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ABSTRACT

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Title	DESIGNING AN INNOVATION SOURCING PROCESS – A Case Study in the Pharmaceutical Industry		
Supervisor(s)	Ph.D. Harri Lorentz Ph.D. Sini Laari		

Abstract

This research was conducted as an assignment for a Finnish pharmaceutical company, Orion Corporation.

Innovations have become increasingly important for organizations' growth efforts. Particularly in the pharmaceutical industry, companies must generate innovations to sustainably increase the bottom line due to substantial pressures to lower prices.

Thereby, also procurement literature has increasingly focused on highlighting the criticality of exploiting suppliers' knowledge for increased innovation performance. Also in practice, procurement functions have recognized their significant role in enabling innovations. However, thus far, research regarding innovations in procurement focuses mainly on the supplier relationship management (SRM) process, which encompasses actions within the current supplier base. While these research contributions are valuable for emphasizing the importance of innovation efforts with suppliers, the current academic literature lacks in understanding how innovations can be driven with an aligned sourcing process. Thus, the aim of this research was to develop a case company specific innovation sourcing process and to define when to adopt the developed process.

To address the research aims, relevant research disciplines were first examined to develop a theory based process and a propositional application context. To examine practical applications, four large Finnish companies that have already implemented an innovation sourcing process were interviewed. Subsequently, the researcher facilitated three interactive case company workshops. As a result, a case company specific innovation sourcing process was constructed based on the findings from theory, the benchmarked company processes and the workshops. To assess the applicability of the process and when it should be adopted, case company sourcing managers responded to a questionnaire regarding the likelihood of applying the process and the foreseen challenges.

The final process comprises of five main phases: define, discover, ideate, test & develop MVP (Minimum Viable Product) and transfer. The process is characterized by substantial iteration and end user centricity in contrast to the traditional sourcing process. The average likelihood of applying the process was 3.7/5, indicating the acceptance of the process. Furthermore, regarding the applicable sourcing context, two key determinants, solution specification, and company and sourcing case attractiveness, were identified. Consequently, these determinants were incorporated into a case company specific evaluation matrix which sourcing managers can utilize when assessing the applicability of the innovation sourcing process.

Key words	Innovations, sourcing process, pharmaceutical industry, process design
Further information	

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Tiivistelmä

Tämä tutkimus on tehty toimeksiantona suomalaiselle lääketeollisuusyhtiölle, Orion Oyj:lle.

Innovaatioiden tärkeyttä korostetaan yhä enemmän yhtiöiden kasvutekijänä. Tämä korostuu lääketeollisuudessa kasvavan hintakilpailun johdosta. Täten yritysten on jatkuvasti kehitettävä uusia innovaatioita kannattavuutensa puolustamiseksi.

Hankinnan kirjallisuudessa korostetaan enenevissä määrin toimittajien tietotaidon hyödyntämistä innovaatioiden edistämisessä. Lisäksi käytännössä yritysten hankintaorganisaatiot ovat tunnistaneet merkittävän roolinsa innovaatioiden mahdollistamisessa. Hankinnan tutkimus innovaatioiden edistämisestä keskittyy kuitenkin pääasiassa toimittajahallintaprosessiin, joka kattaa toimet yrityksen nykyisten toimittajien kanssa. Aiemmat tutkimustulokset ovat arvokkaita, sillä ne korostavat toimittajien tietotaidon hyödyntämistä innovaatioiden edistämisessä. Toisaalta kirjallisuudessa on tutkimusaukko kilpailutusprosessin kehittämisen osalta. Täten tässä tutkimuksessa kehitettiin toimeksiantajalle soveltuva innovaatiokilpailutusprosessi ja määritettiin, milloin tai millaisiin hankintaprojekteihin tätä tulisi soveltaa.

Tutkimusaukon johdosta kirjallisuudesta ei löytynyt valmista mallia innovaatiokilpailutusprosessista. Täten tutkimuksessa kehitettiin ensin teoreettinen malli eri tieteenalojen kirjallisuuden pohjalta. Kirjallisuuskatsauksen tuloksena syntyi ehdotus prosessin soveltamiskontekstista. Teorian tueksi haettiin esimerkkiprosesseja käytännöstä. Tutkija haastatteli hankinta-ammattilaisia neljässä suuressa suomalaisessa yhtiössä, jotka ovat jo ottaneet käyttöön vastaavanlaisen prosessin. Tämän jälkeen tutkija fasilitoi kolme interaktiivista työpajakertaa, johon osallistui asiantuntijoita toimeksiantajayrityksen hankinta- ja liiketoimintaorganisaatioista. Työpajoissa kehitettiin toimeksiantajalle soveltuva innovaatiokilpailutusprosessi teorian ja käytännön löydösten pohjalta. Lisäksi prosessin soveltamiskontekstia selvitettiin kyselyllä, joka lähetettiin kaikille toimeksiantajan hankintapäälliköille. Kysely kartoitti prosessin soveltamisen todennäköisyyttä ja ennakoituja käytännön haasteita.

Lopullinen prosessi koostuu viidestä vaiheesta: määrittele, etsi, ideoi, testaa ja kehitä MVP (Minimum Viable Product), ja siirrä. Prosessissa korostuu iteratiivisuus ja loppukäyttäjäkeskeisyys perinteiseen kilpailutusprosessiin verrattuna. Keskiarvo prosessin soveltamistodennäköisyydelle oli 3,7/5, mikä viittaa prosessin hyväksymiseen. Lisäksi prosessin soveltamiseen liittyen tunnistettiin kaksi keskeistä tekijää: ratkaisun spesifikaatio sekä yrityksen ja projektin houkuttelevuus. Näiden tekijöiden pohjalta kehitettiin case-yrityskohtainen matriisi, jota hankintapäälliköt voivat hyödyntää arvioidessaan innovaatiokilpailutusprosessin soveltamista.

Asiasanat	Innovaatiot, kilpailutusprosessi, lääketeollisuus, prosessikehitys
Muita tietoja	

UNIVERSITY OF TURKU
Turku School of Economics

DESIGNING AN INNOVATION SOURCING PROCESS

A Case Study in the Pharmaceutical Industry

Master´s Thesis
in Operations and Supply
Chain Management

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The originality of this thesis has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

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Helsinki, 24 April 2020

Pinja Valtonen

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List of Abbreviations

API	Active Pharmaceutical Ingredient
APM	Agile Project Management
CDA	Confidentiality Disclosure Agreement
CNS	Central Nervous System
FFE	Fuzzy Front End
IPR	Intellectual Property Right
KPI	Key Performance Indicator
LOI	Letter of Intent
MaSsOs	Marketing, Sales support and Operational services
MRO	Maintenance, Repair and Operations
MVP	Minimum Viable Product
NDA	Non-Disclosure Agreement
NPD	New Product Development
NCD	New Concept Development
OTC	Over-the-Counter
POC	Proof-of-Concept
RBV	Resource Based View
RQ	Research Question
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Quotation
R&D	Research and Development
SLA	Service Level Agreement
SMI	Supply Market Intelligence
SRM	Supplier Relationship Management
TCE	Transaction Cost Economics
VRIN	Valuable, Rare, Imperfectly Imitable, Non-Substitutable

1 INTRODUCTION

1.1 Background and research gap

Innovations have become increasingly important for organizations' growth efforts (Luzzini et al. 2015). They have been recognized as one of the five basic competitive priorities in corporate competitive strategy in addition to cost, quality, delivery and flexibility (Buffa 1984; Ward et al. 1990; Ettlie 1995; Cohen et al. 1996; Krause et al. 2001). Thereby, enabling innovations is a key initiative of also a procurement function's strategy and efforts in generating value to the company. In fact, recently, there seems to have been a clear shift in procurement functions' focus towards innovation and value co-creation together with suppliers. This shift is mostly due to procurement's increasing maturity as a centralized function and it gaining ground as a strategic function from an operational cost saver. (Umberhauer & Younger 2018, 4; Naoui-Outini & El Hilali 2019, 171.)

In addition, the same phenomenon emerges in literature, as scholars increasingly highlight the importance of exploiting suppliers' knowledge for increased innovation performance (Schiele 2006; Un et al. 2011; Pulles et al. 2014). However, research regarding innovation in the private sector procurement focuses mainly on the supplier relationship management (SRM) process, which encompasses actions within the current supplier base (Aminoff et al. 2015). Overall, studies concerning innovation in procurement mainly divide into two research areas: stimulating key suppliers' innovation performance (Ellis et al. 2012; Schiele 2012; Wagner and Bode 2014; Jajja et al. 2017) and identifying innovative suppliers (Schiele 2006; Pulles et al 2014). While these contributions are valuable for emphasizing the importance of innovation efforts in collaboration with suppliers, the current academic literature lacks in understanding how innovations can be driven with an aligned and specified sourcing process.

Sourcing, as defined in this thesis, is the set of activities or a project to find, evaluate and select suppliers from which the company acquires a specific product, service or material for a business need at the best price-value ratio possible. This process is typically fully led by the company's centralized procurement function. In addition, the assigning business unit or function and other relevant stakeholders such as the legal unit provide knowledge throughout the process. (Axelsson & Wynstra 2002; Van Weele 2005.)

The traditional sourcing process builds upon the buying company's conviction of the product or service specification, which are handed to suppliers at the latest in the Request For Proposal (RFP) phase (Van Weele 2005). Axelsson and Wynstra (2002) note that too strict or extensive specification definition leads to delimiting the spectrum of available suppliers and solutions, and further supplier innovativeness regarding the solution design.

In addition, the ever rapidly changing internal and external environment can result in obsolete predefined specifications. Thus, an alternative sourcing process is needed to generate innovations, when the buying company may not be aware of the available and applicable solutions on the market, or it explicitly wants to stimulate supplier innovation for a tailored solution and mitigate risks regarding predefined, fixed specifications.

1.2 Research objective

This research is conducted as an assignment for Orion Corporation's procurement function. Orion is a Finnish pharmaceutical company developing, manufacturing and marketing human and veterinary pharmaceutical products and active pharmaceutical ingredients (APIs) globally. Orion's new drug and treatment method discovery and development focuses primarily on the following three core therapy areas: central nervous system (CNS) disorders, oncology and respiratory diseases. Its net sales amounted at 1.05 billion euros in 2019. (Orion.fi A 2019.)

During the 21th century, the pharmaceutical industry has been subject to significant turbulence. This is mainly due to global macro-level phenomena around the rising demand for healthcare due to aging population in developed countries, whilst governments increase initiatives to cut budgets on consumer drug reimbursements. Consequently, this results in pharma companies facing pressures to lower prices to retain sales volumes. (Stirling & Van den Heuvel 2017.)

In addition, market analysis agency, EvaluatePharma (2018), projects that roughly $250 billion in sales are at risk due to proprietary blockbuster drugs' expiring patents between 2018 and 2024. However, only roughly $139 billion will be lost due to the patent cliff. Nevertheless, consequently companies need to seek novel drivers for cost-efficiency and innovative ways of growing the business model to sustainably increase the bottom line and change the industry dynamics despite the aforementioned hurdles (GEP 2018).

Despite the challenging and intense price competition on the pharmaceutical market and expiring proprietary drug patents, Orion systematically strives for a more rapid market growth. It has announced its future growth target to increase net sales with 50% by 2025, amounting to EUR 1.5 billion. The growth target requires persistence, prioritization and new ways of working from the company as a whole with a key focus on generating new innovative products. (Orion.fi C 2019, 3.)

Orion's procurement function has recognized its significant role in its strategy to be able to infuse new ideas and opportunities for innovations as it is both inwards business-facing and outwards market-facing in nature. Consequently, the function can match internal customers' business needs to insightful supplier knowledge and expertise to enable the co-creation of innovations also by the sourcing process. However, *Orion's traditional*

sourcing process does not adequately support innovation generation efforts as it requires detailed internal specifications to run smoothly. In addition, the process is time consuming, which restricts a rapid time to market application. Furthermore, the value of the solution is captured only once a long-term agreement is already in place, restricting the application for new and outcome uncertain innovation projects.

Therefore, it is, increasingly important now than ever, to elevate Orion's procurement function's vital role in not only decreasing costs and mitigating risks, but increasingly also in acting as a catalyst for innovation and continuous improvement to build competitive advantage by an innovation sourcing process. Thereby, the function will be able to drive the ever so needed business growth according to Orion's 2025 year growth target.

1.3 Research questions and structure

The above described research problem will be scrutinized first based on the primary research question (RQ1):

- What kind of sourcing process should the case company adopt to enable the generation of innovations?

Once a systematic process has been developed, the context and scope of application will be explored to answer the second research question (RQ2):

- When should the developed process be applied?

Further justification of the research questions is provided in Chapter 4.2.2. Moreover, to answer the research questions, this thesis is divided into six research phases, which portray the six research chapters. Each research phase yields an important output to answers the aforementioned research questions. The combined phases and outputs represent the research logic of this study, which is depicted in Figure 1.

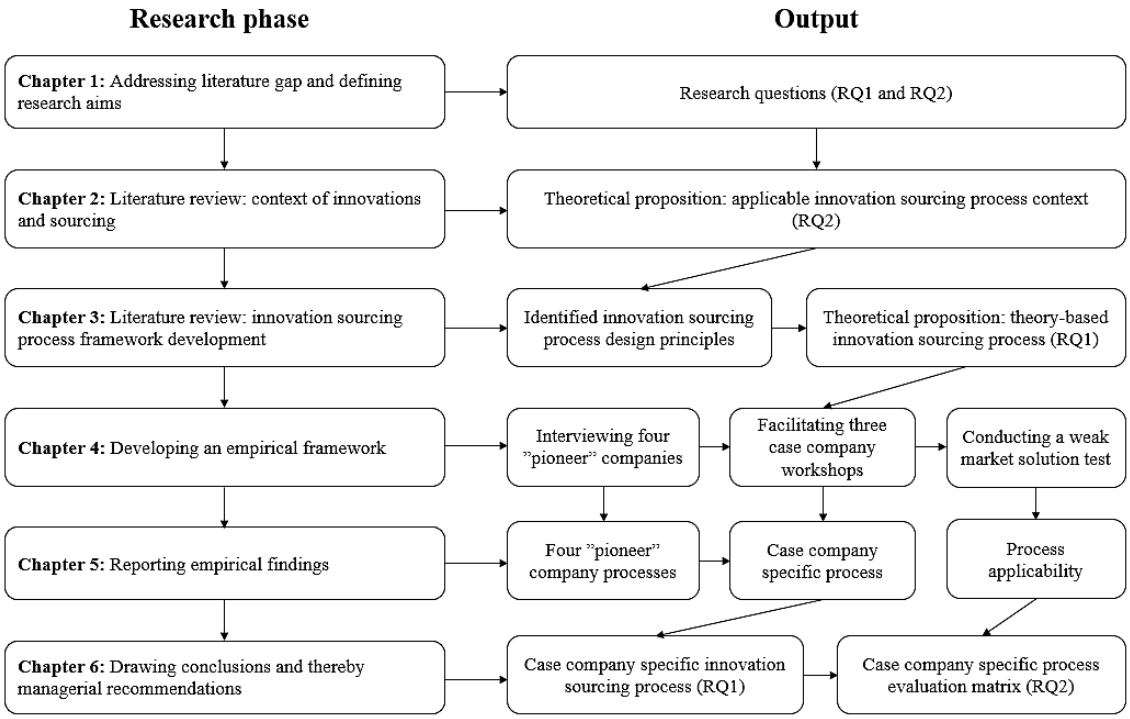

Figure 1 Research logic

The first chapter introduces the research topic, gap in literature and thereby the research objective together with the research questions. Chapter 2 provides an understanding of the key concepts and background related to generating innovations in the sourcing context. Also, it addresses the need for an alternative sourcing process in light of the current literature. Consequently, Chapter 2 contributes to generating a theoretical proposition to RQ2: when should an innovation sourcing process be applied.

Next, Chapter 3 proceeds to exploring relevant research disciplines to uncover what kind of guidelines or principles steer the design of the alternative innovation generating sourcing process. As a result, the design principles are utilized to construct a theory-based innovation sourcing process, which represents the theoretical proposition to RQ1: what kind of process should the case company adopt to enable the generation of innovations. Next, Chapter 4 describes the methodological framework for this thesis. The empirical methods, interviewing "pioneer" companies, facilitating case company workshops and testing the applicability of the process by the means of a questionnaire, to develop a case company specific innovation sourcing process are introduced.

Furthermore, in Chapter 5, the analyzed data and findings from all three empirical phases are presented. Subsequently, drawn conclusions and managerial recommendations are suggested in Chapter 6. Thus, the final output of this research, thereby, is the case company specific innovation sourcing process (RQ1) and a practical evaluation matrix (RQ2) to assess the suitability of applying the innovation sourcing process to a sourcing case.

2 SOURCING FOR INNOVATIONS

This section, as a part of the literature review of this thesis, focuses on describing the context of generating innovations and enhancing companies' innovation performance. In addition, more specifically, this thesis further delimits the examination of innovation generation to the sourcing context and identifies the need for an innovation seeking sourcing process as an alternative method to the traditional one. Consequently, by the means of the contextual analysis done in this section, the synthesis presented at the end of this section contributes to presenting a literature based proposition for the second research question of this thesis (RQ2) *"When should the developed process be applied?"* Based on the identified context proposed in this section, the research proceeds to identifying the design principles that steer the development of the theory-based process.

2.1 Innovation as a positional advantage

The theoretical framework of this thesis draws on the Resource Based View (RBV) theory of a firm and the conversion of valuable, rare, imperfectly imitable, non-substitutable (VRIN) resources, such as product design expertise, into positional advantages, such as innovations, to achieve superior performance and competitive advantage (Luzzini et al. 2015, 110). In essence, the RBV theory introduced by Wernerfelt (1984) and Barney (1991) is a managerial framework that examines the strategic resources companies can attain to achieve sustainable competitive advantage, which is linked to superior company performance.

Daft (1983) characterizes resources as company-controlled assets, capabilities, processes, characteristics or know-how that enable the development and implementation of strategies to improve business efficiency. However, according to Barney (1991, 103–107), simply the possession of resources is not yet sufficient to gain sustainable competitive advantage and thereby better performance. The resources, tangible or intangible, must be dispersed within the company and difficult to be transferred from the company to another. In addition, they must also be VRIN.

The VRIN resources are usually owned by companies, but can also be acquired from external sources such as suppliers (Luzzini et al. 2015). Day and Wensley (1998, 2) further suggest that the acquisition and possession of VRIN resources is not sufficient to gain competitive advantage, but they also need to be converted into positional advantages, with which a company is able "to do more or better (or both) than its competitors". For example, positional advantages enable the company to execute activities at a lower cost, provide more innovative offerings to customers faster than competitors. Consequently,

the end user or customer is willing to pay a premium price to obtain such products or services, and thus the company achieves sustainable competitive advantage.

Innovation is thus also recognized as a positional advantage, and therefore an antecedent of success and a key competitive driver for economic growth (Swink & Song 2007; Chen et al. 2010; McKinsey 2010; Song et al. 2011; Luzzini et al. 2015). In addition, innovation has been recognized as one of the five basic competitive priorities in corporate competitive strategy in addition to cost, quality, dependability and flexibility (Buffa 1984; Ward et al. 1990). According to McKinsey's (2010) global executive survey receiving 2240 responses from executives around the world and from different industries, 84% of responding executives state that their company's future success is dependent on innovation. Consequently, it is crucial that a company has processes in place to be able to generate innovations in-house and externally.

2.2 Multidimensional innovations

Although innovation is claimed to be a driver of value adding capability and in general vital for companies' economic growth, some ambiguity prevails among the available definitions of innovation. There is a broad range of definitions for innovations amongst researchers. However, often these definitions overlap resulting in no univocal definition. Thus, intrinsically, the ambiguity from literature has a ripple effect on our daily language and innovation in business and management context is used in wide scale, resulting in somewhat a buzzword in our daily language (Baregheh et al. 2009; Kogabayev & Maziliauskas 2017, 60.) Baregheh et al. (2009) rightly highlight this problem and state that the development of innovation strategies and further initiatives within companies becomes difficult without a clear definition of the term. Thus, also in this thesis, a definition of the term "innovation" is required before linking it to procurement and developing a novel innovation seeking sourcing process.

The term "innovation" stems from Latin's past principle verb "innovare", which means "to renew, restore" and also "to change". Its intransitive meaning is "to bring in new things, alter established practices" (Etymonline, 2019.) Many researchers (Shumpeter 1934; Utterback 1994; Afuah 1998; Cooper 1998; Fagerberg 2005) have contributed to conceptualizing the term and identifying its various dimensions.

Schumpeter (1934) has been identified as the founder of the theory of innovation, who also first contributed to the typology of innovation stating that "innovation", or "development" is a new combination of new or existing knowledge, resources, equipment, and other factors attempted to be commercialized. Innovations are generated through a development process after which they are put into commercial practice. Afuah (1998) further suggested that innovation is the "use of new technical and administrative knowledge to

offer a new product or service to customers". More recently, Fagerberg (2005) describes innovations as new products or services, methods of production, markets or ways to organize business that add value.

Despite the broad and ambiguous definition of innovation, researchers coincide that innovation can be generated in multiple forms and approached from multiple dimensions (Cooper 1998, Utterback 1994). Cooper's (1998) multidimensional interpretation has been widely recognized and cited by scholars and therefore is presented in this thesis to characterize innovation (Zawawi et al. 2016). The multidimensional model of innovation is presented in Figure 2.

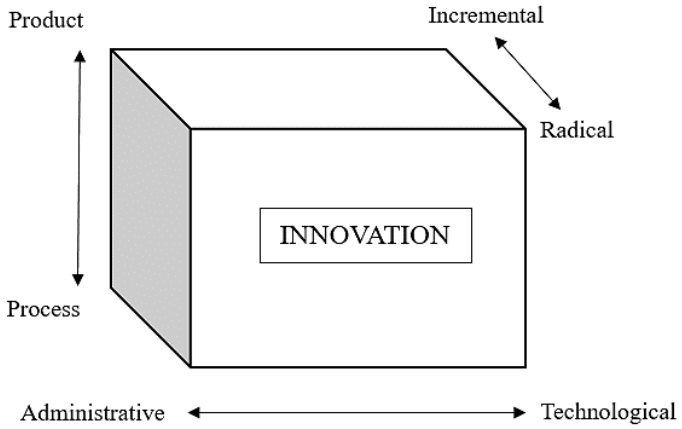

Figure 2 The three dimensions to innovation (adopted by Rowley 2011, 78 from Cooper 1998)

Cooper (1998) divides innovations into three dimensions: administrative or technological, radical or incremental and product or process innovation. The division between administrative and technological nature has received most attention amongst scholars (Zawawi et al. 2016). Yang (2012) proposes that technological innovations concern companies' core operations such as new products, services or technologies while administrative innovations cover new policies or new organizational procedures such as processes. The subject of an innovation can be a product or a process and the nature of an innovation can extend from incremental enhancements to radical reformations. (Cooper 1998; Rowley 2011.)

Moreover, Cooper (1998) notes that an innovation can be a combination of any of the six dimensions of innovation. For example, an innovation can be an incremental new change targeted in administrative process work. Thus, as understood in this thesis, innovation is considered to be any new radical or incremental, process or product targeted administrative or technical focused development resulting directly or indirectly in the commercial use of a company.

2.3 Generating innovations

As mentioned in Chapter 2.1, it is crucial for companies to have processes in place to be able to generate innovations. The generation and enhancement of innovations forces companies to decide on the fundamental question: should it seek to produce the innovation in-house (make) or to acquire it from the market (buy). This make-or-buy decision is inevitable due to companies' limited resources and the pressure of allocating these resources based on altering market situation, increasing competition and cost-structure. Due to the dynamic internal and external business environment, initial make-or-buy decisions are not definite and thus companies must constantly re-evaluate and assess these decisions. (Cànez et al. 2000; Cousins et al. 2008.)

Explanations on how to address the make-or-buy decision have been sought within various research disciplines, such as economics, operational research and strategic management, generating multiple theories on how to approach the decision. However, Serrano et al. (2018) claim that practitioners should not only use one approach, but combine RBV, strategic management view and transaction cost economics (TCE) theories to address the decision.

Consequently, according to the TCE theory developed by Williamson (1975) based on Coase's initialization (1937), the company should produce the innovation itself only as long as the costs of organizing and administering it are less than the market transaction costs generated from acquiring the innovation from a supplier. In addition, according to the RBV theory, the company should also weigh in, if the process of generating the innovation utilizes the company's VRIN resources, which can create competitive advantage (Espino-Rodríguez & Padrón-Robaina 2006, 62). Such resources and capabilities can be perceived as core competencies (Prahalad and Hamel 1990) and thus should be utilized to generate the innovation in-house. Therefore, typically in manufacturing industries, such as pharmaceuticals, generic products are more likely to be sourced externally than proprietary products (Veugelers & Cassiman 1999). However, in order to make use of core competencies, Hamel and Prahalad (1994) emphasize that companies should abstract away from this one-sided product-centric assessment and rather assess the company's capabilities on which their core products are based on, and consequently to which new product innovations could these capabilities be applied to.

Despite decision determinants, the outcome of the make-or-buy decision for innovation enhancement has implications on which of the company's main process, new product development (NPD) or sourcing, will be applied to generate the innovation. This division is illustrated in Figure 3.

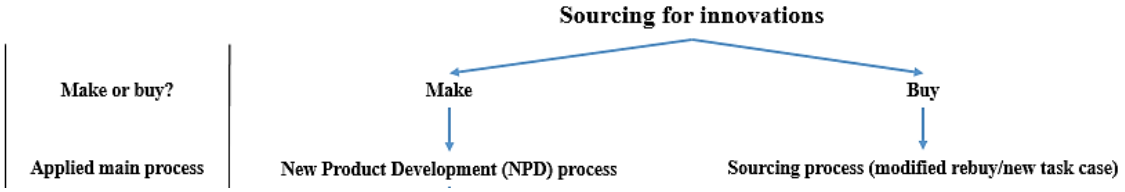

Figure 3 Generating and enhancing innovation performance by the application of NPD and sourcing processes

The "make" decision implies that the company will invest its research and development efforts to take a product or service from conception to market by following its NPD process (Cefis & Triguero 2016). Alternatively, the "buy" decision induces the company's sourcing process to acquire the product or service from an external source or sources (Walker 1988). The next two sub-chapters focus on the description and delimitations of the NPD and sourcing process respectively and portray procurement's role in enhancing innovations in both main processes.

2.3.1 New Product Development process

The make decision induces a company's NPD process, which scholars highlight as the most crucial company process being instrumental for the company's economics growth success (Clark & Wheelwright 1992; Clark & Fujimoto 1991; Brown & Eisenhardt 1995). In fact, Cooper and Kleinschmidt (1995) describe it as the motor that keeps companies functioning as it harnesses the company's core competencies to generate growth. In essence, Monczka et al. (2000) define the NPD process as "a series of interdependent and often overlapping stages during which a new product (or process or service) is brought from the idea stage to readiness for full-scale production or operation". Scholars (Kagioglou et al. 1998; Boer 1999; Cooper 2001; Schroeder 2003; Ulrich & Eppinger 2004) have divided the process into different stages and the application of the process depends on a company's intention and level of innovation and uncertainty. However, Cooper's (2001) six stage gate model seems to be most cited and therefore is presented in Figure 4.

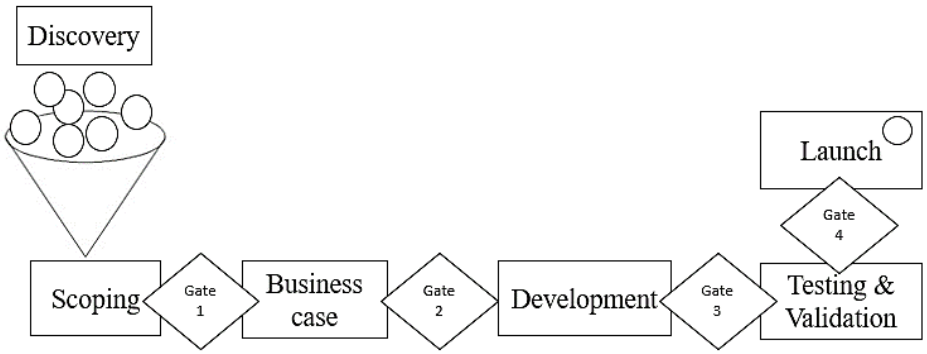

Figure 4 The six phased NPD process to generate innovations (adapted from Cooper 2001)

The stage gate NPD process generates innovations through the six broad phases, which are preceded by check point gates to verify that the work quality is sufficient. The process starts from the discovery phase by screening ideas and further scoping the potential product or service ideas. Before going into development, a business case or plan will be created for potential idea(s). Once the testing and validation is complete, the product or process can proceed to be commercially launched. (Cooper 2001.)

Primarily this process is owned and led by the company's research and development (R&D) function, which primary focuses on the design of the product, process or service innovation (Matheson & Matheson 1998). However, despite this process being induced by the initial "make" decision to generate an innovation, Eisenhardt and Schoonhoven (1996) stress that there are limitations to the make decision as companies rarely possess all required expertise to produce the product or service. In fact, most of the costs of a ready product accumulate from parts and materials purchased from an external source (Barczak & Wilemon 2001). This implies that, also during the NPD process, the company must constantly make partial make-or-buy decisions according to RBV, core competence and TCE principles regarding parts of the product or service despite the initial make-or-buy decision. Consequently, often the NPD process induces also the sourcing process typically led by procurement.

In addition, the design itself can be jointly developed with a supplier, which is known as the open innovation method (Chesbourgh 2003). The level of external collaboration in product or service design will further be discussed in more detail in Chapter 2.4. However, due to the need of sourcing decisions during an NPD process, scholars increasingly suggest the adoption of a more internally cross-functional innovation process approach to drive improved success in the company's innovation performance (Love et al. 2009, 3). Traditionally, the procurement function has not fully participated in the NPD projects. However, increasingly, also companies have recognized the added value of involving procurement early in the design phase of the NPD process to ensure that components and

services needed are sourced efficiently from appropriate suppliers, ensuring low costs and high quality by the application of a formal sourcing process (Calvi et al. 2010; Johnsen 2009; Schiele 2010.)

Nevertheless, the overall NPD process is typically led by the R&D function and thus procurement acts merely as an intermediate between the internal R&D function and the external market due to its more appropriate supplier market knowledge and expertise in SRM (Dowlatshahi 1992; Servajean-Hilst & Picauhd 2014). Thus, procurement's role in the overall NPD process typically includes sharing knowledge on supplier markets and individual suppliers, and acting as a supplier relationship manager to motivate, examine supplier collaboration (Wynstra et al. 1999) and the application of the sourcing process to acquire materials or parts of the product or service if a new make-or-buy decision results in a buy decision.

In conclusion, this thesis delimits the focus regarding the NPD process to the sourcing cases potentially induced by a buy decision during the NPD process, which triggers the application of a sourcing process. Furthermore, this thesis continues to examine whether an alternative innovation seeking sourcing process could be applied also in this sourcing context.

2.3.2 Sourcing process

On the other hand, in case of a buy decision, the company directly applies the sourcing process to acquire the innovation from an external source, such as a current supplier or a new supplier. Sourcing as defined in this thesis, is the set of activities (a project) to find, evaluate and select suppliers from which the company acquires a specific product, service or material for a business need at the best price-value ratio possible. This process is typically fully led by the company's centralized or decentralized procurement function. In addition, the assigning business unit or function and other relevant stakeholders such as the legal unit provide knowledge throughout the process. (Van Weele 2005.)

Although companies' sourcing processes vary significantly, scholars have distinguished comparable phases across various sourcing projects. Robinson et al. (1967) first introduce a description of the industrial sourcing process, which consists of the following eight phases: problem recognition, general need description, product specifications, supplier search, proposal solicitation, supplier selection, order-routine specification and performance review. Van Weele (1994) further divides the process into six broad consecutive phases (Figure 5) that are typically referred to in literature, when describing the sourcing process.

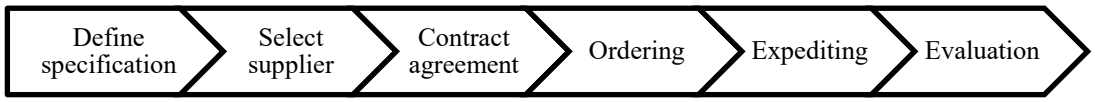

Figure 5 The traditional sourcing process illustrated by six broad phases (Van Weele 1994)

The business needs and requirements act as inputs for the sourcing process model. Thus, the first step of the process is to carefully define the specifications which are subsequently communicated to potential suppliers. Van Weele highlights that procurement must assure adequate supplier selection and thus this phase typically includes multiple shortlisting activities such as pre-qualifications by a Request for Information (RFI) and subsequent shortlisting by a Request for Proposal (RFP) and finally a Request for Quotation (RFQ). After selecting the final supplier, final negotiations are conducted to sign the final contract. Next, the companies establish order routines and establish expediting routines for trouble-shooting. Finally, the acquiring company periodically assesses and evaluates the supplier performance and thereby issues relevant corrective actions if needed. The last phase represents the initiation of the SRM process, which is a continuum for the sourcing process. (Van Weele 1994.)

The aforedescribed traditional sourcing processes are simplifications of a typical process. In addition, the process is merely a construct and thus, the practical implementations deviate from the aforedescribed. (Van Weele 2005.) However, various factors affect the complexity and the practical execution of the process. The two fundamental factors are 1) previous experience of the company buying the material or service (Robinson et al. 1967) and 2) complexity of the material or service specifications (Håkansson and Wootz 1975; Van Weele 2005). Depending on the sourcing case, the design itself can also be jointly developed with a supplier, which can be characterized similarly to the NPD process as an open innovation method (Chesbourgh 2003). The level of external collaboration in product or service design will further be discussed in more detail in Chapter 2.4.

In addition, Robinson et al. (1967) have identified three types of sourcing circumstances, the straight rebuy, modified rebuy and new task, related to the company's prior experience on the needed product or service and examined these types in relation to uncertainty and complexity. The three circumstances are presented in Figure 6 and characterized by three dimensions related to uncertainty or risk: newness of the problem, information requirements and consideration of new alternatives. In addition, some phases of the sourcing process defined by Robison et al. are compressed or bypassed in the straight and modified rebuy types.

Phases of the sourcing process	Sourcing situations		
	Straight rebuy	Modified rebuy	New task
1. Problem recognition	No	Maybe	Yes
2. General need description	No	Maybe	Yes
3. Product specification	Yes	Yes	Yes
4. Supplier search	No	Maybe	Yes
5. Proposal solicitation	No	Maybe	Yes
6. Supplier selection	No	Maybe	Yes
7. Order routine specification	No	Maybe	Yes
8. Performance review	Yes	Yes	Yes

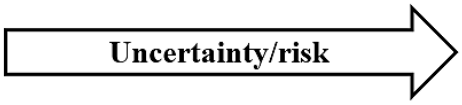

Figure 6 Sourcing process phases aligned with different sourcing situations (adapter from Robinson et al. 1967, 14)

First, the straight rebuy situation, which is the most frequent sourcing type as it encompasses the acquisition of a familiar previously sourced material or service from a current supplier. Rather than services, materials and products are more often subject to straight rebuys as their specifications are clearly defined. Furthermore, often suppliers' offering of the needed products and materials are more homogenous than for services (Heikkilä et al. 2013) and thereby, companies sourcing often have multiple sources for critical materials or products from which they can issue orders against an effective supply agreement. Consequently, the overall uncertainty of the transaction is low due to the problem, specifications and supplier being known. Therefore, the sourcing process commonly entails only the following phases: product specification and performance review, and requires limited amount of cross-functional input. (Robinson et al. 1967; Van Weele 2005.)

Second, modified rebuys represent situations in which a company acquires either a new product or service from a current supplier, or an existing product or service from a new supplier. Consequently, the problem is relatively new and therefore moderate amount of information is needed from cross-functional sources regarding either the specifications for the new product or service or the exploration for alternative market providers. However, the consideration of new alternatives is limited as the specifications of the product or service will not be modified radically and thereby, the supply market is familiar to some extent. Nevertheless, it is noteworthy that a modified rebuy is solely a re-evaluation of the current specification or supplier, induced by the belief that an alternative solution could be superior. Therefore, it does not directly imply that the status quo will be altered. However, a systematic, cross-functional re-evaluation of alternative providers and solutions should be done carefully and the sourcing process case-by-case includes at least the

product specification and performance review phases, but also other phases depending on the level of radicalness of the change. (Robinson et al. 1967; Van Weele 2005.)

Finally, sourcing for new tasks occurs when a company sources for a completely novel product or service supplied by a new provider. The transaction portrays a high degree of uncertainty regarding the mapping of specifications, spectrum of providers and thereby the outcome of the acquired solution. Consequently, the sourcing process requires comprehensive problem-solving, cross-functionality in decision making and collecting extensive amount of information. In addition, the process comprises of all consecutive phases with an emphasis on mapping specifications. (Robinson et al. 1967; Van Weele 2005.)

Circling back to the research question and thereby further to the definition of innovation, modified rebuy and new task sourcing types align with Cooper's (1998) compiled interpretation of innovation being a completely novel or incrementally changed product or service. Therefore, the focus of this thesis is delimited to modified rebuy and new task typed sourcing processes as characterized by Robinson et al (1967) as only these types are applied when a company seeks for innovations and decides to acquire rather than make them by applying the NPD process.

2.3.3 Level of supplier integration

As mentioned in the previous sub-chapters, the product or service design can be developed in collaboration with a supplier or suppliers when seeking innovations. This collaboration is defined as supplier integration in NPD literature (Das et al. 2006) and thus will be used also in this thesis in the sourcing process context. Essentially, suppliers can be integrated to contribute to the design, and thereby innovativeness of the product or service. This is considered an asset due to the rapidly changing business environment, which is better understood by the suppliers that have expertise regarding market of the purchased solution. Thus, in general, supplier integration leads to companies leveraging suppliers' capabilities and thereby achieving higher product or service quality, reduced total costs, faster time to market and the ability to concentrate on its core competencies as argued by the RBV theory (Monczka et al. 2000; Wagner & Hoegl 2006). In particular, the cost reduction should be highlighted due to 70% or more of the product or service costs incurring based on design decisions. In addition, it becomes increasingly difficult and costly to alter the design after the initial plan. (Daetz 1987.) Consequently, it is critical to secure sufficient knowledge internally and, or externally for decision making.

The level of supplier integration depends on whether the method of innovation is closed or open. In open innovation, as defined by Chesbourgh (2003) the supplier would be invited to contribute to designing and developing the innovation, in contrast to closed innovation in which the company is fully responsible for the development. Furthermore,

the level of integration is connected to procurement's role and the type of sourcing process to be applied. Consequently, it is important to identify the different integration levels before aligning these with sourcing process types. Handfield et al. (1999) identify four levels of supplier integration: none, white-box, grey-box and black-box. This classification is presented in Figure 7.

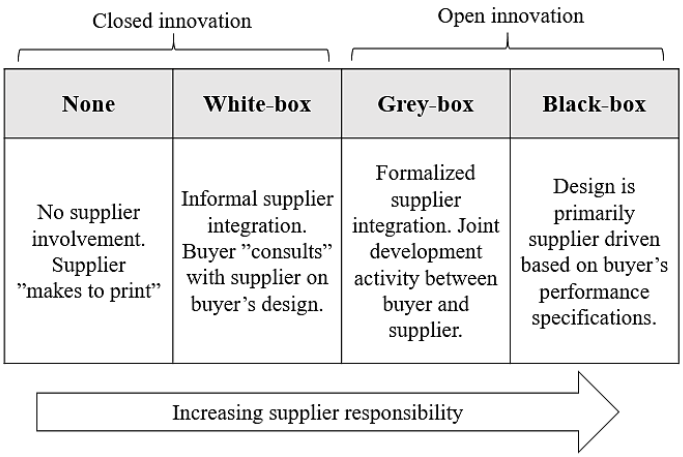

Figure 7 Level of supplier integration classified into four types (adapted from Handfield et al. 1999)

"None" integration refers to closed innovation in which the company designs the product or service solely internally and then purchases the development from a supplier according to internally defined specifications. In white-box, the buyer company is fully responsible for the design, but consults a supplier or suppliers for possible improvements or fulfills gaps in knowledge once it acquires the development from them. This can also be characterized as a closed innovation method due to the lack of formal cooperation. Furthermore, grey and black-box integration refer to open innovation in which the design and development process is partially or fully sourced from the supplier aiming for innovations. (Handfield et al. 1999; Petersen et al. 2005.)

In grey-box integration, chosen supplier or suppliers jointly develop the design with the buying company. Thus, consistently with the RBV theory and Hamel and Prahalad's (1990) core competencies theory, supplier's expertise is used to fill in the in-house knowledge gaps and thus design activities are shared so that the buying company concentrates on the tasks that utilize and protect core competencies by granting the supplier the responsibility of all other tasks. However, decisions are typically made in consensus. Last, in black-box integration, the buying company hands the primary responsibility of the design and development to the chosen supplier or suppliers according to its specifications and requirements. Therefore, the buying company merely spars the suppliers design suggestions and potential pilots, but is still in control and makes the final decisions. (Handfield et al. 1999; Petersen et al. 2005.)

However, Koufteros et al. (2007) further refine Handfield et al. and Petersen et al. dichotomy regarding the open innovation integration approaches and state that within the NPD context grey and black-box integration are not mutually exclusive approaches. To highlight this approach, an illustration as a contextual summary of the previous chapters is created by the researcher and presented in Figure 8, which demonstrates the origins of each approach and highlights their application from a sourcing perspective.

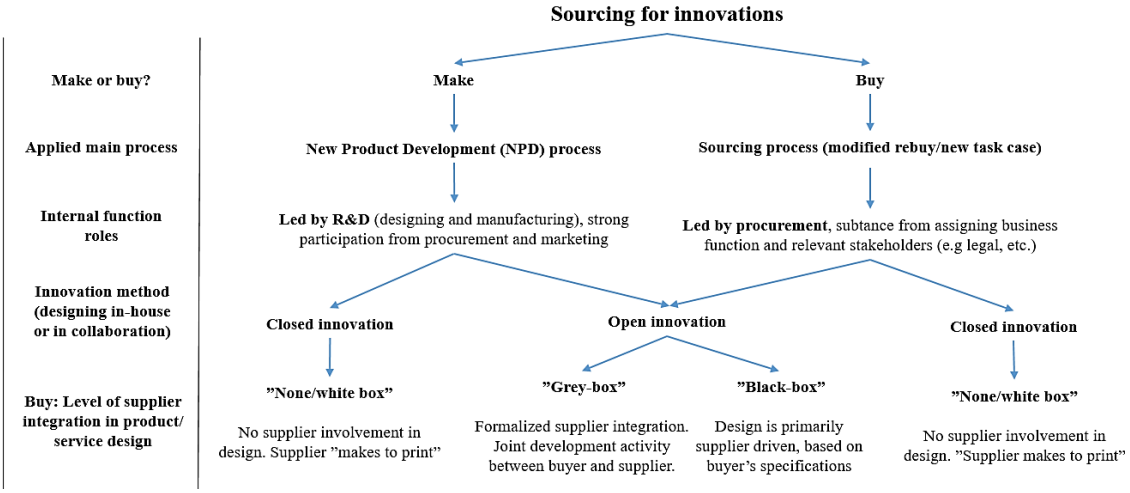

Figure 8 Contextual summary of innovation sourcing aligned with levels of supplier integration

Koufteros et al. (2007) elaborate that the application of any open innovation approach can be manipulated by management during the process. Consequently, the selected supplier for grey-box joint-development may not always deliver the full product or service. Thus, the design of another part of the service or component of the product can be sourced from another supplier implying a black-box approach. However, they also state that within the NPD process, the use of solely a black-box approach is not recommended as core competencies would not be applied to the generation of the innovation and thus this would cancel the initial "make" decision. Also, similarly, grey-box approach would not be recommended to be used in the sourcing process context after the initial "buy" decision, since this would mobilize the use of core competencies such as research and development efforts, and thereby cancel the initial "buy" decision. Nevertheless, despite origins, black and grey-box integrations represent open innovations as suppliers are taken into the design process.

Despite the integration level and whether the sourcing process origins from the NPD process or not, the buying company needs to define the product or service specifications. Scholars stress the importance of defining specifications and requirements early in the sourcing process. However, the level of specification detail decreases towards the complexity of the acquired material, product or service and the level of supplier integration,

shifting to a more value-based specification. (Robinson et al. 1967; Axelsson & Wynstra 2002; Van Weele 2005.) Thus, specification methods will be described next and subsequently aligned with the Handfield's (1999) levels of supplier integration to be able to highlight the need for an innovative sourcing process as an alternative to the traditional process.

2.3.4 Specification methods

Typically, it can be challenging to define exact specifications for a new or modified product or service as the buying company may not be aware of the available and applicable solutions on the market or it explicitly wants to stimulate supplier innovation for a tailored solution (Axelsson & Wynstra 2002). Consequently, Van Weele (2005) highlights the need to differentiate between "functional" and "technical" based on the level of supplier integration. Technical specifications describe in detail the technical characteristics of the product or service and the tasks to be implemented by the supplier. On the contrary, functional specifications describe the performance and value which the product or service must achieve for its users. Therefore, how the supplier will achieve the required performance level is left to its expertise.

Axelsson's and Wynstra's (2002) further expand technical and functional specifications into four methods: input, throughput, output and outcome method. Input and throughput methods are characterized similarly with the detailed technical specification, which the buying company provides to the supplier. Output and outcome methods, on the other hand, align with the functional specification as the detailed technical specification is extended to the supplier. Figure 9 illustrates the four methods aligned with Van Weele's typology.

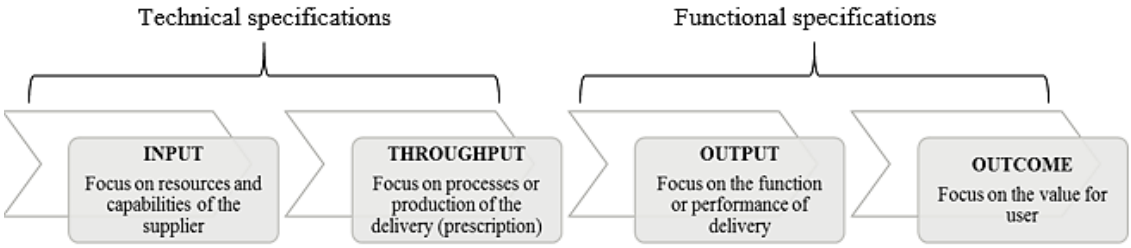

Figure 9 Methods to specify products or services (adapted from Axelsson & Wynstra 2002, 144; Van Weele 2005; 47–48.)

First, the input oriented approach represents focusing on resources and supplier capabilities by purchasing for example additional capacity or specialist capabilities. Typically, this method is applied when the acquiring company is able to define precise technical

specifications regarding the product or service. For example, concerning office cleaning services, the acquiring company could purchase a certain amount of cleaners and specific materials, which would typically be charged based on an hourly, daily or monthly rate.

Second, the throughput method focuses on the process or production of the delivery. For example, continuing with the cleaning services, the acquiring company could pay for sanitizing, dusting or emptying trash bins and would thereby be charged on a transaction basis. (Axelsson & Wynstra 2002; Heikkilä et al. 2013.) Consequently, input and throughput methods can be aligned with technical specifications due to the customer and supplier being able to describe the specifications in detail (Van Weele 2005).

Third, the output specification method focuses on the service or product function or performance resulting in challenges to define technical specifications. This method provides more liberty for the supplier to translate the customer needs into activities, which are deemed most appropriate by the supplier. Thus, applying the method requires that the customer is capable of defining the boundary conditions and the desired output of the solution to the supplier. For example, the company could purchase a certain level of cleanliness, which would indicate the desired output of the cleaning service. The supplier is able to conduct the optimal activities to reach this level and would thereby be compensated based on the delivered performance. (Axelsson & Wynstra 2002; Heikkilä 2013.)

Finally, in contrast to the previous three methods, outcome specification is the only method in which the value to the user, internal or external, is defined. Opposed to specifying the solution itself, the specification should focus on what the solution should accomplish after it has been delivered. For example, an outcome of the cleaning services could be workplace satisfaction as clean office space can be associated with how content an employee is with the provided working environment. Although the measurement of the solicited performance is crucial, defining the performance level (Service Level Agreement, SLA) is the most challenging of all four methods as customer is charged based on the value of the impact. However, it offers the highest potential for both parties to optimize the solution and have it delivered in a novel and high quality manner (Heikkilä et al. 2013). (Axelsson & Wynstra 2002.)

Each method stresses different aspects of the product or service and its provider. However, this does not imply that only one method should be used to specify the delivery. A buying company can use a combination of more than one of the four methods, but typically one method should be dominant from the others. (Axelsson & Wynstra 2002.)

2.4 Synthesis of the need for an innovation sourcing process

The level of integration can be aligned with the applicable specification method and further to procurement's role and type of sourcing process to be applied in acquiring the

product or service. This connection is illustrated in the complete synthesis (Figure 10) as an extension to Figure 8 and thereby acts as a summary of the second chapter of this research. Figure 10 illustrates how the sourcing context for innovations from procurement's perspective is understood in this thesis. Furthermore, the synthesis provides a literature review based proposition to RQ2: *"When should the developed process be applied?"* as it highlights the proposed context in which the innovation enabling sourcing process developed in this thesis should be applied.

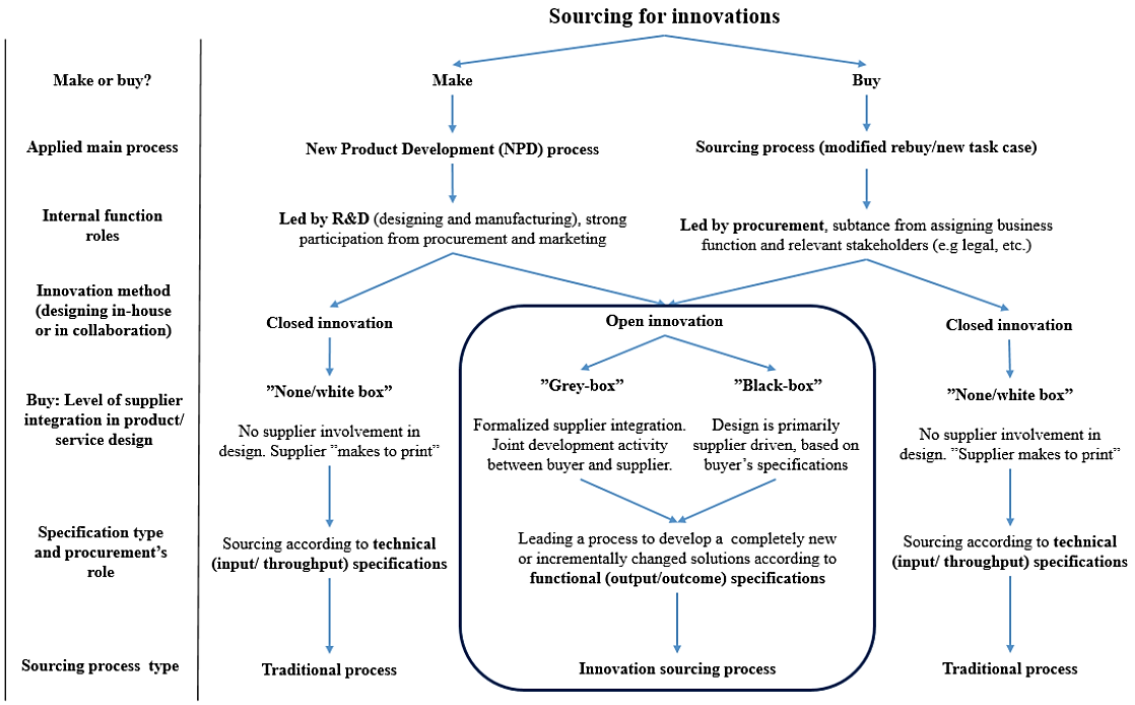

Figure 10 Framework for generating innovations from procurement's perspective

The alignment of the supplier integration and specification methods can be interpreted from Figure 9: when supplier integration increases, focus on the functionality of the specification increases as the supplier is increasingly responsible for the detailed technical design of the product. Consequently, functional (output and outcome) specifications can be applied in both grey and black-box integration cases despite the origin and technical (input and throughput) specifications can be applied in none and white-box integration cases. Thus, from a procurement perspective, the sourcing cases between none and white-box or grey and black-box do not differ significantly even though the case is originally a "make" or a "buy" induced case. The sourcing process, despite being traditional or innovation, is always directional and can be applied case specifically. Thus, the difference between a black and a grey-box case or a white or none depends on the scale and thereby the application of the sourcing process.

Furthermore, the synthesis implies that procurement's role in closed innovation cases that apply none or white-box integration is to source according to internally defined detailed technical specifications, limiting the innovativeness of the sourcing process. Consequently, the consecutive traditional sourcing process as described in Chapter 2.3.2 should be more suitable and effective as it builds upon the buying company's conviction of the product or service specification as characterized by Axelsson and Wynstra (2002) and Van Weele (2005).

However, in open innovation cases; grey or black-box, procurement's role is to lead a process of developing a completely new or incrementally changed solution, an innovation, according to the internally defined functional specifications. Axelsson and Wynstra (2002) note that too strict or extensive definition of specifications lead to delimiting the spectrum of available suppliers and solutions and further supplier innovativeness regarding the solution design. Thus the traditional sourcing process does not support or encourage procurement to take role in sourcing innovations from suppliers as it is built to know the primary solution before contacting potential suppliers. In conclusion, the next chapter will further focus on assembling principles from literature that steer the design of the innovation sourcing process into the above proposed context.

3 DESIGNING AN INNOVATION SOURCING PROCESS

The purpose of a literature review is to achieve an understanding of the existing research, identify potential gaps and need for additional research regarding the subject matter. In addition, the literature review based findings and proposals to the formulated research questions provide a theoretical lens through which the research is further conducted and analyzed to answer the research questions. Consequently, it provides a context to which the conducted research can be placed and examined to identify future research possibilities. (Majam & Theron 2006.)

Due to the absence of an integral framework for an innovation sourcing process, this thesis contributes to assembling one. Specifically, the target of this chapter, as a part of the literature review, is to identify and formulate what kind of guidelines and principles should steer the design of the alternative innovation seeking sourcing process. Consequently, this section contributes to formulating a proposition, a literature review based innovation sourcing process, to answer the first research question (RQ1) *"What kind of sourcing process should the case company adopt to enable the generation of innovations?*

3.1 Design principles from literature

In the absence of a theory on guidelines and principles steering the design of an innovation sourcing process, propositions must be elicited by exploring various research disciplines. In this research, the literature review is divided into two parts: 1) examining innovation generation within the sourcing process, and 2) seeking design principles to steer the design of an innovation sourcing process. The former seeks to formulate a proposal to RQ2 and the latter to RQ1. The derived design principles and thereby the constructed theory-based innovation sourcing process are presented in Chapter 3.2.

Due to the absence of an innovation sourcing process model in literature, the search for the process design principles is extended from procurement literature to various research disciplines. The examined disciplines are presented as a Venn diagram in Figure 11 to depict the logical relationships between one another, which uncovered relevant research topics. The intersection of the three disciplines, marked with a star, illustrates the subject matter of this research: designing an innovation sourcing process.

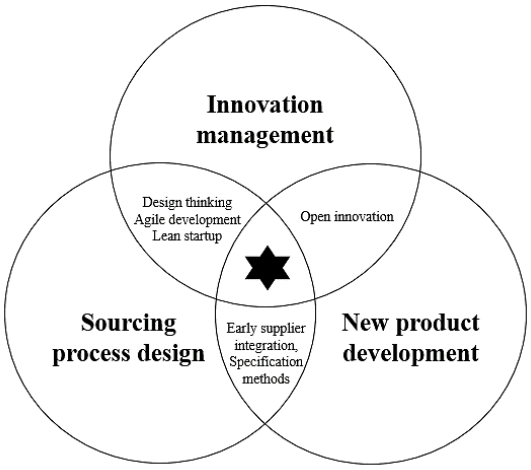

Figure 11 Venn diagram illustrating the research disciplines contributing to the innovation sourcing process principles

Based on the literature review conducted in Chapter 1, three primary research disciplines: 1) innovation management, 2) new product development and 3) sourcing process design emerged that could potentially provide at least indirect input to formulate propositional design principles. Innovation management is considered a starting point for the literature review as it acts as a hypernym for all innovation enabling activities in companies. Sourcing process design was reviewed to explore, if any elements of the traditional sourcing process have been scrutinized from an innovation perspective or if the review would provide insights on complex solution sourcing and innovative supplier identification and selection. Thus, the intersection between innovation management and sourcing process design raised agile and creative methods, which led into design thinking, lean startup and agile development literature. These methods are typically applied in for example start-ups, which share similar characteristics with innovation sourcing such as high risk and need for process flexibility.

In addition, new product development literature is reviewed to elicit any applicable principles emerging from the "make" decision triggered sourcing process. Furthermore, the intersection between innovation management and NPD raised especially open innovation as a relevant topic area. Finally, the intersection between NPD and sourcing process design raised especially early supplier integration and specification methods as relevant topic areas to examine for innovation sourcing design principles.

The literature review, however, delimits public procurement research regarding the topic although for example the European Union (EU) has increasingly enhanced the public procurement guidelines and policies to enable the generation of innovations (European Commission 2020). For example, in 2014, the European Parliament and the Council introduced the new public procurement procedure called the innovation partnership as a

part of the newly adopted directive on public procurement (EUR-Lex 2014). The challenge so far had been that the legislation had made it nearly impossible to tender R&D work without it being certain that it could subsequently purchase the results of this work without another tender. Thus, the innovation partnership procedure contributes to the need for purchasing both development work and the results of this development work in a single tendering process, which increases the generation of innovations. This procedure was implemented in the Finnish public procurement law in the beginning of 2017. (Andhov 2015; Aho 2017)

In addition to the innovation partnership procedure, the public procurement policies enable various other innovative elements, such as pre-commercial procurement and the alliance model, which are applied case specifically according to the applicable regulative framework (Tampereen Kaupunki 2019). Nevertheless, the decision to delimit the research to only private sector research and applications is justified based on public procurement's strict regulative framework, which reduces the applicability of the practices in the private sector. Furthermore, if applicable public procurement principles or practices exist, it is justified to assume that these would emerge in the literature review regarding the private sector sourcing process design or in the company interviews, considering that the EU has enabled innovation sourcing practices increasingly already from 2014.

In summary, three primary research disciplines: 1) innovation management, 2) new product development and 3) sourcing process design emerged that could potentially provide at least indirect input to formulate propositional design principles for constructing the theory-based process. These research disciplines will next be explored comprehensively.

3.1.1 Innovation Management and NPD

Innovation management is the organization's process of managing innovations by the means of innovation processes such as the NPD process (CIMA 2007). The systematic approach of promoting innovations by innovation management consists of two main pillars. First, the development of the framework conditions such as governance models and strategy to enable the successful development of innovations. Second, the actual development of innovations by following an innovation development process such as the NPD process. (Hengsberger 2018.)

As a basis for innovation management and the task of developing the framework conditions for innovations, an innovation strategy, culture and leadership are considered crucial for establishing a successful innovation process. The *innovation strategy*, aligned to support a company's core strategy, provides a clear platform to seek solutions to defined

challenges. Simply, it defines the direction that complies with the company's vision. Furthermore, for an effective innovation strategy, *the definition for innovation needs to be clearly specified and communicated internally and externally to partners and potential new partners prior to working with innovation projects* (Baregheh et al. 2009). In addition*, top management support* for the enhancement of innovations is crucial, as it enables the active participation, mandate and prioritization of innovation efforts. Without the support of the company and the concerned business function management, the process will not be perceived as important. (Bank & Raza 2014; Naoui-Outini & Hilali 2019.)

Finally, a *pro-innovation culture* encourages employees to enhance innovation efforts according to the innovation strategy and thereby catalyzes the generation of new solutions. Thus, it is critical that the company or business unit not only emphasizes an innovative approach in its strategy and values, but also concretely motives its employees in internal innovation challenges and rewards participation with intangible or tangible awards. (Bank & Raza 2014; Naoui-Outini & Hilali 2019.)The aforedescribed principles can be perceived as prerequisites for the innovation sourcing process as they are not explicitly part of the process, but act merely as enablers of it.

Regarding the process principles, innovation management literature highlights two variant approaches to generate innovations: the stage gate model and the lean startup model. The stage gate model, as presented in Chapter 2.3.1., generates innovations by the means of the six broad phases, which are preceded by check point gates to verify that the work quality is sufficient (Cooper 2001). The process is linear and it relies on considerable documentation within each phase and gate (Cooper 1979). This clearly defined and structured process assists managing innovation development, and thereby increases development speed, quality and overall performance in comparison to informal development processes (Ettlie & Elsenbach 2007).

However, the tradeoff for greater discipline and risk management is that the process suppresses creativity and diminishes variation across the developed solutions (Bobrow 1997). Consequently, the gate decisions often favors only incremental improvements, limiting the number of new opportunities and radical innovations as defined by Cooper (1998). In addition, the end user need is defined only prior to the development of the solution, which poses the risk of misunderstanding it and not allowing re-definitions of the need as the solution development progresses. (Koetzier et al. 2012.) Due to the aforedescribed stage gate model limitations, companies, especially startups, increasingly adopt the lean startup approach principles to their innovation processes (Muller & Thoring 2012). Thus, this thesis focuses on exploiting the opportunities and principles introduced by this approach instead of the stage gate model.

3.1.1.1 Lean startup

The lean startup is a fairly new approach, developed by Eric Ries (2011) who applied the approach in managing multiple startup companies. The approach focuses on mitigating the risk of developing a solution that is misaligned with customer targets and needs by integrating a continuous user feedback loop during the development of the minimum viable product (MVP) (Maurya 2012). In addition, it focuses on an effective process, reducing redundant activities and consequently supporting uncertain solution development such as efforts to generate innovations (Muller & Thoring 2012). The primary principle of the lean startup approach is the iterative three-phase "Build-Measure-Learn" process (Figure 12), which emphasizes the need to frequently test the user preference hypothesis against objective, predefined metrics (Ries 2011).

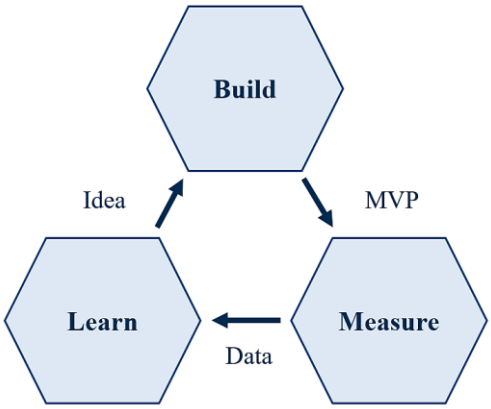

Figure 12 The iterative "Build-Measure-Learn" lean startup process (adapted from Ries 2011)

The efficient process minimizes uncertainty and waste by developing the solution in cooperation with the solution end user. The first phase is to ideate and define an initial hypothesis of the end user demand followed by the build phase. Based on the idea and hypothesis, a MVP is rapidly built without extensively using resources. A MVP can be for example a video, a demo, customer interview, prototype product or smoke test. The purpose of the build phase is to present a concrete idea, which fulfills the minimum features described by end users for feedback purposes. Gathering information on the end user feedback should be done against predefined metrics, so that the analysis of the successfulness of the solution can be done objectively in the next phase. (Ries 2011.)

Based on the metrics data and the hypothesis, an evidence-based decision should be done in the learn phase to decide whether to persevere the development and further refine the solution with additional feedback cycles, or pivot by completely resetting or correcting the course with additional feedback loops to test a new hypothesis. The cycle often needs to be done repeatedly before deciding to persevere, but it will add value to the

whole process as the user need is placed in the center of the process and only an adequate amount of resources are used before user value is detected. When multiple loops of build-measure-learn are completed, eventually a solution, product or feature is found which the user wants and is willing to pay for. After this, one can start scaling up the solution. (Ries 2011.)

Due to the objective of this thesis to develop a process to generate specifically innovations that are aligned with end user needs and that are highly uncertain in nature, the principles of the iterative lean startup process and its structure appear to be better aligned than the stage-gate model principles and structure. Consequently, *the iterative lean startup "build-measure-learn" cycle should be incorporated into the innovation sourcing process* to enhance the effectiveness of the process and to place the end user at the center of the process for risk mitigation purposes. In the innovation sourcing process, the supplier is responsible for the building phase due to the initial buy decision and the measure and learn phase is completed in cooperation with the buying company.

However, innovation management specialists (Leurs & Duggan 2018; Beklemysheva 2019; Haig & Co 2019) state that in uncertain innovation projects, such as in startup product or service development, a proof-of-concept (POC) and a prototype should precedent the build-measure-learn cycle in which end users are included in building the MVP. Thereby, the solution can be fully developed and transferred into full scale production. Beklemysheva (2019) notes that these three terms are related to one another, but represent different phases of the development process. This is illustrated in Figure 13, which portrays the development lifecycle of a solution from POC to production. The x-axis presents the typical timeline and y-axis the main development activities. Furthermore, the size of the circles depicts the associated costs. (Haig & Co 2019.)

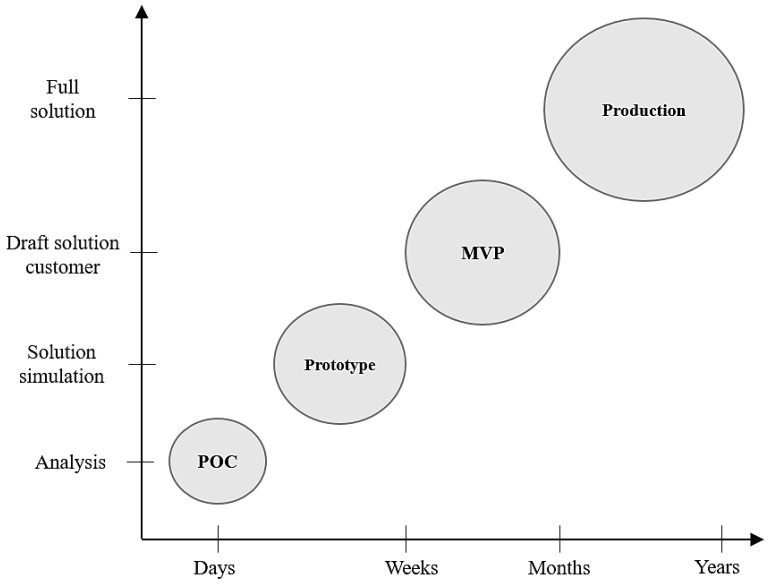

Figure 13 Solution development lifecycle from POC to production (adapted from Haig & Co 2019)

The purpose of a POC phase is to provide evidence of the feasibility of the design concept, product or service. Thus it is not about delivering the idea, but rather demonstrating "are we able to build it" (Leurs & Duggan 2018). Thus, in an innovation sourcing context, the acquiring company could issue a POC phase to uncover which suppliers are capable of even attending in building a solution. Furthermore, based on the POC, Leurs and Duggan (2018) explain that a prototype will next answer "how" it will be developed. A prototype should be a "visible, tangible or functional" representation of the solution idea. For example, a prototype could be a mockup of an information system or a concept illustration of a service process. Beklemysheva (2019) states that the acceptance of a prototype will kick-start the feedback loop from end users and thereby is directed to the lean startup development cycle. Moreover, the MVP will finally be scaled up into a fully functional solution, within the defined scope.

Considering the level of uncertainty of defining and developing the solutions with potential suppliers, the build-measure-learn MVP cycle should be accompanied by a POC, prototype and scale up phase in the innovation sourcing process. In conclusion*, the innovation sourcing process should incorporate a POC, prototype, MVP and scale up phase respectively to manage scalability and user satisfaction related risks*.

3.1.1.2 Design thinking and agile development

Despite lean startup increasing its popularity as a modern method to the innovation process structure, it has also received some criticism. Lean startup has been criticized for the lack of a specifically describing how user needs can be captured and also on how to proceed in scaling up and developing the most promising solutions generated after the build-measure-learn cycle. (Muller & Thoring 2012) Thus, solely lean startup as a process method for generating innovations is considered inadequate also for the innovation sourcing process.

As a consequence to the criticism, design thinking and agile development methodologies frequently emerge discussions as solutions to a more holistic product development and innovation approach. Similarly, the roots of these two approaches stem from startups in the technology and software industries, specifically IT-project management. However, often these three innovation process methodologies are considered mutually exclusive in software development. (Muller & Thoring 2012; Gartner 2016.)

Nevertheless, after Gartner (2016), a research and advisory company, introduced a model applying the three approaches in tandem to amplify the benefits and patch the weaknesses of each approach, these approaches have increasingly been considered to complement each other. Due to the novelty of this combination, little if any peer reviewed research has been published regarding the application of the combination. However, research on combining either two approaches exists (Mueller & Thoring 2012; Grashiller et al. 2017; Pereira & Russo 2018). However, apart from academic publication, multiple sources such as companies' blogposts (Mantini 2018; Digicorp 2019; Schmidt 2019) share successful implementations, but also highlight risks. Nevertheless, Gartner's model is introduced in Figure 14.

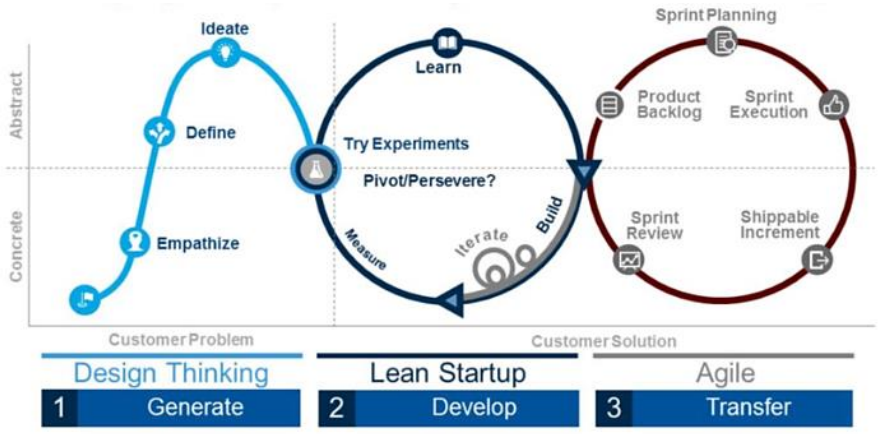

Figure 14 Applying design thinking, lean startup and agile in tandem (Gartner 2016)

Gartner's (2016) model combines the three methodologies to understand end user needs and problems, develop products and finally scale the solution by transferring the MVP into an agile ramp-up cycle. As illustrated, the development process is not linear, but rather iterative in which the end user need and problem is constantly scrutinized. Though Gartner describes the design thinking phase as a customer problem phase, the problem solving continues in the next phases, but new methods are being implemented to develop a solution to solve this problem. Thus, design thinking offers methods to scrutinize the problem by first empathizing, defining and lastly ideating before a concrete representation of a solution can be iteratively build and given feedback on. After an end user centric development cycle, the solution can be transferred into production by scaling it up by the means of an agile development method such as Scrum. Consequently, overall, Gartner's process should be viewed and implemented in collaboration, not in silo design thinking, lean startup and agile team. Next, design thinking and agile development principles will be described in more detail to discover further process design principles.

Design thinking has increased its popularity from the late 90s, when the concept was developed by the design consultancy company, IDEO (Kelley & Littman 2001). In essence, design thinking is creative problem solving that has evolved over the past three decades from various fields such as engineering, business and architecture into how it is understood today (Muller & Thoring 2012). Fundamentally it focuses on end user centricity by deeply understanding who the user is, what is its need and further creatively discover and exploit the best solution to fulfill those needs (Brown 2009). It is no longer only an approach and a mindset, but a toolkit for any multidisciplinary team in any kind of organization as multiple techniques and processes have emerged during the past three decades (Tschimmel 2012). Aligned with the innovation sourcing process nature, design thinking is particularly suitable in providing structured ways of working to identify and solve complex, vague and ambiguous problems and thereby invent new solutions (Liedtka 2015). Thus, it fills the lean startup approaches' gap in providing concrete tools to discover user needs.

The core principles of design thinking are: empathy, ideation and experimentation, which can be translated into various iterative process models (Brown & Wyatt 2010; Stickdorn & Schneider 2010; Tschimmel 2012). The first and most popular model, the 3 I Model, developed by IDEO in 2001 distinguishes three phases: inspiration, ideation and implementation. First by inspiration, one should seek to understand the user and its circumstance to which the solution will be developed. Specifically this requires research to gather qualitative and quantitative data by the means of engagement, observation and, or immersion. Concrete methods can be for example interviewing, researching on previous engagements, user surveys, shadowing or user journaling. Second, based on the data collected, one should determine the user problem and need, and thereby develop preliminary

ideas on how to meet those needs. Typically this ideation phase is conducted as a brainstorming session, followed by implementation, which transforms the most feasible ideas into a prioritized action plan. Implementation is conducted by prototyping and simultaneously collecting feedback iteratively to tests these ideas. As mentioned, the criticism for design thinking related to prototyping would lead to applying lean startup principles for this final implementation phase. (Brown & Wyatt 2010.)

Thus, to decrease the risk of purchasing solutions misaligned with user needs, *the design thinking methods should be applied internally and together with potential suppliers, before the lean startup cycle to increase the understanding of the status quo, uncover and prioritize the fundamental user problems and needs.* Furthermore, the needs can be re-evaluated by design thinking methods at any phase of the innovation sourcing process.

Whereas design thinking focuses on creatively exploring user needs and lean startup on frequently testing the need hypothesis by an iterative prototype and MVP development process, agile development represents how to scale and build this construct into a final product for commercialization. The origins of agile development go back to managing software development projects, when seventeen likeminded software practitioners (Beck et al. 2001) wrote the Agile Manifesto as a formal proclamation to uncover improved methods for managing software development projects. Despite the Manifesto, agile is often misunderstood as it has become somewhat a buzz word. It is often interpreted as a methodology, framework or process, or a specific way of developing. (Muhammad 2012.) While these are in fact ways to implement agile development, the Agile Manifesto (Beck et al. 2001) actually declares agile as a set of four values and twelve principles, which guide how agile development should be implemented. The four values are as follows:

1. Individuals over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following plan

However, the purpose of these values is not to undermine the value of tools, documentation, contract negotiation or plans, the Agile Manifesto simply suggests that the items on the left should be valued more to increase the success of development. Thus, agile does not make decisions for the project team, but rather establishes a foundation to make decisions that result in better development. (Beck et al. 2001.) Since the Manifesto, agile has been adopted in many industries with an emphasis on project management, also further referred to as agile project management (APM) (Schatz & Abdelschafi 2005).

Multiple APM process methods have been developed such as Kanban, Scrum and eXtreme programming, XP, which comply with the agile core values. These methods vary

slightly but the fundamental idea of all methods is the core of agile development: prioritizing the iterative work of smaller batches, leading to delivering the full solution incrementally instead of all at once. (Gustavsson 2016.) However, according to Cooper and Sommer (2016) and Gustavsson (2016), Scrum is the most applicable and used method to be applied in non-software projects.

Contrary to traditional, "waterfall" principles, APM methods are most applicable for complex projects with high risk and uncertainty, such as innovation projects. The application of agile methods in non-software projects increases communication and cooperation amongst the client, supplier and other stakeholders and thereby increases visibility and response time to changes even late in the process. Furthermore, the implementation increases customer responsiveness by the conformance to customer specifications and satisfaction, and overall resilience. (Wieland and Marcus 2013; Gustavsson 2016.) According to Gustavsson's (2016) literature review, the majority of the benefits correspond to the first value, "Individuals and interactions over processes and tools", of the Agile Manifesto. In addition, however, agile development methods can yield challenges, which further were described as "changing mindset to allow flexibility, lack off process visibility and buy-in from managers" based on the 21 reviewed case studies.

Due to the alignment of possible benefits of agile methods with the innovation sourcing process aims, agile development principles and process models seem to be worth incorporating into the innovation sourcing process after the lean startup cycle for solution ramp up purposes. However, considering that the agile development process models stem from the "make" scenario in software development, the process needs to be described from a buyer's perspective. Also, after the lean startup testing phase, it is worth considering whether agile development process methods are applicable. Not all solution deliveries can be broken into smaller batches. However, if this is possible, *agile development values and principles in the form of the Scrum method* should be applied, so that changes to the solution can be made in light of the development performance metrics before full deployment. If the solution cannot be broken into smaller batches, *a pilot implementation is another method of incremental deployment*, with identical objectives to the agile methods. A pilot implementation is defined as a smaller-scaled version of the full deployment to get user feedback. (Hertzum et al. 2012.)

Due to the aforedescribed limitations of each approach and the combination of the approaches offering a leveraged process structure to ensure minimizing risks of misalignment of user needs and maximizing innovation, *the innovation sourcing process should also adapt the iterative combination of design thinking, lean startup and agile or pilot development respectively* due to aligned aims with innovation sourcing. Thus, this thesis proposes that the integration of these approaches is not only limited to software development from where they originate. Instead, they should be used also in other types of innovation processes with similar aims and risks to amplify the benefits of each approach,

such as the innovation sourcing process. The application does not mean that all approaches should be applied consecutively, but rather case specifically, allowing the model's feedback loops to take the adoption from for example lean startup or agile execution back to design thinking methods, if for example user need definition should be re-evaluated (Bjarnason et al. 2011; Digicorp 2019; Schmidt 2019).

3.1.1.3 The Fuzzy Front End phase

In addition to the development process structure, innovation management and NPD literature highlights the importance of the pre-development activities, which are typically referred to as the fuzzy front end (FFE) phase of the innovation process (Herstatt & Verworn 2004). As illustrated in Figure 15, the FFE phase is the foundation of the NPD process, which further leads to a commercialization phase (Koen et al. 2002).

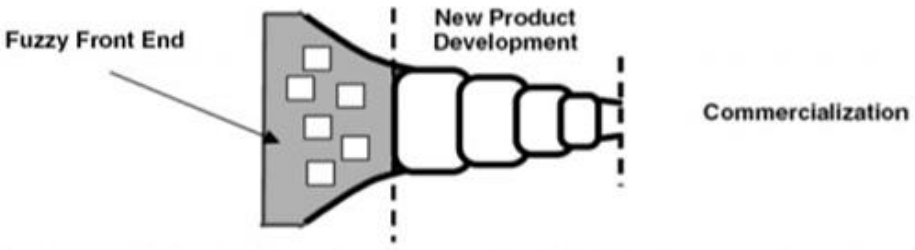

Figure 15 FFE phase as the foundation for the NPD process (Koen et al. 2002, 6)

Based on an extensive empirical study, Cooper and Kleinschmidt (1994) claim that "the greatest difference between winners and losers were found in the quality of execution of pre-developed activities". They further elaborate that the high quality of the FFE phase prior to development not only increases the innovativeness of the product or service in question, but also results in cost reduction and shorter project duration as the phase creates a shared understanding internally of for example the customer need, targets, risks, performance analysis criteria and overall cooperation model between the project members. Consequently, *a FFE phase should also be included in the innovation sourcing process*. However, the activities included in this phase should differ from the innovation management literature as it focuses on the "make" decision regarding new product or process development, but the function of the phase should remain similar as the sourcing process is also a project by nature, sharing the same target: to generate new solutions to user problems.

Also, apparent from the term 'fuzzy front end', Herstatt & Verworn (2004) claim that the FFE phase is the least-well-structured phase of the innovation process in theory and

in practice despite the criticality of its activities. This might be due to the fact that product ideas are often generated unintentionally and at times even accidentally, and there usually is no funding, forum or project group for the ideation phase before the systematic NPD process (Cagan & Vogel 2002). However, essentially in the buy scenario, the FFE phase should determine which user needs will be realized, explore and evaluate the methods to do. Thus, *an assessment of the sourcing process type, whether traditional or innovation, should be carefully done during this phase.*

Furthermore, various FFE models exist (Cooper 1993; Khurana & Rosenthal 1997, 1998: Koen et al. 2001, 2002; Cagan & Vogel 2002; Nobelius & Trygg 2002; Reid & Brentani 2004), which alter between controlled sets of consecutive principal activities to somewhat liberal sets of iterative activities. However, Brem and Voigt (2009) state that the most popular model currently seems to be Koen et al. (2001, 8) new concept development (NCD) model (Figure 16) as it addresses the uncertain nature of innovation and need identification by formulating an iterative process. It includes five elements that should be applied case specifically when necessary and in a case applicable order. Thus, the NCD model is further analyzed and principles from its five elements are exploited for applicable adaption into the innovation sourcing process' FFE phase.

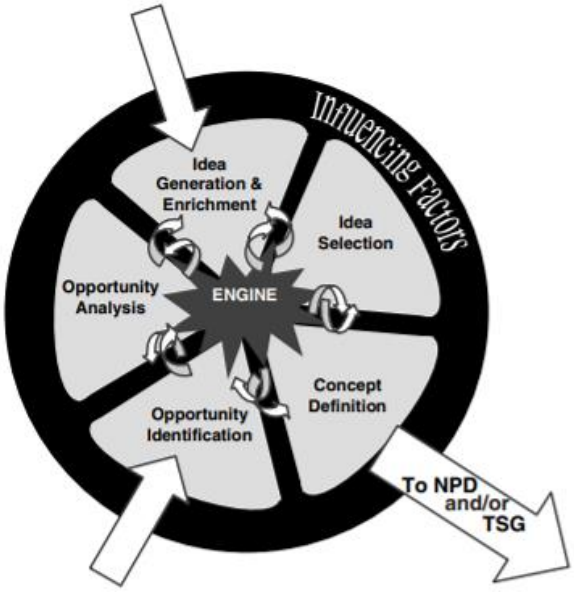

Figure 16 The new concept development (NCD) model as a construct for pre-development activities (Koen et al. 2001, 8)

The NCD model includes the following elements iteratively: opportunity identification, opportunity analysis, idea generation and enrichment, idea selection, and concept definition. The elements are driven by the engine that represents top management support, culture and business strategy as identified in previously in this chapter as prerequisites for innovation. In addition, the NCD process is influenced by various external factors

such as distribution channels, law, government policy, customers, competitors and political and economic climate, which need to be considered throughout the process. (Koen et al. 2001.)

The opportunity identification element is driven by the business goals and strategy, which set the direction. The company might have a formal and active process aligned with the influencing factors to support the identification and prioritization of unmet opportunities or improvements to the current state for example through brainstorming sessions, scenario planning, trend analysis and market and competitor research and analysis. Obviously pro-innovation culture nurtures individuals to challenge the status quo, but the process might be induced informally as individual recognize unmet customer needs. (Koen et al. 2001, 2002.)

In addition, the identified ideas must go through a more detailed analysis in which similar methods as in the previous phase can be applied. In addition, the idea must be aligned with the relevant business unit and company strategy to be applicable and successful for development. This phase aims to prevent opportunity errors based on insufficient or faulty information gathered in the previous phase. (Koen et al. 2001, 2002.) Translated to the buy scenario, the idea can be interpreted as the internal customer need and thus the previous remarks seem to be applicable for the innovation sourcing process' FFE phase.

The idea generation and enrichment element focuses on building up, tearing down, combining and modifying the identified ideas. This phase is typically executed by a larger cross-functional group and in collaboration with the customer and even external parties for detailed information and further assessment. As a result, a detailed description of the idea or product concept is formulated. (Koen et al. 2001.) In terms of the innovation sourcing process, this would infer that the communication to potential suppliers is opened earliest at this phase for more information and interest in developing a solution to the need.

Selecting the idea for further development should be done by prioritizing the attractive ideas and selecting the best one with a strategic fit and highest opportunity for adding value to the company. A formalized decision process is often difficult to implement due to limited information at this point. However, documentation of the ideas for future endeavors is also considered important. In addition, more detailed risk assessment should be done latest before the idea is selected. (Koen et al. 2001.)

Once an idea is selected, typically the concept definition phase is the final element before going into development. The elements to be addressed at the latest by this element are: customer need or benefit, the objectives, fit for strategy, size of the opportunity, specific value proposition for value chain participants, commercial and technical risk factors, sponsorship and project plan including resources and schedule. In terms of the sourcing process, specification value proposition would infer drafting functional specifications

(Van Weele 2004; Axelsson & Wynstra 2002) before the development phase. (Koen et al. 2001.)

In conclusion, the applicable principles adapted from the NCD literature to be incorporated during the FFE phase of the sourcing process are the following: *1) identification, analysis and prioritization of the user need based on strategic objectives and externally influencing factors, 2) assessment of the applicable sourcing process to be utilized 3)target setting and functional specifications for the future solution based on the analyzed user need 3) risk analysis according to internal and external factors and 4) market research and communication to identify potential suppliers*. In addition, it is important to note that these activities should be applied case specifically, according to the detail level and order considered applicable. Furthermore, Koen et al. (2001) advice that all the applicable activities are addressed in a common document before proceeding.

3.1.1.4 Early supplier integration

As characterized in Chapter 2.3.3, supplier integration in NPD literature can contribute to companies leveraging suppliers' capabilities and thereby achieving a higher level of innovation and product or service quality, reduced total costs, and faster time to market. (Monczka et al. 2000; Wagner & Hoegl 2006). However, principles to when and how to integrate regarding the innovation sourcing process are covered in this chapter to further explore process design principles.

Overall, regarding the prerequisites to integrate suppliers, researchers strongly advice companies to first develop a set of practices to focus on the internal element of supplier integration. These practices assemble a foundation for coordinating sourcing initiatives and the overall cooperation and communication with chosen suppliers. Das et al. (2006) thus summarize that supplier integration "begins with internal integration practices". These practices include for example, sharing visions and strategy, joint goal setting, defining collaboration practices and forums, and participation in cross-functional new product or process design. (Fitzpatrick 1996; Narasimhan & Das 2001; Narasimhan & Kim 2002.) Thus, also in the innovation sourcing context, *clear internal integration practices* by the means of vision, strategy and target sharing, collaboration practices and forums are considered a prerequisite to the application of the process.

However, in contrast with the APM literature's recommendation to work cross-functionally throughout the complex development project, supplier integration literature presents a more case specific approach varying between a functional, multifunctional and cross-functional team. Kahn (2009) place the aforementioned formation types into a matrix (Figure 17) divided by task uncertainty and task scope, which he considers to repre-

sent task complexity. However, Barclay et al. (2011) later added “the newness and volume of the product”, and Gemser and Leenders (2011) added “the degree of risk” to Kahn’s definition of complexity.

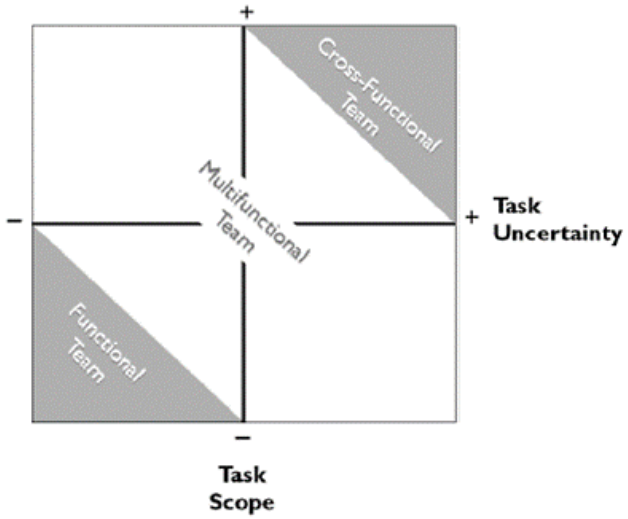

Figure 17 Types of inter-functional initiatives regarding task scope and uncertainty (Kahn 2009)

Kahn (2009) defines a functional team initiatives as activities executed by having minimal to no contact with other functions. Cross-functional team initiatives represent strategic, organization-wide activities, which require participants from different functions, prioritizing the initiative over one function’s objectives. Multifunctional team initiatives, on the other hand, require participants from necessary functions to complete the initiative’s objective. Thus, essentially, the increase in task uncertainty and scope increases the need for a more cross-functional team.

Kahn further explains that simpler tasks can be executed by a multifunctional or functional team. However, in general “make” based NPD projects tend to position as high scoped and uncertain projects, resulting in essentially creating a core cross-functional team working from the beginning to the end (Kahn & Barczak 2012). Due to innovation sourcing being “buy” based, one can infer that the scope and uncertainty of the project is less than for NPD projects, interpreting that multifunctional teams could be sufficient for innovation sourcing projects. However, as a best practice regardless of the interfunctionality, Kahn and Barczak (2012) state that each project should have at least a project leader as governance to be successful.

In conclusion, as a principle for the innovation sourcing process *before integrating suppliers to the innovation sourcing process*, the company needs to *determine an internal multifunctional core project group with applicable governance and communication models*. The level of interfunctionality can vary within process phases and tasks by assessing

the newness and scope or volume of the product or process, the degree of risk and uncertainty. Nonetheless, coordination between these functional areas should be conducted applicably by defined formal or informal communication methods. (Olson et al. 2001; Kahn 2009; Kahn & Barczak 2012.)

In addition to the extensiveness of supplier integration (Handfield et al. 1999) covered in Chapter 2.3.3, NPD literature covers research on the timing of the integration, which Wagner (2012) considers a key success factor of the project. Furthermore, Handfield et al. (1999) suggest that suppliers can be integrated at any phase of the process. However, in general, earlier involvement is proven to be better (Handfield et al. 1999; Monczka et al. 2000; Petersen et al. 2005; Wagner 2012), especially in projects that have higher technological uncertainty (Handfield & Lawson 2007). Handfield et al. (1999) suggest that critical and complex solutions require the commencement of early supplier integration already during the idea generation phase, so that the acquiring company can begin face-to-face discussions before developing the solution. Furthermore, less critical and simpler solutions do not require supplier contribution to for example specifications and target setting, and thus can be integrated later in the process.

However, Wagner (2012) expanded his examination to include the FFE phase and demonstrated that suppliers can contribute significantly already at this phase, if involved applicably. However, he denotes that "if the supplier is integrated intensively in the later NPD phase (e.g., because the supplier's responsibility is to design a product jointly with the buying firm), FFE integration is less effective". Consequently, regarding the innovation sourcing process, this would infer that the more "black-box" the project is in nature, the earlier suppliers should be integrated to contribute and provide knowledge for the functional specifications and target setting, already in the FFE phase. However, full intensive supplier integration refers to for example face-to-face workshops prior to the development phase, and thus *suppliers should be integrated at the latest before the lean startup phase.* The intensive integration provides suppliers with important knowledge about the project, such as user needs, overall outcomes, and extends the acquiring company's knowledge on supplier's competencies and fit for participation (Heikkilä et al. 2013). Nonetheless, full supplier integration requires that suppliers are first identified, contacted and assessed to increase knowledge regarding potential suppliers' competencies, reputation, interest and overall fit for participation during the FFE phase (Hartley et al. 1997; Nooteboom et al. 1993; Petersen et al. 2003; Wagner 2012). Principles regarding this will further be explored and defined in Chapter 3.1.2.

Moreover, Monczka et al. (2000) propose a process model for successful intensive supplier integration execution after suppliers are identified. Moreover, as an antecedent to the execution, they highlight the importance of a strategic planning phase. The activities identified: 1) determining current and future needs 2) establishing strategically aligned world-class supply base and 3) establishing a bookshelf of viable technologies

and suppliers, are identical to the ones identified in the FFE phase activities. However, the intensive supplier involvement phase should consider the following five steps presented in Figure 18.

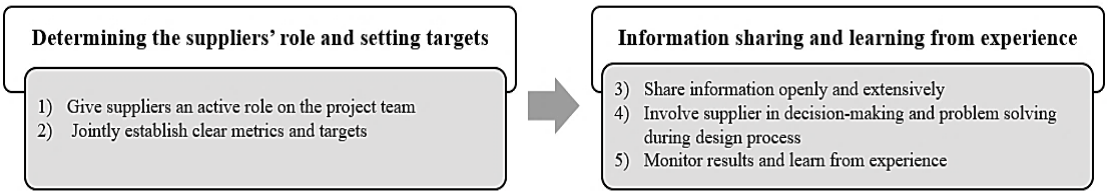

Figure 18 Intensive supplier execution activities (adapted from Monczka et al. 2000)

Considering the innovation sourcing process, supplier(s) cannot be given an active role on the core project team before the agile or pilot scale-up phase. However, prior to initial supplier selection and scale-up phase, Monnczka et al's (2000) and Wagner's (2003) insight on *establishing clear communication practices (e.g. forums and frequencies) for the later lean startup development phase is crucial.* This also builds a foundation for the steps 3 and 4, which researchers (Efstathiou & Frizelle 2003; Yen & Hung 2013) state are enabled by trust, satisfaction and asset specificity, highlighting the importance of groundwork already done in the FFE phase supplier identification and communication activities.

In addition, before beginning development efforts, clear metrics and targets for development should be established jointly with the supplier to ensure commitment and responsibility in designing the solution (Wynstra et al. 1999; Monczka et al. 2000; Petersen et al. 2005). Due to sourcing involving more than one supplier and the importance of having same performance metrics for all suppliers involved for transparency purposes, the joint establishment of metrics is not perceived applicable for the innovation sourcing process. However, for transparency and commitment purposes, *it is vital to establish and communicate the performance metrics to all suppliers prior to the lean startup development phase*. Once the initial supplier is selected for the pilot or agile execution phase, joint metrics establishment appears to be applicable as the application context is now similar to the NPD process. Finally, Monczka et al. (2000) underline that development needs to be constantly monitored and improved according to the defined metrics, as also highlighted in the lean startup approach.

3.1.1.5 Contracting

In the traditional sourcing process, contracting can be considered fairly straight forward: a supply or service contract is negotiated and signed after selecting the most promising

supplier (Van Weele 1994). In contrast, as described above, the innovation sourcing process is comprised of different sourcing parameters and carries higher risks. Thus, the contracting framework should also differ from the traditional process to be able to ensure appropriate risk management. Similarly, in NPD projects it is difficult to construct a contract template that covers all possible future scenarios regarding different types of projects. Thus, it is important to consider contract flexibility, because a too rigid contract might deteriorate suppliers' ability and incentive to innovative. (Cox 1996.) Laursen and Salter (2014), also, remind about the open innovation paradox, stating that the development of innovations requires transparency, but the commercialization of them requires protection. This highlights the difficulty of contracting in the innovation sourcing context.

Regarding the contractual framework for innovation sourcing projects, Hedberg (2017) emphasizes that as a starting point to any sourcing activity, it is crucial that the acquiring company protects its business secrets by having in place a non-disclosure agreement (NDA) before disclosing business sensitive information to the potential suppliers. A NDA is a good way to ensure a more comprehensive legal protection of a company's business and professional secrets and other confidential information (Minilex 2020). Consequently, the innovation sourcing process should also include *signing a NDA at the latest before detail conversations with suppliers*, in which business sensitive information could be disclosed.

In addition to a NDA, the uncertain development phases of the innovation sourcing process should be covered with a contract. The Business Technology Forum (2019) suggests signing a trial agreement or a Letter of Intent (LOI) to agree on the critical commercial terms or frame, business model and Intellectual Property Rights (IPR) of the potential solution before the development work.

Also, Heikkilä et al. (2013) state that new development project contracting should especially include IPR issues before any development work is started. Agreeing on clear IPRs ensures that the acquiring company "does not take unnecessary risks and to secure its position in terms of potential innovation and its commercialization, as well as potential future revenues." They further specify that the companies should clearly outline who owns the rights to the potential new knowledge or technology, who can utilize this knowledge or technology and how, and how to share the risks and benefits for example by profit sharing. Consequently, drafting the IPR terms should be a joint effort with the supplier and the acquiring company, including business function, procurement and legal functions' input.

In addition to IPR, parties should also agree on the metrics by which the solution is evaluated on, if and how the supplier is compensated for the development work and what are the responsibilities and possible exit clauses (Baldwin 2008). Consequently, incorporating the above mentioned critical contractual aspects, the *parties should agree on IPR,*

compensation and critical commercial terms or frame, lean startup cycle content, performance metrics and exit clauses before developing the MVP.

Regarding the agile development or pilot phase of the innovation sourcing process, it is justifiable that the acquiring company and the initially selected supplier should contract for this phase separately as the scope of the development work differs from what was covered with the lean startup cycle trial contract. Thus, the contracting principles for this phase can be sought from the agile development literature, which concerns software development.

Laakkonen (2014) explains that the five most critical contractual elements to be considered are: the agile development practices and scope, pricing, change management, early termination of the project and warranties and liabilities. Regarding early termination, Laakkonen describes that the project can be terminated due to failure to meet defined performance targets or if the acquiring company finds the solution to be already scaled up despite not all originally planned features exist. Due to the lack of literature on agile and pilot contract in the innovation sourcing process context, it is considered justifiable that the high-level agile development critical aspects, development practices and scope, pricing, change management, early termination of the project and warranties and liabilities, are applied as a guideline for the *agile and pilot development contract* as well.

Finally, the Business Technology Forum (2014) suggests that the *development phases are followed by negotiating and signing a full commercial agreement.* This can be negotiated in parallel or subsequent to the development phases. Furthermore, Tekes (2013) notes that the acquiring company should also consider the development as a long-term process and thus ensure that the supplier will further develop the solution also after the acquisition. Tekes highlights *that the scope of the contract should remain agile for further development* and introduces various contract models, such bonus or life cycle model, to incentives the development of the solution. These contractual models are designed to achieve a win-win situation for both parties.

Scholars (Poppo & Zenger 2002; Blomqvist et al. 2005), however, note that collaboration and contracting in development projects requires mutual trust between the involved parties to be successful. Thus, the contractual framework and the elements mentioned above are insufficient without an adequate level of trust. Van Echtelt et al. (2008) highlight that in order to gain long-term trust and thereby collaborative benefits, it is compelling that the companies capabilities are aligned. Melander (2014) states that these important capabilities forming trust can be further divided into technological capabilities and relational capabilities. Technological capabilities include the supplier's understanding about the new technology and thereby also potential future technologies, which is critical to be able to develop innovations, while relational capabilities can be characterized by the supplier's motivation and interest in collaborating with the acquiring company (Handfield et al. 1999; Chung & Kim 2003; Wagner & Hoegl 2006). Consequently, due

to supplier dependency in developing a long-term beneficial solution and development driven relationship, the innovation sourcing process should incorporate elements by which the acquiring company is able to assess the technological and relation capabilities to form trust with potential suppliers. These elements will be further discussed in the next chapter.

3.1.2 Sourcing process design

As mentioned in Chapter 2.3.4, communicating the desired solution outcomes to the potential suppliers offers the highest potential for both parties to optimize the solution and have it delivered in a novel and high quality manner. Consequently, input, process and output specifications will be further defined by the supplier and given feedback on by the acquiring company during the lean startup phase. In fact, since the outcome of the solution represents the key determinant of the project scope, it can be perceived as an integral factor of the suppliers' interest in participating in the innovation sourcing process. Therefore, the *outcome specifications of the solution should be communicated to all potential suppliers during the market communication activities in the FFE phase*. More specifically, if the acquiring company decides to issue a RFI document, outcome specifications should be included. Furthermore, to assure the outcome specifications are comprehended similarly amongst all suppliers, the outcome specifications should be quantifiable and thus also later translated into clear metrics conductive to the lean startup development phase. (Axelsson & Wynstra 2002.)

Right supplier capabilities fulfilling the specified outcome of the project are essential to the project's success. Thus, scanning for these capabilities amongst potential suppliers at an early stage of the process is necessary. As highlighted in the supplier integration literature, scanning for potential suppliers should be done during the FFE phase. Heikkilä et al. (2013) highlight that it is important to invest enough time and resources in gathering supplier related data, not only during the sourcing process but more so proactively and continuously before the commencement of any new sourcing project. Additionally, according to Handfield et al. (2009) profound understanding of the key supply market characteristics such as emerging technologies, price and cost trends, mergers and acquisitions, capacity requirement, quality and delivery performance ground successful strategic sourcing. The capability to gather the aforementioned is referred to as Supply Market Intelligence (SMI), which is often followed by an RFx phase when proceeding to a sourcing project. (Van Weele 2005; Schuch et al. 2008; Handfield et al. 2009). In general, Zsidisin et al. (2015) claim that SMI is fundamental in procurement's ability to contribute in cross-functional discussions. Thus, in conclusion, *SMI can be considered a prerequisite for also the innovation sourcing process.*

Once potential suppliers are identified, market communication begins. This is typically conducted by the means of a RFI phase to select potential suppliers to participate in the intensive supplier integration activities. (Van Weele 2005; Schuch et al. 2008) The formal way to gather detailed information about potential suppliers, their competencies is the RFI document. Typically, the suppliers are asked a set of detailed questions regarding their technical competencies related to the sourced solution. (Schuch et al. 2008; Heikkilä et al. 2013.) Procurement literature does not introduce opposing views in terms of the RFI phase in a traditional or non-traditional sourcing process. Thus*, an RFI should be incorporated to the innovation sourcing process.*

However, due the distinct nature of the innovation sourcing process and the aims to identify innovation potential suppliers, it is arguable that the methods by which the suppliers are selected should differ from the traditional process after the RFI phase. Thus far, procurement literature has explored the nature of innovative suppliers in a SRM process context (Schiele 2006; Pulles et al. 2014). However, due to similar proceeding aims and the absence of a theory when suppliers are not within the buyer's current network, the suggested identification criteria for innovative suppliers is worth considering as a starting point in the sourcing process context.

Pulles et al. (2014) empirically indicate a set of characteristics that are influential to suppliers making significant innovation contributions in a buyer-supplier collaboration. They suggest that the supplier's technical and relational capabilities are fundamental to innovation contribution. Pulles et al. distinguish professionalism and specialization as technical characteristics which are shown to positively contribute to buyer innovation. However, Gulati et al. (2000) remark that suppliers' cannot dedicate their best capabilities to all customers. Thus Pulles et al. (2014) highlight that it is crucial to not only identify technically capable supplier to innovate, but also the ones willing to dedicate their resources to contribute. These relational capabilities are characterized as collaboration attitude, preferred customer status and supplier development program. Interestingly, the relational capabilities, especially preferred customer status, were shown to have a more significant impact on the innovation contribution than technical capabilities. Consequently, the supplier selection methods in an innovation sourcing process should extend to focus more on evaluating supplier's collaborative attitude and relational aspects than technical aspects.

Furthermore in addition to the emphasis on relation capabilities, the traditional RFP or RFQ methods pose challenges in evaluation in an innovation sourcing case. Traditionally, after market communication (RFI), potential suppliers are evaluated and shortlisted based on a RFP or RFQ phase (Van Weele 2005; Schuch 2008). Due to the set initial technical specifications, solutions do not differ significantly from one another. Thus, comparisons and a final supplier selection can be carried out primarily based on this information. However, when sourcing for new solutions specified by outcomes, typically only few suitable

suppliers exist and their solutions and core competencies differ significantly. Considering there is no comparative competition amongst solutions, RFP or RFQ as a tool to shortlist and contract with suppliers might not be applicable. (Heikkilä et al. 2013.) Thus, the selection methods after the RFI shortlisting should differ from the traditional RFP and RFQ evaluation method and be aligned with further evaluating suppliers' relational capabilities when sourcing for innovative suppliers to deliver innovations according to the functional specifications (Pulles et al. 2014).

Specifically, Heikkilä et al. (2013) suggest issuing fictive cases, or idea-generating workshops for capability evaluation purposes when seeking highly creative solutions. Aligned with assessing relational capabilities (Pulles et al. 2014) and design thinking principles (Brown & Wyatt 2010; Stickdorn & Schneider 2010; Tschimmel 2012), interactive face-to-face sessions not only facilitate further relational capability assessment but also eliminate ambiguity related to targets and user needs, and create a forum for mutual assessment of potential collaboration suitability. Consequently, the innovation sourcing process should incorporate *interactive face to face e.g. workshops sessions after the market communication* by the means of design thinking activities: inspiration and ideation to evaluate suppliers' relational capabilities for further innovation collaboration. Furthermore, as a result, potential suppliers have clear and sufficient understanding of the target and user need, and thus can provide a POC and, or prototype before the lean startup development cycle.

3.2 Theoretical framework: the innovation sourcing process

In conclusion, the above proposed principles steering the design of an innovation sourcing process are compiled and presented in Table 1. The identified principles are compiled in four themes: prerequisites, process structure, risk management & contractual aspects, and communication and cooperation. The themes were created by the researcher as follows: first similar principles were grouped, next the researcher examined each group and finally identified a common theme term to characterize each group. Furthermore, process structure is broken down to four associated high-level phases: FFE, Market communication & supplier integration, test & develop and transfer, as can be interpreted based on the literature review principles.

Table 1 Literature review based principles denoted in themes

Theme		Principle
Process structure	**FFE**	Definition of internal project group and governance model
		Identification, analysis and prioritization of user need by design thinking methods
		Assessment and selection of applicable sourcing process
		Setting target and outcome specification(s)
		Risk analysis
		Planning contractual aspects
	Market communication & supplier integration	Market research, communication and down selection with RFI
		Signing NDA before detailed discussions
		Interactive workshop sessions before test & development phase
		Suppliers show POC before developing solution
		Contracting for test & development phase
	Test & develop	Signing contract for test & development phase
		Suppliers create prototype to kick-start MVP development
		An iterative MVP development cycle (build-measure-learn)
		Establish and communicate clear performance metrics
		End-user centricity
	Transfer	Signing master agreement
		Agile method or pilot implementation
Communication and cooperation		Internally multi-functional project team
		Prioritize face-to-face meetings internally and externally
Risk management & contractual aspects		Re-evaluating user need during process
		Compensation for development work (fixed or hourly)
		IPR
		Incentivized and agile scoped master agreement
Prerequisites		Sharing innovation startegy and vision with business
		Management support / leadership
		Pro-innovation culture
		Clear internal collaboration practices
		Innovation definition
		Supplier Market Intelligence (SMI)

Next, as a conclusion of this literature review, the researcher designed an innovation sourcing process (Figure 19) adopting the design principles. The process represents the theoretical framework, which contributes to fill in the identified literature gap.

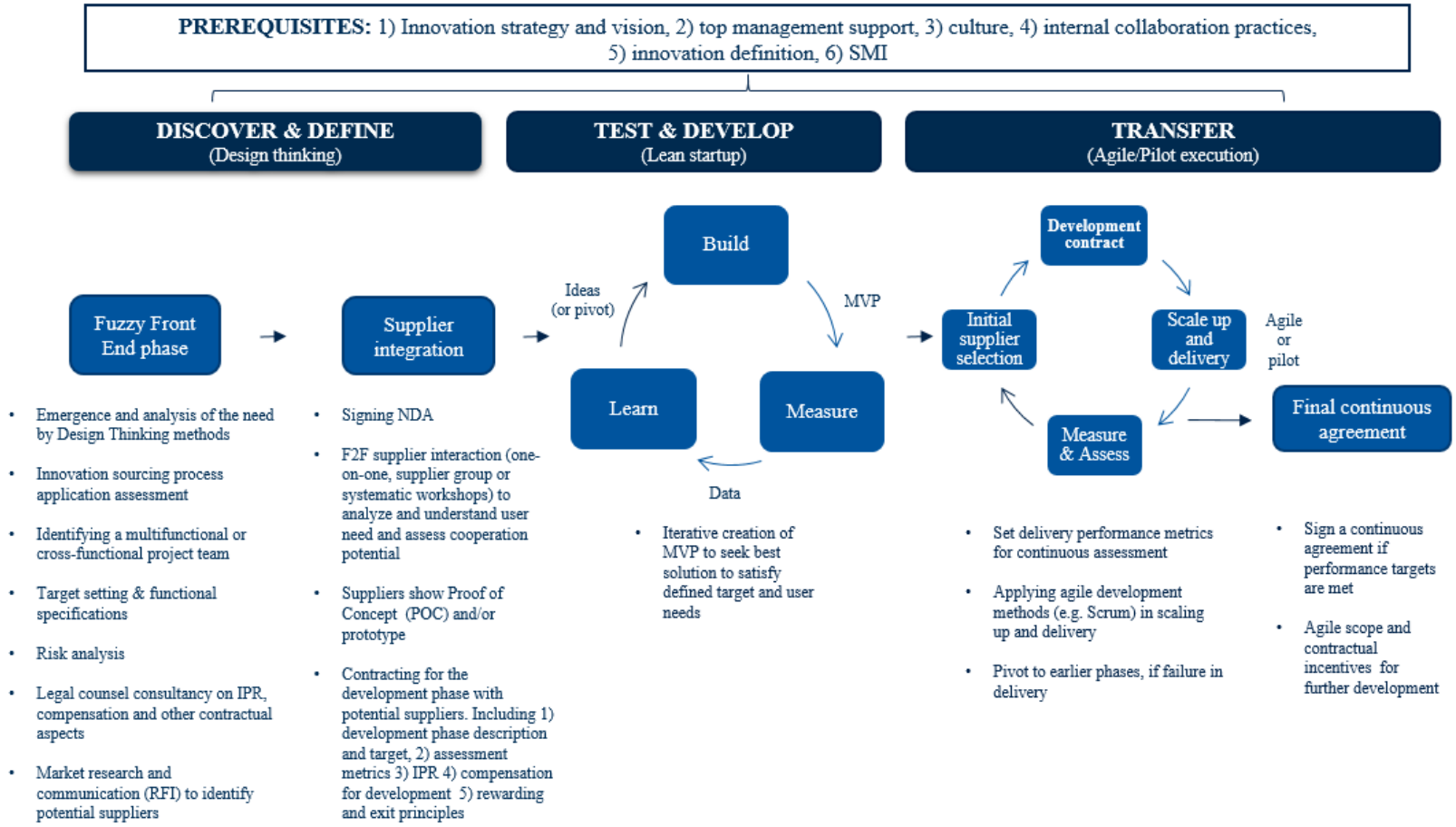

Figure 19 The literature review based proposal of an innovation sourcing process

This theory-based process represents a literature review based proposition to the first research question of this thesis (RQ1): *"What kind of sourcing process should the case company adopt to enable the generation of innovations?"* The process incorporates the iterative combination of design thinking, lean startup and agile or pilot development approaches. Thus, this does not mean that all approaches should be applied consecutively, but rather case specifically, allowing the model's feedback loops to take the adoption from for example lean startup or agile execution back to design thinking methods, if for example user need definition should be re-evaluated. Furthermore, the activities listed under each phase do not need to be applied in the order written, but rather represent the activities to be conducted before advancing to the next phase.

The process begins with an internal FFE phase to organize resources, understand and define the outcome to be sourced. The FFE phase is first triggered by the emergence of the need. The company can have a formal and active process to support the identification and prioritization of unmet opportunities, or the process can be induced informally as for example an internal or external individual recognizes an unmet customer need. Next, the identified idea must go through a more detailed analysis in which design thinking methods are applied to understand the underlying problem and thereby be able to analyze and choose which needs are acted on. The company should prioritize the needs and act on the ones most aligned with the relevant business unit's and company's innovation strategy.

Furthermore, the company should identify and setup a multifunctional (or cross-functional) sourcing project team based on the scope and risk level of the project. The project team should assess which sourcing process method, traditional or innovation, is applicable based on the nature of the analyzed need. Furthermore, based on the need analysis, the project group should define the outcome of the project, which includes setting a clear target and the functional specifications for the sourced solution.

Additionally, potential risks regarding the sourcing process and the sourced solution should be analyzed as early as possible. More specifically legal counsel should be consulted regarding critical risk management subjects such as IPR, development work compensation and other critical contractual aspects, if needed. Finally, before moving into the supplier integration phase, market research and communication by the means of an RFI should be conducted to identify and contact potential suppliers. The RFI should not only seek to evaluate suppliers' technical capabilities but more so the suppliers' relation capabilities.

Based on the RFI responses, shortlisted suppliers are invited to meet face to face with the acquiring company. The purpose of the face to face interaction is to better provide detailed information about the user need and problem for the potential suppliers. Furthermore, both parties are able to assess cooperation potential. Case specifically, the face to face meetings could be arranged as one-on-one meetings, in supplier groups or the acquiring company could organize systematic workshops. Also, it is important to assess the

need for an NDA and sign one prior to the face to face meetings, if the companies will be disclosing such information. Before shortlisting most promising suppliers into the test and development phase, the acquiring company should issue a POC phase to uncover which suppliers are capable of even attending in building a solution. Furthermore, based on the POC, the suppliers should show a prototype to address how the defined need or problem would be solved.

Furthermore, the shortlisted suppliers and the acquiring company should sign a contract for the development phase. The contract should include the 1) development phase description and target, 2) performance metrics by which the acquiring company assesses the suppliers, 3) potential IPR clauses, 4) compensation principles and finally 5) principles for selecting a supplier and exiting the development phase.

Next, the test and development phase incorporates the lean startup cycle, which includes as many build, measure and learn cycles as needed to develop a MVP and thereby select the most promising solution and supplier into the transfer phase. The purpose of this phase is not only to develop the MVP but also mitigate the risk of developing a solution that is misaligned with customer targets and needs. Thus, the end user of the solution must be placed in the center of this cycle. Consequently, based on the information gained in the previous phases on the end user need, the suppliers rapidly build an initial MVP, which fulfills the minimum end user requirements.

Next, the end users test the solution and provide feedback. This feedback is analyzed in the learn phase in which the supplier and acquiring company decide whether to persevere the development and further refine the solution with additional feedback cycles, or attempt to build a different solution. Based on the pre-defined exit principles, the acquiring company could also end the development with selected suppliers and continue with only the most promising ones, if applicable. Moreover, based on the awarding principles, the acquiring company can make an initial supplier section, if it is content with the developed MVP.

Finally, the transfer phase incorporates the agile and pilot execution practices to mitigate risks in scaling up the solution. The parties negotiate an agile or pilot development contract. According to the development contract terms, the solution is scaled up with agile development methods such as Scrum. If the solution cannot be broken into smaller batches, a pilot implementation should be done before a full deployment to be able to assess the performance in practice and make applicable changes based on the performance metrics. If the scale up is not successful, the company could pivot to the earlier phase and select the second best solution or alternatively to earlier phases if considered applicable. However, if the scale-up is successful the company will sign a final continuous agreement, which should provide flexibility for the scope to mold and develop. Furthermore, the contract should include for example pricing models which incentivize suppliers to further develop the solution.

4 RESEARCH METHODS

4.1 Research approach

Researches can be positioned based on their methodological approach. Neilimo and Näsi (1980) refer to this as the research approach, which is pivotal to categorizing business economics research papers from one another. Choosing and defining a research approach is particularly important when conducting research, as it essentially influences the methods by which the data is collected and analyzed, and thereby how the research questions are ultimately addressed (Eskola & Suoranta 1998). Furthermore, Creswell (1998) underlines the importance of defining and illustrating the research approach to increase the validity of the research. Neilimo and Näsi (1980) and Kasanen et al. (1993) propose a detailed framework to position business economics researches. Thus, this framework will be utilized to further position this research and subsequently define the appropriate methods to be applied in this research.

Neilimo and Näsi (1980) identify four research approaches positioned based on two distinctive dimensions: the way knowledge is generated (theoretical – empirical) and the nature of that knowledge (normative – descriptive). The four research approaches identified on this two-dimensioned spectrum are: 1) conceptual, 2) nomothetical, 3) decision-oriented and 4) action oriented approach. Kasanen et al. (1993) further expand on Neilimo's and Näsi's identification by adding a fifth research approach: the constructive approach. The complete framework is illustrated in Figure 20.

	Theoretical	Empirical
Descriptive	Conceptual approach	Nomothetical approach Action-oriented approach
Normative	Desicion-oriented approach	Constructive approach

Figure 20 Identified research approaches in business economics (adapted from Neilimo & Näsi 1980; Kasanen et al. 1993)

Neilimo and Näsi (1980) construe theoretical research as a manner of generating a priori knowledge, which is evident without experimenting. In contrast, empirical research is perceived as a manner of generating knowledge by the means of field or laboratory data collection. The nature of this knowledge varies, and thus can be positioned between descriptive and normative research. The former aims at describing and interpreting "what is" and "how is", whereas the latter aims at systematically exploring practical ways to solve explicit problems and recommend alternative solutions to solve these problems.

By exploiting the aforedescribed framework, this research can be positioned as normative, because it aims at practically exploring and developing an alternative sourcing process to better enable innovations rather than only describing the design principles. Moreover, with regards to the means of collecting this normative data, this research can be positioned as empirical on the horizontal axis, because the research questions are addressed based on the data collected by interviews, workshops and a questionnaire. Furthermore, the difference between the remaining approaches, action-oriented and constructive, must be explored to further position this research.

Lukka (2005) further divides empirical business economics researches into interventionist and non-interventionist research approaches based on the extent the researcher is involved in solving the underlined problem or set of problems. The action-oriented and constructive research approaches represent an interventionist approach to doing case study research.

In contrast to the action-oriented approach, the constructive research approach is positioned slightly more towards a normative research on the framework. The former aims at formulating relevant theoretical knowledge by actively participating in solving a defined problem in a case company or companies. The latter, on the other hand, focuses on solving the problem by creating an explicit managerial construction, such as an organizational process, procedure or model to be then implemented in the case company to solve the underlying problem. (Lukka 2005.) Thus, this research can be positioned as constructive as it not only aims at analyzing the current sourcing process and defining the lack of support in enabling innovations, but it also aims at developing an alternative innovation sourcing process. Moreover, the innovation process developed based on the theory, interviews and workshops represents the novel construct as described by Kasanen et al. (1993).

In essence, the constructive approach can be characterized as a method of producing novel knowledge in the form of normative applications, following an innovative, non-traditional research process, which thereby creates new knowledge and contributions to theory and reduces the gap between research and practice (Lukka 2000). Lukka (2014) further divides the constructive research into four fundamental elements, which together form the construct. The elements are: 1) practical meaning of the problem and the solution, 2) functionality of the solution in practice, 3) connection to previous theory and 4) theoretical contribution of the research. These elements are further discussed in Chapter

4.2.3 when elaborating on the research process which is conducted according to the constructive approach practices.

4.2 Research design

Yin (2003) explains that "A research design is the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of a study". Consequently, it prevents the situation where the researcher is unable to answer the research questions by utilizing the collected data. Eriksson and Kovalainen (2008) remark that there are five elements to be examined in the research design: 1) choosing your research area and identifying the research topic, 2) formulating research question(s) 3) choosing the appropriate theories and their role, 4) choosing appropriate method(s) and 5) designing how the data is collected. Thus, to achieve coherence and ensure transparency on how the research is conducted to conclusively address the research questions, the aforementioned elements will be further defined in detail in the following sub-chapters.

The sub-chapters are divided as follows. First, the identification of the research area and topic is described by a case company description and current state analysis. Second, the formulation of the research questions is addressed based on the current state analysis. Next, the research process aligned with the research approach is described in detail. Subsequently, the methodological decisions regarding data collection and analysis are presented and justified. Lastly, the overall research quality is appraised.

4.2.1 Case company: Orion Corporation

This research is conducted as an assignment for Orion Corporation, which is a Finnish pharmaceutical company developing, manufacturing and marketing human and veterinary pharmaceutical products and active pharmaceutical ingredients (APIs). Orion's research and development focuses primarily on the following three core therapy areas: central nervous system (CNS) disorders, oncology and respiratory diseases. (Orion.fi A 2019)

Orion's roots go back to the year 1917, when Finland gained its independence. Three pharmacists were determined to produce and distribute various chemical substances ranging from medicines to cleaners in Helsinki as Finland's government incentivized the growth of the domestics chemicals industry and overall self-sufficiency. Today, Orion has successfully reached a clear market leader position in Finland as a research-driven pharma company, claiming approximately one third of the market. In addition, it operates globally with product marketing in over a hundred countries. Still today, all of Orion's

six manufacturing plants are located in Finland where also most of its research and development operations are conducted. In 2019, the company employed approximately 3 250 employees and its net sales amounted to 1.05 billion euros. (Orion.fi B 2019)

This research assignment was generated from Orion's procurement function, which is centrally in charge of the corporation's strategic procurement activities. The strategic function is further divided into two broad entities, direct and indirect procurement, based on similar supply and usage characteristics.

Direct procurement encompasses materials, packaging and raw materials, utilized in Orion's products, while indirect procurement comprises of various materials and services utilized to support the production of Orion products. These two categories are further divided into centrally led sub-categories to optimally manage the supply to meet their business objectives. Indirect procurement is divided into the following four categories: Research and Development (R&D), Marketing, Sales support and Operational services (MaSsOs), MRO (maintenance, repair and operations), Supplies & Facility, and Information Management (IM). Direct procurement, on the other hand, is divided into the following three categories: Packaging materials, Fermion materials and Raw materials.

Despite the category divisions, all categories comply with the same procurement policy. Furthermore, they follow the written companywide procurement processes striving to provide continuous quality, availability, cost efficiency and innovation by capitalizing on external supply markets and resources in order to meet Orion's current and future business requirements. Procurement's main processes are introduced in Figure 21.

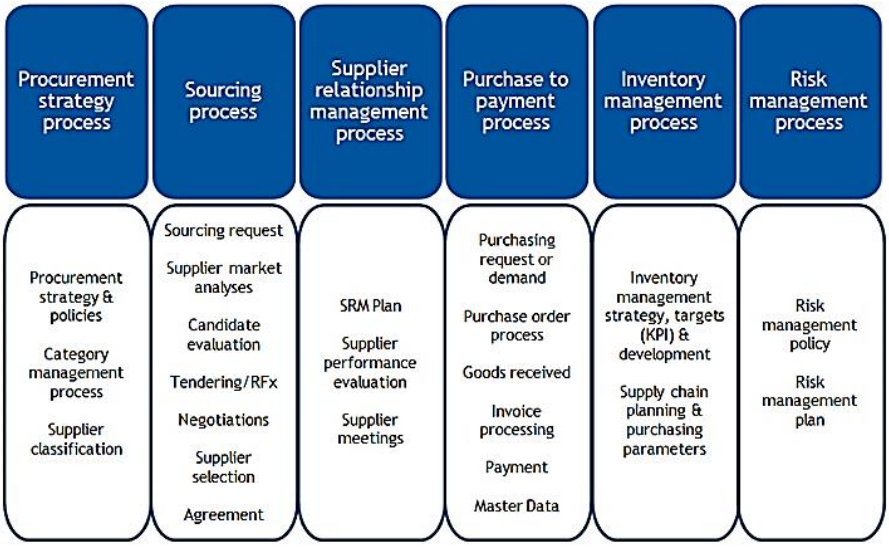

Figure 21 Compilation of the case company's strategic procurement processes

Innovations in procurement are primarily enhanced through the procurement strategy, supplier relationship management and sourcing process work. A questionnaire, conducted

internally as a part of procurement's "Value Adding" project in April 2019, revealed that 53% (n= 16) identified the "lack of internal alignment of processes" for stimulating innovations as the second most significant barrier currently blocking value adding supplier enabled innovations after "lack of time due to daily routines and processes" (73%, n= 22). In addition, many respondents highlighted the sourcing process as the key process that needs to be transformed to enable external innovations as currently only 19% (n= 6) of the respondents even evaluate suppliers' innovation level when sourcing new suppliers. The questionnaire was sent to 110 members of Orion's procurement community including key stakeholders and sourcing managers, from which 31 members responded. The majority, 90% (n = 28), were actively working with suppliers and working within the Purchasing, Logistics and Packaging Technology team (65%, n= 20).

As a follow-up of the "Value Adding" project, the analysis of the sourcing process was undertaken as it is a critical element from the company's end-to-end perspective. The process supports Orion's operational requirements by acquiring the right products, materials and services cost-effectively at the right place and time. The implementation of the process defines the future operative success of the purchase in question. Thus far, the procurement function has systematically developed and leaned its current sourcing process to reduce lead times, enhance internal customer satisfaction and overall success, but concrete ways to stimulate innovations with an alternative sourcing process have not yet surfaced as a key development action.

4.2.1.1 Current state analysis

In order to design an alternative innovation sourcing process, a current state analysis of the case company's traditional sourcing process needs to be conducted to understand the baseline and the emerged need for an alternative process to drive innovations. Thus, first, the traditional process including required roles is explained in detail and finally its challenges and the underlying research objective is construed.

Orion's procurement function has systematically leaned its traditional sourcing process to reduce lead times and provide more added value to its internal customers. The current process, including all phases, is illustrated in Figure 22.

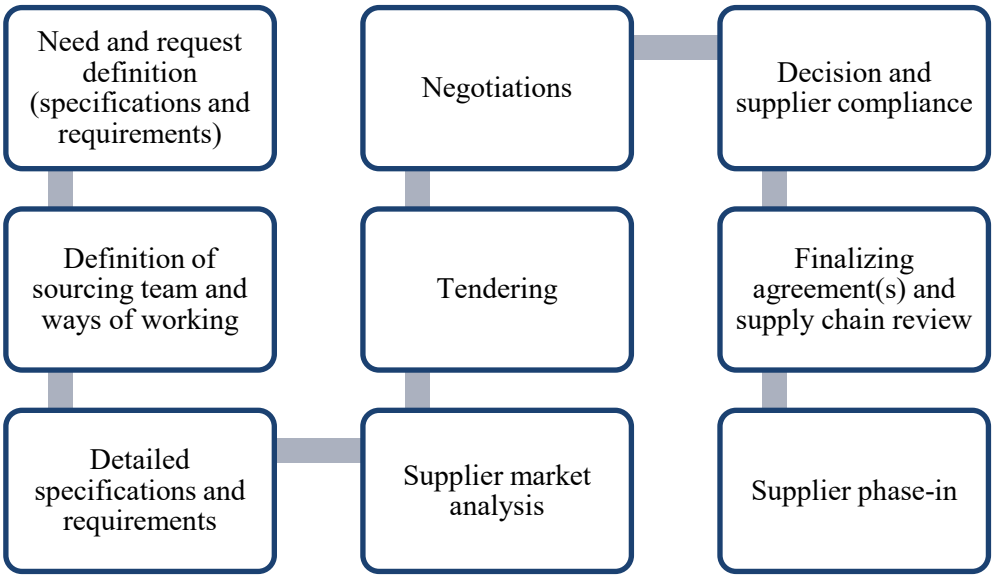

Figure 22 Case company's current traditional sourcing process

The need for a material or service can be generated from various sources such as R&D projects, insourcing, contract manufacturing or from Procurement's initiative to for example mitigate risks, increase cost-effectiveness or change suppliers for obligatory reasons. To enable procurement's early involvement, the line function in need of the material or service should inform procurement's category team and, or the relevant sourcing manager of the purchase as early as possible. Additionally, the line function should conduct a request definition, which includes a definition of the preliminary specifications and requirements for a material or service to ensure open competition of available suppliers.

A relevant sourcing manager is assigned responsible for the correct application of the process. The sourcing manager defines all relevant stakeholders, a team, from the assigning organization or business units to participate throughout the process in providing knowledge on the business need and goals. The business unit(s) in need of the material or service is responsible for the final purchase decision as they are responsible for the compliance and management of external resources. In addition, the sourcing project team can occasionally include other stakeholders from for example legal or quality management functions to provide relevant knowledge to achieve the targeted business needs and goals. The aforedescribed team should agree on roles, responsibilities and ways of working throughout the sourcing project.

Setting detailed requirements and specifications for the purchase in question is one of the most important tasks during the process. Requirements and specifications are multidimensional and should include definitions for the following dimensions:

- Material or service specifications
- Supplier competence, compliance and commercial requirements

- Generic requirements

Market research should identify potential suppliers that could meet the established specifications and requirements. However, in principle the current supplier base should be first reviewed for potential suppliers. Based on the research findings, a short-list of potential suppliers are invited to send their offers to supply the needed material or service. The tendering phase typically consists of the following elements:

- Sourcing team agrees on roles and responsibilities in the RFx process with stakeholders
- Sourcing manager approaches the potential suppliers with the a RFx and additionally a Confidentiality Disclosure Agreement (CDA) if needed
- Iteratively and transparently evaluating and comparing received and updated offers based on a set of pre-defined decision making criteria
- Short-listing suppliers based on specification conformance
- Paving way for agreement negotiations and supplier compliance evaluations by constantly encouraging suppliers to improve or optimize their design or concept and refine their offers to align specifications and requirements

Next, the supplier selection decision should be transparently based on possible material or service testing, functionality, auditing and other relevant information documented during the tendering process. Finally, future operational performance should be secured with relevant agreements before the new supplier phase-in and commence of operations. Also, a supply chain review for direct materials is recommended to be performed prior to singing agreement(s) to agree supply chain related practices and evaluate supplier's capabilities.

The implementation of the aforedescribed sourcing process ensures a transparent and structured way of acquiring materials and services by first introducing the predefined solution to potential suppliers and then cost-effectively selecting the most suitable provider with an aligned material or service solution. However, according to Orion's business units and procurement members, there are a few factors that hamper the stimulation of innovations when using this process.

First, the full spectrum of specifications and requirements, which the traditional process assumes to be defined at the very beginning of the project, are not always known. For example, the need might be completely novel to the business, or the current service or material does not meet the business targets. Alternatively, the sourcing team might have a preliminary understanding of the needed solution, but is uncertain if it actually is optimal to fulfill the business targets. Consequently, the current traditional process leaves

little if any room for supplier innovations or the co-creation of the most applicable solution together with the potential service or material providers as specifications and requirements are mostly locked prior to sending the RFx.

Second, the value of the solution is captured once a long term agreement is already in place. This is applicable for known services, but risky for novel solutions as the outcome is more unclear and the purchasing party should first test the applicability of the solution before entering into a binding long term partnership. Hence, a more agile way of contracting or realizing value should be applied when specifications and requirements are not clear.

Third, the traditional process can be time consuming as it extends to several months. Often a lot of time is consumed on mapping the specifications and requirements in-house as it often requires cross-functional input. In addition, sourcing project team members are merely always involved in other projects or operational work, which leads to inefficiency and the need of revising previous discussions and decisions. Simultaneously, time to market is becoming more important in the ever so rapidly changing business environment. Thereby, long project timelines diminish the added value to the internal customer as the preliminary need and specifications might have already altered.

In conclusion, the aforedescribed factors compile the current problem at Orion: *the traditional process does not adequately support the generation of supplier innovations by sourcing*. Consequently, Orion's procurement function needs an alternative sourcing process to stimulate innovations in these cases. Thus, to clarify, the traditional sourcing process appears to be well-suited for sourcing cases in which the company is able to define the technical specifications and requirements, which act as the foundation for the process.

The alternative innovation sourcing process should, moreover, act as a catalyst for mindset change not only within procurement but also within the business units as sourcing managers can utilize a transparent and systematic tool, which is agile to alterations in specifications and needs to capture new solutions and different ways of working. Thereby, sourcing mangers can further communicate to internal stakeholders that requirements and specifications no longer need to be fully defined, which might increase procurement's initiative of earlier involvement in sourcing cases. In addition, the clearly defined process can be communicated to the potential suppliers when first contacted, which might increases the efficiency and lead time of the sourcing process itself.

4.2.2 Research questions

Research questions focus the investigation of the research problem into a limited area, thus providing a carefully defined scope. Consequently, research questions guide the

whole research process from focusing the research, determining the choice of research methods, guiding the stages of data collection, analysis and ultimately answering the questions. Therefore, it is critical that the research questions are carefully formulated and reflect the research aims. (Eriksson & Kovalainen 2008.) The research questions formulated for this study are: RQ1 "*What kind of sourcing process should the case company adopt to enable the generation of innovations"* and RQ2 *"When should the developed process be applied?"*

As described in Chapter 1.1, there seems to be little if any research conducted regarding the optimal sourcing process design to enable the generation of innovations. Thus, the subject matter of this research is novel, implying a more explorative than a confirmatory nature to solving the research problem. Furthermore, due to the practical application of this research, the research questions should be formulated to not only describe a phenomenon, but also generate answers to how and in what kind of context it should be addressed in practice. Thus, the main research question starts with "what kind of", describing the applicable structure of the sourcing process to address the underlying problem of the traditional process not having enough support in enabling innovations. (Eriksson & Kovalainen 2008.)

Furthermore, in order to generate added-value in practice, the application context must be defined, implying the second research question to start with "when". Due to the explorative nature of this research, the results of this research are not merely conclusive but leave room for further researches.

4.2.3 Research process

Stuart et al. (2002) divide the traditional research process into five stages: 1) define the research question, 2) instrument development, 3) data gathering, 4) analyze data and 5) disseminate. However, due to the chosen research approach, this research follows the principles outlined in literature to conduct a constructive research. In contrast to the traditional research process, the constructive research process differs as it is purely heuristic by nature during the empirical phase and thereafter typically provides theoretical justification and a usability test of the solution (Lukka 2014). Kasanen et al. (1993) divide the research process into a sequence of six phases:

1. Finding a practically relevant problem with research potential
2. Achieve a comprehensive understanding of the problem and its underlying topic
3. Create an innovative solution to the problem
4. Demonstrate the applicability of the solution
5. Provide evidence on the theoretical link and contribution of the solution

6. Explore and define the scope of applicability of the solution

These phases form the foundation of this research process. The detailed research process is illustrated in Table 2 as a Gantt chart. The main research tasks conducted are listed on the vertical axis and the time intervals, in months, are listed on the horizontal axis. The width of the colored horizontal bars presents the duration of each task.

Table 2 Research process illustrated as a Gantt chart

	September	October	November	December	January	February	March	April
Research plan								
Current state analysis								
Literature review								
Methods design								
Searching interview companies								
Conducting and analyzing interviews								
Conducting and analyzing workshops								
Conducting and analyzing weak market solution test								
Reporting findings								
Discussions and conclusions								

Overall, the research process was conducted within an eight month time period spanning from September 2019 to April 2020. The research plan represents finding the practically relevant problem with research potential. This problem partially originated from an ongoing innovation themed procurement project that was initiated in the spring of 2019. Thus, the researcher conducted a current state analysis by reviewing the materials and data collected from this project and discussing the topic with procurement management, category and sourcing managers. As a result, the researcher achieved a comprehensive understanding of the current problem and its underlying topic. Consequently, at the end of September, the researcher had formulated initial research questions and related literature review areas.

Next, to create an innovative solution to the problem, the researcher conducted a literature review. Identified relevant literature disciplines were reviewed in order to seek design principles due to the absence of an innovation sourcing process. Next, the identified design principles were utilized to construct a theory-based innovation sourcing process. Simultaneously, in November and December, the researcher sought and contacted potential companies that had already developed and implemented an innovation sourcing process. Finally, four selected companies were interviewed during January and February whilst simultaneously analyzing and reporting the findings. After the interviews, the researcher facilitated three two-hour workshop sessions during February and March for selected case company participants. The purpose of these sessions was to ideate and develop a case company specific innovation sourcing process, utilizing the findings from the literature review and interviews.

To demonstrate the novelty and applicability of the developed process, it is highly important that the usefulness of the solution is tested by the means of a solution market test when conducting a constructive research. Only once the solution passes the practical test, the usefulness of the managerial construction can be validated. (Kasanen et al. 1993.) Consequently, in the beginning of April, the researcher presented the case company specific innovation sourcing process to the company's sourcing managers (n=23) within the direct and indirect procurement function. After this, the managers completed an online questionnaire to state the likelihood of applying the process and potential improvements.

Finally, before the end of April, the researcher provided evidence on the theoretical link and contribution of the solution. Furthermore, the scope of applicability of the solution was described in the discussions and conclusions section of this research. Based on the findings and conclusions, the researcher indicated theoretical and practical contribution and proposed future research topics.

Next, the main empirical phases of the research process are further described in detail in the next sub-chapters. The main phases are: data collection, data analysis and research quality.

4.2.4 Data collection

The most basic methodological choice can be done between a qualitative and quantitative research method. Ghauri and Grønhaug (2005) suggest applying qualitative methods when the objective of the research is to explore and interpret a phenomenon thoroughly rather than generalizing it. Consequently, the amount of data points is considerably lower as the research aims at providing a thick and holistic description of the phenomenon, thus implying the intensive (single) case study approach to collecting data. Due to this research being conducted as an assignment to the case company, it is evident that the case company represents the subject of the case study to which the innovation sourcing process is explored and designed. However, part of the data collection also involves an extensive (multiple) case study approach due to the novelty of the research topic. Due to the lack of theory-based innovation sourcing process examples and the case company applying only a traditional sourcing process, generalizable best practices from other companies already applying an innovation sourcing process will be first explored. The examination of these "pioneer" companies represents the multiple case study approach. (Eriksson & Kovalainen 2008.)

Despite this research being qualitative, the typical black-and-white dichotomy of linking qualitative research with non-numerical and quantitative with numerical data collection is rather limited (Piekkari & Welch 2006). As for this research, both numerical and non-numerical data is collected by the means of various data collection methods to answer

the research questions. Yin (2003) identifies six sources of evidence, 1) documentation, 2) archival records, 3) interviews, 3) direct observation, 4) participant observation and 6) physical artifacts. Moreover, the selection of the data collection method should be aligned with the established research approach and objective.

The data collection for this research consists of three sequential methods, which were selected based on the alignment with the selected constructive research approach principles and the defined research aims. The first method, interviewing, was selected to achieve a comprehensive understanding of the problem and its underlying topic. In comparison to other data collection methods, Hirsjärvi et al. (1997) argue that interviews are especially applicable when the research objective is to scrutinize an unexplored and rather complex topic area, and subsequently place the results into a broader context, thus providing a suitable data collection method for the first phase. Consequently, due to the absence of an innovation sourcing process model in the case company, the researcher conducted interviews to explore the various innovation sourcing processes utilized by the "pioneer" companies and thereby acquire data on generalizable best practices.

Next, aligned with the constructive research approach principles, the second data collection method, participant observation in the form of workshops, to develop an innovative solution to the problem. Chronicle workshops as a data collection method is particularly well-suited in studies that are emerging, unpredictable and focus on enabling organizational change and design. Moreover, workshops provide an applicable method in real-time investigation whilst allowing an iterative and refining design process. (Darsø 2001, Ørngreen & Levinsen 2017.) Consequently, workshops appear to be well-suited to participate case company representatives in iteratively developing the innovation sourcing process. Thus, the researcher facilitated three sequential workshops within a two week time period to participate relevant case company representatives in developing the innovation sourcing process based on the conducted literature review and interviews.

Finally, aligned with defining the scope of applicability of the solution when applying the constructive research approach, a questionnaire was conducted as the third and final data collection method. The weak market solution test (questionnaire) represents the assessment of the applicability of the solution, which aims at reassessing and validating the application context of the innovation sourcing process. This assessment is done by case company representatives, who do not participate in the workshops. Vilkka (2007) states that a questionnaire as a data collection method is superior when exploring personal preferences and opinions or the amount of respondents is significant and they are scattered. Consequently, a questionnaire was sent to all case company sourcing managers for triangulation purposes concerning the evaluation of the process' application context. Moreover, further methodological decisions regarding all three data collection methods are further explained in detail and justified in the following three sub-chapters. Also, the researcher's role in each method is clearly and comprehensively described.

4.2.4.1 Interviews

The multiple case study part of this research was conducted by collecting data by the means of semi-structured interviews to be able to fully capture the research phenomenon (Yin 2003). The interviews were conducted at four large Finnish companies in which an innovation sourcing process had been already utilized in practice. All companies are kept anonymous in this research and thus these companies are not further characterized. The companies are referred to as Company A, B, C and D. Moreover, the data collected by the means of the interview is analyzed or described in the way that the identity of the organization or the interviewee cannot be connected to the information and events handled in the interviews.

The company selection, case sampling, was conducted by the means of a two-phased purposeful case selection process. Patton (2002) divides purposeful sampling into seven strategies from which the intensity sampling strategy was followed in this research. Aligned with the constructive research approach principles, this strategy was chosen as it allows the researcher to select only a couple of information rich cases to provide in depth information on the subject matter. Consequently, the aim of the first phase of the sampling process was to identify information rich companies that have already developed and applied an innovation sourcing process. The researcher contacted potential companies by email that are known to have a centralized, high-maturity procurement function, from which the case company could learn as much as possible. In total, dozen companies were contacted.

Next, during the second phase of the sampling process, the identified companies were selected for interviews. Due to the scarcity of companies that had developed an innovation sourcing process, only one selection criteria was applied to assess the process maturity. The criterion applied was the amount of times the process had been applied in practice to be able to assure that the existing process has been validated in practice and that the company can provide as much information on the realized added-value and potential challenges as possible. Furthermore, the level of variation, for example size and industry, amongst potential companies was considered influential as this would consequently provide higher assurance regarding the common patterns across each process (Patton, 2002). Therefore, the selected companies operate in different industries.

The data from the interviews was simultaneously analyzed to assess the contribution of each new interview. After four interviews no significantly new information was uncovered in the data analysis, signaling the reach of the data saturation point and a zero marginal utility. Consequently, no new interviews were conducted. (Bowen, 2008.)

Regarding the interviewees, the researcher sought to interview a person or persons from each selected company who had excellent knowledge regarding the subject matter

and strategic procurement comprehensively. Moreover, all interviewees must have experience in implementing and managing the innovation sourcing process in practice to be able to provide sufficient information regarding the application of the process. (Gerson & Horowitz 2002.) The detailed information regarding each conducted interview is compiled in Table 3, which presents the interviewee's title, procurement category, date and duration of the interview.

Table 3 Detailed information on conducted interviews

	Interviewee's title	Procurement category	Date	Duration
Company A	Category Manager	Marketing	29.1.2020	57 min
Company B	Sourcing Manager and Head of Procurement Development	ICT	30.1.2020	1h 7 min
Company C	Sourcing Manager	Consulting and legal services	10.2.2020	1h 25 min
Company D	Head of ICT sourcing	ICT	11.2.2020	1h 4 min

All interviews were conducted face to face at the interviewed company's premises within a two week time period between January and February 2020. The duration varied between approximately an hour and an hour and half depending on the complexity and level of detail of each process. Also, explicit practical examples given by the interviewees undoubtedly increased the duration. Typically, the interviewee was a category or a sourcing manager. All interviewees operated in an indirect procurement category as most of the practical experience applying the process had taken place in the indirect sourcing context.

The type of interview was chosen by seeking the appropriate level of flexibility and standardization in order to collect manageable data with regard to the research objective. Thus, the interviews should be somewhat standardized to guide conversion and take the theoretical background into account rather than administering an informal conversational interview type. However, emergent observations prompted by salient and relevant questions increase the reliability of the collected data. Thus, to provide sufficient structure whilst remaining fairly conversational and circumstantial, the interviews were conducted as semi-structured, theme-based interviews. Consequently, the themes and their sequence were predefined. Moreover, the exact wording and sequence of questions were predefined, asking all the interviewees the same primary questions. (Gerson & Horowitz 2002; Patton 2002.)

The interview themes were selected based on the theoretical framework. The final interview guide, presented in Appendix 1, was constructed based on an operationalization exercise. The objective of the operationalization is to align the theoretical framework and concepts with empirically measurable equivalents (Eskola & Suoranta 1998). Consequently, it is easier to aggregate and analyze the empirical data against the theoretical propositions and thereby address the research questions. The operationalization model is presented in Table 4.

Table 4 Operationalization model denoted in themes

Research question	Theme	Principles and propositions	Interview questions
RQ1: What kind of sourcing process should the case company adopt to enable the generation of innovative solutions?	Process structure	Discover & define - FFE activities - Market communication & supplier integration activities Test & develop - Iterative lean startup cycle Transfer - Agile or pilot implementation	1. What does your innovation sourcing process typically look like? What are the main phases? 2. What kind of practices or factors to be considered should each phase include?
	Communication and cooperation	Internally - Cross-functional project team Externally - Prioritize F2F meetings	3. Internally, who typically participates during the process and how do you organize responsibilities amongst the participants? 4. How do you cooperate with the suppliers?
	Risk management and contractual aspects	- Constant revaluation of user need - Contractual framework: NDA, test & development, transfer and agile or pilot development contract - IPR - Compensation for development work - Incentivized and agile scoped master agreement	5. How do you manage risks during the process? What kind of contractual aspects should especially be considered? 6. How do you increase suppliers interest in participating? (e.g. compensation for development)
	Prerequisites	- Innovation strategy - Top management support - Pro-innovation culture - Innovation definition	7. What kind of prerequisites do you have for applying the process?
RQ2: When should the developed process be applied?	Application context	- Grey and black box sourcing cases (functional specifications)	8. What kind of sourcing projects is the process applicable for?
	Added-value		9. What kind of added-value has the application of the process yielded on the short and long term? 10. What kind of weaknesses does your process have? How could these be prevented or developed?

The interview was first structured into the four innovation sourcing process design principles presented in Chapter 3.2: 1) process structure, 2) communication and cooperation, 3) risk management and contractual aspects, and 4) prerequisites, which address the RQ1. Research questions were then mapped to address these themes and the principles and propositions emerged from theory. Therefore, the interview questions were created to first draw a broader perspective on the process structure and thus the interviewees were asked to describe the main phases of the process.

Next, according to the following themes, the questions from 3-7 provided supplementary details regarding specific phases and the overall process. In addition, the application context and added-value theme questions provide answers to RQ2. After drawing a detailed understanding of the process structure and its details, the final three questions

served as ways to find out the context to which the companies had already applied the process and the subsequent results.

Moreover, the final interview guide served as a framework for each interview, however according to the interview type principles, the researcher asked various supplementary questions when needed. The interview guide was sent approximately a week before the interview by email to all interviewees for them to be able to familiarize the questions and prepare for the interview. In addition, all interviews were conducted in Finnish and all interviewees consented to the recording of the interview. Consequently, each interview was recorded with a smartphone to ease the interview situation and subsequently serve as the primary data source for analysis after being transcribed in verbatim.

4.2.4.2 Case company workshops

The researcher facilitated three two-hour workshop sessions at the case company within a two week time period between February and March 2020. The overall aim of the workshops was to develop a case company specific innovation sourcing process and to define its application context. To achieve this objective, each session was attended by several managers from the case company's procurement and relevant business functions. The full list of invited participants is presented in Table 5.

To provide procurement perspective to the process design, all seven category managers from each direct and indirect procurement sub-category was invited to participate. Furthermore, for broader procurement perspective and management support, the director and heads of direct and indirect procurement participated. Thus, a total of ten procurement professionals were invited to participate.

Reflecting on process design principles, the aligned business function participation is considered important to be taken into account to provide the business' perspective in developing a practical process. Bakic et al (2015) stress that, in general, it is pivotal to identify the people subject to the change and thereby purposefully engage these relevant subjects in the development process prior to commencement. Thus, each category manager appointed a relevant stakeholder from their business area.

Category managers were instructed to appoint a development-minded and innovative stakeholder with practical experience in sourcing projects. One category manager (R&D) appointed two stakeholder due to the broadness and complexity of that sub-category. Overall, the amount of workshop participants for each session ranged from 13 to 16 depending on the availability of the participants. Cancellations regarding participations were due to sudden illnesses and unexpected urgent meetings overlapping the workshop session. Furthermore, the first two workshops were held face to face at the case company

premises. However, the final workshop was forced to be transferred into a Skype conference call due to the case company's instructions amid the COVID-19 pandemic.

To achieve the overall workshop objective, the researcher communicated a clear agenda and objective to all workshop participants prior to each session. Table 5 presents the realized date, agenda, number of workshop participants and output regarding each workshop session.

Table 5 Details regarding each workshop session

Workshop	Date	No. of participants	Objective	Agenda
1	28.2.2020	16	Explore process applicability across all procurement categories (RQ2)	13:30-13:35 Intro 13:35-14:00 Icebreaker and introduction to the topic 14:00-14:25 Literature review and interview results 14:25-14:30 Break 14:30-14:45 Group work: category application 14:45-15:25 Groups present key points + discussion 15:25-15:30 Wrap-up and next steps
2	3.3.2020	13	Examine and assess literature and benchmark processess and begin drafting case company process (RQ1)	09:00-09:05 Recap of previous session + discussion 09:05-09:20 Detailed look at literature and benchmark processes 09:20-09:45 Group work: Assessing processes (pros/cons) 09:45-09:55 Groups present key points + discussion 09:55-10:00 Break 10:00-10:40 Group work: Drafting 1st version of the process 10:40-11:00 Groups present processes + discussion
3	16.3.2020	14	Finalize 1st process version, and define prerequisites (RQ1)	09:30-09:45 Recap of previous session + discussion 09:45-09:55 Introducing the compiled process 09:55-10:15 Group work: Assessing the compiled process 10:15-10:40 Groups present + discussion 10:40-11:15 Refining & fine tuning final process 11:15-11:30 Wrap-up and next steps

The first workshop aimed at expanding the participants' knowledge on the subject matter and thereby exploring the process applicability across all procurement sub-categories. The researcher first introduced the workshop process and each session's objective to provide an overview of the project. Next, all participants introduced themselves as not everyone were familiar to one another.

The challenge with workshops as a data collection method is that workshop participants, often unfamiliar with one another, are required to rapidly collaborate and boldly engage in exchanging ideas to solve a problem. Consequently, in order to better enable this and thereby increase the reliability of the collected data, Almeth-hib (2009) indicates that the researcher should devote time for ice breaking activities prior to actual workshop activities. Thus, the researcher facilitated an ice breaker exercise, introduced by Peter Skillman, called the "Marshmallow challenge" in which teams competed to assemble the tallest freestanding structure in 15 minutes with the given set of materials. The challenge not only provided a shared experience, but also an introduction to the fundamentals of

innovation and collaboration as the teams had to rapidly facilitate prototyping by building, testing and learning, which were highlighted as innovation sourcing process principles.

Next, the researcher introduced the literature review and interview findings after which the participants had sufficient knowledge on the subject matter to examine the applicability of an innovation sourcing process in their own procurement context. Thus, the participants were divided into sub-category groups, category manager and stakeholder, to answer the following three questions with an emphasis on the final questions: 1) Are innovations important in your category? What elements or phases in the traditional process hamper the generation of innovations or process agility? 2) Have you deviated from the traditional process to enable innovations? Describe the results. 3) To what sourcing projects within your context do you consider the innovation sourcing process being applicable? Finally, all groups presented their answers, followed by an overall discussion and wrap-up of the first workshop. If a group decided that the innovation sourcing process would not be applicable to their context, they would not participate in the next workshop sessions.

The objective of the second workshop was to examine and assess the literature and benchmark processes and begin drafting the case company process. First, the researcher reviewed the literature and interview processes in detail. Next, the participants were divided into three groups to assess the pros and cons regarding all processes. This provided an aggregate outlook on which elements were considered valuable to be adopted into the case company process. Next, based on the previous exercise findings, the participants began drafting the case company process on a blank A1 paper using post-it notes. Main phases discover, define, test and develop, and transfer were added upfront as post-it notes on the A1 to avoid "writer's block". All groups presented their process suggestions before the wrap-up.

Between the second and final workshop session, the researcher analyzed and combined all three process suggestions developed in the second workshop into a single, compiled process suggestion. This process provided a basis for the final workshop in which the objective was to finalize the first process version of the case company innovation sourcing process and define the prerequisites for adoption. The workshop began by recapping and discussing all three process suggestions. Next, the participants were divided into three groups to discuss whether they would make changes or additions to it. Subsequently, groups presented their views to all participants. Finally, based on the changes and additions suggested by all three groups, the process was fine-tuned and finalized together with all participants. Lastly, the researcher wrapped up by describing the next steps of the research.

As Yin (2003) suggests, the data collection procedures conducted during all workshops ensured data triangulation to increase the research validity. All group work exercises were

conducted so that each group documented discussion points and answers to specific questions on a shared PowerPoint document. Furthermore, regarding group presentations and overall workshop discussion, the researcher appointed two workshop participants to take notes. Immediately after each workshop session, the researcher aggregated and reviewed all collected data (the documented group work and workshop notes) and completed any missing observations.

Regarding the researcher's role during the workshops, Lukka (2014) states that the researcher's role in developing the construct is slightly broader than in a typical action-oriented research. To develop the construct, the innovation sourcing process, the researcher must adopt a "change agent" like role. Darsø (2001) describes this role as the balance between a "clinician" and an "ethnographer", and stresses the importance of being constantly mindful of these roles. Darsø further explains that the clinician role focuses on the participants' needs, and the ethnographer role focuses on conducting the research and guiding the data collection to aggregate only relevant data.

Consequently, the researcher's role in the case company workshops was focused primarily on facilitation. The researcher guided the discussions according to each workshop objective and the outlined agenda to collect relevant data for addressing the research questions. However, Durance and Godet (2010) remark that focusing solely on this ethnographer role can lead to conflicts of interest and thereby affect the practicality of the solution, which is considered crucial in constructive research. Thus, the researcher also allowed flexibility in discussing emergent topics bordering the research topics and started the sessions with a moment to reflect on the previous session and present any thoughts and ideas that had emerged after the previous session(s).

4.2.4.3 Validation

In line with the constructive research approach principles, the application of the innovation sourcing process must be evaluated by the means of a solution market test. Lukka (2014) stresses that this feasibility test is the most distinctive element differing the constructive research approach from any other approach. Kasanen et al. (1993) suggest that companies' managerial constructs, such as processes, are competing solutions on a market of solution ideas. Thus, new competing constructions must be evaluated against all other solutions on the market. Kasanen et al. divide market tests into three, weak, semi-strong and strong, depending to what extent the construct is implemented. Strong market test refers to applying the construct systematically in practice to assess realized value. Semi-strong test, on the other hand, explores whether the construction is widely adopted by other companies. Finally, the weak test examines whether relevant managers would

apply the construct or not. Only once the solution passes the practical test, the usefulness of the managerial construction can be validated.

In this research, the weak solution market test was considered sufficient with regards to the scope and schedule of this research. Applying the developed innovation sourcing process to a real sourcing case for strong solution market testing purposes would have required significantly more resources and was considered unrealistic considering the lack of defined application prerequisites. Consequently, the weak solution market test procedure was conducted as follows. After the workshop sessions, the researcher presented the developed innovation sourcing process in detail to all 22 indirect and direct procurement category sourcing managers on a conference call. After the call, each sourcing manager received a link to an online (Webropol) questionnaire seeking the likelihood of applying the process in practice and asking for improvements, thus applying triangulation.

A questionnaire, as a data collection method, was considered most applicable as the amount of sourcing managers is considerable and they are scattered across the Espoo and Turku company locations (Vilkka 2007). Appendix 3 presents the questionnaire utilized to collect the data. The objective of the questionnaire was to identify the likelihood of applying the process and identify challenging phases and areas of improvement in the process. Furthermore, each respondent filled in their procurement sub-category in order to report the findings per sub-category for further analysis. No other characteristics of the respondents were collected.

4.2.5 Data analysis

In qualitative research, data analysis can be defined as the systematic process of searching and arranging the accumulated data to increase the understanding of the researched phenomenon (Bogdan & Biklen 1982). Moreover, it aims at "making sense" out of huge amounts of data and thereby yielding new information of the subject matter and answering the research questions. This is commonly considered the most challenging part of the research process. (Merriam 2014.)

Miles and Huberman (1994) identify three components of data analysis; data reduction, data displays and conclusion drawing or verification. As advised by researchers (Dubois & Gadde 2002; Stake 1995; Miles & Huberman 1994), all three components of data analysis were performed simultaneously and in parallel with each data collection phase conducted during this research. Nevertheless, a more systematic analysis was executed once all data for each empirical entity was collected. Consequently, the information with regards to the analysis process provided in this section is primarily associated with the later analysis phase.

In addition, Yin (2003) outlines four general strategies to guide analysis within a case study research: 1) relying on theoretical propositions, 2) working your data from the "ground up" 3) developing a case description, and 4) examining plausible rival explanations. Although the strategies are not mutually exclusive, relying on theoretical propositions seems to be best aligned with the aims of this research. Aligned with the principles of this strategy, propositions regarding the application context stated in Chapter 2 and process principles outlined in Chapter 3 will be evaluated against empirical findings to formulate theoretical and practical implications. Furthermore, due to the novelty of this research, primary propositions aid in forming the interview questions, direct the researcher's attention to relevant data and structure the overall analysis process.

However, this research does not fully rely on theoretical assertions, as the data collected was intended to yield new themes and explanations in contrast and, or in addition to the initial propositions. Nevertheless, the research and formulation of the propositions inevitably influenced the researcher's interpretations of the collected data although the researcher remained open to embrace emerging and even surprising empirical findings. (Eskola & Suoranta 1998.)

In addition to the general analysis strategy, Yin (2003) further suggests five specific techniques, 1) pattern matching 2) explanation building 3) time-series analysis 4) logic models and 5) cross-case synthesis, from which at least one should be selected to succeed in analyzing the case study data. However, in order to yield a more structured and sound understanding of the analysis process and techniques performed in this research, this section is divided into the data collection entities: interviews, workshops and questionnaire. Each sub-section describes in detail the data analysis activities and specific techniques performed to reduce, display and draw conclusions of the collected data.

A specifically designed analysis software, NVivo 12, was employed throughout the analysis process, although the amount of data collected is not considerably large. Nevertheless, a data analysis software was considered beneficial to better manage and arrange data, and benefit from flexible code generation (Eriksson & Kovalainen 2008). In addition, Sinkovics et al. (2008) argue that the utilization of an analysis software helps formalize and improve the transparency of the analysis process and, thereby facilitates more reliable research findings.

4.2.5.1 Interviews

The analysis process was initiated once the audio recordings were transcribed in verbatim promptly after each interview. Verbatim transcription was conducted to enliven the reporting of the findings with direct quotes and thereby provide a more comprehensive

analysis by forming integral links between the data and its analysis. As the interviews were conducted in Finnish, the direct quotes were translated in English.

Regarding the analysis techniques suggested by Yin (2003), pattern matching was considered most applicable as it is recommended for studies characterized as deductive in nature. Although this research is not merely deductive, pattern matching was used to compare the empirically based patterns with the predicted patterns, meaning the formulated propositions and principles. Thus, the technique also accommodated emerging findings in addition and, or in contrast with the theory. The unit of analysis was sourcing process.

More specifically, before transferring the transcribed data to NVivo, the researcher opened and explored all interviews to form a general view of each interview. Then, the empirically based patterns were created into NVivo by forming six a priori top level nodes (themes) to which the data was subsequently categorized into. Due to the literature review yielding four themes, 1) *process structure, 2) communication and cooperation, 3) risk management and contractual aspects and 4) prerequisites*, to answer the RQ1, it is well-grounded that these themes should be the foundation of the analysis. Furthermore, to seek answers for RQ2, *application context* and *added-value* themes used in the interview, were also added.

The transcribed data was then coded sentence by sentence into either the a priori nodes or into new emerging top or lower level nodes created throughout the coding exercise. Consequently, the node structure constantly molded during the exercise. Ultimately seven new lower level nodes were added. However, all a priori top level nodes remained, reinforcing the propositions formulated in the literature review. Furthermore, one new top level node, *background information*, was added to code for example any relevant information regarding the interviewee or company specifics. The final node structure is presented in Appendix 2.

In addition, parts of the data were coded into multiple nodes, if the content aligned with more than one top or lower level nodes. Nonetheless, some data was discarded as it did not align with the a priori nodes and was considered irrelevant for answering the research questions, thus not requiring the creation of an emergent node. However, only limited amount of data was discarded, which indicates that all interviews remained on topic with regards to the research aims.

Finally, in addition to the pattern matching technique, the interviews were analyzed first individually (within-case analysis) by creating applicable queries in NVivo to provide a comprehensive understanding of the innovation sourcing process or processes utilized in each company. The within-case findings for each company are presented in Chapter 5.1.1. Furthermore, to build upon the within-case analysis, the cross-case synthesis technique (Yin 2003) was conducted to aggregate and compare findings across the within-case analyses. Moreover, a compiling data display and process illustration were created to summarize the findings and aid in identifying similarities and differences. These were

subsequently presented in the workshop sessions as material to develop the second version of the process.

4.2.5.2 Case company workshops

The analysis of the workshop data was conducted concurrently with the data collection. The analysis process was initiated once the researcher went through all data collected from the previous session to create an overview. Regarding the analysis techniques suggested by Yin (2003), pattern matching was first utilized as the data was imported into Nvivo and coded following the same principles as presented in the previous chapter to identify dominant discussion themes. The unit of analysis was high level process phase.

Furthermore, regarding Yin's (2003) analysis techniques, the different group works represent also a cross-case synthesis technique as groups provided different comments and process versions, which were thereby aggregated and compared to find similarities and differences. Between the second and the final workshop session, three different process suggestions were compiled to provide a cross-case synthesis and a starting point for the final workshop session in which the case company specific process was finalized. The compiled process was created by identifying duplicate or similar phases in Nvivo and thereby merging these into one process activity or phase.

4.2.5.3 Validation

The analysis of the questionnaire data began when the responses (observation unit) were first opened and reviewed one-by-one in Webropol to form an overview of all responses. Subsequently, the responses were transferred to Excel for a more comprehensive analysis as the analysis tools in Webropol were regarded as insufficient. Furthermore, the written responses in Finnish were translated to English for the use of direct quotes.

The analysis was done in the Excel pivot tool instead of Nvivo due to the relatively low amount of data. First, a pivot table was created to group and calculate simple descriptive key figures such as average, min and max of the numerical responses. Subsequently, to illustrate the figures and ease the analysis across sub-categories, various bar charts were created. With regards to the written responses (n=12), the analysis was conducted straightforwardly in Excel by grouping similar responses and reporting dominant findings. The analysis unit was procurement sub-category.

4.2.6 Research quality

Assessing the trustworthiness of a research is important to evaluating its worth (Lincoln & Guba 1985). Essentially, when conducting qualitative research, it is important to acknowledge that the researcher is the main "tool" to conducting research and thus research will always include subjective choices about what is researched and presented, and how it is presented. Consequently, the researcher has to constantly reflect on the decisions made and thereby assess the quality of the research. (Eskola & Suoranta 1998.)

Especially in quantitative research, researchers use conventional terms such as internal and external validity, reliability and objectivity to assess the trustworthiness of their studies (Forero et al. 2018). However, Lincoln and Guba (1985) refined the concept of trustworthiness and suggest a set of four criteria – credibility, dependability, confirmability and transferability – to assess the rigor of a qualitative research paper. Thereby, the quality of this research will also be assessed by utilizing these four dimensions of trustworthiness.

First, *credibility* refers to the confidence in the "truth" of the research findings, meaning if the research findings portrayed authentically (Lincoln & Guba 1985). Eisenhardt (1989) advises to apply triangulation, meaning "multiple sources of evidence" (Yin 2003), to increase the credibility of a research. Patton (1987) further divides triangulation into four types of triangulation: data, investigator, theory and methodological triangulation.

To increase credibility, this research adopted all four forms of triangulation during the research process. Data triangulation was used to assess the applicability of the case company specific process. First, workshop participants, including procurement professionals and key business stakeholders, evaluated the applicability of the process. After this, sourcing managers, who did not attend the workshops also had the possibility to evaluate the likelihood of applying the process in ones context by responding to a questionnaire. Consequently, also different methods, face to face group work in workshops and the structured questionnaire, were used to assess the process.

Next, investigator triangulation was adopted in workshops. The data was collected by having the workshop participants' write group work conclusions on shared PowerPoint slides. Furthermore, two appointed workshop participants took notes of all workshop discussions. Lastly, the researcher aggregated and reviewed all the aforementioned data and completed any missing observations. Finally, theory triangulation was applied in the literature review as the design principle search was extended from procurement literature to innovation management and NPD literature.

In addition to triangulation, credibility was increased by consciously taking into account the sample size and carefully selecting relevant respondents for each method (Farquhar 2012). First, regarding the interviews, the number of interview companies reached

a level that is commonly considered sufficient (Eisenhardt 1989). Furthermore, the interviewees were chosen based on their knowledge and practical experience on applying the company's sourcing process in order to provide a context-rich and truthful ("thick") description of the process. However, the thickness of the description had to be slightly sacrificed to preserve the anonymity of the respondents and the represented companies. Consequently, the context such as the industry and the process examples, was not portrayed which might decrease credibility. On the other hand, ensuring the anonymity lowered the interviewees' threshold to describe the process comprehensively, thus increasing the credibility of the disclosed information.

Second, the selection of workshop participants was done carefully to collect insights cross-functionally and from different hierarchical levels. Thus, all category managers, who have a wide understanding of their category sourcing cases and thereby are capable of advocating broad category specific needs. Furthermore, procurement management was invited to not only provide broader views but also to show top management support for the project. Finally, the inclusion of business stakeholders was done to promote diversity in process design ideas and to achieve stakeholder acceptance when adopting the process.

Overall, the somewhat large amount of workshop participants was considered inevitable to provide a sufficient representation of all procurement areas. However, it is possible that some participants did not speak up their mind during workshops due to the amount of participants. However, to increase credibility, the researcher kept the amount of participants fairly low in group works, changed the group work assemblies and attempted to interpret facial expressions to provide a say when possible during discussions. However, this proved to be challenging in the last workshop, which was held virtually due to the COVID-19 pandemic. Thus, the researcher noted that, when finalizing the innovation sourcing process, the participants from the categories that had already deviated from the traditional sourcing process (R&D, IM and MaSsOs) were more vociferous than other participants. Thus, it is possible that the final process is biased towards the aforementioned category contexts.

Finally, regarding the questionnaire, the sample size (n=22) and response rate (83 %) can be considered sufficient regarding the credibility of the findings (Farquhar 2012). In addition to the researcher complying with the weak solution market test guidelines when designing the questionnaire template, the respondents were introduced to the template prior to responding. Thereby, the respondents were provided the possibility to clarify for example any wordings in the questionnaire. The purpose of this was to limit the chance of respondents misunderstanding questions or answer alternatives, thereby increasing the credibility of the questionnaire results.

Next, *dependability* refers to the consistency of the process of the study and whether it could be repeated over time, by different researchers and methods (Goetz & LeCompte 1984). In this research, the adopted methodological concepts, data collection, analysis

and the overall research process itself are described as thoroughly as possible. Furthermore, the researcher has made an effort to provide concise reasoning for the methodological decisions to increase the credibility of the research results.

Moreover, the study design is congruent with the research questions as the researcher has chosen to adopt the constructive research approach, which is aligned with the aims of this research: to construct a novel sourcing process. Aligned with the constructive research principles, the value of the construct is assessed by adopting a weak solution market test to assess the suitable application context. Nevertheless, the constructive research approach has received criticism related to the high level of researcher involvement, consequently increasing the possibility of biased results and limited dependability. Hence, to increase dependability, the role of the researcher is described clearly and all four types of triangulation are applied. (Kasanen et al. 1993; Lukka 2000.)

Next, *conformability* addresses evaluation regarding researcher bias, motivation, or interest. It describes the degree of neutrality of the findings, meaning to what extent the findings are formed by the interviewees not questionnaire respondents (Lincoln and Guba 1985). In this research, there is a possibility of the researcher misunderstanding the process phases, single activities and their sequences as only one of the interviewees sketched the process on a whiteboard. Thus, apart from Company D process, all other processes are sketched by the researcher based on the review of the verbatim transcripts.

Furthermore, the translation of the verbatim transcripts from Finnish to English for direct quotes, to enliven the text and thereby increase the credibility of the findings, could increase the likelihood of misunderstanding intended message. However, considering the researcher's proficiency in English, this is deemed limited. Finally, the recording of the interviews could have impacted the interviewees' speech. However, researcher assured all interviewees that the recording will only be used for analysis purposes, deeming the possibility of significant falsifying impact limited. However, there is always the possibility that the interviewees, deliberately or imperceptibly, portrayed their company's sourcing process in a better light compared to reality.

Finally, *transferability* refers to the generalizability of the results, so whether the conclusions of the research have applicability in a wider context (Lincoln & Guba 1985). In this research, the assessment of the saturation point for interview companies increases the transferability of the results. Also, the amount of interviewed companies can be claimed typically sufficient (Eisenhardt 1989).

However, there is a possibility of misrepresentation of the selected "pioneer" companies due to limiting effects in sampling (LeCompte & Preissle 1993). The absence of an established term for the alternative sourcing process in question posed challenges to evaluate the alignment of contacted companies' sourcing processes with the research aims and the maturity of the processes. Also, the challenge was amplified as the contacted

companies did not have a mapped process to share with the researcher to portray the process compactly and comprehensibly by email. Thus, to decrease the possibility of misunderstanding, the researcher approached multiple companies by phone, if there was a doubt of miscommunication when exchanging emails. Lastly, the limitations regarding the transferability of the findings and conclusions (Becker 1990) is further discussed in Chapter 6.5 after the findings and conclusions of this research have been presented.

5 RESEARCH FINDINGS

The findings from all three data collection phases are presented in this chapter. Consequently, this chapter is divided into three sub-chapters according to the conducted data collection phases: interviews, workshops and questionnaire, respectively. Further conclusions and reflection on the theoretical propositions are done in Chapter 6.

5.1 Company interviews

The presentation of company interview results is divided into two sub-chapters. The first sub-chapter focuses on describing each interview (within-case analysis) in detail, enlivened with direct interviewee quotes. In addition, individual company processes are illustrated in each within case analysis sub-chapter. This provides a solid foundation for the cross-case analysis, presented in the second sub-chapter, to identify similarities and differences across the four company processes. The similarities and differences are illustrated in a cross-case synthesis and thereby scrutinized. Finally, a compilation of all four processes is illustrated to conclude the results.

5.1.1 Within-case analyses

The findings from each interview are presented chronologically in the following sub-chapters. The findings are presented in a way that highlights the typical progress of the process whilst simultaneously describing the findings regarding each theme: process structure, communication and cooperation, risk management and contractual aspects, prerequisites, application context and added-value. The findings from each individual interview are compiled and presented in the cross-case synthesis in Chapter 5.1.2.

5.1.1.1 Company A

Company A interviewee first clarified that the process has not been explicitly mapped but has been applied several times. In addition, the process has only been defined and applied within the marketing category, since the traditional process is, to some extent, misaligned with the category's nature and strategy. Furthermore, the interviewee stated that the process is only a generalization and thus applied case specifically. However, typically, the integration phases prior to workshops are essentially similar each time. The researcher's sketch of process is presented in Figure 23 to illustrate the main phases, which are placed

under the high-level literature review phases: discover & define, test & develop and transfer.

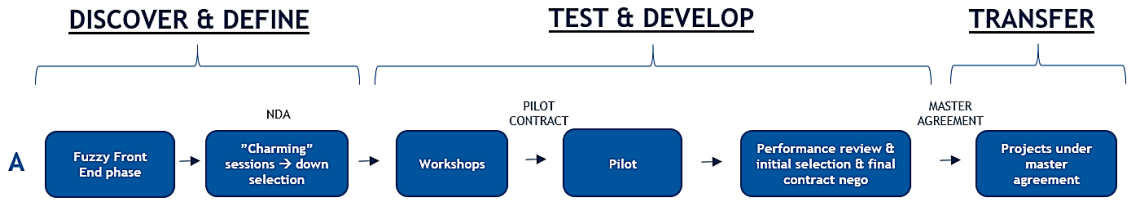

Figure 23 A simplification of Company A's innovation sourcing process

The process begins with internal activities that can be interpreted as FFE phase activities. Typically the process is triggered by the emergence of a need, which is then internally analyzed to understand the current problem, evaluate the make-or-buy decision and set the solution outcome. In addition, the market trends are evaluated as marketing is constantly in a state of disruption by digitalization and targeted advertising. Consequently, the interviewee argues that the company cannot presume that a current supplier has been able to keep up with the trends. Furthermore, the aforedescribed activities are executed for example in brainstorming sessions by the initially defined core project group. This group typically includes the marketing director and his/her subordinates from the relevant business area according to the project scope. Also, the Chief Digital Officer (CDO), to whom the marketing director reports to will also participate in case the scope is large. Furthermore, the category manager acts as the project manager, primarily managing the sourcing process.

Next the business scouts for potential suppliers. Typically the marketing director has a sufficient understanding of the actors on the market, but also benchmarking groups are utilized proactively. The company also performs background checks on all potential suppliers to discard any suppliers used by competitors. After this, the marketing director contacts suppliers by vaguely describing the outcome defined during the need analysis and seeks to identify the interest and collaboration attitude of the suppliers. Suppliers showing interest are then offered a 45 minute face-to-face *"charming session"* under a NDA to show interest, better understand the need, target and process, and mutually analyze the cooperation basis. The interviewee further states: *"They bring in the people and resources that would be utilized in the pilot and further projects. The added-value here is that we see them and how they hear, analyze and comprehend our outcome target and need."*

Next, the suppliers are shortlisted for the workshop phase based on cooperation. The workshop sessions serve the purpose of describing the need and target in detail, while simultaneously analyzing supplier's competence and how they would solve the case at

hand with the information they have gathered. Latest at this point, the internal core project group is extended to include also operative business users. Moreover, to mitigate risks, contractual aspects regarding the final agreement are also discussed at this point after which a pilot contract will be signed prior to issuing the pilot cases.

Suppliers are next issued with individual real-life, internally low-risk pilot cases, which are measured against set targets. The pilot contract is a *"light, two paged contract"* that defines the scope, duration, price and IPR in addition to the general procurement terms, information security, and corporate responsibility as appendices. The interviewee further clarifies *"In principle we always pay for the pilot. However, everything that happens prior to it can be considered suppliers' new customer acquisition expenses"* and regarding the IPR *"the suppliers need to accept that all outputs generated from the pilot are ours because we have paid for them".* Regarding the pricing, the supplier typically suggests a fixed pricing model for the pilot. However, as risk mitigation, the interviewee states that the business should be able to evaluate the price range of the pilot prior to assigning it. Moreover, the pilot contract can be terminated at any point of time by Company A according to the measured performance metrics, which would then yield payments for only the work accumulated. However, if the duration of the pilot case is already initially short, for example two weeks, no contractual exit clauses are applied.

Next, the core project group analyzes the pilot metrics and reviews the performances with each supplier. Next, Company A makes an initial supplier selection decision and begin final price model negotiations. The interviewee highlights that for risk mitigation purposes, the selection is not communicated to other suppliers before the final master contract is signed. Although the process to the final contract varies from the traditional sourcing process, the final contract is not agile per se. However, the master agreement is somewhat flexible with regards to the scope, as it is not financially binding and allows the creation of sub-contracts.

The interviewee states that the prerequisites for the application of this process is first and foremost the prioritization and transparency of strategies: *"we mutually share strategies and thus, procurement knows in advance what the business will be focusing on and prioritizing next".* This is also enabled by procurement working closely with the business. In addition, as prerequisites, the interviewee highlights the company's agile and lean company culture, and an aligned SRM process that supports further agility and innovation.

Regarding the application context, the interviewee states that they do not want to stiffen the process with a formal and explicit check-list, but further elaborates that the process is applicable when sourcing for creativity and when the value of the solution and supplier competence needs to be realized before commitment. Thus, due to the nature of the category purchases, *"the process has somewhat become the prevalent way of sourcing"*. In addition, the process should be applied when the solution to the current need or problem is not known or the company wants to challenge its assumptions by harnessing

suppliers' knowledge. Also, the interviewee clarifies that the process is applicable for also smaller scale projects as it is scalable. Although the process has only been applied in the marketing category so far, the interviewee reckons it might be applicable also in the company's IT category when sourcing for agile development.

The application of the process has yielded new solutions and innovations, which would have not been generated internally or with current suppliers. In addition, the company has been able to verify the suppliers' competence and the applicability of the solution before long-term commitment. Furthermore, the company has been able to better align the solution with user needs, targets and strategy, and thereby build an innovative and congruent supplier base. On the contrary, however, the interviewee highlights that the vagueness of the process occasionally yields challenges such as difficulties in setting project schedules. Thus, the project manager needs to focus on finding the balance between flexibility and process clarity, which requires project management and facilitation skills.

5.1.1.2 Company B

The interviewee A first clarifies that Company B does not have an explicitly mapped innovation sourcing process. However, the mapped traditional sourcing process acts as the *"backbone"* for application. Consequently, to seek new solutions and flexibility, several applications of the traditional process have been executed, in which the implementation has been done for example as a hackathon or an agile development. Despite varying implementation methods, the interviewee A states that *"the main theme in these cases is the definition and analysis of the need. So, we are sourcing for an outcome, which needs to be defined and communicated to potential suppliers. Then, the methods by which we finally reach that outcome vary case specifically".* However, the interviewee has mainly applied the agile sourcing method in the ICT category, and thus this method was primarily described in detail.

Furthermore, the process has been primarily applied on the ICT category level due to the traditional process being misaligned with the nature of the solutions sourced in this category. However, interviewee A reckons the need for innovativeness of the need analysis phase has also been discussed in other categories. Within ICT, the process is typically applied when sourcing for new solutions or the change to the current solutions is substantial. In addition, interviewee A considers the process applicable when there are no supplier references and the company wants to tap into suppliers' knowledge. The process has been mainly utilized for larger scope projects, but is also applicable for smaller scaled projects due to process scalability. The researcher's sketch of the process is presented in Figure 24 to illustrate the main phases, which are placed under the high-level literature review phases: discover & define, test & develop and transfer.

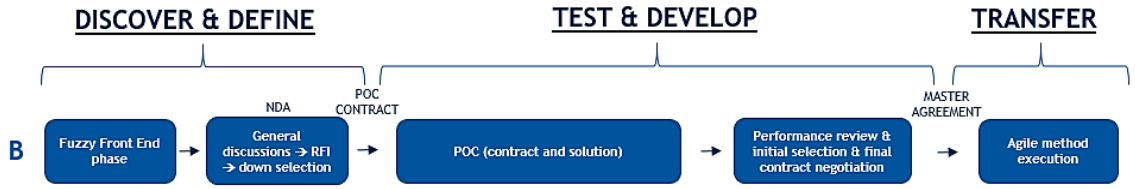

Figure 24 A simplification of Company B's innovation sourcing process

The process begins with internal activities that can be interpreted as FFE activities. First, interviewee A describes that the process begins with an emergence of the need, which is then analyzed. Furthermore, the interviewee states that there are no explicit methods, but typically this is induced by conversations with the business. The analysis includes understanding the current need or problem, defining the outcome specifications, current market knowledge and the sourcing strategy, meaning the applicable sourcing process. Furthermore, a negotiation team (internal project group) and the steering model are defined. Similar to all traditional sourcing projects, the negotiation team includes the sourcing manager to manage to process and relevant participants from the assigning business unit. In contrast with the traditional process, the interviewee B states that *"the business has a bigger role in these innovative cases, because we need to better understand the substance as we are buying outcomes".* In addition, the end users become involved in the process at the latest in the POC phase.

After the preparation and need analysis phase, the project group scouts for potential suppliers, if not already identified. Interviewee A mentions exhibitions and benchmark data sources such as Gartner as possible sources. Next, potential suppliers are contacted. In contrast to the traditional process, the interviewee states that *"when we are looking for cooperation and innovativeness, sending a pile of documents (RFI) immediately gives the impression of situating ourselves on the other side of the table"*. Thus, Company B initiates the market communication with general discussions, during which it communicates the defined need and outcome specifications and sourcing process (to the extent they have internally decided) to suppliers, and analyzes the collaboration basis. Moreover, interviewee A states that *"typically we openly discuss how they would solve the case at hand and what kind of competences they possess to do so",* and despite not having an explicit scoring board *"we want to communicate the selection criteria in the beginning to emphasize what are the most important aspects so they can prioritize and we are able to assess them and ultimately justify our selection".*

After the general discussions, Company B asks whether the suppliers are interested in receiving the RFI with an attached NDA for further discussions to better describe the problem and outcome, and mutually analyse collaboration and trust. Consequently, the RFI does not seem as formal and there is a lower threshold for communication whilst responding to the RFI. This typically results in no silent phases, which is considered important for collaboration. In addition, the interviewees characterize the overall external communication as more open and dependent on mutual trust and interest than during the traditional process. Thus, face-to-face meetings are prioritized.

Next, the Company B assesses the solution, contractual aspects and information privacy and data security with a Proof of Concept (POC) phase. The interviewee A emphasizes *"If any of these three elements fail, there will be no deal with that supplier. POC is not only a way to test technology, but we can simultaneously find out the aforementioned elements, which are related to managing risks during the process. This way we don't extend the lead time of the process, when we can "POC" the contract and solution at once".* However, this requires that a POC contract is first signed and that the company has a primary indication of the price range of each company. Regarding the POC contract, interviewee A further elaborates that *"two things are highlighted, because POCs need to be done rapidly, the contracts are light and we are sometimes ready to sign them even on worse terms than normally, because the duration is fixed and short. So, we generally don't take out our corporate contract templates".*

However, the interviewee emphasizes that IPRs need to be clearly agreed upon, but states that it is a misconception that the client would always want to keep the IPR. The interviewee further explains *"it is case specific, but in ICT, cloud services are a typical example, we don't want to keep them because if you want to make changes the fee is not shared with other clients nor do you benefit from other clients' development ideas. And in these innovation cases, if the outputs are the supplier's standard products then obviously, the supplier cannot grant the IPRs for us".*

After the suppliers' POC performances are analyzed against selection criteria, an initial supplier selection is done. Interviewee B adds regarding the selection *"we need to more so calculate the value that the solution adds, not so much the price"*. The selection proposition needs to be accepted by the business and thus the decision, involved suppliers, risks and reasoning need to be presented in a documented manner. Next, the company signs the master agreement, e.g. a consulting agreement stating the agile implementation method. The company can for example purchase sprint work for a year and then the project group will monitor and control the implementation using an agile information system, which serves as the project contract. Agile contracts are typically priced on an hourly fee basis, because the outcome cannot be explicitly stated as it tends to change within sprints.

Finally, the project team typically organizes a lessons learned session after the implementation starts, however if it is done using an agile method, a sprint retrospective is done anyway every three weeks.

Regarding prerequisites, interviewee A mentions the company's startup and agile company mindset and pro-innovation culture. In addition, visibility into the business' strategy and prioritization is considered central. This is also linked to understanding and defining the sourcing strategy, meaning what entities, suppliers, and sourcing processes already exist.

Regarding added-value, the interviewee states that already the existence of the process adds value to procurement as it is a new feasible method into the *"sourcing toolbox"*, when seeking for new solutions. Moreover, the application has yielded high end user satisfaction as the process is flexible and applied in cooperation not only internally but also with the supplier. Furthermore, the interviewee states that the application adds value and mitigates risks as the end users can verify the feasibility and value of the solution in the company's own environment, using their own data before long-term commitment.

However, with regards to measuring procurement effectiveness, interviewee A states it is a challenge. The interviewee elaborates that *"if you ask the business' top management, they will say it was a great success and we achieved the desired outcome, but if you look at procurement's KPI tool, it will say we haven't made any savings and only a couple of suppliers were involved. However, we can currently apply the process without forcing the KPI perspective, but we need to improve by developing ways to measure procurement's effectiveness with metrics that differ from the ones used in the traditional process".* Furthermore, finding the right suppliers on the market to develop the new solutions in considered a challenge.

Furthermore, interviewee A states that the company has some templates for POC contracts, however ultimately they yield challenges if outcomes are not clearly defined and IPR terms vary, which require work. In addition, the legal resources are typically a bottleneck, and thus, the interviewee states that the company should solve how to create contract templates that support the implementation of this process. In addition, developing a more structured way of doing innovation sourcing, for example mapping different process methods in the innovation sourcing toolbox and creating an aligned SRM model to promote innovations were mentioned as improvement ideas. Finally, interviewee A highlights that *"we also have room for improvement regarding portfolio management to have better visibility into the business, meaning what projects will be done, in which order and will the resources be allocated".*

5.1.1.3 Company C

As background information, the interviewee first elaborates that Company C has an explicitly mapped high-level toolbox type sourcing process for all indirect and direct categories in all countries. The mapped process is applied to all sourcing projects. However, the implementation and tasks within each phase vary depending on the method chosen within the toolbox. Thus, there is no separate innovation sourcing process, but the range of methods within the toolbox includes methods designed for innovation sourcing, such as a hackathon, vested model and co-creation model.

Furthermore, the high-level process has been applied for approximately one and a half years now. However, the interviewee does not have practical experience applying all innovation sourcing methods within the toolbox. Thus, the interviewee and interviewer mutually agreed to focus on describing the high-level process. Furthermore, the interviewee gave detailed examples on a co-creation model case the interviewee had led. The researcher's sketch of the high-level process is presented in Figure 25 to illustrate the main phases, which are placed under the high-level literature review phases: discover & define, test & develop and transfer.

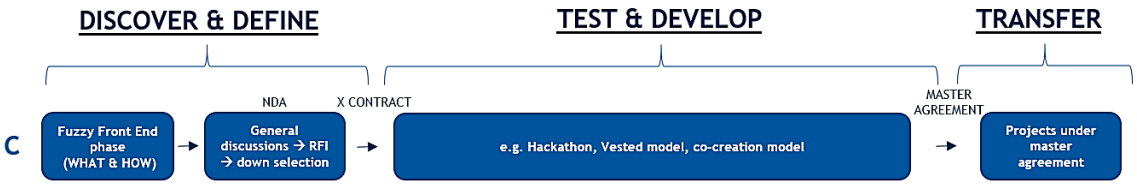

Figure 25 A simplification of Company C's innovation sourcing process

The interviewee begins by stating that the high-level process phases are simple. The process begins with internal activities that can be interpreted as FFE phase activities. Primarily, the "What" and "How" phases define the entity to be sourced. These phases are executed internally by the sourcing project group, which primarily consist of the business representatives and the sourcing manager from procurement. The sourcing manager is responsible for the management of the process and for being the point of contact to suppliers.

Next, after the emergence of the need, an internal project group is defined. Moreover, the interviewee states that a steering group for decision making support is also defined if the case scope is significant. In addition, definitions of the current state and problem, outcome, scope, budget and scalability of the solution as aspects to be considered during the "What" phase. The interviewee further emphasizes that *"The outcome is the guiding aspect and needs to be communicated to suppliers. The definition of the outcome together with stakeholders is divided into three aspects: MDO (Most Desired Outcome), LAA*

(Least Acceptable Agreements) and BATNA (Best Alternative to Negotiated Agreement). These must be defined to get an acceptance for the project from the sourcing initiative board."

Furthermore, the interviewee emphasizes assessing risks and planning the contractual framework early in the "What" phase. Risk assessment should further continue throughout the process. The interviewee states *"Understanding the business criticality is crucial and risks need to be mapped. With current suppliers, we typically use the SWOT analysis. In addition, we need to start defining which contracts will be made during the process and how. For example NDA, exclusivity and IPR aspects will be addressed."*

Next, the sourcing project group defines the applicable sourcing method based on the defined outcome during the "How" phase. Company C has a mapped chessboard from which the project group selects and reasons the most feasible method to be adopted. The interviewee mentions co-creation, hackathon and vested model as alternatives to innovation sourcing. Despite the selected innovation sourcing method from the "How" toolbox, all methods share a similar "What" phase, in which the most crucial aspect is the definition of the outcome.

In addition to the "How" and "What" phases, the process has a governance and a gate stage model (Sx) as procurement check-points for decision making. More specifically, before supplier short-listing, the project is in S1 and when a shortlist is created the project moves into S2. Finally when a supplier is selected and a contract is signed, the project moves into S3, which follows a couple of steps. Lastly, once the service has been in use for a defined period, the final stage is the review stage, in which the project group assesses in hindsight whether the defined outcome (BATNA, LAA, MDO) has been achieved or not.

After the "How" phase, the project group scouts for potential suppliers, if current partners are not selected. The interviewee states that *"the contacting and communication with new suppliers is done similarly to the traditional sourcing process. So, we first understand the market and the range of suppliers and ask relevant questions with a RFI document. This is typically done after a conversation phase in which we describe the outcome."* Also, the interviewee adds that before deeper discussions are done, the potential suppliers sign a NDA for further discussions. The discussions focus on understanding the supplier capabilities for collaboration and development.

After preliminary supplier selections, the potential or current suppliers typically sign a preliminary contract for the development or testing work. In the example case, the co-creation method in which current suppliers and Company C's personnel co-create a solution, the development phase consisted of workshop sessions and contract negotiations for the final agreement. The interviewee explains that the contracts signed for this phase are very case specific and depend whether current or new suppliers are involved. However, typically the scope and outcome are described. In addition, the scalability of the solution

needs to be understood at this point to be able to scale it also contractually, which the interviewee describes as *"...very challenging given that we should be able to define the outcome and see far into the future on how the final contract should be done."*

Furthermore, the interviewee states that despite the outcome guiding the development, at times the company also describe the development process and principles. Ethical values, general terms and conditions, profit sharing, performance metrics for development and contract review principles are also typically agreed upon before the development. Furthermore, the interviewee states that it is crucial to agree on clear IPR rights, compensation principles (none, fixed or hourly) and exclusivity. Regarding IPR, *"in the co-development example, we created a matrix on paper to be able to clearly understand IPRs contractually but also to implement and communicate it our organization – so what are the responsibilities for each party in which situations."*

Moreover, the end users are typically invited to join the project at the latest during the development phase. Also, regular face-to-face interactions are preferred and co-working spaces for suppliers and Company C's personnel are utilized for the co-development. Otherwise, the interviewee describes the communication and cooperation to be fairly similar to the traditional process. After the development phase, the performance of the work is assessed against defined metrics and the outcome definition. A final agreement is typically signed and the co-created solution is finally implemented. In addition, review sessions regarding the project outcome and lessons learned are always done as a checkpoint for each sourcing project.

As prerequisites for implementing the process, the interviewee mentions top management's support in trying new sourcing methods, clear internal roles and communication practices for the sourcing process, understanding market trends and suppliers. Furthermore, the company culture supporting constant change, simplification and new ways of working were also mentioned. The interviewee elaborates more on the relationship between the business functions, *"it is important that we have close cooperation and we are in relevant business' forums such as executive meetings. Thus, we have built a sourcing business partner model. We have now more transparency."*

With regards to the application context, the interviewee reckons that the innovation sourcing models within the framework have been applied more in indirect categories than in direct categories. The interviewee suspects that this is due to more strict conformity to regulations in the direct categories. However, the company does not have any check-list for when to apply innovation typed models within the "how" chessboard, but a more comprehensive reasoning to the sourcing initiative board is needed to apply them. Typically, the innovation methods are used when the company has an outcome in mind and wants to tap into supplier knowledge. The application is also feasible for smaller scale projects due to process scalability.

The high-level toolbox typed process has provided flexibility and new feasible methods within frames for sourcing new solutions. Furthermore, the application has yielded scalable solutions and achieved the defined outcomes. The interviewee furthermore states that for example in the co-creation case *"we learned and received new perspectives from suppliers, because they are the experts within their fields"*.

However, the large amount of alternative methods within the toolbox poses challenges in how to define and map all methods to decrease the threshold to try new ways differing from the safe RFx method. Also, the sourcing stage gate model combined with the innovation sourcing methods occasionally increases rigidity and lead time. However, the interviewee states that *"the checkpoints should rather be seen as support from management and a risk mitigation practice"*. Furthermore, the toolbox method and mindset requires showcases, sparring, conversations, info sharing and more training to be better put into practice. The interviewee suggests that *"when a manager has used a certain method multiple times, he/she could be appointed the expert of that method and could search and share information on it."* In conclusion, the interviewee states that Company C is still testing and developing the process, and considers innovation sourcing methods an important opportunity and development area within strategic procurement.

5.1.1.4 Company D

First, the interviewee elaborates that Company D has two areas regarding innovation development within sourcing: 1) new business and 2) existing business, especially within the ICT procurement category. From a sourcing perspective, new business area concerns the integration of procurement into Company D's startup entity (xLab) to which procurement cannot bring the corporate processes and hurdles as these would slow down the development. In this environment, Company D has had to create new rules and practices to be able to rapidly test, e.g. 1-6 months, measure outcomes and decide whether to persevere or pivot. The interviewee further describes the startup sourcing by *"we created different types of POC agreement templates and focused on crucial aspects such as IPR and next steps regarding the first collaboration contract, so what the future and contractual terms for it would look like."* Although, the xLab is now longer an entity of its own, procurement still uses the lessons learned for similar startup type sourcing cases.

Second, regarding practices within the existing business area, especially ICT sourcing, the interviewee briefly describes the process, which is based on sourcing for outcomes and is based on open communication and collaboration, not a long list of pre-defined specifications. The interviewee further explains that *"the intention here is to understand and utilize supplier competences, and thereby get a better start from this in order to achieve outcomes."* After the interviewee described both innovation sourcing areas, the

interviewer decided to focus on hearing more about the existing business' innovation sourcing process in detail, as it is more aligned with the aims of the research and the case company's sourcing environment.

As background information, the process is mainly applied within the ICT category and is especially applicable for large scale projects such as development, SaaS technology selection, business process outsourcing. However, the application of the process does not have any spend limit as the process is scalable as such. However, the interviewee states that the process can be applied within other categories and reckons a similar method has been used for sourcing training services at Company D. In ICT, the process is typically applied when the company is uncertain of what kind of solution should be sourced to achieve outcomes, or the environment is rapidly changing. Thus, predefined fixed specifications can become obsolete before the implementation of the solution begins. The practical examples provided by the interviewee relate to a SaaS technology selection project.

The researcher sketch of the sourcing process is presented in Figure 26 to illustrate the main phases, which are placed under the high-level literature review phases: discover & define, test & develop and transfer.

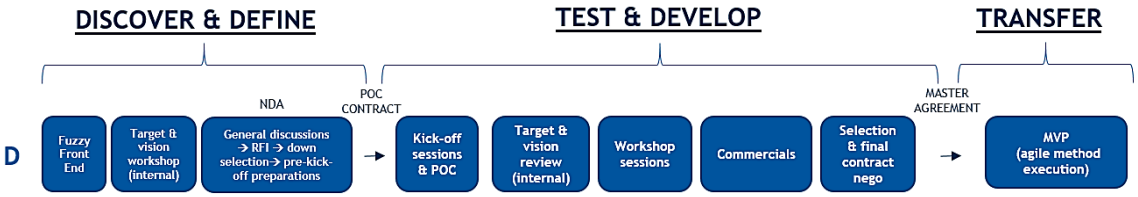

Figure 26 A simplification of Company C's innovation sourcing process

The process begins with internal activities that can be interpreted as FFE phase activities. First, the process is triggered by the emergence of a need. The interviewee states that if the scope is too small, procurement is responsible for first pooling the need and asking for other business functions future needs to be able to increase volumes and create a larger scale project for a more feasible sourcing process application. Next an internal project group is defined, which typically includes end users from business function(s), a sourcing manager as project manager, a sourcing specialist, and an IT architect in ICT projects. In addition, the interviewee emphasizes the importance of including top management from each participating business function(s) for managerial support.

Next, the project officially begins with one or multiple internal vision and target workshops to define the target/outcome, scope, 3-5-year vision and the selection criteria. The interviewee describes *"we pick end users from different business areas, who do not know each other, but have a similar need either now or in the future and collaborate during the workshops to determine the elements needed to run the sourcing."* Next, if the company does not yet understand the feasible solutions or technologies, the market and suppliers,

a desktop study needs to be conducted. Also, if there are new and multiple suppliers, the interviewee states that *"we would then do a traditional RFI typed phase to analyze the alternatives and down select"*. With regards to supplier collaboration and communication, the company prefers face-to-face workshops and meetings to be able identify supplier's interest and build a foundation for further collaboration. Also, the interviewee highlights that it is based on openness and honesty *"so also the client has to be extremely honest. In the long run, it is detrimental for everyone if the client lies about the vision and scope to get better terms".*

Prior to the POC phase kick-off session, general discussions regarding the topic and outcome are done. Also, pre-kick-off preparations such as detailed discussions regarding the outcome, POC phase and signing the POC contract take place during the POC phase kick-off. Further detailed discussions are subject to a signed NDA. Furthermore, the interviewee mentions transparent performance metrics for POC performance and a possible fixed price compensation as elements included in the POC contract. In addition, regarding risk management throughout the process, the company has a startup typed "fail fast" mindset, meaning that *"everything we do we must be able to change direction and suppliers if needed".*

Next, the POC phase begins with a face-to-face kick-off session. The POC phase mainly serves the purpose of assessing the solution in the company's own environment and with the company's own test data. If the technology is new for the company, the assessment focuses on specific pain points such as integration or flexibility, configuration and user experience, which are hard to change afterwards. In addition, to minimize risks, the interviewee states that "*we must make sure the solution not only looks and sounds good, but actually is what is promised. Consequently, procurement needs to ensure that correct people are evaluating the technical aspects."* After the POC phase, the performances are reviewed against defined metrics together with suppliers and a down selection can be done at this point, if necessary. However, regarding risk management, the interviewee highlights that procurement should avoid ending up with only one supplier to sustain competition and negotiation positions.

After POC, as the team has increased its knowledge regarding the solution and selected suppliers, the internal project group gathers to review the validity of the initial vision and target. After this, suppliers are invited to workshop sessions to further discuss the implementation and commercial terms. For example, regarding the example SaaS project, the company held a total of 6 sessions: first for all business areas concerning the vision and target, next business area specific workshops and an IT session in which technical specification were discussed, and finally a contract and commercial workshop. The workshops are not subject to any agreement, and thus rely solely on the suppliers' interest. Moreover, to steer focus on the implementation, workshops also include discussing about the first MVP and its scalability solution. Furthermore, the MVP scalability contractually is also

discussed. The interviewee emphasizes the importance of successfully combining a POC and a workshop phase *"we have been able to show the businesses that both solutions are applicable"* and *"with these workshops that are based on demos, we have been able to dive deeper into the systems and match our requirements with it. Thereby, the business has committed its focus and time into the process and has accepted that this needs to be done with both suppliers"*

Next, the commercials phase focuses on negotiating prices for the final scaled solution to be able to conduct TCO comparisons regarding the scaled solution, not the MVP. The interviewee states that *"this is the moment when we can truly make the suppliers compete and we can negotiate an optimal price."* To mitigate risks, the company does not down select a supplier before signing a final contract, typically a master agreement, but rather focuses the final contract negotiations on one supplier after the commercials phase. Finally, the MVP typed development begins. For example, when buying SaaS, the SaaS contract is a part of the master agreement and is thereby implemented by a project contract in which an agile method is define. Furthermore, the parties have agreed on for example the responsibilities and IPR, information security, data privacy and possible penalties for late delivery.

Finally, regarding the implementation, the interviewee states *"I cannot emphasize the importance of the MVP enough. It is critical that the implementation doesn't begin too large. So, now that we understand how the solution or technology really works and we have the commercial and contractual terms, we need to start the implementation as small as possible so that it still can be launched to end users and it provides value for business. After this, we can broaden the implementation to achieve the desired outcome."* Moreover, each business involved is responsible for commencing the MVP implementation with a dedicated team.

Regarding process prerequisites, the interviewee mentions the company's startup and agile culture to promote innovations, flexibility and speed. Thus, procurement also needs to change its practices, and have strong facilitation skills to manage the process. Moreover, visibility, commitment and top management support were mentioned as prerequisites. The interviewee further elaborates that *"business and procurement share vision and strategy and we have succeeded in working closely with the business, so the business partner mindset is essential".*

The application of the process has yielded increased speed and shorter time to market. In addition, the company has learned from suppliers and thereby co-creates new solutions and disrupts internal ways of working to better utilize supplier solutions. The interviewee also states that the process steers to collaborate with fast paced and agile suppliers. Moreover, the value of the solution and alignment with long-term vision and targets is verified before commitment. In contrast to the traditional process, risks are better managed, when

focusing on outcome specification and evaluating suppliers' competencies instead of predefined, non-functional specifications. However, the interviewee clarifies that *"there is a place for the traditional process: when sourcing for specific requirements. However, if they are not certain it could lead us into a wrong outcome and to overlook supplier competencies."*

Despite the company's success in applying the process, the interviewee however mentions some challenges and areas of improvement. For example, how to preserve the company's negotiation position and competition amongst suppliers despite business' increased collaboration and communication with suppliers. Also, how to identify and ensure all relevant contractual aspects are covered although the company utilizes contract templates.

5.1.2 Cross-case synthesis

The aim of the cross-case synthesis is to aggregate and compare the findings from each company interview. To provide a structured comparison, this section is divided into two parts aligned with the research questions. First, the findings regarding the principle themes: process structure, communication and collaboration, risk management and contractual aspects, and prerequisites (RQ1) are aggregated and addressed by highlighting differences and similarities between the interviewed companies. Next, similarly, the findings regarding the application context and added-value (RQ2) are aggregated and addressed by highlighting differences and similarities between the interviewed companies.

Table 6 presents the compiled interview findings, denoted in theory based principles. The principles are categorized into themes accordingly. Moreover, a cross on a principle line item indicates that the interviewee mentioned the exact same principle or something identical. The findings presented in Table 6 are further explained in themes below.

Table 6 Cross-case synthesis denoted in theory principles

Theme	Principle	A	B	C	D
FFE	Definition of internal project group and governance model	x	x	x	x
	Identification, analysis and prioritization of user need by design thinking methods				
	Assessment and selection of applicable sourcing process		x	x	
	Setting target and outcome specification(s)	x	x	x	x
	Risk analysis			x	x
	Planning contractual aspects			x	x
Market communication & supplier integration	Market research, communication and down selection with RFI		x	x	x
	Signing NDA before detailed discussions	x	x	x	x
	Interactive workshop sessions before test & development phase	x			x
	Suppliers show POC before developing solution		x		x
	Contracting for test & development phase	x	x	x	x
Test & develop	Signing contract for test & development phase	x	x	x	x
	Suppliers create prototype to kick-start MVP development				
	An iterative MVP development cycle (build-measure-learn)				x
	Establish and communicate clear performance metrics	x	x	x	x
	End-user centricity	x	x	x	x
Transfer	Signing master agreement	x	x	x	x
	Agile method or pilot implementation		x		x
Communication and cooperation	Internally multi-functional project team	x	x	x	x
	Prioritize face-to-face meetings internally and externally	x	x	x	x
Risk management & contractual aspects	Re-evaluating user need during process				x
	Compensation for development work (fixed or hourly)	x	x	x	x
	IPR	x	x	x	x
	Incentivized and agile scoped master agreement				
Prerequisites	Sharing innovation strategy and vision with business	x	x	x	x
	Management support / leadership	x	x	x	x
	Pro-innovation culture	x	x	x	x
	Clear internal collaboration practices			x	
	Innovation definition				
	Supplier Market Intelligence (SMI)			x	

Regarding the FFE phase, companies were unanimous and emphasized the importance of analyzing the emerged need, setting targets and outcome specifications instead of a

requirements list as done in traditional sourcing. Despite varying implementation methods in the test & develop phase, *"the main theme in these cases is the definition and analysis of the need. So, we are sourcing for an outcome, which needs to be defined and communicated to potential suppliers. Then, the methods by which we finally reach that outcome vary case specifically",* as Company B interviewee sums up. Typically, the FFE phase including the need analysis and outcome specifications is done by a facilitated brainstorming sessions (Company A) or a workshop (Company D). However, none of the company interviewees mentions explicit techniques or methods such as design thinking "inspiration and ideation" methods. Thus no crosses were marked on the table line item regarding the need identification, analysis and prioritization principle.

Furthermore, risk management, planning contractual aspects and assessment and selection of applicable sourcing process principles varied amongst interviewee answers. Company C mentioned all the aforedescribed activities to be completed during the FFE phase. Also, only Companies C and B explicitly mentioned assessing and selecting the applicable sourcing process. Company C utilized the sourcing toolbox method and Company B interviewee explained that the internal project group defines the sourcing strategy, in which the group decides the applicable method for the sourcing case. However, also Companies A and D mentioned having a traditional sourcing process as an alternative to the innovation sourcing process, inferring that the sourcing manager consciously has to decide amongst the applicable method to apply. Nevertheless, the interviewees did not mention this as an activity during the phase and thus no crosses were market on this line item.

In addition, regarding risk management and planning contractual aspects, only Company C and D included these in the FFE phase as explicit tasks. However, again, Company A and B mentioned doing risk management and contractual planning, but did not mentioned these as tasks to be done in the very beginning of the project. Thus, no crosses were marked.

In addition to FFE phase literature principles, Company D and C mention focusing on the scalability of the solution when analyzing the need and defining the outcome specifications. In addition, Company D highlights pooling the need to increase the volume of the purchase if needed and outlining a 3-5 year vision whilst defining the outcome specification. Subsequently, the vision was reviewed after the POC phase to assess its validity.

Regarding market communication, Companies B, C and D have a similar market communication phase, in which suppliers are first contacted regarding general discussions on the topic. General discussions typically include communicating the defined outcome. After this, companies commonly send a RFI to collect more detailed information about the suppliers' competencies and interest. Based on the RFI, each company down selects suppliers.

In contrast, Company A's market communication phase differentiates from the other companies as it does not include a RFI phase. Instead, after brief general discussions, the company invites all interested suppliers to meet face-to-face in 45 minute "charming sessions". The purpose of the charming session is to mutually provide detailed information and assess collaboration basis. Furthermore, Company A and D interviewees explicitly mention workshops or kick-off sessions after down selection prior to the development & testing phase. The purpose of these is to further define the target, need and other relevant factors regarding the test and development phase.

With regards to market research, all interviewees mentioned that the company typically has a good understanding of the trends, suppliers and technologies before commencing the sourcing project. However, if the technologies and suppliers are not understood, all companies will first execute a *"desktop study",* as Company D interviewee describes it. Understanding the solution is considered central, which thereby is reflected on the increased business' role. As company B interviewee explains *"the business has a bigger role in these innovative cases, because we need to better understand the substance as we are buying outcomes".* Moreover, all companies sign an NDA before further discussions and a test & development phase contract. Overall, no additional aspects in addition to the theory principles emerged regarding market research and communication.

The methods used in the test & develop phase varied most significantly between the four companies. Companies B and D execute a POC phase with similar aims: to evaluate suppliers and their solutions. In addition, Company B interviewee additionally highlights the importance of simultaneously evaluating contractual aspects. Moreover, Company D interviewee mentions facilitating an interactive kick-off sessions with suppliers prior to the POC phase. With similar aims as a POC, Company A evaluates supplier competencies and solutions by issuing a real marketing pilot case. Furthermore, Company C mentions POC as one method, but does not include it explicitly in the co-creation method, which was covered in detail.

Despite varying methods to evaluate solutions, supplier competencies and contractual aspects, all companies establish performance metrics for testing the solution. Also, the companies review the metric results with each supplier after the testing phase. Furthermore, all interviewees state that they include end users at the latest in the test & develop phase to provide information and give feedback to suppliers. However, regarding solution development with suppliers, none of the companies request a prototype of the solution after the POC or pilot. Also, only Company D incorporates an iterative development cycle, which is fairly similar to the literature review lean startup cycle. The company facilitates workshops to discuss the implementation and contractual aspects, and define the MVP. Moreover, Company C facilitates co-creation workshops simultaneously with all involved suppliers to develop the solution. In contrast, Company A and B do not explicitly mention facilitating development sessions with suppliers after the pilot or POC.

As an overall similarity, in addition to end user centricity and establishment of performance metrics, all companies sign contracts for the test & development phase according to the method used in this phase. In addition to theory principles, all companies emphasized simultaneously negotiating contractual aspects during the testing and development phase, meaning that the companies introduce "showstopper" clauses at the latest during the testing phase to minimize risks. Furthermore, Company D interviewee also was the only one to explicitly mention an internal vision and target review session as part of the test and development phase. This was conducted to validate and make adjustments to the preliminary outcome and vision definitions done before the POC phase.

In general, out of all high-level phases, the transfer phase received the least attention during each interview. All companies sign a master agreement after the test & development phase. Company B and D both execute an agile development phase, in which the MVP is scaled up using an agile development method such as Scrum. In contrast, Companies C and A have already developed the solution with suppliers in a Vested model, hackathon, co-creation model, or a workshop session. However, Company A interviewee states that the contract is not agile per se, but the master agreement as a framework provides the possibility of creating sub-contracts if the scope changes. Thus, if the transfer phase requires development work in terms of the scope, the company can flexibly utilize the master agreement and subsequently make additional sub-contracts.

In addition to the literature principles, Company B and C mention lessons learned sessions, in which the company reviews the project outcome. This is considered an important factor not only regarding the single project, but also in terms of developing the sourcing process as a whole.

Regarding the communication and collaboration theme, there was no differences between internal groups. All companies begin the process by defining a cross-functional internal project group, which typically includes the business stakeholders and other relevant stakeholders in addition to the sourcing manager, who manages the process. Furthermore, all companies highlight the importance of top management support especially regarding large scale projects. Companies B and C explicitly mention project steering groups. In addition, all interviewees highlight that face-to-face communication and collaboration is preferred throughout the process in a larger extent than in during a traditional sourcing process. All companies explicitly emphasize openness, honesty and or trust as an uncompromising basis for collaboration, consequently emphasizing the face-to-face interactions especially in the market communication and supplier integration phase.

Next, regarding the risk management elements, all companies have a similar framework to contracting. All interviewees mentioned signing an NDA before detailed discussions, next a test and development phase contract such as a POC or pilot contract and lastly a final contract for example a master service agreement.

Regarding specific contractual elements, all interviewees elaborated most on the test and development phase contract(s). IPR terms were discussed especially emphasized by all interviewees as the primary clause to mitigate risks. However, Company B interviewee also notes that it is a misconception that the buyer would always want to keep the IPRs. Nevertheless, all interviewees stated that the IPRs need to be jointly and clearly agreed with the parties and communicated to the organization. As a concrete tool, Company C has created a clear IPR matrix on paper to be able to clearly understand the IPRs contractually and to clearly communicate the responsibilities in different situations to the organization.

Despite IPR emphasis, all parties overall emphasized the lightness of the test and development phase contracting. For example, Company B explicitly states that the purpose is to aim for a win-win outcome and thus the purpose is to rapidly, without compromising company risk management, proceed to testing the solution and supplier capabilities in practice. Thus, the buyer should not take out a heavy corporate contract template for the test and development phase contracting. Nonetheless, all companies stated to compensate for the test and development phase, typically on a fixed compensation basis. However, Company D stated that the MVP development phase after the POC phase was not compensated for.

Moreover, regarding the final contract, all companies stated using company contract templates such as a service agreement template. Also, none of the companies included incentivized contractual clauses such as pricing models for further solution development. Finally, regarding overall process risk management, only Company D had incorporated explicit internal sessions to re-evaluate the need and outcome specifications after learning from the suppliers about the possible solutions.

Next, with regards to process application prerequisites, all company interviewees explicitly mention strategy and vision sharing with business, top management support and pro-innovation or agile culture. However, none of the companies mentioned explicitly an innovation strategy, and thus can be inferred that the companies share solely the general strategy and vision.

Furthermore, only Company C mentions clear internal collaboration practices and understanding market trends and suppliers as prerequisites. However, also other company interviewees mention these factors during the interview, but did not explicitly state them when asked for prerequisites. Furthermore, regarding strategy and vision sharing, at least Company C mention having implemented a business partner model to increase visibility into the relevant business functions. Also, Company D mentions business partner "mindset". Although Companies A and B do not mention business partnership, similar practices are described. Company A interviewee mentioned that procurement works in close collaboration with the marketing function and Company B interviewees mention that the ICT category is essentially integrated into the ICT department. In addition to literature

principles, Company A interviewee explains having an aligned SRM process and Company D mentions procurement's strong facilitation skills to be able to manage the rather complex process in contrast to the traditional RFP process.

Finally, a compilation of all processes was created to illustrate and summarize the findings regarding the high level process structures. All processes are sketched by the researcher based on the information disclosed by the interviewees. The compilation is presented in Figure 27. Each company process is divided into the high level literature review process phases: discover & define, test & develop and transfer, to highlight similarities and differences between the four innovation sourcing processes.

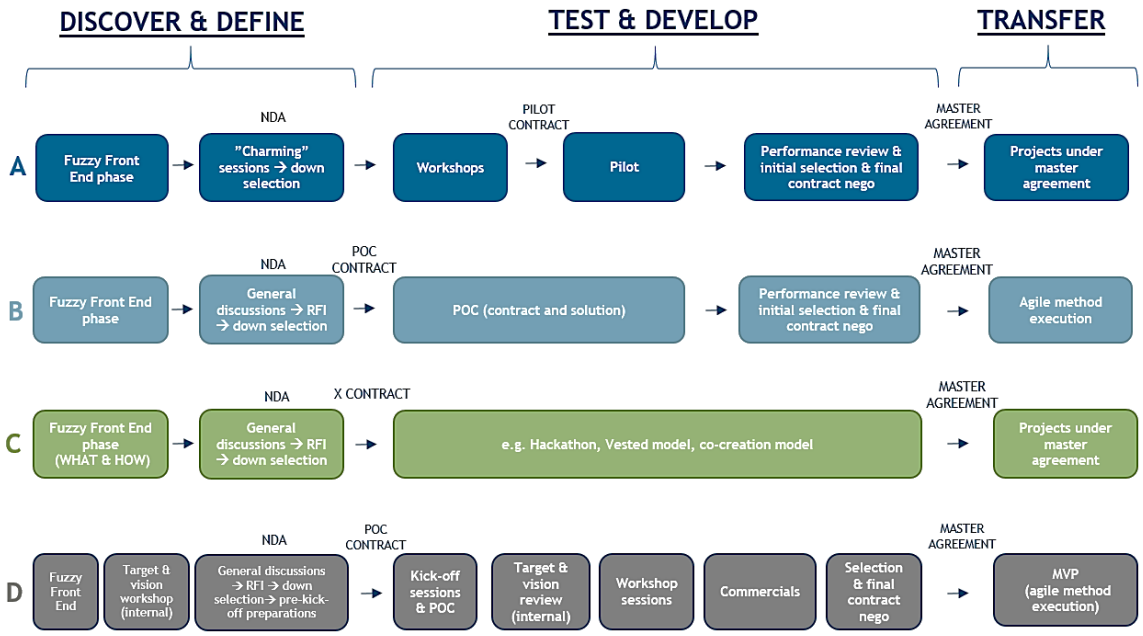

Figure 27 Compilation of all four company processes

As an interpretation of Figure 27, the company phases denoted in discover & define and transfer high-level phases are rather identical. Regarding the discover & define phase, each company has a FFE phase in which the company at least defines an internal project group and possible governance or steering model, identifies, analyzes and prioritizes the user need, and sets the target and outcome specifications for the solution. Furthermore, all companies contact potential suppliers, and perform a down selection either by the means of an RFI or by an interactive face-to-face session. In addition, the contract framework is primarily similar: first a NDA, next a contract for testing and developing and finally a master agreement. Lastly, in ICT categories (Company B and D), the solution is scaled up from the MVP by the means of an agile development method such as Scrum.

However, the most significant differences can be found in the test & development phase. As described above, Company A's and B's test & develop phases lean towards

testing and down selecting with a pilot or POC , whereas Company D and C (Vested and co-creation models) phases focus on developing a company specific solution once suppliers are down selected.

Next, regarding the process application (RQ2), findings from all four companies are compiled and presented in Table 7. The table presents the detailed application context, perceived added-value, challenges and areas of improvement for all four processes.

Table 7 Compilation of the application context, perceived added-value, challenges and areas of improvement for each interviewed company

	Application context	Added-value	Challenges & improvement
A	• Mainly marketing category • No limitations for scope size • Solution not known or company wants to tap into supplier knowledge • Sourcing for creativity, outcomes and agile development • Value needs to be realized before long-term commitment	• New solutions/innovations • Verifying supplier competence and solution feasibility before long-term commitment • Aligning user needs, outcome and strategy • Building innovative, aligned supplier base • Flexibility	• Vagueness of the process • Difficulty to set schedule
B	• Mainly ICT category • No limitations for scope size • Sourcing for new solutions or change to current solution is significant • No references and desire and company wants to tap into supplier knowledge	• New feasible method into the sourcing method toolbox • High end user satisfaction • Verifying supplier competence and solution feasibility before long-term commitment • Increased flexibility and cooperation	• More structured way of working is needed (e.g. mapping various methods) • Measuring procurement effectiveness • Finding right suppliers on the market • Improving contract templates to support implementation (legal resources a bottleneck) • Better visibility into business' prioritizations and need analysis • Developing an aligned SRM model to promote innovations
C	• Innovation sourcing models applied more in indirect categories • No limitations for scope size • Sourcing for outcomes • Company wants to tap into supplier knowledge	• Scalable, new solutions and achieving defined outcomes • Flexibility • New feasible method when seeking new solutions • Learning from suppliers	• More structured way of working (mapping various methods) • Toolbox method/mindset requires showcases, sparring, conversations and training to be better implemented • Sourcing stage gate model occasionally increases rigidity and slowness
D	• Mainly ICT category • No limitations for scope size • Most applicable for large scale development projects, SaaS technology selection, business process outsourcing • Sourcing for outcomes, uncertain and changing environment	• Co-creation of new solution • Increased speed and shorter time to market • Verifying supplier competence and solution feasibility before long-term commitment • Managed risk when focusing on outcomes, not non-functional specifications • Learning from suppliers	• How to preserve company's negotiation position and competition amongst suppliers despite increased collaboration with business and suppliers • How to identify all relevant contractual aspects

The application contexts across interviewed companies did not vary significantly. The differences mainly concerned the procurement categories in which the process was applied. Companies A, B and D applied the process primarily in indirect categories, whereas

Company B applied the process in both direct and indirect. However, the innovative methods within that process have thus far been applied primarily in indirect categories.

Regarding similarities, the process was typically applied in ICT and sales and marketing categories, when sourcing for creativity or a technological solution within a rapidly changing business environment. All company interviewees stated that the process is applied when sourcing for outcomes, the environment is uncertain or rapidly changing or the company wants to tap into supplier knowledge. In addition, Company B further specified that uncertainty typically relates to the fact that the company is sourcing for a completely new solution or the change to the previous solution is significant, requiring a different sourcing process approach. Moreover, none of the companies had a checklist nor spend limits for applying the process. Rather, the company sourcing managers often evaluate the process application with internal business participants. All company interviewees also stated that the process per se is scalable. However, Company D highlighted that it has been especially applicable when sourcing larger scale projects.

Concerning realized added-value, all companies except Company C stated similar topics. The companies verify the supplier competence and solution feasibility before long term commitment, implying more careful risk management than in traditional sourcing. Furthermore, all companies similarly mentioned to generating new solutions when achieving the defined outcome. Also, Companies C and D stated that the companies have learned from suppliers when limiting the non-functional specifications to a bare minimum. Also, flexibility and co-operation were mentioned by all. Company D further specified that time to market has decreased as the company no longer uses substantial time in creating a specification list which would subsequently be outdated due to rapid technological advancements on the market.

Overall, the differences regarding added-value represent only minor nuances. For example, Company D focuses on iteratively reviewing the outcome and gradually developing the MVP and subsequently scaling it up. Also, risk management was increased by negotiating critical commercial terms already during the development phase. Furthermore, only Company A mentioned the realized positive implications in the SRM process as the process steers the company to select innovative suppliers. Consequently, the company has been able to build an innovative supplier base in which the new ways of working can be developed further after suppliers have been selected. This, however, was identified as an areas of improvement in Company B: to develop an aligned SRM model to promote innovations also after the sourcing process.

The challenges and areas of improvement theme portrays the most differences between the interviewed companies. However, all except Company D mentioned the vagueness of the process as a prominent challenge. Consequently, the interviewees stated that they could improve the process by mapping it and the various methods within the process.

Thereby, procurement could clearly communicate the process to the business stakeholders, increasing process visibility. Also, Company A further explained that the vagueness of the process affects the scheduling of the project and thereby occasionally increasing the planned lead time. Similarly, Company C interviewee stated that in addition to defining the various methods in practice, the company could showcase the implemented methods and harness specific sourcing managers to spar and provide training to others on the implemented methods.

Nevertheless, the companies have experienced different challenges. Regarding contractual aspects and negotiations, Company D was the only one to highlight challenges regarding the increased business role in the process. The interviewee stated that they need to find ways to preserve the company's negotiation position and competition amongst suppliers despite the increase collaboration with the business and suppliers. Contractual challenges related to templates and how to identify that all relevant contractual aspects are covered were raised by Company D and B. Finally, Company B also was the only one to highlight challenges regarding the measurement of procurement effectiveness. Thus, to improve, the company should create new sourcing KPIs for the alternative process rather than utilizing traditional KPIs such as savings or number of suppliers.

5.2 Case company workshops

This section is divided into three sub-sections to present the findings from each three case company workshop session. The first workshop aimed at exploring the application context (RQ2) across case company procurement categories. Next, the second and final workshop aimed at developing a case company specific innovation sourcing process (RQ1) by adopting applicable elements from the literature and interview processes. Each sub-chapter presents workshop participants' dominant comments and thereby possible changes to the case company specific process. Thus, this chapter focuses on illustrating the development process of the case company specific innovation sourcing process.

5.2.1 First workshop session

The first workshop session was focused on exploring the potential application context of the innovation sourcing process within the case company procurement sub-categories. All sub-categories discussed the following three questions: *1) Are innovations important in your category? What elements or phases in the traditional process hamper the generation of innovations or process agility? 2) Have you deviated from the traditional process to*

enable innovations? Describe the results. 3) To what sourcing projects within your context do you consider the innovation sourcing process being applicable? The findings to these three questions are reported first individually regarding each of the seven indirect and direct procurement categories. Finally, a cross procurement sub-category synthesis regarding the overall application context is presented.

In the MaSsOs (indirect procurement) context, innovations are considered extremely important as the consumer marketing industry is rapidly changing. Products are typically similar to competitors' offering and therefore the company needs to distinguish itself from competitors with other methods than product features. This requires innovations for example in digital marketing. The application of an innovation sourcing process, however, could be challenging as the business processes are rather long and include regulation. Nevertheless, some deviations from the traditional process have already been attempted with good results, such as in digital sales promotion campaigns in which the focus has been on identifying the original customer problem and need and thereby creating a prototype or pilot together with end users and suppliers. However, this process is not standard and thus has not been mapped. Overall, the participants were confident that the innovation sourcing process is certainly applicable in any product or service sourcing project in this sub-category.

In the packaging materials (direct procurement) context, innovations are considered increasingly important regrading product packaging. However, merely case company specific primary packaging needs are difficult and costly to develop as the case company relies on standard packaging materials. In addition, the case company's production supports these standard materials, posing challenges to adapt to any new materials. Also, for pharmaceutical products, strict product specifications for example regulatory requirements further limit introducing new materials. However, innovations regarding the over-the-counter (OTC) products is more applicable as these can be implemented faster due to loser regulative requirements. Also, the innovation sourcing process would be applicable for completely new packaging materials, for example when sourcing for sustainable packaging materials. However, IPR concerns were raised and participants stated that this might decrease suppliers' interest in participating. Nevertheless, overall, the innovation sourcing process was considered partially applicable for the packaging materials sourcing context.

Regarding the IM (indirect procurement) context, innovation sourcing principles are familiar and thus the development of this process is considered important. Due to the rapid technological development, new ICT solutions emerge constantly making the specification definition challenging and increasing the need for speed to market and risk management. In addition, new solutions are highly needed due for example replacing legacy systems and building integrations for more robust solutions. The category has explored various process deviations from the traditional sourcing process, such as POC. Especially

POC has been worth conducting due to the increasing need of risk management and rapidly getting into testing the solution in the company's own environment and using the company's own data. However, no mapped process exists either in this sub-category. Moreover, the IM sub-category participants specify that the innovation sourcing process is especially applicable in application solutions as the company is typically sourcing for outcomes and cannot constantly keep up with the Software as a Service (SaaS) market offerings.

With regards to the raw materials (direct procurement) context, innovations were mainly discussed within the generic and OTC product context. Deviations from the traditional sourcing process have not yet been applied. However, the process is considered applicable especially within the OTC products in which the customer need and problem should be traced back before sourcing. Also, with regards to generic product sourcing, the innovation sourcing process is considered a new method to potentially lower the product price as this is critical to competition. Thus, the price would represent the set outcome specification.

Moreover, innovations are considered fundamental in the R&D (indirect procurement) context, especially in the concept/discovery phase of the drug development process. So far, setting too strict specifications has limited sourcing in this context and thus projects have been transferred to the internal startup, X-lab, function to be able to decrease the process lead time. Agile and innovation sourcing type practices have been implemented, which have yielded excellent results. However, no defined process for innovation sourcing exists. Thus, this process is certainly considered important to be defined and applicable in the R&D context especially for software solution and X-lab sourcing.

Regarding Fermion (direct procurement) material sourcing, innovations are considered important particularly for R&D process improvements which would yield increased price competitiveness. However, the majority of the materials sourced within this sub-category have strict specifications and the requirements regarding the Drug Master File (DFM) to be submitted to the Food and Drug Administration (FDA) or the European Pharmacopoeia (CEP) regulations, limiting the changes that can be made to production as these may have negative effects on the material quality. Thus, the sub-category has not deviated from the traditional sourcing process thus far. However, the innovation sourcing process could be applied to the early stage R&D material sourcing as the importance of innovations is considered more significant during this stage.

Finally, innovations are considered increasingly important in the MRO, Supplies & Facility (indirect procurement) context, especially for the production and laboratory equipment sourcing. Occasionally, the case company receives outdated technology due to suppliers offering only standardized products or due to too strict specifications from the case company. However, some pilots have been implemented as a part of the sourcing

process which has yielded good results. Thus, the innovation sourcing process is considered applicable and needed in this sub-category, particularly in the R&D equipment sourcing context.

Overall, the comments regarding the process application across case company procurement sub-categories are aggregated in Table 8. The table presents, if the categories have previously deviated from the traditional sourcing process and the possibilities for applying an innovation sourcing process. Furthermore, the table highlights the particularly applicable sourcing areas in each sub-category as identified in the workshop.

Table 8 Examining innovation sourcing process application across case company procurement sub-categories

Procurement category	Sub-category	Deviations from traditional process?	Innovation sourcing process applicability	Particularly for
Indirect	Marketing, Sales support and Operational service	Yes	Yes	Digital marketing
	MRO, Supplies & Facility	No	Yes	Production and laboratory equipments
	Information Management	Yes	Yes	Software as a Service (SaaS)
	R&D	Yes	Yes	Concept/discovery phase of drug development e.g. software solutions, X-lab sourcing
Direct	Raw materials	No	Partially	Generic and over-the-counter (OTC) products
	Packaging Materials	No	Partially	Over-the-counter (OTC) products
	Fermion materials	No	Partially	Early stage R&D materials and process improvements

As previously reported, the innovation sourcing process is essentially considered applicable across all case company sourcing sub-categories. However, there is more demand for the process from indirect than direct procurement categories due to more evident application opportunities. This is particularly due to differences in the regulative framework. In addition, from the product portfolio perspective, OCT and generic product sourcing context tend to provide clearer opportunities to deviate from the traditional sourcing process. On the other hand, the case company Procurement Director noted that if there are no strict specifications, the case company should in principle begin sourcing projects from the end user need and targeted outcome, and thereby determine how the innovation sourcing process can best be adapted to serve that need rather than limiting the application to any sub-category per se.

Furthermore, during the group discussion part of the workshop, the participants agreed that the process should be applied when the uncertainty of the solution is high and thus the company would source for outcomes. Moreover, the participants noted that the process requires significant resources from both parties and stated that the attractiveness of the company in low volume cases such as in material sourcing might become a challenge.

5.2.2 Second workshop session

The second workshop session focused first on evaluating pros and cons for the literature and interviewed company processes. Next, the three groups began drafting case company specific innovation sourcing processes. Thus, the compiled findings regarding pros and cons are presented first. Subsequently, the pros and cons are reflected in each group's process suggestion.

Regarding the compiled pros, the high-level phases, define, discover, test and develop, and transfer, presented in the literature review process were considered a convenient framework for the innovation sourcing process. Moreover, regarding the FFE phase, all three groups valued the "what" phase, including specifying the outcome and the 3-5 year vision as it forces the case company to comprehensively evaluate the end user need and problem. However, the participants noted that applying the 3-5 year vision would require repeated reviews during the process. Furthermore, the application of a "what" phase was considered to require an innovation strategy, which was noted as an important prerequisite for the process.

With regards to the discover and test & develop phases, two out of three groups mentioned that the case company should leave room for process flexibility as the case companys' sourcing projects vary in nature across procurement sub-categories. Thus, these groups considered Company C's "how" phase toolbox applicable for the case company process. Furthermore, methods within the toolbox were discussed. Two out of three groups considered Company A's charming sessions as a convenient method for first round shortlisting. Also, Company B's principles for the POC were noted as two out of three groups included "covering final agreement terms in the POC evaluation" in their list of pros. Finally, the groups concluded that the scope of the solution should remain flexible in the final contract, as suggested in the literature process.

Regarding the compiled cons, overall, only minor phases or activities were brought up as the groups focused more on evaluating the pros. However, the lack of prioritization and organizing case company resources was mentioned by all groups. Thus, the participants highlighted that this should be a prerequisite for applying the process. Also, the groups noted that all processes lacked the task of evaluating, if the acquiring company is considered attractive and thereby how to increase the company's attractiveness. The participants highlighted that as a prerequisite, the process should primarily be applied only for larger scale project to be able to draw suppliers' attention and persuade suppliers to put in their effort despite increased need for resources. Finally, two out of three groups were generally sceptic about the co-creation model within the toolbox. All groups, however, stated that this method would be interesting to explore, but pondered whether it is applicable in practice with new suppliers or not.

Based on the aforementioned findings that emerged during the pros and cons exercise, each group drafted a suggestion of the case company specific innovation sourcing process. Next, all three process suggestions are presented in succession.

The first group highlighted the importance of risk management which is reflected in the process elements. However, as a prerequisite the group noted that simultaneously the case company needs to adopt a "fail fast" and "accept risks" mindset when deciding to apply the innovation sourcing process due to the outcome specification adding uncertainty. Furthermore, the group emphasized the importance of transparency into business' strategies and action plans in order to organize sufficient resources well in advance before the innovation sourcing process is initiated. The group's process suggestion is presented in Figure 28.

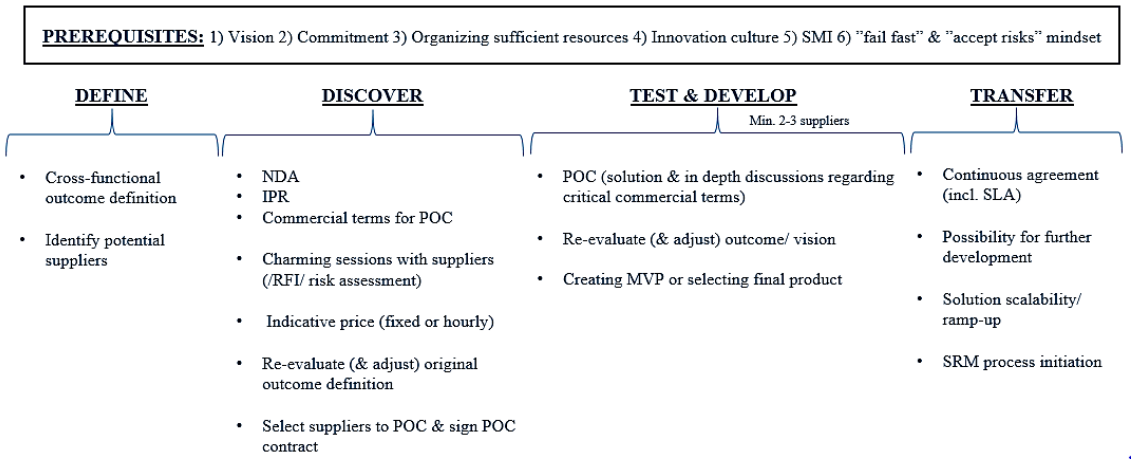

Figure 28 First group's case company specific process suggestion

After cross-functionally defining the outcome, potential suppliers should be identified. The group, however, stresses the importance of having strong SMI in order to execute this effectively. Moreover, the group noted that risk management elements such as NDA, IPR, indicative price and commercial terms for POC need to be defined as promptly as possible. Next, during the discovery phase, promising candidates are invited primarily to a face-to-face charming session as done by Company A. However, the group also introduces alternative shortlisting methods such as a simple risk assessment activity or sending traditional RFIs to potential suppliers. Before shortlisting, the case company should also revisit and potentially adjust the original outcome definition as the company has now learned more from the candidates in terms of the solution alternatives.

Next, the shortlisted suppliers sign a POC contract in which the previously highlighted risk management factors are addressed. Due to the significant amount of case company resources required to execute the POC phase, the group suggests that only two to three suppliers are selected. In addition to evaluating the solution, the group again notes the

importance of managing risks and states that the company should also introduce the critical final contract commercial terms, as done by Company B. After the case company has learned more about the alternative solutions, the group incorporated the outcome definition re-evaluation as done by Company D. Next, the process would go on to defining the case company tailored MVP. However, the group also notes that the suppliers could offer an applicable standard solution and thus did not go in detail as to how the final solution is developed or identified.

Finally, in the transfer phase, the defined solution is possibly further developed and scaled up. Furthermore, a continuous contract including SLAs is negotiated and signed. This initiates the SRM process, which should focus on further developing the solution. Thus, the final continuous contract should provide flexibility in the solution scope.

Next, the second group provided a more detailed and flexible process. The group incorporated elements equally from all processes, thus presenting a toolbox of various methods on how to shortlist suppliers. The group's process suggestion is illustrated in Figure 29.

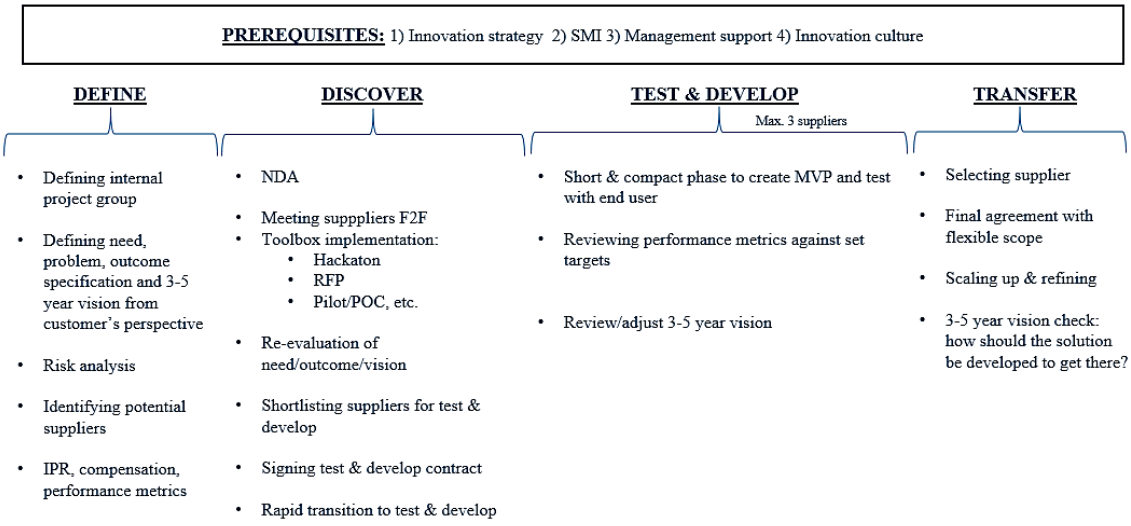

Figure 29 Second group's case company specific process suggestion

The group emphasized the innovation strategy as an important prerequisite to being able to effectively define the end user need and solution outcome. Furthermore, as done in Company D's process, the group incorporated a 3 to 5 year vision definition to be able to communicate a long term scope of the contract to the potential suppliers and simultaneously manage scalability risks. With regards to the risk analysis, the group identified IPR, compensation, commercial terms and performance metrics as factors to be considered before reaching out to potential suppliers.

Next, the group emphasized that the case company should focus on keeping the discovery phase as brief as possible. The purpose of this is to be able to retain suppliers'

interest and rapidly transition into the test and development phase in which the company can evaluate the solution and suppliers in practice. Thus, the group suggested that instead of an RFI phase, suppliers should be met face-to-face to provide information on their competences. Simultaneously the case company would provide more details on the project and both parties would be able to analyze the collaboration basis.

Before shortlisting suppliers and signing a test and development phase contract, the group added that the case company should perform a re-evaluation on the internally defined outcome, need and vision. Moreover, once the case company has more information on the amount of potential supplier and solution alternatives, the project group should only then decide on how the process will continue. The company could decide to publish a hackathon already after the define phase is completed, if there are many alternatives or proceed to shortlist the identified suppliers after the face-to-face meetings by initiating a POC or a pilot phase and then developing an MVP. Furthermore, the group notes that the company could still dismiss the innovation sourcing process and continue with the traditional RFP process. Going back to traditional sourcing could be justified if, for example, none of the suppliers are willing to participate in the innovation sourcing method due to it typically requiring more resources also from suppliers.

As for the test and development phase, the group notes that the development of the MVP could be an already existing solution or case company tailored solution. Nevertheless, the group suggests that the phase should be short and compact, including iteration between end user feedback and development. Also, the predefined performance metrics and set targets should be iteratively reviewed. Before the MVP moves from testing and developing to the transfer phase, the case company should once again review and possibly make alterations to the 3 to 5 year vision and outcome specification, if needed.

Moreover, based on the supplier performances, a supplier is finally chosen and the company should define how to scale up the solution and make potential refinements before signing the final agreement. The group also highlights that the final agreement should be flexible in scope, considering the defined 3 to 5 year vision. The parties should jointly agree on collaboration principles on how to develop the solution in the future to be able to reach the 3 to 5 year vision.

Finally, the third group's process suggestion is presented in Figure 30. The group first outlined that they approached the process from the business perspective, overlooking the emphasis on procurement related parameters such as price or contract specific elements. Moreover, the basis for drafting the process was a problem the group first identified: the case company has challenges to keep up with its customers' needs. Currently, much of the business focus is on product prices or the lack of specific products in the product portfolio which a competitor might have. Consequently, the case company is alerted to examine its customers' fundamental needs often when someone else, for example a competitor, indicates that the product is too expensive or another solution would be superior.

Thus, the drafted innovation sourcing process steers the company to the forefront of development, revolving around the examination of the true customer need.

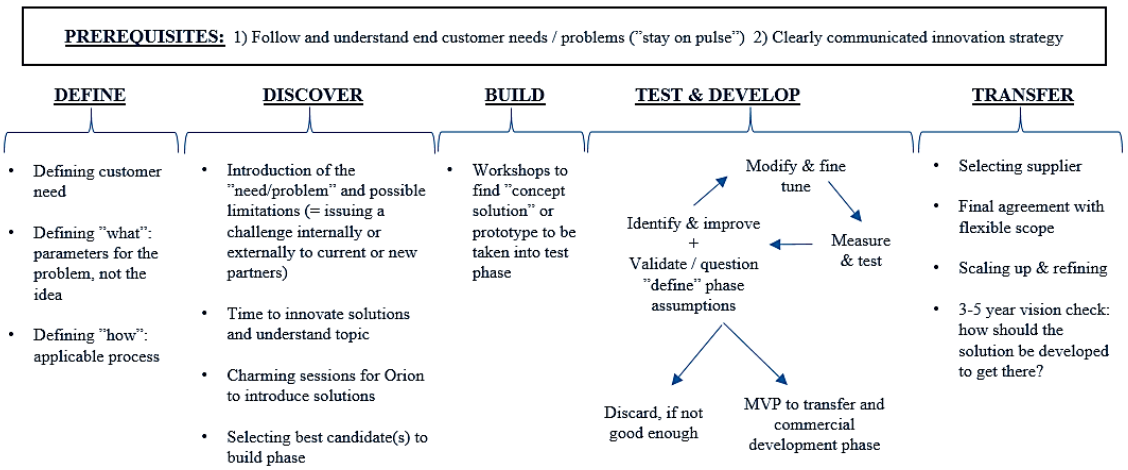

Figure 30 Third group’s case company specific process suggestion

The prerequisites for the process are that the case company constantly follows and understands the customers’ needs and challenges. Moreover, the innovation sourcing process dives deeper into the identified needs by first defining the need and then setting the mandatory parameters for the problem. The group highlighted that this exercise is done to be able to identify and subsequently communicate to the potential suppliers, what the problem or need to be solved is, but not yet define the solution. Next, considering the variation in sourcing cases across procurement sub-categories, the group emphasized that they aimed at drafting a flexible process which allows case specific alterations in application. Thus, the group included a “how” phase in which the project group defines the sourcing process details such as how the suppliers are shortlisted.

Next, in the discovery phase, the customer need parameters defined in the “what” phase are published externally on a selected case company forum, similarly to a hackathon challenge. The potential suppliers are given time to think about the solution and next a selected group of candidates are invited to face-to-face charming sessions to pitch the solution and the company’s competences. Furthermore, the case company simultaneously assesses the collaboration basis and shortlists suppliers for the newly added building phase.

The building phase consists of workshop sessions in which the candidates conceptualize or build the pitched solutions into prototypes. Most promising prototypes are allowed into the iterative MVP test and development cycle in which the prototypes are further developed together with the case company and the end user(s). The iterative cycle reflects the principles outlined in the literature review process’ build-measure-learn cycle, in which the development cycle goes on until a MVP is developed. If the solution is not good enough, it will be discarded, ensuring that only the absolute best solutions are taken

into the transfer phase. Finally, in the transfer phase the MVP is further developed and subsequently scaled up.

Lastly, between the second and the final workshop session, the researcher compiled all three process suggestions to provide a cross-case synthesis. This synthesis provided a starting point for the final workshop session in which the case company specific process was finalized. The compiled process was created by assembling all phases and activities into one framework. After this, duplicates or similarities were merged. The compiled process is presented in Figure 31 after which the merged elements are described.

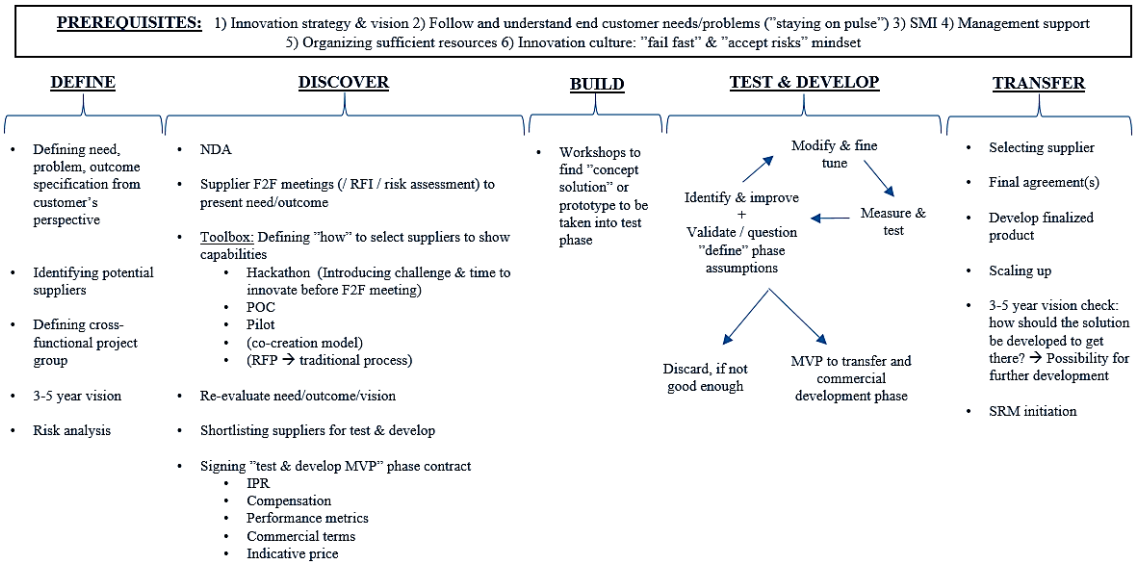

Figure 31 The compiled process for final workshop session

With regards to the high-level process phases, all groups retained the original phases. However, one phase "build" was added into the compilation as suggested by the third group. Furthermore, with regards to activities within the phases, the following were merged. All groups incorporated a similar end user need and problem analysis from which the internal project group would define the outcome specification for the solution.

Furthermore, two out of three groups incorporated similar "how" phases to determine the case specific process. The toolbox alternatives, hackathon, POC and pilot, represent alternative methods to uncover supplier and solution capabilities. Each group suggested at least one of these methods.

However, as the second group noted, the definition of the method should be done only after the company has an understanding of the amount of potential supplier and solution alternatives. The company could decide to publish a hackathon already after the define phase is completed, if there are many alternatives. Alternatively, the company could proceed to shortlist the identified suppliers after face-to-face meetings by initiating a POC or a pilot phase and then developing an MVP. Thus, these methods were placed in the discover phase. Although the groups were somewhat sceptic about the co-creation model in

practice, it was also added as an alternative to the toolbox as suggested by the second group.

Furthermore, all groups incorporated a MVP development phase, which was thus merged and illustrated as an iterative cycle as suggested by the third group. All groups mentioned “iteration”, “end user centricity” and “data collection” for performance review, when presenting their suggestions. However, only the third group added details and an explicit MVP development cycle.

With regards to contract specific risk management factors, the first and second group mentioned NDA, IPR, compensation or indicative price, performance metrics and commercial terms as factors to be considered. Thus, these were merged into the discover phase before signing a test and development or final contract. Also, all groups had a similar contract framework, which began with an NDA before detailed conversations, next a test and development contract, and lastly a final contract for the scaled solution.

Finally, concerning the prerequisites, a clear innovation strategy and vision were merged as these were stated by all groups. After the discussion section of the workshop, the participants proposed that the innovation strategy and vision could be published also on external forums to proactively receive proposals from potential suppliers. Thus, the case company could potentially overlook the define and discover phases and directly head into the test and development phase or initiate the full process by identifying competing suppliers. However, the participants noted that if the case company publishes the strategy, it should be ready to respond and advance these proposals. Furthermore, in addition to merging the innovation strategy and vision, the first and second group also mentioned innovation culture, SMI, management commitment as prerequisites.

5.2.3 Third workshop session

The third workshop session focused on finalizing the case company specific process. Changes to the compiled process were done based on the overall discussion that followed after the group discussions. The final workshop process is presented in Figure 32. In addition, the final prerequisites were the following 1) clearly communicated and shared innovation strategy & vision, 2) follow and understand end customer needs and problems, 3) organizing sufficient resources, 4) management support, 5) SMI, and 6) pro-innovation culture: “fail fast” & “accept risks” mindset.

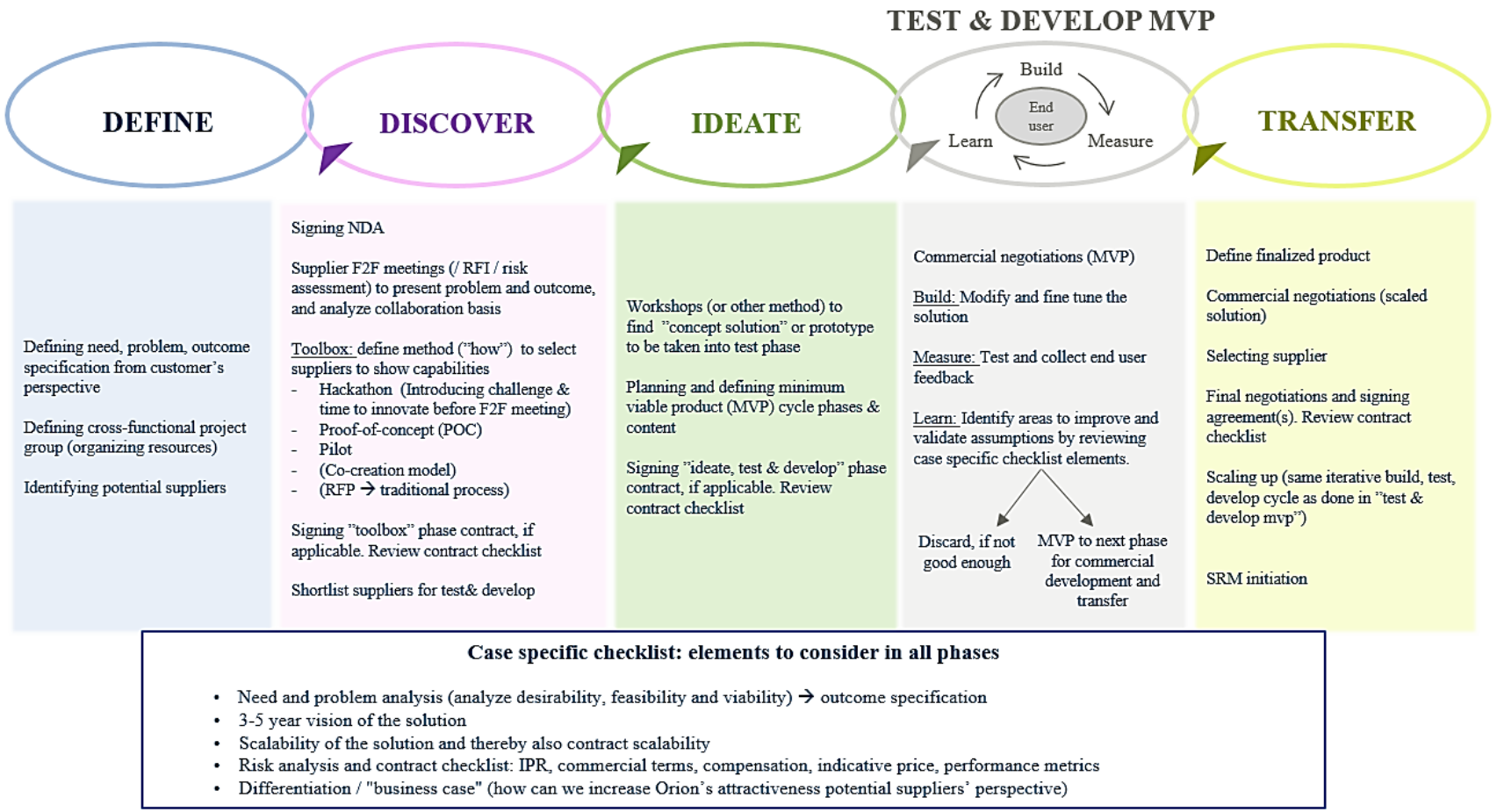

Figure 32 Final case company specific innovation sourcing process as a result from the workshop sessions

Overall, the three groups noted similar topics regarding the compiled process. All groups were content with the compiled define phase. However, the participants noted that the need and problem analysis might be challenging in practice, if it is not described in more detail. Thus, the participants stated that the case company could utilize design thinking methods such as customer interviews to analyze the desirability, feasibility and viability of the current solution and thereby define the outcome of the desired solution.

Furthermore, all three groups stated that the compiled discover phase seems rather rigid in practice, implying that the process should better take into account the broad spectrum of sourcing cases. Thus, after the overall discussion, the participants proposed that the toolbox should represent a more modular approach. In addition, the participants concluded that contract specific factors should be refined into a case specific checklist as not all factors are applicable, but should be reminded of throughout the process as these were considered generally critical regarding risk management. Thereby, when applying the process, the internal project group should re-evaluate, whether the factors listed in the risk management and contract checklist are relevant to be scrutinized or not at each phase of the process.

Furthermore, regarding risk management, two new elements, solution scalability and case company attractiveness, were added into the case specific checklist as a result of the overall discussion. First, the participants noted that especially in direct procurement, the case company's purchasing volumes are globally relatively low, which poses challenges in negotiating power, implying that these suppliers would not be interested in participating in a resource-intensive innovation sourcing process. Thus, the participants added that the case company should evaluate its attractiveness and consider various methods on how to increase attractiveness from the suppliers' perspective. Moreover, solution scalability was added into the checklist as participants stated it being critical to evaluate throughout the process. This was reasoned due to the fact that the scope of the solution changes and thereby also the solution and contract scalability should be evaluated accordingly.

In addition, the lack of iteration regarding the specific elements and the process illustration was emphasized during the overall discussion. This was discussed in the previous workshops, but the emphasis was now more on the process illustration. In general, the participants indicated that the illustration should better depict the iterative nature of the process, meaning that it could at any phase move backwards into a previous phase or even back to the beginning. For example, if the case company is not able to find one or more suppliers into the test and development phase, or discards all MVPs from the development cycle, the company could go back into the discovery phase and seek new suppliers. Alternatively, the company could go back to the initial define phase to re-examine the end user need or problem.

Furthermore, the participants noticed that each phase included a need, problem, vision or outcome re-evaluation. Thus, the participants proposed that this would be added into

the case specific checklist similarly to the other risk management factors. Overall, the checklist was intended to act as a rapid exercise to ensure that most critical elements are considered case specifically.

Regarding the contract framework, participants stated that the typical contract package would be first signing a NDA, second a test and development contract and finally a continuous master agreement. However, multiple sub-category participants implied that a "test and development" contract is not necessarily applicable when for example sourcing for standard solutions. Therefore, an additional "if applicable" mention was added into the ideate phase "signing an ideate, test & development contract" task.

Moreover, before initiating the MVP development cycle, the participants noted that it is critical to break down the solution into manageable development cycles, if possible. Consequently, the MVP development cycle should be planned to address each development task accordingly, providing a more manageable adoption for the end users. Furthermore, related to the MVP cycle, end user centricity regarding feedback loops and performance measurement was mentioned frequently. Thus, the participants decided that this should be added into the illustration by placing "end user" in the middle of the build-measure-learn cycle.

Finally, the process prerequisites were discussed and the participants stated that all are relevant. However, particularly the importance of following and understanding the customer needs and problems, clearly communicated and shared innovation strategy and vision amongst procurement, business and externals, and the organization of sufficient resources were stressed. Thus, these prerequisites were placed first in order. In addition, the "management commitment" and "organizing sufficient resources" prerequisites were further commented. The sourcing project group should have the mandate to deviate from the traditional sourcing process, which would also include the sufficient resources and "fail fast" and "accept risks" mindset.

5.3 Weak market solution test

The above presented final case company specific innovation sourcing process was evaluated by all case company sourcing managers. The evaluation represents the weak solution market test, which was conducted as an online questionnaire. The questionnaire response rate was 83% (n=18). Overall, 11 indirect procurement and seven direct procurement sourcing managers responded. All procurement sub-categories are represented in the results.

The likelihood of applying the developed innovation sourcing process was asked first. Simple descriptive key figures are presented in Table 9 to portray the overall likelihood of applying the process and the differences between indirect and direct procurement and

across sub-categories. The table displays the overall, category and sub-category averages regarding the likelihood of applying the process on a scale from 1 to 5. Furthermore, to provide a more comprehensive description of the results, minimum and maximum scores representing the score range are presented for each category and sub-category.

Table 9 Descriptive key figures regarding the likelihood of applying the innovation sourcing process

Category	Sub-category	Count of respondents	Likelihood of applying the process		
			Average	Min	Max
Indirect	Information Management	1	5 (score)	5	5
	MaSsOs	2	3.5	3	4
	MRO, Supplies & Facility	4	4.3	3	5
	R&D	4	4.3	3	5
	Total	**11**	**4.2**	**3**	**5**
Direct	Fermion Materials	2	2	1	3
	Packaging Materials	3	2.7	2	3
	Raw Materials	2	4	4	4
	Total	**7**	**2.9**	**1**	**4**
Grand total		**18**	**3.7**	**1**	**5**

The overall average for applying the process is 3.7. However, there is a notable difference between indirect and direct procurement. The indirect category average is 4.2 whilst the direct category average is only 2.9. Furthermore, the level of average scores is relatively consistent within the indirect sub-categories. Also, the direct sub-category scores are consistent despite the raw material sub-category score of 4, which is distinct from otherwise below total average score. Overall, the highest sub-category average is 5, which represents the IM category in indirect procurement. This is, however, explained by the low number of respondents (n=1). On the other hand, the lowest sub-category average is 2, which represents the Raw Materials category in direct procurement.

However, the consistency within indirect and direct category scores is supported by small ranges. This is illustrated in Figure 33, which displays the ranges across sub-categories in light blue. Furthermore, the bar chart illustrates the averages and the overall average of 3.7 is depicted with a horizontal line.

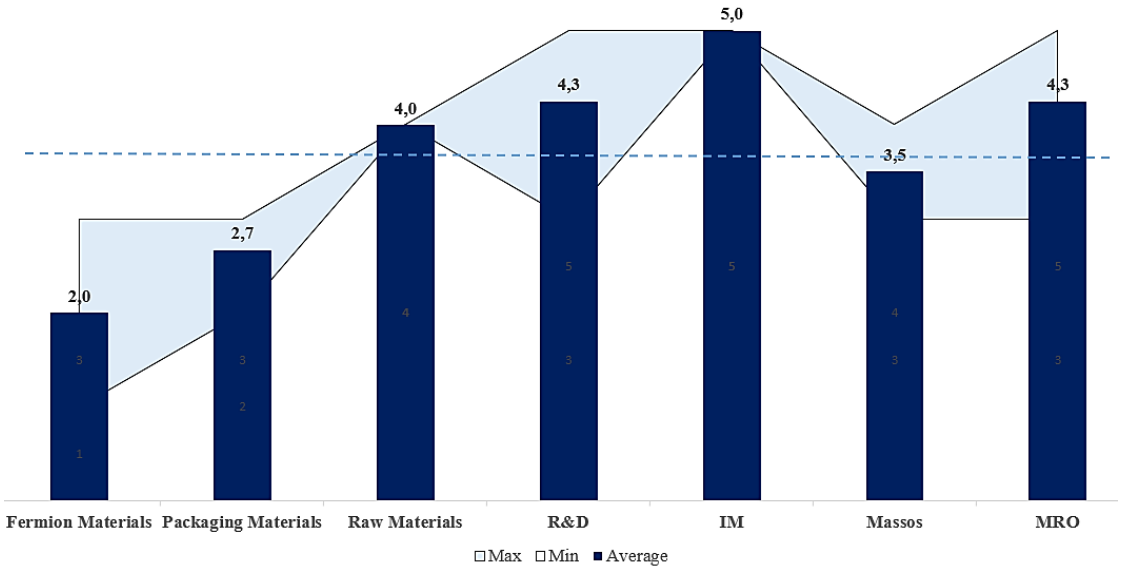

Figure 33 Average and range of the likelihood of applying the innovation sourcing process across procurement sub-categories

Despite the high overall ranges, the ranges within sub-categories are fairly low as illustrated in the figure. The highest range is 2, which is reported in the MRO, Supplies & Facility, R&D and Fermion Materials sub-categories. Nevertheless, the low sub-category ranges indicate that the most significant differences in scores are derived from differences between categories and sub-categories, not between individual sourcing manager responses within a specific sub-category.

Next, the sourcing managers were asked to evaluate which phase or phases within the innovation sourcing process seem challenging to apply in practice. The respondents were able to select multiple phases and were given a comment field to further elaborate on why the phase seems challenging. The foreseen challenging phases are reported across indirect and direct categories and subsequently across sub-categories in Table 10. The table presents the amount of observations for each process phase and the “none” option.

Table 10 Foreseen challenging innovation sourcing process phases

Category	Sub-category	Count of respondents	Challenging phase					
			None	Define	Discover	Ideate	Test & Develop	Transfer
Indirect	Information Management	1	1	0	0	0	0	0
	MaSsOs	2	1	0	1	1	1	0
	MRO, Supplies & Facility	4	0	2	1	1	2	1
	R&D	4	1	1	0	1	1	0
	Total	**11**	**3**	**3**	**2**	**3**	**4**	**1**
Direct	Fermion Materials	2	0	2	1	2	1	1
	Packaging Materials	3	2	1	0	1	1	1
	Raw Materials	2	1	1	0	0	0	0
	Total	**7**	**3**	**4**	**1**	**3**	**2**	**2**
	Grand total	**18**	**6**	**7**	**3**	**6**	**6**	**3**

Overall, one third of the respondents stated that none of the phases seem challenging, further clarifying in the comment section that it is difficult to evaluate challenges before applying the process in practice. The amount of "none" responses was equal in indirect and direct categories. However, overall, the define phase was considered most challenging to apply in practice as seven respondents selected this phase. On the contrary, the discover and the transfer phases were considered least challenging as only three respondents selected these phases. Ideate and test & develop phases received each six votes. As illustrated in Figure 34, there is no distinct difference between indirect and direct categories regarding the level of challenge in each process phase.

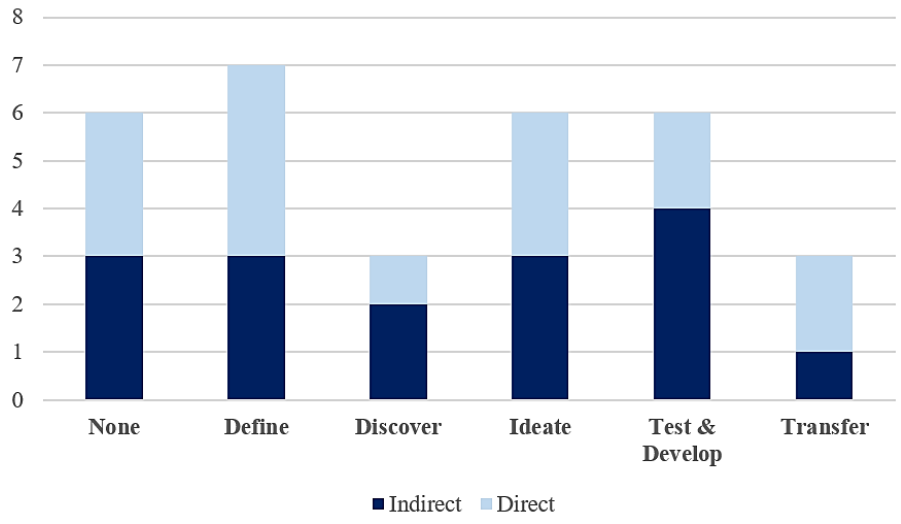

Figure 34 Differences between indirect and direct categories regarding challenging process phases

Regarding least challenging phases, transfer phase was selected only once in indirect and discover only once in direct. On the contrary, define phase was considered most challenging in direct and test & develop in indirect. Despite relatively similar emphasis across

phases, the test & develop phase received most variation between indirect and direct responses with four selections from indirect and only two from direct categories. Moreover, no clear patterns emerge when scrutinizing the sub-categories. Thus it is rational to compare only indirect and direct category results.

Despite no clear patterns, one distinction is the univocal emphasis of the define phase in direct sub-categories. The define phase was the only phase which was considered challenging in all direct sub-categories. All four respondents commented this phase. Overall, all sourcing managers highlighted that the specifications for their materials are strict and thus procurement should be involved earlier in the development process to be able to influence the specifications. A Raw Material sourcing manager's comment summarizes this view: *"It seems that there is always clear instructions and specifications from elsewhere on what to source for and it is challenging to get to the earlier stage of the project where the supplier's ability to innovate could still be utilized"*.

In addition, a sourcing manager from Fermion materials stated that the identification of potential suppliers within the define phase would also be challenging in practice due to the substantial amount of resources required to produce a material. Thus, *"this leads to the fact that if the specification of the material is even slightly more difficult, there should be considerable amount of business with the supplier prior to the project so that the development would be beneficial for both parties. Therefore, in principle, we should only look at e.g. partner classification suppliers, because if the material is new to the supplier, they require a lot of resources and possible investments to produce it."*

Moreover, comments regarding the define phase within the indirect sub-categories were more focused on how to define the outcome specification from the end user's perspective in practice rather than how to be able to influence the specifications. A sourcing manager from MRO, Supplies & Facility commented that *"it is difficult to describe the outcome or functional specifications, because we are so used to describing only the technical specifications – what kind of tools could help us in this?"* Furthermore, a R&D sourcing manager noted the challenge to manage the changing outcome by stating that *"also, the outcome may change slightly as work progresses and different functions discuss project needs"*.

Regarding the most challenging phase in indirect sub-categories, the test & develop phase, three out of four comments emphasized that the challenge concerning this phase is the fact that it is new and it requires a lot of resources from both parties. A MRO, Supplies & Facility sourcing manager stated that *"Fast paced testing is new for us and would require practicing".* Also, a sourcing manager from R&D stated that *"this is a concept and we have not tried it before"* although the sub-category has at times deviated from the traditional sourcing process.

Furthermore, the discover phase received only two votes from indirect sub-categories, both sourcing managers commented on the lack of knowledge of the toolbox methods and

at times the substance discussed. A MaSsOs sourcing manager commented that *"choosing a method from the toolbox requires that we should be trained on what should be done in a POC, pilot and hackathon. Also, this should be supported with some kind of contract templates, if a contract is applicable at this stage."* Also a MRO, Supplies & Facility sourcing manager commented that *"choosing the method requires also deep understanding on certain field of science or chemistry to be able to understand the potential value of the possible suppliers' innovation".*

Finally, the sourcing managers were asked to provide possible improvement ideas regarding the overall process or solely individual phases. Overall, 12 out of 18 sourcing managers commented, from which eight were from the indirect category and four from direct category. No clear patterns could be found within sub-category comments, which was primarily due to the small amount of comments. Thus, it is rational to make comparisons primarily between the indirect and direct category.

All direct category comments stated the challenge of applying the process in general due to the inadequate sourcing volumes and thereby the lack of interest from suppliers' perspective as the process requires significant resources from suppliers. Thus, two out of four sourcing managers stated that the categories could find this applicable in certain cases in which the regulation is not as strict. Consequently, procurement can also influence the specifications. Moreover, two out of four sourcing managers also stated that parts of this process could be applied in direct procurement sourcing, where applicable. Also, a sourcing manager stated that the process is not applicable in direct procurement. However, *"the need on the direct side is more on the SRM and supplier collaboration, as the biggest challenges are related to the availability of materials (too small volumes) and how this could be improved. For example joint purchases with other pharma companies to increase purchase volumes and thereby improve price advantage and availability."*

On the contrary, as can be interpreted from the average likelihood of applying the process (4.2), the indirect category sourcing managers did not highlight any particular improvement areas, but mainly were looking forward to applying the process to seek for improvements. Six out of eight sourcing managers stated that it is challenging to provide any improvements regarding improvements as the process seems applicable as such and thus it is important to boldly test the process, and thereby provide experiences and possible process improvements. A comment provided by a MaSsOs sourcing manager is a good representation of the indirect category comments: *"We just have to boldly pilot this process and thus gain more experience. Maybe by this we have more ideas on the concrete tools to be created such as contract templates and agendas for workshops. Also, the process instructions must make it clear that only parts of this process can be used"* Furthermore, a MRO, Supplies & Facility sourcing manager further elaborates that *"We Finns are so pragmatic, that it would be useful to share examples across procurement of how innovatively this process can be applied in different cases."*

The remaining two comments differing from other indirect category comments were both provided by R&D sourcing managers. Both managers commented more so on best practices as they had already deviated from the traditional sourcing process. Both sourcing managers highlighted the importance of the define phase and especially the project management aspect of this phase. One sourcing manager stated that *"The internal discussions in the initial phase should be done as widely as possible to be able to take various aspects into account. Consequently, the necessary studies and their schedules are taken into account and the overall outcome is clear to everyone."* The other manager further summarized that *"I see that this is really about a project with a clear goal, a plan and a budget, and that procurement is part of this project".*

In conclusion, based on the questionnaire results, no process refinement on the workshop version of the process was considered required at this point. The questionnaire data provided valuable information regarding the application context, whilst the improvement ideas where only minor and thus cannot be generalized in all categories. However, due to multiple comments on having to be able to apply only parts of the process, the instructions for the innovation sourcing process should clearly emphasize this.

6 DISCUSSION AND CONCLUSIONS

In this chapter, the key findings from the empirical section of this thesis are compiled and interpreted whilst simultaneously reflecting these on the theoretical findings. Thereby, the proposed research questions are answered and theoretical and managerial implications are provided. Finally, the underlying limitations to this research are described and possible future research topics are proposed.

6.1 Answering the research questions

The objective of this research was to contribute to the identified research gap on the sourcing process alignment with innovation generating efforts. To address this aim, this research sought to answer *what kind of sourcing process should the case company adopt to enable the generation of innovations* (RQ1) and thereby, *when should the developed process be applied* (RQ2). Consequently, this chapter is divided into the following two sub-chapters according to the aforementioned research questions. Both sub-chapters are constructed as follows. First, key findings from the company interviews, case company workshops and the weak solution market test are summarized and reflected on the identified theory. Subsequently, based on the findings, the research questions are addressed.

6.1.1 Innovation sourcing process model

To answer the first research question, *what kind of sourcing process should the case company adopt to enable the generation of innovations*, a framework process was constructed based on the relevant literature. Due to the gap in literature on the sourcing process alignment with innovation generating efforts and thereby the absence of an integral framework for an innovation sourcing process, the literature review aimed at identifying process design principles from multiple literature disciplines. The identified disciplines were: new product development, innovation management and sourcing process design. Subsequently, utilizing the identified design principles, a theory-based innovation sourcing process was developed (Figure 19).

Furthermore, to provide detailed insights on the optimal process design in practice, four large Finnish companies, in which a similar process had already been implemented, were interviewed. Consequently, based on the theory and the empirical findings, a case company specific innovation sourcing process was developed as a result of three case company workshop sessions.

Despite the theory-based process being constructed from multiple research discipline principles, the findings from the interviews are essentially consistent with the proposed theory-based innovation sourcing process. Although the four processes had variability, similar high-level phases, define, discover, test & develop and transfer, could be identified which were aligned with the theory-based process. Nevertheless, Company B's and D's processes were most similar to one another and the literature process. Thereby, this indicates similar practices in the ICT context as both companies mainly applied the process to ICT sourcing. Moreover, the theory-based process was heavily influenced by software development induced principles such as iterative agile development (Beck et al. 2001), lean startup (Ries 2011) and design thinking (Kelley & Littman 2011). These principles were more evident in Company D's process and thus this process was overall most congruent with theory.

Overall, the most significant difference between the company processes and the theory-based process was the practices implemented in the test and development phase. None of the companies included a prototype phase before development and only Company D incorporated an iterative MVP development phase as highlighted in the lean start up literature (Ries 2011). Company C, however, had applied co-development with multiple suppliers, but this had been implemented only with current suppliers. Companies A and B only included a piloting or POC to evaluate the supplier and solution to proceed with selection.

Consequently, in contrast to the theory-based process, these findings suggest that the majority of the company processes (A, B and C) represent a somewhat linear and lean approach to sourcing rather than an iterative innovation approach. The companies only set functional specifications for the solution. After this they rapidly proceed to evaluate the solution and supplier capabilities in practice for supplier selection according to defined performance metrics, but do not iterate in developing a novel solution.

This interpretation is further supported by the mentioned prerequisites and the added value which deviate from the proposed literature principles. All companies mentioned strategy but did not explicitly mention an innovation strategy (Bank & Raza 2014; Naoui-Outini & Hilali 2019) nor defining innovation (Bargheh et al. 2009) as proposed in literature as prerequisites to applying the process. Moreover, regarding realized added value, all companies emphasized flexibility or decreased lead time and verifying the solution in practice. However, none of the companies specifically stated the generation of innovations, but merely new solutions. Consequently, this suggests that the interviewed companies primarily utilize the alternative sourcing process to source for standard solutions with minor company specific modifications rather than having the suppliers develop tailored solutions for the companies.

In light of the innovation management literature, the above mentioned would suggest that the new solutions represent at most incremental innovations rather than radical innovations as defined by Cooper (1998). However, as an outlier, Company C had developed completely new sales concepts with the co-development method, representing radical innovations (Cooper 1998). However, this had been done only with current suppliers. Furthermore, Company A interviewee mentioned having an aligned SRM process to support innovation enhancement and Company B interviewee stated they should also implement an innovation aspect to their SRM process. Consequently, this would support the emphasis of innovation enhancement primarily in current supplier relationships as identified by Aminoff et al. (2015). Whereas, according to the findings in this research, the sourcing processes are more so being transformed leaner rather than to enhance innovations per se.

Enhancing innovations in current supplier relationships rather than in a sourcing process could be supported by inadequate test and development phase methods, difficulties in risk management such as IPR or forming an adequate level of trust with a completely new supplier. All companies did highlight the importance of mutual trust for collaboration practices and especially IPR negotiations as a crucial aspect to risk management. These findings are consistent with literature in which long-term trust (Van Echtelt et al. 2008) and relational capabilities (Pulles et al. 2014) are stressed as prerequisites to innovation contribution in a buyer-supplier development collaboration.

However interestingly, despite the emphasis on innovation in the SRM process, none of the companies incorporate incentivizing contracting practices such as pricing models to develop the sourced solution further as suggested in literature (Tekes 2013). This would suggest that the bridge between the sourcing and the SRM process, meaning the contractual practices, have not been aligned in practice and that the innovation enhancement is merely enabled by other SRM process practices. On the other hand, the lack of incentivizing contracting practices in practice might be a consequence of widely applied standard company templates for final contracts, which were mentioned by all four companies. Furthermore, the lack of sufficient legal counsel resources, as pointed out by half of the companies, and sourcing managers' insufficient legal knowledge to substantially deviate from company templates might explain the absence of incentivizing contract.

However, despite significant discrepancies in the test and development phase amongst all company processes and the theory process, all companies univocally gave priority to the define phase activities. The companies especially highlighted the need analysis and outcome definition which is consistent with the proposed theoretical framework (Cooper & Kleinschmidt 1994; Axelsson & Wynstra 2002; Brown 2009). All companies furthermore stressed the importance of including the end users in the need analysis and to defining the outcome specification as proposed by Brown (2009). Moreover, the significance of the define phase was further reflected on similar prerequisites. Aligned with theory (Fitzpatrick 1996; Narasimhan & Das 2001; Narasimhan & Kim 2002), all companies

emphasized the importance of seamless collaboration and transparency with stakeholders and other solution end users to be able to have visibility into the needs, trends and prioritizations.

However, interestingly only Company C had incorporated a business partner collaboration model and was the only company to emphasize also SMI as a prerequisite to collaboration and applying the process. This would indicate evidence for Zsidisin et al. (2015) claim that SMI is fundamental in procurement's ability to comprehensively contribute in cross-functional discussions. Nevertheless, the significance of a thorough define phase could indicate that both lean and innovation sourcing approaches are driven by similar fundamentals: end user centricity and stakeholder proximity.

Based on the findings described above, the case company specific process was developed after a series of three workshop sessions. The workshop participants included all case company category managers, identified stakeholders from each sub-category, head of indirect and direct procurement and the procurement function's director. The final high-level case company specific process is presented in Figure 35. The process was not refined after receiving feedback from all case company sourcing managers (weak market solution test) and thereby the presented process answers the first research question: *what kind of process should the case company adopt to enable the generation of innovations?* Next, the developed case company specific process is further described in detail.

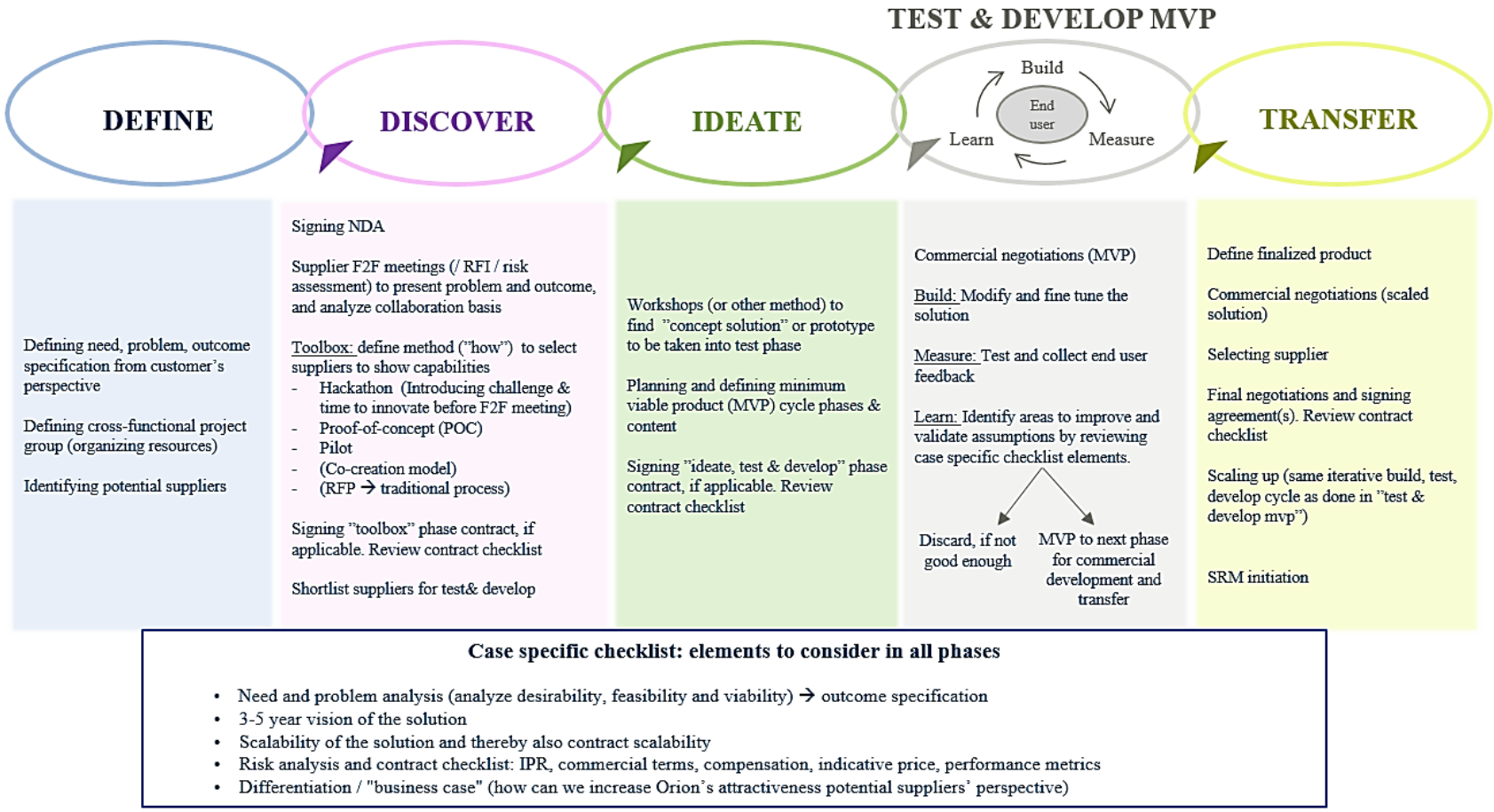

Figure 35 The final case company specific innovation sourcing process

In essence, the aim of the developed innovation sourcing process is to steer the case company to first comprehensively examine the fundamental customer need and problem and thereby define the functional specification for the sourced solution. After this, the company can rapidly examine and test potential solutions and solution providers in practice and finally iteratively build a MVP and scale up the most promising solution. Thus, the innovation sourcing process is characterized by iteration, end user centricity and supplier collaboration to build and negotiate a win-win solution, which addresses the end user need and achieves the defined functional specification. Moreover, the sourced solution can be a company specific tailored solution, a supplier's standard solution or something in between the former and latter.

The process consists of five main phases, define, discover, ideate, test & develop and transfer. The process does not proceed sequentially from one phase to another, but will contain case specific iteration between the main phases as the case specific checklist is reviewed during each phase.

First, in order to apply the process, the case company should ensure that the following prerequisites are realized: 1) the relevant business area has a clearly communicated and prioritized innovation strategy, which is shared internally with procurement and possibly externally, 2) the company understands end customer needs and problems, 3) the company can organize sufficient resources for applying the process, 4) the project group has management support and mandate for applying the process and making decisions accordingly, 5) the company has a sufficient level of SMI to identify market trends and potential suppliers, and 6) the process is supported by a pro-innovation culture, which promotes a "fail fast and accept risks" mindset.

The listed activities under each main phase represent typical activities to be conducted during the phase, but should be adopted case specifically. Also, the order of these activities is not mandatory. Furthermore, the case specific checklist takes into account the typically critical factors, which should be case specifically assessed and adjusted during each phase as the company gains more information of the sourced solution. Thus, if an item on the checklist does not apply to the case, for example no IPR is generated, this item should simply be marked as N/A. However, the N/A items should also be further re-evaluated in the next phase to manage risks. Thus, the purpose of the checklist is not to increase process rigidity, but rather ease risk management and remind the project group about the typical critical factors that should be taken into account and re-evaluated during the process. Next, each main phase and the according activities will be described concisely one-by-one.

The define phase is triggered by the emergence of a need. The need can be an internal or external customer need and thus, for the sake of clarity, both are referred to as the end user of the sourced solution. During the define phase, emerged needs should be comprehensively examined by design thinking methods such as interviewing or shadowing the

end user to identify the fundamental problem and need. Consequently, a target, outcome specification, can be defined. For example, digital marketing does not reach enough customers and the outcome specification is to increase the coverage by x percent. Consequently, no specific solution is yet defined, only an outcome to the identified problem. However, the company can define mandatory parameters such as the geographical scope or product portfolio to be able to indicate the scope of the case to potential suppliers. Moreover, aligned with Kahn's (2009) suggestion, an internal cross-functional or multi-functional sourcing project group should be defined and potential suppliers should be explored.

Next, the purpose of the discover phase is to seek innovation potential suppliers which could develop the final solution according to the functional specification. The methods to assess the supplier capabilities take into account the broad spectrum of sourcing cases. Thus, the toolbox of supplier evaluation methods includes multiple alternatives. All alternatives however promote the importance of evaluating the suppliers' relational capabilities as this is considered important for the subsequent solution development collaboration. Moreover, before detailed discussions, the company should always manage risks by signing an NDA with potential suppliers. Subsequently, after shortlisting the suppliers based on the selected toolbox method, if applicable, the company should sign a test and development contract and include the applicable contractual elements from the case specific contract checklist.

Before proceeding to test and develop the solution, the case company should define the solution, meaning the technical specifications, with each selected supplier. The parties should now agree on what will be developed according to the functional specification: is it a solution from the supplier's current offering or will the supplier develop a completely novel solution. Before testing, the supplier should show a concrete conceptualization or prototype of the solution and the parties should plan the content of the subsequent MVP cycle phases accordingly. Also, if applicable, the parties may agree to sign a contract for the MVP development phase and thereby the case company should again review the case specific contractual checklist.

The purpose of the test & develop phase is to iteratively develop a MVP, meaning a solution that fulfills the minimum value-adding features by placing the end user at the center of the development cycle to regularly provide feedback. According to the planned MVP cycles, in the ideate phase, the MVP is first build, then tested by the end users and subsequently improved or discarded based on the end user data which is analyzed against predefined metrics. Finally, after a necessary amount of build-measure-learn cycles, the case company can select the most promising MVP(s) to the transfer phase for final commercial negotiations, selection and scale up.

Finally, the transfer phase entails final commercial negotiations on the scaled solution and a final supplier selection. Also, relevant contracts should be negotiated by taking into

account the relevant contract checklist elements. Finally, the solution is scaled up under the relevant contracts and the SRM process is initiated accordingly.

Next, comparing the developed case company specific process to the developed theory-based process and the four company processes, the case company process is most congruent with the theory-based process and Company D's process. The most significant indication of this is the emphasis on iteration and the test and development phase practices, which were incorporated into the case company process.

Aligned with the agile development (Beck et al. 2001), lean startup (Ries 2011) and design thinking (Kelley & Littman 2001) literature, uncertainty demands iteration. Thus, the company should not only review and refine the outcome specification but also other sourcing parameters such as contractual aspects as the solution gradually evolves. This was more clearly incorporated in Company D's process than in the theory-based process. Furthermore, as specified by Company D, reviewing the outcome requires reviewing the long term three to five year vision of the solution to mitigate scalability risks, which was not highlighted in literature. Consequently, these iteration aspects combined from theory and Company D process, were incorporated into the case company checklist.

In addition to the iterative approach, the checklist represents case specificity, which was not identified in the literature review, and thus not incorporated in the theory-based process. This reflects the origins of the process design principles, which primarily stem from software development and thus do not take into account variability across other sourcing contexts. Concerning case specificity, the case company specific process incorporates a toolbox approach to discovering suppliers, which also deviates from the theory-based process. Only Company C had a toolbox approach to the discover phase as the process is applied across indirect and direct procurement sourcing cases similarly to the case company's intention.

However, despite different discover phase methods, the case company methods emphasize relational capabilities over technical characteristics in supplier selection by primarily evaluating the suppliers' interest in collaboration, which is consistent with Pulles et. al (2014) suggestions. Thus, based on this research, this would suggest that Pulles et al. (2014) proposition is also valid in new supplier selection for innovation collaboration despite it being proposed to only current supplier relationships.

In addition to iteration, the conformance with the theory-based process' test and develop methods indicates that the case company process represents more of an innovation approach than a lean approach, which is more aligned with theory-based process than the interview company processes. All test and develop phase design principles were incorporated into the case company process. However, the case company specific process also includes elements that were not identified in theory nor in the interview company processes.

First, the case company process includes an additional ideate phase, which was not identified in the literature nor the interview company processes as such. The phase includes suppliers showing a prototype as suggested by Ries (2011), but additionally prepares for the MVP development cycle by contracting and planning the iterations. This additional phase including the additional activities indicates the risk management approach to developing the solution, which was substantially emphasized by the case company.

Finally, the last significant addition to the case company process, which deviates from the theory-based process and interview company processes was to incorporate pro-activeness to induce the innovation sourcing process. The case company specific process includes sharing the innovation sourcing strategy and vision not only internally as emphasized in literature (Bank & Raza 2014; Naoui-Outini & Hilali 2019) and executed by all companies, but also externally in applicable forums such as the company website or exhibitions. Clearly communicating the future needs and focus areas to potential new suppliers could also provide assistance in SMI initiatives as new suppliers could contact the company and thereby reduce sourcing managers' burden in exploring the market for suppliers. However, this requires the prioritization of the needs (Brown & Wyatt 2010) and readiness to commence the process by organizing sufficient resources (Koen et al. 2001). Nevertheless, the significance of proactively communicating future needs to new suppliers provides an interesting finding to innovation development and SMI initiatives, which might gradually induce increased open innovation sourcing cases (Chesbourgh 2003).

6.1.2 Application context

Regarding the application context, theory-based propositions and company interview findings were aligned. As proposed in light of the literature review, all company interviewees stated that the process is applied when the sourced solution is not known or the company wants to tap into suppliers' knowledge. This would imply that the application of the process is considered suitable when sourcing according to functional specifications (Axelsson & Wynstra 2002; Van Weele 2005) as proposed in the light of the literature review.

Furthermore, the companies did not specify whether the sourcing cases were "make" or "buy" induced as proposed in light of the literature review. However, all companies applied the process mainly in indirect procurement categories. This would imply that the cases where buy driven as the indirect procurement categories typically represent procuring solutions which do not account for the company's research and development efforts

to take a product or service from conception to market (Cefis & Triguero 2016). Furthermore, aligned with theory, none of the companies limit the application of the process to a specific spend threshold.

To answer the second research question, *when should the developed innovation sourcing process be applied,* a questionnaire (Appendix 3) was sent to all case company sourcing managers (n=22) to evaluate the likelihood of applying the process and seek further improvement ideas. The questionnaire response rate was 83% (n=18). This questionnaire represents the weak solution market test, which is central to evaluating the applicability and thereby worth of the developed innovation sourcing process, according to the adopted constructive research approach (Lukka 2000).

Essentially, the theory-based and company interview findings are aligned with the case company weak solution market test findings. The weak solution market results provided two fundamental determinants, solution specification, and company and case attractiveness, which should be analyzed when considering the application of the innovation sourcing process.

First, as an interpretation of the workshop discussions and questionnaire results, the application of the developed case company process should not be limited to any specific indirect or direct procurement sub-category. However, the application of the context should first be analyzed from the sourcing case specification perspective, meaning is the company sourcing for a functionally or technically specified solution. If the company is sourcing for functional specifications, outputs or outcomes (Axelsson & Wynstra 2002), the innovation sourcing process would seem to be applicable according to this determinant. Aligned with the theoretical proposition, also workshop participants stated that typically these sourcing cases deal with sourcing for a completely new need or the change to the current solution is significant.

Furthermore, the solution specification determinant is supported by the weak solution market test results. The overall case company average regarding the likelihood of applying the process was 3.7 on a scale from 1 to 5, which indicates that the process passed the weak solution market test (Lukka 2000). However, the likelihood average varied between indirect and direct procurement, as the average in indirect category was 4.2 whereas the direct category average was 2.9.

Nevertheless, there was a clear difference between the range of indirect and direct sub-category averages. For example, in direct sub-categories, the average for the Raw Materials sub-category was 4.0 whilst the average for Fermion Materials was 2.0. Consequently, aligned with the theoretical proposition, these findings imply that the application of the process should not be limited to indirect or direct procurement nor any specific sub-category. Rather, the process should be applied when sourcing according to functional specifications, overlooking if the process is induced by a make or a buy decision.

Furthermore, the specification determinant is supported by the findings regarding the foreseen challenges of the developed process. The respondents were asked to pinpoint which high-level process phase could prove challenging in practice within their sourcing context. There was a significant difference between indirect and direct procurement answers as the define phase was clearly selected as the most challenging phase by direct procurement respondents, whilst test and develop phase was foreseen most challenging by indirect procurement respondents. Thus, as an interpretation, the variation between indirect and direct procurement averages and the foreseen difficulty of the define phase in direct procurement categories would suggest that there are more functional specification cases in indirect procurement than in direct procurement.

Reflecting the aforedescribed findings to the theoretical proposition of applying the process (Figure 9), this would suggest that open innovation sourcing cases are induced more from the buy decision than from the make decision. This supports the presented RBV theory (Wernerfelt 1984; Barney 1991). The innovation sourcing process represents the process of converting supplier expertise (VRIN resources) into innovations (positional advantages). Thereby, companies should harness the innovation sourcing process only in case it does not possess VRIN resources to enhance innovations itself (Luzzini et al. 2015.). Thus, it is profitable to exploit external opportunities using innovation sourcing process rather compromise core competencies to try to internally create new skills for new opportunities. In contrast, the lower level of open innovation cases in direct procurement shows that the company converts its core competencies to innovations independently. Thus, the sourcing cases from the NPD process are typically technically specified (Axelsson & Wynstra 2002; Van Weele 2005) once introduced to procurement.

The second determinant, company and case attractiveness, to applying the process was not proposed in light of the literature review as such, but is supported by the company interviews and questionnaire findings. All of the interviewees from the four companies stated that they have not had any problems attracting suppliers to participate in the sourcing process and thus did not state any methods to lure suppliers into participating. However, all companies emphasized ensuring mutual trust and suppliers' interest in collaboration. This would suggest that the companies had applied the process to cases in which the company and, or the case were essentially seen attractive.

Furthermore, regarding the case company weak market solution test, the direct procurement respondents giving low scores for the likelihood of applying the process commented that the fundamental challenge to applying the process is the fact that it requires significant supplier resources and the company is not sufficiently attractive in all cases. The low attractiveness was mainly described as low purchase volumes. These findings are consistent with Pulles et al. (2014) empirical findings that the company attractiveness, which can eventually yield a preferred customer status, is central to suppliers' innovation contribution. Thus, the company should be able to evaluate their attractiveness and seek

ways to appear more attractive to suppliers if necessary (Ellegaard et al. 2003; Ramsay & Wagner 2009). Consequently, the case company should evaluate its own and the relevant sourcing case's attractiveness from a supplier's perspective and select the innovation sourcing process only if the attractiveness is considered sufficient.

In conclusion, to properly answer the second research question, *when should the case company apply the developed innovation sourcing process*, an evaluation matrix is created based on the aforementioned findings and conclusions. The fourfold matrix is presented in Figure 36. The identified determinants, buyer company and sourcing case attractiveness and solution specification, are placed on the horizontal and vertical axes respectively. Moreover, company and case attractiveness is evaluated from low to high and solution specification from technical to functional as defined by Van Weele (2004) and Axelsson & Wynstra (2002). This matrix is applicable when innovation is a key strategic priority such as in the case company.

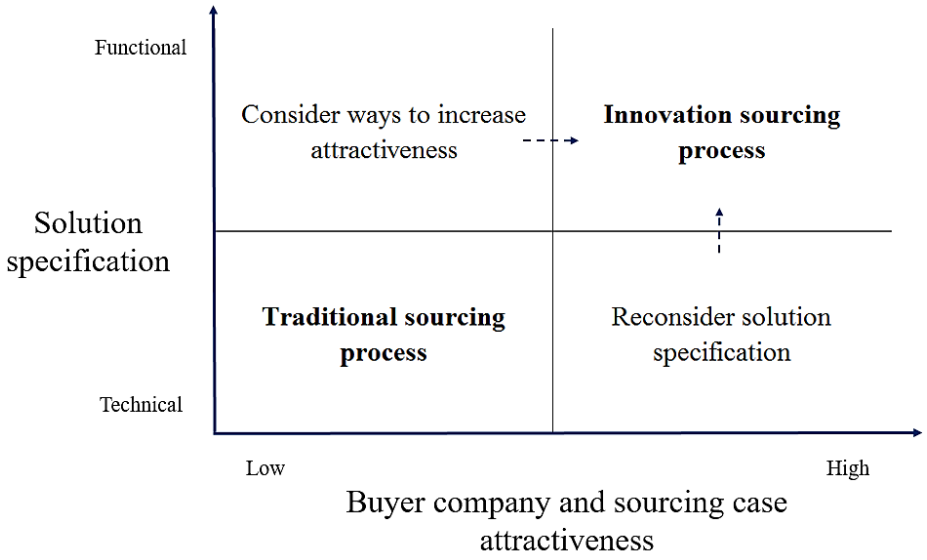

Figure 36 Fourfold matrix to evaluate the application of the innovation sourcing process when innovation is a key strategic priority

Thus, when considering the application of the innovation sourcing process, the buying company should evaluate if the specifications of the solution are technical (input or throughput) or functional (output or outcome) as defined by Van Weele (2004) and Axelsson and Wynstra (2002). Also, the company should assess if its own and the sourcing case attractiveness from potential suppliers' perspective is low or high. For example, is the scope of the sourcing case attractive enough from the potential suppliers' perspective in order to participate in the resource intensive sourcing process?

The company should apply the traditional sourcing process if the solution to be sourced is characterized by technical specifications, meaning that the company is able to explicitly define the precise technical specifications required, and the company and case are not perceived attractive by potential suppliers, meaning for example the purchase volume of the specified solution is low. In contrast, the company should apply the innovation sourcing process when the solution is characterized by functional specifications, meaning that the company might have some boundary conditions to the solution but primarily is able to specify merely the result of the sourced solution, and the company including the sourcing case is perceived attractive by potential suppliers.

Furthermore, to increase enabling innovations by sourcing, the company should seek ways to increase its attractiveness on the market (Pulles et al 2014; Ellegaard et al. 2003; Ramsay & Wagner 2009) if the solution is functionally specified. If the company succeeds in increasing its own or the case attractiveness, for example by pooling demand to increase the sourcing case scope, the company should apply the innovation sourcing process to increase innovation generation efforts. Similarly, if the company and case is perceived highly attractive from the potential suppliers' perspective, but the solution specifications are technical, the company should find ways to reconsider the specification and thereby the fundamental end user need. Thus, the company should assess if it would benefit from defining functional instead of technical specifications to increase the likelihood of innovations by applying the innovation sourcing process.

6.2 Practical contribution

This research provides versatile practical contributions. Furthermore, these contributions are not merely limited to the case company, for which this research was conducted as an assignment, but also extend to the interviewed companies and any other company interested in enhancing their innovation efforts within procurement.

First, the sampling of companies to be interviewed provides an interesting current state review regarding the maturity of innovation sourcing efforts in Finland as dozen high procurement maturity companies were contacted. This unveiled that the innovation efforts within sourcing, meaning implemented innovation sourcing processes, are currently scarce in practice. Nevertheless, all contacted companies showed considerable interest in the topic, which might indicate a future trend in developing an alternative innovation sourcing process and gradually shifting towards applying this instead of the traditional sourcing process when applicable. Consequently, harnessing the innovation potential of the sourcing process would amplify companies' benefits from the SRM innovation initiatives as companies would essentially select high innovation potential suppliers to their network.

Second, the findings from the literature review provide a starting point not only for companies seeking to develop an innovation sourcing process, but also for companies merely interested in what are innovations, why are they important and how can procurement enhance them specifically by developing an alternative innovation sourcing process. Thus far, the information regarding innovations and the sourcing process has been scarce and more focused on the SRM process efforts. Consequently, the literature review provides a convenient and compiled overview of the topic for anyone interested in reviewing one.

Third, the interview findings collected from the four ”pioneer” companies, which have already implemented an innovation enhancing sourcing process, provide an accessible and comprehensive benchmark compilation on the proven practices, challenges and prerequisites for applying the process. Furthermore, these findings together with the literature review principles were utilized to develop the case company specific innovation sourcing process, which provides a fifth benchmark process for any interested company. Similarly, the findings and conclusions provide the four interviewed companies benchmarks and insights on how to further develop their innovation sourcing process. Furthermore, the developed evaluation matrix provides a useful tool for sourcing managers to evaluate whether to use the traditional (RFx) process or the innovation sourcing process, considering innovation is a key strategic priority.

Also, even if a company’s procurement function is not mature enough to adopt an innovation sourcing process, the process nonetheless provides concrete elements to potentially consider incorporating into a traditional sourcing process, such as how to manage risks when sourcing for completely new solutions. Yet, the process can present new insights when for example leaning traditional sourcing process. Also, these elements could be considered applicable in the public procurement context for enhancing innovations as this research limited the scrutiny of innovation sourcing to the private sector.

Finally, for companies interested in proceeding to develop an innovation sourcing process, this research provides a concrete and detailed roadmap on how to develop one. Consequently, companies could review and further adjust the methods explicitly described in this research, such as the detailed workshop agendas and the questionnaire template for asking feedback, to ones needs.

6.3 Managerial recommendations for the case company

This research provided substantial practical contribution to the case company. The company gained insights on a novel subject matter, received benchmark from four “pioneer” companies on the process structures, proven best practices and practical challenges of

applying an innovation sourcing process. Furthermore, a case company specific innovation sourcing process and an evaluation matrix for applying the process were constructed to the case company needs.

Also, the benefit of developing a practical innovation sourcing process was not merely limited to the constructed case company specific process as such, but also provided a common, cross-functional shared development experience for key stakeholders and procurement professionals across procurement categories. Thus, the development of the process by the means of three interactive workshops provided a forum to share insights and knowledge on innovation development and innovative process design across business functions and procurement categories. Moreover, the sourcing managers, who did not attend the workshops were heard as they provided feedback regarding further development ideas and the likelihood of applying the process in practice.

As this research represents a work in progress at the case company, this research yielded a variety of further managerial recommendations on how to develop the process and subsequently proceed to applying it in practice. Intrinsically, the developed process is merely a high-level process description as it was developed to be adopted by all case company procurement sub-categories. Thus, as a first managerial recommendation, each sub-category together with the category and all sourcing managers should further review the process and add any sub-category specific details to for example the case specific checklist. These details and additions should be shared across other sub-categories to exchange ideas.

Next, as concluded by the majority of the supplier managers, to find out challenging phases or general hurdles in applying the process, the developed process needs to be first piloted on couple of well-suited pilot sourcing cases. The selection of an applicable sourcing case should be done according to the developed evaluation matrix. Furthermore, to provide more and generalizable insights on further process development, the pilots should be conducted in different sub-categories. Also, to further mitigate risks, the pilots should be conducted in the sub-categories that mentioned to have already deviated from the traditional sourcing process by implementing similar innovation sourcing elements. The sub-categories that have already deviated from the traditional process are: R&D, MaSsOs and IM.

Prior to commencing the pilots, the case company should identify any concrete gaps to conducting a pilot and thereby patch these if needed. For example, the case company should first review the defined prerequisites to applying the process and assess whether there are gaps between the current and the defined state that would hamper conducting the pilots. Furthermore, as commented by some case company sourcing managers, the case company should identify the need and content of possible contract templates, test and development workshop agendas and specific risk analysis factors prior to executing the pilots.

After piloting the process, the case company should organize a lessons learned session with the same participants that attended this research's workshops. Thereby, the participants could evaluate the need for further process development and organize a similar development workshop utilizing the methods applied in the second and third workshop of this research. In addition, the lessons learned sessions should re-evaluate the need and content of possible contract templates, test and development workshop agendas and specific risk analysis factors in light of the executed pilots. Ultimately, the case company could create a process master e.g. excel file (Koen et al. 2001), which includes the evaluation matrix, process steps, detailed case specific checklist elements and any other relevant material or information to support the application of the innovation sourcing process. Also, the measurement of procurement effectiveness should be subsequently evaluated when the process has been applied widely due to the identified misalignment of the current sourcing KPIs.

Lastly, the general managerial recommendations relate to the findings from the weak market solution test and thereby constructed evaluation matrix (Figure 36). As suggested by the means of the developed matrix, the case company should seek to increase its attractiveness and reconsider the solution specification, if applicable to increase enabling innovations by sourcing.

Consequently, regarding the attractiveness determinant of the evaluation matrix, the case company should further assess what other elements than low purchase volume contribute to its attractiveness. For example, as suggested by one sourcing manager, the company could either pool its own demand to a smaller amount of suppliers when possible or attempt co-sourcing with partners to increase purchase volumes. Nevertheless, these contributing factors could be directly asked from current supplier by a questionnaire. The case company could ask for example, which elements the suppliers value in a customer and how the case company performs on each element from the supplier's perspective. This would also provide information about which current suppliers consider the case company as a preferred customer and are potential innovation collaborators as suggested by Pulles et al. (2014). Thereby, in areas where the attractiveness cannot be increased and thereby the innovation sourcing process is not applicable, the case company should seek to focus more on the SRM process innovation efforts to enable innovations.

Finally, regarding the solution specification determinant of the evaluation matrix, the case company should further develop the transparency and proximity to stakeholders as the define phase was considered overall most challenging by sourcing managers. This would enable sharing strategy and vision, and developing an innovation roadmap as included in the defined process prerequisites. Furthermore, the reconsideration of the solution specification requires that procurement and the solution end user, internal or external, have clear communication and collaboration practices to enable sharing for example strategy and future needs. Close proximity could be enabled for example by a business partner

model as utilized by Company C, transferring sourcing managers to sit in the same office spaces with key stakeholders, sharing performance metrics or developing SMI practices as suggested by Zsidisin et al. (2015).

Furthermore, regarding the make induced sourcing cases, the case company should examine why majority of the sourcing cases from the NPD process are technically specified. Is there a possibility to transform the technically specified cases into functionally specified cases by involving procurement earlier in the NPD process to provide SMI related knowledge and thereby include supplier in the solution design.

Moreover, as suggested in the workshops sessions, the developed innovation roadmap should be clearly communicated also externally to proactively induce the innovation sourcing process. Consequently, once the innovation roadmaps are developed with different business areas, a clear and compiled innovation roadmap should be published on an applicable external forum such as the company website. Obviously, the externally included roadmap should include only the focus areas that do not disclose any business secrets and which the company is ready to respond to.

6.4 Theoretical contribution

In addition to versatile practical contribution, this research makes also theoretical contributions. First, it contributes to filling the identified literature gap on the sourcing process alignment with innovation development. As highlighted in literature, innovations have become increasingly important for organizations' growth efforts (Luzzini et al. 2015) and have also been recognized as one of the basic competitive priorities in corporate competitive strategy in addition to cost, quality, delivery and flexibility (Buffa 1984; Ward et al. 1990; Ettlie 1995; Cohen et al. 1996; Krause et al. 2001). Thereby, also procurement literature has increasingly highlighted the importance of exploiting suppliers' knowledge for increased innovation performance (Schiele 2006; Un et al. 2011; Pulles et al. 2014). However, thus far, the research on procurement's efforts to enable the generation of innovations has been primarily limited to procurement's SRM process initiatives (Aminoff et al. 2015) with little if any research on sourcing process related development. Consequently, this research as a whole contributes to extending the exploration of innovation efforts in procurement from SRM to sourcing by combining current theoretical insights with practical implications.

In addition to identifying the literature gap, this research contributes to filling it by constructing a novel innovation sourcing process and evaluation tool regarding its application. These constructs were created by first identifying relevant research disciplines and assembling design principles and thereby a theory-based innovation sourcing process as a theoretical framework to this research. After this, the constructs were further developed

based on current practical processes implemented by four large Finnish companies. Furthermore, the findings from theory and practice were utilized to create an innovation sourcing process and an evaluation matrix for the use of the assigning case company of this research.

In addition to a novel innovation sourcing process to fill in the literature gap, the process of developing the construct provides an additional contribution to theory as similar researches do not exist. Thus, the research process, including the selected research methods, provides a novel example of how to create an innovation sourcing process. Similar data collection and analysis methods could be worth considering when developing for example a traditional sourcing process.

Overall, this research provides new theoretical perspectives on innovation management and procurement. Also, the findings of this research represent a gradual shift from the traditional sourcing process to a more outcome specific, end user centric and iterative way of doing sourcing, which thereby enables the generation of innovation. Furthermore, the interest in practice towards the subject matter could imply a future trend in exploring sourcing process opportunities to enabling the generation of innovations.

6.5 Limitations and future research suggestions

This research represents work in progress at the case company and has the traditional caveats and limitations associated to single case study methods in one sector and in a specific context. Thus, the developed innovation sourcing process and the identified application context are designed according to the case company context and needs, and therefore limit directly transferring the process into another company's use.

Furthermore, the conclusions drawn from the company interviews represent only four Finnish companies and thus, these findings and conclusions are not widely generalizable. Consequently, also the reflections made to theory and thereby done interpretations should be carefully examined by taking into account the relatively small sample size. Moreover, any further limitations and the quality of this research is scrutinized in Chapter 4.2.6.

This research represents a starting point for further researches on how companies could transform the traditional sourcing process into an alternative process to enable the generation of innovations. Thus, to increase generalizability, the developed case company specific process should be tested by different companies in different industries and procurement categories to further identify new and or contrary findings on how and what kind of process should be designed. In addition, different sourcing process designs might vary depending on companies' procurement function's maturity level. Nevertheless, once an optimal design has been validated, future research should seek to identify how to measure

procurement effectiveness when applying the innovation sourcing process in contrast to the traditional sourcing KPIs.

Finally, extending the examination of innovation sourcing from the acquiring company to suppliers, the application of the process from suppliers' perspective would provide an interesting future research topic. The research could explore what capabilities and pre-requisites are required from a supplier when attending an innovation sourcing process compared to a traditional sourcing process.

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APPENDICES

Appendix 1: Interview guide

Interview guide

The aim of the study is to explore what kind of innovation sourcing process should the case company develop in order to promote innovations, and thereby to which sourcing contexts should the process be applied. The research questions are the following: what kind of sourcing process should the case company adopt to enable the generation of innovations? (RQ1) and when should the developed process be applied? (RQ2).The term innovation sourcing process refers to a more outcome based way of sourcing, compared to the traditional RFx process, which thereby promotes the generation of innovations.

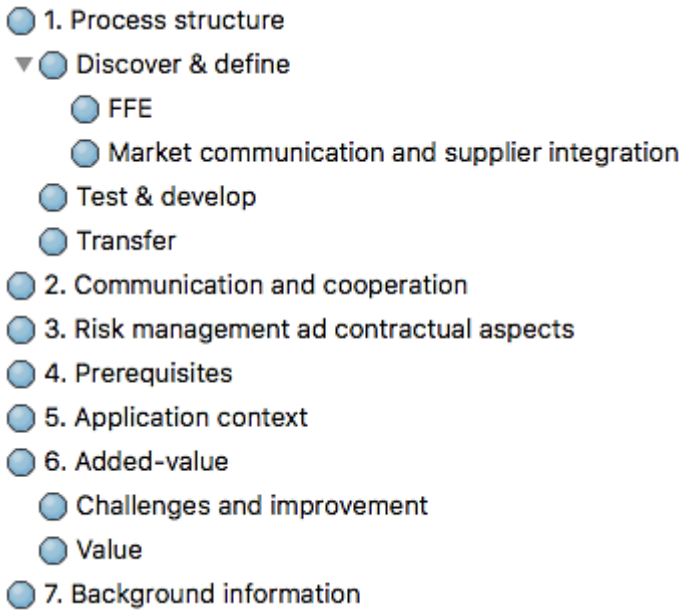
The aim of this interview is to identify experiences and best practices from companies that have already implemented an innovation sourcing process in practice. The interview questions (10) are categorized into six themes: 1. Process structure, 2. Communication and cooperation, 3. Risk management and contractual aspects, 4. Prerequisites, 5. Application context, and 6. Added-value.

The anonymity of the interviewee and the company is guaranteed. The information provided by the interviewee will be described in the research in a way that the identity of the interviewee or organization cannot be connected to the information and events handled in the interview.

Theme	Interview question
1. Process structure	Process description: 1. What does your company's innovation sourcing process typically look like? What are the main phases? 2. What kind of practices or factors to be considered should each phase include?
2. Communication and cooperation	3. Internally, who typically participates during the process and how do you organize responsibilities amongst participants? 4. How do you cooperate with suppliers?
3. Risk management and contractual aspects	5. How do you manage risks during the process? What kind of contractual aspects should especially be considered? 6. How do you increase suppliers' interest in participating in the process? (e.g. compensation for development)
4. Prerequisites	7. What kind of prerequisites do you have for applying the process?
5. Application context	8. What kind of sourcing projects is the process applied to?
6. Added-value	9. What kind of added-value has the application of the process yielded on the short and long term? 10. What kind of weaknesses does your process have? How could these be prevented or developed?

Thank you for the interview!

Appendix 2: Nvivo node structure



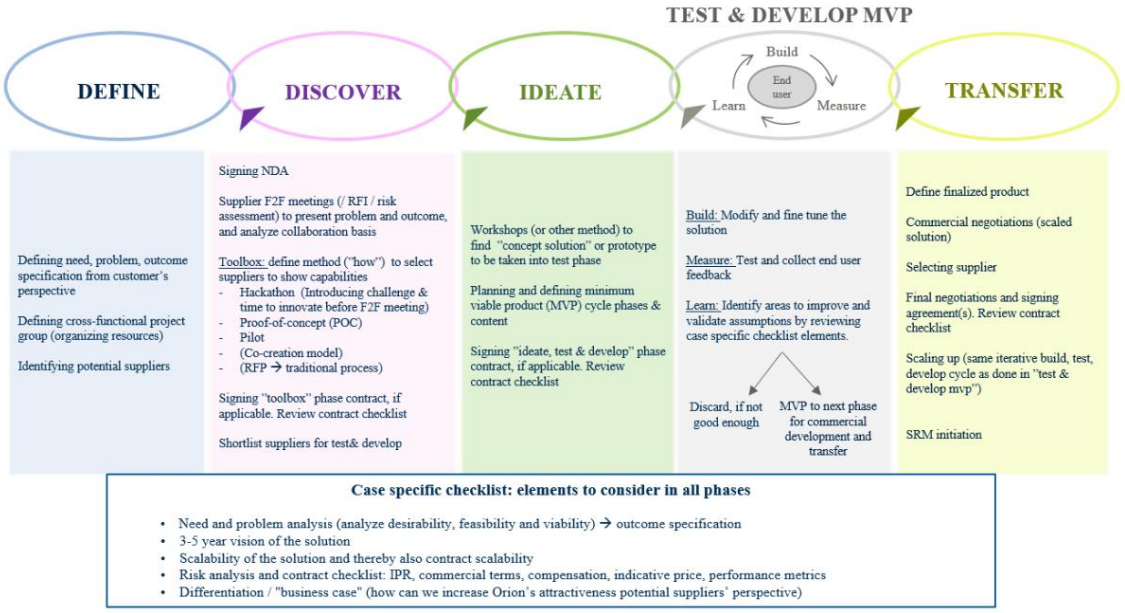
Appendix 3: Weak solution market test (questionnaire)

The Innovation Sourcing Process

1. Which category do you work in? *

- ○ Raw Materials, Direct
- ○ Packaging Materials, Direct
- ○ Fermion Materials, Direct
- ○ MRO, Indirect
- ○ IM, Indirect
- ○ R&D, Indirect
- ○ MaSsOs, Indirect

The developed innovation sourcing process is presented below



2. The innovation sourcing process is created to be applied when only the outcome of the solution is known and thus a comprehensive specification/requirements list cannot be made AND/OR we want to tap into suppliers' expertise to solve the problem or need.

Overall, I consider the alternative innovation sourcing process applicable in my sourcing context in the aforementioned case. *

	1	2	3	4	5	
Strongly disagree	○	○	○	○	○	Strongly agree

3. Which phase(s) do you consider challenging to apply in your sourcing context? Please provide an explanation. *

- ☐ None
- ☐ Define
- ☐ Discover
- ☐ Ideate
- ☐ Test & develop
- ☐ Transfer

4. How would improve the process (overall or specific phase)?