr>
<td>A</td>
<td>Impliquer des prestataires externes pour identifier des innovations (research labs, private firms...)</td>
</tr>
<tr>
<td></td>
<td>Appel à projet sur la plateforme de &quot;PACTE PME&quot;</td>
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<tr>
<td>A</td>
<td>Networking interne</td>
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<tr>
<td>A</td>
<td>Innovation découverte durant les tech days avec les fournisseurs</td>
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<td>A</td>
<td>Expositions</td>
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<td></td>
<td>Méfiance relative à l'égard des achats qui ne pourraient pas suffisamment identifier des</td>
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<td></td>
<td>innovations lors des visites de salons</td>
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<td>A</td>
<td>Appel à compétence via l'expression de besoins fonctionnels sur des plateformes open innovation.</td>
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<td>Autant le département &quot;stratégie et innovation&quot; est impliqué dans certains clusters notamment</td>
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<td>A</td>
<td>Outils IT</td>
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<td>Présence dans les écosystèmes</td>
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<td>A</td>
<td>Périmètre d'action</td>
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<td>A</td>
<td>Entretenir des relations informelles avec le fournisseur</td>
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<td>AMC?</td>
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<td>M</td>
<td>Culture &quot;innovation&quot; de l'entreprise</td>
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<td>M</td>
<td>Les achats suivent la stratégie groupe (gouvernance et impulsion du CEO)</td>
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<td>M</td>
<td>Le marché tire vers les innovations</td>
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<td>M</td>
<td>Les achats veulent contribuer au business et influencer</td>
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<td>Les achats doivent sourcer une innovation venant de la R&amp;D interne</td>
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<td>Obtenir des innovations de nos fournisseurs</td>
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<td>Chercher au-delà des fournisseurs existants</td>
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<td>Gains court terme</td>
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<td>M</td>
<td>Augmenter la visibilité sur le business</td>
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<td>M</td>
<td>Obtenir des contrats long terme</td>
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<td>Les achats sont sollicités par un autre dept</td>
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<td>atteindre un objectif KPI</td>
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<td>Obtenir plus de reconnaissance interne</td>
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<td>Intérêt personnel</td>
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<td>Incitations individuelles : bonus, prime</td>
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<td>M</td>
<td>Optimiser les ressources de l'entreprise</td>
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</table>
Moi j’anime un core team, une espèce de groupe et éventuellement aussi avec les autres travers de toutes les organisations achats du groupe et éventuellement aussi avec les autres. Mettre en place une communauté et l’animer au niveau de l’entreprise, ce qui est une vraie intimité technique et avec qui on a une vraie intimité technique, avec qui on a une vrai
## Thèmes émergents

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<td>Perret</td>
<td>Goutay</td>
<td>Dos Santos</td>
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<tr>
<td>Purchasing Director - Co-Innovation</td>
<td>Stratégie et Innovation &amp; new businesses development</td>
<td>Strategy &amp; Innovation Purchasing Director BU</td>
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</tbody>
</table>

### (C) Les achats innovations sont vus comme un processus unifiatif. On doit déterminer l’innovation, d’ôter et de la transformer par le partenaire. On n’est pas les seuls à déterminer mais on doit déterminer 2 ! On doit challenger l’adoption c’est à dire que notre job c’est de pousser les innovatifs, qu’on découvre auprès des fournisseurs stratégiques traditionnels.

### (C) La mise en place de la fonction achats innovation intervient dans un contexte de virage stratégique où SE a un nouveau patron orienté innovation plutôt que performance, et aussi se rend compte que les fournisseurs peuvent contribuer fortement à l’innovation.

### (M) La nécessité d’un cycle de vie occupé en activités distinctes, dont une très amont, qui correspond à la phase d’exploration technologique et l’exploitation technologique. On n’a pas encore de flotté produit, on n’a pas de projet ouvert, on ne sait pas encore où on va faire mais on sait que c’est quelque part il faut trouver de la techno même disruptive sur le marché.

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## APPENDIX 4: Display of the final matrices showing the main patterns of findings

<table>
<thead>
<tr>
<th>Detailed Patterns</th>
<th>Emerging Patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/ Increase the influence of the Purchasing function within the firm&lt;br&gt;2/ Richness of the supply network (active + potential partners)&lt;br&gt;3/ Institutional knowledge and self-interest in different markets&lt;br&gt;4/ Specific purchasing unit dedicated to innovation (organizational design)&lt;br&gt;5/ Institutionalization of a new purchasing role (e.g. champion's role)&lt;br&gt;6/ Implementation of specific tools/processes to listen to suppliers and assess suppliers' innovative suggestions.&lt;br&gt;7/ Implementation of specific tools/processes to listen to suppliers and assess suppliers' innovative suggestions.&lt;br&gt;8/ Use of scouting systems, and e-sourcing services.</td>
<td>1/ Natural tendency to go beyond project boundaries&lt;br&gt;2/ Creativity, curiosity, individual experience&lt;br&gt;3/ Individual informal social networking activities outside of the workplace&lt;br&gt;4/ Ability to listen to others (suppliers), to &quot;smell&quot; the invention (and its innovativeness potential)&lt;br&gt;5/ Sense of working without knowing what is searched (functionality, etc.)&lt;br&gt;6/ Soft skills: ability to create and sustain partnerships. No longer only hard transactional skills&lt;br&gt;7/ &quot;Business development&quot; orientation, more than &quot;technology development&quot;&lt;br&gt;8/ No technological expertise (i.e category management), but more an innovation development mindset.</td>
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</tr>
<tr>
<td>1/ Specific purchasing unit dedicated to innovation (organizational design)&lt;br&gt;2/ Capability to manage exploitation/assimilation/exploitation phases (ambidexterity)&lt;br&gt;3/ Ability to manage tensions created by purchasing involvement into innovation-related topics (with other functions)&lt;br&gt;4/ Ability to manage tensions created by purchasing involvement into innovation-related topics (with other functions)&lt;br&gt;5/ Ability to challenge the assimilation phase (i.e. convince other internal departments to adopt an innovation) and to support the adoption.</td>
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APPENDIX 5 : Paper 1

Purchasing contribution to innovation: A systematic literature review and future research directions

François Constant¹, Thomas E. Johnsen²

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This paper investigates the contributions of the purchasing function to innovation. In particular, we focus on the motivations and capabilities of the purchasing function to contribute to innovation. The paper is based on a systematic literature review of 74 peer-reviewed publications across disciplines, published between 1976 and 2018. We analyse the literature identifying purchasing motivations and capabilities during the innovation phases of exploring, assimilating and exploiting. We identify three precedents of purchasing contribution to innovation: first, purchasing organizational design; second, purchasing integration with other internal functions; third, a champion and boundary-spanning role. Our analysis of the extant literature results in the identification of two gaps in current research. The first gap is a lack of research on purchasing contribution to innovation to innovation exploration. The second gap is a lack of research on the micro level of individual purchasing skills and competences required for purchasing employees to effectively contribute to innovation within firms. The paper concludes by outlining future avenues of research that include the investigation of individual skills to explore innovation, purchasing function work boundaries, purchasing integration to marketing function, and studying firm size as a contingent effect.

1. Introduction

In the 1990s scholars started to demonstrate that innovations can be acquired from outside the firm (Cohen and Levinthal, 1990; Teece et al, 1997) and that firms acquire knowledge and technology from external suppliers (Yan and Azadegan, 2017, Henke and Zhang, 2010; Lau et al., 2010). External sources include suppliers that are now considered as sources of innovation and competitive advantage (West and Bogers, 2014, Narasimhan and Narayanan, 2013; Schiele, 2010; Li and Vanhaverbeke, 2009; Grimpe and Sofka, 2009). Companies “need to excel at capturing innovation opportunities with existing and potential supply chain members” (Legenvre and Gualandris, 2018, p. 95).

Where the attention is traditionally on the R&D function’s role in capturing sources of innovation, recent research has shifted the focus to how the purchasing function can contribute to innovation. Despite the perception of purchasing as purely a cost-saving function, research shows that innovation is now viewed as the second most important challenge for purchasing
The purchasing function is uniquely positioned to perform a boundary spanning role that enable it to access technology and knowledge through supplier relationships and networks. Leveraging on its role to effectively manage the supply base (Monczka et al., 2010), purchasing can, for example, screen a firm’s supply network, have informal discussions with suppliers, participate in joint supplier events and use internet platforms to collaborate with suppliers (Winter and Lasch, 2011).

However, traditional studies perceive “purchasing’s concern for innovativeness is a far cry from its former role” (Gadde and Håkansson, 1994, pp34). An important stream of literature reports that purchasing is a neglected function as far as contributing to firm's innovativeness and new product development (NPD) is concerned (Schiele, 2006). Even the most recent research suggests that purchasing has a limited contribution to innovation: purchasing is rarely seen as a real technology importer (Melander, 2014), and purchasing is not seen as a key contributor in innovation exploration (Gualandris et al, 2018).

The last decade or so has seen an increasing interest in the role of purchasing in innovation. Schiele (2010) introduced the concept of the “dual role of purchasing”, and presented purchasing’s involvement in innovation development. Recent attempts related to purchasing’s contribution to innovation have focused on project management (Borges et al, 2017), NPD (Van Echtelt et al., 2008, Gonzalez-Zapatero, 2016); early supplier involvement (ESI) (Johnsen, 2009), supplier collaboration (Patrullo et al., 2017; Kähkönen, 2017), innovation outsourcing (Un C, 2017) and open innovation (Brunswicker, 2015). Little research has analysed purchasing contribution to innovation, although purchasing is the common interface with supply base (Araujo et al., 1999) which is known to be the most proficient external source of ideas (Laursen and Salter, 2006). This gap is confirmed by most recent publications highlighting the need to better understand the role of purchasing in contributing to the management of innovation projects (Mikkelsen and Johnsen, 2018). There is no consensus about the adequate base theory involved in research on this matter and in our research we have found various theoretical perspectives: Patrullo et al. (2017) built on Resource Based View, Pihlajamaa et al. (2017) on Absorptive Capacity, van Echtelt et al. (2007) on Resource Dependency Theory, Melander and Lakemond (2015) on Transaction Costs, etc. Moreover, the literature builds on various concepts of innovation, considering neither the degree of uncertainty nor the type of the innovation: architectural innovation, radical innovation (Legenvre and Gualandris, 2018), incremental innovation, discontinuous innovation (Picaud, 2016) which needs to be considered as well in our analysis at some point.

Several systematic literature reviews have been published in purchasing and supply management or technology sourcing related fields, such as supplier involvement in NPD and innovation (Johnsen, 2009), sourcing and acquiring innovation through open innovation (Dahlander and Gann, 2010); leveraging on external sources to source innovation (West and Bogers, 2014), or sourcing innovation through alliances and joint ventures (Gnekpe and Coeureroy, 2017), but none of them analyse purchasing function contribution to innovation.

The aim of this paper is threefold. First, we systematically review the literature related to purchasing’s contribution to innovation, focusing on purchasing motivations and capabilities. Second, we analyse the literature to identify activities and processes that facilitate purchasing’s contribution to different phases of innovation (exploration, assimilation and exploitation). Third, we analyse the contingencies that drive the need for purchasing contribution to innovation.

We first introduce our initial conceptual model that formed the basis of our systematic literature review. Then we present the method we adopted to synthetize, code and analyse the literature.
The last sections report on the findings from the systematic literature review and a refined conceptual model is suggested. We conclude the paper by proposing new avenues for research.

2. A conceptual model for studying purchasing contribution to innovation

2.1. Innovation: an absorptive capacity perspective

When investigating innovation-related fields, the use of the concept of innovation cannot stay at a generic level because it still suffers from clarity in its definitions (Garcia and Calentone, 2002). We build on the definition of an innovation as “an iterative process initiated by the perception of a new market and/or new service opportunity for a technology-based invention which leads to development, production, and marketing tasks striving for the commercial success of the invention” (Garcia and Calentone, 2002).

A firm’s ability to access innovations from external sources depends on its absorptive capacity: “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal 1990, p. 128). Absorptive capacity defined by Cohen and Levinthal or by more recent publications in the field (Todorova and Durisin, 2007; Zahra and George, 2002) takes for granted that the innovation is well known when entering the absorption process. Purchasing contribution to innovation is likely to start before the absorption phase, because purchasing can implement innovation scouting activities. Some scholars studied the earliest stages of innovation in their model: innovation might be identified from existing or potential supply chain members, then accessed and finally leveraged (Linder et al., 2003). Therefore, we need to complement Cohen and Levinthal’s process by adding one more phase representing the innovation screening and discovery/identification phase, the “exploration phase”. Thus, we consider innovation as a process made of three sequential phases: innovation exploration, assimilation and exploitation.

Innovation exploration is defined as the ability to generate ideas that create customer value (Narasimhan and Narayanan, 2013). This involves scouting for unfamiliar, distant and remote knowledge (Ahuja and Lampert, 2001; Rosenkopf and Nerkar, 2001; Nerkar, 2003) and innovation detection. It includes also innovation value recognition (Cohen and Levinthal, 1990). It refers to scouting innovations outside the existing supply base and calls for distant search with the new capabilities, bringing opportunities to the firm in achieving new-to-the-world innovations (Nerkar and Roberts, 2004). This phase includes also innovation value recognition which is about valuing the opportunity, seizing and understanding the potential of an innovation (Todorova and Durisin, 2007).

Innovation assimilation comes after innovation exploration, and constitutes a prerequisite to innovation exploitation. Innovation assimilation is a critical stage. No matter the great potential of an innovation, if the firm is unable to assimilate it, the work to explore and recognize its value will be in vain. Assimilation represents a firm’s capability to absorb the innovation without transforming it, or a firm’s ability to adapt the internal context and to transform the innovation before exploiting it (Zahra and George, 2002). It includes the decision phase, during which the firm decides to invest resources to exploit the innovation.

Last, innovation exploitation consists in benefiting from the innovation and commercializing it: exploiting the innovation means using it through a project or developing a new product. The ultimate goal of the innovation process is the commercialization.

2.2. Purchasing contribution to innovation
Purchasing will not contribute to any innovation if it is not motivated (i.e. incentivized) and capable to contribute. “To contribute to” is an action, a move towards a potential benefit in return. Any action is naturally enabled by various precedents: an extensive literature examines the reasons why an action occurs, reporting that an action is enabled by “the extent of awareness, the level of motivation, and, finally, the capability to respond” (Livengood and Reger, 2010). In our case, purchasing will contribute to innovation if it is aware, motivated and capable to contribute to the three phases of the innovation process. Cohen and Levinthal (1990) considered awareness as a capability that individual must possess: “critical knowledge includes awareness of where useful complementary expertise resides within and outside the organization” (Cohen and Levinthal, 1990, p133). We therefore consider awareness as a capability under the same type of enabling factor, focusing only on motivations and capabilities to contribute to innovation in three main stages (innovation exploration, assimilation and exploitation). Thus, we shaped out model positioning the two constructs (purchasing motivations and purchasing capabilities) in the left side of the framework.

We aim to investigate the three following research questions:

a) Why is purchasing motivated to contribute to innovation?
b) What capabilities does purchasing need to contribute to innovation?
c) What distinct processes does purchasing implement to contribute to innovation exploration, innovation assimilation and innovation exploitation?

Our initial conceptual framework is shown in Figure 2.
2.3. Purchasing motivations to contribute to innovation

We raise a first question to examine “why” purchasing is motivated to contribute to innovation, meaning we aim to better understand motivations fostering purchasing contribution to innovation. Motivations reflects the incentives to acquire and use specific skills and abilities (Locke and Latham, 2004). Purchasing motivation here represents purchasing’s willingness to contribute to innovation. Motivation can be intrinsic (individual, cultural), organizational (incentives within a firm or an organization), or extrinsic (market changes or external incentives) (Chen and Miller, 2015).

It is accepted in the literature that purchasing first objective is cost optimisation and value creation. Purchasing motivation to contribute to innovation will be naturally exacerbated if contributing to innovation facilitates the ability to reach these targets. For instance, contributing to innovation will provide purchasing the opportunity to influence product design decisions and consequently to improve design-to-cost. Also, considering purchasing has a premium view on external opportunities, contributing to innovation could facilitate the identification of opportunities from existing or potential suppliers that can be captured, leveraged, enabling purchasing to increase its strategic influence within the firm. We can think of a large list of reasons, making purchasing motivated to contribute to innovation.

To better enable purchasing’ willingness to contribute to innovation, firms can set up moderately challenging goals assignment, and moderately specific goals by purchasing management. Explicit incentives, such as bonuses and rewards, may motivate purchasing to create market opportunities to source innovation (Amabile et al., 1996). Motivation can be also exacerbated by the intrinsic interests in different technologies (Gimeno, 1999). Implementation of “innovation champions”, i.e. managers intensely interested in new ideas, can spread enthusiasm to other employees and motivate (Gemünden et al., 2007). Motivation is widely influenced by organizational culture: attitude towards risk taking (Kyriakopoulos et al., 2016) and creativity in a context of high technological uncertainty facilitates innovativeness (Slater et al., 2014; O’Connor and Ayers, 2005).

2.4. Purchasing capabilities to contribute to innovation

Our second question relates to capabilities, defined as “a collection of knowledge, skills, abilities, processes and other characteristics that are needed for effective performance in the jobs in question” (Campion et al., 2011). This refers to the definition of core capabilities which is described as “a set of differentiated skills, complementary assets, and routines that provide the basis for a firm’s competitive capacities and sustainable advantage in a particular business” (Teece et al., 1990). By this way, we first consider capabilities from within-organisation perspective, processes and managerial systems (Leonard-Barton, 1992) implemented to support purchasing contribution to innovation. For instance, this includes the consideration of purchasing budget and policies for innovation search (Pihlajamaa, 2017). Absorptive Capacity literature suggests that organizational mechanisms facilitate the absorption of an innovation, such as functional centralization, internal networks and cross-functional interfaces (Cohen and Leinthal, 1990). More recent studies present purchasing capability to work closely with other functions and clients as a purchasing capability to explore innovation (Legenvre and Gualandris, 2018). Second, we build on scholars who consider also resources coming from outside the firm, i.e. a rich business environment is a capability (Chen and Miller, 2015). This includes how suppliers are integrated, how purchasing performs in the “assimilation and dissemination of information on suppliers and markets and [its] relationship-building capabilities” (Quintens et al., 2006). Purchasing can access suppliers’ innovations by screening a firm’s supply network, having informal discussions with suppliers, participating in joint
events, such as supplier days or innovation clusters, and using an internet platform (Winter and Lasch, 2011). Relationship-building capabilities are also relevant in our case, when considering close partnerships on new product development and innovation (Cavusgil and Zou, 1994).

2.5. Uncertainty as a contingent factor

Whereas motivation and capabilities are key enablers to purchasing contribution to innovation, a critical question is whether it is enough for purchasing to simply get incentives and implement processes to make it happen. We argue that purchasing contribution to innovation is more complex than a simple enactment of these practices. Keeping wide open the scope of our analysis to all possible types of innovations calls for the consideration of contingent factors related to technological and market uncertainty in the relationship between motivations, capabilities and purchasing contribution to innovation. For instance, purchasing can support the co-development of an innovation “designed inside” by internal R&D under low business uncertainty, can source and acquire “finished, turnkey” innovation from any external partner including start-ups under high technological and market uncertainty, can procure inventions directly from their inventors under high technological uncertainty, can search for an innovation responding to a customer pain, etc. All these cases have a specific market/technological level of uncertainty. This goes along with a distinction between incremental innovations, radical and architectural innovations. We assume that the search for “turnkey innovations” in the supply base (which are often more radical) may require different approaches than those needed to co-develop an innovation in collaboration with a supplier in a context of NPD. Here, high market/technological uncertainty is characterized by a high degree of novelty for the buying firm and its market with regards to the product functionality, architecture, or manufacturing technologies used. Oppositely, low market uncertainty is regarded as involving less innovative products because it calls for slight adaptations of a firm’s existing product. A clear stream of research suggests that when firms evolve under high technological uncertainty, they will preferably use their internal capabilities to develop innovations rather than rely on suppliers (Oh and Rhee, 2008), means that purchasing contribution is limited to exploitation Our work aim to put some clarification on this. Thus, we posit that the relevance of motivations and capabilities on purchasing contribution to innovation is contingent upon technological and market uncertainty.

3. Method

In this paper we systematically review the existing research on purchasing contribution to innovation. We follow the process proposed by Durach et al. (2017) to ensure a structured process of literature searching, screening, and reporting. The key interest of using Durach et al. (2017) methodology is that it provides a specific process adapted to supply chain related fields. The framework for systematic literature review by Durach et al (2017) is a continuous refinement of a conceptual model, starting from an initial framework proposition and resulting in a revised model. Durach’s process is based on six steps. We implemented these six steps as following:

Step 1 consisted in defining the research questions and the initial conceptual framework presented above.

Step 2, we determined the set of data needed to be extracted from the selected articles. These data are of two types: the descriptive data, and the data derived from the conceptual framework presented above (Appendix A).
Step 3 consisted in a structured and rigorous screening within existing literature, using keywords search. We relied on SCOPUS search engine to filter relevant papers responding to these keywords (Appendix B). At this stage it is important to consider that our paper is a review of existing literature and investigates purchasing contribution to innovation, from any type and any degree without distinction. We thought it was appropriate to keep the focus on the widest definition of an innovation, meaning that we have considered innovations that are new to the firm, to the world, innovations concerning product, process and business model. Considering any type and any degree of innovation in our scope allows us to embrace the widest range of motivations and capabilities. But, to keep a good traceability, we recorded the degree and the type of innovation, to see whether they constitute a contingent factor for motivations and capabilities in our model. We assume motivations and capabilities are contingent to the context studied, because the literature suggests that “obtaining innovations includes searching, enabling, filtering and acquiring, each category with its own specific set of mechanisms and conditions” (West and Bogers, 2014). Also, during the paper selection, we do not add any sectorial constraint: innovation in all sectors, including public procurement, are included to the scope, so that we can highlight bridges between the articles analysed. We retrieved first a preliminary sample of 1139 articles which reflected this keyword search.

Step 4a is a filtering process where quality and relevance checks were applied. Quality check excluded the articles that are not published in journals registered within ABS ranking. Although the use of any journal ranking as an indicator of quality can be questioned, the ABS ranking still represents a proxy of research rigor and quality. In the same phase, we excluded conference papers and journal articles different from business and engineering fields, focusing on those written in English language. After this quality check, we have narrowed down our list of articles to 545 articles.

Fig 3: Systematic literature review article selection process
Step 4b is a relevance check which consisted in reading abstracts and applying inclusion/exclusion criteria to determine whether each article related to the study. We have kept publications reporting on purchasing only, and we excluded articles referring to close fields such as supplier relationships, supply networks and supply chain management, in the case they did not specifically refer to purchasing or procurement. Before excluding an article, we performed one more relevance check to validate the exclusion decision, by reading the core text a second time. We read progressively the remaining articles, and we ended up to 74 key articles. An overview of these selected articles is shown in Appendix D including basic attributes of these papers: article title, authors’ names, journal name and ranking, year of publication, base theory, unit of analysis and research method.

Step 5 is the analysis and coding phase. According to Durach et al. (2017), the aim of this phase is to find interesting patterns. The idea behind coding is to develop “schemes” to extract relevant details from the papers under focus and to refine the theoretical model based on evidence from the base articles. As suggested by Durach et al. (2017), we proceeded to two parallel coding structures: (1) one for synthesizing the articles by extracting simple descriptive data such as research methodology and type, theoretical lens, unit of analysis; (2) one to investigate the relationship between variables in the initial framework (“why” and “how”), so called “thematic findings”. This classification has been used to develop an initial list of motivations and capabilities. The coding process has been doubled, i.e. conducted by two people, in order to increase its validity: two coders read the selected articles and extracted codes in two separate reading processes. The two final lists of codes were then consolidated in a single database, in which the code duplications were removed, resulting in a common list of unique codes and a single database of articles (see Table 1 below).

### Table 1 – Codes for research about purchasing contribution to innovation

<table>
<thead>
<tr>
<th>Codes</th>
<th>Definition</th>
<th>Representative articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market changes</td>
<td>Market changes and forces to source change in key innovation</td>
<td>Dumas et al. (2015), Williams and Smith (2005)</td>
</tr>
<tr>
<td>Looking outside boundaries</td>
<td>To benefit from the innovation capability of non-traditional suppliers and start-ups</td>
<td>Horvath et al. (2017), Billing and Davidson (2015)</td>
</tr>
<tr>
<td>Short-term NPD gains</td>
<td>Short-term product development gains, costs, quality, speed, time to costs</td>
<td>Holstein et al. (2014), Constand and Holle (2005)</td>
</tr>
<tr>
<td>Attraction by suppliers in new</td>
<td>Increase accessibility to suppliers’ innovation</td>
<td>Mathe and Laamanen (2015), Trachtenberg et al. (2017)</td>
</tr>
<tr>
<td>Business viability</td>
<td>Increase availability in the firm’s business and technology roadmap</td>
<td>Patrucco et al. (2017), Makulak and Johnson (2018)</td>
</tr>
<tr>
<td>Long-term contracts</td>
<td>Innovation as a driver to contract long-term relationship with supplier</td>
<td>Jorndt and van Weste (2015)</td>
</tr>
<tr>
<td>Temporal governance</td>
<td>Firm imposes governance, culture, values, corporate strategy</td>
<td>Schobe et al. (2016), Gonzalez-Padron et al. (2006)</td>
</tr>
<tr>
<td>Purchasing strategy</td>
<td>Strong purchasing strategy (such contribution to strategic and inform processes)</td>
<td>Wysoczanski (2002), Hermann and Revis (2012)</td>
</tr>
<tr>
<td>Purchasing power</td>
<td>Strong purchasing power, and involvement in product development</td>
<td>Tracey and Dyne (2012), Schiele (2015)</td>
</tr>
<tr>
<td>Strategic importance</td>
<td>Purchasing support and involvement by another department in designed innovation</td>
<td>Legg and Suchardt (2013), Tschakaloff et al. (2017)</td>
</tr>
<tr>
<td>Professionalism</td>
<td>One or more participating to strategic function</td>
<td>Pfitscher et al. (2017), Patrucco et al. (2017)</td>
</tr>
<tr>
<td>Institutional insiders</td>
<td>One or more participating to strategic function</td>
<td>Molot and Sears (2018), Schiele et al. (2015)</td>
</tr>
<tr>
<td>Individual knowledge and</td>
<td>One or more participating to strategic function</td>
<td>van Schie et al. (2007), Besemer-Dzepetan et al. (2016).</td>
</tr>
<tr>
<td>Individual incentives</td>
<td>One or more participating to strategic function</td>
<td></td>
</tr>
</tbody>
</table>

Step 6 is about classifying the articles and presenting the results. We have developed two systems of classification: we first adopted a multilevel approach of motivations and capabilities (individual/firm/network levels) based on Rothaermel and Hess (2007). This might provide us...
a distinction of the nature of the motivations and capabilities. This classification also supports studies built on absorptive capacity approach: Volberda et al (2010) suggest that “absorptive capacity is a multilevel construct and should be studied at the individual, unit, firm, and interfirm level of analysis” (Volberda et al., 2010, p937). The second system of classification is based on the different phases of the innovation process following the three stages presented above: innovation exploration, assimilation, exploitation.

4. Findings

4.1. Descriptive findings

We can see an obvious increase of the quantity of articles published in the last decade (Fig 3), while very few papers were published before 2009. In total 32 journals have reported on purchasing contribution to innovation since 1976. Our analysis shows that only 7 journals out of 32 offered more opportunities for publications about the topic in the past 7 years than the other journals, because they have published most of the articles (they are marked in green in Appendix E). Four different academic fields have published at least one article about the topic. The first, the most fruitful source of papers mentioning purchasing contribution to innovation is from the field of Operations Management, with 20 articles (27%). The second is the field focused on Marketing with 17 articles (23%), the third is Purchasing and Supply Chain Management, with 15 articles (19.5%). The fourth belongs to the Innovation-related field, with 14 articles (19%). Last, the fifth source is made of journals from General Management and Economics field, with 10 articles (13.5%).

We have found 74% of the articles reporting on purchasing motivations and 91% examining capabilities. Most of them investigated the firm level (63%), and very few articles studied cases at the individual level (fig 5).

Considering the innovation phase, almost 68 articles out of 74 (92%) focus on the innovation exploitation phase (fig 6). If we consider articles involving innovation exploration phase, we can find only 9 articles, and notably all these articles have been published since 2011 (Appendix C). The number of articles reporting on the innovation assimilation phase is not high neither, with 17 articles out of 74 (23%), which still does not represent a large stream of research.
We have found about 40% of the selected papers relying on one or more base theory, the rest (60%) does not consider any type of theoretical frame. This result should be compared with findings from other literature reviews in PSM or SCM fields: Chicksand et al. (2012) found 40% of the total papers (from both PSM and SCM fields) theoretically grounded. Spina et al. (2016) found only 10% of the full sample (PSM field only) involving one or more grand theories from management, economics and other social sciences. Overall, the most frequent theories mentioned are TCE, RBV and Social exchange theory. If we filter out all journals but those related to PSM and SCM, our result matches with Chicksand et al. (2012). Looking in more depth at the type of journals and their rankings, an interesting pattern emerges. Most of the articles published on purchasing contribution to innovation are published in journals ranked 2 or 3. The better is the ranking, the more articles are grounded theoretically. That means that researchers willing to publish about this topic, and targeting high ranked journals, have to build their article onto a strong base theory to increase their chances to be reviewed.

Fig 5 – Count of articles reporting on motivations and/or capabilities within the selected list of 74

Fig 6: count of papers about purchasing contribution to innovation according to innovation phases

4.2. Purchasing motivations to contribute to innovation

a) **Motivations to explore:** The scarcity of internal knowledge motivates naturally the consideration of external partners, who provide an access to opportunities for many more strategically significant innovations than companies could achieve alone from exploiting internal resources (Hartmann et al., 2012). To identify these partners, exploration phase entails specific motivations, Pihlajamaa et al. (2017) suggested that purchasing motivations come from
the setting of moderately challenging goals assignment, and moderately specific goals (Pihlajamaa et al., 2017), enabling the exploration. One strong motivation is the strategic pressure purchasing can receive, in case the firm has demanding expectations to source innovations from external partners (Wynstra et al., 2003; Hartmann et al., 2012). Purchasing can have cross-functional incentives to start exploring, such as being invited by other departments to take part of the development of technology and marketing roadmaps, providing support in innovation exploration (Legenvre and Gualandris, 2018) or being nominated by the organization to implement open innovation (Maier et al., 2017). Purchasing can gain motivation to contribute to innovation exploration because of the willingness to increase department status within the organization, or to increase its strategic influence (Luzzini and Ronchi, 2011). Scouting for innovations may be an important task during new product developments characterized by high degree of uncertainty: purchasing might be involved in advanced sourcing phases.

Motivation can emerge from individual knowledge and self-interest to create market opportunities to source innovation (van Echtelt et al., 2007), or individual willingness to enlarge work boundaries through informal social networking activities outside of the workplace (Liu et al., 2017). Purchasing function can be in a quest for a better recognition within the firm (Luzzini and Ronchi, 2011), using innovation as a mean to increase its influence. Increase the visibility of firm’s business and technology road maps.

Incentives to explore can come from outside the firm, when market changes call for sourcing innovation (Williams and Smith, 1990; Gonzalez-Zapatero et al., 2013), or when purchasing is tempted by an innovation identified far outside the firm’s current boundaries (Homfeldt et al., 2017).

b) Motivations to assimilate: At this stage, the innovation opportunity is well identified, and purchasing has recognized its value (i.e. its benefit for the firm) during the exploration phase. Now the next step is to bring the innovation into the firm. Possibly, purchasing is convinced by the great potential of the innovation but has no support to bring it into the firm. In this case the assimilation is hardly feasible. Assimilation, as Cohen and Levinthal’s suggested, may be done by adapting the internal context and keeping the innovation found turnkey in the supply base, or through transforming the innovation before exploiting it (Zahra and George, 2002). Both cases call for different purchasing motivations. Acquiring a turnkey innovation will likely speed up the innovation process and reduce the time-to-market, because acquiring a turnkey innovation avoids developing it in house but needs adaptation in most of the cases. Literature present cases where these innovations come from start-ups, who help to increase competence base, stimulate creativity and capability for generating new ideas for competitive advantage (Homfeldt et al., 2017) and can often provide disruptive innovations. Purchasing contribution to innovation can be motivated by the set of clear objectives towards innovation acquisition, but pre-conditions have to be met, such as purchasing involvement in innovation processes, participation to organization’s improvement programs, and a long-term focus strategy (Patrucco et al., 2017). Acquisition implies difficulties of the assimilation into the buying firm, for instance the “not designed here” syndrome, and might kill purchasing motivations in case purchasing does not have a strong position within the firm (Moge and Bean, 1976; Patrucco et al., 2017).

c) Motivations to exploit: Motivations here relate to cost reduction, quality improvement, development time reduction (Hüttinger et al, 2014; Homfeldt et al., 2017; Bengtsson et al., 2013), or examine purchasing sourcing process cycle time reduction (Gonzalez-Padron et al., 2008). This phase is characterized by low technological and market uncertainty, and exploitation concerns activities belonging to project and product development. Literature frequently cites motivations that come from the firm level, and make purchasing incentivized
to take actions towards innovation. For instance, explicit incentives such as metrics can be imposed by the firm and used as enablers to get purchasing involved into innovation activities (Patrucco et al., 2017). The willingness to promote the corporate reputation can push purchasing to exploit turnkey innovations found in the supply base (Williams and Smith, 1990), during supplier workshops or conversations (Homfeldt et al., 2017) which is even more true in case of innovative ecological products sourcing (Preuss, 2007). Many papers investigate the effect of early purchasing involvement (ESI) in product development, and demonstrate the positive contribution purchasing has on innovation (Schiele, 2010). In that case, purchasing is incentivized by a project team who expects purchasing to proceed to advanced sourcing of innovations, in a context of a well-defined project. By sourcing innovations, purchasing might gain a better control on strategic in/out decisions within the firm such as make or buy technology (Castaldi et al., 2011).

There is only one study reporting on the need to implement explicit individual incentives such as bonuses, rewards (Gonzalez-Zapatero et al, 2016) to enable innovations, although several scholars recognize the effect of incentives purchasing motivation to sustain relationship building with suppliers, in the aim of innovation enhancement (Gonzalez-Zapatero et al., 2016; Corsten and Felde, 2005). Motivations fostering purchasing involvement into innovation exploitation may also come from the supply network itself: learning from suppliers or accessing to supplier knowledge through the usage of an innovation they have presented to the market (van Echtelt et al.; 2007, Schiele, 2006), enhancing joint value creation through co-development, mitigating the risk of opportunism (Clauss and Spieth, 2016).

4.3. Purchasing capabilities to contribute to innovation

Capabilities to explore: The 9 papers examining purchasing contribution to innovation exploration provide a rich and common view of the capabilities needed. They emphasize the need to have a knowledgeable, mature and skilled purchasing function (Luzzini et al., 2015) capable to scout the universe of partners to detect opportunities. Crucial capabilities relate to the skills to interact with R&D (Mikkelsen and Johnsen, 2018), or more specific skills such as creative mindset, curiosity-driven behaviour, innovation-oriented mindset which facilitate the contribution to innovation exploration (Kähkönen et al, 2017; Hartmann et al, 2012; Schiele et al, 2011). The use of a specific organizational design dedicated to explore innovation is necessary: Schiele (2010) first introduced the “dual role” or purchasing, arguing that a dedicated scouting unit must be distinct from the strategic unit (Schiele, 2010). This is followed by Luzzini and Ronchi who suggested that a “dedicated configuration is clearly the one that seems more suitable to deal with technological uncertainty” enhancing innovation capabilities from the supply base (Luzzini and Ronchi 2011, pp24). The institutionalization of a new purchasing role enabling the open innovation process calls for the creation of a formal role of a “champion” (Maier et al, 2017), exemplified as the role of “purchasing engineering” unit (Luzzini and Ronchi, 2011). This organizational separation is examined as well by Melander and Lakemond (2015), who consider that the separation between transactional and relational governance is mainly prevalent in projects with a high degree of uncertainty.

Another frequent cited capability is the purchasing integration to other firm’s functions, such as R&D (Legenvre and Gualandris, 2018) but more surprisingly with Marketing: “Sharing information on customers and suppliers and understanding its implications for the other function would reduce uncertainty and lead to the optimal alignment of both functions' resources and requirements” (Gonzales-Zapatero et al, 2017) and avoid exploring non-marketable product/services.

Scholars investigate on the exploration process itself, suggesting that specific methods and tools to scout new technologies, suppliers, and markets to identify new opportunities are necessary
Innovation exploration outcome is the detection of the innovation: an interesting list of screening instruments so-called "pull/push" tools to explore innovations from external sources has been published by Homfeldt et al. (2017) but without a clear explanation of how purchasing is involved in their usage. Scouting methods such as the use of trend-scouts, incubators and technology centers targeting mainly start-ups are reported to be efficient (Homfeldt et al., 2017) but literature still lacks at explaining purchasing’s role in these processes. The use of "patent analysis" tool to support procurement and sourcing will help the strategic management of the supply base: it provides a quantitative indicator to identify innovative suppliers and to support supplier selection decisions (Trautrims et al., 2017). A consensus emerges showing that it is important to consider new suppliers rather than existing suppliers to source complementary capabilities under conditions of high uncertainty (Philips et al., 2006; Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2018; Gonzales-Zapatero et al, 2016; Billington and Davidson, 2013).

**Capabilities to assimilate:** The first capability needed to succeed in innovation assimilation is an individual resource, “the knowledge of who knows what, who can help with what problem, or who can exploit new information” (Cohen and Levinthal, 1990, pp133). That is found in various selected articles reporting that prior to think of contracting for acquiring the innovation, purchasing must convince internally that the opportunity is real, and find the relevant support to get it assimilated (Patrucco et al., 2017). Then, the use specific contracting and governance mechanisms to deal with innovative entrepreneurial companies to succeed in the acquisition phase are needed (Pihlajamaa et al., 2017). But very few articles examine purchasing involvement in explicit contract design and licensing agreements with external partners. The selected literature lacks also at presenting the challenges related to the management of intellectual property protection regime in which purchasing may have a role to play. This said, we found more hints about processes and tools needed to succeed in innovation acquisition: information-processing tools such as open-innovation intermediary platforms (Homfeldt et al., 2017; Billington and Davidson, 2013; Sjödin and Eriksson, 2010) or IT tools (Kim and Chai, 2017; Spring and Araujo, 2014) might help to support the transaction. Acquisition can speed up through the use of web-based idea platforms, where suppliers uploaded and sell their innovative ideas online (Homfeldt et al., 2017). Overall, literature reports that innovation assimilation phase requires in-depth understanding of the market and market intelligence (Pihlajamaa et al., 2017), which is enabled by a strong purchasing integration to marketing and other internal functions such as R&D (Gonzales-Zapatero et al., 2017; Mikkelsen and Johnsen, 2018). Scholars examined also how informal buyer-supplier employee interactions influence as a mean to enhance buying firms’ innovation capabilities, and suggest that the ability to build formal and informal social interactions enables knowledge acquisition (Liu et al., 2017).

![Table 2: Synthesis of purchasing motivation and capabilities for contributing to innovation exploration phase](image)

Table 2: Synthesis of purchasing motivation and capabilities for contributing to innovation exploration phase
Table 3: Synthesis of purchasing motivation and capabilities for contributing to innovation assimilation phase

<table>
<thead>
<tr>
<th>Level of uncertainty</th>
<th>Purchasing Motivations</th>
<th>Purchasing Capabilities</th>
</tr>
</thead>
</table>
| MEDIUM               | - to acquire innovation means at lower risk and faster payoff than exploring for an invention  
                        - to acquire new ideas while mitigating the risks of long time-to-market and market uncertainty.  
                        - to increase accessibility to suppliers’ innovations,  
                        - to make purchasing central to the whole cost-reducing, innovation-enhancing, market-competitive positioning of an organization. | - develop open-innovation techniques  
                        - implement IT tools to purchase innovation  
                        - Use “innovation capitalists”; intermediaries capable to source innovation for the firm  
                        - Develop specific contracting and governance mechanisms to deal with innovative entrepreneurial companies  
                        - Match sales strategies to the evolution of the purchasing function  
                        - Develop purchasing absorptive capacity (buyer knowledge, internal communication, knowledge scanning capabilities) |

Capabilities to exploit: The exploitation phase has been extensively researched and there is no doubt that purchasing can contribute to innovation in this phase. There is a clear domination of studies in a context of low uncertainty, represented by a large number of publications about NPD, with a particular emphasis on innovation benefits. The NPD and ESI literature demonstrate the role purchasing can play in innovation by collaborating with suppliers and co-developing products. The emphasis on this phase may be because it directly matches with strategic challenges identified in purchasing field, such as cost reductions, early purchasing involvement in NPD, Early supplier involvement, co-development, etc. Or it may be because the outcomes of purchasing contribution to innovation are easily measured if we consider traditional purchasing metrics. Tassabehji and Moorhouse (2008), proposed a multilevel framework and categorization of purchasing skills into five sections: technical skills, interpersonal skills, internal enterprise skills (referring to interactions between firm’s functions), external enterprise skills (referring to the richness of the supply chain network) and strategic business skills. From this framework, we recognize some key capabilities described below.

Under low technological uncertainty, literature suggests that the best process to enhance purchasing contribution to innovation is to involve buyers in new product developments. This is about aligning internal development activities with suppliers’ development activities, in which purchasing’s role is to exploit supplier’s technical competencies (Wynstra et al. 2003). A strong integration between purchasing and R&D can lead to a better NPD innovativeness (Van Echtelt et al., 2007), whereas integration to marketing is preferred to foster innovation in a context of high market uncertainty (Gonzales-Zapatero et al., 2017). Some authors suggest that detailed process with purchasing inclusion points ensures purchasing’s regular participation in NPD (Schiele, 2010), other recommend setting innovation-related tasks as routines, such as specific processes, managerial systems, metrics (Charterina et al., 2016).

Capabilities to manage supply base are often highlighted in the selected literature: supplier relationship management has a positive influence on innovation sourcing in NPD (Sjoerdsmia and van Weele, 2015). Purchasing has to develop governance mechanisms between the supplier and the buying firm (Liu et al., 2017; Tracey and Neuhaus, 2013) to increase innovation capabilities. The way purchasing build long term supplier relationship/collaboration to engage in innovation projects (Patrucco et al., 2017), and in more general terms the relationship-building capabilities are often cited as a core capability to develop innovations with supply network (Sjoerdsmia and van Weele, 2015; Bengtsson et al., 2013, Schoenherr et al., 2012). Innovation exploitation typically necessitate reinforcement of existing relationships with existing suppliers, refinement of existing technologies, leading to incremental innovations.
Table 4: Synthesis of purchasing motivation and capabilities fo contributing to innovation exploitation phase

<table>
<thead>
<tr>
<th>Level of uncertainty</th>
<th>Purchasing Motivations</th>
<th>Purchasing Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW</td>
<td>- to reduce costs, improve quality, to reduce development time,</td>
<td>- better integration approach between purchasing and R&amp;D</td>
</tr>
<tr>
<td></td>
<td>- to respond to an invitation to contribute to NPD,</td>
<td>- Supplier relationship &amp; trust management</td>
</tr>
<tr>
<td></td>
<td>- to benefit from the innovation in product development,</td>
<td>- ESI, EPI</td>
</tr>
<tr>
<td></td>
<td>- to engage a long term contract with a supplier,</td>
<td>- Implement detailed NPD process with purchasing inclusion points</td>
</tr>
<tr>
<td></td>
<td>- to get a bonus, a reward.</td>
<td>- Transactional orientation with suppliers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Communication, formal socialization activities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Formalized supplier selection process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Supplier incentives (competitive, cooperative)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Becoming a supplier’s preferred customer</td>
</tr>
</tbody>
</table>

5. Synthesis, discussion and future research directions

5.1. Refining the initial conceptual model

By reviewing the motivations and purchasing capabilities from the selected literature, we found that purchasing motivations and capabilities vary according to the phase of the innovation. Thus, our conceptual model has been refined to take the various phases of innovation into consideration. In this refined model, purchasing motivation is an precedent to each phase of the innovation, while the nature of the motivation is different respectively to each phase. Similarly, purchasing capabilities is also a precedent to each innovation phase, while the nature of the capability is different according to the phase considered. The main contribution of this paper is to suggest the following model, which reflects the current literature about purchasing involvement in innovation:
Refined conceptual model

INNOVATION PHASES

INNOVATION EXPLORATION
- Security of internal knowledge
- Moderately challenging clear goals
- Strategic pressure
- Cross-functional incentives
- Willing to increase purchasing influence
- Involved in advanced sourcing phases
- Self-interest to create market opportunities
- Radically market changes
- Expected to implement open innovation

INNOVATION ASSIMILATION
- Acquire a new idea to speed up the time to market
- Partner with a start-up to be first obtaining a competitive advantage
- Access to more radical innovations
- Purchasing becomes clear objectives towards fact is involved (tech spec)
- Involvement into innovation process
- Build an internal supportive network
- Use specific set of contracting governance
- Develop licensing agreements
- Develop skills in IP
- Use IS tools (open innovation platforms)
- Develop information processing partners
- In-depth understanding of the market (market intelligence)
- Inform buyer-supplier employee interactions

INNOVATION EXPLOITATION
- Cost reduction, quality improvement and all short term outcomes
- Development time reduction
- Explicit incentives matrix, KPI on innovation performance
- Individual bonuses and rewards
- Increase corporate reputation
- Project team wants to source an idea in an existing project
- Innovation pushed by existing suppliers
- Better access to supplier knowledge

Purchasing Motivations
- Strong interaction with R&D
- Creative mindset, curiosity-driven behaviour
- Dedicated function focused on innovation
- Institutionalization of new role
- Separation between transactional and relational governance
- Integration with marketing and sales
- Use of screening instruments (IS)
- Use of incubation and test centres
- Use of patent analysis

(Purchasing Capabilities
- Degree of uncertainty

Purchasing contribution to innovation
- Strong interaction with R&D
- Early Supplier Involvement in NPD
- Early purchase involvement in NPD
- Set innovation-related tasks as routine
- Develop capabilities to build strong partnerships with existing suppliers
- Refinement of existing technologies
- Implement co-development w/suppliers

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Fig 6 – Refined conceptual framework
5.2. Discussion

The main objective of this paper was to examine purchasing motivations and capabilities, a precedents to purchasing contribution to innovation. We categorised codes to make appear some thematic patterns, found out some thematic findings presented before. In the current section, we discuss three main precedents that we have identified as key precedents in purchasing contribution to innovation.

The first main precedent enabling purchasing contribution to innovation is about the purchasing organization design, as a key enabling factor for a firm’s innovation capability. We have found 8 papers reporting on the need to implement a specific unit, distinct from the purchasing core department, “dedicated” to innovation. Luzzini and Ronchi (2011) first introduced this precedent, but several other papers confirmed the necessity to implement organisational differentiation between explorative unit and exploitative units (Maier et al., 2017; Mikkelsen and Johnsen, 2018). This resembles to another stream of literature, namely organisational ambidexterity, which reports on the necessity to design ambidextrous firms with two distinct and autonomous units, one dealing with exploration, another with exploitation (O’Reilly and Tushman, 2011; Benner and Tushman, 2003; Tushman and O’Reilly 1996). Base assumption is that exploration and exploitation tasks are hardly compatible, but not impossible (March, 1991), and therefore organizations must adapt and treat exploration and exploitation activities differently (Boumgarden et al., 2012). Although the most recent publications about purchasing suggest this “dual structure”, a debate arise in the literature about ambidexterity: the structural differentiation creates tensions between structures so that some scholars consider organizations capable to simultaneously explore and exploit innovations as the best mean to increase firms’ innovativeness. However, all these studies focus on firm level, and lack at reporting on several aspects such as the communication processes between units, the functional organizations design, the balance between different tasks and the work boundaries.

The second precedent emphasized by many papers relates to purchasing capability to be integrated to other functions within the firm. Three codes might be grouped to highlight the importance of purchasing integration: integration to R&D, integration to marketing and cross-functional interactions. Literature has fragmented definitions on this concept, but a very recent study published by Gonzales-Zapatero et al. (2017) describes the functional integration mechanisms as a bi-dimensional process, which needs shared and understood information as well as aligned decisions. In our study, we found that purchasing integration is a strong organisational precondition to adhere to any activity towards innovation, no matter the degree of the innovation is. A seminal literature exists on the topic, from the setting of “liaison personnel” to better exchange knowledge across units (Gupta and Govindarajan, 2000), or the creation of a particular type of organization context at the business-unit level to foster certain behaviours and incentives (Gibson and Birkinshaw, 2004). Purchasing literature starts to consider a distinction between innovation types, calling for differentiated integration to R&D or to business development functions depending on the degree of uncertainties.

The third precedent refers to the individual (intrinsic) motivations and capabilities. By grouping codes, we saw that patterns emerge. It emphasizes the fact that purchasing needs individualspecific motivations and capabilities to contribute to innovation, and that these enablers are different according to the innovation phase. Focusing on skills, our study demonstrated the specific purchasing skills or purchasing individuals’ knowledge needed to contribute to innovation, such as creative mindset; curiosity-driven behaviour, innovation-oriented mindset which facilitates the contribution to innovation exploration. Innovation absorption phase requires in-depth understanding of the market and market intelligence (Pihlajamaa et al.; 2017). However, our findings contrast with the seminal stream of literature reporting on purchasing
skills and capabilities, which does not report on specific skills to contribute to innovation (Tassabehji and Moorhouse 2008, Knight et al, 2014; Giunipero and Peacy, 2000). Although we have found that our selected literature report on specific capabilities and motivations, these types of enablers have rarely been used in the wider field of purchasing management. A second contrast comes from the comparison with the adjacent research investigating “work boundaries” within strategic field, which investigates intra-organizational processes underlying middle managers individual behaviours. It demonstrates for instance that middle management “job enrichment” (i.e. self-motivation to do something not formally expected) influence a lot the ability to explore outside traditional boundaries (Wooldridget et al., 2008). Middle management’s role in building and leading informal strategic networks in and across firms for open innovation (Kodama, 2005). This might be an interesting pre-condition to investigate, but it has not been covered at all among all the literature we have selected, although one paper touched this topic (Liu et al., 2017).

5.3. Future research directions

5.3.1. The need for holistic investigation of purchasing role in innovation: The literature about purchasing has elaborated several ways to present purchasing involvement to innovation, and this allowed a better understanding of potential purchasing contribution. As seminal publications on the matter, we can retain articles from Schiele (2010), Luzzini and Ronchi (2011), von Hartmann and Bengtsson (2015), Homfeldt et al. (2017), Legenvre and Gualandris (2018), etc... Combined together, these studies provide an interesting research base, trying to demonstrate the outcomes of purchasing contribution to innovation. These scholars studied cases in-depth, or built on a quantitative approach to better generalize their findings prior to provide their propositions. This helped a lot to broaden our understanding of the field.

However, the coherence seemingly found in existing publications is not apparent in most of the literature about purchasing role in innovation. From a limited role of purchasing agent (Weigand, 1968) to a potential strategic contribution to innovation (Schiele, 2010), existing research does not provide a common view of purchasing role. Research attempted to isolate functional role but overemphasized firm and supplier perspectives. Many other authors developed and described “buying firm” roles or “suppliers’ contribution to innovation”, examined “sourcing” or “knowledge acquisition” from external partners without mentioning purchasing. When cited, purchasing role in investigated widely in NPD, but not in other phases of innovation. Multiple theories and methodologies are involved, thereby reducing the transparency of linkages across studies.

Future research, therefore, should build on investigating a holistic view of purchasing contribution to innovation, focusing on purchasing function as a unit of analysis. What is needed at this point is a theory-based approach that provides a consistent and deep understanding of purchasing role in innovation. To this end, future research should benefit from bridging with fundamental theories, such as absorptive capacity theory (Cohen and Levinthal, 1990), using the evidence that purchasing nowadays is involved in all phases of the strategic process, and consequently to the innovation process. For instance, as presented in our fig 3, research might ground the conceptualization of purchasing role in innovation during the three distinct innovation phases: exploration, absorption and exploitation.

5.3.2. The need for more insights about purchasing contribution to innovation exploration and absorption phases: The strong disequilibrium between the quantity of articles reporting on
innovation exploitation phase (92%), absorption phase (23%) and exploration phase (12%), calls for future examination of the earlier phases of the innovation process. This is reinforced by the fact the exploration phase is much more researched in the five past years, but still too few papers cover the topic (only 9, reporting only on a very specific contexts). Although existing research identifies purchasing as a contributor to innovation (Luzzini et al, 2011), and more precisely to innovation exploration (Legenvre and Gualandris, 2018), there are still too few studies that investigate the role purchasing has in the early phases of innovation, exploration and acquisition, characterized by high market and technological uncertainty. Consistent with early studies (Miekelsen and Johnsen, 2018), future research might investigate why and how purchasing contributes to innovation under high technological uncertainty, aiming at underlying motivations, resources, skills, specific capabilities needed to succeed in the innovation exploration and acquisition phases.

5.3.3. The need for links between antecedents, resources, and outcomes.
As a growing field, it is fundamental to better develop the understanding of the conditions leading to and the outcomes flowing from purchasing contribution to innovation. Our study demonstrated that we have already a large set of precedents and key elements reporting on the benefits of purchasing involvement to innovation: the list seems to grow after each publication. On way to better structure all these findings would be to organize them using a multilevel approach, where firm (as a center of decision), function (as a group within the firm) individual (as a single position within the stakeholders) and supply network (as a universe of potential partners) can be used as units of analysis. Such distinction would provide clarity and structuration in the investigation of this topic, mainly because it will highlight the numerous interactions and influences of each unit of analysis (Rothaermel and Hess, 2007). For instance, our study shows that past focus has neglected to consider the individual level and over-emphasized the understanding of firm level (i.e. “buying firm”). Literature also neglected to investigate links between purchasing individuals’ and self-motivations towards innovation (i.e. purchasing individuals pursuing initiatives in various innovation phases), although some scholars demonstrated that the unformal social interactions outside work boundaries has a positive influence on innovation (Liu et al., 2017). Thus, future research may deeper focus on purchasing from the individual perspective (the buyer/purchaser as a unit of analysis), and further consider how individual skills, background, self-interest, creative mindset can influence innovation through purchasing. For instance, examining the work boundary theories is likely to be a good start to further explore how purchasing individual can enable purchasing contribution to innovation.
In addition, future research should investigate deeper how purchasing function must be designed to better enable purchasing contribution to innovation. Although literature demonstrated that purchasing organisation design is a precondition to enable innovation, existing studies fails to find a consensus on the best adequate shape to facilitate all the phases of the innovation process and the transitions between them. Existing purchasing literature suggests that a distinct purchasing organization to explore innovation is more efficient than a single unit which does both exploration and exploitation tasks (Schiele, 2010), but little is known about the emergence and the settings of such organization. This might be bridged with the stream of research about ambidexterity theory, which investigates the balance between exploration and exploitation phases. Literature about ambidexterity suggests that ambidextrous
firms have two distinct and autonomous units, one dealing with innovation exploration, another with innovation exploitation (Boumgarden et al., 2012). More precisely, future research can investigate how purchasing organization can be shaped to align and balance exploration and exploitations activities, and to smoothen transitions between innovation phases. Good starting points could be either the R&D literature about how R&D function adapted to both explorative and exploitative tasks (Kuittinen et al., 2013), or the literature about ambidextrous organizations (Raish et al., 2009) or purchasing ambidexterity (Gualandris et al., 2018).

The development of a deeper knowledge about purchasing contribution to innovation requires also additional research about the champion’s role (Maier et al., 2017) as a precondition. Existing theory about innovation provided evidences that having a champion within the organization to deal with innovation exploration facilitates the detection and implementation of innovations (Howell and Higgins, 1990), but no literature exists on the role played by this specific position in purchasing. Thus, building on champion theory, scholars should investigate why and how the differentiated role of a champion might facilitate purchasing contribution to innovation. Further research might investigate personality characteristics, leadership behaviours, and influence tactics and any other enablers that purchasing might develop to better contribute to innovation, starting from the extensive literature published on the topic in innovation theory.

Last, our study revealed the need of continuous alignment between customer needs and supply network capabilities. However, we have found very few articles examining purchasing integration to marketing and business development functions, although it is highlighted to be a very important enabler of innovation in a context of high uncertainty. We suggest concentrating future effort in this direction, building upon Gonzales-Zapatero et al. (2017), who provided empirical evidence of the benefits of purchasing-marketing integration to innovation capabilities. In this aim, future research can look deeper at purchasing integration to marketing and business development, building on organization-level absorptive capacity and related interaction between individuals (Volberda et al., 2010). The examination of different constructs of absorptive capacity can help at linking antecedents, resources, and outcomes of purchasing integration to marketing, by studying the effect of interactions on innovation.

5.3.4. The need for the investigation of other contingent factors
Firm size may be an additional moderator to consider when looking at innovation performance (Camison et al, 2004, van Echtelt et al., 2007). Literature is not always aligned on the moderating effect of firm size. Some scholars suggested that large firms have more advantages to develop innovations (Schumpeter, 1942; Dewar and Dutton, 1986; Pisano, 2015). In the opposite perspective, researchers argue that large firms may have more troubles to react and innovate in fast-paced environments where speed and agility are key success factors (Dougherty and Hardy, 1996; Stringer, 2000). Although the inclusion of this moderating factor is questionable, we should have included it in our refined model after having checked its influence on purchasing’s contribution to innovation.

5.3.5. The need for considering the public procurement as a mean to broaden this review
In our study, the absence of consideration of public procurement within the scope of selected articles is a limitation. We have focused our analysis on publications related to industrial and private sector. But many interesting articles report on how public procurement contributes to innovation. Recent publications have investigated procurement contribution to innovation, some of them focusing on SMEs (Saastamoinen et al., 2018), public procurement strategies...
fostering innovation (Patrucco et al, 2017), public procurement incentives towards innovation, role of intermediation (Edler and Yeow, 2016). Including such kind of articles in a systematic literature review extended to public procurement could create another perspective and better insights about purchasing and procurement motivations and capabilities.

6. Conclusion

This paper presents a structured review of 74 peer-reviewed articles published in leading academic journals from 1976 to 2018. Our specific aim was to understand why and how purchasing contributes to innovation. This systematic literature review indicates a growing focus about purchasing contribution to innovation, especially in the past 10 years, a trend that is predicted to continue. Given the number of articles in consideration, the field looks mature and well documented on the topic. However, our review shows that there are heterogeneities in the research on purchasing involvement to innovation. Our study findings show that research in this field has primarily emphasized certain popular topics such as purchasing contribution to innovation during NPD while other crucial ones suffer from lack of focus, namely purchasing contribution to innovation exploration under high uncertainty and innovation assimilation. Our study shows that each innovation phase calls its own specific set of motivations and capabilities, that purchasing needs to get prior to have a positive contribution. These findings contradict one of the articles in the selected literature which examine cases where “very little variations [are found] in the way firms effectively manage projects of differing degrees of innovation” (van Echtelt et al., 2007). Although van Echtelt’s study was based on 8 cases, these authors suggested further research on this precise point. Apart of this publication, most of the academic contributions on the topic report that a clear adaptation of purchasing incentives and capabilities to the innovation phase is necessary, supporting the refined conceptual model presented above.

The first main finding and contribution of our paper comes along with the identification of specific motivations and capabilities relatively to each innovation phase and degree of uncertainty. This presents how the existing research to date has been conducted. In our paper, we have categorized purchasing motivations and purchasing capabilities relatively to each innovation phase. The coding we’ve made using the phases of innovation (exploration, absorption and exploitation) allows us to distinguish interesting patterns. By crossing the data, we have identified that the type of motivations varies according to the phase of the innovation, and indirectly to the degree of technological and market uncertainty. Literature about absorptive capacity has already taken for granted that the three innovation phases require different capabilities, considering that exploration, assimilation phases must be conducted prior to the exploitation phase (Cohen and Levinthal, 1990; Volberda et al., 2010). We found also a clear heterogeneity in how the different topics have been treated: the research about exploiting innovations is the largest and most vibrant in the purchasing field, whereas exploration phases and high uncertainty have been considered only recently. Moreover, existing literature lacks at doing the distinction between innovation phase. Factors enabling purchasing to contribute to innovations are rarely correlated with the level of market and technological uncertainty, which has been proven to be a strong contingent factor.

The second main finding of this article is the identification of gaps in the literature that reflects the heterogeneity of the research on the topic. During the analyse phase we have been able to highlight several topics that have not been addressed in the literature, such as individual capabilities to contribute to innovation, purchasing integration to marketing, purchasing function organizational design, use of information systems to contribute to innovation. Most of the studies focus on short term benefits of purchasing involvement in innovation. Few papers introduce very interesting enablers, but they are all contextualized into specific cases. These
gaps highlighted in the literature became areas for future research that are promising for purchasing field.

References:


Clauss, T., & Spieth, P. (2016). Treat your suppliers right! Aligning strategic innovation orientation in captive supplier relationships with relational and transactional governance mechanisms. R&D Management, 46(S3), 1044-1061.


Li, Y., and Vanhaverbeke, W. 2009. “The effects of inter-industry and country difference in supplier relationships on pioneering innovations”. Technovation, 29(12), 843-858


Appendix A: Category used in extracting and analysing data in the systematic literature review

<table>
<thead>
<tr>
<th>Area</th>
<th>Category</th>
<th>Attributes, notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive</td>
<td>Authors</td>
<td>Information</td>
</tr>
<tr>
<td></td>
<td>Title</td>
<td>Title of the article</td>
</tr>
<tr>
<td></td>
<td>Year of publication</td>
<td>No specific limit has been specified</td>
</tr>
<tr>
<td></td>
<td>Journal</td>
<td>Journal in which the article has been published</td>
</tr>
<tr>
<td></td>
<td>Abstract</td>
<td>Exact detailed abstract</td>
</tr>
<tr>
<td></td>
<td>Journal ranking</td>
<td>Position in the ranking scale of ABS (2015), from 1 (lowest) to 4* (highest)</td>
</tr>
<tr>
<td>Date</td>
<td>Why?</td>
<td>Report on multilevel motivations: firm level (Incentives, bonuses, corp policies, etc...), individual (innovation, external market, supplier, etc.)</td>
</tr>
<tr>
<td></td>
<td>How?</td>
<td>Report on multilevel capabilities (processes, resources, skills, organisation design, managerial systems and tools, network attributes, environment, etc.)</td>
</tr>
<tr>
<td></td>
<td>Innovation phase</td>
<td>3 phases of innovation absorption introduced by the Absorptive Capacity Theory, suggested by Cohen and Levinthal (1990) 2/ recognize the value of new, external innovation, 3/ absorb and assimilate it, and 3/ apply it to commercial ends</td>
</tr>
<tr>
<td></td>
<td>Technological / market uncertainty</td>
<td>Nature of the technological and market conditions under which purchasing function evolves. Depends on the type of innovation. (incremental/radical...). Binary result = 1/CHOSU</td>
</tr>
<tr>
<td>Methodology</td>
<td>Theoretical lens</td>
<td>Base theory on which is driven the paper, according to Spina et al (2016).</td>
</tr>
<tr>
<td></td>
<td>Unit of analysis</td>
<td>Report on the unit of analysis serving the article: firm, dyad, dyad, network.</td>
</tr>
<tr>
<td></td>
<td>Research type</td>
<td>Categorization of research methods according Heising and Schiefe (2015); 4 different base methodologies: (1) conceptual or theoretical publications; (2) case studies; (3) literature reviews and (4) surveys. We have added another category, when a combination of two types was adopted: (5) combined empirical research</td>
</tr>
<tr>
<td></td>
<td>Sampling / cases</td>
<td>Details from the sample (size, sector...), when cases are utilized.</td>
</tr>
</tbody>
</table>

Appendix B: Keywords and search terms used in the systematic literature review

<table>
<thead>
<tr>
<th>Function</th>
<th>Field</th>
<th>Published</th>
<th>Quality</th>
<th>Subject area</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasing OR Procurement OR Sourcing OR Buy* AND Innov* OR &quot;Open Innovation&quot; OR &quot;Product Development&quot; OR &quot;technology&quot; OR &quot;knowledge&quot; AND LIMIT TO All years Article OR Review Business, Management and Accounting OR Engineering English</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix C: Noticeable papers reporting on purchasing contribution to innovation exploration phase (only 9)

- Legenvre H., Gualandris J. Innovation sourcing excellence: Three purchasing capabilities for success 2018 Business Horizons
- Billington C., Davidson R. Leveraging open innovation using intermediary networks 2013 Production and Operations Management
- Luzzini D., Ronchi S. Organizing the purchasing department for innovation 2011 Operations Management Research
Innovation sourcing excellence: Three purchasing capabilities for success

KBV

The influence of the type of relationship on the generation of innovations in buyer-supplier collaborations.

Gonzalez-Zapatero C., Gonzalez-Benito J., Lannelongue G.,

The impact of global purchasing and supplier integration on product innovation

Not Considered

Not considered

Supply Chain Management

Revilla E., Knoppen D.,

Involving purchasing in product development

Production and Operations Management

Maier M.A., Rück P., Brem A.,

The impact of supplier innovativeness, information sharing and strategic sourcing on improving supply chain agility: Global supply chain perspective

European Journal of Purchasing and Supply Management

Tangpong C., Michalisin M.D., Melcher A.J.,

Governance of supplier collaboration in technologically uncertain NPD projects

European Journal of Purchasing and Supply Management

Rosell, D. T.

Spiritual theory

Charterina J., Basterretxea I., Landeta J.,

Implementation of open innovation strategies: a buyer–supplier perspective.

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Charterina J., Basterretxea I., Landeta J.,

Supplier innovativeness and supplier pricing: The role of preferred customer status

Legenvre H., Gualandris J.,

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Journal of Purchasing and Supply Management

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Social exchange theory

Nambisan S., Sawhney M.,

How to Integrate Suppliers into the Innovation Process? An Explorative Case of Champion Formalization in the Purchasing Department in Times of Open Innovation

International Journal of Innovation and Technology Management

Tracey M., Neuhaus R.,

RBV

Surveys

Absorptive capacity

Not considered

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International Journal of Innovation Management

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International Journal of Production Economics

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Research Technology Management

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Social Capital Theory  +
Resource dependent Theory

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Appendix E: Journals included in the review (green: gaps > +2, red = gap > -2)

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Purchasing’s Contribution to Innovation Exploration: Awareness, Motivation and Capabilities (AMC)

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Abstract

Purpose - This study investigates purchasing’s contribution to innovation exploration. We build on the awareness-motivation-capability (AMC) framework to investigate how purchasing develops its awareness of innovation opportunities, how purchasing is motivated to explore innovation, and the capabilities needed to enable purchasing contributing to innovation exploration.

Design/Methodology/Approach - We adopt an in-depth qualitative case study strategy, focusing on two case studies of companies that have involved purchasing in innovation exploration.

Findings - Our findings illustrate how a differentiated purchasing unit focused on exploration, strong integration into innovation clusters and new individual orchestration capabilities are employed to facilitate purchasing’s contribution to innovation exploration.

Originality/Value - Our study offers two main theoretical contributions: first, we expand and refine Purchasing and Supply Management (PSM) theory with a more comprehensive set of precedents to purchasing’s contribution to innovation; second, we show how the AMC framework can be applied to research purchasing’s contribution to innovation. Our study suggests ways for managers to shape, adapt or redesign their purchasing organizations to better support innovation exploration processes.

Keywords - purchasing, innovation, exploration, uncertainty, AMC framework

Paper type – Research paper

1. INTRODUCTION

As companies increasingly concentrate on their core business, their ability to source innovation from external partners is becoming a key success factor to stay ahead of competition (Narasimhan and Narayanan, 2013). Purchasing is often in charge of external resource management but is traditionally not regarded as a key contributor to the technological development (Mikkelsen and Johnsen, 2018). Despite purchasing’s responsibility for sourcing, it is usually R&D and not purchasing that is seen as the key contributor to innovation exploration (Gualandris et al., 2018; Damanpour and Aravind, 2012).
However, there is a growing interest in the role of purchasing in sourcing organisational and technological capabilities for innovation (Spina et al., 2013). This is particularly pertinent in contexts of high technological uncertainty as this requires a change in sourcing strategies that emphasises exploration in distant supply markets (Phillips et al., 2006; Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2019). In the context of high technological uncertainty, exploration is about sourcing or scouting distant capabilities that are likely to be found outside the firm’s existing environment (Narasimhan and Narayanan, 2013). Sourcing new capabilities brings opportunities to the firm in achieving innovations (Nerkar and Roberts, 2004), but implies evolving in higher uncertainty and higher risks (O’Connor and Rice, 2013). Narasimhan and Narayanan (2013) suggest that uncertain environments require organisations to modify their approach to innovation sourcing that involve a new role for the purchasing function.

Companies need to develop new internal capabilities, change their strategies, organizational structures, processes, management resources and culture (Slater et al., 2014). Recent research suggests that purchasing can play a key role in this process (Gualandris et al., 2018) but the understanding of the required changes in purchasing to be able to perform this role is still limited. In fact, purchasing is not traditionally equipped to perform a role in innovation exploration as this is normally not within its remit. Purchasing may not have any incentive to explore innovation as this is commonly viewed as R&D’s territory (Damanpour and Aravind, 2012). Developing insights into how purchasing can potentially contribute to innovation exploration therefore requires unpacking purchasing’s awareness of a need to assume such a role, its incentives or motivations, and the required capabilities.

We build on the Awareness-Motivation-Capabilities (AMC) framework to investigate precedents of purchasing’s contribution to innovation exploration. The AMC framework provides a frame to identify business cooperation and behavioural drivers in an organization (Chen and Miller, 2015; Chen, 1996). Originating in cognitive theories and general management, the AMC framework provides a novel perspective within purchasing and supply chain management. Adapting the AMC framework, we argue that purchasing’s contribution to innovation exploration is enabled by purchasing’s awareness, purchasing’s motivations, and purchasing’s capabilities. Despite several papers identifying enablers to purchasing contribution to innovation exploration (Mikkelsen and Johnsen, 2018; Legenvre and Gualandris, 2018; Homfeldt et al., 2017, Cousins et al., 2011), the literature lacks a structured set of precedents. Using the AMC framework, we explore three research questions:

**RQ1:** How is purchasing made aware of opportunities to contribute to the firm’s innovation exploration?

**RQ2:** What motivates purchasing to contribute to innovation exploration?

**RQ3:** Which capabilities are required to enable purchasing to contribute to innovation exploration?

Based on two in-depth case studies, we explore the precedents that facilitate purchasing’s contribution to innovation exploration under high technological or market uncertainty. We offer two main theoretical contributions: first, we elaborate PSM theory with a better understanding of purchasing’s contribution to innovation; second, we demonstrate the interest to adapt the AMC framework to the PSM field through its conceptualization and operationalization. We outline the implications for managers intending to shape, adapt or redesign their purchasing organizations to better support innovation exploration processes.
Section 2 reviews the literature concerning purchasing’s contribution to innovation exploration (Section 2). We present our conceptual framework based on AMC in Section 3 and then explain our case study method in Section 4. We then present the findings from the two cases and a comparison between the two cases (Section 5). In Section 6 we discuss the findings in light of existing research and offer conceptual developments on purchasing’s contribution to innovation exploration (Section 6). The conclusion section (Section 7) outlines the theoretical and managerial implications and the limitations of our study.

2 - LITERATURE REVIEW

2.1. Defining innovation exploration

Innovation exploration is viewed as a precursor to innovation exploitation i.e. how to benefit commercialise or apply innovation (Cohen and Levinthal, 1990). Innovation exploration refers to scouting innovations outside the existing knowledge base and calls for distant search for new capabilities, bringing opportunities to the firm in achieving new-to-the-world innovations (Ahuja and Lampert, 2001; Rosenkopf and Nerkar, 2001). Exploration is “a fundamental mechanism by which firms learn and organizational knowledge evolves” (Rosenkopf and Nerkar, 2001, p. 287). Innovation exploration complements innovation exploitation because they are sequenced over time and constitute a natural cycle (Rothenberg & Deeds, 2004).

In a context of high technological uncertainty, innovation exploration implies facing unexpected challenges, tensions, and disillusion. Explorers need to manage unanticipated obstacles, learn from what they discover, and have a creative mindset (Day, 1994). This makes it more difficult to keep motivation alive (Kelley et al., 2011). Current literature has reported a lack of motivation as an obstacle to innovation, when teams are in pursuit of innovation in a context of great uncertainty (Alexander and van Knippenberg, 2014). Exploration “entails a shift away from an organization’s current knowledge base and skills” (Lavie et al., 2010, p. 114). Research has demonstrated that the nature of these shifts is related to new technical skills, market expertise, and external relationships (Lavie and Rosenkopf, 2006).

2.2. Purchasing contribution to innovation

With the traditional view of innovation as coming from the incumbent firm (Henderson and Clark, 1990; Utterback, 1994), the 1990s saw an upsurge in research on how innovation can be acquired from outside the firm (Cohen and Levinthal, 1990; Teece et al, 1997). This is reflected by the concept of open innovation (Chesbrough and Bogers, 2014), which considers suppliers as sources of innovation (West and Bogers, 2014; Li and Vanhaeverbeke, 2009; Schiele, 2010; Narasimhan and Narayanan, 2013; Lau et al., 2010, Grimpe and Sofka, 2009). The field of early supplier involvement in product development has strongly focused on collaboration with existing suppliers (Johnsen, 2009). However, the need for innovation rather than (incremental) product development means that it is no longer sufficient for firms to focus on existing and close suppliers. As argued by Legenvre and Gualandris (2018, p. 95), companies “need to excel at capturing innovation opportunities with [both] existing and potential supply chain members.”

Although the R&D function has traditionally been responsible for capturing sources of innovation, recent research has shifted the focus to the purchasing function and its potential contribution to innovation. In fact, research on purchasing suggests that innovation is regarded as the second most important challenge for purchasing after cost reduction (Spina et al, 2013). Purchasing can be involved in innovation acquisition from external suppliers (Henke and
Zhang, 2010), can facilitate involvement with suppliers early in the NPD process to benefit from joint R&D (Patrucco et al., 2017), or can use open innovation practices within buyer-supplier relationship to leverage external sources of innovation (West and Bogers, 2014).

2.3. Purchasing contribution to innovation exploration

Purchasing has usually a good visibility of suppliers relatively close in terms of technology, geography, and distance in the network. Companies tend to ignore suppliers that are more distant from them in terms of product type, geography and knowledge (Livengood and Reger, 2010) as this implies risk. But exploring the supply base ecosystem can bring new knowledge and innovations resources, and consequently value to a company (Möller and Törrönen, 2003). Innovation exploration requires working with new markets, new routes of sourcing and innovations which bring higher uncertainty and risk (O’Connor and Rice, 2013).

There is an emerging debate about purchasing’s role in the exploration phase, especially when market and technological uncertainty is high. Melander and Lakemond (2015) argued that purchasing’s influence is limited as far as the product has a high degree of innovation. In contrast, others have argued that purchasing can contribute to innovation exploration (Legenvre and Gualandris, 2018, Mikkelsen and Johnsen, 2018). Organisations willing to modify their approach to innovation sourcing consider adopting a new role of the purchasing function (Narasimhan and Narayanan, 2013). However, existing research is limited on the understanding of the adaptations needed to succeed in involving purchasing in innovation exploration.

3 – CONCEPTUAL FRAMEWORK

3.1. Awareness-Motivation-Capabilities framework

The AMC framework derives from cognitive science and is now part of the field of strategy (Chen et al. 1992; Livengood and Reger, 2010). AMC relies on cognitive components and introduces a set of precedents that explain why actions occur (Table 1). The AMC concept has been used initially to investigate how firms react to competitive tensions (Chen, 1996), analysing “the extent of awareness, the level of motivation, and, finally, the capability to respond” to a competitive attack (Livengood and Reger, 2010, p49).

Chen and Miller (2015) suggested that the AMC framework could justify not only the reasons for competitive actions but might also help to understand reasons, sources, concerns and consequences of cooperative and relational actions (Chen and Miller, 2015). We build on this approach, because we are interested in how innovation takes place in the relationship between a customer and its supplier (Schiele, 2006, 2010). Strategic management field emphasizes the need to build upon supplier’s cooperation (Markman et al., 2009) or suggests the need “to build up core capabilities and increase cooperative network” (Chen et al., 2015, p763). In the relational approach, the AMC framework has a specific shape where cooperation is moderated by organization type and industry culture.

3.2. The multi-dimensions of the AMC framework

The relational view of the AMC framework presented by Chen and Miller (2015) classifies awareness, motivation and capabilities into three main origins: organization, industry and culture. Table 1 presents the 3x3 matrix and the 9 constructs are defined below.
Awareness is defined as accessibility to knowledge (Chen et al., 2007) and is conditioned mainly by market visibility (Chen, 1996). In a collaborative context, this is about understanding the firm’s environment to obtain suppliers’ support and cooperation (Donaldson and Preston, 1995; Freeman et al., 2010). Chen and Miller (2015) emphasize the importance of organizational structure and systems to acquire knowledge from the firm’s environment and to manage boundary-spanning activities, considering that organizational design (centralized/decentralized) or decision-making processes can facilitate environmental scanning. Physical proximity with potential partners has a role to play in enhancing awareness of opportunities and interactions (Glaeser et al., 1992). Socialization, i.e. participation in clusters, start-up incubators or trade associations facilitates the discovery of potential suppliers, whereas firm’s culture and reputation facilitate its visibility to potential partners (Chen and Miller, 2015).

Motivation is defined in the AMC framework as the firm’s willingness to engage in a relational approach with its partners, including suppliers, fostering innovations and long-term mindset (Chen and Miller, 2015). AMC presents various dimensions driving motivation: firm’s governance, culture, incentive systems can influence motivation at the organization level, whereas individual values and mores are cultural drivers of motivation (Chen and Miller, 2015). At the industry level, scarcity of outside resources or an industry crisis force companies to build proficient relationships or renew technologies, which is named by Chen and Miller (2015) as “crisis and birth”.

Capability represents the firm’s resources to engage in the collaborative approach (Chen and Miller, 2015). Similarly with awareness and motivations, capabilities are described in three levels in the AMC framework. At the organizational level, core capabilities include superior technical equipment and skilled human resources that enhance the firm’s ability to engage external partners in a cooperation approach (Chen and Miller, 2015): strong organizational capabilities attract outside partners (Dyer and Chu, 2011). At the industry level, the nature of the firm’s environment, i.e. a rich business environment, is a capability (Chen and Miller, 2015): having a fruitful environment facilitates the discovery of potential partners and new knowledge. At the cultural level, people’s experience and practice is a core capability to develop cooperation.

Table 1 summarizes these constructs introduced into the AMC framework by Chen and Miller (2015). According to recent applications focusing on cooperative decisions, we adapt the AMC framework to investigate the precedents of purchasing’s contribution to innovation exploration.

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<td>Firm governance, culture, incentives</td>
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<td>Industry Industry</td>
<td>Physical proximity</td>
<td>Crisis and birth</td>
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<td>Culture Culture</td>
<td>Upbringing and socialization</td>
<td>Values and mores</td>
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Table 1 – AMC model (Chen and Miller, 2015)

3.2. Adapting AMC framework to purchasing: defining purchasing awareness, purchasing motivations and purchasing capabilities

**Purchasing Awareness** concerns purchasing’s visibility of innovation opportunities in firm’s ecosystem; these may come from the firm’s supply network or from within the firm. Developing a perfect awareness of the supply market to capture sourcing opportunities is a traditional task.
for purchasing, but surveying sources of innovations is not a systematic process. Literature describes extensively how purchasing can gain visibility of the supply market, mainly through involving suppliers in NPD (Narasimhan, 2013; Ragatz et al., 2002). Few papers describe how purchasing can develop its awareness of innovations opportunities: by joining innovation clusters (Alfonso-Gil and Vazquez, 2010), using information systems or open innovation platforms to search for innovative sourcing opportunities (Homfeldt et al., 2017; Gonzalez-Zapatero et al., 2016), or using idea-collection systems to collect suppliers’ innovative solutions (Melander and Lakemond, 2015). AMC framework suggests that without awareness, there is not possible support and cooperation with suppliers. However, the view literature does not present purchasing’s awareness of sources of innovations as a precedent of innovation exploration. Thus, the first question is:

**RQ1: How is purchasing made aware of opportunities to contribute to the firm’s innovation exploration?**

**Purchasing Motivation** represents purchasing’s willingness to explore supply networks to detect new sources of innovations, or to find suppliers able to execute innovations designed in the buying firm. Purchasing may be motivated to explore innovations to achieve short term quality, cost and delivery benefits (Choi and Krause, 2006) or to NPD goals (Tracey and Neuhaus, 2013). Explicit incentives such as metrics (Patrucco et al., 2017) and bonuses and rewards (Gonzalez-Zapatero et al., 2016), may push purchasing to create market opportunities to source innovations. Purchasing can also be attracted by innovative capabilities from non-traditional suppliers or start-ups (Homfeldt et al. (2017) or can be forced to adapt to market changes (Gonzalez-Zapatero et al., 2016). Furthermore, motivation can come from purchasing’s need to continuously update its market knowledge and market visibility (Sjoerdsma and van Weele (2015), and to refine purchasing strategy and purchasing might seek to contribute to innovation exploration to strengthen its internal status and to increase its internal recognition (Schiele et al., 2011). Van Echtelt et al. (2007) suggest that individual motivations to explore innovation may originate in the buyer's own interest to technologies. However, literature does not present these motivations as precedents to innovation exploration. Our second research question is:

**RQ2: What motivates purchasing to contribute to innovation exploration?**

**Purchasing Capabilities:** Purchasing functions are often not evaluated on innovation but on cost savings, they are not traditionally equipped to the role of innovation exploration. The capability of contributing to innovation exploration cannot be taken for granted (Mikkelsen and Johnsen, 2018). Literature reports on several capabilities making purchasing contributing to innovation exploration: communication, coordination, supplier’s integration (Spina et al, 2016), sourcing relationship capabilities (Weeks, 2009), relationship-building capabilities (Cavusgil and Zou, 1994). Specific processes and managerial systems (Leonard-Barton, 1992), purchasing budget and policies for innovation search (Pihlajamaa, 2017) enhance purchasing’s contribution to innovation. A recent study suggests that gathering unmet needs, involving suppliers in innovation projects, and exploring external opportunities are key capabilities to succeed in innovation exploration (Legenvre and Gualandris, 2018). Excepted these fragmented publications, traditional frameworks of PSM skills and capabilities do not consider innovation (e.g. Tassabehji and Moorhouse, 2008). No study presents how companies adapt internal capabilities to develop purchasing’s maturity in the objective to contribute to innovation exploration. To complete these frameworks, our research aims at answering to the following question:
RQ3: Which capabilities are required to enable purchasing to contribute to innovation exploration?

As a summary, Table 2 presents the 3 dimensions of the AMC framework adapted to purchasing, and bridges with references found in the PSM literature:

<table>
<thead>
<tr>
<th>Main Themes</th>
<th>Related sub-themes from PSM literature</th>
<th>Representative articles found in PSM literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational structures and processes fostering information sharing:</td>
<td>Purchasing integration with other functions, early purchasing involvement in new product development.</td>
<td>Boumgarden et al. (2012); Luziini et al. (2011); Legenvre and Gualandris, (2018); van Echtelt et al. (2007); Kahkönen et al. (2017); Wynstra et al. (2003); Johnsen (2009)</td>
</tr>
<tr>
<td>Information Systems facilitating access to innovations: procurement suites, patent analysis, open innovation platforms, systems to collect suppliers’ suggestions via idea-generation systems, etc.</td>
<td>Trautrim et al. (2017); Homfeldt et al. (2017); Melander and Lakemond (2015)</td>
<td></td>
</tr>
<tr>
<td>Close proximity to suppliers’ innovations: suppliers’ involvement in NPD, geographical proximity, connections with innovation clusters, knowledge of supplier suppliers (tier-n), start-ups incubators, etc.</td>
<td>Narasimhan, (2013); Ragatz et al. (2002); Quintens et al. (2006); Livengood and Reger, (2010); Alfonso-Gil and Vazquez, (2010)</td>
<td></td>
</tr>
<tr>
<td>Informal scouting activities: span work boundaries, informal discussions and interactions with suppliers, individual knowledge, natural interest for technologies</td>
<td>Wooldridge et al. (2008); Liu et al. (2017)</td>
<td></td>
</tr>
<tr>
<td>Follow firm’s governance, culture, strategy, processes, incentive system (bonus, reward, etc), solicitations by another department</td>
<td>Hartmann et al. (2012); Narasimhan, 2013; Pihlajamaa, (2017); Gonzalez-Zapatero et al. (2016)</td>
<td></td>
</tr>
<tr>
<td>Achieve short term quality, cost and delivery benefits improve a KPI, Contribute to NPD goals, respond to a solicitation of another department</td>
<td>Tracey and Neuhaus (2013); Schiele (2010); Paedroughge et al. (2017); Consten and Felde (2005); Choi and Krause, (2006); Patrucch et al. (2017)</td>
<td></td>
</tr>
<tr>
<td>React to customers’ market changes: radical consumer shifts to new technologies, need to quickly adopt a competitor’s innovation, need to keep following the market evolution, etc.</td>
<td>Gonzalez-Zapatero et al. (2016); Williams and Smith (1990)</td>
<td></td>
</tr>
<tr>
<td>Develop innovative long term plans: Benefit from non-traditional suppliers’ innovation capabilities, sign long term contracts incl. co-innovation, be first to engage a relationship with a start-up, etc.</td>
<td>Homfeldt et al. (2017); Schiele (2006, 2010); Gonzalez-Padron et al (2008)</td>
<td></td>
</tr>
<tr>
<td>Influence firm’s strategy: refine purchasing strategy, influence technology/supplier selection, strengthen internal recognition, develop firm’s business visibility and tech road maps</td>
<td>Patrucch et al. (2017); Mikkelsen and Johnsen (2018); Sjoerdsm and van Weele (2015)</td>
<td></td>
</tr>
<tr>
<td>Individual intrinsic motivation: satisfy its own interest about technologies, develop personal knowledge, network with innovative clusters, etc.</td>
<td>van Echtelt et al. (2007); Gimeno, (1999)</td>
<td></td>
</tr>
<tr>
<td>Organizational structure design: separated unit focused on innovation, implementation of a champion’s role, cross-functional interaction mechanisms, processes, etc.</td>
<td>Maier et al. (2017); Melander et al. (2015); Pihlajamaa et al. (2017); Liu et al. (2017); Patrucch et al. (2017)</td>
<td></td>
</tr>
<tr>
<td>Right vision of future market expectations: usage of service providers, participation to innovation clusters, connection with customers.</td>
<td>Nambisan and Sawhney (2007); D’Antone and Santos (2016); Legenvre and Gualandris, (2018)</td>
<td></td>
</tr>
<tr>
<td>Availability of digital tools facilitating innovation-related tasks: AI-based softwares for managing IP in new contracts, internal SharePoint systems to collect IP rights, to fund risks taken in a co-innovation project.</td>
<td>Kim and Chai (2017); Spring and Araujo (2014);</td>
<td></td>
</tr>
<tr>
<td>Individual skills: Ability to look beyond work boundaries, to build an informal supply network, to leverage on a creative mindset, to inspire trust to suppliers in an uncertainty context, etc.</td>
<td>Cousins et al. (2011); Homfeldt et al. (2017); Liu et al. (2017); Kulangara et al. (2018); Sjoerdsm and van Weele (2015); Schoenherr et al. (2012); Schiele (2006); Gonzalez-Padron et al. (2008); Luziini et al. (2015)</td>
<td></td>
</tr>
<tr>
<td>Governance mechanisms between parties: ability to contract with start-ups, to secure a relationship including IP rights, to fund risks taken in a co-innovation project</td>
<td>Pihlajamaa et al. (2017); Kahkönen et al. (2017); SjÖdin and Eriksson (2015); Hüttinger et al. (2014); Schiele (2012);</td>
<td></td>
</tr>
<tr>
<td>Resource-richness of the supply network: quantity and quality of the innovative suppliers (current+new), richness of start-up ecosystem around the company, ability to serachs beyonf tier-1 suppliers, etc.</td>
<td>Legenvre and Gualandris, (2018); Trautrim et al. (2017); Tracey and Neuhaus (2013)</td>
<td></td>
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</tbody>
</table>
Figure 1: Conceptual framework for investigating precedents of purchasing contribution to innovation

4 – RESEARCH METHODOLOGY

4.1. Research strategy

Our research project is complex in a sense that it includes complex business relationships due to interactions between purchasing and other functions within and outside a firm. This complexity encouraged us to follow a case study method, as suggested by Stuart et al. (2002). Our research investigates a new phenomenon, because no clear body of theory reports on purchasing contribution to innovation exploration. The exploration of a new phenomenon requires the collection of all the necessary contextual insights about the topic (Halinen and Törnroos, 2005). Case studies “capture the dynamics of a studied phenomenon and provide a multidimensional view of the situation in a specific context” (Järvensivu and Törnroos, 2009). Case-study research fits well with operations and supply chain research (Voss, 2010). The purpose of our case study is in line with the principle of theory elaboration (Ketokivi and Choi, 2014) and follow a rigorous process (Stuart et al., 2002). Thus, we do not present a priori propositions but pose open research questions and allow for themes to emerge from the findings.

4.2. Case study selection

We searched for companies that had already made changes to their purchasing function to involve purchasing in innovation. This proved very challenging but nevertheless resulted in a list of potential target companies. Having contacted the companies, we reduced our list to only two companies and both agreed to contribute to our research. These companies are both French innovation intensive manufacturers, yet are different in sizes and have different levels of purchasing maturity. We follow Pettigrew (1992), who suggested that it makes sense to select
rare cases where the process of interest is “transparently observable”, not to say exacerbated. Table 3 presents the two firms.

We refer to the first company as S Corp: an international group, worldwide leader in connected solutions for building, infrastructures and industry. On a corporate level, the S Corp culture is oriented to long-term views where innovation is a priority.

We refer to the second as D Corp: a family-owned company that designs, manufactures and sells electronic products for home applications and buildings.

### Table 3 – Case selection: descriptive data (Source: Authors)

<table>
<thead>
<tr>
<th>Firm's core business</th>
<th>Date of Creation</th>
<th>Country of origin</th>
<th>Employees</th>
<th>Total nb of patent (as of 2016)</th>
<th>Innovations developed in 2016</th>
<th>Innovation in which purchasing contributed (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S Corp: Develops, manufactures and commercializes home/building automation systems,</td>
<td>1836</td>
<td>France</td>
<td>150,000 (among which 1,800 employees in purchasing dept = 1,2%)</td>
<td>20,000</td>
<td>115</td>
<td>40 (35%)</td>
</tr>
<tr>
<td>electric power distribution systems and industrial safety systems.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Corp: Develops, manufactures and commercializes smart home/building systems,</td>
<td>1998</td>
<td>France</td>
<td>800 (among which 15 employees in purchasing dept = 1,8%)</td>
<td>350</td>
<td>25</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>communication systems and energy management solutions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3. Data collection

Focusing on intra-organizational relationships and dynamics, our unit of analysis is the purchasing function. We conducted 28 interviews across several departments in each firm (Table 4). We involved various hierarchical positions in purchasing department spanning strategic and operational levels. We covered a range of purchasing roles, including project purchasing, category purchasing, and “innovation purchasing”, as well as R&D, business development, and strategic innovation departments. Our goal was to gain insights from “a broad spectrum of people with regard to their roles within the company and their experiences” (Dubois and Araujo, 2007, p. 175) to increase the depth of the observations and to obtain multiple perceptions.

We adopted an active interviewing methodology, treating the interview as a social experience in which knowledge is jointly created by the interviewer and the interviewee (Holstein and Gubrium, 2004). The interviews were semi-structured: the topic was fixed but the scope was relatively broad, focused on processes and events. We designed three versions of the interview guide: Appendix 1 shows the generic version which was adapted to the interviewees’ profile. Questions about strategic vision and change management were asked to VPs and Directors, whereas questions about processes and operational activities were asked to managers and purchasers.
All interviews were recorded and transcribed, resulting in 290 pages of text. We decided to implement a manual data coding process (DeCuir-Gunby et al., 2011). Based on theories, the initial codes included 3 coding structures related to innovation awareness, motivation for innovation exploration and capabilities to explore innovations. Our coding method then followed Ragin (1997), using data driven codes to take the context into account. Following Miles and Huberman (1994), we organized the codes into a large matrix structure representing multiple interviewees in columns and codes in lines to identify emerging patterns and facilitate the detection of similarities and differences in responses. During the coding phase, we have also elaborated additional categories reflecting the constructs introduced by Chen and Miller (2015), in order to classify our findings. We kept a log of representative quotes from interviews to illustrate particular points. Finally, we analysed emerging themes that we sought to bridge back to the themes arising from the literature.

4.5. Research validity

The term validity has a different meaning here from the positivist approach (Järvensivu and Törrroos, 2009). Our goal is not to construct a generalizable theory from a positivist perspective but to explore a phenomenon in its specific context. Two case studies does not allow us to empirically generalise but the risk of relying on only two cases is mitigated through the investigation of multiple stakeholders within an organisation and to collect data from multiple actors (Halinen and Törnroos, 2005). Our research is "authentic and fair" (Lincoln and Guba, 2000), meaning that all stakeholder voices have been heard and considered in the results. To increase validity, we also returned reports to interviewees to gain their confirmation and clarifications in order to correct any misinterpretations and we collected multiple sources of evidence e.g. reports and organization charts. We looked at cases that are maximally different, to report on the contrasting nature of the findings, which helped “to record evidence of other factors that might be alternative explanations for the observed patterns” (Stuart et al., 2002, p. 425).

5 - FINDINGS

5.1. Findings within D Corp (Case 1)

A family company created in the early 1970s, D Corp leads the smart home building solutions business in Europe, offering technological solutions to support energy transition and personal comfort both at home and at work. The product range consists of control energy, lighting,
boilers, heaters, and roller shutters. In the past, D Corp designed products (electrical and mechanical components) with little innovative content. For instance, D Corp used to upgrade its range of remote controllers for heating systems from an analogic to a digital version to include LCD screens. This added value to the end customer by making interfaces more user-friendly.

Recently, D Corp faced drastic changes in its core consumer market and incremental product improvements were no longer sufficient to capture new market shares, or even to maintain existing market positions. The market was disrupted by small firms offering apps for smartphones potentially rendering the D Corp products obsolete. This change forced D Corp to adopt new technologies and services that were not well-known inside the firm, such as cloud services, smartphone apps based on Internet of Things (IoT). D Corp was not used to deal with connected products.

The R&D culture in D Corp was described as “designed-inside” but the company realised it had to make changes to boost innovation management. The company therefore decided to open up another department supporting innovation called Research and Innovation (R&I) to explore market and technological changes and to push new strategic orientations to other departments, including purchasing. Technical departments (R&D and R&I) still hold a strong position, with purchasing seen as a follower. In 2013, the managing director nominated the R&D director as the head of the purchasing department. This move proved significant, signalling that purchasing must be involved in R&D and innovation.

Despite this change, D Corp still suffers from a management in “silos”, where purchasing is not expected to detect innovations but is only encouraged to disclose good practices identified within the existing supply base. Purchasing is therefore implicitly an executor rather than an importer of innovations with R&D and R&I remains in charge of innovation.

Nevertheless, D Corp executives have understood the opportunity to secure complementary assets from suppliers, and in 2017 they asked purchasing to start exploring innovations outside of the current supply base. This novel strategy has not yet resulted in clear successes, especially as purchasing struggles to adapt to these new expectations and learn how to source new technologies. Sourcing cloud services is definitely not the same as sourcing a printed circuit boards.

D Corp purchasing awareness: various sources make Purchasing aware of innovation opportunities. The first source of awareness comes when purchasing is solicited by technical departments (R&D and R&I) who can detect innovations in the market. Once R&D or R&I decide to develop an innovation found outside the firm, they direct purchasing to source the innovation in question so that the innovation can be produced and then commercialized. Purchasing is seen as an internal support to technical functions, and the supplier is an executor, even if the supplier is the innovator.

“Purchasing acts as a post mail between suppliers and R&D” (D Corp Purchasing Director).

The second source of awareness is the supply base itself. Purchasing integrate suppliers early in the development of new products, to foster information sharing at the earliest in a project. If purchasing identifies an interesting innovation within the supply base, purchasing informs R&I who takes the lead in assessing the opportunity. However, purchasing does not actively manage this:
“It is a permanent technological market survey within the existing supplier base, but quite passive: I ask my suppliers to inform me when they have something innovative. If one of my suppliers show me something strange or supposedly innovative, then I take a picture, make a note and send it to R&D” (D Corp purchaser).

Surveying the supply base consists also in organizing “tech days” at D Corp premises. During these annual events managed by purchasing, current and new suppliers are invited to showcase their innovations. During these events D Corp purchasing has a good chance of involving R&D and R&I, but this is not always successful:

“We organise tech days since 2013, but we hardly succeed to get other departments coming to attend. Even if we insist… it remains very hard to make R&D or R&I people join. They always have a good excuse to avoid coming, although suppliers are here with very interesting things to share with us” (D Corp Purchasing Manager).

The third source of awareness relates to various connections with firm’s external network, for instance through service providers who are solicited by purchasing to scout the supply market and find innovative technologies when needed. Purchasing attempted also to build partnerships with universities, but this was not successful. Non-regular contacts with innovators during exhibitions, trade shows are also done and could provide opportunities, but this is rarely done by purchasing:

“Apart from innovations designed inside that we need to source outside, it remains a coincidence when purchasing discovers an innovation outside and bring it back into the firm, even more rare to make it accepted by internal teams” (D Corp R&D Manager).

The fourth source of innovation awareness come from information systems used at D Corp. Purchasing has implemented a procurement suite, which includes a module for technological sourcing. This allows purchasing to access to technologies which are not yet well known internally. Limitations of this tool are related to the very small amount of real opportunities offered by the system.

**D Corp Purchasing motivations:** purchasing is motivated to explore innovation in the supply base because of the need to source new technologies. Radical market changes imposed purchasing to adapt to new needs including cloud and data services, integrated software, and immaterial products, while they used to purchase electro-mechanical components.

“We are struggling to source what is expected from us since these radical market changes. We are not trained yet to find innovative suppliers in the fields of data management, smartphone apps, etc. but we must adapt quickly” (D Corp Purchasing Manager).

D Corp’s governance and corporate culture seem to have little influence on purchasing’s motivation to explore innovation as top management keeps asking the technical teams to develop innovations and not purchasing. Management incentives have more impact, because innovation sourcing is part of the mission written officially in the purchaser’s statement of work:

“The motivation to explore innovation is not a wish, because this is part of the mission. It is written in the buyer’s mission profile, so they’re forced to keep surveying the market for innovations” (D Corp purchasing Director).
The motivation is more opportunistic when a buyer meets a supplier and starts having an unformal discussion. For example, one D Corp buyer stressed repeatedly during our interview that:

“Individual creativity about what is feasible to do with suppliers is exacerbated during informal discussions with our traditional partners” (D Corp buyer)

At the individual level, buyers have limited intrinsic motivation to move naturally towards innovation exploration. Some of them have personal interests in certain technologies and attempts to transpose external ideas into professional knowledge. Such personal knowledge is acquired through personal investigations, interests, readings and participation in social networks. But having only personal sources of knowledge is not enough to provide sufficient innovation opportunities back to the firm. Indeed, there is no clear track of any positive individual contribution, showing that the origin of the innovation is personal knowledge. Moreover, buyers receive little consideration by technical departments in case they come up with something potentially valuable.

**D Corp purchasing capabilities:** The ever-changing technological environment forces D Corp to consider individual technical knowledge as a core capability in purchasing to better contribute to innovation exploration:

“Purchasers must have a minimum technical background, a good understanding of how the firm processes to adapt to new technological needs and to develop innovations” (D Corp Purchasing Director).

The need for purchasers to be curious and capable of learning from new technologies was also emphasised by the purchasing director. Technical knowledge enables purchasing professionals allows to better communicate with technical departments (R&D and R&I), and with suppliers. The individual ability to interact with others was seen as key:

“The buyer must have soft skills such as communication skills and a good aptitude to manage interpersonal relations. This is key to me, right after technical skills” (D Corp Purchaser).

The capability to motivate suppliers and to convince internal colleagues was also important for D Corp purchasing although this as driven by personal willingness rather than being a formal task:

“We will motivate our traditional suppliers to go and explore new technologies, so that we can all get things moving. That said, it is mainly our personal willingness to look outside the box and to convince people internally that is determining our contribution to firm’s innovativeness” (D Corp Purchaser).

D Corp has not created a dedicated purchasing team to focus on innovation exploration:

“Due to our limited firm size, we cannot create specific positions focused entirely on innovation exploration. Our buyers take a limited portion of their time to stay tuned with the market, but we know it has a limited impact” (D Corp Purchasing Director)

Consequently, purchasers struggle to balance daily tasks and innovation explorations:

“I have limited time to screen the supply base and find innovations. The time assigned to traditional purchasing tasks takes 99% of my working time. Our priority is to solve problems
R&D and purchasing agree that a good supply base is a competitive resource and that a resource-rich environment contributes to provide idea generation. However, purchasing considers that it has too few contacts with start-ups or innovation clusters to really impact firm’s innovation capabilities. Purchasing is mainly focused on the existing supply base, making the path to access to non-traditional or distant suppliers very hard.

<table>
<thead>
<tr>
<th>Codes</th>
<th>D Corp : different views from various departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>R&amp;D or R&amp;I</strong></td>
</tr>
<tr>
<td><strong>Purchasing integration to technical functions (R&amp;D, etc.)</strong></td>
<td>“We can buy it from P. R&amp;D can’t submit the tech specs to F. R&amp;D does not have any permanent surveys of the market needs, including suppliers. Only after purchasing decided.”</td>
</tr>
<tr>
<td><strong>Supplier integration</strong></td>
<td>Tech days (innovation event) 1x year. We involve suppliers in our design phases to ask for their feedback.</td>
</tr>
<tr>
<td><strong>IT tools and information systems</strong></td>
<td>D Corp has linked contacts with start-ups. D Corp is not involved in innovation clusters. Good connections with various consulting firms which can provide some support.</td>
</tr>
<tr>
<td><strong>Firm historical culture, values and positioning</strong></td>
<td>Firm oriented towards technology development (market follower)</td>
</tr>
<tr>
<td><strong>Governance, corp-strategy and management incentives</strong></td>
<td>Corp strategy reports on a clear mission towards innovation, but no incentive process apart for R&amp;D.</td>
</tr>
<tr>
<td><strong>Market shifts</strong></td>
<td>Market impose changes, firm follow the competition. Radical changes are coming again soon.</td>
</tr>
<tr>
<td><strong>Solicitation by another department</strong></td>
<td>When we need to source an innovation, we involve purchasing. Sometimes we ask them to source a key innovation which we identified.</td>
</tr>
<tr>
<td><strong>Metrics, KPIs to measure contribution to innovation</strong></td>
<td>RM measures the innovation performance, not none else in the company.</td>
</tr>
<tr>
<td><strong>Intrinsic motivation to be part of innovation process</strong></td>
<td>R&amp;D feels that purchasing attempts to get more influence internally, since the former R&amp;D director moved to a purchasing position.</td>
</tr>
<tr>
<td><strong>Organizational structure design</strong></td>
<td>There is no specific unit to explore innovations. R&amp;D says that this should not be a problem because purchasing has limited responsibilities in exploring innovations.</td>
</tr>
<tr>
<td><strong>Routines and processes</strong></td>
<td>R&amp;D has implemented routines and processes to scout innovations, but purchasing is rarely involved.</td>
</tr>
<tr>
<td><strong>Richness of the supply base</strong></td>
<td>A resource-rich environment contributes provide idea generation. But current strategic suppliers are best placed to innovate</td>
</tr>
<tr>
<td><strong>Individual capabilities</strong></td>
<td>Good technological background, knowledge about firm process, curiosity, openness to new tech, learning capabilities</td>
</tr>
</tbody>
</table>

Table 5: Summary of case findings at D Corp

5.2. Findings within S Corp (Case 2).

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S Corp has a long history of innovation. At corporate level, S Corp always fostered innovation and technological progress, which spread innovation culture down to all departments. This strong “designed inside” culture is still visible in the company and the sole strategy until recently: R&D innovates internally and pushes these to the market.

Since about a decade ago this began to change, moving S Corp from an “innovation push” towards an “innovation pull” model. S Corp now identifies innovation needs within the customer base (internally known as “customer pain point”). Then internal teams have to explore ways to respond to these needs, mainly by importing innovations from outside the firm. At S Corp, the Business Development function is now considered as a better source of innovation detection than R&D. The majority of S Corp interviewees reported that innovation detection come mainly from “the understanding of customer market needs” rather than “getting technical demand from R&D”.

Thus, innovations coming from outside are increasingly considered as valuable. Consequently, involving purchasing in innovation exploration is a also recent change at S Corp. The purchasing department is embarked in the process of innovation exploration, as all strategic functions are. Purchasing is used to being involved in NPD searching their networks to find suppliers capable of executing innovations designed inside. But in the new era, the purchasing organization has been redesigned to become equipped to contribute effectively to innovation and a new function emerged: Purchasing & Innovation (P&I), devoted to orchestrating innovation activities in purchasing and its stakeholders.

One example of purchasing exploration at S Corp is the implementation of an energy-saver public lighting system connected with sensors capable to detect movements in the streets. R&D could not respond to this need whereas P&I had already in its radar a start-up who developed an innovative product, available “turnkey”. S Corp incubated the start-up, using a specific contract negotiated by purchasing, and started to buy the modified product from the start-up in question 12 months after under a shared patent.

**S Corp purchasing awareness:** integration with departments surrounding purchasing are the first mean to be aware of an innovation, especially Business Development. After the identification of a customer’s need, Purchasing is solicited to check whether the current supply market can provide an answer to this need, or if P&I has something in its radar coming from outside the current supply base. If nothing is available, active exploration is engaged, involving P&I. Most of S Corp interviewees reported that:

“purchasing awareness comes mainly from the understanding of customer market needs though purchasing interactions with business functions rather than getting technical demand from R&D”

A second mean of purchasing awareness is the R&D function. R&D detects technological risks or opportunities, listens to the technological market, attends trade shows, exhibitions and start-up clusters. R&D requests purchasing to work with the innovation provider (often a start-up) to set up a contractual frame to make the business relationship happen. The challenge is that traditional purchasing functions are not used to contract with start-ups including IP rights, neither to source a concept rather than a product.

The third source of awareness comes from the physical proximity with supply network with existing or new potential suppliers. The quality of the ties between purchasing and the “geography” of the supply network influences purchasing’s awareness of new opportunities. Purchasing is already in close contact with existing strategic suppliers but does efforts to stay
close from new sources of innovations. For example, S Corp purchasing is involved in several innovation clusters:

“clusters provide new opportunities of sourcing innovation. It makes us aware of an unknown firm’s strength, product or service”

These clusters attract specialized suppliers, start-ups and new entrants. Clusters consequently become a source of knowledge and a facilitator of complementary alliances. P&I’s network includes also trade associations or start-up incubators.

“These sources all serve as platforms to share data, to enlarge the scope of supply network. We find opportunities for exploring new technologies, to communicate our needs, and to interact with our pairs” (Strategy and Innovation Purchasing BU Director).

Last, P&I can use IS tools available in the company: There are specific communication tools implemented to manage data across the company, similar to Sharepoint. They can also use open innovation platforms (Yet2.com), web apps (InnoCentive), big data apps, complete procurement suites (Ariba) to scout innovations or to add data to internal systems.

S Corp Purchasing motivations: innovation culture and strategic priorities related to innovation are shaped by those who govern, and then spread to all employees through firm’s values and missions. S Corp’s culture is oriented to long-term views where innovation is a priority, which incentivize everyone including purchasing:

“Innovation incentives come first from the CEO. Our CEO has an excellent strategic vision and has inspired many transformations in the company since he arrived. He trusts purchasing capabilities to deal with innovations” (P&I Director). “A clear corporate strategy focused on innovation facilitates alignment with functional and operational tasks and make people move forward.” (Innovation Director).

The second source of motivation for purchasing is when buyers are solicited by other departments to manage tricky relationships with innovative suppliers. Purchasing is particularly involved early in innovation programs (more advanced than development programs), to be part of decisions and to provide a contractual frame to discussion with start-ups.

“Purchasing must be involved in everything about supply relationship management. Any discussion with a supplier will come back, in fine, under purchasing management, including innovation-related topics. Therefore, that’s logical to involve purchasing early in these activities, to avoid discovering problems later in a program.” (P&I Director).

The third source of motivation comes from a few metrics implemented to measure innovation sourcing performance. Purchasing measures collaboration level with strategic suppliers, and counts the number of suppliers’ innovations that have been discovered under their [purchasing] advises. However, purchasing feels that the overall measure of suppliers’ innovativeness is not reliable enough, although they think that KPI systems are in a continuous improvement:

“Measuring the discovery of an innovation is a first step. It is the most important motivation factor, because we measure purchasing work. But we keep searching for a reliable assessment method of supplier’s contribution. We are even not sure that measuring creativity with a KPI is the best way to proceed.” (P&I Director).

Motivations are also from extrinsic origins. A recent shift of market expectations towards service-integrated products, which was not the core technology at S Corp, imposed a new
product positioning and “re-birth” of the purchasing strategy. This drastic change in the market impacted the type of suppliers targeted for new sourcing and processes to split the exploration of innovative opportunities.

Finally, motivations can be found at the individual level (intrinsic motivations). Purchasers are willing to be part of decision related to supplier’s innovations, because this changes from routines and traditional tasks. Most purchasers are intimately interested by technological matters, keeping an eye on innovations by reading web articles or participating to innovation hubs. Also, being involved at the earliest stages of innovation avoids having troubles later in the development phase:

“We want to be associated to any innovation program involving suppliers. We want to be involved at the earliest in the process. The problem of discovering the context of the innovation too late is that we can no longer influence decisions, raise alerts or identify risks in the relationship with an external partner” (P&I buyer).

**S Corp purchasing capabilities:** the newly created P&I department dedicated to innovation exploration is structurally separated from the rest of the purchasing organization (which includes purchasing operations, projects and category management). The P&I unit is smaller compared to the rest of purchasing department (5 full time employees compared with 1800 employees in total), but it manages functionally about 50 people inside or outside the purchasing department. P&I is more decentralized and flexible, operates independently from category management, and reports to the Chief Purchasing Officer. This unit is expected to scout the external environment to continuously feed innovation tank, and to bridge with NPD teams when the innovation has to be developed. To justify the implementation of this specific purchasing unit, S Corp argues that:

“Traditional organisations [i.e. without this flexible unit] have a reverse effect that inhibits innovation because they are not agile, not focused, not skilled” (VP P&I).

The second key purchasing capability is related to the orchestration of innovation-related activities between suppliers and internal functions. S Corp has implemented a single position, a “champion” (the P&I Director) who has this orchestration role. The P&I champion implements methods, tools, processes to foster supplier’s creativity and to connect suppliers’ innovations with the internal stakeholders who manage the development. He describes himself as the architect of the innovation activities with suppliers, because his role starts from the detection of the innovation, the assessment of its relevance from a technological and business perspectives, and the support of its development.

“I manage - even challenge - all parties within internal community to support the development of the innovation: the most difficult is to convince technical functions to adopt the innovation which has been detected by P&I, because the ‘not designed here’ syndrome is still strong. Ultimately, my role is also to support the commercialization of the innovation” (P&I Director).

The third set of capabilities is imposed by the specific characteristic of innovation sourcing. Contracting with a start-up, managing IP rights, engaging relationship with non-traditional suppliers, negotiating without complete datasheet: this requests tools and processes which are not the same as simple transactions with a component supplier during NPD. For instance, the usage of knowledge management systems to gather, sort out and share collected data, or the involvement AI-driven procurement suites generating contracts including shared patent generation are now part of P&I processes.
The fourth capability comes from supply network itself. The access to abundant and various innovation providers, start-ups incubators or competitive poles, such as “The French Tech” or “Pacte PME” in France is fruitful. S Corp P&I has strong connections with these sources, but has few contacts with academics or universities:

“The external environment supporting innovation is made of four different layers: 1/ Existing strategic suppliers with whom they already have a partnership 2/ Known suppliers but not previously identified as innovators 3/ Large ecosystems, clusters of innovations, some geographical regions where innovators are more concentrated and 4/ Universities and academics.” (P&I Director).

Lastly, the fifth capability refers to individual capabilities. Innovation purchasers are curious, tenacious, capable to listen to multiple sources of potential innovations, and above all are passionate by technologies.

“This is a non-ending process of surveying the market outside the firm, to take notes of each and every little sign of opportunity, and to assess permanently the potential benefit for your company, even at home when reading a magazine” (S Corp P&I buyer).

In addition to this leadership skills and a good sense of risk taking are key success factors for the P&I position:

“P&I folks take risks, try to influence and convince, develop arguments, challenge everyone for the adoption of the innovation” (Innovation director).

Hence, S Corp hires people from other industrial sectors to join P&I positions, to develop a creative and cross-competencies mindset and to boost their ability to explore fast-moving markets.
Corporates use innovative tools and platforms because of confidentiality issues. Paris is too critical. Having suppliers involved in this type of innovations means a door open to the future. R&D can use platforms like SYNERGIE, or ADOCTA where IP is too critical. Very reluctant to use open innovation platforms because of confidentiality issue. Paris is too critical. Having suppliers involved in this type of innovations means a door open to the future. R&D can use platforms like SYNERGIE, or ADOCTA where IP is too critical.
5.3. – Case comparisons

In this section, we compare the two cases highlighting contrasting findings. For each of the three main dimensions of the AMC framework, we present a comparison of the importance given by interviewees to the detailed patterns.

5.3.1. Purchasing Awareness

In both cases, purchasing has built a solid internal network made of formal or informal links tied among the community of colleagues working close to sources of innovation requirements. Particularly, purchasing awareness of innovation opportunities is facilitated by purchasing integration to technical functions (R&D, R&I). At S Corp, tight integration with business development enables purchasing to be closely aware of customer expectations, which in turn facilitates the assessment of supply network innovation capabilities. At D Corp, purchasing awareness comes mainly from technical departments who expect purchasing to source innovations designed inside rather than to explore innovations outside the firm.

The existing supply base is considered as a provider of innovation capabilities. Both firms involve suppliers early in NPD and collect supplier suggestions through an incentivization program. D Corp purchasing organizes “tech days” with current suppliers or potential new suppliers, attend professional exhibitions, and leverages external service providers who can search innovations opportunities. S Corp emphasize informal discussions with suppliers, viewing these as facilitating purchasing awareness of innovation opportunities more than anything else.

S Corp emphasize the quality of the ties between purchasing and a very close network of non-traditional actors: innovation clusters, start-ups incubators, universities or any innovation ecosystem. Physical proximity is important to surveying multiple local sources of potential innovations. Both companies emphasized the use of scientific knowledge and building partnerships with universities.

Information systems are used at S Corp to increase purchasing’s awareness of innovations, but not at D Corp. S Corp purchasing uses several systems among which knowledge management suite, IA-based scouting systems, open-innovation platforms, and procurement applications using machine learning. Systems integration is still in progress, mainly because the e-procurement tools market is very dynamic.

5.3.2. Purchasing Motivations

Purchasing motivation to contribute to innovation exploration comes mainly from organizational drivers: values, culture, corporate vision and CEO mindset towards innovation drives purchasing’s behaviour and motivations in both cases. These values are spread through a set of specific processes in which purchasing is involved, but the implementation differs a lot in the two firms. S Corp trusts purchasing and involves P&I into advanced programs as soon as innovation outsourcing is concerned, which keep the motivation high. S Corp reports that traditional pay-for-performance program is not effective to motivate purchasing towards innovation, because motivation is not sustained when failures are punished. Instead, S Corp exhibits tolerance for failures and has implemented specific KPIs to assess long term success of purchasing contribution to innovation. D Corp has not implemented any reward program so far.
Extrinsic motivations are related to market changes such as shifts in customer expectations, market radical evolution, incentives from customers. Radical technological shifts motivates purchasing to adapt and to renew its knowledge, through an exploration phase. At S Corp, be the first to solve “customers pain points” represents the main motivation, and P&I Director lead all buyers to reach that goal. At D Corp, the short-term benefits are still a good motivation: to gain from short-term performance (cost, quality, delivery, project lead time, etc.), to get a negotiation argument towards other suppliers, to obtain long term contract with a supplier, or to increase visibility on the firm’s business and technology road maps.

In both companies, purchasing is incentivized by the willingness to increase its influence internally, by contributing in the innovation phase, supposedly more strategic. Intrinsic motivations are also made of human factors like curiosity and experience. Among the two cases studied, S Corp has a better success to involve purchasing in innovation exploration because purchasers feel deeply involved in this process and recognized as important contributors. They are incentivized to leave their comfort zone, taking risks and exploring, because S Corp has substantial tolerance for early failure and rewards for long-term success (individual recognitions like bonuses and rewards). D Corp counts on purchasers’ motivations such as self-incentivization towards technological matters, but with non-tangible result.

5.3.3. Purchasing Capabilities

In both firms, one major difference resides in the purchasing organization structure, and the way purchasing deals with tasks related to exploration: at S Corp, there is a specific unit managing innovation exploration full time, but this specific unit does not exist at D Corp. S Corp has also created the position of a “champion”, who orchestrates all activities related to purchasing and innovation. S Corp interviewees reported unanimously that this organizational design is very effective and proficient.

At the individual level, purchasers’ ability to span work boundaries is considered as critically important for taking a position in S Corp P&I purchasing. S Corp sees purchaser’s experience and practice as key factors influencing innovation exploration capabilities. This is related to knowledge and skills embodied in people, culture, background, creativity, agility to explore innovation. For instance, S Corp hires P&I buyers who have limited core purchasing skills but who are able to investigate untested approaches that are likely to fail, and to learn fast from this experience. At D Corp, purchasing capabilities are seen as the accumulation, codification and structuration of knowledge for a long term, hence hires purchasers with a solid purchasing background.

Comparing the two cases, we find that technical and transactional skills are seen as less important than the ability to network, to sustain trusting relationships with supplier, to listen to the market, and to engage a difficult discussions of IP rights with start-up companies. S Corp has developed this set of capabilities, along with capabilities to contract with non-traditional suppliers and the mindset to continuously explore. In addition to this, the ability to convince R&D or to demonstrate the potential benefit of a supplier’s innovation as an important soft skill in both firms.
## AMC Constructs | Emerging Patterns (theory + data) | D Corp | S Corp
---|---|---|---
### A
**Purchasing integration**
1/ Purchasing integration to R&D
2/ Purchasing integration to marketing and business development
3/ Purchasing involvement into innovation-related topics
4/ Physical proximity with innovation clusters (e.g., universities, practitioners’ associations, etc.)
+++ | ++
### A
**Purchasing connectedness to firm’s external network**
1/ Organization of tech days
2/ Attendance to exhibitions, fairs, trade shows
3/ Regular proactive formal discussions with suppliers
4/ Informal discussions with suppliers representatives
5/ Change traditional segmentation from “category mgmt” to a classification based on functions
+++ | ++
### A
**Purchasing connectedness with current supply base**
1/ Use of sourcing systems, and e-sourcing services
2/ Use of collaborative tools (e.g., platforms, open innovation apps, etc.)
3/ Strategic consideration of data management softwares
4/ Use of machine learning, big data and AI to scout innovations
- | ++
### A
**Purchasing Information Systems and tools**
1/ Radical market evolution
2/ Customer pains solving process, customer incentives
3/ Push from a current supplier
4/ Push from a new potential partner
+++ | ++
### M
**Extinsic pressures**
1/ Customer driven v/s Technology driven firm
2/ Influence of the Corporate Strategy
3/ CEO values and mindset
4/ Firm’s governance
- | ++
### M
**Company strategic orientation towards innovation**
1/ To voice purchasing views in the firm
2/ Increase department status and recognition within the organization
3/ Increase its strategic influence internally
4/ Increase visibility on the firm’s business and technology road maps
+++ | +++
### M
**Williness to increase Purchasing influence within the firm**
1/ Institutionalize a new purchasing role (= champion’s role)
2/ Adaptation of supplier selection criteria, new contracting practices.
3/ Adaptation of sourcing group categorization process
4/ Ability to challenge the assimilation phase (i.e., convince other internal departments to adopt an innovation) and to support the adoption.
5/ Involvement into technology push and technology pull to/from outside the firm
6/ Implementation of specific tools/processes to listen to suppliers and assess suppliers’ innovative suggestions.
- | ++
### M
**Within-firm specific incentives**
1/ KPIs, specific metrics to measure purchasing contribution to innovation
2/ Specific processes in which purchasing is involved
3/ Solicitation by another department (R&D, bizdev, etc.)
4/ Need to contract with a start-up or a new partner
5/ Influence of the Corporate Strategy
6/ Push from an external network
+++ | +++
### M
**Individual motivations**
1/ Individual recognition (bonus, rewards...)
2/ Individual knowledge and self-interest in different markets
3/ Own skills development
4/ Personal wish to expand work boundaries
++ | +
### M
**Purchasing short-term benefits**
1/ To gain from short-term performance (cost, quality, delivery, project lead time, etc.)
2/ To get a leverage to deal with current suppliers
3/ To obtain long term contract with a supplier (hook strategy)
++ | -
### C
**Purchasing function specific capabilities**
1/ Institutionalize a new purchasing role (= champion’s role)
2/ Adaptation of supplier selection criteria, new contracting practices.
3/ Adaptation of sourcing group categorization process
4/ Ability to challenge the assimilation phase (i.e., convince other internal departments to adopt an innovation) and to support the adoption.
5/ Involvement into technology push and technology pull to/from outside the firm
6/ Implementation of specific tools/processes to listen to suppliers and assess suppliers’ innovative suggestions.
- | ++
### C
**Firm-specific organizational capabilities**
1/ Specific purchasing unit dedicated to innovation (organization design)
2/ Purchasing integration and cross-functional processes with other departments
3/ Implementation of data sharing systems
4/ Ability to manage the change behaviours from designed-inside to designed-outside (internal processes)
5/ Innovation cycles well structured in distinct phases with distinct processes and routines
- | ++
### C
**Firm’s external capabilities**
1/ Richness of the supply network (active + potential partners)
2/ Attractiveness (as a customer) or being supplier preferred customer
3/ Ability to reach a strategic fit with external partners (strategic agility)
4/ Natural tendency to go beyond work boundaries
5/ Creativity, curiosity, individual experience
6/ Individual informal social networking activities outside of the workplace
7/ Ability to listen to others (suppliers), to "smell" the invention (and its innovativeness potential)
8/ Power of knowing what is searched (functional specs)
9/ Soft skills: ability to create and sustain a partnership. No longer only hard transactional skills
10/ "Business development" orientation, more than "technology development"
11/ No technological expertise, but more an innovation development mindset
+++ | +++
### C
**Individual skills**
1/ Natural tendency to go beyond work boundaries
2/ Creativity, curiosity, individual experience
3/ Individual informal social networking activities outside of the workplace
4/ Ability to listen to others (suppliers), to "smell" the invention (and its innovativeness potential)
5/ Power of knowing what is searched (functional specs)
6/ Soft skills: ability to create and sustain a partnership. No longer only hard transactional skills
7/ "Business development" orientation, more than "technology development"
8/ No technological expertise, but more an innovation development mindset
++ | +-+

**Legend:** - : no mention or clear mention of limited importance       + : little importance       ++ : medium importance        +++ : high importance

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**Table 7:** Patterns emerging from the cross-case analysis (source: Authors)
6 – DISCUSSION OF FINDINGS

6.1. How does purchasing develop its awareness of innovation opportunities to better contribute to firm’s innovation exploration?

Our findings show how purchasing is made aware of a need to contribute to innovation through integration with technical functions. “Functional integration” refers to “intra-firm alignment and information sharing activities across functions” (Swink and Schoenherr, 2015, p71). For instance, involving purchasing in NPD makes it aware of the need to source an innovation designed inside (Schiele, 2010, Wynstra et al., 2001; Legenvre and Gualandris, 2018; Van Echtelt et al., 2007). Purchasing’s integration to R&D facilitates purchasing’s involvement in innovations activities within the buying firm (Jansen et al, 2009; Legenvre and Gualandris, 2018). The two firms we have studied have implemented inter-dependent tasks between purchasing, project teams and R&D, what Gonzales-Zapatero et al (2017) named bi-dimensional process; involving shared and understood information or aligned decisions between these functions.

Our work highlights how purchasing is made aware of innovation through integration with marketing and business development functions. This functional integration allows purchasing to learn customer innovation needs. Literature supports this idea by the notion of marketing and purchasing co-management synergies (Lindgreen et al., 2016). This co-management calls for continuous alignment of customer needs with supply network capabilities, sequentially or simultaneously (Wagner and Eggert, 2016), and provides positive influence on product development speed (Gonzalez-Zapatero, Gonzalez-Benito and Lannelongue, 2017). In our study, we noted that the purchasing function in charge of innovation exploration and business development functions are deeply inter-connected at S Corp: both functions often exchange information about customer needs and suppliers’ capabilities, developing purchasing awareness of innovation opportunities. These findings are also compatible with those of Gonzales-Zapatero et al (2017), providing insights about the benefits of purchasing-marketing integration on product development. Benefits of this integration are also on suppliers’ creativity and innovation capabilities (Schoenherr and Swink, 2012).

Our study is aligned with literature which endorses the need of scouting supply network to source complementary capabilities under conditions of high uncertainty (Philips et al., 2006; Legenvre and Gualandris, 2018; Mikkelsen and Johnsen, 2018; Gonzales-Zapatero et al, 2016). External partners are significant innovations providers, even more than firm’s internal resources (Hartmann et al., 2012). S Corp and D Corp attempt to stay strongly connected with innovation clusters and new potential suppliers, use trend-scouts, incubators and technology centers, keep start-ups in their radar. This type of awareness development is also found in other sectors, such as automotive, where purchasing uses open innovation tools to find innovation opportunities among non-traditional suppliers (Homfeldt et al., 2017).

Last, our study shows that purchasing awareness is facilitated by cultural and individual factors. Willingness to span work boundaries increases awareness in both firms. Literature has neglected to investigate links between purchasing individuals’ self-motivations towards innovation, although other fields demonstrated that the informal social interactions outside work boundaries has a positive influence on innovation (Liu et al., 2017). Our two cases showed that middle management self-motivation to act influences the ability to explore outside traditional boundaries, which fits with Wooldridge et al. (2008) findings. Our two cases confirmed that middle management can play a role in building and leading informal strategic
networks in and across firms for open innovation (Kodama, 2005), or informal social networking activities outside of the workplace (Liu et al, 2017).

6.2. What motivates purchasing to contribute to innovation exploration?

In the two cases we have studied, purchasing’s main motivation to explore innovation is to find knowledge outside current supply base when the current supply base is limited. Literature reports how purchasing can benefit from external sources of ideas to increase its contribution to firm’s innovation capabilities (Homfeldt et al., 2017). This motivation takes roots into purchasing’s traditional role to source external capabilities for the buying firm.

The interesting contrast between S Corp and D Corp resides in what motivates purchasing to engage in innovation exploration. Risk taking and creativity are widely influenced by organizational culture especially in a context of high technological uncertainty (Slater et al., 2014; O’Connor and Ayers, 2005). Our two cases show two radically different managerial contexts. On one hand, S Corp has created a supportive context that stimulates purchasing to be involved in innovation exploration and encourages individuals to optimally allocate their workload to exploration activities. This motivating culture not only tolerates risk taking but also encourages risk taking and accepts failures (Kyriakopoulos et al., 2016, Manso, 2011). On the other hand, D Corp’s purchasing context reflects a “not designed here” syndrome in which purchasing does not feel welcome to contribute to innovation activities. This creates a counter-productive effect and a roadblock for purchasing to stay motivated for innovation exploration. Thus, our study suggests that purchasing motivations to contribute to innovation can be limited if purchasing does not have a strong managerial position within the firm (Mogee and Bean, 1976; Patrucco et al., 2017).

We also noted in both cases that market shifts to new or unexpected customer demands, technological transitions or disruptions can motivate purchasing to explore innovation (Williams and Smith, 1990; Gonzalez-Zapatero et al, 2013). Our two cases manage these transitions differently: D Corp reacts only after a market shift, incentivizing purchasing to start exploring with the aim of adapting to new technologies. The typical example is when D Corp’s purchasing discovers an innovation during “tech days” after its competitors. In comparison, S Corp’s purchasing is incentivized to proactively feed the store of innovation opportunities to anticipate future market changes.

Purchasing’s motivation can be exacerbated by strategic pressure from top management, or by other functions expecting purchasing to source innovations from external partners (Wynstra et al., 2003; Hartmann et al., 2012). Purchasing can also be invited by other departments or NPD teams to take part in the development of technology and marketing roadmaps, calling for purchasing support in innovation exploration (Legenvre and Gualandris, 2018; Wynstra et al., 2003; Hartmann et al., 2012). In S Corp, Purchasing is nominated by the organization to implement open innovation (Maier et al, 2017). Although literature reports that the potential for cost reduction, quality improvement, development time reduction, and lead time reduction can motivate a search for innovations (Homfeldt et al., 2017; Bengtsson et al., 2013; Gonzalez-Padron et al., 2008), our two cases do not clearly show up these motivations.

Literature suggesting that implementing explicit individual incentives, such as bonuses, rewards (Gonzalez-Zapatero et al, 2016) or even metrics fostering innovation exploration (Patrucco et al., 2017), contradicts our S Corp case findings. Most of the S Corp interviewees report that traditional such rewards are not suitable when creative activities and innovation are concerned. Other factors, like the quest for a recognition within the firm (Luzzini and Ronchi, 2011), using innovation as a mean to increase its influence internally are stronger motivations
at S Corp. Also, motivation can reflect a need of individual knowledge development, a self-interest to search for market opportunities to source innovation which is not new in the literature (van Echtelt et al., 2007).

6.3. Which capabilities are required to enable purchasing to contribute to innovation exploration?

The most influential capability found in our research related to the firm’s organization design. Exploring innovations through the use of a distinctive unit appear to be effective at S Corp, whereas D Corp struggles with only one unit. Schiele (2010) argued that a dedicated scouting unit must be distinct from the strategic unit (Schiele, 2010), which has since been suggested by other scholars (Mikkelsen and Johnsen, 2018; Maier et al., 2017; Luzzini and Ronchi, 2011). Such organizational separation is examined also by Melander and Lakemond (2015), who considered that the separation between transactional and relational governance is mainly prevalent in projects with a high degree of uncertainty. S Corp differentiates traditional functions of category and project purchasing from P&I function which contributes largely to innovation exploration. Both structures are separated structurally and are independent functions with independent routines and objectives. This structural differentiation creates tensions mainly between S Corp P&I and technical functions (R&D): P&I faces resistances from R&D, when P&I brings innovations opportunities from supply base into the buying firm.

This study highlighted also the importance of the role of champions, tasked with orchestrating activities related to innovation exploration within the purchasing function and peripheral departments. Although the concept of champions is well known in the wider literature, but very little research in purchasing has examined this (Maier et al., 2017; Narasimhan and Narayanan, 2013). A champion can be considered as a “liaison personnel” to facilitate exchange of knowledge across internal functions (Gupta and Govindarajan, 2000). “Innovation champions” can spread enthusiasm to other employees and facilitate the development process (Gemünden et al., 2007). In our cases, the P&I Director’s role as champion is to understand the market and customer needs and then organise the assessment, absorption and development of a supplier’s innovative solutions. One of the major roles for the champion is also to integrate innovative suppliers with firm’s internal R&D function, often contracting with start-ups or new suppliers. Purchasing champion needs to have multiple capabilities such as good market knowledge together with excellent leadership. It should also have a strong technical background so that he/she understands the technicality of the requirements and have healthy discussions with stakeholders. As we saw at S Corp, a purchasing champion will orchestrate the matchmaking between all parties, so that the assimilation of the innovation succeeds.

Capabilities might come from organizational processes themselves: literature suggests that specific methods and tools to scout new technologies, suppliers, and markets to identify new opportunities are necessary (Pihlajamaa et al., 2017). Our case studies shed light on the usage of information systems in purchasing to scout and acquire innovations: information-processing tools such as open-innovation intermediary platforms (Homfeldt et al., 2017; Sjödin and Eriksson, 2010), IT tools (Kim and Chai, 2017; Spring and Araujo, 2014), web-based supplier’s suggestions web platforms (Homfeldt et al., 2017), patent analysis tools (Trautrim and MacCarthy, 2017; Cox, 2015; Trautrims et al., 2017) to support innovation exploration. With new solutions and technologies offered to purchasing professionals, procurement can tap opportunities for performance improvement and innovation (Wyman, 2018).

Finally, individual purchasing capabilities seem to be specific as soon as purchasing involvement in innovation exploration is concerned. Literature emphasizes the need to have a
knowledgeable, mature and skilled purchasing function capable of scouting the universe of partners to detect opportunities and innovations (Luzzini et al., 2015). This is also suggested by our study. Creativity, curiosity-driven behaviour and innovation-oriented mindset facilitate the contribution to innovation exploration (Kähkönen et al, 2017; Hartmann et al, 2012; Schiele et al, 2011). Ability to convince internal stakeholders, to find the relevant support to get the innovation considered internally (Patrucco et al., 2017), to interact with R&D (Mikkelsen and Johnsen, 2018) are also key skills. But the findings of this research contrast with the seminal stream of literature reporting on purchasing skills and capabilities, which does not report on specific skills to contribute to innovation (Tassabehji and Moorhouse 2008, Knight et al, 2014; Giunipero and Pearcy, 2000).

7. CONCLUSION AND IMPLICATIONS

We have investigated three research questions: How purchasing develops its awareness of innovation opportunities to better contribute to firm’s innovation exploration? What motivates purchasing to contribute to innovation exploration? Which capabilities are required to enable purchasing to contribute to innovation exploration? Following Chen and Miller (2015), we used the lens of the AMC framework to analyse two in-depth case studies of innovation exploration in the purchasing function. We report on precedents enabling purchasing contribution to innovation exploration. The following two sections will present theoretical implications of our research, as well as managerial implications.

7.1. Theoretical implications

This study contributes to academic research in several ways. First, our paper supports the view of a possible contribution of purchasing function to innovation exploration, while traditional thinking is to consider R&D as the main contributor. A few publications report on the possible role purchasing has in innovation, but this is mainly in a low-technological and low-market uncertainty context. Our study contributes to better understand purchasing’s role in innovation exploration under high technological and market uncertainty, through the suggestion of several precedents respectively about purchasing awareness, motivation and capabilities. The refined conceptual presents these precedents and display the linkages with purchasing contribution to innovation exploration (Figure 2).
Second, our analysis suggested that using the AMC framework to analyse purchasing and innovation is relevant, because it helps to understand the drivers of decisions in purchasing.
Cognitive sciences have been rarely used in purchasing, but we think it makes sense to use the constructs found in this field in purchasing, in a sense that cognitive sciences provide very clear set of constructs (Chen and Miller, 2015). Our study demonstrated that the use of these constructs can provide a rich framework supporting actions related to innovation exploration. For instance, we discovered that motivations to move towards innovation exploration are rarely intrinsic, which is in line with the literature, suggesting that managers of large corporations often complain that it is hard to induce their employees to be more innovative (Manso, 2011).

7.2. Managerial implications

Companies face new challenges ever, new risks, digitalization, face-paced market changes. These “new global forces” are impacting business practices (Dobbs et al, 2015). Purchasing must adapt, and innovation exploration is part of this adaptation. Our research offers practitioners an opportunity to consider adapting the purchasing operating model: involving purchasing in innovation exploration is a company-wide strategic transformation, which might provide a competitive advantage to the firm, but is also a challenge. Our study may help practitioners to build a new shape of purchasing organizations, so that it better explores innovations. For instance, we would encourage practitioners to modify their purchasing organization by setting up a specific unit to manage innovation exploration.

Second, considering these enablers, firms can start involving purchasing into advanced innovation projects. Managers can think of the way they integrate purchasing into other functions, meaning how they facilitate cross-disciplinary bridges so that purchasing can be involved in a better understanding of market needs. Doing so, they support purchasing to better tune sourcing strategies, and enhance purchasing internal collaboration and integration to business development. Consequently, purchasing can better explore innovations adapted to company needs.

Third, we found that traditional approach to “innovate inside” is questionable. Of course, R&D and technical functions have still a large control on innovations and products development but working in silos is not an option for companies willing to maximize chances to identify an innovation providing a competitive advantage. Purchasing has access to the existing supply base, and this function has capabilities to explore, to facilitate innovation exploration outside the firm. Managers should consider these opportunities, and let purchasing explore innovations, in particular when the market is quickly shifting to new technologies making future uncertain. Through innovation exploration purchasing can contribute to increase the firms’ visibility, innovativeness and cross-disciplinary interactions.

7.3. Limitations and future avenues of research

Our research encounters some limitations. First, AMC framework suffers from lack of credibility, reliability and validation in the literature. It is difficult to limit the understanding of purchasing contribution to only three factors (A, M, C), and even more difficult to attempt generalizing, but we think this model can be used more broadly in purchasing field. We hope this paper will open future roads of research and attempts to empirically validate the AMC framework in purchasing. Second, although we compared two cases in depth, the number of cases studied is relatively small. We might consider a testing process using larger sample size and a quantitative approach. For instance, the impact of firm size is not enough understood. It could be a coincidence in our case that the biggest firm is more mature in innovation exploration: we can find easily counter-examples.
Future research could investigate the outcomes of purchasing contribution to innovation, metrics to implement to track and measure this contribution. Future research could investigate also drivers and processes about purchasing integration into marketing, to get a better view of the potential benefits of this integration: what are the cross-disciplinary rules and routines implemented between the two departments that make happen the synergy and a better communication? We suggest also that future research investigates the specific skills needed to allow purchasing to better explore innovations, in a context of high uncertainty: there is obviously a strong need to adapt purchasing skills to fast-changing environment, where innovation is becoming a commodity to be sourced from outside the firm, as an “innovated outside” product or service.

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**APPENDIX 1: Interview guide for Purchasing function**

| A. | To begin, can you please describe your firm’s corporate strategy? To what extent is this strategy geared towards innovation and creativity? How does management (board of VPs) encourage creativity and risk taking? How do you perceive tolerance for early failure in your organization? How would you describe your corporate culture, including the relation to uncertainty? |
| B. | Describe the technological innovation process in your firm. Describe the stages of innovation and the stakeholders at these stages: exploration of an idea, identification / detection, evaluation, absorption / assimilation, exploitation or commercialization. |
| C. | Who are the main stakeholders of the innovation process? Describe the activities of these stakeholders. Who are they? Are they important in the organization? How do they contribute to innovation? |
| D. | Describe how the purchasing department contributes to technological innovation in your business. What are the innovation exploration activities carried out by each buyer individually? How is the buyer organized to manage these exploration activities? Can you tell me how many innovations have been sourced by purchasing over the last 10 years? |
| E. | What types of innovations have been managed through the purchasing department? Give an example of a product innovation that has been successful, in which the purchasing has participated. Describe this innovation, its degree of radicality and the level of technological uncertainty. Explain how purchasing contributed to this innovation. Same question with a case of failure. |
| F. | What purchasing organization have you put in place to facilitate the contribution of purchasing to innovation exploration? Since when is this structure in place? What types of interactions does this organization have with other departments of the company? |
| G. | How does purchasing identify innovation opportunities within the current supply base? How does purchasing identify innovation opportunities outside the current supply base? How purchasing is made aware of the need to contribute to an innovation designed inside (via sourcing, scouting, etc.)? How does purchasing survey the technological innovations in the supply market? In most of the cases, from where comes the knowledge that a technological innovation exist? A personal network? Colleagues? Suppliers? |
| H. | What motivates purchasing to contribute to buying firm’s innovation exploration? How management incentivize purchasing to contribute to innovation exploration? What types of incentives exists? Bonuses, awards? Metrics? Others specific recognition? What are the main factors motivating purchasing to contribute to innovation exploration? |
| I. | What types of knowledge and skills are needed for purchasing to contribute to innovation exploration? What specific resources does purchasing need to explore innovations outside the existing supplier network? Prompt: resources = competencies, processes, budget, organization, time allocated, etc. How are collected and managed the data collected by purchasing (data about innovation opportunities)? |
| J. | Do you see paradoxes in involving purchasing in the innovation process? What is your department’s vision of purchasing involvement in the innovation process? What are the tensions related to purchasing involvement in innovation exploration activities? |
APPENDIX 7: Paper 2 / Invitation to JPMS special issue 2018

Invitation to Submit to JPSM’s IPSERA 2018 Conference SI

cdimaro@unic.tr

Jun 30/04/2018 19:22

A Francois Constant <constant.francois@polimi.it>
cc GIANNAKIS Mihalis <mgiannakis@audencia.com>; wendytate@utk.edu <wendytate@utk.edu>

Dear Francois,

We are pleased to inform you that your paper “Innovated outside: examining precedents to purchasing’s contribution to innovation exploration” has been selected for consideration of inclusion in the Journal of Purchasing and Supply Management IPSERA conference special issue. We feel that your paper is very interesting and could make a strong contribution!

To move forward, please confirm that you received this email, and that you intend to submit your paper by June 2nd.

The manuscript will need to be submitted to JPSM by June 2, 2018 using the EVISE system, which is specifically set up for the IPSERA SI. Please, ensure that you submit to the IPSERA SI and not to the regular issues of the journal.

The system is ready to go and upon receipt of the manuscript, the editorial process will begin with a review by the special issue editors who will preliminarily verify that the manuscript is ready to be sent out for a double-blind peer review. Manuscripts that are not ready by June 2nd will not be given further consideration for the SI.

Congratulations, and we look forward to your participation in the IPSERA SI! The SI is looking like it will be a contribution of excellent papers! Please let us know if you have any questions.

Carmela and Mihalis (Special Issue Editors)
Cc: Wendy (JPSM overseeing SI Editor)
APPENDIX 8: Paper 3

Managing tensions between exploitative and exploratory innovation through purchasing function ambidexterity

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Abstract

Building on the emerging concept of purchasing ambidexterity, we aim to explore how purchasing ambidexterity is developed and contributes to manage tensions between exploitative and exploratory innovation. We identify four types of ambidexterity (structural, sequential, contextual and managerial ambidexterity) and discuss the tensions and complementarities between these. We present an in-depth case study of a large firm (S Corp) which has implemented ambidexterity to enable purchasing to contribute to innovation. We observed how the four types of ambidexterity were manifested in S Corp, and used to balance purchasing’s contribution in both exploratory and exploitative activities. The findings illustrate how S Corp designed a differentiated, autonomous, smaller unit to manage exploratory activities and how the infrastructural elements, i.e. incentives and organization, promoted a valuable context to facilitate purchasing’s contribution to innovation. We highlighted also some complementarities between the types of ambidexterity, on which S Corp leveraged to mitigate tensions created at various levels, such as the implementation of a champion to orchestrate purchasing’s involvement in innovation purposes. Last, we report on how S Corp proceeded to develop purchasing ambidexterity in a 2-stage process, over the past 2 decades. Ultimately, we enrich the understanding of purchasing’s role in innovation and provide insights into how managers can develop ambidextrous purchasing.

Keywords: Purchasing; Innovation; Ambidexterity, Tensions

1. Introduction

To prosper, or even survive, firms must excel at both exploitative and exploratory innovation (Tushman and O’Reilly, 1996). Exploitative innovations are incremental innovations designed to meet the needs of existing customers by developing new products or services that rely predominantly on the existing skills that can be mobilized by a company (Jansen et al., 2006; Benner and Tushman, 2003). Exploratory innovations are radical innovations designed to meet the needs of emerging markets by combining new knowledge from inside or outside the firm (Jansen et al., 2006; Benner and Tushman, 2003).

A long tradition of research in organization theory suggests that, at firm level, pursuing exploration and exploitation goals simultaneously may require structures and actions that are fundamentally at odds, making it difficult to pursue both simultaneously without acting on organization processes (March, 1991; Tushman and O’Reilly, 1996). This dilemma is particularly important in product innovation management as firms need to exploit their existing competencies while trying to avoid their dysfunctional rigidity effects by renewing and
replacing these with entirely new ones (Atuahene-Gima, 2005; Leonard-Barton 1992). Creating ambidextrous organizations may facilitate the harmonious development of exploratory and exploitative innovation (Benner and Tushman, 2003; Cantarello et al., 2012).

Organizational ambidexterity refers to the firms’ ability to adapt and develop in their environment (Duncan, 1976), and to succeed at both exploration and exploitation (Tushman and O’Reilly, 1996; Raisch and Birkinshaw, 2008). In this context, exploitation activities correspond to the search for familiar, mature, current or proximate knowledge, while exploration activities correspond to the search for unfamiliar, distant and remote knowledge (Ahuja and Lampert, 2001; Rosenkopf and Nerkar, 2001; Nerkar, 2003; Atuahene-Gima, 1995). Because the benefits of exploration are long term and uncertain, managers tend to put more resources into exploitation than into exploration (March 1991).

However, research has mainly focused on ambidexterity at the organization level, or examined one specific type of ambidexterity (O'Reilly and Tushman, 2013). Researchers have recently highlighted the need for more investigations of the combinations of ambidexterity (Turner et al., 2013), aiming at better understand this concept from a multi-level perspective, such as its application to a function (Raisch et al., 2009) and individual level (Rogan and Mors, 2014). For instance, little research exists on “how managers orchestrate exploitation and exploration” (Turner et al., 2013, p. 328). Analysing ambidexterity at the organizational level is therefore insufficient to embody all antecedents of ambidexterity at a functional level. In this paper, we argue that investigating ambidexterity within the purchasing function is important because purchasing is increasingly confronted with a dual role of (Schiele, 2010) balancing exploitation activities, such as constantly finding ways to save cost, with exploration activities, such as sourcing innovative technology from new supply markets. This role of the purchasing function in exploring innovation from outside the organization is also in line with the open innovation concept (Chesbrough, 2003), as opposed to a more traditional internal approach to innovation.

The term purchasing ambidexterity has been recently coined in the literature, defining “the extent to which a purchasing function simultaneously pursues exploratory and exploitative activities within supply networks” (Gualandris et al., 2018, p. 667). This concept bridges two fields: ambidexterity theory and purchasing’s contribution to innovation capabilities; despite the relevance of this topic it remains under-studied in the purchasing literature (Blome et al., 2013; Kristal et al., 2010).

Our paper aims to analyse how purchasing ambidexterity develops and contributes to manage tensions between exploitative and exploratory innovation. We use a case study research strategy to examine ambidexterity within the purchasing function of a large multi-national company, which has recently made a major organizational change by implementing a “Purchasing & Innovation” function. This new function oversees the contribution of external resources to exploratory innovations, whereas other purchasing functions remain oriented towards exploitative innovation.

Following this introduction, the paper briefly reviews the literature about ambidexterity as a precedent to innovation performance and defines different types of ambidexterity. We present an initial conceptual framework, explain our case study method and report on the findings from the case study. We discuss the findings in the light of existing research and suggest conceptual developments on purchasing ambidexterity. We conclude by outlining the implications and the limitations of our study and suggest future research directions.

2. Literature review

Ambidexterity as an antecedent to innovation
Ambidexterity explains the firm’s capacity to do two different things equally well: manage the short and the long term, make trade-offs between resource allocations, explore and exploit innovations or mitigate tensions between two competing objectives. Ambidexterity through simultaneously exploring and exploiting innovation is key to improving technological innovation performance (He and Wong, 2004). Exploitation involves local search that builds on a firm’s existing technological capabilities, providing the firm with advantages in making incremental innovations. In contrast, exploration involves distant search for new capabilities, bringing opportunities to the firm in achieving new-to-the-world innovations (Nerkar and Roberts, 2004).

Although achieving high levels of exploration and exploitation simultaneously is the challenge of many organizations, literature reminds us that this outcome is not easily achieved (Brion et al., 2008; Boumgarden et al., 2012; Birkinshaw and Gupta, 2013). Tensions can come from combining internal and external technology sourcing (Rothaermel and Alexandre, 2009). Often, organizations “divide their time between conflicting demands for alignment and adaptability” (Gibson and Birkinshaw, 2004, p. 210) and managers fight against organizational routines, invisible forces influencing decisions, calling for new technical skills, market expertise, or external relationships (Lavie and Rosenkopf, 2006). Such tensions can be solved at an organizational level (Andriopoulos and Lewis, 2009) or at an individual level (Mom et al., 2009).

Birkinshaw and Gupta (2013) argue that we need more insights into managerial capabilities to understand how ambidexterity is achieved: “We know some organizations are more ambidextrous than others, but for this insight to be valuable we have to take a more detailed look at the way they make their decisions, who gets involved in those decisions, and how those decisions are implemented” (Birkinshaw and Gupta, 2013, p. 293). This view is shared by Turner et al. (2013) who suggest that ambidexterity reflects a capability of a managerial activity (Turner et al., 2013). Thus, exploring purchasing ambidexterity can be a good opportunity to better understand how purchasing balances exploratory and exploitative activities related to innovation.

Different types of ambidexterity

We can distinguish between four types of ambidextrous organisations, differing in the way they shape the organization and operationalize exploration and exploitation activities. The most common distinction is structural ambidexterity versus contextual ambidexterity (Bonesso et al., 2014), but literature also reports on two other types: sequential ambidexterity and managerial ambidexterity (Mom et al., 2009).

![Four types of ambidexterity](image)

Figure 1: Four types of ambidexterity. Source: Authors

**Structural ambidexterity:** Early research on ambidexterity reported on the necessity to design ambidextrous firms with two distinct and autonomous units: one dealing with exploration and another with exploitation (Tushman and O’Reilly 1996; Boumgarden et al., 2012). One unit enables the efficient execution of exploitation routines whereas another unit focuses on the
execution of non-routine tasks such as exploration and innovation (Raisch and Birkinshaw, 2008). Tushman and O’Reilly (1997) argue that a structural separation between exploration and exploitation activities is key to a successful ambidextrous organization. The main argument in favour of a differentiated organisation is that exploration and exploitation tasks are hardly compatible: trying to balance them within one single unit is impossible (Christensen, 1997; Bower and Christensen, 1996) or might create strategic tensions (March, 1991). Separating exploiting and exploring activities allows organizations to develop incremental changes in exploitative units and radical changes in exploratory units (Tushman and O’Reilly, 1996).

**Contextual ambidexterity:** Gibson and Birkinshaw (2004) argue that reconciling exploration and exploitation activities is feasible. Contextual ambidexterity implies that the same people combine exploration and exploitation activities so that both are coexisting instead of being mutual exclusive (Turner et al. 2013). In the last decade, studies about ambidexterity predominantly concluded that organizations dealing with exploitation and exploration simultaneously are more successful than others (Lavie et al, 2010). For instance, Birkinshaw and Gupta (2013) argued that if an organization put in place dual structures to deal with exploitation and exploration, then “there is no unit of the organization that does only one thing” (p. 294). In such a case, each level of hierarchy within the organization is supposed to make trade-offs individually and solve ambidextrous dilemmas, while dealing simultaneously with exploration as well as exploitation. However, Raish et al (2009, p. 687) point out the difficulty of individuals to manage exploratory and exploitative tasks simultaneously: “Because the need for exploitation and exploration can vary across initiatives as well as over time, managing the differentiation-integration tensions is likely to be an important dynamic capability for creating and sustaining organizational ambidexterity.” The success of this type of organization implies the creation of a supportive context that stimulates individuals to simultaneously manage ambidextrous trade-offs. This context is made of systems, processes or incentives which encourage individuals to optimally allocate their workload to exploitation or exploration (Gibson and Birkinshaw, 2004). Thus, one main difference with structural ambidexterity is the focus on individuals rather than organizations, functions or projects (O’Reilly and Tushman, 2013).

**Sequential ambidexterity:** Exploitation and exploration are sequenced over time and constitute a natural cycle (Rothaermel and Deeds, 2004). Due to a permanent change of environmental conditions or strategies, firms need to adapt their structures and processes, alternating longer periods with a main focus on exploitation with those of exploration (Raisch and Birkinshaw, 2008; O’Reilly and Tushman, 2013). Keeping one single formal unit and making it regularly switching from exploration to exploitation is easier than adapting the culture and informal organization (Nickerson and Zenger, 2002; Boumgarden et al., 2012). The drawback is that the members of such an organisation alternate longer periods of exploitation with shorter periods of exploration and are more likely allocating less focus on exploratory needs (Gupta et al., 2006). Tushman and O’Reilly (1996) suggest that this type of organization is less effective in a context of rapid change.

**Managerial ambidexterity:** Aggregating various fragments of the literature, Mom et al (2009, p. 812) define managerial ambidexterity as a “manager’s behavioural orientation toward combining exploration and exploitation related activities within a certain period of time”. In the three previous types of ambidexterity, organizational tensions are due to trade-offs occurring between exploration and exploitation activities. However, managers can also exhibit personal ambidexterity and behave ambidextrously, by resolving trade-offs at the management level (Raish et al, 2009, Mom et al., 2009). For instance, managers can build strong links between exploratory and exploitative units to foster complementarities and to reach a balance in execution (Boumgarden et al., 2012; Raish et al., 2009). Linkages between both are ensured by
a set of routines and directives and enhanced by resource sharing, coordination and managerial control systems (Raish et al., 2009). Senior managers support the implementation of sequential, structural and contextual ambidexterity (Raish and Birkinshaw, 2008). Birkinshaw and Gupta (2013) argue that managerial capability is central to the contextual ambidexterity perspective, whereas O’Reilly and Tushman (2011) suggest that management controls and culture can support workers to combine contradictory goals within one unit, such as efficiency and control versus creativity. Managerial ambidexterity connects to the fundamental integration mechanisms identified a long time ago by Lawrence and Lorsch (1967). They argue that the more an organization becomes complex due to environmental evolutions, the more it needs to differentiate its structure (structural and sequential ambidexterity) and the less effective the coordination between actors. For this type of organisation they advocate the development of integrator managers who are able to act as facilitators between the different parts of the organisation. Although managerial ambidexterity and contextual ambidexterity are closely related, there is one clear difference between them: contextual ambidexterity implies that individual employees combine exploration and exploitation themselves, whereas managerial ambidexterity implies that managers choose and allocate resources among exploration and exploitations tasks through integration mechanisms and connections to other organizational members and orchestration of activities.

**Purchasing ambidexterity**

In the field of supply chain management, researchers have highlighted the critical role of organizational ambidexterity as an enabler of innovation and cost performance (e.g. Blome et al., 2013) but purchasing ambidexterity remains under-researched. In a recent paper dedicated to exploring purchasing ambidexterity, Gualandris et al. (2018) define purchasing ambidexterity as “a balance dimension and a combined dimension between exploration and exploitation activities”. This balance is also emphasized through the need to reconcile exploitative innovations and exploratory innovations through purchasing operations (Chanal and Mothe, 2005).

The first side of the balance, contribution of the purchasing function to exploitative innovation, has received extensive interest under the banner of purchasing involvement in new product development (NPD) (Wynstra et al., 2003; Van Echtelt et al., 2008, Schiele, 2010). These tasks occur mainly in a project context when the company is looking for external support in order to design new products or services based on existing technological capabilities. Purchasing involves key suppliers early in the NPD process to benefit from joint R&D (e.g. Johnsen, 2009; Patrucco et al, 2017).

The second side concerns how purchasing may contribute to exploratory innovation (Narasimhan and Narayanan, 2013) through searching for new and distant capabilities that bring opportunities to the firm in achieving more radical innovations (Nerkar and Roberts, 2004). Exploratory innovation is typically characterized by high technological uncertainty (Melander and Lakemond, 2014; Narasimhan and Narayanan, 2013), higher risks (O’Connor and Rice, 2013) and the need of new capabilities (Slater et al., 2014).

But despite the fact, that the potential contribution to innovation of purchasing function is largely present in the literature, in most companies these contribution is merely existent or only on a strictly informal level (Maier, Rück, & Brem, 2017).

The balance dimension considers the extent to which purchasing balances the magnitudes of exploration and exploitation on a relative basis. The combined dimension considers the extent to which purchasing advances the combined magnitudes of exploration and exploitation.” (Gualandris et al., 2018, p. 667). Thus, the purchasing function can be considered as ambidextrous if it is able to equally contribute to exploration and exploitation mechanisms of
the firm and at the same time achieve and maintain a high level of performance in exploratory and exploitative activities.

The different types of ambidexterity mentioned above can be found in the purchasing and supply management literature, although they are not named as such. Structural ambidexterity in purchasing can be recognized in publications investigating purchasing organization structure, suggesting for instance that a dedicated scouting unit must be distinct from the strategic unit (Mikkelsen and Johnsen, 2018; Luzzini and Ronchi, 2011). Schiele’s (2010) “dual role” of purchasing refers to contextual ambidexterity, as his suggestion is that purchasing proceed simultaneously to cost reductions and innovative products development. Sequential ambidexterity in purchasing has roots in research investigating the purchasing process and its distinct phases among which exploration is key (Linder et al., 2003; Legenvre and Gualandris, 2018). Last, managerial ambidexterity in purchasing can be recognised when it comes to defining purchasing manager’s role in solving organizational tensions.

3. An initial conceptual framework

We aim to better understand how purchasing is organized to combine exploration and exploitation activities in the innovation process. Systematic literature reviews, such as Turner et al. (2013), have emphasized the need for more research to investigate ambidexterity across various levels of analysis, namely organization level, group level and the individual level, or a combination of these levels.

Several researchers further suggested that the consideration of various levels of analysis such as alliance, inter-organizational, organizational, business units, projects, function, individual level requires the study of different types of ambidexterity (Raisch et al., 2009; Birkinshaw and Gupta, 2013; O’Reilly and Tushman, 2013; Turner et al., 2013). As shown in Table 1, studying structural ambidexterity focuses predominantly on the organisational level, whereas contextual ambidexterity can be better examined at the functional or the individual levels.

Table 1: Defining four types of ambidexterity (Source: Authors)
<table>
<thead>
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<th>Types of ambidexterity</th>
<th>Definitions</th>
<th>Organizational level</th>
<th>References</th>
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| Structural ambidexterity      | - Suggests that a specific organizational design with two distinct and autonomous units is necessary to separate exploration from exploitation activities.  
- separate organizational units pursuing exploration are smaller, more decentralized, and more flexible than those responsible for exploitation.  
- structural differentiation helps ambidextrous organizations maintain different competencies with which to address inconsistent demands arising from emerging and mainstream business opportunities. | Firm's organization  | Tushman and O'Reilly 1996; Boumgarden et al., 2012  
Benner and Tushman 2003, Christensen 1998; Tushman and O'Reilly 1996  
Gilbert 2005 |
| Contextual ambidexterity      | - Contextual ambidexterity implies that the same people combine exploration and exploitation activities so that both are coexisting instead of mutually excluding each other  
- No buffer between concurrent exploration and exploitation. Organizations dealing with exploitation and exploration simultaneously are more successful than others.  
- Chances of success in exploration activities are lower than in exploitation activities, thereby reinforcing the tendency toward exploitation.  
- Creation of a supportive context that stimulates individuals to simultaneously manage ambidextrous trade-offs: context is made of systems, processes or incentives encouraging individuals to optimally allocate their workload to exploitation or exploration. | Individual           | Turner et al. 2013  
Lavie et al., 2010  
Groysberg and Lee, 2009  
Gibson and Birkinshaw, 2004 |
| Sequential ambidexterity      | - exploitation and exploration are sequenced over time and constitute a natural cycle  
- firms should temporarily cycle through periods of exploitation and periods of exploration  
- the same unit shifts over time between different organizations to focus alternatively on exploration and then exploitation.  
- organizations resolve the paradox of exploration v/s explorations by engaging in only one activity at a time. | Firm's organization  | Rothaermel and Deeds, 2004  
Nickerson and Zenger, 2002; Siggelkow and Levinthal, 2003  
O'Reilly and Tushman, 2013  
Raisch and Birkinshaw, 2008 |
| Managerial ambidexterity      | - Need for top management teams to ensure integration across exploration and exploitation differentiated units.  
- Ambidextrous management requires firms to explore new knowledge, exploit existing knowledge, and coordinate these knowledge bases.  
- Trade-offs arise from combining internal (R&D) and external (Suppliers) technology sourcing, and managers have to actively manage the spillovers from internal and external technology sourcing.  
- Manager's decision-making authority is positively related to ambidexterity, whereas formalization of a manager's tasks has no significant relationship with this manager's ambidexterity.  
- Both a manager's participation in cross-functional interfaces and his or her connectedness to other organization members are positively related to ambidexterity.  
- Ambidexterity requires active management of the tensions between differentiation and integration. | Function, management | Tushman and O'Reilly 1996, Smith and Tushman 2005  
O'Reilly and Tushman, 2011  
Taylor and Helfat, 2009  
Rothaermel and Alexandre, 2009  
Mom et al., 2009  
Mom et al., 2009  
Raisch et al., 2009 |
Other scholars suggest investigating multiple levels of analysis because “choices about how to resolve the tension at one level of analysis are often resolved at the next level down” (Raisch and Birkinshaw, 2008, pp. 396–397). Some researchers have suggested that studying combinations of different types of ambidexterity is more appropriate at a functional level (Raisch et al. 2009; Andriopoulos and Lewis, 2010). Thus, examining all four types of ambidexterity makes sense when aiming to investigate purchasing ambidexterity and how it combines the four types of ambidexterity defined as the mode of balancing. Thus, our first research question is:

**RQ1: How are different types of purchasing ambidexterity manifested?**

Assuming purchasing ambidexterity is a mix of different types of ambidexterity raises the question of interactions between these different types. Interactions can be divided into tensions and complementarities. Proceeding to exploration and exploitation simultaneously raises challenging tensions (Andriopoulos and Lewis, 2009). These tensions stem from inherent trade-offs between exploration and exploitation (March, 1991), which happen when managing businesses with two different dominant logics (Prahalad and Bettis, 1986; Tripsas & Gavetti, 2000).

Smith and Tushman (2005) report that exploration and exploitation create overarching demands and nested tensions among the firm. Firms face multiple innovation tensions such as conflicts between outside-inside, new-old, determined-emergent, and freedom-responsibility (Dougherty and Hardy, 1996). “Innovation tensions also may foster traps, vicious cycles that stem from increasingly one-sided focus on either exploitation or exploration” (Andriopoulos and Lewis, 2009, p.697). Levinthal and March (1993) identify goal conflict at the management level due to the need to allocate sequentially divergent goals. Managers need to fight against organizational routines and invisible forces influencing decisions. Managers are forced to buffer exploration from exploitation or to choose either departmentalization or sequential goal attention (Lavie et al., 2010).

In the purchasing literature a few papers report on typical trade-offs, such as long versus short term, low cost versus better quality (Monkza et al., 2015), environmental protection versus cost performance (Esfahbodi et al, 2016) etc. In technology sourcing, tensions can arise from combining internal (R&D) and external (suppliers) technology sourcing, when managers have to actively manage the spillovers from these (Rothaermel and Alexandre, 2009).

Although literature reports extensively on managing these trade-offs and tensions, related studies investigate either structural or contextual approaches at the organization level. Few papers investigate how tensions can be solved at functional level (Raish et al., 2009; Andriopoulos and Lewis, 2009). Birkinshaw and Gupta (2013) suggest that we still need more insights into managerial capabilities to mitigate the impact of these tensions and to understand how ambidexterity is achieved. In sum, very few papers have investigated the tensions created at the functional level in ambidextrous organizations, and none in purchasing. Our second research question therefore is:

**RQ2: What tensions emerge from the need to balance exploratory and exploitative innovations within a purchasing function?**

Balancing exploitation and exploration is needed to reduce tensions which occur in the management of contradictions and tensions during both exploration and exploitation activities. Such balance does not reflect a mediocre split or foggy compromise but means excelling at both
exploitation and exploration (Atuahene-Gima 2005). However, little agreement is found in the literature on how organizations achieve such balance (Adler et al., 2009). There are various approaches to mitigating tensions, typically divided into two dichotomous streams of research: one fostering differentiation tactics, the other one advocating integration mechanisms (Andriopoulos and Lewis, 2009). However, these studies often focus on one type of ambidexterity in isolation.

We argue that interactions between the four types of ambidexterity can be also investigated under the lens of complementarities (Cao et al., 2009). Complementarities represent the way organizations achieve a combination of various types of ambidexterity to successfully balance exploration and exploitation. Tensions are not only solved through one type of ambidexterity, but also through interactions among them. In the purchasing literature Eriksson (2013) investigated project-based organizations and procurement, arguing that structural and sequential separation of exploration and exploitation activities are not easy to reach without strong integration mechanisms: “cooperative procurement procedures can serve as a basis for facilitating both exploration and exploitation of knowledge and technologies in construction projects” (p. 333). Hence, our third research question is:

**RQ3:** How do these complementarities between different types of ambidexterity help to ease tensions created by purchasing’s need to balance exploration and exploitation?

Our initial conceptual model shows purchasing involvement simultaneously in exploratory and exploitative innovation and the tensions, which may occur between these two activities: reconciling tensions is a necessary condition for achieving purchasing ambidexterity (Lavie et al., 2010). In turn, balancing the four types of ambidexterity is required to ensure successful purchasing function ambidexterity. Purchasing function ambidexterity can ultimately facilitate purchasing’s function contribution to innovation (Legenvre and Gualandris, 2018).

![Fig 2: Initial conceptual framework (Source: Authors).](image)
Investigating ambidexterity in purchasing requires understanding of multiple interactions - formal and informal - at multiple levels of the organization. Therefore, we adopted an in-depth case study approach that would allow us to gain rich insights into the workings of an organisation based on collection of data from different functions that interact with purchasing in innovation processes. This way we were able to “capture the dynamics of a studied phenomenon and provide a multidimensional view of the situation in a specific context” (Järvensivu and Törnroos, 2009, p. 100).

Our aim was not to test any pre-existing theory but to elaborate (Ketokivi and Choi, 2014) emerging theory on ambidexterity within purchasing. Thus, we formulated open research questions and an initial conceptual framework based on the literature and aimed to refine this framework based on the case study analysis.

We focused on a single case study because we saw it as essential to gain in-depth insights into the workings within an organisation and to really understand the context in which it operates. Our ambition was not to aim for generalisation but instead to develop a “force of example” (Flyvbjerg, 2006). We explain this further in the following section.

Case selection
We set out to find a company that had developed an ambidextrous purchasing organisation with the purpose of enabling purchasing to contribute to innovation: this was our casing (Raging (1992). More specifically, we identified three requirements for the company that would constitute a good case study. First, the company’s purchasing functions’ contribution to innovation should occur in an obvious manner and be “transparently observable” (Pettigrew, 1992). Second, the nature of the company should to be innovation intensive and with a purchasing organisation sufficiently large and mature to show complex interactions with other departments. Third, the case needed to be an exemplar (Dubois and Araujo 2007) of ambidexterity in purchasing, renowned for its excellence in exploitative and exploratory innovation within its market.

We followed the advice of Raisch and Birkinshaw (2008) who suggest that understanding trade-offs and tensions occurring at a functional level can be better understood while considering the organization level. Therefore, we decided on the company as our unit of analysis in order to better understand ambidexterity at a functional level i.e. purchasing within the context of other internal functions.

We selected a large French manufacturing company, referred to as S Corp: an international leader in connected solutions for building, infrastructures and industry. At a corporate level, the S Corp culture is oriented to long-term views where innovation is a priority. We examined practices already implemented in this firm, across its three business sub-units. S Corp meets the selection criteria in different ways: it shows a record profitability (best ever net income of €2.3bn in 2018) and belongs to the top-20 innovative French companies in 2018 (measured by the number of patents deposited). Also, based on one author’s experience with this company, we knew that S Corp started to involve purchasing into the development process over 20 years ago (X, 1999) and create a purchasing innovation function less than 10 years after (Y, 2019). Furthermore, an initial meeting with a purchasing director confirmed this impression and we therefore decided to proceed with this case.

Data collection:
We sought to capture different perceptions and meanings in order to understand the dynamics within the company and between different departments. For example, we expected purchasing to believe that it could contribute to innovation but R&D to be more sceptical of purchasing’s contribution. Therefore, we saw it as essential to obtain the views of different departments.
within the firm as well as both strategic and operational levels. Thus, we interviewed 18 people within Purchasing and other departments, including R&D, R&I (Research and Innovation: a technical department working in advanced phases of design and innovation), Business Development and Marketing.

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<th>Table 2: Interviewees’ profiles</th>
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<tbody>
<tr>
<td><strong>Interviews</strong></td>
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<tr>
<td>(recorded)</td>
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<tr>
<td>Purchasing (senior level)</td>
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<tr>
<td>(Operations)</td>
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<tr>
<td>Purchasing &amp; Innovation (P&amp;I)</td>
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<tr>
<td>R&amp;D or R&amp;I</td>
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<td>Business dept</td>
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<td>TOTAL</td>
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We followed an active interviewing methodology which was treated as a social experience (Holstein and Gubrium, 2004) in a sense that the creation of knowledge is not only one way from the interviewee down to the interviewer. During the discussions, knowledge has been jointly created by the interviewer and the interviewee, because the interviewer directed the interviewee towards the closest answers to the topic. The interviews were semi-structured using an interview guide, but keeping the scope broad, and focusing on processes and events (Easterby-Smith et al., 1991). Thus, consistent with our focus on theory elaboration, we did not seek to operationalise the theoretical constructs and develop pre-determined measures for each of these, but instead asked open-ended questions that allowed interviewees to discuss freely around broad themes.

We asked questions covering three levels within the firm: firm level (organization), functional level (department) and individual level. We sought to ensure that all interviewee voices were considered in the result to keep the research “sufficiently authentic” as defined by Guba and Lincoln (2005): “isomorphic to some reality, trustworthy, related to the way others construct their social worlds” (p. 205). Adopting this view, we sought to understand interviewees’ perspectives on the basis of their context, to get as close to an accurate picture of the organization as possible.

**Data analysis**

Based on recordings of the interviews we wrote full transcriptions of about 70% of the interviews; the remaining 30% were not recorded typically because interviewees were uncomfortable with being recorded so we relied instead on detailed notes. The coding of interview data as captured in the transcripts and/or notes followed the process described by DeCuir-Gunby et al. (2011) to assign “units of meaning to the descriptive or inferential information compiled during a study” (Miles and Huberman, 1994, p??).

The first step of the coding process was to identify evidence of theory-driven codes, including the four types of ambidexterity, the tensions induced by balancing exploration and exploitation and the means to mitigate these. The second step aimed at revisiting theory-driven codes in view of the empirical data. Finally, the third step was to find emerging patterns, commonalities and oppositions between the various interviewees’ perspectives.

**Research validity**

Our aim was to investigate and seek to explain a phenomenon in its specific context. The risk of relying on only one case was mitigated through interviewing “a broad spectrum of people...
with regard to their roles within the company and their experiences” (Dubois and Araujo, 2007, p. 175), to increase the deepness of the observations, and to give multiple angles of perceptions. We also sent reports back to interviewees to gain their confirmation and clarifications in order to correct any misinterpretations. A dialogue between the authors was held in order to maximise mutual understanding and exhaustiveness of each theme (Weber, 1990), benefitting from one author’s previous experience of the company.

5. Findings

5.1. S Corp: an innovative company

S Corp is a company making more than €20 billions with about 150 000 employees worldwide (data 2018). Purchasing spend counts for about 50% of the turn over and is considered as a major contributor of firm’s technical and economical performance. Purchasing department has about 1800 employees, traditionally organized in a matrix involving category buyers, project buyers, and serial buyers (what they call purchasing operations). The spent is made of manufactured components but also raw materials and services. The purchasing strategy is oriented towards supply base rationalisation, and emphasize the increase of the spent from suppliers belonging to new economy, targeting 75% of “new economy suppliers” in 2020. The firm practices suppliers’ involvement into new product development as a standard.

S Corp has a long history of being innovative, driven by technological development. S Corp invests about 6% of its turn-over in R&D and owns a 30,000-sqm R&D centre including 7000-sqm laboratory. To date, S Corp has invested in 25 start-ups in Europe and USA, with whom the group has developed partnerships to detect innovative solutions at an early stage, and to enable their assessment and eventual integration within the company. S Corp targets three main areas of innovations: disruptive technologies (micro-electronics, nano-technology, intelligent materials and opto-electronics), emerging technologies (mobile communications, micro-electricity generation, sensors) and new services, software and network applications (energy, industry).

The Research & Development (R&D) function has traditionally pursued an innovation-push strategy. R&D designed innovations internally and pushed these to the market in the hope of a technological advantage. However, the last decade, S Corp has moved from its innovation-push towards an innovation-pull model; innovations identified within the customer base through what S Corp calls ‘customer pain point’:

“We are not in a context where the needs are created and pushed to the market, but we are in a context where marketing creates the needs, once they have identified a customer pain, calling for an action to mitigate it through an innovation” (Purchasing Senior level)

S Corp innovations span the spectrum of incremental and radical innovations according to market and technological uncertainties. One example of a recent innovation is in the field of intelligent public lighting. The business development department identified a ‘customer pain’, which consisted in reducing electricity consumption in the streets. The customer (a large city) wanted to have automatic public lighting systems connected with sensors capable of detecting movements in the streets. This technology was already available in the market for other applications, but S Corp’s R&D had limited knowledge about it and could not catch up the development on time. The final solution was supposed to replace the current patented smart lighting management which used consumption management through tiltable LED modules. The business development department therefore requested the Purchasing & Innovation (P&I) function to find a solution. P&I had already identified a start-up that had developed an innovative product available as ‘turnkey’, which used waterproof motion sensors to increase the lumen intensity for 30 seconds when triggered by movement. S Corp incubated the start-up
business and began to buy the modified product from the start-up 12 months later under a shared patent.

Another example of an S Corp innovation concerned connected water management systems (Industrial Internet Of Things - IIOT - applied in connected house systems). Forecasted potential market needs suggested a need for better water resource monitoring and management processes, using connected control platforms to provide better insight into operations, reduce time to invoice, etc. S Corp realized this urgent need to adapt to a fast-changing market, although the potential concrete market benefits were not tangible. During a morning brainstorming involving P&I and the Advanced Research & Innovation department (R&I), both realized that they should work together in order to scout external capabilities. R&D was out of the scope, bypassed by the direct contact between the R&I department and the P&I department. To explore the field, P&I put together a 10-line project datasheet and posted it on an open innovation web platform. The basic principle was a ‘call for competence’: who could support S Corp in responding to this urgent need? Subsequently, three offers were pre-selected by the P&I department and transferred to R&I department for assessment. One of the three solutions was selected and incubated, involving the use of IoT-ready products, edge control, software suites, and digital services. At the time of data collection for this study, the adoption had not yet been decided due to the major investment required and the high level of market uncertainty. Regardless, the P&I department did succeed in orchestrating the detection, assessment and absorption of this good opportunities.

These exemplify how once a customer pain point has been identified, internal teams begin to explore ways to respond to this. Considered as a superior source of innovation detection than R&D, the business development function takes the lead in this process. Involving purchasing in the innovation ‘pull’ process is a recent change, aiming for purchasing to explore and detect innovations in the supplier market. There is still a strong culture where innovation is viewed as ‘designed inside’ but this has started to change, as innovations coming from the outside are increasingly considered valuable. According to a senior purchasing executive, purchasing had zero contribution to innovation before 2014 but by 2017 35% of innovations sourced externally came through purchasing (the rest came from R&D). However, the need to contribute to innovation creates a new challenge for purchasing - to be ambidextrous:

“The challenge is precisely to balance a more supportive mission where we are still asked to exploit our current resources and to respond to an internal demand, with the challenge to propose suppliers’ innovations. It’s like killing two birds with one stone” (P&I)

5.2. Manifestations of purchasing ambidexterity

Based on our coding process it has been possible to describe how S Corp had combined the four different types of ambidexterity in order to cope with this new innovation context. We reported on the manifestations of the different types of ambidexterity, the tensions occurring between them, and the mechanisms to mitigate these tensions. Table 3 summarizes these findings.

**Structural purchasing ambidexterity**

As in many organizations, S Corp purchasing is involved in new product development projects to scout the supply networks to find suppliers capable of manufacturing an innovation designed by R&D. The traditional purchasing team is involved in NPD and exploitative innovations, managing operations, projects and category sourcing. However, fifteen years ago, S Corp realized that R&D and category purchasing were inhibiting innovation if they were not complemented by another organization including a new purchasing function dedicated to contribute to innovation. Thus, in 2005 S Corp implemented a new function called “Purchasing
& Innovation” (P&I), structurally separated from the rest of the purchasing organization. S Corp decided that a structural differentiation between traditional purchasing and P&I was the best way to achieve concrete results in innovation.

The P&I unit is independent from purchasing operations but still belongs to the purchasing organisation and reports to the Chief Purchasing Officer. P&I’s objective is:

“to first understand customers’ market needs, then R&D’s needs and finally match both with the supply network capabilities. Therefore, we have trained our team to talk to R&D and also to listen to marketing, sales, business units, etc... because we want to pull the knowledge up from the market” (P&I)

The P&I team scout the supply market to detect any innovation which could be valuable for the firm. With only five full time “innovation buyers”, P&I remains small compared to the rest of purchasing department that counts 1800 employees in total. P&I is in charge of managing about 50 people inside or outside the purchasing department for an equivalent work load of 12 full-time employees. This unit is focused on exploration, scouting for new opportunities and listening proactively to new customer needs: it is smaller, more decentralized, and more flexible than the core purchasing team. This differentiated structure avoids purchasing having to deal with both exploitative and exploratory activities.

**Contextual purchasing ambidexterity**

Contextual ambidexterity can be observed at various individual levels within S Corp purchasing. Firstly, because most P&I buyers are not dedicated full time to innovation exploration and divide their time into exploratory and exploitative activities. Apart from five full time “innovation buyers” the rest of the P&I community consists of about 50 buyers working part-time on exploration; their task is to balance exploratory and exploitative tasks:

“Of course, they do not dedicate 100% of their time to exploration because they are also involved into projects development, not innovative programs, but still have the training and background and fundamentals to speak fluently about innovation with suppliers” (P&I)

Secondly, we can recognize contextual ambidexterity among S Corp Purchasing at the business unit (BU) level. The BUs manage projects, i.e. the development of new products, and work closely with the business development function. Project buyers are mainly involved in exploitative innovation and NPD, when innovations are ‘translated’ into a new product going through project milestones, but they are also supposed to contribute to exploration:

“[Project buyers] contribute mainly to the short-term project development for which time to market is important because we have to push the product to the market as quickly as possible. But we can also leverage on our current suppliers to reduce total cost of our project, leveraging on their innovations. But we have to keep pushing exploring to get real opportunities”. (Purchasing operations)

Thirdly, contextual ambidexterity is found at category purchasing level, which is a cross-BU function belonging to purchasing operations. The contextual ambidexterity reflects the fact that one individual is expected to deal with both exploratory and exploitative activities. For instance, category buyers define sourcing strategies and reduce purchasing costs for the company, implying a perfect knowledge of supply market and new technologies. Indirectly, these buyers are also involved in innovation scouting in addition to their daily category management activities, because it helps at reducing their cost reduction objectives:

“Category buyers need to explore and find innovations by their own. Normally, innovation is not our main objective at all. But we count on innovation to improve our supply base cost effectiveness” (Purchasing operations)

Overall, the contribution of the P&I department is limited in a sense that it does not provide short-term opportunities to operation buyers. P&I doesn’t provide enough visibility to category buyers because P&I is focused on more radial innovations which need long assimilation and absorption plans, too long in the time frame of a category buyer. So, category buyers need to
devote their time not only to transactional activities but also on exploratory activities, like the search for innovations which provide short-term cost reductions.

Sequential purchasing ambidexterity

S Corp organizes the innovation process into three phases, in which exploratory activities precede exploitative activities. The first phase corresponds to the search and survey of advanced innovations: S Corp has not yet defined a project and they do not know what they need although they do know that something needs investigating. The second phase involves developing offers and products with a clear time to market and the third phase is the commercialization of offers. These phases are organized sequentially, i.e. one after the other: S Corp’s processes reflect this sequence. Purchasing (P&I) is involved in all three phases although being involved in first phase is a recent development:

“P&I is involved in the three phases of the innovation process. We are first involved in the detection phase of innovations (phase 1), we push them into development (phase 2) and we support the commercialization of this innovation (Phase 3). This phase 2 is critical and time consuming for us.” (P&I)

When innovations are sourced outside S Corp P&I starts exploring both the current and new potential supply base. Once detected, P&I buyers have to convince internal stakeholders of the potential value of the innovation. If adopted, the innovation is included in the development phase during which the innovation is transformed from a concept into a new product. Commercialization is the ultimate exploitation phase, when P&I continues to follow end customer feedback. The process alternates longer periods of exploitation with shorter periods of exploration, reflecting a sequential path in which P&I is deeply involved. This is a sequential ambidexterity process with P&I balancing exploratory and exploitative activities over time.

Managerial purchasing ambidexterity

About fifteen years after the implementation of the new P&I function, a new position at senior management level was created within the P&I function to act full-time as ‘innovation champion’, perceived as an architect of innovation activities between the supply base and S Corp. At first, the term “architect” reflects its coordination role to orchestrate, provide support to connect supplier innovations with internal stakeholders:

“I have built a community internally and I animate it throughout the whole purchasing organization and possibly also with the other functions. Basically, it’s all about creating interfaces with people from technology and marketing, people from open innovation, people from operations, on the innovation topics” (P&I)

The second role of P&I champion is to keep surveying the supply market and assess potential innovations. Supply market is not only the existing supply base, but also new potential partners like universities, start-ups, clusters, incubators.

“My role is first to detect the innovation within supply base. During the detection phase, I have to assess whether the innovation is relevant and makes sense from a technological and business perspectives.” (P&I champion)

Once the innovation is detected and assessed, P&I must convince R&D and other departments of the potential of this innovation sourced outside the company. Several interviewees emphasized that credibility leadership skills are a key success factor in the P&I champion position:

“I need to challenge the adoption, to convince internal stakeholders that this innovation is valuable. Once the decision to adopt the innovation is made, my role is also to support the development and exploitation. I need also to convince the innovation provider to open its doors, because a start-up is often reluctant to disclose its innovation to a large company like us” (P&I champion)

The need for orchestration increases as far as complex innovations or supplier relationships are concerned. Orchestration means facilitating decisions involving multiple stakeholders, enabling
the company’s agility to move in one direction or another, maintaining a strategic vision of internal and external capabilities.

“I need to coach each member of the community, including the innovation provider, until the commercialization phase, spreading more agile practices. It is like creating interfaces between people and bridging with external capabilities in order to improve the organization efficiency towards innovation.” (P&I champion)

In sum, this champion acts to actively resolve the trade-off between exploration and exploitation objectives always existing in the day-to-day activities of purchasing function in S Corp. This illustrates the role of managerial ambidexterity as a key capability to orchestrate exploratory and exploitative activities.

5.3. Tensions within and between different types of ambidexterity

S Corp faces important challenges, such as realizing that internal design capabilities are no longer sufficient to come up with more modern solutions, agile offers addressing different market positions and completely new market segments. The complexity and variety of the tensions made it difficult to identify these during the interviews, as they were nested within the firm and interviewees did not disclose tensions spontaneously but were more likely to emphasise their successes. We observed many tensions. However, when pushed interviewees revealed underlying tensions related to the different forms of ambidexterity. The coding process helped us to identify four main tensions emerging repeatedly during the interviews.

Tensions related to purchasing resource allocation: Buyers involved in exploratory innovation are not dedicated full time to exploratory tasks so are overloaded with daily operational tasks and cannot devote sufficient time to innovation exploration. Some buyers spend a small proportion of their time on exploratory activities and judge this as ineffective for capturing innovation opportunities:

“...the best would be to have fully dedicated teams. The reason is that if you are too much involved in daily operational tasks and program development, the priority will be operational or program emergencies. There is a critical involvement to reach, let’s say the minimum is 50% of your time devoted to innovation exploration, the better is full time of course. Today we struggle to spend enough time on exploration phases” (P&I)

This affects individual planning and efficiency in innovation exploratory activities. Buyers feel frustrated when missing exploration objectives and argue that doing both exploratory and exploitative tasks within a single mission profile is hardly compatible. This reflects tensions created by contextual ambidexterity, as individuals are expected to work simultaneously on exploratory and exploitative tasks within the same function.

Tensions related to purchasing integration to other functions: tensions also stem from the organizational design and occur between functions. Several interviewees question the creation of a specific purchasing unit focused on technological innovation, which challenges structural ambidexterity itself. Tensions are exacerbated between R&D and purchasing, because R&D views purchasing’s role as disconnected from technological concerns. R&D argues that purchasing normally does not have to deal with innovations because they are not experts in technologies. R&D finds it hard to accept that an external supplier is capable of doing something better or quicker than they can. Purchasing is sympathetic to this position and understands that this is the result of a long tradition in technology and innovation. But R&D can be harsh:

“Purchasing is supposed to find innovations from their familiar suppliers. But this is rarely efficient, because the buyer who negotiates with a supplier has objectives in mind relating to a contract, a price reduction, or an end-of-year rebate: all these aspects will take the priority towards an open discussion about innovations. So, you can imagine that purchasing shouldn’t deal with new technological partners such as start-ups or universities” (R&D)
This illustrates tensions occurring when ambidexterity is implemented by means of a structural differentiation between exploratory and exploitative functions which partitions the purchasing function. When integration is not well managed, other departments perceive this differentiation as surprising, or sometimes irrelevant. In comparison, we observed that P&I integration with business development function was strong, even stronger than with technological functions.

**Tensions related to transitions between innovation phases:** the consideration of innovation as a sequential process, where exploration precedes exploitation, implies a difficult transition between exploration and exploitation phases. This transition creates coordination tensions which are exacerbated by processes or individual behaviours. Major differences in the nature of activities between exploratory and exploitative tasks call for a radically different time-to-market perspective, customer commitment and return of investment timeframe. These tensions are supposed to be resolved at an organization level, but this is not facilitated by the differentiated organizational structure. Several interviewees suggested that P&I needs to convince internal teams to adopt supplier innovations:

“What is difficult in innovation sourcing, is not to find the innovative supplier, the start-up or the partner providing a very high-tech solution, it is that we don’t know how to convince internal functions that they should develop this innovation. Compared to innovation detection, convincing people is ten times trickier and creates a lot of tensions” (P&I).

The sequential split between exploratory and exploitative activities poses numerous problems internally. This reflects sequential ambidexterity and the challenge of managing transition between sequenced phases.

**Tensions related to purchasing skills and processes:** tensions appear within the purchasing operations who struggles to perform in exploratory activities and who believes that P&I receives all the resources to do a better job. Moreover, purchasing operations do not have the skills to scout for innovative suppliers and the traditional purchasing processes cause problems. As in many other firms, purchasing operations used to categorize purchasing needs into commodities, which includes a rigorous supplier selection process. However, this process is perceived by purchasing operations as poorly adapted to sourcing from innovative suppliers. For example, a traditional supplier audit grid is not suited to assess the potential success of the relationship with a start-up. By reasoning in categories, purchasing has extensive knowledge of the supply market for one category, but has no understanding of how to source an innovation, a concept or an idea. Last, purchasing operations argue that scouting innovative suppliers calls for different tools, such as the use of open innovation platforms and purchasing suites. Thus, tensions often occur within the purchasing department, because people feel ill-equipped to reach the mission which they have been assigned:

“For sourcing innovations or functionalities, purchasing operations is not well equipped. We must change entirely our way of thinking in categories, get trained to new tools: this is a radical change for us” (Purchasing operations)

P&I also point to other tensions as a result of unsuitable purchasing skills and processes. For instance, contracting with a start-up requests intensive discussions about intellectual property and confidentiality terms, which are not needed in contracting terms with a commodity supplier. Consequently, P&I complain about purchasing operation people lacking skills to scout innovations and to develop partnerships with start-ups. P&I also believes that there is a lack of coordination between the numerous operation buyers working on topics related to innovation and missing processes around common objectives.

5.4. Complementarities between the four types of ambidexterity

The case study illustrates not only tensions but also complementarities between the four types of ambidexterity. First, structural ambidexterity is combined with sequential ambidexterity

\[ \text{PhD Thesis – F.Constant} \]
within the purchasing function. The structural design of the S Corp organization, divided into two separate units for exploratory and exploitative activities, is viewed as effective by interviewees but only if activities are sequenced over time, i.e. starting from exploratory and finishing with exploitative activities. Most of the purchasing workforce at S Corp focuses on exploitation, preparing and executing sourcing for NPD or other exploitative activities. Only a minor proportion of purchasing employees are engaged in exploratory activities. Thus, splitting into two types of activities over time is viewed as necessary to spread the work and leverage on different skill sets. The necessary corollary is that a strong management of the transitions is needed:

“To manage transitions between different phases, we need of a strong coordination at the organizational level and a spread of the workload among purchasing operations.” (Senior purchasing)

Second, contextual ambidexterity is combined with managerial ambidexterity. We observed that buyers in the two distinct structures had no strict focus on either exploratory or exploitative activities, but the two structurally separated units had a different balance between exploration and exploitation. Thus, many employees are required to be ambidextrous, reflecting contextual ambidexterity at an individual level. S Corp interviewees see this is feasible because strong coordination mechanisms are implemented which stimulate individuals to simultaneously manage ambidextrous trade-offs: systems, processes and incentives encourage individuals to allocate their workload to exploratory or exploitative activities. This happens at the management level, through the position of P&I “champions” and processes to orchestrate the numerous tasks related to innovation:

“Although there is a separated unit, S Corp needs people involved in both activities to smoothen the transition between innovation phases. But people stress when they’re engaged into two different timeframes: short term with operations, long term with innovation. So, management is key to provide a supportive infrastructure and to help buyers to plan their workload.” (Senior purchasing)

Third, the findings show that a combination of managerial purchasing ambidexterity and contextual ambidexterity facilitate sequential ambidexterity through the creation of cross-functional contacts and incentives. The four types of purchasing ambidexterity in S Corp are not stand-alone practices but interrelated approaches that together create the purchasing ambidexterity capability. Combining contextual ambidexterity at the individual level and managerial ambidexterity at the function level seems to help S Corp to overcome the tensions that result from having to balance exploration and exploitation activities in two differentiated units (structural ambidexterity) or switching between them (sequential ambidexterity):

“We have implemented mechanisms to integrate P&I in other decision structures, so that P&I knows what’s happen there but also they facilitates the overall success of our company. Hopefully they mitigate biases created by our dual organization.” (VP Purchasing)

Table 3 summarizes the findings displaying the four types of ambidexterity. For each function, we show the manifestation of each type of ambidexterity. This reflects how the company tries to balance innovation exploration with innovation exploitation. We also display the tensions within each type of ambidexterity and the mechanisms created by company to reduce these tensions.
<table>
<thead>
<tr>
<th>Structural purchasing ambidexterity</th>
<th>Manifestations</th>
<th>Tensions</th>
<th>Mechanisms to reduce tensions</th>
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<tbody>
<tr>
<td>Separate unit dedicated to exploration implemented 5 years ago, and successful so far.</td>
<td>Tensions to manage coordination across the 2 units and contradictions at the senior management level. Different views, skills and career paths.</td>
<td>Role of the mandatory position of P&amp;I director, to coordinate with the rest of the firm and especially the assimilation of innovations.</td>
<td>Management is key to provide a supportive infrastructure and to mitigate tensions.</td>
</tr>
<tr>
<td>Not involved in exploitative activities, only a few new products by other departments. Focused on innovation and technology.</td>
<td>Tensions with P&amp;I, with R&amp;D because of different set of priorities, different time frame, different supply base. Not visible.</td>
<td>Tensions are created because of daily activities (short term) force buyers to skip exploitative activities, of longer term.</td>
<td>Need strong managerial directions, but good to have a foot in both types of activities (broader view, better decisions).</td>
</tr>
<tr>
<td>P&amp;I is more legitimate and efficient at convincing technical functions in case of an innovation failure outside. But PO is more effective in development phase than P&amp;I.</td>
<td>Coordination mechanisms are key, like a set of routines and directives, resource sharing, coordination and control. Dual structure avoids to inhibit innovation.</td>
<td>Management is key to provide a supportive infrastructure and to mitigate tensions.</td>
<td>Need both tech and business skills, know how to prioritize and orchestrate. Need to assess the relevance of an innovation.</td>
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<thead>
<tr>
<th>Contextual purchasing ambidexterity</th>
<th>Manifestations</th>
<th>Tensions</th>
<th>Mechanisms to reduce tensions</th>
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<tbody>
<tr>
<td>Some PO are involved in both exploitative and explorative activities, without buffer between these activities.</td>
<td>Tensions occur when managing contradictions within organizational units, self-arbitrations. Opposite objectives (short vs long-term etc).</td>
<td>Management is key to provide a supportive infrastructure and to mitigate tensions.</td>
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<tr>
<td>Some PO are involved in both exploitative and explorative innovation where exploitation is 20 to 30% of working time.</td>
<td>Tensions are created because of daily activities (short term) force buyers to skip exploitative activities, of longer term.</td>
<td>Need strong managerial directions, but good to have a foot in both types of activities (broader view, better decisions).</td>
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<tr>
<td>PO buy work part-time on P&amp;I. They have to manage exploitative and explorative activities and to report to P&amp;I.</td>
<td>Tensions created because teams are not dedicated full-time.</td>
<td>Need both tech and business skills, know how to prioritize and orchestrate. Need to assess the relevance of an innovation.</td>
<td>No data found.</td>
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<thead>
<tr>
<th>Sequential purchasing ambidexterity</th>
<th>Manifestations</th>
<th>Tensions</th>
<th>Mechanisms to reduce tensions</th>
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<tr>
<td>Sequences skills over time from exploration to exploitation and vice versa.</td>
<td>Challenges are in managing transitions between explo/explo activities and also to mitigate inertia pressures.</td>
<td>Three different phases, exploitation the maximization and finally exploitation. But need of a strong coordination at the organizational level.</td>
<td></td>
</tr>
<tr>
<td>P&amp;I comes first with advanced phases, then assimilation and development are ensured by PO. This is really sequential.</td>
<td>Transitions between advanced phases and development are always difficult, because of data sharing etc.</td>
<td>The role of PO &amp; Director (the “champion”) is key to mitigate effect of difficult transitions between exploit/exploit activities.</td>
<td></td>
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<tr>
<td>P&amp;I is involved in exploration phase, which come prior to exploitation. P&amp;I has to manage the transition between the two phases.</td>
<td>Biggest concern is to convince internal functions to develop this innovation. The process is often blocked during absorption of the innovation.</td>
<td>Mandatory position of P&amp;I director, to coordinate with the rest of the firm and especially the assimilation of innovations.</td>
<td></td>
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<tr>
<td>Purchasing is obliged to prioritise NPD and projects. But before NPD, they can contribute to advanced phases like innovation scouting initiatives.</td>
<td>Hardly accept to see one of external innovation scouting innovations.</td>
<td>A few buyers are good at this, but they’re obliged to deal with P&amp;I organization.</td>
<td></td>
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<tr>
<td>P&amp;I is more and more involved in advanced phases, where “customer pain points” can be shared with the teams.</td>
<td>All of buyers work around innovation, but not enough meshed around a common process.</td>
<td>No data found.</td>
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<tr>
<th>Managerial purchasing ambidexterity</th>
<th>Manifestations</th>
<th>Tensions</th>
<th>Mechanisms to reduce tensions</th>
</tr>
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<tbody>
<tr>
<td>Orchestration of exploration and exploitation activities across the organization, through the position of P&amp;I implemented 2 years ago.</td>
<td>PO are more adapted to scout technologies rather than functions. Our processes are not equipped to source innovation.</td>
<td>Need to develop a hybrid culture, across all the organization and the management to support individuals and to complement dual structure.</td>
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<tr>
<td>No data found.</td>
<td>Our processes are not equipped to deal with startups, contracts involving IP or secrecy PO does not support too much.</td>
<td>Need to solve tensions through the implementation of strong links with business dev functions.</td>
<td></td>
</tr>
<tr>
<td>“Champion’s role” is key to balance exploration and exploitation activities. Orchestration inside and outside the company.</td>
<td>Tensions with P&amp;I when those decisions are tackled by cost aspects. So no way to have them involved in innovation sourcing.</td>
<td>P&amp;I skills: leadership to convince. Need to balance decisions such as absorbing an innovation or not.</td>
<td></td>
</tr>
<tr>
<td>A lot of meetings and coordination routines between R&amp;D and P&amp;I Director.</td>
<td>Can have bad stories because R&amp;D is bypassed, or P&amp;I not available etc.</td>
<td>Need people who understand both universes exploration and exploitation.</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Cross-functional perceptions of four types of ambidexterity (Source: Authors).
Previous researchers outside the purchasing field have studied ambidexterity in different forms.

6.1 Manifestations of purchasing ambidexterity

The S Corp case exemplifies structural ambidexterity within the purchasing function with the traditional purchasing function of purchasing focused on daily transactional tasks and the P&I function focused on explorative activities. These are structurally separated as independent functions with independent routines and objectives. Specialized in exploratory innovation with its own structure and formalized processes, the creation of the P&I function seems to work well for S Corp. This indicates that such a structural separation of the purchasing function can be an effective way to create ambidexterity and thereby enable purchasing to better contribute to innovation.

Employees from project and category purchasing functions are individually involved in both exploration and exploitation tasks and have to alternate between long periods of exploitation and short periods of exploration. This is aligned with Brown and Eisenhardt's (1997) conclusions, also confirmed by Gupta et al (2006), that employees in traditional organisations are more familiar with and more focused on exploitation (Gupta et al., 2006). Switching between exploration and exploitation is far easier than changing the culture of the organization (Nickerson and Zenger, 2002; Boumgarden et al., 2012).

Previous literature on ambidexterity suggests that resources and capabilities are effectively used when people, structures, processes and cultures from different units are merged or integrated (Tushman and O’Reilly, 1996). Integration calls for inter-dependent tasks, specific processes or “functional integration”, referring to “intra-firm collaboration and information sharing activities” (Swink and Schoenherr, 2015). Recent research describes functional integration as a bi-dimensional process, which requires shared information as well as aligned decisions (Gonzalez-Zapatero et al., 2017). These mechanisms enable organizational effectiveness for structurally or sequentially separated exploration and exploitation. The presence of integration mechanisms within S Corp indicates a certain organizational maturity (Jansen et al., 2009). Also, the P&I function is closely integrated with the business development and marketing functions: integration takes place through individual behaviour and the networking ability of purchasers that enable them to become aware of customer needs or “pain points”. Gonzales-Zapatero et al (2017) also give insights into the benefits of purchasing integration with marketing, bridging with the idea that integration supports supplier innovation and creative capabilities (Schoenherr et al, 2012). Thus, managerial and contextual purchasing ambidexterity contribute to purchasing integration and consequently facilitate structural and sequential purchasing ambidexterity.

At S Corp, exploratory and exploitative units have cross-functional interfaces such as specific positions or “champions” who facilitate knowledge exchange across units. This is aligned with Gupta and Govindarajan (2000), arguing that “liaison personnel” facilitate transitions between exploration and exploitation. These links represent bridges that are artificially created during meetings, across functional teams such as R&D and purchasing or marketing and purchasing, during which distinct or complementary knowledge is shared. Cross-functional interfaces allow employees from different departments to better understand the challenges faced by other units and to reach a common understanding of objectives and methods.

Integration is also related to organizational culture and context. Gibson and Birkinshaw (2004) argued that the capacity to become ambidextrous increases with the creation of a particular type of organization context at the business-unit level, or what they call “social context”. They argue that organizational culture, administrative mechanisms fostering certain behaviours, incentives, career management and other tangible systems might result in better equilibrium in the exploitation and exploration activities. They also argue that when a supportive organization
context is created, individuals engage in both exploitation-oriented actions (geared toward alignment) and exploration-oriented actions (geared toward adaptability), and this results in contextual and managerial ambidexterity found at S Corp as well.

6.2 Tensions surrounding purchasing ambidexterity

S Corp case demonstrates that inevitable conflicts occur when purchasing seeks to contribute to innovation by becoming ambidextrous. The P&I function struggled to unravel the difficult balance between exploration and exploitation in innovation development phase. Nevertheless, S Corp is able to achieve positive results considering the large number of innovations brought in the firm resulting from purchasing exploration. Tensions are partly mitigated as purchasing managers nurture the company with fresh innovative external supplier knowledge. S Corp leaders also succeed in allocating resources between exploration and exploitation, showing how managerial ambidexterity is embedded within S Corp. O’Reilly and Tushman (2013) suggested that the successful achievement of ambidexterity come from the leaders’ ability to manage tensions between exploration and exploitation tasks, which can make organizations more ambidextrous than others (Birkinshaw and Gupta, 2013) and we observe this in S Corp.

6.3 Complementarities between different types of purchasing ambidexterity

O’Reilly and Tushman (2013) observed a lack of research clarifying how sequential ambidexterity, and more especially the transition between exploration and exploitation, occurs at the managerial level and how resulting tensions can be solved. We observed how S Corp interviewees insist on the fact that this transition is sensitive. We also noted how the P&I function contributes to the transition between exploratory and exploitative phases by effectively assessing innovations to convince internal stakeholders such as R&D to pursue these. The S Corp case exemplifies how the combination of managerial purchasing ambidexterity and contextual purchasing ambidexterity at individual levels facilitate sequential ambidexterity through the creation of cross-functional contacts and incentives. These stimuli motivate co-workers and enable innovation process to go a step forward to the innovation development.

Moreover, the S Corp case shows how the creation of a dedicated function to span purchasing and R&D (the P&I function), can be a way to put in place the right skills (Gupta et al., 2006), and that individual knowledge, or a specific process, is necessary to combine or switch between routines of exploration and exploitation. We observed how S Corp’s CEO promoted a new culture oriented towards innovation and spread the firm’s values and missions to all employees: this helped to orient S Corp’s culture towards long-term views where innovation is a priority. This highlights how the creation of a supportive context allows individuals to simultaneously handle ambidextrous requirements within the same function and to successfully manage the transitions between phases of sequential ambidexterity. This is in line with Raish et al. (2009), who argued that ambidexterity at a function level might support firm’s innovativeness through individual ability to deal simultaneously or sequentially with exploration and exploitation.

Last, we observed that complementarities between the four types of ambidexterity are developed over time. One of the author of this paper has a long term overview of S Corp development, which brings a longitudinal view of the development of purchasing ambidexterity in this company. S Corp has developed its purchasing ambidextrous structure in two big stages over the two past decades. Structural and sequential ambidexterity were implemented fifteen years ago under the former CEO’s initiative (stage 1). During this first stage, S Corp added a P&I structure to its former matrix organization, and shaped innovation development as a sequential process. This was seen as a good solution for a decade. The new CEO, arriving in the early 2010’s wanted to strengthen this structure by adding new processes, tools and skills. Thus, S Corp completed its organization by improving the supportive context of innovation orchestration through various coordination mechanisms, and created the P&I champion’s role
(Stage 2). This second stage is still on-going. These two stages reveal a 2-stage vision of ambidexterity development in purchasing, reflecting S Corp’s way of combining the four types of ambidexterity over time, but there is no literature about the longitudinal development of organizational ambidexterity. We can represent the 2 stages and the complementarities as the following (Figure 3):

Fig 3: Complementarities between four types of ambidexterity and the 2-stage implementation of purchasing ambidexterity at S Corp.

6.4 Refined conceptual framework

Overall, our study indicated that all the four types of purchasing ambidexterity are manifested at S Corp, that tensions occur within and between the four types of ambidexterity, and that complementarities may mitigate these tensions. At S Corp, the way these four types of ambidexterity are organized are key to enabling purchasing to contribute to the firm’s innovations. In particular, structural and managerial ambidexterity appear to facilitate the right balance between exploration and exploitation by reducing tensions.

Considering these findings, we refined our initial conceptual framework (fig 4). The first change is related to the manifestations of the different types of purchasing ambidexterity. The answer provided to RQ1 allows us to populate the main characteristics of each type of purchasing ambidexterity. The second change concerns the tensions: we observed typical tensions which occurred at S Corp, which are displayed in this refined framework. Last, the third change is about the complementarities we observed in this case. The two stages described above are now part of the new framework, as a longitudinal view of the development of purchasing ambidexterity.
7. Conclusion

Building on the emerging concept of purchasing ambidexterity, we have explored how purchasing contributes to the firm’s innovation capabilities. We have observed how S Corp, a large multi-national firm, has successfully implemented four types of purchasing ambidexterity (structural, sequential, contextual and managerial ambidexterity) and we have reported on tensions and complementarities between these. These findings allowed us to answer our three research questions:

**RQ1: How are different types of purchasing ambidexterity manifested?**

We found that ambidexterity is a concept which applies to the purchasing function and our case study illustrates how the different types of ambidexterity are organised and managed in the purchasing function. These different types of ambidexterity are manifested through a set of strategic decisions, operational activities, processes, and skills. Structural purchasing ambidexterity is characterised by the creation of a small, independent purchasing unit devoted to exploratory activities, in addition to a traditional purchasing organization devoted to exploitative activities. Sequential purchasing ambidexterity has been observed also in the way S Corp divides the innovation process into different phases, sequenced over time. We have investigated how S Corp implemented contextual purchasing ambidexterity, developed motivation mechanisms, and has integrated purchasing into business development functions. Last, managerial purchasing ambidexterity exists in S Corp, by means of the implementation of a "champion's role" to orchestrate innovation activities. Aiming to develop managerial ambidexterity, S Corp hired people with new skills specific to innovation exploratory activities, such as contracting with innovative partners, such as start-ups, far in advance from NPD phase.

**RQ2: What tensions emerge from the four different types of purchasing ambidexterity?**

Our study allowed us to distinguish a set of trade-offs which cause tensions due to various types of ambidexterity. Creating an ambidextrous purchasing organisation is a powerful way to enable purchasing to contribute to innovation but that this creates some serious tensions that need to be managed. We identified four types of tensions, including purchasing resource allocation,
purchasing integration with R&D, transitions between innovation phases, and purchasing skills and processes. At S Corp, these tensions are reduced by a complex set of coordination mechanisms, which we expand on below.

RQ3: How do complementarities between different types of ambidexterity help to ease tensions created by purchasing’s need to balance exploration and exploitation?

Our case study shows that that purchasing ambidexterity can be created through a combination of different types of ambidexterity: structural, sequential, contextual and managerial ambidexterity. The way the combinations are made helps to reduce tensions created by the necessary trade-offs in any purchasing organization, when purchasing is involved in both exploratory and exploitative innovations. For instance, contextual and managerial ambidexterity facilitate purchasing ambidexterity by complementing structural and sequential ambidexterity. We also provide empirical evidence that there is an interesting diachronic vision of the way that the four types of ambidexterity are embedded over time to be more effective in involving purchasing in innovation. Thus, by first implementing sequential and structural ambidexterity, we can provide the basis for later creation of contextual and managerial ambidexterity.

Theoretical implications

Our article explores the concept of organisational ambidexterity in the context of purchasing. It contributes to several theoretical concepts. First, we suggest that purchasing ambidexterity can facilitate the purchasing function’s contribution to innovation, which calls for questioning how purchasing can manage exploitative and exploratory activities. At S Corp, we saw that purchasing is at the heart of an ecosystem to succeed in managing the two activities and contribute effectively to the firm’s innovation capabilities, which confirm recent views from the literature (Gualandris et al., 2018). It is not new that purchasing can contribute to innovation: various authors have investigated the “dual role of purchasing” (Schiele, 2010, p 138), or how to organize the purchasing department for innovation (Luzzini et al., 2011). But we contribute to more recent research which still emphasize the need to investigate purchasing’s contribution to innovation exploratory innovation (Mikkelsen and Johnsen, 2018; Homfeldt et al, 2017).

Second, we explained the different types of purchasing ambidexterity. For instance, structural purchasing ambidexterity at the organizational level facilitates purchasing contribution to innovation. This organization design involves two main adaptations: (1) a differentiated, autonomous, smaller unit to manage exploration activities and (2) the infrastructural elements, i.e. incentives and organization promotion of a valuable context to promote contextual ambidexterity. The effectiveness of structural differentiation is already found in the literature (Boumgarden et al., 2012; Raish et al 2009). We elaborate the field of ambidexterity in purchasing by shedding light on how purchasing can design its organization through the addition of a distinct and autonomous unit dedicated to innovation exploration.

Third, our study shows how an ambidextrous purchasing organization depends on complementarities and strong links with the rest of the firm to reach a balance in execution, for instance a very strong internal network. Linkages between P&I structure and the rest of the firm are ensured by a set of routines and directives, also enhanced by resource sharing, coordination and control (Boumgarden et al., 2012). We suggest that the organisational structural differentiation enables purchasing’s contribution to exploration tasks but requires strong complementarities with other types of ambidexterity. Furthermore, managerial ambidexterity is effective in combination with contextual ambidexterity to facilitate structural and sequential ambidexterity. Complementarities between managerial ambidexterity and contextual ambidexterity at the individual level enable a better chance of success in structural and sequential ambidexterity within the purchasing function. We suggest that managerial
ambidexterity is not only dependent on managerial capabilities but also needs to be considered together with other types of ambidexterity. Contextual and managerial ambidexterity, i.e. individual levels, support sequential and structural ambidexterity, i.e. organizational level.

Last, we have empirically presented a diachrony between two stages of purchasing ambidexterity over time. We suggest that the first stage of purchasing ambidexterity emerges through the implementation of structural and sequential ambidexterity. Then, as purchasing ambidexterity gains a higher level of maturity in the second stage, the firm can consolidate its processes and skills by implementing contextual and managerial ambidexterity.

Managerial implications

In any organization, the alignment of decisions and the transitions across innovation phases are critically sensitive and must be managed with strong coordination mechanisms, and structured processes. The purchasing function must adapt as well: adopting purchasing ambidexterity is part of this adaptation. Our findings provide several insights to managers on how to facilitate purchasing contribution to innovation. First, our suggestion to practitioners is an opportunity to consider changing the purchasing operating model: involving purchasing in innovation is a company-wide strategic transformation, which might provide a competitive advantage to the firm, but is also a challenge. Second, our study may help practitioners intending to shape, adapt or redesign their purchasing organizations to better balance exploration and exploitation. For instance, we would encourage practitioners to modify their purchasing organization by setting up a specific unit to contribute to exploratory innovation and spreading incentives so that purchasing is better motivated to contribute to innovation. They should also consider carefully purchasing integration to other departments such as business development, as well as the creation of a skilled “champion” who will contribute to the whole innovation process.

Limitations and future avenues of research

This case study has obvious limitations mainly because it relies only on one single case. Generalization was not an objective and we would caution again against empirical generalization. Our intention was to investigate an exemplar of purchasing ambidexterity and we hope others will draw inspiration from this.

We suggest further research to follow up on our findings. Further research could investigate who ends up taking responsibility for managing the tensions between exploration and exploitation. This refers to the need for further insights into managerial purchasing ambidexterity, visible through the “champion role”. Also, future research could investigate the diachronic vision of the way that the four types of ambidexterity are embedded over time, through the use of additional case studies and longitudinal studies. Last, an avenue of research is opened in the field of purchasing contribution to exploratory innovation, as already confirmed by Mikkelsen and Johnsen (2018).

References


PhD Thesis – F.Constant


Appendix 1: Interview guide for Purchasing function

<table>
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<tr>
<th>A.</th>
<th>To begin, tell me how you see the overall strategy of your business.</th>
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<td></td>
<td>To what extent is this strategy geared towards innovation and creativity?</td>
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<td></td>
<td>How does management encourage creativity and risk taking, even in the event of a previous failure?</td>
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<td>Do you perceive that failures are accepted in your organization?</td>
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<td>How would you describe your corporate culture, including the relationship to uncertainty?</td>
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<th>B.</th>
<th>Describe the innovation process in your firm.</th>
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<td>Describe the stages of innovation and the stakeholders at these stages: exploration of an idea, identification / detection, evaluation, absorption / assimilation, exploitation or commercialization.</td>
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<th>C.</th>
<th>Who are the main stakeholders of the innovation process?</th>
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<td></td>
<td>Describe the activities of these stakeholders. Who are they? Are they important in the organization?</td>
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<td>How do they contribute to innovation?</td>
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<th>D.</th>
<th>Describe how the purchasing department contributes to technological innovation in your business.</th>
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<td></td>
<td>Can you tell me how many innovations have been sourced by purchasing over the last 10 years?</td>
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<td></td>
<td>Explain how purchasing contributed to this innovation. Same with a case of failure.</td>
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<th>E.</th>
<th>What types of innovations do you know how to manage through the purchasing department?</th>
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<td></td>
<td>Give an example of a product innovation that has been successful, in which the purchasing has participated.</td>
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<td></td>
<td>Describe this innovation, its degree of radicality and the level of technological uncertainty.</td>
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<th>F.</th>
<th>What purchasing organization have you put in place to facilitate the contribution of purchasing to innovation?</th>
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<td>Since when is this structure in place?</td>
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<td>What types of interactions does this organization have with other departments of the company?</td>
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<th>G.</th>
<th>How Innovation activities driven by purchasing are sequenced over time?</th>
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<td></td>
<td>Are there priority activities or activities that need to be carried out before others?</td>
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<td></td>
<td>How do purchasing activities fit into the company's innovation process?</td>
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<th>H.</th>
<th>What are the innovation activities carried out by each buyer individually?</th>
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<td></td>
<td>How do these activities vary according to the different buyer profiles?</td>
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<td></td>
<td>How is the buyer organized to manage these innovation-related activities?</td>
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<td></td>
<td>To what extent does management have a role to play in organizing procurement activities related to innovation?</td>
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<th>I.</th>
<th>Do you see paradoxes in involving purchasing in the innovation process?</th>
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<td></td>
<td>What is your department's vision of purchasing involvement in the innovation process?</td>
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<td></td>
<td>How do you agree that purchasing contributes to the innovation process?</td>
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<th>J.</th>
<th>What are the various tensions encountered in this process of involving purchasing to Innovation?</th>
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<td></td>
<td>To what extent do purchasing have difficult choices to make, face dilemmas regarding innovation activities?</td>
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|     | What tensions exist between internal functions, when purchasing are involved in innovation?
APPENDIX 9: Screenshot showing that Paper 3 has been invited for a major revision by JSPM - JPSM_2019_184

Dear Authors,

thank you for submitting your manuscript to the IPSERA 2019 JPSM Special Issue. Your paper has been carefully revised by two anonymous reviewers and myself as guest editor, and we all agree that it is valuable and interesting, and can provide a significant contribution. At the same time, we also agree on some issues that need to be solved in order to make the paper publishable and fully exploit its potential.
The main issues are the following:

- There is ambiguity and misalignment between the Research Questions and the Research Framework, this needs to be solved by both clarifying the formulation of the RQs and improving the coherence with the framework. In particular, the concept of Innovation Capability is mentioned but never defined, nor analyzed, nor discussed, so it is advisable to eliminate it.

- You are somehow ambiguous between conducting a purely exploratory study and providing an explanatory/theory building contribution. Indeed you leverage on existing knowledge and you formulate a preliminary research framework, to investigate relationships among various constructs, therefore your work is explanatory and interpretative, not only exploratory, but you need to be consistent throughout the paper.

- You need to clarify how you were able to select this case, knowing upfront that it was advanced and successful. This has probably to do with the previous relationship between one of you and the company, which also needs to be clarified. Please consider also the possibility to disclose the company name.

- The discussion and conclusion sections need to be revised, providing better structure and consistency, and avoiding repetitions of results.

- The paper also needs a careful proofreading, to eliminate typos and improve the flow of sentences.

Below you can find detailed comments to the paper, as well as the reviewers’ comments and suggestions.

We understand there is still some significant work to do, but we also think it is feasible, although challenging. We hope you are willing to accept the challenge and revise the paper.

Introduction:

- Here you may emphasize the role of the purchasing function in sourcing innovation from outside the organization, in line with the open innovation concept, as opposed to a more traditional internal approach to innovation.

- There is a consolidated stream of PSM literature on the role of purchasing for innovation, but unfortunately this is not yet so widespread in industry, hence the need for further research.

Literature:

- It is not clear why you associate purchasing involvement in NPD with exploitative innovation only: is this your assumption? Is it clearly stated in the literature? Purchasing may be involved in NPD every time suppliers are involved, and suppliers may be involved for either incremental or radical innovation (there is plenty of evidence of both), considering both consolidated and new suppliers…
- Purchasing ambidexterity: here you define the concept, but it is not clear how this is achieved in practice, isn’t there any contribution at all in the literature

- Forms of ambidexterity: if I understand correctly, these forms have been identified for organizational ambidexterity in general, not specifically for purchasing. Do they apply to purchasing as well? Is there anything about it in the literature? Probably not, but please make it explicit

- Managerial ambidexterity seems to play at a different level compared to other 3, and it could coexist with the others (all 3 in principle, not only contextual).

Research framework and questions:

- RQ1 is actually 2 questions in one: first you ask how the 4 types of ambidexterity are manifested, then how they impact a firm’s innovation capability. You may consider splitting them in 2 (or eliminate the second part, if you drop the concept of innovation capability).

- Here you introduce the concept of firm’s innovation capability, which however was not presented in the literature review, nor is defined here. Since it is part of both your framework and research question, please define it clearly or eliminate it.

- RQ2 states “What tensions emerge from the four different types of purchasing ambidexterity?”. But then in Fig. 2 you show tensions between exploitative and explorative innovation. This is confusing, please clarify.

- RQ3 is formulated in a quite complex way. You give for granted that there are complementarities among the 4 types of ambidexterity (which is not so straightforward for the reader at this point of the paper), and you also assume that such complementarities will ease tensions between exploitation and exploration, while the question is about the “how”. Please consider simplifying and streamlining this question.

- I suggest you to show the 3 RQs in the figure, to help the reader understand the overall logic and reconcile RQs with the framework

Research method:

- Please revise the first paragraph, better connecting the investigation of ambidexterity with your choice of case study. Please explain the different between theory elaboration and theory building, and why you aim for theory elaboration. Please explain upfront why you have chosen a single case study, not at the end of the case selection.

- What do you mean by “this choice of research site”? Which site?

- You mention that one author had previous experience with the company, what do you mean? What kind of experience? This is mentioned two more times in the paper, so needs to be clarified upfront

- In Table 2 S Corp becomes SE Corp, I am afraid that confidentiality is at risk. If you really need to hide the name of the company, better avoid to use their initials… If instead
you could reveal the name of the company, it would be a good improvement for the paper, and indeed you present a successful case without revealing any industrial secret…

- In table 2 you can also add the total interview time

- Please explain what you mean by “we followed an active interviewing methodology which was treated as a social experience in which knowledge is jointly created by the interviewer and the interviewee”

- You mention that you combined data driven and theory driven coding. Please elaborate and explain how you coded the interviews and how you identified the various constructs (ambidexterity types, tensions, complementarity, innovation capability, etc.)

- The first part of the discussion about validity is off topic: of course case studies, and even more a single one, do not aim for statistical generalizability, this is not the point. Validity is about ensuring that what you measure and report is correct, as you explain in the second part of the paragraph.

Results:

- Usually the literature uses the terms “Technology push” and “Market pull” to distinguish the two types of innovation.

- 5.2 here again you assume that when R&D develops an innovation and Purchasing looks for suppliers to produce it, it is a case of exploitation. However R&D could develop radical innovation that requires new suppliers, so closer to exploration. Please clarify this point.

- Structural ambidexterity: when presenting the P&I function, you mention both “market needs” (which I assume refers to the end market – customers) and “scout the market” (which I understand as supply market). Please clarify to avoid misunderstanding.

- Sequential ambidexterity: the second phase is called in multiple ways (NPD, development, assimilation). This is confusing, please clarify.

- Table 3: here the term “mode of balancing” is introduced, which is understandable, but was not used before. The use of the term “complementarities” instead is not clear: so far complementarities have been discussed between the 4 types of ambidexterity (structural, contextual, sequential, managerial), here instead they refer to single types. This is not clear and confusing, complementarity does not seem to the right term in this table.

- There is no mention at all in this section of innovation capability, which is the outcome variable of the research framework. Have you collected any information about this? How can you answer RQ1 otherwise?

- Regarding innovation performance, I understand that you mentioned the number of patents in 2018 in section 4, but is this related to ambidexterity types? Is this the only measure of explorative innovation? How do you measure exploitation?

Discussion:
This section is quite rich and articulated, but lacks a clear structure. I would recommend to structure the section according to the 3 RQs, answering them one by one. Please avoid (or limit) the repetition of what is presented in the results section.

At page 20 you discuss the concept of purchasing integration, which however is not part of your research framework nor mentioned in the RQs. Why are you discussing it?

At page 21 you introduce the concept of contextual antecedents to ambidexterity, which appear to be relevant, but again were not included in your framework and questions. By the way, the term “contextual antecedents” creates confusion with “contextual ambidexterity”

Page 21 and figure 3: there is ambiguity/misalignment between the text and the figure: which types of ambidexterity were introduced in stage 1 and which in stage 2?

In the revised version, the outcome variable is no more innovation capability, but innovation performance, which is something different, please clarify/align

Conclusion:

Here you answer the RQs, actually by summarizing again your findings from the case. As said before, I suggest you to answer the RQs in the discussion section, where you already analyze the results and compare them with the literature. There is no need to repeat the findings from the case here, rather focus on highlighting your theoretical and managerial contribution.

Are you sure that nobody has investigated the role of a dedicated P&I structure (or similar) before? This is quite a bold statement.

Spina et al. (2013) did a literature review and found that innovation is the second most frequently investigated goal in the PSM literature, which does not mean that it is the second priority for purchasing functions. It may be true anyway, but citing Spina et al. (2013) is not correct.

Reviewer 1

I’m not an expert in the field of purchasing, but I found this paper very interesting and it seems to me that it adds value for both the academic and the practitioner perspective.

I think it requires only some minor reviews in order to be published.

The main weakness in my opinion concerns the “innovation capability” concept and how it is dealt with in the paper.

The concept is mentioned in the title and in the first research question, but it is not well introduced in the paper from a theoretical perspective (specifically, in the introduction, in section 2 “Ambidexterity as an antecedent to innovation capability”, in the first two rows in section 3, in the development of RQ1) nor it is appropriately considered in the case study (section 5), nor it is adequately discussed in the conclusions (point 1). In synthesis, it seems to
me that the concept is only mentioned, but not actually analyzed nor investigated appropriately. The literature has spent thousands of pages on the concept and I think it cannot be mentioned in the paper without the necessary references and also in the case study it should have a dedicated section of investigation. My opinion is that the concept of innovation capability can simply be eliminated from the paper, without losing any value. The focus of the paper could be on purchasing ambidexterity, how it is manifested, which are the tensions and complementarities, without dealing with their impact on the innovation capabilities, which would require a dedicated, different investigation. This means that RQ1 should be reduced only to the first part. The concept may (finally) remain in the frameworks (figures 2 and 4), but in this case it needs to be taken for granted from the literature: “the literature has demonstrated that ambidexterity can contribute positively to innovation capability …”, but with some caution and with the necessary contextualization and references.

Another issue that requires some attention concerns the case study. At page 10 it is argued that “the case needed to be a model of ambidexterity, renowned for its excellence in exploitative and exploratory innovation within its market”. How can the authors know this BEFORE the investigation? Which information and data have been used to identify the case and then to decide to use it for the study? Furthermore, it is not clear to me if the case is considered SUCCESSFUL (as said at page 20: “the structural ambidexterity demonstrates its effectiveness as the involvement of P&I buyers in innovation has proved successful”) and, if so, from what perspective: financial? Innovative? Or simply in terms of implementation of ambidexterity organization and management? It is very important to clarify this, because depending on the type of “success”, the conclusions that can be drawn from the empirical study are completely different, and consequently the specific theoretical and practical implications. Lastly, the name of the company is not revealed. This could be a little weakness, not probably in terms of reliability of the study (I’m sure the authors respect all the ethical rules in writing their paper), but more in terms of interest for the reader and also in terms of contextualization: knowing the company would help the audience in better understanding the problems and the relevance of the solutions adopted by the company. However, I leave this point totally in the hands of the editor who can decide about this.

One very very minor point: Section 6 could be given a higher level of systematization, in order to make it more easily readable and to lead the reader more clearly through the logical steps towards figure 4.

- Reviewer 2

The paper deals with a relevant topic not only for the JPSM readership, but for all scholars and practitioners involved in management issues. Although the term ambidexterity is relatively new, the topic is not. The scientific and managerial community has always wondered how to reconcile the need for continuity and innovation, efficiency and creativity, stability and change. Ambidexterity remains a topical issue and the main merit of this work is its contextualization in the field of purchasing.

The work has a predominantly exploratory character, but to some extent also confirmatory. It has an exploratory character because the empirical case-based research brings out dynamics and problems that are not well conceptualized so far. It has a confirmatory character because
it builds on existing theories, in particular on the four types of ambidexterity that literature provides, verifying their existence through a case study.

In addition, the study has a component of theory elaboration that led to figure 2, the result - if I understand correctly - of a purely conceptual work carried out on the basis of existing literature. And it has another component of theory refinement (figure 4) carried out on the basis of the evidence that emerged from the case. Therefore, this paper is quite complex: the reader has some difficulty in finding the way within these multiple aims. I will come back to this aspect in the following.

The paper is well written, well-articulated, and has the potential to be published. In my opinion, however, it requires additional work along the following directions.

**Background.** The background section effectively illustrates the different types of ambidexterity, but it remains predominantly conceptual. This section should better highlight not only what research has so far conceptualized, but also empirically demonstrated, and the gaps existing in this literature.

**Methodology.** There is a widespread, but fundamentally erroneous, belief that case studies serve only exploratory research. This is not the case. The paper is, in my opinion, ambiguous on this point. As mentioned above, this research has both exploratory and in some way confirmatory intentions. I suggest to the authors to be more explicit on this aspect. The next point is linked to this one.

**Research questions and framework.** The reader has some difficulty in putting together the research questions R1-3 and the research framework reported in figures 2 (which is not introduced in the text; by the way, only figure 3 seems to be introduced in the text). The questions aim to explore and understand ambidexterity (*How are ... manifested ...* What tensions emerges ... *How ... ambidexterity help to ...*), while figure 2 hypothesizes a set of connections between distinct constructs (purchasing involvement, innovation capability, ambidexterity balance and combination). The questions are open, while the figure resembles a set of propositions (although the authors write that: "...we do not present a priori propositions but pose open research questions", page 10). The authors probably assume that the reader can easily understand that the figure represents the theory building effort performed downstream of the previous exploration phase. This is not the case, precisely because the link between the research questions and the framework is not immediate (and it is weakly explained in the paper). I suggest the authors to rethink this section.

**Findings.** The case seems really interesting but - in order to fully appreciate its contents - it would be useful a more detailed description of the company, its organizational structure and the units involved in purchasing and innovation activities. A drawing of the organization chart and additional information could be useful to better understand the functions involved in the investigation (Purchasing / senior level, Purchasing / operations, Purchasing & Innovation (P&I), R&D, R&I (Research and Innovation), Business development), their role, and their interdependencies.

**Discussion and conclusion.** These sections seem to me too long, and some content is repeated. I believe that these two sections can be shortened and made more effective.
In conclusion, this work makes an interesting contribution to the debate on ambidexterity in the purchasing field. However, it is a complex work: the reader has some difficulty in understanding the overall research design and therefore the logical development path of the investigation. I wish the authors good work.

Specific remarks

Page 2: “In this paper, we argue that investigating ambidexterity within a function, such as purchasing, is interesting because purchasing …”. Our paper aims to analyse how purchasing ambidexterity contributes to innovation capability.” However, the title does not highlight this “functional specificity”. Please consider a title modification in order to make it clear that the focus is on purchasing.

Page 3: “Ambidextrous organizations create tensions that are supposed to be solved at functional and management levels (Raish et al., 2009).” This juxtaposition of functional and management level is not clear. What “level” is the management level?

Page 8: “RQ1: How are different types of purchasing ambidexterity manifested and how do they impact on a firm’s innovation capabilities?”. So far, ambidexterity has been discussed, and not purchasing ambidexterity. More specifically, there was no mention of different types of purchasing ambidexterity. Does the distinction between Structural, Contextual, Sequential, and Managerial ambidexterity also apply to purchasing ambidexterity? If the answer is yes, this crucial step requires adequate explanation. It is then written that (page 8): "Assuming purchasing ambidexterity is a mix of different types of ambidexterity..." This step, namely that purchasing ambidexterity is a mix of different types of ambidexterity", should not be assumed, but explained.

Page 8: “Achieving high levels of exploration and exploitation simultaneously is not easily achieved”. Achieving ... achieved: unclear.

Page 8: “… and freedom- responsibility Dougherty and Hardy (1996).” Check the brackets.

Page 13: “15 years ago, S Corp emphasized the opposition of traditional strategic resources (core capabilities such as R&D and category purchasing) and new core capabilities: “traditional organizations have a reverse effect that inhibits innovation” (P&I)”. That sentence is not clear to me.

Page 17: “Purchasing operations struggle to succeed in explorative activities and claim that P&I gets all the means because they are not well equipped to scout innovative suppliers”. That sentence is not clear to me: if the P&I gets all the means, it should be well equipped …

Page 17: “Most of the purchasing workforce at S Corp focuses mostly …”

Page 14: “With only five full time employees, P&I remains small compared to the rest of purchasing department that counts 1800 employees in total…”. Can we talk about “function” in this case?