



## TIIVISTELMÄ

<b>Tekijä:</b>	Rebecca Mansner
<b>Tutkielman nimi:</b>	Leagile kategoriajohtaminen – Lean ja ketterien menetelmien hyödyntäminen kategoriajohtamisessa
<b>Tiedekunta:</b>	School of Business and Management
<b>Tutkielman valmistumisvuosi:</b>	2019
<b>Pro Gradu-tutkielma:</b>	Lappeenrannan–Lahden teknillinen yliopisto LUT, 131 sivua, 13 kuviota, 2 taulukkoa & 1 liite
<b>Tarkastajat:</b>	Anni-Kaisa Kähkönen, Katrina Lintukangas
<b>Avainsanat:</b>	Hankinta, strateginen hankinta, kategoriajohtaminen, Spend-analyysi, Lean, ketterä, Scrum ja Leagile

Tämän tutkimuksen tarkoituksena on perehtyä kategoriajohtamiseen epäsuoran hankinnan näkökulmasta ja tutkia miten hankinta voi hyödyntää Lean ja ketteriä menetelmiä kategoriajohtamisessa. Tutkimuksen tarkoituksena on kontribuoida hankinnan kirjallisuuden edistämiseen tarjoamalla tietoa rajallisesti tutkitusta aiheesta perehtymällä kokonaisvaltaisesti kategoriajohtamisen prosessiin ja sen kehittämiseen Lean ja ketteriä menetelmiä ja työkaluja hyödyntämällä. Tutkimus suoritettiin kvalitatiivisena tapaustutkimuksena, koska tutkimuksen avulla halutaan ymmärtää tutkittavaa ilmiötä syvällisemmin. Tutkimuksen empiirinen aineisto kerättiin puolistrukturoitujen haastattelujen avulla ja tutkimuksessa haastateltiin kahtatoista henkilöä, joista kahdeksan edustaa epäsuoran hankinnan ammattilaisia ja neljä edustaa Lean ja ketterien menetelmien asiantuntijoita. Tutkimuksessa saadut tulokset perustuvat tutkimuksen teoriaosuudessa esitettyihin tutkimuksiin ja kirjallisuuteen, sekä haastattelujen avulla kerättyyn empiiriseen tutkimusmateriaaliin. Tutkimus osoittaa, että Lean ja ketterät menetelmät eivät ole toisiaan poissulkevia vaan niitä voidaan käyttää kategoriajohtamisen eri prosessivaiheissa tuomaan ketteryyttä, sekä tunnistamaan ja poistamaan hukkaa. Empiirisen tutkimuksen perusteella ketteryyttä voidaan tukea tutkimuksessa tunnistetuilla mahdollistajilla ja huomioimalla menetelmiin liittyvät haasteet. Tutkimuksen perusteella digitaalisilla ratkaisuilla nähdään olevan myös hyvin tärkeä rooli menetelmien tukemisessa.

## ABSTRACT

<b>Author:</b>	Rebecca Mansner
<b>Title:</b>	Leagile category management – Utilizing Lean and agile methods in category management
<b>Faculty:</b>	School of Business and Management
<b>Year:</b>	2019
<b>Master's thesis:</b>	Lappeenranta-Lahti University of Technology LUT, 131 pages, 13 figures, 2 tables & 1 appendix
<b>Supervisors:</b>	Anni-Kaisa Kähkönen, Katrina Lintukangas
<b>Keywords:</b>	Procurement, strategic sourcing, category management, Spend-analysis, Lean, agile, Scrum and Leagile

The aim of this research is to study category management from the perspective of indirect procurement and to examine how procurement can manage categories in a more Lean and agile way. The purpose of the research is to contribute to the development of procurement literature by providing information on a topic for which only a limited amount of research exists, through a comprehensive understanding of the category management process and its development by utilizing Lean and agile methods and tools. The study was conducted as a qualitative case study because the research aims to gain a deeper understanding of the phenomenon being studied. The empirical data of the research was collected through semi-structured interviews and twelve individuals were interviewed, eight representing indirect procurement professionals and four representing Lean and agile methods specialists. The results of the research are based on the research and literature presented in the theoretical part of the research, as well as empirical research material collected through interviews. The research shows that Lean and agile methods are not mutually exclusive but can be used in different stages of category management process to bring agility and to identify and eliminate waste. Empirical research suggests that procurement can manage categories in a more Lean and agile way by utilizing the enablers identified in the research and by addressing the challenges of the methods. According to the study, digital solutions are also seen to play a very important role in supporting the methods.

## ACKNOWLEDGEMENTS

As this thesis is being finalized, my five years journey at Lappeenranta-Lahti University of Technology LUT is nearing completion. At this point, I would like to sincerely express my special thanks to our university's knowledgeable and skilled professors who have provided first-class teaching and thus enabled the comprehensive development of our knowledge. Many thanks to the fellow students for providing an inspirational and motivating learning environment and for creating the true spirit of Skinnarila. In addition to my accumulated know-how, I will continue my journey with the memories and friendships that last a lifetime.

For this thesis, a big thank you goes to the case company who provided the opportunity to do this research. I would like to warmly thank my supervisor from the commissioning organisation and all those who took part in the interviews for their time and effort. I truly appreciate your contribution and without you this would not have been possible. Special thanks go to my professor Anni-Kaisa Kähkönen for her professional guidance, valuable perspectives and constructive feedback.

Finally, I would like to extend my warmest and most sincere thanks to my family, Fabian and friends, who have been the greatest and most invaluable support throughout my studies. This thesis is dedicated to my brother, who had an amazing ability to create something new, and who always challenged the traditional ways of thinking. This idea is also at the heart of this thesis. As Grace Hopper has once said, the most dangerous phase in the language is "we've always done it this way."

In Helsinki, August 18<sup>th</sup>, 2019

Rebecca Mansner

## TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>6</b>
1.1 Research problem objectives and limitations .....	8
1.2 Research methodology .....	10
1.3 Conceptual framework.....	11
1.4 Key concepts of the research .....	12
1.5 Structure of the research .....	14
<b>2. CATEGORY MANAGEMENT PROCESS IN PURCHASING .....</b>	<b>15</b>
2.1 Stage 1 – Initiation .....	17
2.2 Stage 2 – Insight .....	21
2.2.1 Spend-analysis .....	21
2.2.2 Purchasing Portfolio models .....	22
2.2.3 Supplier preferencing.....	28
2.3 Stage 3 – Innovation .....	29
2.4 Stage 4 – Implementation .....	32
2.5 Stage 5 – Improvement .....	33
2.5.1 Supplier relationship management.....	33
2.5.2 Continuous improvement.....	36
<b>3. LEAN AND AGILE METHODS IN CATEGORY MANAGEMENT.....</b>	<b>37</b>
3.1 Lean concept .....	37
3.1.1 Six Sigma .....	39
3.1.2 Lean Six Sigma.....	41
3.1.3 Lean tools.....	42
3.2 The concept of agility .....	44
3.2.1 The framework of agile supply chains.....	45
3.2.2 Agile framework Scrum.....	46
3.3 Bringing Lean and agile together.....	49
<b>4. EMPIRICAL ANALYSIS OF LEAGILE CATEGORY MANAGEMENT .....</b>	<b>50</b>
4.1 Description of the case company .....	50
4.2 Research methodology.....	54
4.2.1 Data collection .....	55
4.2.2 Data analysis .....	58

4.2.3 Reliability and validity.....	60
4.3 Leagile category management in the case company.....	62
4.3.1 Utilizing Lean tools in category management .....	63
4.3.2 Scrum as an enabler for agile category management .....	70
4.3.3 The role of digital solutions in supporting agile category management.....	78
4.3.4 Enablers and obstacles of Lean and agile category management .....	86
<b>5. CONCLUSIONS AND DISCUSSION.....</b>	<b>92</b>
5.1 Theoretical implications .....	107
5.2 Managerial implications .....	109
5.3 Limitations and suggestions for the future research .....	110
<b>REFERENCES.....</b>	<b>112</b>

## **LIST OF APPENDICES**

Appendix 1. Interview questions .....	130
---------------------------------------	-----

## **LIST OF FIGURES**

Figure 1. Conceptual framework of the study .....	12
Figure 2. Category management process (O'Brien 2019, 89). .....	17
Figure 3. Day one analysis (modified from O'Brien 2019, 132). .....	18
Figure 4. RAQSCI model (O'Brien 2019, 144). .....	20
Figure 5. Purchasing portfolio analysis (Cox 2014). .....	23
Figure 6. Supplier preferencing model (modified from Steele & Court 1996). .....	29
Figure 7. Risk diagram (Hallikas et al. 2004) .....	31
Figure 8. Portfolio analysis + supplier preferencing (modified from O'Brien 2019, 361). ..	35
Figure 9. DMAIC cycle (modified from Pepper & Spedding 2010) .....	40
Figure 10. Lean tools (Singh et al. 2006). .....	42
Figure 11. Agile supply chain framework (Christopher et al. 2004). .....	45
Figure 12. Scrum framework (Eloranta et al. 2016). .....	48
Figure 13. Leagile category management process .....	98

## **LIST OF TABLES**

Table 1. Value levers model (modified from O'Brien 2019, 136) .....	20
Table 2. Description of the interviews .....	56

## 1. INTRODUCTION

According to O'Brien (2019, 10), procurement today has more opportunities than ever to add significant value to the organization and its stakeholders, and category management represents one of the most important enablers to realize these opportunities. Category management can provide a major value improvement not only in terms of reduced prices, but also in reducing costs and risks, boosting innovation, brand value, improving efficiency and strengthening company's competitive position. Moreover, it can provide a strategic framework for companies to decide the best possible sourcing approaches. Category management is said to make a clear contribution to the bottom line or EBITDA (earnings before interest, taxation, depreciation and amortization) and it can also have a significant impact on the value delivered to corporation's shareholders. For listed companies, category management is increasingly seen as having the ability to raise, hedge or recover the share price. (O'Brien 2019, 20) The potential of category management to create value in multiple ways has been demonstrated by the best companies, where shorter lead times and stronger supplier relationships are just few examples of the benefits that can be achieved through category management (Partida 2012).

As the current business environment is characterized by strong global competition (Kocabasoglu & Suresh 2006) and the role of supply has changed to more strategic (Ahtonen & Virolainen 2009), companies must selectively target their limited human, financial and technical resources for the supplier relationships they expect to generate the highest value (Day, Magnan & Moeller 2010). Day et al. (2010) state that investing to a certain supplier relationship is critical decision for companies as the value of the supplier relationship is based on the decision of which suppliers the company has decided to work with. For this reason, companies must carefully segment their supply base, with the aim of building supplier relationships with suppliers who support their company in different ways (Day et al. 2010). O'Brien (2009, 46) states that company's supply base is an integral part of their resources and in order for any corporate strategy to be effective, companies need to consider the role of supply base to support how the organization will achieve its goals. Partida (2012) also highlights that the main goal of category management is to establish deep relationships with suppliers to get the most out of the sourcing.

In order for companies to cope with constantly increasing global competition, many companies have invested in continuous improvement of all aspects of their business while simultaneously developing and refining processes to minimize overall waste (Singh, Kumar, Choudhury & Tiwari 2006). To succeed in this companies from many different sectors of the economy have adopted Lean Management in recent decades (Martínez-Jurado & Moyano-Fuentes 2014). Lean and Six Sigma have gained a lot of attention by representing perhaps one of the most popular and effective management philosophies for achieving functional and service excellence in any organization today (Corbett 2011). The combination of Lean and Six Sigma philosophies - Lean Six Sigma - has a valuable position as being one of the best-known hybrid continuous improvement methodologies, which has led many organizations around the world to adopt it in order to improve their competitiveness (Cherrafi, Elfezazi, Chiarini, Mokhlis & Benhida 2016). According to Wood (2015), Lean management can be powerful and effective for procurement because it enables the company to improve processes and develop employees when embedded in management practices. Lean can be utilized by procurement in category management, supplier relationship management, risk management as well as data management (Wood 2015).

Recently increasing number of companies have also introduced an agile way of working (Eloranta, Koskimies & Mikkonen 2016). This is not surprising since the aim of agility is to be the first, fastest and the best (Kisperska-Moron & de Haan 2011). Agility has helped companies to gain a competitive edge, as it enables companies to respond in a timely and efficient manner to market volatility and other uncertainties and thus strengthen their competitive position (Gligor 2014). According to Stellman and Greene (2014), agile can be seen as a set of methods and methodologies that help teams in different organizations to think more effectively, work more efficiently as well as to make better decisions. Agile methods have become increasingly popular and used in projects because they deal directly with the challenges of working with dynamic projects in a changing environment (Serrador & Pinto 2015). Eloranta et al. (2016) state that when looking at the actions of individual companies and development teams, agile development usually means using at least some of the practices of commonly used agile development framework Scrum. In line with this van Van Ruler (2015) argues that “one of the methods for acting agile is Scrum”. As one of the developers of the Scrum model, Jeff Sutherland, has stated “The type of project or problem doesn’t matter - Scrum can be used in any endeavor to improve performance and results”

(Sutherland 2015). Layton and Morrow (2018) also emphasize that although Scrum is primarily used by software developers, it is also ideal for many different work tasks and industries. Therefore, Scrum can also be used in category management (Procurement Leaders 2018).

In Scrum people work as a team and are jointly responsible for achieving the set goals (Srivastava and Jain 2017). According to O'Brien (2009, 43), category project is often carried out by a cross-functional team whose task is to work together on the category management, therefore, this group naturally forms a Scrum team. Giunipero and Percy (2000) have identified ten skills as most important skills of purchasing and supply management professional. The set of skills include interpersonal communication, ability to make decisions, ability to work in teams, analytical, negotiation, managing change, customer focus, influencing and persuasion, strategic, as well as understanding business conditions (Giunipero & Percy 2000). With the Scrum model, procurement can utilize the identified skills of procurement professionals within the Scrum team. In line with this it has been shown that with Scrum companies can, among other things, optimize resources according to skills and strengths, optimize the resources used during the lifecycle of the sourcing as well as improve job satisfaction (Procurement Leaders 2018). In order to get the most out of the benefits of both Lean and agile, these methods do not have to exclude each other (Kisperska-Moron & de Haan 2011) instead Lean and agile methods can be used together, despite their differences (Purvis, Gosling & Naim 2014), to leverage synergies of both concepts (Naylor, Naim & Berry 1999), known as Leagile. When companies try to improve the level of competition, the importance of understanding how to become Lean and agile is even greater than before (Narasimhan, Swink & Kim 2006).

### **1.1 Research problem objectives and limitations**

Procurement is considered to be an important resource to help the company achieve high levels of quality and cost savings (Carr & Peason 1997), because they affect quality, cost, technology and supplier response and thus have a direct impact on the company's ability to compete (Mcivor, Humphreys & Mcaleer 1997). In order for procurement to succeed, effective and efficient category management is needed. The purpose of this research is to study category management from the procurement point of view and to provide

comprehensive understanding on the management of the categories, focusing in particular on how the procurement can bring Lean tools and techniques as well as agile methods to category management process. The aim of this research is to understand deeper and more comprehensively how procurement can utilize Lean tools in category management and how procurement can bring agility to the category management through the agile framework Scrum. The study aims also to recognize how different digital solutions, such as task and project management software Jira in the context of the case company, can be used to enable and support agility in category management process. This study also seeks to identify key enablers of leanness and agility by recognizing what competencies are essential in order to manage categories in a more Lean and agile way. In addition, the study aims identifying the obstacles preventing leanness and agility in category management.

As there is a limited number of existing academic studies that have been conducted on the category management (Heikkilä & Kaipia 2009), which would provide comprehensive knowledge on how to manage categories in a more Lean and agile way the aim of this study is also to create new knowledge to a previously unexplored topic. That said the study does not only seek to identify existing Lean and agile methods but also to find new methods and tools that the procurement can utilize in their daily business. The study approaches the subject by building on existing theories and studies, as well as exploring new methods and then reflecting them on the case company practise. The goal of the study is to provide a comprehensive answer to the main research question as well as to the four sub-research questions that support the main research question. The aim of this study is to find methods and tools that are generally usable in a similar operating environment and can be used to manage also other categories inside the case company in a more Lean and agile way. On the basis of the research gap observed and the objectives of the study the main research question of this thesis is formulated as follows:

- *How can procurement manage categories in a more Lean and agile way?*

In order to achieve the objectives and to answer the main research question, sub-research questions have been set up to support the main research question. By answering the four sub research questions author seeks to find a comprehensive answer to main research question. The main research problem is supported with the following sub research questions:

- *How can procurement utilize Lean tools in category management?*
- *How can the agile framework Scrum bring agility to the category management?*
- *How can different digital solutions support agility in category management?*
- *What are the main enablers and obstacles of agile and Lean category management?*

There are certain issues that are excluded from the study. This study is limited to category management process and the study focuses on utilizing Lean tools and techniques and agile methods such as Scrum in category management process. This study follows the category management process presented by O'Brien (2019) and introduces the essential process steps. Thus, optional steps are excluded from the study. The research is made from procurement point of view and therefore supplier's perspective is excluded from this study. The study is limited to indirect categories of spend and therefore direct categories are left out of the study. Direct categories refer to raw materials, components or services that are directly part of the final product, whereas indirect categories refer to products and services that cannot be directly considered as a part of the final product or make is possible for the company to function overall (Gebauer & Segev 2000; O'Brien 2019, 6). As O'Brien (2009) has stated, category management and supplier relationship management should be integrated in order to be effective, but as supplier relationship management is an entire topic all of its own this study does not dive deep into the supplier relationship management (SRM) instead it is viewed as part of the category management process. The starting point for the study is that the case company has completed a segmentation of the categories and prepared a category project schedule for all categories and for this reason, the study does not focus on the opportunity analysis across all categories but instead opportunity analysis is viewed at the category specific level.

## **1.2 Research methodology**

The research has been implemented by using a qualitative research methodology. Alasuutari (2011, 31-32) states that the qualitative analysis consists of a step of "reducing observations" and a step of "solving a riddle". In the process of reducing observations, the material is first examined from many different perspectives, after which the number of observations is reduced by combining them. Solving a riddle refers to the ability to interpret meanings and create entities as a result of the observation entity (Alasuutari 2011, 32-35). The qualitative

research method has been chosen as a research methodology as qualitative research is ideally suited to deepen understanding of the phenomenon studied (Hirsjärvi, Remes & Sajavaara 2005). The nature of the research and the empirical material supported the selection of qualitative research methodology.

The thesis is made based on the existing literature, previous research and interviews. The empirical material of the research is collected through interviews conducted for pre-selected Lean and agile as well as procurement professionals. Interviews are conducted in a semi-structured manner. Semi-structured interviews are characterized by interview questions that are same for all, but no ready-made answers are used, instead the interviewees may respond in their own words (Eskola & Suoranta 1998, 64). Interviews are chosen as a data collection method, as interviews allow the author to better understand the phenomenon studied and thus provide more detailed information to support the study. According to Yin (2009), interviews can be seen as a one of the most important and essential sources of case study information therefore a case study has been used as a data collection method for the study as it can be used to understand more deeply the phenomenon studied (Syrjälä, Ahonen, Syrjäläinen & Saari 1994, 11-12). Studies also show that case study enables to assemble rich empirical data and this way to obtain more comprehensive understanding of the phenomenon studied (Kähkönen 2011). Case study has also been found valuable by many authors in the research made in the fields of supply chain management, purchasing and supply management (Kähkönen 2011), which indicates that the selected method is suitable for the phenomenon studied in this thesis.

### **1.3 Conceptual framework**

According to Jabareen (2009), conceptual framework is a network of interrelated concepts that together provide a comprehensive understanding of the phenomenon being studied. Concepts that form a conceptual framework support each other, express their phenomena, and form frame-work specific philosophy (Jabareen 2009). The theory part of this study presents the main theories of the research area and examines their subsequent development. The literature review introduces the previous studies related to the phenomenon studied. The conceptual framework of this study is illustrated in the figure 1. The conceptual framework bases on the category management which is described more detail in this research as a five-

step category management process presented by O'Brien (2019, 96), which includes process stages (1) initiation, (2) insight, (3) innovation, (4) implementation and (5) improvement. Different Lean tools and technologies together with agile methods such as Scrum are brought to conceptual framework to illustrate how they can bring agility and leanness to category management process. Thus, the conceptual framework also illustrates how Lean and agile are integrated into category management. Combining Lean methods and tools, agile methods, and category management results in Leagile category management, which is shown at the right end of the conceptual framework.

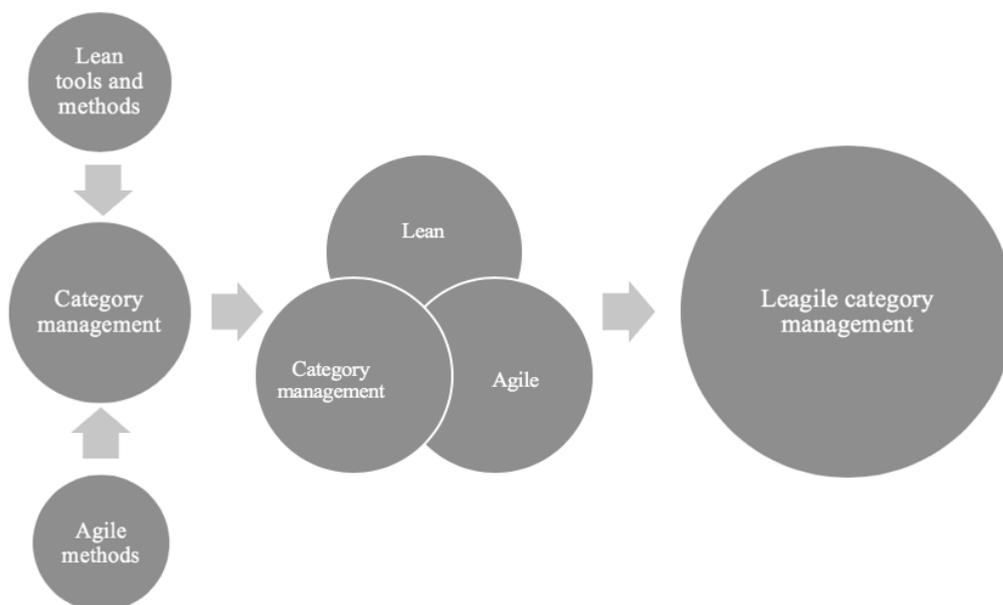


Figure 1. Conceptual framework of the study

#### 1.4 Key concepts of the research

This section briefly explains all the key concepts used in this research. The main concepts of this research are procurement, strategic sourcing, category management, spend-analysis, Lean, agile, Leagile and Scrum.

*Procurement:* Procurement can be defined as the unit that looks after and represents the main interface with the suppliers from which it sources (O'Brien 2009, 44). They source materials, goods, services or people behalf of the organization (O'Brien 2009, 43-44), at the right time and place with the right quantity and quality (Lysons & Gillingham 2003). In this thesis procurement refers to purchasing unit within the company.

*Strategic sourcing:* Strategic sourcing includes elements of “elevation of the purchasing function from the traditional transaction-processing mode to one with a more strategic role; effective cross functional coordination of purchasing with other functions of the firm; and information sharing with and development of key suppliers” (Kocabasoglu & Suresh 2006). Strategic sourcing refers to process that include designing, evaluating, implementing and monitoring important purchasing decisions (Carr & Smeltzer 1997).

*Category management:* Category management can be defined as follows: “The practise of segmenting the main areas of organizational spend on bought-in goods and service into discrete groups of products and services according to the function of those goods and services, and most importantly, to mirror how individual marketplaces are organized. Using this category segmentation organizations work cross-functionality on individual categories, examining the entire category spend, how the organization uses the products or services within the category, the market place and individual suppliers, in order to determine and implement sourcing strategies that will deliver significant value to the organization” (O’Brien 2019, 6).

*Spend-analysis:* According to Heath (2006), the purpose of spend-analysis is to investigate how the company’s money is spent. Ideal spend-analysis shows the suppliers that receive the spend, which are the suppliers that need the spend as well as what commodities or services are purchased with the spend (Heath 2006).

*Lean:* Lean and leanness refer to development of a value stream in order eliminate all waste, including time, and ensuring a level schedule (Naylor et al. 1999). Lean is all about improving processes by eliminating waste and doing things right at the first time or if errors appear they are corrected immediately to minimize the risk of reproduction, which requires greater responsibility and strong commitment of the staff (Machad & Leitner 2010). In this study Lean is viewed as a set of tools and techniques.

*Agile:* Agile and agility refers to: “a business-wide capability that embraces organizational structures, information systems, logistics processes, and, in particular, mindsets” (Christopher 2000). Agility can be defined as: “the ability of an organization to respond rapidly to changes in demand, both in terms of volume and variety” (Christopher 2000).

*Leagile:* Leagile and Leagility refers to combination of both Lean and agile paradigms (Naylor et al. 1999). In this study Leagile refers to combination of agile methods such as Scrum and set of Lean and Six Sigma tools and techniques.

*Scrum:* Scrum is an agile development framework that focuses on value maximization through a self-organized team and iterative process that includes fixed-length development cycles also known as sprints (Eloranta et al. 2016; Srivastava & Jain 2017).

### **1.5 Structure of the research**

The structure of this this thesis is divided into five chapters. The thesis consists of an introduction, a theoretical part, an empirical part as well as conclusions and discussions. Introduction part of this thesis introduces the background and basis of the study and describes the research problem objectives and the limitations of the thesis. The introduction part also includes familiarization with the research methodology and conceptual framework of the research, which helps to create an overall picture of the thesis. The key concepts and structure of the research are also presented and explained in chapter one.

The second and the third chapter after the introduction form the theoretical part of the study. Chapter two examines previous scientific publications and studies related to category management. The second chapter presents the process of category management and discusses in detail all five steps of the category management process. The second theoretical chapter of the thesis, chapter three, discusses Lean concept and agile concept as well as methods based on previous scientific publications and other secondary sources. Combination of both concepts, known as Leagile is also presented in the third chapter of the study. The description of the case company is presented at the beginning of the chapter four. After that follows a presentation of research methodology, case selection as well as data collection and data analysis. After this, Lean and agile category management methods in the case company are discussed and analysed. The final chapter of the study presents the conclusion and discussions. The results achieved in the research are compared with previous research presented in the theoretical part of the research by highlighting the findings that are consistent with theory and analysing results that differ from previous studies. This will be followed by managerial recommendations and further research topics.

## 2. CATEGORY MANAGEMENT PROCESS IN PURCHASING

The concept of category management was introduced in the sales and marketing in the early 1980s. In late 1980s the category management emerged in purchasing. (O'Brien 2019, 8) In the retail sector the category management started in the early 1990 as retailers wanted to improve their margins and boost their competitiveness (Nielsen, Karolefski & Heller 2012). In the retail context category management is said to play a significant role in the success of retail (Gruen 2002). Heikkilä and Kaipia (2009) state that in academic purchasing literature the term category management is not widely used, but in practical literature the term has become more common. In line with this Hesping and Schiele (2015) argue that many concepts of strategy development, such as category management, have been created for practical applications containing only limited references to previous academic work. O'Brien's (2019, 6) comprehensive guide to strategic category management defines the concept of category management as follows: "The practise of segmenting the main areas of organizational spend on bought-in goods and service into discrete groups of products and services according to the function of those goods and services, and most importantly, to mirror how individual marketplaces are organized. Using this category segmentation organizations work cross-functionality on individual categories, examining the entire category spend, how the organization uses the products or services within the category, the market place and individual suppliers, in order to determine and implement sourcing strategies that will deliver significant value to the organization".

According to O'Brien (2019, 43), category management is based on the three foundations that include: (1) taking a strategic approach to sourcing, (2) understanding and managing the market and (3) having a strong change management. Kocabasoglu and Suresh (2006) have studied different definitions of strategic sourcing employed over the years and state that the concept of strategic sourcing includes elements of "elevation of the purchasing function from the traditional transaction-processing mode to one with a more strategic role; effective cross functional coordination of purchasing with other functions of the firm; and information sharing with and development of key suppliers". Strategic sourcing can be seen as the process of designing, evaluating, implementing and monitoring important purchasing decisions (Carr & Smeltzer 1997). Understanding the markets is important to determine the best way to manage them and to know what actions are needed to ensure the best quality and

results (O'Brien 2019, 53). Change management is essential for the effective implementation of the strategy (O'Brien 2019, 55), and should be done by understanding the needs of the company and thereby choosing the right actions needed to drive the change (Merrell 2012).

There are four pillars that are built on the three foundations that are: (1) breakthrough thinking, (2) customer focus, (3) cross-functional teams and (4) use of information and data to support the development of a sourcing strategy (O'Brien 2019, 77). According to Cordell and Thompson (2018), breakthrough thinking in category management refers to making large-scale improvements through changes. From category management perspective, customer focus is seen as the ability to know and interact with customers to understand and respond to their needs throughout the whole process (O'Brien 2019, 62). Cross-functional team consist of members from different functions across the organization (Randel & Jaussi 2003). According to Lovelace, Shapiro and Weingart (2001), cross-functional teams bring together persons from different disciplines and functions who have pertinent expertise and therefore these teams are considered to be highly effective, creative and innovative, as members' diverse expertise enables them to benefit from a wide range of information and new knowledge. O'Brien (2019, 109) states that the most successful category management projects require a cross-functional team consisting of the right people around the business. The optimal size of cross functional category management team is five to six people, consisting of a project manager, team members, stakeholders and an optional facilitator or sponsor (O'Brien 2019, 110). Structured information and data gathering supports the research and analysis of the category (Cordell & Thompson 2018, 34) and sufficient information systems help to collect, compile and analyse category-specific information (Hübner & Kuhn 2012), and should therefore be used to support the development of an appropriate sourcing strategy.

There are many variations of the category management process developed by different purchasing specialists and authors (O'Brien 2019; Cordell & Thompson 2018) as well as institutes (CIPS 2011), each with a different number of process stages and tools. However, the number of stages is not essential instead the most important thing is that the whole organization follows the same process (O'Brien 2019, 89). This study follows a classic five stage category management process presented by O'Brien (2019, 96) and adopted by other authors (Cordell & Thompson 2018), which includes five process stages of (1) initiation, (2)

insight, (3) innovation, (4) implementation and (5) improvement, illustrated in the figure 2. Each stage includes a number of steps to be performed before moving on to the next stage.



Figure 2. Category management process (O'Brien 2019, 89).

The first three phases of the project are shorter, one to three months but require close teamwork to develop the strategy. During the implementation phase, the project takes a new shape and the last two stages take longer, two to eighteen months, depending on the changes needed. As the arrow at the end of the process demonstrates category management process should be seen as a circular process as markets, technology, suppliers and organizations as well as their requirements are constantly changing which creates a need to start the process again. (O'Brien 2019, 97-99) In line with this Cordell and Thompson (2018) state that category management does not have a so-called end point, instead it is a cyclical process that constantly seeks to find better solutions for managing each category of spend.

## 2.1 Stage 1 – Initiation

The first stage of the category management process involves starting the process and creating an early project plan. Initiation stage consists of contacting the relevant stakeholders and agreeing on a strategic plan of actions for the given area of spend (Cordell & Thompson 2018). According to O'Brien (2019), the first stage of the process involves six essential steps that form the main activities of the first stage and these steps are: (1) scoping the category project, (2) STP (situation, target, proposal) tool, (3) stakeholder mapping model RACI (responsible, accountable, consult, inform), (4) day one analysis, (5) value levers and (6) business requirements model RAQSCI (regulatory, assurance of supply, quality, service, cost/commercial, innovation). O'Brien (2019, 92) states that the first workshop should also be organized to plan the team and internal activities. Scoping the category project is essential so that the boundaries of the project are clear to the whole cross-functional team. Definition of the scope of the project should be correct and precisely defined and answer to questions regarding how the category is defined, what the category does, what are the market and

geographical boundaries, are there time-frame implications that affect defining the scope or are there any organizational boundaries to be set (O'Brien 2019, 104). Cordell and Thompson (2018) state that if the category lacks a sense of structure, profile and importance it jeopardizes the ability of the latter process phases to produce significant benefits.

According to O'Brien (2019, 131), STP serves an essential problem-solving tool for all category projects as it allows the group to become aware of an issue and find solutions to solve it by defining together the problem, analysing the current situation, setting targets and finally making a proposal about how the target can be achieved. It is also an effective way of engaging business stakeholders and gathering valuable information for a category plan (Cordell & Thompson 2018, 54). Day one analysis shown in the figure 3, can be used to complement the STP model. O'Brien (2019, 131) states that in day one analysis category, area of spend or product is segmented based on the number of suppliers and buyers in a specific market place to tailored, generic, custom and proprietary. Day one analysis is also known as power check tool as it tells who has the power in each quadrant (O'Brien 2019, 130). According to Bohme, Childerhouse, Deakins and Corner (2008), power phenomenon can be seen as the ability of one party to control the other party's decision. Therefore, day one analysis should be used to recognising why and what the implications of power positions are and what needs to be done to unlock the benefits and unlock the components of the generic category that are bundled to proprietary quadrant (O'Brien 2019, 133). The distinguishing feature of this model from other power matrix models such as Cox's (2015) The Power Matrix is that in day one analysis there is only one supplier or customer or more than one supplier or customer, nothing in between.

Number of suppliers One More than one	<p><b>Tailored</b></p> <p>Buyer has the power</p>	<p><b>Generic</b></p> <p>Buyer has the power</p>
	<p><b>Custom</b></p> <p>Shared power</p>	<p><b>Proprietary</b></p> <p>Supplier has the power</p>
	One	More than one
	Number of customers	

Figure 3. Day one analysis (modified from O'Brien 2019, 132).

Stakeholder mapping model RACI represents a responsibility assignment matrix which offers a common understanding of roles and responsibilities within the team (Cordell & Thompson 2018, 16). According to Hill, Bell, Goldsby and Autry (2013), RACI matrix identifies the roles and responsibilities for all stakeholders involved in the project. It is a company-wide way of thinking, where participation and expectations are effectively shared to accomplish the job (Costello 2012). When changes take place in an organization, it is important to identify the people involved in the process and understand how their role and responsibilities change from the current process to the new process (Hill et al. 2013). O'Brien (2019, 117) state that the RACI model includes assessment of stakeholders based on the project or category by asking questions such as: "Who in the business is responsible for this area, who is accountable, who need to be consulted here, and who needs to be kept informed?" The benefits of the RACI model include less misunderstandings, more efficient use of time, productivity and capacity, fewer disagreements and a clearer picture of roles and responsibilities (Hill et al. 2013). In addition to RACI model there are other alternative models for stakeholder mapping presented in the literature, such as RAM (Responsibility Assignment Matrix), all of which have the same goal of defining roles and responsibilities across the team in relation to goal of the project (Melnic & Puiu 2011).

Value levers are seen as one of the most important tools of the entire category management process. Value levers can be defined as a set of possible positive actions that can be used to achieve increased value. (O'Brien 2019, 135-136) According to Kähkönen and Lintukangas (2012), value can be understood in different ways, but a common way to define value is to see it as an exchange between sacrifices and benefits (Walter, Ritter & Gemünden 2001). In line with this Anderson and Narus (1998) define value as follows: "Value in business markets is the worth in monetary terms of the technical, economic, service, and social benefits a customer company receives in exchange for the price it pays for a market offering." The value levers model consists of six levers of (1) category levers, (2) process levers, (3) supply market levers, (4) supplier relationship levers, (5) supplier incentivization levers, and (6) demand management levers (O'Brien 2019, 136). Each value lever includes different interventions to drive value, presented in the table 1.

Table 1. Value levers model (modified from O'Brien 2019, 136)

Value lever	Intervention to drive value
Category levers	<ul style="list-style-type: none"> <li>• Change specification</li> <li>• Change design</li> <li>• Aggregate spend or demand</li> </ul>
Process levers	<ul style="list-style-type: none"> <li>• Improve process efficiency and capability</li> <li>• Analyse and remove cost</li> <li>• Improve logistics</li> </ul>
Supply market levers	<ul style="list-style-type: none"> <li>• Increase competition</li> <li>• Find new markets</li> <li>• Restructure supply base</li> </ul>
Supplier relationship levers	<ul style="list-style-type: none"> <li>• Improve relationship</li> <li>• Performance development</li> <li>• Seek innovation</li> </ul>
Supplier incentivization levers	<ul style="list-style-type: none"> <li>• Offer commitment</li> <li>• Improve payment terms</li> <li>• Support route to market</li> </ul>
Demand management levers	<ul style="list-style-type: none"> <li>• Buy less or eliminate</li> <li>• Policy and compliance</li> <li>• Increase asset utilization</li> </ul>

Like the RACI model, there are many variations of the business requirements model RAQSCI, such as AQSCI (assurance of supply, quality, service, cost, innovation) (Monczka & Petersen 2012), or QCLDM (Quality, Cost, Logistics, Delivery, Management) (Handfield, Cousins, Lawson & Petersen). According to Cordell and Thompson (2018), RAQSCI framework is built on the staircase principle, which allows a hierarchical analysis of business requirements to be accomplished. Regulatory, assurance of supply, quality, service, cost/commercial, innovation represent the different themes under which the requirements of category are defined (O'Brien 2019, 143). Each step represents a business requirement that must be fully identified and scoped in order to proceed to the next step (Cordell & Thompson 2018, 37). RAQSCI model shown as a staircase is illustrated in the figure 4.

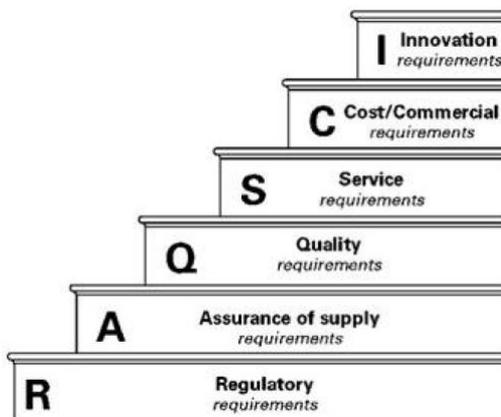


Figure 4. RAQSCI model (O'Brien 2019, 144).

According to Cordell and Thompson (2018, 38), understanding the business requirements represents an essential part of category management and has an influence the sourcing process and in addition the model serves a platform for agreement and SRM metrics through the key performance indicators identification. Business requirements should not be defined only by procurement, instead key stakeholders should be involved in the definition process (Cordell & Thompson 2018, 38). This way RAQSCI model helps to set the business requirements in a way that reflects the needs of the entire business (O'Brien 2019, 144). O'Brien (2019, 148) states that good business requirements have their roots widespread throughout the organization and are defined as being linked to different functions to understand and define all the needs and desires of the organization.

## **2.2 Stage 2 – Insight**

The essence of the second stage of the category management process is to develop a category insight by building a strong understanding through different data analysing, from which the future strategy can be formed. Stage two consists of five essential steps of (1) internal data gathering, (2) supplier data gathering, (3) market data gathering, (4) portfolio analysis, and (5) supplier preferencing. The second stage also includes a workshop for current state analysis. (O'Brien 2019, 92, 159) As Cordell and Thompson (2018, 43) state data gathering represents a key part of category analysis and strategy development. Market data gathering differs from internal and supplier areas of data gathering as it focuses on gaining insight about the marketplace and market trends through different sources of data such as financial reports, industry publications, interviews and articles (O'Brien 2019, 176). Spend-analysis serves an effective way to analyse internal and supplier areas of category data as it collects company data from different sources in order to answer questions who, what, when, where, why, and how, regarding organizations expenditures (Sievo 2019).

### **2.2.1 Spend-analysis**

As stated by Wood (2015): “Spend data is the lifeblood of category management”. Spend-analysis is also seen in literature as an important tool to support category management. According to O'Brien (2009, 10), the value of category management is delivered to organization by setting the spend at the center of attention. It is required in order to identify

the different categories (O'Brien 2009, 10). Studies show that spend analysis allows companies to find out where the money goes, in other words which suppliers receive and require the spend and what services and materials are purchased with the it (Heath 2006). Spend analysis is often associated in the literature with strategic sourcing, as roots of spend analysis are tightly tied to strategic sourcing (Pandit & Marmanis 2008), and it represents the first step of strategic sourcing process, where the historical spend of the company is analysed (Knight, Blessner, Olson & Blackburn 2017).

Spend analysis is therefore an often-used activity when companies take more a strategic approach to sourcing and want to have a clear picture of where the money is spent (Anonymous 2005). Spend analysis has also been criticized in the field of category management literature as others think that companies should focus more on strategic supply management and understanding the impact of the supply item, in terms of both the commercial and operational objectives of the organization, instead of focusing merely on tactical cost management and categories of spend (Cos 2015). When utilizing spend analysis in the right way in category management, the tool provides comprehensive visibility for all business costs and better data quality, helps to identify savings opportunities and make more savings, streamlines and centralizes sourcing process and other administrative efficiency benefits, helps to manage risk, helps to assess vendor performance for better relationship management, provides benchmark internally, helps to utilize spend data in business units, and offers the opportunity to improve collaboration with other organizations (Sievo 2019).

### **2.2.2 Purchasing Portfolio models**

According to Gelderman and Van Weele (2003), purchasing portfolio models have gathered considerable attention in academic and business field. Gelderman and Van Weele (2003) base their argument with reference to studies made by Olsen and Ellram (1997), Bensaou (1999), Nellore and Söderquist (2000), Dubois and Pedersen (2002), Gelderman and Van Weele (2002). Caniëls and Gelderman (2005) also agree and state that in the recent literature of professional purchasing, different portfolio models and supplier segmentation have gained a lot of attention. Day et al. (2010) state that supplier segmentation refers to a process of dividing suppliers to separate groups with different needs, characteristics or behaviour, requiring different business-to-business structures to achieve value from exchange.

Academic literature offers many different portfolio models, but one of these models has received more attention than others. Kraljic's (1983) Purchasing Portfolio Analysis stands out from the other earlier supplier portfolio models such as Dickson (1983) and Cunningham (1983) as it has been the most known and often used method for category management and purchasing strategy development in the last 30 years (Cox 2015). O'Brien (2019, 213) argues that the model was developed to allow buyers to choose the specific actions required for each spend area based on the profit impact and supply risk. Day et al. (2010) have also described Kraljic's Purchasing Portfolio Matrix as the most popular way of classifying suppliers from the buyer's perspective. The main idea of the model is that companies should minimize their vulnerabilities and take full advantage of their buying power (Kraljic 1983). Kraljic's purchasing portfolio model introduces a four-stage approach to devise companies supply strategies. All purchased items are first classified based on profit impact and supply risk to strategic (high profit impact, high supply risk), bottleneck (low profit impact, high supply risk), leverage (high profit impact, low supply risk), and non-critical (low profit impact, low supply risk) (Kraljic 1983), illustrated in figure 5. O'Brien (2019, 215) argues that it is not recommended to change the profit impact to spend as items with small spend can have a critical affect to the final product. After classification the supply market for these materials is analysed by the company, and the overall strategic supply position of the company is determined, and finally strategies and action plan are provided (Kraljic 1983).

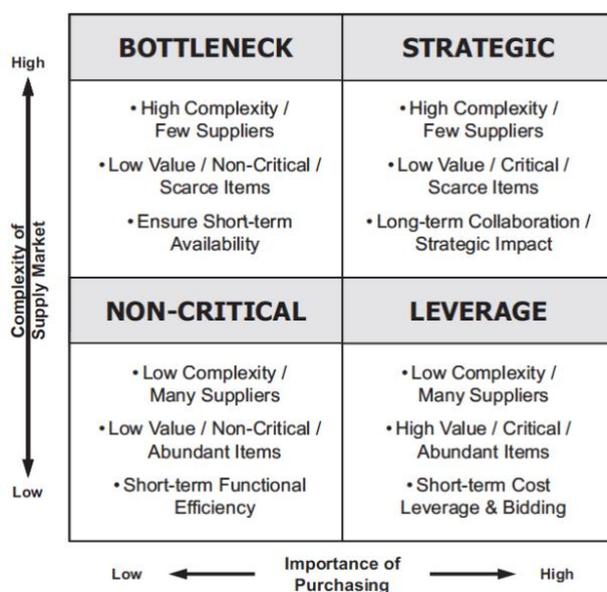


Figure 5. Purchasing portfolio analysis (Cox 2014).

According to Cox (2015), Purchasing Portfolio Analysis has been the usual recommendation for guiding managerial action since the 1980s. In the literature a wide range of authors such as O'Brien (2019), Howard and Miemczyk (2018), Van Weele (2009), Monczka, Handfield, Giunipero and Patterson (2016), Lysons and Farrington (2006) as well as Booth (2010) have used this approach in their studies. The literature also offers studies that criticize the model. Cox, Lonsdale, Sanderson and Watson (2005) have made a surprising observation that only a few companies were aware of the model even though the approach has been central since the 1980s, which shows that is a great distance between theory and practice. In line with this Gelderman and Van Weele (2002) agree that despite the fact that the purchasing portfolio model has become more common in academic publications, there is little knowledge on the actual use of these models. Nellore and Söderquist (2000) also criticize portfolio models in general because they provide very limited knowledge of how each category is actually managed after the classification itself has been made. This indicates that despite the fact that there are wide range of research and publications made from purchasing portfolio model perspective, the application of the model to practice has not been so common in the literature.

After Kraljic's Purchasing Portfolio other approaches to portfolio models have been developed by several researchers. According to Caniels and Gelderman (2005), Kraljic's (1983) Purchasing Portfolio approach inspired many other researchers to carry out further research on portfolio models. AT Kearney developed a new methodology called The Purchasing Chessboard, which was an adaptation of Kraljic's Purchasing Portfolio methodology (Cox 2015). According to Schuh, Kromoser, Strohmer and Mariscotti (2012), the model was developed to enable companies to cope with turbulent times and effectively compete in the new operating environment. The Purchasing Chessboard is a holistic framework that charts the market situation of each purchasing organization, enabling each to adapt to changing market conditions (Schuh et al. 2012). According to Schuh et al. (2012), the purchasing chessboard methodology was designed to meet the challenges of a "new age of procurement", where purchasing plays a key role in the success of a company (Schuh et al. 2012).

As Gelderman and Van Weele (2005), also International Institute for Advanced Purchasing and Supply (IIAPS) together with Cox have critically analysed the weaknesses of Purchasing Portfolio Analysis and the Purchasing Chessboard in Sourcing Portfolio Analysis made by

Cox in 2014. According to Cox (2015), IIAPS developed an alternative approach to category management and strategic sourcing, known as Sourcing Portfolio Analysis (SPA) methodology, to respond to identified weaknesses. In controversy to approaches presented above, the SPA combines criticality analysis and power positioning analysis to create a much tighter and more robust segment structure from supply categories rather than focusing on spend categories (Cox 2015). By combining these two analyses it creates 16 potential sourcing scenarios and identifies more than 32 potential strategic purchasing strategies for static leverage, and in addition nine potential dynamic leverage strategies to help buyers improve their future power and leverage through dynamic leverage (Cox 2015).

According to Hallikas, Puumalainen, Vesterinen and Virolainen (2005), literature offers many supplier classification models on supply chain and marketing management that can be roughly divided into two approaches: the continuum approach and the portfolio approach. Hallikas et al. (2005) state that first one bases the supplier classification on transaction-cost economics, core competencies and governance structures and the second one includes analysis of purchased items/services and relationship-management strategies for classified suppliers. In addition to typical continuum approaches from Cox (1996), Dwyer, Schurr and Oh (1987), Ellram (1991), Hughes, Ralf and Michels (1998), Lambert, Emmelhainz and Gardner (1996) as well as Webster (1992) cited in Hallikas et al. (2005), suppliers can also be categorized based on the different relations such as arm's-length or market-based relations, partnership relations and joint-venture or hierarchy-based relations, competitive relations, transactional relations or collaborative relations (Hallikas et al. 2005).

Research made by Dyer, Cho, Chu (1998) represents a continuum approach in categorizing the suppliers. In their paper Dyer et al. (1998) compare the characteristics of supplier management in the automotive industry of United States, Japan and Korea. They suggest that companies should focus their strategic thinking on their supply chain management and segment their suppliers into strategic partners and durable arm's length suppliers to allocate resources of different levels to each group, which then helps the company to optimize the efficiency of purchasing. Dyer et al. (1998) state that as the arm's length suppliers do not require same amount of attention as the strategic partners, the majority of resources should be focused on suppliers representing the strategic partners as they offer high value inputs and have major effect on the final product.

As Kraljic's Purchasing Portfolio Analysis given above, Olsen and Ellram's (1997) model also provides a good example of the portfolio approach. Building on the approaches developed by Fiocca and Kraljic, Olsen and Ellram (1997) proposed a normative three-step portfolio model that would help companies to manage different supplier relationships. Fiocca (1982) introduced a portfolio model to managing customer accounts, where accounts are categorized according to strategic importance and the difficulty of managing the them. After this, key accounts should be further analysed base on customer attractiveness and strength of the buyer-supplier relationship. The first step in Olsen and Ellram's (1997) portfolio analysis includes categorizing the purchases of a company according to the strategic importance of the purchase and the difficulty of managing the purchase situation. The next step is to analyse current supplier relationships of the company according to the relative supplier attractiveness and the strength of the current supplier relationships in order to decide how company's supply is managed. The final step contains drawing up an action plan describing how to adapt existing supplier relationships by comparing the ideal situation with the actual supplier relationship (Olsen & Ellram 1997).

Models made by Bensaou (1999) as well as Steele and Court (1996) also represent portfolio approaches. Bensaou (1999) classifies suppliers based on supplier's specific investments and buyer's specific investments. Research differentiates four types of relationships: strategic partnership (high supplier's and buyer's specific investments), market exchange (low supplier's and buyer's specific investments), captive buyer (low supplier's specific investments and high buyer's specific investments), and captive supplier (high supplier's specific investments and low buyer's specific investments). Steele and Court (1996) categorize supplier according to relative cost and risk or exposure and believe that categorization should be done so that the company could focus on items that are considered strategic critical or strategic security to manage risks and leverage with suppliers that provide these high-risk / high-quality products (Day et al. 2010).

Hallikas et al. (2005) have also provided a framework for categorizing suppliers. According to Hallikas et al. (2005), a risk-based classification of supplier relationship, where suppliers are categorized based on supplier dependency risk versus buyer dependency risk, should be done because the risks and the way risk is managed differs in different types of relationships. Supplier dependency risk in x axis is measured with the hold-up and demand risk of the

supplier, and the buyer dependency risk in y axis is measured through the value added to the customer and the replaceability of the supplier in the relationship. Based on the supplier categorization supplier relationships are classified as follows: strategic (high supplier and buyer dependency risk), non-strategic relationships (low supplier and buyer dependency risk), asymmetric captive-buyer (low supplier dependency risk and high buyer dependency risk) and asymmetric captive supplier (high supplier dependency risk and low buyer dependency risk). Outcome of the study suggest that the collaborate learning is the best way to manage risk in supplier relationships. (Hallikas et al. 2005) As many other approaches such as Bensaou (1999) discussed above, classification by Hallikas et al. (2005) is based on transaction cost economics, but in addition there is also a theoretical base of risk management (Day et al. 2010). Another different portfolio model called Lean and agile purchasing portfolio model is presented by Drake, Lee and Hussain (2013), which classifies items based on two dimension – agility and leanness – to leagile items (high agility and leanness), agile items (high agility, low leanness), lean items (low agility, high leanness), and non-strategic items (low agility and leanness). Agility is measured with item's combined impact on time and flexibility, whereas leanness is measured with item's combined impact on cost and quality (Drake et al. 2013).

To complete the different supplier categorization models offered by literature Day et al. (2010) have concluded a comprehensive summary that, in addition to previously mentioned articles, include articles from Hadelier and Evans (1994), Tang (1999), Moeller, Momme and Johansen (2000), Nellore and Söderquist (2000), Kaufman, Wood and Theyel (2000), Cox, Ireland, Lonsdale, Sanderson and Watson (2002), Svensson (2004), Van Weele (2005) as well as Caniels and Gelderman (2007). Hadelier and Evans (1994) segment suppliers based on value potential and product complexity. Tang (1999) categorizes suppliers according to buyer's bargaining power versus strategic importance of the part to the buyer. Moeller et al. (2000) categorizes suppliers buyer's knowledge contribution and supplier's knowledge contribution. Nellore and Söderquist (2000) segment supplies based on strength of the relationship and market attractiveness. Assessment dimensions of Kaufman et al. (2000) are collaboration and technology. Cox et al. (2002) categorize supplier according to nature of supply market scarcity versus multi-variable cascading. Svansson (2004) on the other hand classifies suppliers based on seller's and buyer's vulnerability. Van Weele's (2005) categorization is based on supply risk and purchasing's impact on financial results. Finally,

Caniëls and Gelderman (2007) assessment dimensions include buyer dependence and supplier dependence.

To summarise the common features between the different supplier categorization models, it can be said that supplier portfolios focus on managing different sources of risk that may arise when interacting with suppliers (Day et al. 2010). In line with this Turnbull (1990) states that the value is achieved in portfolio management by balancing the expected return on the investment based on the expected level of risk. Cox (2015) states that despite the analytical differences between different portfolio models, they all essentially operate with the same conceptual paradigm when making recommendations about how managers should develop sourcing strategies and tactics. Thus, purchasing portfolio models generally seek to develop purchasing and supplier strategies that are differentiated (Gelderman & Van Weele 2003). Supplier segmentation models make it possible for the company to evaluate their supply base in order to determine the appropriate management and relationship structures (Day et al. 2010). Another common feature between these models is that they are based theoretically on transaction cost economics, resource-based view, inter-organizational theory, industry analysis or resource dependency theory, except for models such as Karljic (1888), Hadelor and Evans (1994), Steele and Court (1996) as well as Van Weele (2005) for which no theoretical basis has been presented, but limited connections to industrial analysis (Day et al. 2010). Academic literature also emphasizes that focusing on the classification process is more important than the classification itself, because decision-makers need to discuss the inconsistencies between themselves and be consistent with the importance of different products, suppliers or relationships classified in the portfolio model (Olsen & Ellram 1997).

### **2.2.3 Supplier preferencing**

Supplier preferencing model represents the final essential step of the stage two. Supplier preferencing model was introduced by Steele and Court (1996). The model provides an insight from supplier's perspective (O'Brien 2019, 228). Supplier preferencing model classifies accounts according to relative value of the account and account attractiveness to four different quadrants of development, core, nuisance and exploitable (Steele & Court 1996), as shown in the figure 6. According to O'Brien (2019, 228), in development section supplier sees the account as attractive but the relative spend is low and the supplier would

be interested in finding ways to grow the account, whereas in core quadrant supplier represents a major percentage of supplier's turnover which means that supplier is trying to maintain this relationship. In nuisance section the supplier sees the account as undesirable and is not willing to do business with the account, but the exploitable quadrant is also not a good position to be as an account, because the supplier does not view the account as attractive, but as long as the relative spend is high they are willing to keep the account. (O'Brien 2019, 228)

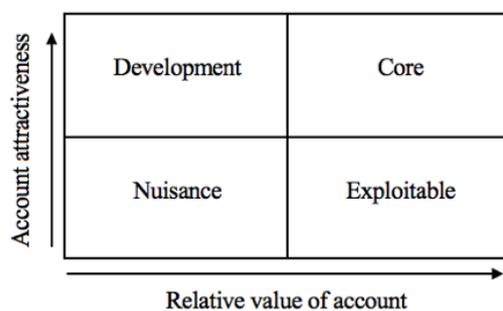


Figure 6. Supplier preferencing model (modified from Steele & Court 1996).

According to O'Brien (2019, 238), portfolio analysis by Kraljic (1888) should be used together with supplier preferencing model offered by Steele and Court (1996) as these tools enable classifying the category and supplier relationship in order to find out the strengths of the position, the power balance as well as the necessary actions needed to improve the position. It is highly important that procurement understands how supplier sees their business, because there is a huge risk if procurement categorizes the supplier as strategic, but the supplier sees the account as "one to manage out" (O'Brien 2019, 228).

### 2.3 Stage 3 – Innovation

The third stage of the category management process is concerned with building a sourcing strategy and ensuring the company's acceptance of its implementation. Sourcing strategy, also known as supply strategy, lacks a clear definition (Nollet, Ponce & Campbell 2005), as it is defined differently in different studies (Ahtonen & Virolainen 2009). It combines several existing information and concepts (Harland, Lamming & Cousins 1999) and consists of different elements (Ahtonen & Virolainen 2009). It is seen as particular actions the procurement pursues in order to achieve its objectives (Carr & Smeltzer 1997), and it refers to

“integration of supply activities within firms, in dyadic relationships, in chains of firms and in inter-organizational networks” (Harland et al. 1999).

Innovation stage consists of six essential elements of (1) summarising insights through SWOT (strengths, weaknesses, opportunities and threats) analysis, (2) defining the chosen option, (3) risk assessment and contingency planning, (4) high-level category strategy’s implementation planning, (5) finalising the source plan, and finally (6) source plan approval. It also includes a workshop to review the views from the previous phase and to develop and select the strategy. (O’Brien 2019, 92, 240) SWOT analysis should bring together all the key findings and views obtained from the process before this stage (O’Brien 2019, 242). SWOT analysis is seen as a key strategic management tools in academic literature by many researchers (Porter 1991; Glaister & Falshaw 1999; Coman & Ronen 2009), as it offers a simple solution for solving complex strategic situations. According to Helms and Nixon (2010), the four-field SWOT analysis includes analysis of both the company’s strengths and weaknesses and its threats and opportunities by listing favourable and unfavourable internal and external issues into four quadrants of SWOT analysis. Model helps to understand how strengths can be utilized to realize new opportunities, and how weaknesses can slow down development or increase organizational risks (Helms & Nixon 2010).

The second step of the stage three includes defining the strategic option and future sourcing strategy together with the team through discussions. When determining the sourcing strategy, it is important to note that the strategy should be in line with the company’s overall strategy (Lintukangas, Kähkönen, & Virolainen 2013). Strategy definition is followed by risk and contingency planning with risk and contingency matrix (O’Brien 2019, 253-257). According to Hallikas, Karvonen, Pulkkinen, Virolainen and Tuominen (2004), a typical risk management process includes four phases of (1) risk identification, (2) risk assessment, (3) risk management actions, and (4) risk monitoring. Hallikas et al. (2004) state that risk identification is an essential step in risk management, because by identifying risks, decision-makers become aware of things that cause uncertainty. The essence of risk identification is to identify future uncertainties in order to be able to proactively manage these scenarios (Hallikas et al. 2004). Effective risk identification supports later risk assessment and this in turn will lead to better risk mitigation (Kern, Moser, Hartmann & Moder 2012). Risk assessment on the other hand is needed in order to choose the right risk management actions

for the identified risk, which typically include strategies such as risk transfer, risk taking, risk elimination, risk reduction, as well as further analysis of individual risks (Hallikas et al. 2004). After identifying and evaluating the risks, it is useful to illustrate them using a risk diagram shown in the figure 7.

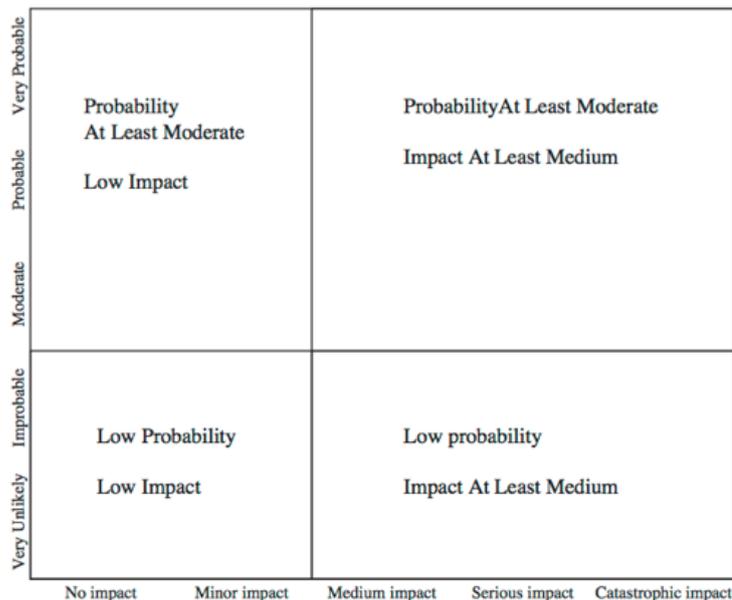


Figure 7. Risk diagram (Hallikas et al. 2004)

As O'Brien (2019, 256) states, for each identified risk, the likelihood of occurrence and severity of the impact should be defined. According to Hallikas et al. (2004), risk diagram provides an overview of all risks and makes visible the most important risks that require the most attention, and also shows whether risks can be reduced by reducing their likelihood or consequences. Finally, because it is said that the company and its environment are not static, and thus the risk situation changes, risk monitoring is also necessary (Hallikas et al. 2004). Cordell and Thompson (2018, 26) highlight that the best way to handle risk assessment is to range a workshop with category team members and wider stakeholders in order to identify the risks and obtain information about the impact of the risk and its likelihood of its occurrence.

Category strategy's high-level implementation plan is done with using a Gantt chart. According to O'Brien (2019, 257), Gantt chart represents one of the most effective solutions for high-level planning. The Gantt Chart contains a variety of horizontal scheduling bars that run from left to right, allowing both project planning and tracking the project schedule

(Sharon & Dori 2017). Geraldi and Lechter (2012) state that Gann chart is a useful tool for communicating project timetable and creating a common understanding of the progress of tasks. Finalising the source plan is essential part of innovation stage. Source plan is an internal document containing a detailed summary of the work done so far, the main findings of the analysis, the proposed sourcing strategy for the future, and how the recommendations were reached (O'Brien 2019, 262). According to O'Brien (2019, 270), last step of the process stage three culminates in the source plan approval by sign-off authority. Once the sign-off is completed, one can proceed to the fourth stage of the process.

#### **2.4 Stage 4 – Implementation**

The fourth stage of the category management process focuses on the actions needed in order to realise the approved sourcing strategy. Implementation stage consists of the essential elements of (1) project management, (2) managing change, (3) contract planning, (4) contract exit planning, and (5) contract management. It also includes a workshop to plan the implementation. (O'Brien 2019, 92, 274) According to Cordell and Thompson (2018, 129), project management is the practice that ensures that the category strategy is delivered on time and in accordance with business requirements. In line with this Svejvig and Andersen (2015) emphasize that the main focus in classic project management is to execute the work on time and within the budget and requirements. O'Brien (2019, 382) states that in category management the ability to manage a project well is essential when sourcing strategies are implemented, and the benefits are realized.

Change management is also seen as an important part of category management, as the implementation of a new category strategy may require major changes in business and this change is unlikely to fail if human perspectives on change management are not understood and planned (O'Brien 2019, 329). According to Merrell (2012), change management is about understanding the unique needs of the company and its people, and thus applying the insights and the right tools to make the change, which requires solid leadership, harmonization and maintenance of operations to support change, and strategic measurement. It is said that the best change management practitioners balance rational and knowledge-based approaches and consider emotional factors, and by following the six activities of (1) leading, (2)

communicating, (3) learning, (4) measuring, (5) involving, and (6) sustaining, organizations are also most likely to succeed in managing change (Merrell 2012).

The next three steps of the stage four deal with contract planning, contract exit planning, and contract management. According to O'Brien (2019, 330), the implementation stage culminates in putting contractual arrangements in place with suppliers, and here contract planning represents an essential part of category management and, therefore, it is important that whatever contract approach is used, the outputs from the category management project defined in the sourcing strategy are included, so that the agreement becomes a key tool for implementing the ongoing strategy. When the contract is put in place exit planning should be considered and once the contract is executed it should be ensured that all the ongoing arrangements for contract management are in place (O'Brien 2019, 330). Cordell and Thompson (2018, 141) state that contract management is about ensuring that matters are implemented as agreed without compromising value, which can be supported by using measurement techniques such as key performance indicators. Rendon (2016) emphasizes that organizations with a higher degree of maturity in the contract management process will in most cases produce excellent performance in project results and business benefits.

## **2.5 Stage 5 – Improvement**

The fifth and the final stage of the category management process is about turning implementation into improvement. The fifth process stage focuses on supplier relationship management and continuous improvement of the category project (O'Brien 2019). As the category management process is cyclical (Cordell & Thompson 2018), the fifth stage also includes a decision on when it is right time to start the category management process again (O'Brien 2019, 375). In each round, the maturity of the category develops and after several rounds, longer periods may come when companies stay in stage five before they need to start the process again (O'Brien 2019, 376).

### **2.5.1 Supplier relationship management**

According to O'Brien (2019, 338), category management needs to be integrated with supplier relationship management in order to be effective. The concept of supplier

relationship management can be defined as follows: “The overarching strategic approach to determine and implement different supplier-based interventions, including the development of collaborative relationships with the critical few suppliers who can make the greatest difference; prioritized against available resources, appropriate across entire supply base to maximize value to the organization, reduce supply chain risk and enable the organization to achieve its goals and enhance the value to the end customer” (O’Brien 2019, 337). Hughes (2008) defines SRM consisting of three different elements: (1) a systematic and comprehensive evaluation of suppliers’ assets and capabilities in relation to overall business strategy, (2) determining what activities are performed with different suppliers, and (3) coordinated planning and implementation of supplier interaction to maximize the value achieved through these interactions. According to Lintukangas and Kähkönen (2010), SRM refers to: “organization’s capacity and ability to manage its suppliers and conduct its internal tasks and responsibilities related to supplier relations in order to achieve the desired results” and represents the link between the supply organization and external supplier network.

The benefits of SRM have been demonstrated in various studies over the years (Carr & Pearson 1999; Amoako-Gyampah, Boakye, Adaku & Famiyeh 2019). According to Carr and Pearson (1999), the relationship between the parties is important for the company’s financial performance. These findings are consistent with a recent study showing that SRM contributes to both directly and indirectly to the performance of the company (Amoako-Gyampah et al. 2019). It is also important to consider the challenges and obstacles of supplier relationship management. Oghazi et al. (2016) state that the lack of co-ordination, commitment and trust between the parties is the greatest potential barrier to SRM integration. Hughes (2008) argues that SRM programs are often implemented without systematic efforts to build the trust and mutual commitment necessary for cooperation and without cross-functional involvement, which is essential to exploit the potential for value creation. According to Hesping and Schiele (2015), it is important to note that the category strategy is not the same as the supplier strategy because supplier strategy defines how a category manager deals with each supplier in the future to implement the category strategy. Different supplier strategies can be applied in one category, depending on the roles and characteristics of the suppliers: one supplier can be defined as a key supplier and the other as a challenger (Hesping & Schiele 2015).



### **2.5.2 Continuous improvement**

According to O'Brien (2019, 333), the final stage of the category management process is about ensuring that the changes implemented are solid and appropriate to prevent getting back into the old state, and to continually look for ways to improve the sourcing arrangements. In today's complex and turbulent environments, the need for continuous process improvement is widely recognized (Bessant, Caffyn & Gallagher 2001). However, there is no single definition in the literature for the term continuous improvement (Sanchez & Blanco 2014). It can be defined as a specific set of routines that can help an organization to improve (Bessant et al. 2001), or as small continuous changes that bring improvement (Dahlgard, Kristensen & Kanji 2002). Bhuiyan, Baghel and Wilson (2006) see the concept on a broader level as a culture of sustainable development that aims to eliminate waste in all organizational systems and processes and involves all participants in the organization. According to Chang (2005), a continuous cycle of improvement includes setting customer requirements, completing them, measuring success and reviewing requirements to find areas where improvements can be made.

Sanchez and Blanco (2014) state that although there are different definitions of the term continuous improvement as described above, there are three main characteristics that can be highlighted and these include: (1) continuous improvement can be characterised as a cycle and not a one-time thing and therefore it should be seen as a continuous act that must be done over time, thus it should not be a single activity, (2) all members of the organization should participate in continuous improvement, and (3) the goal of continuous improvement is precisely to improve and hence the organization should focus on waste disposal and identifying new areas of improvement. O'Brien (2019, 334) argues that continuous improvement in category management refers to the continuous analysis and assessment of position, identification of development opportunities and planning and implementation of necessary changes. In line with this Cordell and Thompson (2018, 138) emphasize that continuous improvement represents an important part of category management, as it can stimulate double-loop learning, which can add value to key stakeholders and at the same time provide development opportunities for team members. In addition, it enables the development of quality culture through continuous monitoring and review (Cordell & Thompson 2018, 138).

### **3. LEAN AND AGILE METHODS IN CATEGORY MANAGEMENT**

Over the past decade Lean thinking has greatly affected both academic and industrial circles (Hines, Holwe & Rich 2004). Agility has also gained a great deal of interest in academic literature (Yusuf, Sarhadi & Gunasekaran 1999). In line with this Narasimhan et al. (2006) state that popular literature on manufacturing techniques and performance is full of discussions about Lean and agility. Lean and agility are usually seen as a distinct, but overlapping paradigms (Narasimhan et al. 2006). According to Moyano-Fuentes and Sacristan-Diaz (2012), both systems share the same competitive conditions including quality, cost, delivery time, and service level, but emphasize different elements. Lean strives to make efficient use of resources by eliminating waste or surplus of unnecessary or inefficient operations, while agile aims to enable companies to adapt effectively to changing and uncertain market conditions (Moyano-Fuentes & Sacristan-Diaz 2012). Despite the differences between the two methods, it has been shown that the paradigms do not have to exclude each other (Cozzolino, Rossi & Conforti 2012), thus both methods can be utilized to obtain the best result. This research approaches agility in the category management through the commonly used Lean tools and agile framework called Scrum, which is known as a one method for acting agile (Van Ruler 2015).

#### **3.1 Lean concept**

According to Machado and Leitner (2010), Lean is a universal philosophy and a new part of corporate culture which is based on the Toyota production system. Other studies also support the fact that Lean concept has its roots in the Toyota Production System in Japan, where the concept was developed by Toyota (Mostafa, Chileshe & Abdelhamid 2016) and Japanese engineers Taiichi Ohno and Shigeo Shingo (Machado & Leitner 2010). Bhamu and Singh Sangwan (2014) state that the concept of Lean lacks a clear definition as it may refer to a process, a set of principles, a set of tools and techniques, an approach, a concept, a philosophy, a practice, a system, a program, a manufacturing paradigm or a model. One of the most important ideas of Lean is to do things right at the first time or if an error occurs it is fixed right away in order to minimize the risk of repetition which requires greater responsibility and strong commitment from the staff (Machado & Leitner 2010). Sreedharan, Sunder and Raju (2018) emphasize that Lean focuses on removing process waste as well as

non-value-adding activities that cause extra costs to services and production. Raynus (2016, 223) defines Lean as a method that focuses on maximizing process speed by providing tools for analysing process flow and delays in each process operation. Lean focuses on separating value-adding work from non-value adding work with tools to eliminate the causes and costs of non-value adding activities, and thus offering the ability to determine and eliminate complexity costs (Raynys 2016, 223).

The key idea of Lean can be summarised to improve processes by: (1) eliminating seven types of waste, (2) variation or unevenness in process, and (3) over-burden, also known as “Muda”, “Mura” and “Muri” (Machado & Leitner 2010; Sreedharan et al. 2018). According to Ohno (1988), Mura is consequence of Muda and Muri is result of Mura. All the non-value-added activities or Muda should be eliminated (Purvis et al. 2014). Removing the non-value-added activities will have a positive impact on the entire production process and on the performance of the entire company (Machad & Leitner 2010). Literature identifies seven types of waste that have a straight impact on the performance, quality and costs and should therefore be eliminated: “transport, inventory, motion, waiting, over processing, overproduction, and defects” (Cherrafi et al. 2016). Womack and Jones (1996) have added an eight waste to this list that include “goods and services that do not meet the customer’s needs”, and other authors have added another waste called underuse of people (Womack & Jones 1996). Seven waste types also concern services including unnecessary service transportation, waiting for something or someone, overproduction of services, defective services, half-finished services, extra movement and extra steps (Sayer & Bruce 2011).

There are five principles of Lean for continuous improvement that are: (1) value from the perspective of customers, (2) identifying value-stream, (3) creating value flow, (4) value pulled by customers, and (5) striving for perfection (Sreedharan et al. 2018). Womack and Jones (1996) emphasize that as Lean is all about doing more with less and therefore companies should: “Use the least amount of effort, energy, equipment, time, facility space, materials, and capital – while giving customers exactly what they want”. In addition to the five principles studies also show that at the heart of Lean is Kaizen (Kisperska-Moron & de Haan 2011). Kaizen refers to the continuous and incremental improvement (Womack & Jones 1996). Kaizen term comes from Japanese, and according to Kaizen founder Masaaki Imai, it means continuous improvement that everyone, leaders and employees, participate in

(Carnerud 2018). According to Cordell and Thompson (2018, 137), Kaizen is based on the full commitment of the participants to seek the maximum utilization of resources and efficiency of tasks while retaining value.

Bhamu and Singh Sangwan (2014) state that in the literature Lean studies have mainly focused on the verification of the theory through empirical and exploratory studies. Lean is studied mainly in the field of automotive industries, but it has also been adopted to other industries (Bhamu & Singh Sangwan 2014). Studies show that in addition to adopting Lean to other research areas such as supply and supply chain management studies (Purvis et al. 2014), continuous improvement methodologies have also been applied to research areas concerning sustainability. Studies propose a wide range of frameworks where Lean is integrated with Green or Environmental approaches as well as sustainability (Cherrafi, Elfezazi, Govindan, Garza-Reyes, Benhida & Mokhlis 2017; Martínez-Jurado & Moyano-Fuentes 2014; Ruben, Vinodh & Asokan 2018) since according to Cherrafi et al. (2016), Lean and Six Sigma have emerged as a major part of the sustainability answer. In addition, it has been suggested that Lean thinking and the five key principles of Lean can be well applied to the category management process (Webb 2011). According to Webb (2011), the focus should be on (1) standardization of internal category management documents, (2) creating a set of examples to demonstrate the standards required by the content of a category strategy, such as defining business requirements and market analysis, (3) standardizing the approach to coaching and milestone reviews by defining the questions to be answered and the documents to be presented, (4) breaking the multi-step processes into manageable steps to make category strategy creation easier, (5) promoting the creativity of a category manager by encouraging participation in the design of the initial process, and finally (6) regularly updating the process and creating improvements through active feedback from the team.

### **3.1.1 Six Sigma**

Pepper and Spedding (2010) argue that if Lean is implemented without Six Sigma it leads to lack of tools to leverage improvement to its full potential. Although the general objectives are similar in both methodologies, Lean focuses on doing the right things, also known as value-added activities, while Six Sigma focuses on doing things right without errors (Langabeer, DelliFraine, Heineke & Abbass 2009). According to Raynus (2016, 222), Six

Sigma highlights the need to identify opportunities and eliminate errors detected by customers and notes that variation prevents the ability to provide quality services reliably. Six Sigma requires data-based decision-making and includes a comprehensive set of quality tools for effective problem-solving, and in addition offers a highly informative cultural infrastructure that is effective to deliver sustainable results and improve operating profit (Raynus 2016, 222).

Pepper and Spedding (2010) define the concept of Six Sigma as a statistical measure of defect rate within a system that provides structure to process improvement with DMAIC model which including a five-stage cycle of define, measure, analyse, improve and control, shown in the figure 9 (Pepper & Spedding 2010). Shokri (2017) states that DMAIC is the most common model that can be used to improve processes. The method was developed based on the William Edward Deming's Plan – Do – Check – Action cycle and the model was introduced to help different organizations to implement Six Sigma with the focus on reducing variability and waste (Pacheco, Pergher, Vaccaro, Jung & Ten Caten 2015).

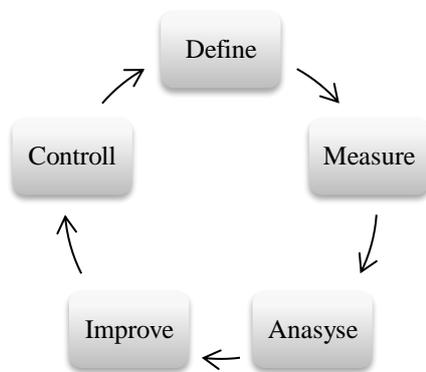


Figure 9. DMAIC cycle (modified from Pepper & Spedding 2010)

According to Knowles, Whicker, Femat and Canales (2005), the model is usually used to structure the individual projects. The define-phase focuses on understanding the process from the from customer's, supplier's and operator's point of view (Knowles et al. 2005). At this point project goals and boundaries are defined and it also includes identifying the issues needed to be addressed (Mehrjerdi 2011). The main goal of the measure-phase is to measure the current performance (Knowles et al. 2005). It collects information from current situations in order to obtain baseline data on current process performance and to identify problem area (Mehrjerdi 2011). The analyse-phase seeks to analyse contributors to poor performance and

variation (Knowles et al. 2005). In the analyse-phase the root cause of the quality problems is identified and conformed with appropriate data analysis tools (Mehrjerdi 2011). The improve-phase defines, tests and operationalises improvements with the help of the outputs of the earlier phases (Knowles et al. 2005). In other words, the main goal of the improve-phase is to implement solutions that address the problems identified during the analysis phase (Mehrjerdi 2011). The main goal of the last phase is to make sure that the changes are embedded, successful and, where appropriate, transferred to other processes (Knowles et al. 2005). It includes evaluation and monitoring the results of the improve phase (Mehrjerdi 2011).

### **3.1.2 Lean Six Sigma**

Lean Six Sigma is combination of Lean and Six Sigma methodologies (Snee 2010). It is said that these two methodologies strengthen and support each other so that the economic benefits such as return on invested capital are much faster than using the models separately (Raynus 2016, 223). The synthesis of these two models leads to an integrated program that combines the best of both methodologies (Verver, van den Hauvel, Bisgaard & Does 2006). Pepper and Spedding (2010) state that Six Sigma complements Lean philosophy as it provides tools and know-how to solve certain issues that have been identified with Lean. According to Snee (2010), Lean Six Sigma is a business strategy and at the same time a methodology that increases process performance which then results in better client satisfaction and results. It is a business improvement methodology that focuses on maximizing shareholder value by improving quality, speed, customer satisfaction and costs with the help of Lean and Six Sigma tools and principles (Laureani & Antony 2012). Lean Six Sigma is also seen as an effective leadership development tool as it prepares leaders for leading change and it is needed because people need improvement and problem-solving methodology (Snee 2010).

According to De Koning et al. (2006), an integrated framework of Lean Six Sigma consists of five elements. The first element is called a structured approach and it means that the deployment infrastructure is based on Six Sigma organizational mechanisms that consist of a task force deployment strategy. The second element is called project-based approach, meaning that both Lean and Six Sigma deal with nonstandard problems that are solved only project by project and these projects are classified as either “quick wins” (Lean) or

“advanced” (Six Sigma). The third element is called organizational competency development which means that the leaders of the Lean Six Sigma projects are trained in a curriculum that resembles Six Sigma and Lean components. The fourth element is called organizational anchoring of solutions which means that to ensure the implementation of solutions and to prevent backwardness, the tasks and responsibilities are clearly defined, the procedures are standardized, and the process control is set as part of the improvement project. The fifth element is called linking strategy with project selection which mean that strategic goals are transformed into performance indicators and tactical targets that are used as the basis for project selection and they will also help ensure alignment of the projects with the overall organization strategy. (De Koning et al. 2006)

### 3.1.3 Lean tools

Together with Lean other continuous improvement methodologies such as Six Sigma (Wang, Du & Li 2004) and Lean Six Sigma (De Koning et al. 2006) provide a wide range of tools, each focusing on different and specific purposes, that can be used to eliminate waste and create the most efficient system as possible. Therefore, the most suitable tools for various problems can be selected from different tools available (Machad & Leitner 2010). Value stream map, conducting time measurements, visual management, 5S, standardization, stopping the line, process map, plan-do-check-act, batch size reduction, one-piece flow and cellular production as well as percent loading chart and line balancing, spaghetti map, 5 whys and 3P are listed as the most used tools by Machado and Leitner (2010). A broader list of forty-five different Lean tools is illustrated in the figure 10 offered by Singh et al. (2006).

- |   |  |  |
|---|--|--|
| 1. Five step housekeeping                                     | 14. Jidoka                               | 31. Setup reduction                          |
| 2. Five W1H<br>(when, why, what,<br>where, who, how)          | 15. Kaiku                                | 32. Skill matrix (I, L, U)                   |
| 3. Five why's   | 16. Kaizen events                        | 33. Small lot production<br>(one piece flow) |
| 4. Andon boards   | 17. Layout change                        | 34. Standardized work                        |
| 5. Batch size reduction                                       | 18. Levelled production                  | 35. Statistical process control              |
| 6. Cellular manufacturing                                     | 19. Line balancing                       | 36. Suggestion schemes                       |
| 7. Continues flow   | 20. Morning market                       | 37. Takt time                                |
| 8. Cross functional<br>work team                              | 21. Point of use<br>storage (POUS)       | 38. Team preparation                         |
| 9. Failure mode and<br>effect (FMEA)                          | 22. Poka yoke                            | 39. Theory of constraint<br>(TOC)            |
| 10. Failure tree<br>analysis                                  | 23. Problem solving                      | 40. TOC TP<br>(thinking process)             |
| 11. Flow production   | 24. Production control<br>boards         | 41. Time and motion study                    |
| 12. Danger management   | 25. Pull/kanban systems                  | 42. Total productive<br>maintenance (TPM)    |
| 13. Internal communications<br>and relationship<br>management | 26. QS 9000                              | 43. Visual control                           |
|   | 27. Quality at source                    | 44. Waste elimination                        |
|   | 28. Quality circles                      | 45. Material handling<br>analysis            |
|   | 29. Quality function<br>deployment (QFD) |  |
|   | 30. Schedule stability                   |  |

Figure 10. Lean tools (Singh et al. 2006).

De Koning et al. (2006) state that the value stream map provides information on speed, flow continuity, and ongoing work that emphasizes non-value-added steps and bottlenecks. It can be used to better understand the flow of the product or customer and to describe the current and the future state (Machad & Leitner 2010). According to Miller (2005), it also shows how organization should change the process in order to strive for perfection. In other words, non-valued value steps are removed. Conducting time measurement tools are used to measure the whole process and the duration of each step (Miller 2005). Machad and Leitner (2010) state that conducting time measurements help to understand the importance and influence of single steps in the whole process and point out fields of improvement. Visual management is a useful tool to organize the workplace in an organized way for example by using Kanban board that visually shows what is needed to keep a process moving, informing when to make, move or get materials from the external supplier (Machad & Leitner 2010). Kanban offers many benefits in managing organization's operations and business such as increased productivity and waste minimization (Rahman, Sharif & Esa 2013). According to Machad and Leitner (2010), 5S comes from Japanese words and the tool can be described as: "a place for everything and everything in its place", so in other words it is a tool for organising the work area. Standardization tool is named as a key tool in management as it helps to prevent variability and complexity in how the work is done (Machad & Leitner 2010). Stopping the line tool gives an employee the right to stop the line if any problem arises (Miller 2005).

The process map describes in detail all the steps needed to convert the raw material into a finished product by using standardized symbols and descriptions, which is why it is a great tool for identifying waste and improvements. Plan-do-check-act is a tool that refers to the continuous improvement and helps the organization to strive for perfection. Percent loading chart and line balancing make identifying the areas of waste easier and emphasize the possibilities of creating a better flow by redistributing the work. Spaghetti map illustrates the movement of one object through the entire process by showing the distance and the way the firm needs to complete the process. (Machad & Leitner 2010) According to Jimmerson, Weber and Sobek (2005), 5 whys -tool is a tool used to explore the root cause of a particular problem with a profound understanding of the current work process. For example, in category management, using the model is recommended in the first stage of the process to determine the real business need (O'Brien 2019, 155). According to Miller (2005), 3P refers to Production Preparation Process with the focus of designing new workspace and processes.

### 3.2 The concept of agility

Literature offers several interpretations and definitions for the agility concept (Van Ruler 2015; Cristopher 2000). According to Gligor (2014), origin of the agility as a business concept can be traced back to manufacturing and to the year of 1991. It is said that agile manufacturing was created by the need to respond extensively to customer requirements in terms of price, specification, quality, quantity and delivery as well as to fulfil the need for common production relationships, and also to cope with increasing internationalization of competition and fragmentation of the mass market (Gligor 2014). Yusuf et al. (1999) suggest a comprehensive definition for the concept of agility as follows: “Agility is the successful exploration of competitive bases (speed, flexibility, innovation proactivity, quality and profitability) through the integration of reconfigurable resources and best practices in a knowledge-rich environment to provide customer-driven products and services in a fast-changing market environment”. Definition offered by Yusuf et al. (1999) takes a more systematic approach to the agility concept than the original definition of agility that was created at Iacocca Institute of Lehigh University (USA).

Perhaps the most widely known and used definition of the concept of agility is offered however by Christopher (2000). According to Christopher (2000), agility is: “a business-wide capability that embraces organizational structures, information systems, logistics processes, and, in particular, mindsets”, and it can be defined more precisely as: “the ability of an organization to respond rapidly to changes in demand, both in terms of volume and variety” (Christopher 2000). Yusuf et al. (1999) have summarised the main features of agility concept offered by several authors. They state that the key features of the definition include: “high quality and highly customised products; products and services with high information and value-adding content; mobilisation of core competencies; responsiveness to social and environmental issues; synthesis of diverse technologies; response to change and uncertainty as well as intra-enterprise and inter-enterprise integration” (Yusuf et al. 1999). Gligor (2014) has also summarised the most common themes in agility definitions offered by literature and states that the key themes include: “quick response to sudden changes in supply and demand; smooth and efficient handling of disruptions; survival of unprecedented threats of business environment; change as opportunity; flexibility; integration within and across functions/processes; speed as well as customer empowerment/customization”.

### 3.2.1 The framework of agile supply chains

According to Cozzolino et al. (2012), focus on the agility supply chain approach emerged in 2001 through research made by Van Hoek, Harrison and Christopher (2001). Sheffi (2005) states that agility in supply chain refers to the ability to respond to unexpected changes. In line with this Lee (2004) emphasizes that agile supply chains are the ones that are able to respond “both quickly and cost-efficiently” to sudden and unexpected changes in the market. Cozzolino et al. (2012) argue that the concept of agility goes beyond the level of an individual enterprise, referring to the entire supply chain to which the company belongs, and which has some special features. Christopher (2005) has provided rules to ensure proper agility throughout the supply chain, and these include: “communication about the situation to partners, creation of a net with suppliers, postponement projection, low-cost stock, construction of a dependable logistics system through the creation of a stable net with 3PLs, and formation of a team to implement the emergency plan” (Cozzolino et al. 2012). O’Brien (2019, 440) also sees the combination of data and information as the enabler for agile and responsive supply chain. He also believes that the leading companies of the future are those who build competitiveness by exploiting the digital solutions in their daily business (O’Brien 2019, 14). There are different conceptual frameworks in the literature describing the characteristics that a supply chain must have to be agile (Gligor 2014). Figure 11 is offered by Christopher, Lawson and Peck (2004) and it shows the agile supply chain framework.

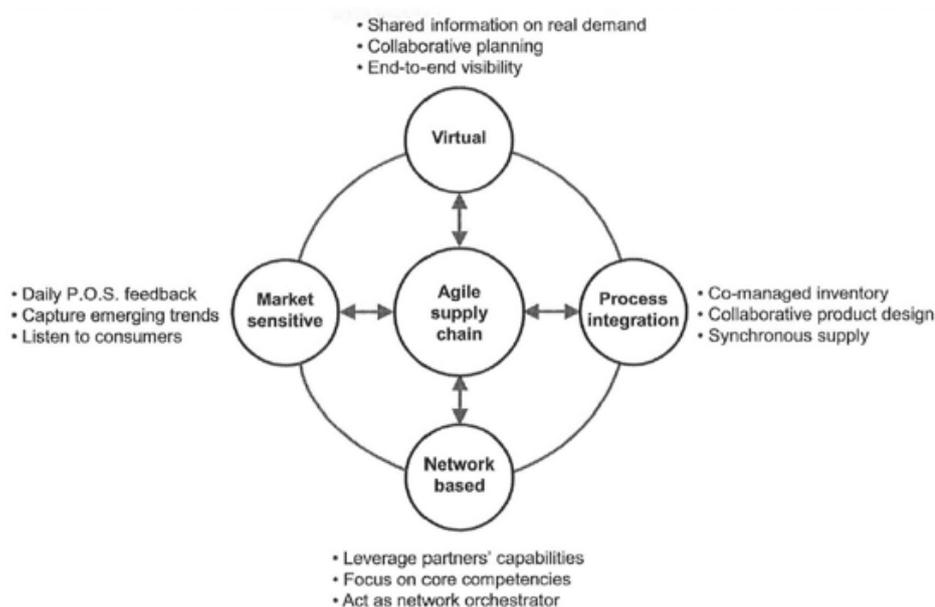


Figure 11. Agile supply chain framework (Christopher et al. 2004).

According to Gligor (2014), market sensitivity in the framework refers to the ability of the supply chain to read and respond to the real demand and it can be achieved by storing and sending point-of-sale data. Virtual supply chains mean supply chains that are based on knowledge rather than inventory and can be achieved by using information technology to share information between buyers and suppliers. Process integration refers to the co-operation between buyers and suppliers, joint product development, shared systems and shared information. Networks mean configurations of partners which are connected to each other. (Gligor 2014). Van Hoek et al. (2001) have also previously offered a quite similar framework for agile supply chain which includes four elements of process integration, virtual integration, network integration and customer sensitivity. Yusuf, Gunasekaran, Adeleye and Sivayoganathan (2004) conclude that the supply chain agility is a measure of how well the relationship of design, manufacture and delivery of products and services improves the four key agile manufacturing objectives that are enriching customers, achieving mass customization at the expense of mass production, managing change and uncertainty through adaptive structures and leveraging people's impact on businesses through information technology (IT).

### **3.2.2 Agile framework Scrum**

In academic literature Scrum framework is mainly studied in the area of project management of software development (Cervone 2011; Drury-Grogan 2014), as it is originally an agile project management framework for software development (Eloranta et al. 2016). Srivastava and Jain (2017) state that Scrum is a software development method which can be seen as a cumulative and iterative process that is driven by software product development. According to Schwaber and Sutherland (2017), Scrum is based on the empirical process control theory or empiricism, which means that information comes from experience and decision-making based on what is known. In IT context Scrum has been described as a framework that enables people to handle complex adaptive problems while delivering the highest quality products in the shortest possible time in the most efficient and creative way possible (Van Ruler 2015). Studies have also explored the benefits of Scrum and it is said that the use of Scrum framework can help companies to add value and gain competitive advantage (Azanha, Argoud, Camargo & Antonioli 2017). However, successful use of the Scrum model requires a strong commitment from everyone, including management (Cervone 2011).

Academic publications on Scrum have also often dealt with the values and principles of Scrum. The agile manifesto consists of four values and the twelve guiding principles of agile development (Sibona, Pourreza & Hill 2018). The four values include: “(1) individuals and interactions over processes and tools, (2) working software over comprehensive documentation, (3) customer collaboration over contract negotiation, and (4) responding to change over following a plan” (Sibona et al. 2018). The twelve principles of agile development are as follows: “(1) customer satisfaction by early and continuous delivery of valuable software, (2) welcome changing requirements, even in late development, (3) deliver working software frequently (weeks rather than months), (4) close, daily cooperation between business people and developers, (5) projects are built around motivated individuals, who should be trusted, (6) face-to-face conversation is the best form of communication (co-location), (7) working software is the primary measure of progress, (8) sustainable development, able to maintain a constant pace, (9) continuous attention to technical excellence and good design, (10) simplicity—the art of maximizing the amount of work not done—is essential, (11) best architectures, requirements, and designs emerge from self-organizing teams and finally, (12) regularly, the team reflects on how to become more effective, and adjusts accordingly” (Stellman & Greene 2014).

Scrum team is characterized by being self-organizing, self-managing, cross-functional, collaborative, and consisting of five to ten people who are working a full time on a project (Sutherland 2015; Cervone 2011; Drury-Grogan 2014). According to Srivastava and Jain (2017), when the team is self-organizing, it can react quickly to the problems and has the power to take all the necessary action on its own. In addition, the self-organizing team can directly affect the effectiveness of the team because decision-making power is at the level of operational problems, which in turn increases the speed and accuracy of problem solving (Srivastava & Jain (2017). According to Schwaber and Beedle (2002), there are three key roles within a Scrum team that are product owner, scrum master, and development team. According to Sibona et al. (2018), the product owner is responsible for managing product backlog and defining product requirements and knows what and how to build to enable the project (Cervone 2011), while the scrum master is acting as an agile supervisor and organizing daily meetings and monitoring the process so that the development team can accomplish its mission, usually working as project manager in a traditional project (Cervone 2011). The development team is responsible for performing tasks of the product backlog and

sprint backlog (Sibona et al. 2018). The framework of the agile development method Scrum is shown in the figure 12.

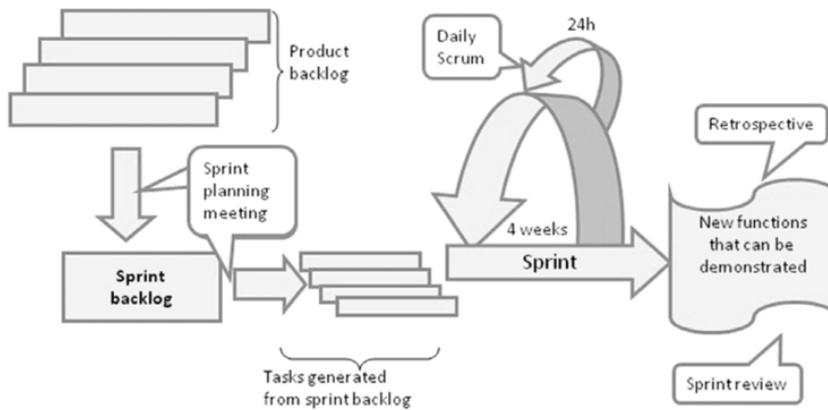


Figure 12. Scrum framework (Eloranta et al. 2016).

Scrum framework works as a process where Scrum team work with backlogs which represent a list of requirements and issues that need to be taken care of (Van Ruler 2015). According to Eloranta et al. (2016), the process begins with a sprint planning and the creation of a product backlog, a list of tasks required for a product. During the sprint, the functionality of the item is developed (Cervone 2011). According to Schwaber and Sutherland (2017), a typical duration of a sprint is one month, but the length may vary from weeks to months according to organizational needs. In the sprint the development team deals with pre-selected collection of product backlog items that are selected for each sprint and these items form a task list also known as sprint backlog (Eloranta et al. 2016). Eloranta et al. (2016) state that the sprint backlog tasks together form an implementation plan for the selected product backlog items, that will be implemented during the sprint. As illustrated in the figure 12, every day of the sprint a 15-minute daily Scrum meeting is held by the product owner, scrum master and the development team in order to plan the work for the next 24 hours (Schwaber & Sutherland 2017). According to Eloranta et al. (2016), the development team is responsible for executing the sprint and can choose the best possible tools and techniques for the tasks. Once every sprint is completed, the complete system is at least in principle ready for publication (Eloranta et al. 2016). At the end of each sprint, a sprint review will be held to check the increment and customize the product backlog if needed (Schwaber & Sutherland 2017). After sprint review and before the next sprint planning a retrospective is organized to enable the team to improve their practices (Eloranta et al. 2016).

### **3.3 Bringing Lean and agile together**

Lean and agile are often seen as two different manufacturing paradigms that are viewed separately and in isolation from each other (Naylor et al. 1999). Many authors, such as Christopher and Towill (2000), have stated that agility should not be confused with leanness or vice versa. According to Bhamu and Singh Sangwan (2014), the reason for this is that these paradigms seem to have slightly different set of goals as Lean emphasizes the reduction of waste of resources while the agile system seeks to be more flexible and adaptable to environmental changes and thus to make more use of resources. Despite the differences in the principles of these two paradigms Lean and agile methods are shown to support each other in the organization by many researchers (Bhamu & Singh Sangwan 2014), and by combining these models it possible to get the best of both.

The combination of Lean and agile, known as leagility and leagile, emerged from a study made by Naylor et al. (1999), where it was argued that neither paradigm is worse or better than the other, instead they actually complement each other within the right supply chain strategy. The research showed that manufacturers should look at operations from the total supply chain perspective and make the decision to develop an agile capability or a Lean manufacturing structure based on where the members are located in the supply chain, and therefore strive for Leagility (Naylor et al. 1999). Cozzolino et al. (2012) also support this by stating that: “the agile principle does not exclude the Lean principle; rather, the two principles can work within the same supply chain at different moments”. After the first study made about leagility the combination of Lean and agility has been explored in many different supply chain studies (Kisperska-Moron & de Haan 2011; Mohamed & Gosling 2011; Purvis et al. 2014). However, it has not been studied in the field of category management and therefore this study aims to contribute to filling the identified research gap through empirical research.

## **4. EMPIRICAL ANALYSIS OF LEAGILE CATEGORY MANAGEMENT**

This chapter presents the empirical analysis of Leagile category management in the context of selected case company. The chapter includes a presentation of the case company and the selected research methodology. The purpose of the research methodology section is to justify why the specific research methodology was chosen in the study and why the research is completed in a chosen way. This chapter also presents the data collection method and discusses the data analysis used in the research. In the data collection section, a brief presentation of the case study interviewees is also provided. In addition to this reliability and validity of the research are also presented in the chapter. The last section of the chapter presents the Leagile category management in the case company. Empirical analysis is divided into separate sub-chapters according to the different themes of the research, that are in line with the research questions of the study.

### **4.1 Description of the case company**

The thesis was made for a large Finnish company operating in more than ten countries. The thesis focuses on the indirect procurement of the case organization, which includes different categories and sub categories of utilities, logistics, technical services, admin, chemicals, technical materials, information and communication technology and non-Finland categories. The case company wants to appear anonymous in the research which prevents the company name or a more accurate description of the case organization from being presented. Case company was chosen as the case company for this research because the it has a genuine need to obtain significant and relevant information about the subject being examined that could later be used to develop company's category management. Next, the research presents the history, current state and future target state of category management in the case company.

The case company has had two so-called waves in the category management. Nine years ago, a procurement transformation was made in the case company and the organization started with a so-called textbook model to build category management. The case company made category strategies and built sourcing projects, and through them, they began to approach important issues from the perspective of procurement and stakeholders. However, at that time, the management of the categories was much done by the procurement and a

little less with the stakeholders. After that, the case company had a period of time when it felt that the strategies generated a lot of documentaries, but little practical actions. The process approach had brought some heaviness to the category management process and when the case company decided to develop the activity, it was agreed that things should be done lighter. As a result, the case company decided on an operating model for doing things that were considered important, i.e. fewer strategies and more so-called good deals. The scarce resources of the procurement were also reason for this decision.

The focus of the activity changed in the case company in a way that the case company focused on doing good deals and not on strategy work in such a way that the procurement would have thought more broadly about the supplier base and for example, with whom the company would like to cooperate in principle. Also, the strategy work was not done to understand the business in the sense that if there are certain areas where the category is procuring, so that there would be a really strong market understanding to truly understand which suppliers are in the market, and what are competitive prices and business models. Category management was not comprehensively viewed in the style that all suppliers and key suppliers would have been reviewed and segmented. At that time, the issue was approached from the point of trying to negotiate the best deals. In other words, the company's operations have been very much focused on strategic sourcing projects in the past, tendering and contract negotiations, as well as on pure purchasing. Thus, the categories have so far lacked a clearly defined category strategy, which would have taken a broader stance on strategic themes and defined the future target state, as well as activities to achieve that target state. Supplier management has also been in the developing phase.

A year ago, the case company analysed the maturity of the procurement and concluded that managing the procurement activity through the category management is clearly an essential issue and one of the procurement's main priorities. The company understood that category management is what the case company needs and therefore the case company has started to invest more in category management and strategy work. Category management is also seen as a platform for all work from the management team's point of view. Now the case company has agreed on a plan for all the main and sub categories of procurement so that all these categories will be reviewed. Strategies are created in different categories and sub-categories so that the first ten categories are handled in five categories of bundles, the so-called two

buckets. Now the strategies of the first bucket are starting to be completed with action plans that have been made and accepted by procurement and stakeholders. For the first five categories that have been under strategy work during the spring of 2019, implementation is also scheduled to start during 2019. In the autumn of 2019, strategy work will be started for the next five categories. In addition, the case company has a number of categories that are still waiting for actions. Thus, different categories are currently in very different stages of maturity. There are areas where the category and strategy work has been more long-term and there are areas where it has never been done. Some categories have background information as these categories and subcategories have been pulled through sourcing projects. Strategic sourcing projects have also been subject to market analyses, either by a case company or by external provider. The current state analysis has also been formed during the sourcing project. The problem is that strategic sourcing projects and such actions are only done for some categories and for several categories the actual strategy work is still ahead.

In the case company category management is seen as a way for the company to perceive together with stakeholders that what really should be achieved. In other words what kind of business goals the company has for its categories. The development of the supplier base is also one of the key issues that the case company wants to achieve with category management. Procurement wants to understand what their supplier base is, who are the key suppliers and to understand how strategic partnerships should be developed. Category management is needed in order to bring company's key supplier management into a solid foundation. Thus, case organization's category management objectives also include a strong supplier relationship management element. Case company wants to have a more systematic approach to supplier relationship management and to include a performance and leadership perspective. Case company brings out different levels of supplier relationship management, starting with critical strategic suppliers, to get senior management meetings between companies and to be able to talk a little bit more than just about an operational matter. The case company also aims to categorize the contract portfolio and contract structure with category management so that the contracts meet the business objectives defined in the strategy. The case company also wants to achieve cost effectiveness through category management, which is also reflected in TCO efficiency targets set in the company's short-term incentives. The objectives of category management in the case company also include aspects related to risk management.

The case company's intention is to bring agility to the management of categories. The procurement wants to streamline processes so that the operations can be developed as smoothly as possible. The aspects of speed and efficiency play a key role when it comes to agility from the case company perspective. The procurement has so much to do at the moment that the case company procurement representatives do not feel that the procurement could go into an operating model, were strategies were made for a full year and then implemented for another year. Instead, the intention is to get the process to the right clock frequency so that the procurement uses their energy and resources for the right things. The intention is to make the best use of resources and involve the right people. The case company is interested in understanding that could procurement find a way to make category strategies so that they could make better use of the people in the procurement so that category people would not only make their own team's strategy but think of more agile way to utilize resources. There is also a perceived need for horizontal collegiate sparring.

In addition, the case company strongly states that the category management and strategy creation require a so-called sprint-style thinking in the case company. However, in terms of agility, there is still a need for a clear common language and an understanding of what agility ultimately is. The company needs information about agile processes and how to implement it. The company does not currently have a process description for category management, but process models are defined at a more detailed level. A process description has been defined for the sourcing process and supplier management, but it is not defined for category management. At the moment, there is no toolkit built to support strategy work, but instead work has been based heavily on everyone's own way of doing strategy. The case company is interested in finding a variety of agile and Lean tools to streamline the process. Currently, the procurement does not have any Lean tools in use and only one procurement team has tested the agile method. There is also a need for improvement in information sharing, project transparency as well as clarification of roles and responsibilities. The case company is also interested in how digital solutions can be used to support agile category management. The so-called ultimate question of the case company procurement culminates in how they can be more agile and Lean in the category management, within the team, or even within the procurement, what are the enablers and obstacles and how to resolve these issues.

## 4.2 Research methodology

This research was conducted as a qualitative case study. The qualitative research methodology was chosen based on the research questions and as the qualitative methodology allows a thorough analysis of the phenomenon being studied (Hirsjärvi et al. 2005). Case research approach was chosen as it is the preferred strategy when the researcher cannot control events and when the focus of the research is on today's phenomenon and real-life conditions (Patton & Appelbaum 2003). Case study provides a way to gather rich empirical information and thus gives a comprehensive understanding of the phenomenon being studied (Kähkönen 2011), and moreover it offers a versatile perspective on the situation in its context and is therefore a particularly suitable method for new situations where current theories of phenomenon and situations are inadequate (Halonen & Törnroos 2005). In addition, it provides depth and comprehension to understand a special phenomenon and the opportunity to be close to the studied phenomenon, which allows an inductive and rich description (Halonen & Törnroos 2005). According to Patton and Appelbaum (2003), case study can be defined as an empirical study that examines the current situation in a real-life context, where the boundaries between phenomenon and the context are not obvious, and where multiple sources of evidence are used. Case studies usually utilize different data collection methods, including archive searches, interviews, questionnaires and observations (Patton & Appelbaum 2003), from which interviews have been the most popular and the most important source of case study information (Yin 2009). It is said that interviews have been chosen as a data collection method in a number of studies, because combining the case studies with the interview allows a more in-depth discussion where why and where questions can be asked, and the underlying causes and nature can be further explained (Kähkönen 2011).

Dubois and Araujo (2007) state that there are five rules for conducting a case study, which are as follows: “(1) case studies are not purely inductive, exploratory tools, (2) generalising from case studies is an analytical process, (3) present the case to persuade the sceptical reader, (4) celebrate the flexibility of the case method and describe the casing process, and (5) case selection is the most important methodological decision”. In addition to the five rules offered by Dubois and Araujo (2007), literature presents different process models containing five (Patton & Appelbaum 2003; Stuart, Mccutcheon, Handfield, Mclachlin &

Samson 2002) to eight (Kähkönen 2011) process phases for conducting a case study. Patton and Appelbaum (2003), have provided case study guidelines that include five activities that need to be done in order to conduct a good case study. These activities are: “(1) determine the object of study, (2) select the case, (3) build initial theory through a literature review, (4) collecting and organizing the data gathering, and finally (5) analysing the data and reaching conclusions”. Seuring (2008) highlights, however, that although a case study is a linear and sequential approach, the actual process may need to repeat several process steps.

Patton and Appelbaum (2003) state that is important that the object of the case study is defined precisely, but sufficiently broadly, so that the case can lead the researcher into the new directions, and in addition to this, researcher must also select the case strategically, so that the subject can be fully investigated. Theory of the study must be built based on a literature review that helps to frame the case study and brings validity in the study and confidence in the findings and conclusions (Patton & Appelbaum 2003). In line with this Kähkönen (2011) states that the literature review provides the basis for research and helps to identify potential research gaps that define research questions and research strategies. The literature review plays an important role in conducting the research and unlike in Patton and Appelbaum’s (2003) process model, it is said that a research should always start with familiarizing with existing theory, and by conducting an extensive literature review that provides the researcher with an understanding of the topic to be studied (Kähkönen). After a thorough literature review, data collection and analysis can be performed, and conclusions drawn (Patton & Appelbaum 2003).

#### **4.2.1 Data collection**

According to Sandelowski (2000), data collection in qualitative descriptive studies usually focuses on exploring phenomena or events with questions of who, what and where. In addition, the collection of data in qualitative studies may be aimed at discovering the basic nature and form of events by means of data collection methods that normally include a structured person or group interviews or observations or the examination of documents and objects (Sandelowski 2000). Stuart et al. (2002) state that in case studies, data is often a written and audio recorded tape of the interview, as well as documents that the company has prepared to give to the researcher for observation. In a case study, the researcher must

determine the actual causal relationships, and therefore building trust between the interviewer and the interviewee is important for the success of the research (Stuart et al. 2002). Patton and Appelbaum (2003) also highlight that it is important that the tools and protocols are created for the data collection, because while collecting data is an ongoing process of catching up with good opportunities and structured plans to monitor events, interview sources, and view documents, it is important that the focus remains on the research. Semi-structured interviews were used as a data collection method also in this research as they have been shown to be a very effective way of collecting rich, empirical data for case studies (Eisenhardt & Graebner 2007). A more detailed description of the data collection, protocol, and tools used to collect data is provided below. Table 2. provides information about the interviews conducted in the research.

Table 2. Description of the interviews

<b>Number of interviews</b>	<b>Title of the interviewee</b>	<b>Organization</b>	<b>Date of the interview</b>	<b>Duration of the interview</b>
12	Category lead	Procurement	06-06-2019	68 minutes
	Category lead	Procurement	18-06-2019	51 minutes
	Category lead	Procurement	25-06-2019	54 minutes
	Sourcing manager	Procurement	25-06-2019	40 minutes
	Sourcing manager	Procurement / External	24-06-2019	89 minutes
	Purchasing specialist	Procurement	06-06-2019	75 minutes
	Category manager	Procurement	19-06-2019	55 minutes
	Chief procurement officer	Procurement	03-07-2019	35 minutes
	Project manager	IT organization	18-06-2019	38 minutes
	Project manager	IT organization	24-06-2019	35 minutes
	Head of digital transformation	IT organization	01-07-2019	31 minutes
	Agile coach	IT organization	28-06-2019	49 minutes

In the research interviews were conducted with procurement specialists working in different positions in the indirect procurement. In addition, four persons with strong experience in utilizing different Lean and agile methods in various projects were interviewed from the IT organization. Interviews were conducted for a total of twelve people to gain different perceptions and meanings and to better understand the phenomenon being studied. Of the twelve interviewees, seven people work in the procurement of the case organization, four people work in the IT department of the case organization and one works in another company, who was interviewed on the basis of the interviewee's solid experience in the field of category management. Out of the procurement interviewees three interviewees work as a category lead, two work as a sourcing manager, one works as a purchasing specialist, one works as a category manager and one works as chief procurement officer. Out of the Lean

and agile specialists, two work as IT project manager in agile and waterfall projects, one works as head of digital transformation and one work as agile coach. All Lean and agile specialists have a long history of working with Lean and agile methods and they have all completed various courses on Lean and Agile methods such as various Scrum courses. All interviewees wished to be considered anonymous so that the answers of the interviewees could not be traced. The privacy of the interviewees was protected by not revealing the names of the interviewees in order to make the interviewees as open as possible in interviews and to ensure that the interviewees would share all the important details without fear of revealing their identity.

The interview process started with a researcher announcing to the procurement members of the case organization that the researcher would interview procurement and Lean and agile specialists working in the case company for the research. After the announcement, the researcher contacted the interviewees and asked each interviewee whether they were interested and willing to be interviewed for the research. After that, the researcher agreed with each interviewee for a suitable time for the interview. All twelve interviews were conducted within one month. All interviews were done in Finnish and later translated into English. Interviews were conducted as semi-structured interviews, where pre-defined themes related to the research topic were discussed. The topics of the interview questions were selected on the basis of the theoretical part of the study, and thus the interview questions dealt with the category management process and the utilization of Lean and agile methods as part of the category management process. Before the interviews all interview questions were reviewed, edited and approved by the company's representative. The interview questions used in this research are provided in the appendix 1 of this research.

Semi-structured interviews were conducted face to face and the interviews lasted between thirty-five minutes and one and a half hours covering a variable number of questions depending on the interviewee. Procurement interviews included more questions than the interviews of Lean and agile professionals. Each interviewee was given the opportunity to read the interview questions in advance so that the interviewees were able to familiarize themselves with the interview questions before the actual interview. Interviews were held as face-to-face meetings in the office rooms of the case organization. In addition to the pre-planned questions, the interviewer also asked additional questions during the interviews in

order to achieve the best possible understanding. The interview order of the interviewees was randomly selected on the basis of how the interview time was arranged. There were small differences in the order and design of the interview questions as interview questions were adjusted by considering the role and the position of the interviewee in the case company. The interviewees answered the interview questions in their own words and according to their own interpretations. The interviews were recorded using a voice recorder. After the interviews, the voice-recorded responses were transcribed, enabling the data analysis of the responses received.

#### **4.2.2 Data analysis**

According to Kähkönen (2011), data collection represents one of the most important steps in the case study research process and the researcher should be aware of different data analysis techniques. Nassaj (2015) state that qualitative research often gathers a lot of information and data from different sources in order to gain a deeper understanding of the individual participants, including their opinions, perspectives and attitudes. Qualitative studies collect data qualitatively, and the analytical method is also generally qualitative including an inductive examination of data to identify recurring themes, patterns or concepts, and to describe and interpret these categories (Nassaji 2015). In line with this Patton and Appelbaum (2003) talk about analysing the data and reaching conclusions, emphasizing that the main goal of the case study is to reveal patterns, define meanings, build conclusions and build theory. Therefore, in-depth data analysis is a crucial step before drawing conclusions (Patton & Appelbaum 2003).

In this study, all interviews were audio-recorded and written notes were made during the interviews. After the interviews, the interviews were carefully listened, and the contents of the interviews were written up. The interviews resulted in 108 pages of written material. Subsequently, the written material was read several times and further written notes were made and the material was pre-coded on the basis of the interview topics. According to Kähkönen (2011), reading the data several times helps the researcher to become familiar with the data and to begin structuring and organizing the data into meaningful units. In addition, it increases the researcher's awareness of the patterns, themes, and different meanings in the data and helps the researcher with the pre-coding (Kähkönen 2011). Shaw

(1999), also highlights the importance of the written notes and states that they can be referred to at the later stages of the analysis and they also help to remind the researcher why certain pieces of information are coded in certain ways and pulled together into organized, meaningful units. In addition, the notes remind the researcher of the logic of the interpretations the researcher has made at the early stage of the analysis (Shaw 2019). In this research the written notes helped the author to structure information and thoughts into relevant units.

In this study, the pre-coding took place according to the themes of the interview by using structured colour coding, which was also used in the final coding. Themes of the interviews followed the structure of the research questions and each theme of the study was marked with its own colour. According to Kähkönen (2011), coding provides the basis for data classification. Shaw (2019) also emphasise that coding the data helps the researcher to categorize, structure and understand the data. Also, further organizing the coded data into categories and relevant structures enables the analysis to be deepened by interpreting the relationships between these categories and explaining why these relationships exist (Shaw 2019). In addition to understanding the relationships between the different categories, constant comparison of the coded sections of the data is also highly important (Shawn 2019). Kähkönen (2011) states that the important role of comparison in data analysis is based on the fact that it enables the detection of variations in the observed patterns and also represents a method of reducing data and offers a preliminary analysis level. In the research comparison was made for structured and colour coded data to build a better understanding of the relationships between the different categories and to deepen the level of the analysis.

Yin (2009) has provided three principles for the data collection process that are as follows: (1) using multiple sources of evidence, (2) creating a case study database and (3) maintaining a chain of evidence. In this study, the case study database consisted of all the interview materials, notes and coded interview material as well as other observations made during the interviews. According to Yin (2009), the reliability of the case study information can be increased by maintaining a chain of evidence which means that an external observer should be able to follow the evidence in both directions: “from conclusions to back to initial research questions or from questions to conclusions”. It requires that the report contains references to the database showing the actual evidence and the circumstances in which this evidence was

collected, and these circumstances must also be in line with the case study protocol demonstrating the link between the content of the protocol and the initial research questions (Yin 2009). Kähkönen (2011) states that before empirical results can be explained, exploring data separately according to the most important theoretical structures and gaining the connection between structures and themes helps to create a deeper understanding of the big picture. The data can then be compared and supplemented with the secondary empirical data and viewed in the light of the theoretical insights that require a review of the literature review to find complementary information to support or explain empirical results (Kähkönen 2011), which was also followed in this research.

#### **4.2.3 Reliability and validity**

Reliability and validity represent evaluation criteria for evaluating the quality of the research and their evaluation has been seen as one of the most important issues in research in general (Kähkönen 2011). According to Metsämuuronen (2003, 86), a reliability of a study refers to the repeatability of the study in the sense that how similar research results would be obtained if the research activities were repeated. Yin (2009) highlights that reliability aims to minimize biases and errors in the research. Stuart et al. (2002) state that there are two ways to improve reliability. The first way to improve the reliability of the study is to use a case study protocol, and another way is to maintain a case database that is stored so that the notes are readily available, allowing another researcher to repeat the analytical procedures from raw data (Stuart et al. 2002). According to Yin (2009), the general way to approach a reliability issue is to make as many phases as operatively as possible, and to do the research as if someone were monitoring it. Case studies should be carried out so that the auditor could repeat the procedures and get the same research results (Yin 2009). This study was carried out by following the case study protocol and in addition a case database was created in which the raw data of the research is readily available.

Validity represents another criterion for judging the quality of research designs (Yin 2009). Traditionally validity testing is divided into three different tests: (1) construct validity, (2) internal validity and (3) external validity (Stuart et al. 2002; Yin 2009; Kähkönen 2011). According to Stuart et al. (2002), the construct validity refers to the extent to which the correct operational measures have been defined for the concepts under investigation. Stuart

et al. (2002) and Yin (2009) state that there are three ways to improve the construction validity. Yin (2009) emphasizes that the first tactic is to use multiple sources of evidence during the data collection. In line with this Stuart et al. (2002) highlight that the article should describe how the data was collected through different sources such as interviews, questionnaires, business documents and observations. Construct validity can also be improved by creating a chain of evidence, meaning that the article should describe how someone else could get the same results for the various constructs in the study, starting with the same raw materials (Stuart et al. 2002), and this tactic is also relevant in the data collection phase (Yin 2009). The third way to improve construct validity includes giving the key informants look at the draft version of the case study report (Stuart et al. 2002; Yin 2009), which was also performed in this study.

According to Stuart et al. (2002), internal validity refers to: “the extent to which we can establish a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships”. Yin (2009) states that there are three ways of addressing internal validity and these include: (1) pattern-matching, (2) explanation building, and (3) time-series analysis, all of which are relevant to the data collection phase. Stuart et al. (2002) emphasize that pattern-matching means that if one case can demonstrate that the actual data pattern correspond to the proposed patterns, there is a good evidence of a particular proposal. If these patterns can be copied in similar cases it increases the confirmation, and if the patterns cannot be considered to hold for obvious reasons for different cases, the confirmation becomes even stronger (Stuart et al. 2002). However, Yin (2009) highlights that internal validity only applies to certain types of case studies, such as causal or explanatory case studies, where the researcher tries to determine whether event x led to event y, which type of case study is not the case in this study.

External validity refers to how the findings of the research or the assumed causal connections can be generalized, that is, whether the results can be generalized at a universal level (Stuart et al. 2002). Generalization describes the extent to which observations can be applied to other cases (Kähkönen 2011). Stuart et al. (2002) argue that case studies often encounter claims that the “sample of cases” is generally too small to generalize results and this criticism is not valid but is due to the confusion between two different types of generalization: (1) statistical generalization and (2) analytical generalization, of which the latter case studies

rely. Stuart et al. (2002) highlight that in a case study, generalization takes place from each case to a broader theory, not from samples to populations, so in specific cases it is possible to generalize from one case. According to Yin (2009), the generalization is not automatic as the theory must first be tested by replicating the findings in the second or even the third case where the theory has determined that a similar result should appear. Once this type of copying is done, the results can be accepted for a much larger number of similar cases, even though no other repetitions have been performed (Yin 2009). Patton and Appelbaum (2003) also emphasize that the quality of the description of the context, the creation of links back to the literature and the triangulation have a decisive influence on determining the validity of the research, of which all these were performed in this study.

In this study, the researcher has sought to increase the reliability and validity of the study by various means. The research presents and describes the research process and the selected research methods in detail. Information has also been provided about the material collected and the content of the interviews. The researcher has completed all interviews, transcribed the recorded interviews immediately and made interpretations based solely on the interview materials. The questions asked in the interviews are designed to answer the research questions. However, when examining the reliability of the study, it must be considered that the interview material was translated from Finnish into English. When translating the text, great attention was paid to the fact that the content remained the same. The researcher also did not know all the interviewees, which allowed an objective examination of the issues. In addition, the researcher's own experiences and opinions were left aside. The direct quotations presented in the empirical section of the study are intended to bring concrete into the study and to increase its reliability. Reliability is also enhanced by the fact that the interviews are repeatable based on the information presented in the study including interview questions.

### **4.3 Leagile category management in the case company**

This chapter presents and discusses the empirical analysis of the research. Review of the empirical findings follows the structure of the research questions and hence, Lean tools and their role in category management are first analysed and discussed. The following section discusses the agile framework of Scrum and its role as an agility enabler in category

management. The third sub-research question of the research deals with digital solutions and therefore the section examines the role of different digital solutions as part of agile category management. The last sub-paragraph presents the enablers and the obstacles of more Lean and agile category management that emerged in the empirical research. A thorough review and empirical analysis of the sub-research questions gives a comprehensive understanding of the phenomenon being studied and will help to answer the main research question of how the procurement can manage categories in a more Lean and agile way.

#### **4.3.1 Utilizing Lean tools in category management**

It is important to understand how the procurement can use various Lean tools to better understand how the procurement can manage categories in a more Lean and agile way. The interviews highlighted two different approaches to Lean method and tools: The use of Lean tools in the different stages of the category management process, and the use of Lean Kanban tool to increase efficiency and improve workflow in category management. The questions addressed to the procurement specialists concerned the use of various Lean tools at different stages of the category management project as well as Lean Kanban as a workflow enhancer. Agile and Lean experts' responses focused on utilizing Lean to improve workflow.

Interviews with each procurement specialist revealed that they could imagine using various Lean tools in the category management process. However, the interviews also revealed different attitudes towards Lean tools as one of the interviewees stated that: "I am not really a Lean person". Despite this the interviewee saw that different tools could be used to streamline the category management process. One of the interviewees, who had completed the Lean Six Sigma Green Belt and had 15 years of experience in Lean tools from a previous employer, strongly believed that various Lean tools could be used in category management. The interviewee had been involved in the strategy work for the first bucket and had experimentally utilized the A3 and the fishbone tools in the category's current state analysis. The interviewee mentioned that the tools such as A3 and the fishbone tool allow for problem identification, assessment of current status, identification of root causes, and planning of countermeasures. In addition, 5 whys -tool was also mentioned as a suitable for exploring the root cause. Another procurement representative who was also part of the strategy team also saw the value of the Lean tools but stressed that sufficient time should be reserved for

the use of the tools so that the discussion would not be rushed. Lean problem-solving tools are seen as a great help by case company representatives in the current state analysis, especially when the category is not already known by the procurement specialist.

The use of Lean tools is seen particularly useful in the current state analysis, but it is also seen that the tools could be used in later process stages, especially in the work-shops: “A current state analysis, for example, presented in the form of a fish bone could be very informative. It could bring a very different perspective to that current state analysis, if done together with the business”. In line with this another interviewee stated: “I think those are great tools, especially for the analysis of the current state, but also later. Any problem can be resolved with those tools. And especially if there is that team and there are different people then different people will come up with different ideas. Gather those ideas up with that tool so you don’t forget what’s said”. Thus, the interviewees felt that Lean tools can also enable a better documentation of information. It was mentioned in the interview that once the information has been documented using Lean tools, it would be easy to go back and continue the development. The interviews also highlighted the time-efficiency of problem-solving tools, as the interviewees felt that the tools would allow them to get the basic category information faster, for example, in hours, without having to spend many days acquiring it, especially when the project team is not familiar with the category.

Standardized work was also strongly highlighted in the interviews by the procurement specialists as a tool that can be utilized in category management. Implementing standardized work, where applicable, in the category management process is seen as a way to facilitate strategy creation and implementation. “Standardized work, which is a Lean tool, so I think it would help with strategy creation and implementation. Once the steps have been clearly defined, a list of standardized work could be followed”, mentioned one interviewee. The interviews revealed that the case company does not have a process description for category management. One of the procurement representatives described that the process came more from the old ways of working with previous employers, and the same formula was applied to the case company. Thus, standardization was seen as beneficial by interviewees: “It already gives a company a lot if you have a process and people follow that same process. And if it’s functional enough. All starts with having one model that everyone follows, and that model works well, the process is simple and easy for people who use it. Strategies should

definitely be done in the same template, because it provides comparable strategies, if you want to present them, you can present them one after the other”. The case company has a broad range of categories and thus the approach and level of implementation have varied enormously. For this reason, there is a need for standardization, starting from the strategy templates: “If we think about the template in concrete terms, what kind of views are made on the plans, then they are very varied. In other words, such harmonization would be beneficial to procurement”. In line with this other procurement specialists stated: “We have different people in the house and from different backgrounds and if everyone gets to do their own thing then very fast there are a lot of different strategy versions”. A standardized template can conceptually support what questions a strategy needs to answer and allows cross-category comparisons. The use of a standardized template is also seen as an opportunity for procurement specialist to move and work in different categories more agile, and resources to be used more agile: “This way we are better able to jump that I know our processes and structures well in terms of category management I could jump from here to IT category and from IT to chemicals and then that agility in terms of resources would increase”. In the interviewee’s words, process descriptions could ensure that time is not wasted on inefficiency when looking for information about what to do. This would also eliminate waste. Interviewees see that the template should also be flexible so that the template would support agility. Headline definition is seen as sufficient from the perspective of interviewees. In addition, one interviewee suggested that in order to get the procurement closer to the business and to create an agile bond with business, the procurement could write proposals on the business’s slides.

With Lean tools, there was a natural focus on continuous improvement. The interviewees were of the opinion that the approach should also be followed in category management. According to the interviewees continuous improvement should be applied, especially when the approved strategy is being implemented. One of the interviewees stressed that all activities should be such that there is continuous improvement. One interviewee summed it up as follows: “In a way, all actions should be based on not waiting for the next time in a year to have a meeting where the strategy is refined, that I think that there should be continual continuous improvement and process improvement”. “The strategy must not be left in the dust. In my opinion, it cannot be done. It should be that we constantly review and improve it”, the interviewee continued. The case company does not have a formal review interval for

strategy review, but several interviewees highlight once a year review interval. Instead, continuous monitoring is seen to take place through actions. However, monitoring actions has proven to be a challenge for the case company as no standardized approach has been agreed. According to the interviewees Kaizen events, together with suppliers, would also be something that could be implemented. Through Kaizen events, it would be possible to discuss with the stakeholders and suppliers about how the activity could be developed. Kaizen events are also seen as a way to facilitate the achievement of set goals. The interviewee summed it up as follows: “I would see that, with strategic suppliers for example, I would definitely organize a Kaizen event to try to brainstorm together. Suppliers could come up with really good ideas. Have we ever asked them how we can improve performance or operations? They will certainly come up with suggestions. If we never ask them how we can develop our cooperation, then it is one-sided and only comes from our perspective”.

Lean and continuous improvement is more common on the production side, and interviews highlighted the need to implement it on the office side as well. “For a long time, I have been of the opinion that bringing Lean into office work would be a really good thing. If Lean’s purpose is not to waste time, then how much of that time is wasted in the office? That’s a shocking amount”, argued interviewee. It is seen that the use of Lean on the office side culminates in the simplification and streamlining of processes. From the point of view of the case company procurement representatives, continuous improvement should not be limited to the production instead it should include all processes and be the starting point for all the activities. There is a need for continuous improvement as the situations are constantly changing, which requires continuous improvement. One of the interviewees stated that processes can be improved endlessly because the interviewee does not see that any process is ever complete but can be developed according to the changing situation. The Plan-do-check-act tool was also mentioned when talking about continuous improvement. It is seen that things are changing all the time and in today’s world even more, so there is no stable situation which requires reacting faster than once a year, thus the plan-do-check-act tool moves all the time. When talking about the tool, the interviewee also highlighted the supplier classification. According to the interviewee, the tool could be used in a situation where the procurement would go through, what should be done if, for example, some suppliers are to be moved to another box, for example, at a strategic level.

The interviews revealed that the organization has an electronic continual improvement channel that can be used by anyone in the organization. The channel offers a quality toolbox, which contains various tools for project planning and implementation, idea creation, process analysis, data collection and analysis, cause analysis and evaluation and decision making. The quality toolbox includes descriptions and templates for tools such as 5 whys, fishbone and RACI. In addition, the channel presents seven different waste types of Lean. At the moment, the procurement has not utilized the toolkit and does not have a toolkit built to support the category management work. However, the procurement specialists saw that such toolbox could be used and believed that the tools would be used in the future to support category management: “It is very likely to be used and a really good idea as this kind of toolkit has not yet been built to support that work”. In addition to the Lean tools, other tools and templates supporting category management work, such as portfolio analysis template were seen as necessary. According to the interviewees, utilizing Lean tools in category management does not require any major training efforts, as the tools are such that everyone can use. Interviewees felt that it was enough for one person to be able to instruct others in the use of the tools. “It’s enough to have someone who knows the model and then give people a 10-minute brief for what that means”, “It requires somebody who is a kind of facilitator who kind of then pushes forward the discussion if people haven’t used those tools before”, interviewees stated. One interviewee pointed out that the best way is to start using the tools through the real-life cases: “Anyone can utilize these tools and I would see that the best way to start utilizing these is through the actual cases and by using different methods. I don’t believe in the idea of somebody telling you about methods and you’re just listening. It doesn’t work that way”.

Lean Kanban emerged as a category management workflow and visual enhancement tool in the interviews with both procurement and Lean and agile professionals. The interviews revealed that applying the tool to category management could increase agility and it would be best suited to the situation where the category process is at a stage where the category strategy is in place and it is time to start implementing the set actions. Based on the interviews, the agile framework Scrum is seen suitable for the first three phases of the category process, where the team works closely and creates the category strategy, while the Lean Kanban is seen as suitable for all phases but especially for implementation and improvement phases, in which the project takes a new form. Scrum is seen as more suitable

for time-limited work and Kanban tool for continuous improvement and overall workflow improvement as these require more time and the method is flexible over time. Procurement specialist summed it up as follows: “I believe this kind of agile model could work on things that are more limited in time. Where there is the epic and what is being done to it, and sort of doing the backlog and prioritizing things through it. But then in a wider sense, you might be able to take advantage of this kind of lean-type method”. According to Lean and agile specialist, in Lean approach, the procurement could start by measuring the lead times and mapping the workflow and gradually reviewing them to improve workflow. “The easiest starting point is to model your team’s workflow into a Kanban. And there are probably different types of work out there, and that goes with improving the visibility of the work, the transparency of the work, measuring and shortening the lead time. Through continuous improvement”, said Lean and agile specialist. Kanban offers the elimination of all unnecessary, the completion of tasks one at a time until complete, the quickest delivery, and the increase of know-how, emerged from the interviews.

The visibility of the work was raised by both procurement representatives, as well as Lean and agile professionals, when talking about Kanban tool. Based on the interviews, using the kanban tool is believed to increase visibility, which is seen as a clear added value in the category management. One of the procurement representatives described how the Kanban board makes the work very visible: “Well, that kanban board is the one that makes that work very visible to others, and it also helps me when I see that I have to get this done this week”. At the moment, the case company has, based on interviews, a rather poor visibility to stakeholders about what is happening and therefore it is believed that the model would increase visibility to stakeholders and also to procurement. Kanban is seen as making the work more visible to employees, teams and supervisors. “I make the work visible to myself and others. I see that what is the workflow, at what stage I have the roadmap and at what stage things are progressing”, one interviewee stated. Interviewees believe that transparency can also ensure that things are not forgotten. It can be used to ensure that if there are person transitions or someone is absent others know the status of the work. Personal information such as emails are often seen as so sensitive that it cannot be accessed, but through the Kanban board the process is clearly visible, and for this reason visual reporting through Kanban boards or traffic lights is considered as a good solution in the opinion of the interviewees.

Kanban board is also seen to bring clarity in terms of job prioritization, both from the perspective of sourcing and from Lean and agile professionals. “When they are put on what is most important, it takes away the hierarchy that somebody is constantly asking what they should do or what is most important. When they are put in that order, that these are the things that we now want to move forward, then we focus on them”, argued procurement representative. A representative of Lean and agile also stated: “and tasks can be marked on that kanban board that the higher that lane is the more important they are”. Kanban also brings transparency to stakeholders in terms of prioritization, as everyone is up to date if the situation changes and prioritization needs to be changed. The interviewees feel that the kanban board would definitely facilitate their role within the project team, when everyone would know what to do. The interviewee felt that Lean Kanban board also helps individuals to push things forward when the person and others know that the tasks are in the name of a particular person. It was also seen as a positive thing that using the tool is not time consuming: “It should not take more than ten minutes in the morning”. Other interviewee also pointed out to the Kanban board provides efficiency in terms of time: “It only takes five seconds of my time to look at the board and to see where the project is progressing”.

Currently, the case company does not have a project management tool for project traceability, but interviewees are consistently in favour of implementing one. Using Lean Kanban is seen as a clear contributor to the project’s traceability and knowledge sharing in category management. The traceability of category projects clearly arises in the interviews, raised by procurement representatives, as something that should be improved. The case company is in the process of creating a strategy in many different categories at the same time, and transparency is also needed at the so-called bucket level, not just within project teams and business units: “Yes, some common tool would be good, because now there is such situation that there is probably no visibility even within the same category about what others are doing”. Many interviews also revealed the need for horizontal collegiate sparring and strategy reviews: “We could spar more on those strategies within the procurement, during that strategy work”. In the case company, category management has been done in so-called own silos within categories and project managers in different categories are not aware of the status or strategies of other categories: “I have not really seen those other categories”.

The interviews highlight the need for some form of benchmarking between teams. Comparison and sharing ideas across categories horizontally in a company is not accomplished, but it is needed: “Horizontal collegiate sparring could be good that if someone else is doing another category then sometimes it might be nice to exchange ideas about what they do and how they handle things. Although what’s bought there is different, but in terms of strategy structure, there are similar issues that need to be addressed”. Sparring culture and teamwork are seen as an element that enables the sharing of knowledge and know-how that contribute to achieving the best possible category strategy. One procurement representative illustrates this through a comparative example of how a team is capable of doing more than one person. In this regard, the procurement could leverage the Lean Kanban tool and bring the much-needed synergy to the category management across categories. However, the prerequisite for using Lean Kanban is to have more than one person in the team. One procurement specialist was solely responsible for designing the category plan, and saw that using Kanban would not have added value to the project in that situation: “Kanban could have been utilized, but in a situation where I was alone in charge of the category plan and I did it all by myself it would have been more about reporting to the supervisor that where we were going”. Lean and agile experts also pointed out that using the Lean Kanban requires a certain number of people to work on the team and using the Lean tools should bring more benefits than they cause work. However, many people are normally involved in the category management project and using Kanban alongside other Lean tools is seen as beneficial.

#### **4.3.2 Scrum as an enabler for agile category management**

In order to better understand how the procurement can manage categories in a more Lean and agile way it is important to understand how the procurement can leverage the agile method. Scrum is one manifestation of agile, one project model within agile philosophy. The interviews revealed that the procurement of the case company requires agile approach and sprint-style thinking for category management and strategy development. Lean and agile professionals saw that the procurement could well leverage the Scrum model in their work: “In my opinion, the procurement could make good use of the model. You could have a list of all the things out there and then you would put them on the big kanban board that here is our backlog and now we take those things to this two-week sprint. Then from there, everyone would see what stage those things are”. Interviews showed that the procurement sees it

possible to utilize the Scrum in the category management process, as the sprint style approach is perceived as natural and efficient in the strategy project: “Sprint-style thinking. I have experienced that it is quite effective, that there is a clear mandate on what part of that strategy is being worked on”, said one procurement representative. The procurement representatives see that the Scrum framework could bring systematics and structure into operations when used in category management process. In the interview, Lean and agile professionals point out that Scrum is suitable for almost any kind of work: “Yes, you can do small things, big things, difficult things, easy things”, one interviewee stated. According to the interviewees, Scrum is also suitable for big tasks, because in Scrum, big tasks are divided into smaller tasks and scheduled. Thus, it can be seen that agile framework is best suited for projects that can be broken down into smaller parts. “Things that can easily be done by component. In a way that you can complete individual sections”. From the procurement perspective, making a category strategy is seen as a time-limited project that allows and is supported by a sprint-style approach.

Lean and agile professionals stressed that Scrum needs three roles to function including the Scrum master, the product owner and the team. “Those three roles are a must-have, without those it doesn’t work”, the interviewee stated. The Scrum master owns the work method and protects the team from all outside interference and is responsible for ensuring that the work is done sensibly. In addition, the role is seen as important because the Scrum master is a facilitative leader who leads through a good work practice, self-organization and people support. The role of the product owner is seen as critical because it owns the backlog and has the last word on how to prioritize the backlog. In other words, the product owner makes sure that the backlog has value-generating things. This role also has control over what is done and what is not. Interviews revealed that in category management project, this role can be seen as the natural position of a category manager or a person with a similar title. In addition, there is a self-directed team that performs sprint-selected tasks such as supplier classification and spend analysis, in the case of category management.

The interviewees stated that Scrum master and product owner could also be members of the team: “Yes, because if someone from the outside comes in to mess around with the work model, I’d rather have someone from that team grow into these roles”. This was also seen to reduce the risk that some roles would lead to micro-management within the team: “The idea

is that it is the team that is empowered and if there are really strong individual characters with a strong role then they will easily start micro-managing and that is stupid”, argued one interviewee. From the point of view of Lean and agile professionals, a suitable team size is from five to six people or less. If the size of the team becomes too large, there is a risk of losing focus and drifting off to the side-lines. “I remember from the training that it was said that just over ten is the maximum where it makes sense”, stated one interviewee. And as with category management, the core idea behind Scrum is that the team is cross-functional.

Interviews revealed that when using the Scrum framework, no task should be personalized: “The idea would be to try to get a team of multiskilled people so that everyone can do everything”. Procurement representatives pointed out that the challenge in procurement is that the know-how is often accumulated by the person in charge of the category and that the case company also utilizes the help of data analysts in the category work. However, procurement is aware that in order to make more flexible use of resources, people in procurement need to broaden their knowledge in different areas of expertise, such as data analytics: “For example, analytics is something that we may all need to be able to take step change in, especially in the future”, stated procurement specialist. According to the Lean and agile professionals, in situations where a large amount of specific knowledge has accumulated for certain individuals, procurement may be able to resolve the situation, for example as follows: “Then the team could think that is there a way that you can help another person who is an expert in what you are not. Or can you take Matti’s other task so that Matti gets that 4 hours so that he can do it for your team”. However, one interviewee pointed out that situations where only one person can do something are situations where it would be valuable to stop to think about why this is the case. In the Lean and agile interviewee’s opinion, this may also be due to a lack of courage. For this kind of situation, a model was suggested, whereby the team always makes suggestions that can be improved upon in the next sprint, and the output is published when they feel that the output is good enough.

In addition to Scrum roles Scrum method also requires certain other things. One thing that stands out strongly in all interviews with Lean and agile professionals is that team members need to be allocated with sufficiently large percentage for the project in question. “I think this is smart when the project is tight, in the sense that the team is not now and then guys”, says Lean and agile professional. “That they are there for three months, half a year, or a year

with such a good allocation that they will team up”, said another interviewee. Product owner dedication was seen as particularly important because if the product owner is not at least 80 percent dedicated to the project, it blocks the progress because Scrum’s idea is to be able to ask and receive feedback from the product owner all the time. If people are not committed to the project, it will easily lead to inefficiency and people will easily cheat in the rules of the Scrum. In Scrum, the intent of allocation is that when a person starts on a team he or she works full time, and if the person has other projects or tasks, they would be eliminated as quickly as possible so that they would not interfere. If the team is not put together with a proper allocation, Lean and agile professionals see Lean style approach as a better option.

As a prerequisite for using the agile model, Lean and agile professionals also see that people should have a certain amount of basic knowledge and that the rules of Scrum should be followed. The interviewees agreed that the necessary skills can be learned through training. Lean and agile professionals stated in the interview that the case company is in the process of running a digital core project that will provide agile training sessions for anyone in the organization who is interested. Lean and agile professionals highly recommended various training courses for procurement including principle and practises as well as product ownership courses. Procurement representatives were unanimous that the procurement could participate in future trainings: “Absolutely yes. I think it’s a good way for us to learn what it’s like in practice, this agile model. And then we can try to make the most of it”.

As with Lean tools, the interviewees stated that Scrum is also best learned by doing: “Through doing. It’s a good idea to get the coaches involved, because they also help with those very practical things, because at the same time, the greatness of the model and the problem is that those things are really simple but pretty hard”. However, according to the interviewees, a few days training gives a really good basic knowledge of how the method works and then the improvement is done by doing. The interviews revealed that Scrum, like Lean Kanban, does not need any special system to operate: “No systems are needed. All you need is a whiteboard and a bunch of people”, said Lean and agile professional. In the same context, interviewees also mentioned that getting started can be even easier without the applications: “When you start using the method and people are in the office, I recommend that you practice using the method on post-it pads for a month and then switch to electronic because the threshold for getting started is pretty low on post-it pads”. However, once the

team has become familiar with the method, it is recommended that the team starts using the tools as they provide significant support for the method. The tools were also found to be very useful for team members sitting in different locations. With the team sitting in one place, Lean and agile professionals saw that using a whiteboard was an easy and good solution. When the workflow is done on a whiteboard, people begin to change the workflow more easily and question whether this is really the case, said the interviewee. In addition, it was seen that face-to-face meetings in front of a whiteboard are perceived as more comfortable than meetings where people look at a screen.

In addition to training, one of the prerequisites for the model is following the rules of Scrum, because if the rules are not followed, Scrum will easily go into Scrum fall mode: “This is so easy to pull into a so-called Scrum fall state. Where you don’t do the right thing in either process, you just pick up the easy stuff everywhere. So, you are not planning a road map, milestones but you are not holding on to your milestones either, so you are failing at the most important things in both waterfall and Scrum”. In addition to the rules of the Scrum, one prerequisite for the method is to hold Scrum meetings, including backlog grooming, weekly and daily meetings. One of the interviewees stressed the importance of defined meetings not only from the viewpoint of transparency but also from the point of view of knowledge transfer: “It is worth remembering that knowledge does not transfer by writing. We need to discuss at some point that it effectively transmits that knowledge. The ticket is just a memoir of what has been said here”. For example, daily meetings were seen as important because they play an important role in team self-organization. One interviewee notes that in addition to these, one prerequisite for the method is that when an organization starts agile change, they should not try to keep the waterfall model bureaucratic and combine it with agility, because then things go really wrong. Thus, commitment from management and organization to the use of the model was seen as a prerequisite for using the method.

According to the interviews, there are also various challenges that should be considered. Adequate team allocation is seen as a prerequisite for Scrum utilization, but it is also seen as one of Scrum’s biggest challenges: “The biggest challenge is the team allocation, if there are those now and then guys, then it’s challenging”, stated one interviewee. Another Lean and agile professional also emphasized sufficient allocation and saw the challenge that individuals are often involved in different projects, making full-time dedication to one

project challenging: “We say that you are on that team and you are there full time, well no”. Based on the interviews, this same challenge is also seen with the case company procurement, as one procurement professional notes that besides category project work, team members often have other projects and operational work going on at the same time. Therefore, attention should be paid to this because it affects the choice of the right method.

The procurement recognizes that if one can focus on doing only one project at a time, it is likely that the project will progress more rapidly. Lean and agile professional highlights this as one of Scrum’s most important points: “One of Scrum’s most important points is that it is really dedicated work. That you do and focus on one thing, that one thing is done from start to finish at once, rather than doing four things side by side a little at a time”. It is due to this that efficiency and value creation are seen to increase. Lean and agile professionals also raised the lack of commitment as a challenge because it is important that people are really committed to the method and are actively involved: “If not everyone is committed to it, then the whole thing will slowly collapse like a card house”. Another challenge that came up was the challenge of predicting the right number of tasks, so that they are ready when the sprint ends. In addition, the interviewees have seen the challenges also arise from the lack of understanding of the roles or attempts to continue to follow the waterfall model. Of which all these can be corrected with the right attitude and dedication to the method.

The case company data analytics team working as part of the procurement has tried the Scrum model and they feel that the model helped them to prioritize the work and provided visibility to the needs and work in progress. “The whole team was extremely aware of what’s topical, where is the most important thing to do this week”, the interviewee summarized. In addition, the model has the advantage of engaging the team from a procurement perspective. Another important point raised was the team’s workload and well-being: “We were also able to ensure things related to workload and employee well-being. That how much work actually fits on the table. It’s the job of the Scrum team to assess whether this is possible, and of course you will learn how to do it and know how much time each type of work takes”.

Based on the interviews, one of the absolute benefits of Scrum is the value maximization. The whole idea of agile is to maximize value and Scrum is one simple framework for doing value maximization. Scrum’s idea is to do time-limited work that eliminates waste. Thus,

Scrum always delivers the highest value things first. In other words, the method starts with the highest-priority issues, whereby Scrum brings the mechanism that the team learns to prioritize. According to the interviewees, learning is seen as one of the benefits of the method and time-limited work, in other words, reducing batch size, is seen as the most important tool for enabling it. “This means that it is not done half a year and then published, but two weeks and then the sprint ends, and the output is published. So, in a way, we are reducing the batch size. We have much simpler things, and we have built-in cyclical, which again aims to teach the team so that the team can learn from their own work”, Lean and agile professional stated. Therefore, the good thing about the method is the time-limited work that forces prioritization and avoidance of waste and delivering the highest-value things first. Another thing is the reduction of batch size, which allows the team to learn along the way, all the time. Time-limited work also ensures that things get done. It also helps the team to plan and anticipate work and increases the speed, believe the interviewees. The team has time to produce the best possible result in the time they have been given, thus the team is not put at an unreasonable level.

When discussing the benefits of Scrum, teamwork is also seen as one of the absolute benefits of the method: “Teamwork, being part of a real team, is one big benefit. And if you compare it to a traditional project organization, the traditional project organization does not offer genuine teamwork in any way”. Procurement also agrees that one benefit of the model is the teamwork. According to one procurement specialist, it is a positive thing to work together for a common goal. The method is seen as good because it involves less predefinition and more finding solutions to problems or approaches to a problem together with the team. Lean and agile professionals also feel that the method provides the team with much greater transparency and efficiency in how things are done and who does what. Interviewees feel that Scrum really has a huge impact on transparency and the flow of information, because everyone has a knowledge of what they are doing and what others are doing. “In Scrum, transparency is the idea of everything, because everything becomes really transparent, because there are short, one-week, or two-week or three-week sprints, so you always know where things are going”, argued one interviewee. The interviewees also positively point out that there is a place where the team can see in real time what the team has accomplished and what the current situation is. In addition, the team sees if the sprint goals will be achieved, and through this, the team will also learn how to anticipate pace and speed.

The strategy creation process is traditionally iterative, and it is seen that Scrum's iterative approach supports the best possible outcome: "In a traditional project model, you decide at that early stage, before you have done anything, you decide insanely important things from that final stage, even though you have the least knowledge of it at that time. In Scrum, the idea is reversed. You start doing, you publish, you learn from your customers, you do more, you publish, you learn from your customers and so on. If it is a really critical decision, as a project owner, I would like to push that decision as late as possible so that I can use as much team understanding and expertise as possible to make that decision". It is therefore seen as an advantage of Scrum to postpone the most important decisions as late as possible. The interviewees emphasize that this way the company can make better decisions with more information. This also makes it possible to stop things if things seem to go in the wrong direction. Activities can be stopped, and things can be rethought, one interviewee stated. The interviewees believe that this can prevent a major mistake from being made at the beginning and only be noticed during the implementation phase, which is difficult to repair anymore: "Usually then, in a state of anxiety, some change is made that somehow fits into that assignment and then it annoys everyone. Somehow it stays together, and everyone starts hoping that this will soon be forgotten". Scrum has the idea that the output is demoed to the product owner and to the wider stakeholder group, and they give feedback very quickly on whether the output is what they wanted. In terms of category management and for example supplier categorization, this means, for example, working on the categorization during the sprint and then involving the stakeholders and seeing together what can be improved, then continuing working and finally publishing the output. "We only do the things that really matter. We get that feedback really fast and then adjust the output according to that feedback and modify it so that the end result is what the customer needs", the interviewee stated.

According to the interviewees, the methods of Lean and agile do not exclude each other: "Of course not". However, one of the interviewees felt that, although the methods are not mutually exclusive, it is clearer to choose and follow one method: "Perhaps I would make the choice of whichever we are aiming for now, to eliminate the waste or to maximize our delivery capacity. The end result is quite similar, but it is somehow slightly different in mind". One of the interviewees described the connection between Lean and Scrum through a Venn diagram of two balls that share a common area. Another way to visualize Lean and Scrum together is through the Scrum framework, which provides various Lean practises:

“There’s just a little bit of everything there, limiting work in progress, load levelling Heijunka, just in time and practically everything, continuous improvement, Kaizen and so on. PDCA (Plan, do, check, act). Everything is almost the same, but they are not exactly the same, because there are those emphasis on the edges that are not common”, mentioned Lean and agile professional. Therefore, the use of Lean tools is considered appropriate when executing a project using the Scrum method.

### **4.3.3 The role of digital solutions in supporting agile category management**

Digital solutions play an important role in supporting agile way of working, and in order to better understand how procurement can manage categories in a more agile and Lean way, it is valuable to understand the role of digital solutions as a contributor. The interviews revealed that technology utilization plays an important role in supporting agility, because we humans can carry only part of the information with us, and yet we are still the bottleneck of the information, because even though we have a lot of information, we cannot communicate it. The machine is able to process much more information, to remember information, and is able to create ready-made views of information that can be viewed together, and they do not remain open to interpretation just because of the way they are communicated, for example. According to the interviews, the tools are not an end in themselves, but when people have the right mindset and intent, the tools really facilitate, coordinate and support the team’s work. With digital solutions, information can be made accessible and visible to everyone, including procurement or stakeholders. “I dare even say that in the future we will be putting more of that information into the systems to be more agile. Whether it’s category management or something else”, said procurement professional. In addition, digital solutions can provide efficiency and speed, and enable a faster response to changing needs and circumstances. Thus, information management and information systems are at the heart of agile category management.

Digital solutions also play a role in supporting Lean Kanban and agile framework. The interviews revealed that while systems can be used without tools and, for example, getting started with the methods can be easier without a tool, it is good to have some system to support the methods. Tools greatly facilitate the work and, according to the interviewees, are worth using: “They really help a lot, why not use a tool. You can do the same thing with

post-it notes, but then especially if you are going in the advanced direction and really want to start calculating more accurately, for example the velocity of the team or a bit better analyse burndown rates, they help in that”. With the help of the tools, a small amount of work gives the procurement a view that supports all activities.

From the procurement point of view, the application’s feature preference emphasizes ease of use: “Jira, that’s great, Jira has a lot of technical stuff specifically designed for software, but from the same product family, Trello, could work better for us”, said one procurement professional. Lean and agile professional also agreed: “Trello, for example, is a super simple tool for pursuing Scrum or Kanban. Jira offers a variety of features built especially on the Scrum side. Everything is ready there. When you finish a sprint, it automatically asks you if you want to run a retrospective and there are all the templates ready for it”. Tool-ready solutions that support the use of the method are seen as important in supporting agility. Interviewees recommended using Drive for data sharing, which is also seen to support agility as it allows linking with other applications, sharing files between the project team, and updating changes in real time for everyone. One interviewee also raises Google Sheets as one of the easiest tools to use Scrum and Lean Kanban: “But then, in my opinion, the easiest tool is Sheets. It’s the easiest, that here is a link for everyone, there is a backlog on one sheet, a current sprint on one sheet and done on one sheet”. The most important thing about using applications is, according to the interviewees, that the team decides on the tool to use together and then stays with that decision. The tool can be anything the team chooses. For Lean Kanban and Scrum, it is seen positive that they can be used with the same applications. In addition, Lean Kanban and Scrum tools are seen as easy to use, and interviewees do not believe that many resources should be spent on training: “It’s enough for some people to practice using the app and then they can help others as well, because others will need it too”.

According to the interviews, Sievo emerges as another important tool to support the agility of category management. Sievo plays an important role in controlling the spend data of the case company: “Sievo, in my opinion, is the soul of this category management”. The value of the system is seen in that it is a source of information that gathers information from many different places and provides speed in the sense that the person in charge of that spend does not have to manually collect data from different systems. Interviewees illustrate that Sievo is currently the cornerstone of category management in the case company because it provides

visibility and understanding of what a category spend is and where and with whom it comes from, which is seen as a very important part of category management. From the agility perspective interviewees see significant value in the fact that digital solutions provide visibility into categories when the quality of information provided by systems can be trusted. Interviews highlight the speed of digital solutions as an advantage: “In a way, if that data is in order, then the spend analysis is just like a click”, said one procurement representative. In the interviews, it was found that digital solutions provide planning and predictability for spend analysis, as it enables procurement to be aware of what kind of spend a particular supplier might have next year. The interviewees emphasize that predictability ensures the availability of services and the correct cost level: “Sievo’s data is vital. I would look at my categories there all the time to know where we were going, and then be able to keep suppliers on the loupe. So that it doesn’t happen that we don’t get offers because the suppliers don’t have the resources because they didn’t know we’re going to need their services”.

Procurement professionals emphasize that Sievo and other similar digital solutions provide important information on category suppliers and purchasing volumes: “I see the biggest benefit as this kind of practical thing, that if I went now into a different category as a new employee and they would give me three suppliers I know nothing about. It tells me a lot that if you take this information from Sievo and look back three years, that if the company has had a million, five million, or 50 million business with this supplier”. From the perspective of category management and strategy, the interviewees see the importance of what kind of spend each supplier has: “If you have that kind of spend that suppliers are interested in, compared to a relatively small spend, then the category strategy has to be quite different based on that”. In such a situation, technology offers a quick snapshot of the category compared to the situation that would require information to be manually searched from systems: “Yes it will speed it up”. In addition, it is seen that digital solutions not only identify opportunities, but also provide an opportunity to study and examine quality deviations, for example. One interviewee pointed out that with digital solutions, the procurement has more information at its disposal, enabling them to get a good contract or negotiate lower prices. Issues related to punctuality of delivery and understanding of performance were also raised. Digital solutions also come with challenges that need to be addressed. Training of people, and above all the quality of the data, comes up in interviews when it comes to the challenges of digital solutions for the case company. One interviewee emphasizes that everyone should

receive sufficient training on how to use different digital solutions. Based on the interviews, the case company has also had challenges with the quality of the spend data. As a result, many procurement activities still require manual work in order to provide numbers to support decision making. The procurement hopes to increase confidence in the information provided by the system. This would reduce manual work and speed up operations: “If you could count on getting the right information most of the time, it would make things easier and faster”.

The quality of the data is seen as vital and the interviewees point out that ensuring the quality of the data requires going to the roots of the data. In other words, the transaction data that goes from an enterprise resource planning (ERP) system to the spend analysis tool should be properly categorized, otherwise it cannot be assumed that the system will provide good data: “So when someone sets up a project or makes a purchase request, that it would include right cost centres and categorization”. Interviewees see that all people need to be trained to fill in the information correctly so that the information is correctly displayed at the end. If the information is incorrect at the beginning, it will distort the information at the end: “If you buy a design service from a supplier, then the supplier shows up in the system like construction would have been bought, even though it is by no means construction”, said the procurement specialist. Procurement specialists state that the data should be cleaned up to a certain point in order to obtain reliable information and at the same time train all users and then monitor operations. For the future, it would be important for the spend data to be aligned so that the right amount of money is displayed at the right cost center and the right organization is visible.

At present, the challenge is also that the procurement is, so to speak, behind the business, because the procurement looks at spends and still has much to do, among other things, in classifying suppliers, when the business is already looking ahead. Procurement believes that all background work should be made agile as possible, so that procurement would have all the necessary information quickly and could bring it to the discussions with business, where people look strongly to the future. The case company has embraced the challenge of data quality by using a partner and artificial intelligence help in categorizing the data. The goal is to improve the quality of the data and reduce manual work, thus providing speed and agility. As the procurement still has a lot to do with the background work, the readiness and ability to bring stakeholder with insights on the most urgent topics are also seen as a

challenge. “How do we get from the history to the same line with business. And even further, to be able to provide the market with the forecast, the scenarios, modelling the future in some way”, summed up one procurement interviewee. The interviews revealed that some procurement interviewees see the spend analysis as looking back. However, the interviews emphasized that while spend analysis is somehow looking at history, sourcing professional must understand where the money is put. An analysis of historical spend is also considered important in terms of where the money will be put in the future. Tracking history data is seen important, especially in situations where the company continues to buy from the same vendors. However, in situations where the business wants to start a business with a new partner, such as universities, the focus should be turned in the same direction as the business, that is, moving forward and not spending too much time looking at spend data: “We say that hey you haven’t bought from any university in the last year, no money has been spent with the universities. So that’s a bad entry into that conversation. It illustrates that our procurement is looking in the wrong direction than where the stakeholder is”.

The large number of systems and the incompatibility of systems are highlighted in all interviews when discussing application-related challenges: “The challenge is that there is data in many different places and the systems do not talk to each other”, stated one interviewee. Other interviewees agreed: “I see the challenge of systems not working together and too many tools”. “The challenge we have here is that we have a lot of these legacy systems and this field is very fragmented and then these systems do not talk to each other. You have to compile that data from many systems”, summed up one of the interviewees. One interviewee also pointed out, as a concrete example, that the company’s contract management system is currently such that it does not talk to any other system and requires a lot of manual work. Interviewees see that the contract view is an essential piece of information for category management because, after all, contracts manage the category from a sourcing perspective. This is where the potential for agility is seen: “The fact that the system is so primitive or outdated that it doesn’t link to anything is really a pretty bad thing, especially in categories where there are a lot of contracts, so agile system would make things tremendously easier”, argued one procurement professional. As a solution to this problem, the interviewees present a system that would be directly integrated with the enterprise supplier management system: “It would be the same system that would maintain the master data for the kind of vendors we have, it would include their self-assessment queries and you

could see their sourcing case where they have participated and from there you could see what kind of contracts we have with them at the moment, how long they are valid, to which department they belong, and who is responsible for them. It would actually be a comprehensive SRM system”, one interviewee stated.

When companies invest in digital solutions, they should think about the compatibility of the applications with different systems, and as with category management, the company should have a strategy of where the company wants to be in years with the tools. Based on the interviews, companies should select compatible tools as they provide agility to the company. For example, Lean Kanban and Scrum tools can be supported by various systems that can be integrated into one system: “It does not mean that they all have to be in the same system. We can use Jira for ticketing, I can use Google Drive for document management, and I can use Monday to display it as a visual tool. They can be integrated with each other, for example, Monday can integrate all other applications so that we get the benefit of being able to use several different tools but seeing them in one single application”. From agility point of view procurement needs tools that gather data from different sources: “Because in category management, that wasted time goes into chewing and collecting data. If there are a million different excels in a million different places, then how much time does it take for people to search for that information before they can even analyse it. For this, we need a well-executed dashboard model. It would help a lot if there was such a tool”.

From the perspective of agility, the interviews also highlight that the document management in the case company procurement should be made more efficient and information should be available so that it is accessible to all people who need it: “This is a good thing to think about that what could be the right place”. Interviewees see that information is easily and quickly available as one of the prerequisites for a company to be agile. If the procurement wants to go into an operating model where all the responsibilities are not so personalized that the procurement could, for example, switch one person to manage another category, then the interviewee believes that all information should be readily available: “We’re still a little bit in that personal folder world, even though there is Drive and all. We should get out of it”.

Interviewees see that managing data and making intelligent conclusions from data play a key role when it comes to the importance of digital systems. This means that the procurement

should take the information management, both internal and external, to the next level. Procurement professionals wish that Sievo, for example, would be even more automated to bring analytics in an automated way: “That I would be able to do just the kind of reports I want and automatically send them to me and others. Such things would be needed in category planning and category management”. The value of digital solutions is seen in the fact that things are visually understandable and easily shared by the team and the wider stakeholder. It is seen that technology can help procurement better understand the supplier field and use knowledge to support strategy work. From the point of view of agility, interviewees see value with tools that let procurement provide views in a category meeting without having to search, chop and construct presentation materials. In line with this other procurement specialist states that: “If you have a great dashboard where you can show that the situations looks like this, so if we look at the data so I think that we get much more out of the discussion with stakeholders and that it raises ideas of what we should do with this and could even identify those cost issues. If there’s such very fine data about where that money has gone”.

Data management of the case company should reach a dream state where procurement would have functional platforms and dashboards and Spend analyses would be done at the touch of a button. Data would come out of the Power Bi tool smoothly, without having to spend a month, for example, to validate whether the data is correct or not. In a dream situation, procurement would have access to a system that would have information about suppliers, their performance, and how the company has purchased from the supplier. Interviewees hope that the system would also provide information on, for example, the hourly rates of different suppliers and what they charge for certain roles, thus providing not only speed but also comparability. “If you are leading some category, then you should have a system that when you come to work in the morning and you open your computer that you would have a screen of what you want to see from your category. That it would pick things up from every possible place”. Procurement sees that in order to avoid a static setup, the information should be in a system where the procurement would have a view of the information. There, the information would be visible and in a format that could be transmitted and viewed at any time, but preferably on a daily basis. This way procurement would always be able to catch the information immediately. This also plays an important role in the planning of the future: “When we get those views and future estimates from our external service providers and get key index forecasts or something else that is considered important from the perspective of

market dynamics, in addition to the information we already have, then we can already pretty well show that in that direction we should go or there” summed up procurement specialists.

The procurement sees that market analysis also benefits from digital solutions. Digital solutions have the potential to create market visibility, which is very important when it comes to strategically speaking what an action plan and strategy work rely on, as they rely on market understanding and market knowledge. In order to make a good market analysis, digital solutions are needed that collect market information and also bring automation to market analysis: “Various automated services or applications that would provide information on specific vendors, for example. That there would be a news feed so that the tool or service would gather the information for you so that you do not have to search for that information yourself one by one”. Interviewees believe that these things are the business card that allows the company to talk with the business at an earlier stage. Thus, the business would involve the procurement at an earlier stage, as the procurement would have something to offer for the stakeholder as a strategic internal partner: “We need to find a way to pre-influence the business, that hey we have something to bring here”.

In addition to information from suppliers, the interviews highlighted the need to obtain data on how the procurement is doing, as the procurement currently has little knowledge of how they operate. One of the interviewees emphasized that the lack of data often leads to the unfortunate result that when the information is missing, the same mistakes are repeated. In addition, it was seen that the data should be structured enough. If the data is too general, it is difficult to utilize the data. Therefore, there is a need for more accurate data. From the point of view of the interviewees, the procurement uses far too few tools, automation, robotics or technology at all. Examples such as of electronic auctions are mentioned in the interview. However, the procurement sees many opportunities for utilizing digital solutions to bring agility and leanness to category management. In the interviews it was noted that the biggest obstacles to using data and digital solutions are often people themselves: “Time, courage, prejudice”, mentioned one interviewee. “After all, we ourselves are the constraint with increasing the digitalization, because we think we don’t have the time, we don’t have the ability to learn, and it’s more important for us to complete this task the old way. That is, before we have the capability to jump into that digitalized solution, we are definitely the decelerator ourselves”, summed up another procurement specialist.

#### 4.3.4 Enablers and obstacles of Lean and agile category management

To better understand how the procurement can manage categories in a more Lean and agile way, it is important to understand its key enablers and challenges. When it comes to enablers of agility and leanness, in addition to digital solutions seen as naturally important enablers, the importance of roles as enablers is strongly highlighted. Interviewees see that the composition of a team depends on which category it is, what size it is, and which organization it is affiliated with. However, all interviewees strongly agreed that the team should absolutely be cross-functional. Procurement representatives emphasized that the category team should have different positions on both sides, stakeholder and procurement: “I would take the stakeholder and the procurement into the dream team, and people from different levels”, stated one interviewee. “Cross functional team, which has the essential actors involved in that function plus then the procurement relevant actors in that category”, said another procurement representative. Interviewees saw that this way the best possible knowledge would be obtained: “I think the team must be absolutely cross-functional, I think that. Because we don’t have all that information here in the procurement, we certainly don’t have all the information about what’s going on in the field. That there must be people from all levels in that strategy team, because they have different types of information, and all of them are needed to create that best strategy”. Other interviewees also strongly agreed: “This must not be a procurement exercise. That is, it must not be that the stakeholder is far away. If the stakeholder is far away, there is a risk of mismatch when the stakeholder has their own daily life and their own priorities, needs and burning cases, which is very short-sighted because they are doing their own thing, then it is easily reactive there, and if we paint a lot of that skyline without enough context, we will be left on quite different levels”.

Interviews revealed a strong emphasis on stakeholder and business engagement: “I think it is vital because they are on top of those issues”. Interviewees emphasized that stakeholder involvement is vital as procurement is a so-called service organization and the procurement is not acquiring anything for itself: “The thing that can never be overemphasized is that it starts from the fact that it is work done with stakeholders, which in a way is a common goal. It must be clearly understood that procurement does not make category strategies for procurement, it is done for completely different purposes. It should be understood by all who do those projects, and also by all the stakeholders involved. In this way, we see that the work

will serve us all. That is the essence of everything”. Others agreed: “Effective cooperation with the business. That’s the crux of it all. After all, we’re not here to get anything for ourselves. It was perhaps our biggest stumbling block also in our earlier procurement layout when we once started building this category management, so it remained nothing more than a procurement exercise, it was not clearly done in collaboration with the business”. Formal approval of category strategy also comes from the business side, although often the procurement director is also involved. Interviewees see that when the category strategy is made with stakeholders, it is also much less painful to implement related actions. In the interview, this is seen as very important thing because it also makes the implementation easier as procurement don’t have to “sell” it to anyone because the strategy is done together.

Procurement sees category management as an immediate communication with a stakeholder, where procurement must get as close to the stakeholder as possible in order to understand their daily lives to create a category strategy for them to support it. Procurement should really understand the current situation of the stakeholder and the challenges they face and, above all, give category management perspective to that thinking. In other words, the strategy should be designed in a stakeholder-oriented way that supports the everyday life of stakeholders. According to the procurement, it is valuable for the procurement to think about stakeholders in the sense of who to consult, who they need input from and who are the key people who should be closely involved: “We need to understand who, on the business side, are the people whose work this affects”, stated one interviewee. The same thing was noticed and mentioned in other interviews: “In my opinion, it requires us to get those key executives involved from those functions to do that work with us, and then they actually define with the sourcing manager who leads the project, what kind of people should be involved from their own teams”, argued another interviewee. Based on the interviews this allows for transparency, which is seen as important in all agile teams. The interviewees saw that it is important from the business side to involve those who have the commitment they need to complete the actions. One interviewee emphasizes that it would be good to involve also the tactical operative people to contribute to what the real challenges in that category are.

In many interviews, it emerged that the persons who approve the category strategy should be involved in the strategy work at an earlier stage than in the approval stage. “If I could create a dream team for this, there should be the one who approves the strategy”, mentioned

one interviewee. Interviewees saw that this would ensure that the strategy team is consistent with management so that there is no need to make major changes to the strategy during the approval phase: “There may be comments from the vice president on such big things, which should have been considered right at the beginning or middle of the process. And now if it’s the case that you have a PDF file waiting to be approved, then getting those big things involved is a challenge. Of course, small stylizations are easy to make, like bug fixes, but I think those significant changes should be considered at an earlier stage. The strategy should be reviewed at an early stage with approvers to see if this is going in the right direction, whether there is consistency with management”. The interviews revealed that approvers do not necessarily need to be part of the core team, but approvers must be kept well informed and consulted along the way: “Yes, I would now keep those people more informed that are we on the right path. They would be involved at an earlier stage in order to have that visibility”, stated interviewee.

The interviewees see that the team should have a person with sufficient experience and drive as a project manager. In the case company the project manager of category project often works as category lead or category manager. One role that was seen as really important in all the interviews was the data analyst or expert in analytics: “I think that analytics support is essential”, stated one interviewee. In line with this the other interviewee stated: “The analyst should definitely be involved in the dream team, definitely, absolutely”. Analytical and data experts are needed as they are able to handle and bring the data to support decision-making, which is needed in strategy work. Interviewees saw that, in addition to the core team, there are also a number of necessary people who are consulted as needed. For example, quality and product development should also be involved. The interviewees emphasized that one of the enablers of agility is also that the company would not do everything alone. Instead, the procurement should be bolder in finding partners who can help them. According to the interviewees, agility comes from the ability to be fast, which also requires external partners: “That we would have this kind of list, a decision pool, that I need a market overview of this, this or this, and then there are these service providers. Of course, it’s not that black and white, but still, having the service providers and knowing that their supply is tailored to our needs so that when we need it, whether it is index forecast or whatever else, we have it available, that we can get it at the touch of a button”.

According to the interviewees, one of the most important enablers of agility is the ability to use resources more agile. One interviewee pointed out that in order to make this possible, there should be more generalists in the procurement who are capable of doing several categories. The interviewees emphasized that knowledge is the key to enabling the flexible utilization of resources, and thus the people in the procurement should have a broad knowledge base. Therefore, competencies are emerging as one clear enabler of agility. Thus, people in procurement should have the widest possible range of competencies, so that they are not experts only in certain types of activities: “That if you do not have the ability, for example, to analyse bid comparisons, or vice versa, your contract negotiation experience is very limited, then we should always think that there should be this kind of expert or that kind of expert”. Interviewees believe that procurement should have comprehensive expertise in handling cases of different sizes. The interviewees saw that within each procurement team, enough analytical power should be found for example. The interviewees felt that digitalization brings with it a lot of prerequisites, for example, the procurement must be able to use and read dashboards correctly and be able to challenge and validate the data. Procurement professionals emphasized that when building procurement teams with extensive expertise, everyone must also have the commercial, negotiating, and contracting ability and knowledge. The interviewees see that a certain set of skills is needed in order to make the procurement agile so that more people can be used in different types of projects: “Then it’s really the substance that changes. But that’s what comes from the business, the stakeholder. We need to have those specific areas of procurement expertise”.

Procurement of the case company is really interested in finding a way to make category strategies so that they can better utilize the talented people in the teams: “It doesn’t have to be that category people always make their own team’s strategies. It might be possible to think about whether we could have a pool with people who can do category strategies, implement supplier management, and so on”. One procurement representative stated if the procurement person has strong experience in creating a category strategy and related activities, then this type of competence can be utilized in different categories: “That there would be people who are capable of managing those projects. Especially when we have quite a few smaller subcategories where we could make some lighter plans”. In the opinion of the interviewees, flexible use of resources is also seen as based on efficiency thinking: “That we have a certain amount of resources and a certain amount of time, and of course how we use

that time. Then also this kind of human-centered angle, how do we get the best of their knowledge, their know-how and their good ideas”. In line with this another interviewee mentioned that: “We currently have a limited number of such people who have experience in making and managing a category strategy, so I believe that it could be one way to enable us to make extensive use of the limited knowledge we have and the experience we have”.

As one of the key enablers of using Lean and agile methods, the importance of change management and factors related to attitudes also raised. The interviewees saw the issue as a kind of change management project that needs to be well handled. A clear communication and repetition are seen important. Another important enabler of the Lean and agile methods was the organization’s mindset that members of the organization have the will and desire to change and develop operations which would support agile practices and continuous improvement: “We should have such mindset in the organization, that there is a desire, so that we do not stay in the old world resting on our laurels but recognizing that the world is changing, and we also need to change”. Enthusiasm, curiosity, and the desire to improve ways of working are perceived as really important. Interviewees emphasized the need for the right attitude and motivation. One interviewee described the agility enablers as follows: “In order to be agile, you need to be able to be a senior who knows the risks involved, but on the other hand has a youthful mind that is capable of thinking about it in a new way. That you have the zeal to do things quickly, but you understand where the risks are. So maybe a combination of these, of youth and old age, that’s what you need, and the courage”.

Management support is also seen to play an important role in enabling a more Lean and agile approach. In addition, when it comes to implementing the change, the interviewees see that it would be good for executives and key persons to lead the change with their own actions, communicating positively what the change enables. The interviewees see that the company should take all the necessary steps to ensure that the new methods are well implemented and then follow up. Training is also seen to have an important role in this matter. In addition, one interviewee emphasized that if the company wants to be genuinely agile, it requires that the agility is considered not only in terms of roles but also in responsibilities and obligations: “It is true that each of us will have more responsibilities, and whether people want it is another question. But it is absolutely necessary if we want to be agile”. One interviewee stressed that there must be mobility at the level of category strategy making, that if decisions

are to be made, they must be able to be made at the level at which the category strategy is made: “So if you talk about mobility, you have to get rid of the bureaucracy”.

For the procurement to be more Lean and agile in terms of category management, the obstacles and challenges involved must also be considered. The interviewees did not see any direct or profound obstacles to Lean and the agile way of working. Today, procurement’s practical obstacles of agility are strongly related to the current state of enterprise information systems and the ability of the procurement to manage data and create different views with data. Data quality has been a challenge for the case company, which needs to be fixed in order to leverage digital solutions as an agility enabler. Although the interviewees do not see any fundamental obstacles to change, it is important that people adopt the new approach. Everyone should have a common understanding of what agility and Lean mean, and for this reason, the interviewees saw that it is important for them to be involved in training. Change management is seen as an enabler of agility, but there are also challenges associated with it: “Tools and their price is not the problem. The problem is how we succeed in change”.

The interviews also brought up challenges related to people’s mindsets: “In a way, I think it is such a natural barrier that we have. That is, the courage to think things in a new way, the slowness in that development. I’m not saying we should jump to anything, of course all the things have to be prepared and properly understood, but somehow this requires such a change of mindset. That you think things differently. For a very long time, we have been systematically making those processes, developing those processes, and of course on the other hand, when we develop the processes, we get that agility, but I would say that the change of mindset plays a huge role in it”. Therefore, the interviewees saw that it is important that the organization also supports and encourages the change at the mindset level. Adding generalists to the procurement is also seen as enabling agility, but at the same time, the individuals in the procurement also highlight the challenges of responsibility: “That if we are really agile and we have only generalists in the procurement then certain things are not the responsibility of anyone”. Another person in the procurement also identified responsibilities as a challenge for agile operations: “The most annoying problem of agile is that there is so-called imaginary responsibility, but in reality, the person is unable to handle it because they have no mandate to act”, the interviewee stressed. These things must be considered in order to be successful in implementing an agile and Lean approach.

## 5. CONCLUSIONS AND DISCUSSION

The final section of the study provides a comprehensive insight into the main and sub research questions of the research and discusses the research results from a theoretical perspective. The chapter first presents the answers obtained through the empirical research to each research question. Answering the research questions starts with answering the sub research questions and ends with answering the main research question of the study. Next, the results of the empirical research are taken to a broader level and compared with the theoretical part of the study. The comparison is made by highlighting research findings that are consistent with the theory and examining results that differ from the previous studies. In addition, the chapter offers managerial recommendations and proposes a new way to operate, based on the findings of the research. Finally, the chapter discusses the limitations of the study and on this basis offers suggestions for further research.

Intense international competition (Kocabasoglu & Suresh 2006), and the increasingly strategic role of sourcing (Ahtonen & Virolainen 2009), are forcing companies to look for new ways to operate in order to stay competitive. Lean methodology is known as one of the most effective management philosophies (Corbett 2011), used to develop operations and minimize overall waste (Singh et al. 2006). Based on the literature Lean continuous improvement methodologies enhancing competitiveness (Cherrafi et al. 2016), can also be used in category management (Wood 2015). In addition to Lean methodologies more and more companies are adopting an agile way of working (Eloranta et al. 2016), which has been said to provide speed, efficiency, competitiveness and the ability to react rapidly to change (Kisperska-Moron & de Haan 2011; Gligor 2014; Stellman & Greene 2014). When companies introduce an agile approach it usually involves using an agile framework Scrum (Eloranta et al. 2016), originally developed and commonly used method for software development (Layton & Morrow 2018) but said to be applicable to any project (Sutherland 2015). In addition, it has been suggested that these methodologies can be used together, known as Leagile (Purvis et al. 2014). To cope with the increasing global competition and meet the strategic targets procurement must find a way to enhance its category management. Therefore, the purpose of this research is to provide comprehensive understanding of the research problem and examine how procurement can manage categories in a more Lean and agile way.

In order to provide a comprehensive answer to the main research question, answers to the sub research questions of the study are provided first. The first sub research question of the research is as follows: “*How can procurement utilize Lean tools in category management?*”. Based on the results obtained from the empirical part of the research Lean methodology and Lean tools are applicable to category management. The empirical section of the study revealed two different approaches to Lean method and tools. The research shows that procurement can utilize various Lean tools at different stages of the category management project to enhance problem solving, strategy work and eliminate waste. In addition, procurement can utilize Lean Kanban as project management tool to improve category management visibility and overall workflow, as well as continuous improvement on a project level especially during the strategy implementation and continuous improvement stages.

The research results strongly emphasize that various Lean problem-solving tools are considered useful and applicable, especially for the current-state analysis as the tools allow for problem identification, assessment of current status, identification of root causes, and planning of countermeasures, which are considered important when creating a successful category strategy. Lean problem-solving tools such as A3, fishbone and 5 whys tools were seen as particularly suitable for the current state analysis. Problem solving tools are considered to be particularly useful in supporting workshop working with the business and stakeholders. The tools are considered very useful especially in situations where the category is not familiar to the category manager. The study found that the procurement sees that it can utilize tools in workshops to improve the informativeness, and that the tools also allow for more effective exchange of ideas with the business. The tools can be utilized to provide a better documentation of information, which is also useful for further development. Research highlighted that the procurement can leverage tools to bring speed to information collection.

Research shows that procurement can also utilize standardization, a Lean tool, in the category management project. The use of standardization is seen as a way to facilitate the planning and implementation of the strategy. For example, standardization can be used to standardize the content of the project, that is to say, a list of things to do when creating and implementing a strategy. When the content of the project and the actions taken during the project are clear, the waste that results from people not knowing how to act will be reduced. The research showed that standardization should also be applied to the strategy template.

Based on the study, the strategy work should be done in the same template as it offers strategies comparability between strategies made in other categories. The content of the strategy template should be defined at the title level, because the categories are naturally different, and the template should also support flexibility. Thus, a standardized template could support what questions the strategy should respond to and what issues should be addressed in the strategy work. Procurement can also benefit from standardization from the perspective that it enables the procurement to leverage its resources more agile, as sourcing professionals can move more flexibly to work in another category once they are familiar with the category management process and strategy structure.

According to the study, continuous improvement should be done in category management. The research revealed that continuous improvement becomes relevant particularly at the stage where the approved strategy is implemented. Based on the research Kaizen and PDCA were found to be suitable tools for this purpose. The research shows that Kaizen events, together with suppliers and stakeholders, can provide important insights on how to improve operations, which has a positive impact on achieving goals. The interviewees feel that continuous improvement must definitely be applied to the so-called office side, not just the production side. Continuous improvement is seen as important because of constant changes in the environment and circumstances. Thus, the plan-do-check-act rotates all the time, as an endless process. The procurement should consider, for example, analysing suppliers in portfolio classification and considering how it can move the suppliers to a different quadrant.

The research shows that the procurement could utilize different Lean tools by building a toolbox that contains various Lean tools such as A3, fishbone template, 5 whys template and PDCA, to support category management work. In addition, the toolbox could contain different category management tools that support strategy work. Interviews revealed that the case company has a continuous improvement channel that provides a quality toolbox with various tools for project planning and implementation, idea creation, process analysis, data collection and analysis, cause analysis and evaluation and decision making. The quality toolbox contains ready-to-use tools for continuous improvement including their descriptions, for everyone in the organization, and the case company procurement sees that it can also be utilized. Interviews showed that implementing Lean tools does not require extensive training. According to the research, everyone is capable of using these tools, which means

that the company don't have to spend a lot of resources on teaching. The procurement feels that it is enough for a few people to know the tools and guide the project team in their use so in other words they act as facilitators.

Based on the research, procurement can also utilize Lean method to improve category management work visualization and overall workflow by using Kanban visual management. The results of the study show that the model is well suited for the last two stages of the category management process presented by O'Brien (2019), which are the implementation and continuous improvement stages. Lean Kanban can also be used in earlier process stages, but if the company wants to use both the Lean and agile approaches, an agile development framework is more suitable for earlier process steps with time-limited work and Lean Kanban, which is flexible about time, for last two stages of the project in which the project takes a new form and requires more time. The research revealed that Lean Kanban can increase visibility, which is seen as a clear benefit in category management as the strategy team includes people from across the organization. Interviewees believe that visibility can also ensure that things get done and are not forgotten. The model makes project team members aware of their own work and the work of other team members, which, based on the interviews, is really needed, especially in the case company. Thus, it can help to ensure that even if someone is absent, others in the group know how to proceed. Transparency of the workflow would make everyone aware of the stage at which action is progressing. Therefore, procurement can utilize it to improve information sharing, particularly towards stakeholders.

The research shows that the procurement could begin utilizing the Lean method by measuring lead times, mapping workflow and reviewing them in order to shorten lead times and improve workflow. Using the model, the company could eliminate waste, complete tasks one by one, deliver fast delivery and increase know-how. The research results strongly emphasize that Kanban can also be utilized to bring clarity in terms of job prioritization to the procurement and its stakeholders, as everyone is up to date if the situation changes and prioritization needs to be modified. The tool is also perceived as helping to push prioritized things forward when tasks are named. The research also finds positive that the tool itself is not time consuming and also provides efficiency and speed when the procurement as well as stakeholders and business see the status of the project from the visual tool right away. Lean

Kanban is also seen to have a positive impact on project transparency, traceability and knowledge sharing within category management process, not only within project teams and business units but also between different categories and teams. Therefore, the procurement can also utilize the model for horizontal collegiate sparring, knowledge sharing and benchmarking between categories that contribute to achieving the best category strategy.

The second sub research question of the research deals with agility through the agile framework Scrum and is formed as follows: *“How can the agile framework Scrum bring agility to the category management?”*. The empirical analysis of the research revealed that the procurement can use Scrum framework, which is a project method within agile philosophy commonly used in software development and IT projects, to bring agility to the category management process. The research shows that Scrum is suitable for almost any kind of work that can be divided into smaller parts and done by component. According to the findings of the research category management project is iterative in nature, which makes Scrum framework’s iterative and agile approach a good fit for the category management project. Sprint style working is seen as particularly well suited to the first three stages of the category management project presented by O’Brien (2019), as they require working closely with a project team including procurement and stakeholders and involve time-limited work.

In order for Scrum to bring agility to the category management Scrum needs three roles to function: the product owner, the scrum master and the development team. In category management the role of the product owner can be seen as the suitable position for a category manager or a person with a similar competence. Based on the empirical results product owner and scrum master can be part of the team. A suitable team size for a Scrum team is less than ten people, usually from five to six people, which is also an average number of people involved in the traditional strategy core team. In Scrum no task should be personalized, which supports the flexible use of resources and supports the agile mindset that everyone in the team should be multiskilled people who are capable of doing different procurement tasks. To enable this the procurement needs to broaden their knowledge in different areas of expertise. Also, in order for agile sprint-style work to be possible, Scrum members must be signed up to the project with a sufficiently high percentage. If this is not possible then Lean is considered a better approach based on the research. Adequate training is also a prerequisite for using the method, as the Scrum only brings agility if its rules are

followed and the team commits to hold the agreed meetings that are important part of the method. The research revealed that the case company has an ongoing project which provides training for all those interested in agile methods and models, in which the procurement can participate. Scrum can best bring agility when the method has management support and the company is not trying to keep the waterfall model bureaucratic and combine it with agility.

Based on the research Scrum can bring agility to the category management process as it helps the strategy team to prioritize work and gives visibility to needs and work in progress. Using the Scrum, everyone is aware of the most important tasks that need to be done in the given time. The method provides benefits such as engaging the team and it also positively affects the team's workload and well-being. The research shows that one of the greatest benefits of Scrum is its value maximization. Scrum can bring agility as it offers time-limited work that requires prioritization and avoidance of waste and delivering the high-value things first. According to the research time-limited work also provides efficiency and speed and ensures that things get done. Based on the study one of the most valued benefit of Scrum is that it offers genuine teamwork and as the tasks are handled closely together it also provides great transparency, better flow of information and efficiency in how things are done and who does what. Scrum can bring agility to the category management process as it provides iterative approach that supports the best possible outcome of category management. In Scrum the most important decisions are left to the last, which allows decisions to be made with as much information as possible. Scrum emphasizes the object, not the individual tasks, which allows the object to be modified along the way to best serve the stakeholders.

Based on the results obtained from the empirical part of the study it can be stated that Lean and agile methods and tools are not mutually exclusive, and methods can be used together. The connection between the methodologies can be illustrated by a diagram where two spheres share a common area. The study also revealed that Scrum framework includes various Lean practises such as limiting work in progress, Heijunka, just in time and practically everything, continuous improvement, Kaizen and PDCA. Therefore, using Lean tools is considered an appropriate option when running a project using Scrum. However, when using the Lean Kanban or the Scrum model to improve overall workflow, it is clearer to choose one and follow it. Leagile category management process is illustrated in the figure 13, which shows agile process stages with light grey and Lean process stages with dark grey.

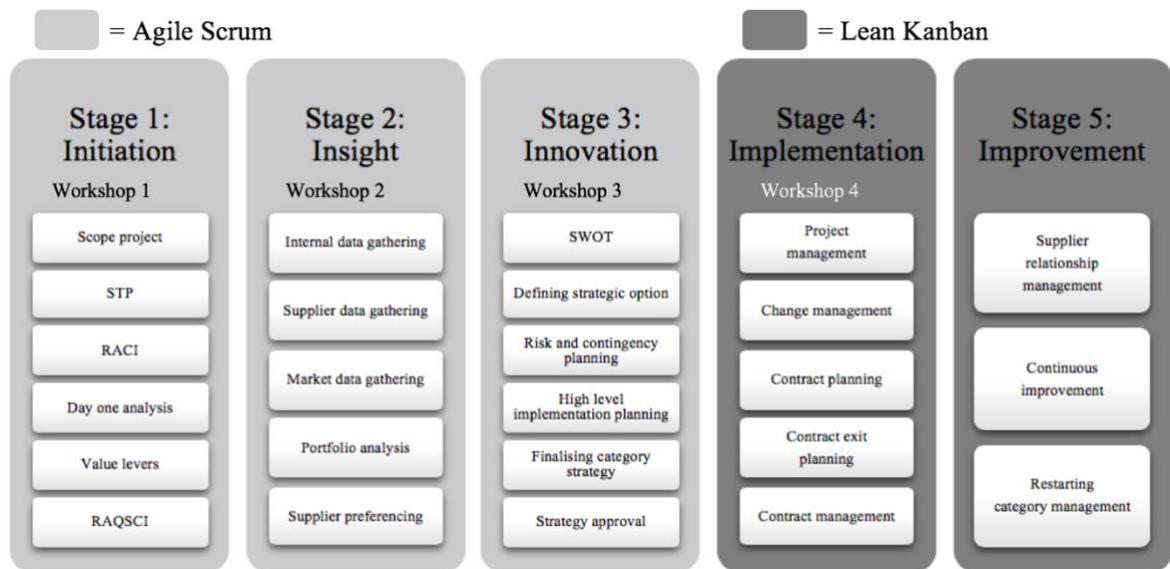


Figure 13. Leagile category management process

The third sub research question of the study examines the role of digital solutions in supporting agile category management and is formulated as follows: “*How can different digital solutions support agility in category management?*”. The research shows that digital solutions have an important role to play in supporting agile way of working because of the limited ability of humans to process and share information. Digital solutions can support agility in category management because digital solutions make information visible to everyone, including procurement and stakeholders. Digital solutions are seen to support agility as they provide efficiency and speed and enable a faster response to changing needs and circumstances. Thus, it can be said that digital systems are at the heart of agility.

Digital solutions are also seen to play an important role in supporting the use of various methods, such as Lean Kanban or agile framework Scrum. Although these tools can be used without digital solutions, it is profitable to use digital solutions as they increase visibility, efficiency and provide ready-made solutions to support the methods and all activities. With digital solutions procurement is able to calculate for example the velocity of the team and analyse burndown rates, which in turn helps the team to develop its operations and get the most out of agile way of working. The research shows that project tools like Trello, Google Drive, Monday and Jira would be well suited to support the methods, with Trello and Google Drive being the easiest to use, according to the interviewees. Jira, on the other hand, offers ready-made solutions for Scrum, including ready-to-use retrospective templates. Drive is

considered best for document management. What is seen positive about Lean Kanban and Scrum is that they can be used with the same software and tools, which also supports agility.

In category management Spend analysis tool called Sievo is seen as another important digital solution to support the agility of category management. The main benefit of Sievo is that it is a source of information that collects information from many different sources and offers speed as the procurement don't have to manually collect the data from different systems. Sievo is seen as the cornerstone of category management as it offers visibility and important information on category suppliers and purchasing volumes, which is a very important part of category management. Research shows that when the data is in order and can be trusted, digital solutions provide the much-needed speed and efficiency. Digital solutions also provide planning and predictability of spend to ensure the availability of products and services. Anyone, even without background information, can quickly get a picture of a category and what it contains with a digital solution. With Sievo, procurement can quickly see, for example, who are the most important suppliers financially. When procurement has more information readily available, it enables them to create best possible category strategy.

Digital solutions can best bring agility to the category management when the challenges involved are also addressed. Research shows that lack of training, data quality and too many applications can be seen as a challenge of digital solutions. Therefore, people who use digital solutions should receive adequate training on how to use the application and how to properly place information into ERP-system, as it has a major impact on the quality of the data and how the information is displayed in Sievo. When there are challenges and slowness in the background operations such as data and vendor classification, this means that the procurement is, so to speak, behind the business. Therefore, all the background operations should be agile so that information is quickly available and can be provided to stakeholders who are very future oriented. Even though spend analysis is seen as looking back, it still plays an important role in category management based on the research, especially in situations where company continues to buy from same suppliers. However, in situations where the business wants to start a business with a new partner, too much time shouldn't be spent on spend analysis. Also, when the company invests in different digital solutions they should select compatible tools as they provide agility. Based on the research, tools that gather data and collect information from different systems and sources are considered a good

alternative. Thus, even if the information is distributed in different systems, it can be visually displayed in one system. An example of this is visual management tool Monday used with Scrum and Kanban, which combines the information from Jira and Google Drive. Based on the research these tools support agility as they combine information into a comprehensible entity. The research shows that in a dream situation, the company would have a system that has the master data for all the suppliers including their self-assessment queries, sourcing cases with all contracts and their details. Digital solutions can also support agility as they provide better document management as documents are easily and quickly available, which is one of the main prerequisites for agility. This would also support agility in the case where the procurement wants to go into an operating model where all the responsibilities are not so personalized, and the procurement can switch one person to manage another category.

The research shows that digital solutions can support agile category management by enabling procurement to make intelligent conclusions from data. The importance of digital solutions in supporting agility is seen in the fact that they can, in the best case, provide information that is immediately available and can be shared with others who need it, which is really needed in the category management based on the research. Digital solutions support agility as they make information visually understandable and thus help the procurement better understand the supplier field. This knowledge can then be used to support the building of the best possible category strategy. The research shows that digital solutions support agility in category management because they enable procurement to provide views to its stakeholders such as different dashboard in Power Bi, in a category meeting without having to search, chop and construct presentation materials, which again saves the time. Based on the research, procurement hopes that digital solutions would provide easy access to information about suppliers, hourly rates for suppliers, and their performance, thus providing not only quick information but also comparability. All necessary information should be in the system so that it is always available and viewable, preferably on a daily basis. This would help the procurement to get the information immediately, which would also facilitate the necessary changes and planning for the future.

Based on the research good market knowledge is also seen as essential in category management as the strategy work rely on market understanding. In order to do a good market analysis, digital solutions are needed that collect market information and provide insights

into market analysis. Based on the research it is seen that digital solutions can offer good market visibility and market knowledge, which is seen as really valuable to the company. According to the study, this is seen valuable because it allows the business to engage the procurement at an early stage in discussions because it sees the company as a strategic internal partner. Digital solutions also play an important role in enabling the procurement to review and develop its own operations. Because if there is no data available it often leads to the unfortunate situation that when the information is missing, the same mistakes are repeated. In order for digital solutions to best support category management, data must not be too general. The study shows that procurement is currently under-utilizing digital solutions to support the category management. The research revealed that time, courage and prejudice are often the barrier to better utilization of digital solutions and increased digitalisation. Therefore, the biggest obstacles to digital solutions are the people themselves.

The fourth sub research question of the research examines the enablers and obstacles related to the methods and is formulated as follows: *“What are the main enablers and obstacles of agile and Lean category management?”* According to the empirical research, digital solutions are seen as important facilitators of agility, and the results also highlight the importance of different roles. The research strongly emphasized the importance of a cross-functional team as an important facilitator of agility. It is seen that the strategy team should include both the stakeholder and the procurement from different levels of the organization because everyone has different knowledge, and all this is needed to create the best possible category strategy. Stakeholder and business engagement were strongly highlighted in the study because procurement is so called service organization that is not acquiring anything for itself. Category strategy is not done for the procurement and therefore it is important that it is done in a stakeholder-oriented way to serve the needs of the stakeholders and in this way the strategy ultimately serves everyone. The strategy should be developed in close cooperation with the stakeholders and the business, as the official approval of the strategy also comes from the business side. The set actions are also easier to implement when the business has been involved in designing them, therefore the involvement of key persons from procurement and business side in strategy work is very essential.

The research also found the involvement of a strategy approver at an early stage as one enabler of agility, because this way the strategy team can ensure that they are consistent

with management so that there is no need to make major changes to the strategy in the approval phase. According to the research, strategy approvers would not necessarily have to be a part of the core team but need to be well informed and consulted throughout the project. Based on the research, the strategy team should have a person with sufficient experience as a project manager. In Scrum, this person would work as a product owner. The role of the facilitator is seen as important in ensuring that an agile approach and process is followed. Because digital solutions play an important role in enabling agility, it also highlights the role of the data analyst in strategy team. Analytical and data experts are seen essential as they are able to bring and analyse data to support strategy work. In addition, a number of necessary people, such as the quality and product development should be consulted as needed. The empirical research also emphasizes the importance of leveraging external resources and the courage to seek help from partners as an important enabler of agility, as agility comes from the ability to act quickly, which often requires the use of external partners.

According to the research, one of the most important enablers of agility is the ability to use resources more flexible. The importance of competencies as agile an enabler is emphasized in the more flexible utilization of resources. The research shows that to be able to utilize resources more agile, individuals within the procurement need to have extensive commercial, negotiation, contracting and analytical skills to handle a variety of cases. For example, people in the procurement should be able to read various dashboards and validate the data. Therefore, a broad knowledge base is needed. The study shows a great interest in the more efficient use of resources. It is seen that the procurement could have a “pool of people” with strong experience in creating a category strategy and related activities, and then people with these types of competencies could be used flexibly for strategy work. According to the study, resource utilization can also be seen to be based on efficiency thinking and the ability of a company to make the most of the expertise they have in different teams.

The research also emphasizes the importance of change management and the right mindset as an agility facilitator. The study shows that successful change management and familiarizing people with the new way of working and methods are important for success. In addition to this the right mindset of the organization and its people is seen as an important enabler of agility. Therefore, the case organization and its people should have the desire and interest to develop their operations, thus supporting agile methods and continuous

improvement. Therefore, enthusiasm, curiosity and the desire to improve working methods are seen as important. In addition, for both Lean and Agile methods, management support is seen as a very important facilitator of agility. The case company and its management should take all necessary steps to ensure that the new methods are well implemented and then follow up. Successful training also plays an important role in this regard, according to research. The study shows that responsibility and obligations should also be addressed with agility.

To be successful in managing categories in a more Lean and agile way it is important that challenges are taken into consideration. Based on the empirical research it can be said that the procurement does not see any fundamental obstacles to a new way of working. At present, the day-to-day challenges of the procurement in the case company are strongly related to the current state of the enterprise information systems and the ability of the procurement to manage information and use data to create different perspectives for the stakeholders. Research shows that data quality needs to be improved to leverage digital solutions as an agility enabler. Everyone should have a common understanding of the meaning of agility and Lean, and thus the company should provide all the necessary training for people who use these models. The challenges of change management also emerge in the study, which need to be carefully considered in order for change to be successful. According to the study, many of the challenges are also related to people's mindsets and attitudes, which make it important for the organization to support and encourage the change at the level of mindset as well. According to the research, one of the challenges of agility is also the fact that tasks are not the responsibility of any particular person which raises concerns that things are not done. The research shows that Lean and agile methods are useful in this regard. The other challenge is that people feel they have responsibility but not authority to act. It is important that these issues are considered for the success of the agile and lean approach.

After a comprehensive analysis of the sub-research questions, an answer to the main research question of the study can be provided. The main research question of the study is as follows: *"How can procurement manage categories in a more Lean and agile way?"*. Based on the empirical analysis of the research it can be concluded that procurement can manage categories in a more Lean and agile way by utilizing both Lean and agile methods and tools and supporting the agile and Lean way of working with enablers and various digital solutions that are seen as important facilitators and supporters of agility, as well as considering the

obstacles. Conclusion can be drawn, that Lean and agile are not mutually exclusive and methods can be used together in order to manage categories in a more Lean and agile way.

Category management is usually performed as a multi-step iterative and cyclic project, which consists of five different process stages. Scrum is an agile way to manage projects commonly used in software development. The purpose of Scrum is to maximize the value through a self-organized team and iterative process including fixed-length sprints. The research shows that the agile framework Scrum can be used in a category management as category management project is iterative in nature and tasks can be divided into smaller tasks. Based on the empirical research procurement can utilize the agile framework Scrum in the first three stages of the category management process, which involves working closely with the strategy team including procurement and its stakeholders. According to the research it can be said that procurement can manage categories in a more agile way by utilizing Scrum framework, which increases agility by providing transparency, help to prioritize work, offers genuine team work, efficiency, speed, better flow of information, avoidance of waste, delivers the highest value things first and provides better decision-making with more data. Procurement can manage categories in a more agile way with Scrum consisting of product owner, scrum master and self-organised development team. In agile framework Scrum tasks should not be personalized which supports the flexible use of resources and increases agility. The Scrum team consist of multi-talented people who work together to maximize the value and achieve the best possible result. Team members are allocated a large enough percentage to the Scrum project, enabling efficient and productive teamwork. If members are not able to devote themselves enough to the project, then Lean is seen as a better approach.

The study shows that procurement can manage categories in a more Lean way by utilizing Kanban visual management tool. Based on the empirical research the last two stages of the traditional category project, implementation and continuous improvement, where the project takes a so-called new form and require more time, are best suited for Lean Kanban method, which is more flexible with time than Scrum. Lean Kanban can also be used in earlier process stages, but if an agile method can be used it is seen more suitable for the earlier process stages with time-limited work and Lean Kanban for the last two stages of the project. This way procurement can utilize both methods. It can be said that procurement can manage categories in a Lean way by using Lean Kanban which increases leanness by eliminating

waste by visualizing what tasks are in progress, which things are blocking the progress of tasks, and how many uncompleted tasks are waiting to be done. Based on the research Kanban provides transparency to procurement and its stakeholders and thus eliminates the waste resulting from the lack of transparency. The tool can also enhance visibility and information sharing across categories, thus increasing collegiate sparring and delivering better category strategies. The tool can also enhance transparency and information sharing across categories, thus providing collegiate sparring and delivering better category strategies. Procurement can manage categories in a more Lean way by measuring lead times, mapping workflow and reviewing them to shorten lead times and improve overall workflow.

Based on the empirical research procurement can manage categories in a more Lean way by using different Lean tools. Lean problem-solving tools allow for problem identification, assessment of current status, identification of root causes, and planning of countermeasures, which make the tools well suited for conducting a current state analysis. According to the research, recommended tools for this purpose include A3, fishbone and 5 whys -tools. Based on the research tools can provide speed in data collection and allow for better documentation of information. Standardized work is seen to reduce the waste through the application of the best practices, which in the case of category management means, for example, standardizing the strategy template and activities in the category management process. Using the same template also provides a comparison opportunity between strategies made in different categories. Standardized work can also be seen as enabling a more efficient and flexible use of resources. According to the study, continuous development is important in category management, for which procurement can use tools such as PDCA and Kaizen. The study shows that the procurement can support leanness by developing a toolkit that includes, in addition to category management tools, ready-to-use Lean tools and their descriptions.

The research shows that procurement can manage categories in a more agile way by using digital solutions. Digital solutions play an important role in supporting agile and Lean methods such as Scrum and Kanban by providing visibility, efficiency and ready-made solutions. While using Scrum the team can for example calculate the velocity and analyse burndown rates, which helps them to develop. Based on the research Trello, Google Drive, Monday and Jira are well suited for supporting agile and Lean methods. Another digital cornerstone of agile category management based on the research is Sievo, which helps

procurement to manage categories in a more agile way by collecting information from different sources and providing a visual view of supplier spend information. Therefore, digital solutions provide speed, efficiency, planning and predictability. According to the research, digital solutions can provide agility to category management by enabling background work to be agile and to provide future-oriented stakeholders with important information when data is of high quality. It is seen that digital solutions best support agile category management when systems are compatible, and they collect information from different sources displaying a visual view on one system. With digital solutions procurement can make sure that the information is accessible to everyone, allowing for a more agile way to leverage resources. The use of data to support decision making and the visual views it provides to information that can be shared with stakeholders is seen as important for agility. Providing visually comprehensible and relevant information is also seen as helping to create a better category strategy by gaining a better understanding of suppliers and supply markets. With digital solutions, such as different dashboards, information is instantly available and also allows for a faster and more flexible response to the changing needs and future planning. In addition, digital solutions also enable procurement to develop its own operations.

There are also different important enablers of agility and leanness that help the procurement to manage categories in a more Lean and agile way. Based on the research procurement can manage categories in a more Lean and agile way by utilizing digital solution and role-related enablers. It was strongly highlighted in the empirical research that one enabler for agile category management is a cross-functional team consisting of people from different levels throughout the organization. Involvement of stakeholders and business is seen highly important as procurement is a service organization and not acquiring anything for itself. In order for procurement to be agile, it should develop a close cooperation with stakeholders and business to be able to keep a finger on the pulse on what is happening in the category. Close cooperation with stakeholders would also enable easier implementation of set actions when the strategy is made in a stakeholder-oriented way. Early involvement of approvers is also seen as one facilitators of agility as strategy team can ensure that they are consistent with the management. Another very important enabler of agility is the ability to use resources more flexible, which requires procurement persons with extensive commercial, negotiation, contracting and analytical skills to handle different cases. In addition, it is considered important for people to have the ability to read dashboards and validate data.

One of the important enablers of agility was also the flexible utilization of resources, where the procurement would have a “pool” of category management professionals for category projects. This way procurement strives to be efficient and make the most of its expertise. In addition to the role-related enablers change management, right mindset and effective training are also seen as important enablers, as people should be familiar with new methods and ways of working and should also have the right attitude and interest in developing activities. The use of external resources and the courage to seek help from partners also represent agility enablers, as they provide speed that is essential in agility. According to the study, there are no fundamental barriers to a new way of working, but the procurement must focus on the success of change management, data quality, compatible systems, training, and responsibilities and obligations so that procurement can manage categories in a more agile way. Also, it is good to remember that that the ultimate success of the methods is determined by the stakeholders and what the methods offer them.

### **5.1 Theoretical implications**

The results of the study show that Lean and agile methods are not mutually exclusive although they have a slightly different goals as stated also in the literature by Bhamu and Singh Sangwan (2014). The research findings are consistent with the theory part of this study which states that methods are not mutually exclusive but can be used together, also known as Leagile (Naylor et al. 1999; Kisperska-Moron & de Haan 2011; Mohamed & Gosling 2011; Cozzolino et al. 2012; Purvis et al. 2014; Bhamu & Singh Sangwan 2014). According to Cozzolino et al. (2012), Lean and agile methods can be used at the same supply chain at different moments. This research also shows that agile and Lean project management methods can be used at different process stages of category management process depending on the form and requirements of the project stage, presented in the literature by O'Brien (2019, 97). The conceptual framework of the study illustrates a Venn-diagram combining agility, Lean and category management, which is consistent with the results of empirical research, where the integration of these methods was described as a Venn-diagram.

The results of this research are also supported by the advantages of the agile method found in the literature which include efficiency, effectiveness, better decision-making, high quality, customization, intra-enterprise integration, flexibility, extensive communication and speed

(Stellman & Greene 2014; Gligor 2014; Yusuf et al. 1999; Cervone 2011), thus improving the company's competitiveness (Gligor 2014; Azanha et al. 2017). In addition to the benefits mentioned in the literature, the method was also seen to offer genuine teamwork, transparency and prioritization of work. The study is also supported by the research by Drury-Grogan (2014), stating that the agile project team consists of up to ten people who are fully committed to the project as the empirical research also strongly emphasized that people need to be adequately allocated to the project and the team should be no more than ten people. The research also highlights the cross-functionality of an agile team, management support, strong commitment and close cooperation with the business, which are consistent with Sutherland (2015), Stellman and Greene (2014), and Cervone (2011)'s research.

In academic literature there is a limited number of research made on category management (Heikkilä & Kaipia 2009), or the use of agile or Lean methods as part of it, as Lean studies made in the field of supply management have mainly focused on supply chain management (Purvis et al. 2014), agile studies on agile supply chains (Lee 2004; Christopher 2005), and Scrum studies on software development (Cervone 2011; Drury-Grogan 2014). However, it has been suggested that the Lean method (Webb 2011), and the Scrum method (Procurement Leaders 2018), would be suitable for category management, which is consistent with the findings of this research, stating that methods can be used in category management. Thus, this research can be seen to provide empirical and theoretical contribution to the observed research gap concerning Leagile category management. This study is also consistent with Webb's (2011) statement that when utilizing Lean method in category management the focus on should be on document and strategy content standardization, process clarity, and process development. Even though the Scrum method is seen suitable for category management, the study does not support the claim that Scrum, originally developed for software development (Eloranta et al. 2016), would fit all projects regardless of the type of the project as mentioned by one of its founders Sutherland (2015), because based on the research Scrum has certain prerequisites to succeed. Literature also suggests that the traditional project manager role in the Scrum method is scrum master (Cervone 2011), but this research found that the project manager of category management project, who is usually a category manager, is more suited to the role of product owner, as it is responsible for the product backlog, high level vision of the product or in this case category strategy, and is also responsible for what the project produces, for whom and why (Sibona et al. 2018; Cervone 2011).

The findings of the research are also consistent with the Lean research which state that using various Lean tools, companies can minimize waste and create the most efficient system possible (Wang 2004; De Koning et al. 2006). As in the literature, in empirical research, tools such as PDCA, 5 whys, standardized work, Kaizen were seen as good solutions for solving problems and exploring the root cause, and to support the continuous improvement (Jimmerson et al. 2005; Machad & Leitner 2010). The findings of this research on the use of the 5 whys -tool is also supported by O'Brien (2019, 155), who has recommended that the method be used in the first stage of the category process. The empirical research also highlighted tools such as A3 and fishbone tool, which were not introduced in the theoretical part of this research. In addition, the findings of this research are also supported by the research of Rahman et al. (2013), stating that the benefits of Lean Kanban include increased productivity and minimization of waste. Previous research has found that digital solutions help in the collection, compilation and analysis of category data (Hübner & Kuhn 2012), which is very much in line with the research findings of this study. In addition, based on the literature Lean requires data-based decision making (Raynus 2016, 222), and the use of information and data are also seen as one of the pillars of category management and described as an enabler of agile supply chain (O'Brien 2019, 77, 440), which are strongly consistent with the findings of this research as digital solutions represented an important enabler and supporter of Leagile category management, thus providing better decision making based on the data.

## **5.2 Managerial implications**

From a management perspective, the research provides a valuable insight into developing the category management process into more Lean and agile, and proposes a new way of working. On the basis of the theoretical and empirical research, the study suggests that in order to respond to the increasingly fierce competition and enhance category management by bringing agility and leanness to it, the procurement should adopt methods to support this. The study suggests that Scrum framework, an agile method to manage projects, is chosen as the category management project management method until the third stage of the process, when the category strategy is identified. An iterative sprint-style approach of Scrum allows the strategy team to develop a category strategy that is tailored based on the comments and needs of stakeholders. To succeed in using the Scrum model, it is suggested that the company

provides management support to the method and the procurement participates in various agile trainings. Based on the study the following training is especially recommended for the procurement of the case company: agile principle and practises as well as product ownership courses, provided by the case company. In addition, the company should ensure that the people working on the project have sufficient competences, for example, in data analysis, as the Scrum team should consist of people with a strong knowledge base, which also allows for a more agile use of resources. The company should allocate people to the project with a high enough percentage. If this is not possible, it is suggested to use the Lean style approach.

Visual project management tool Lean Kanban is suggested to be utilized in the strategy implementation and continuous improvement stages. Based on the study, it is proposed that project tools such as Monday and Jira, which are compatible, and Google Drive for data management be deployed to support these methods. In addition, it is proposed that the procurement builds a tool box that includes category management tools such as STP, RACI, day one analysis, RAQSCI, portfolio analysis, value levers, supplier preferencing as well as Lean tools that can be used, for example, in current state analysis and to support continuous improvement. Such tools include 5 whys, A3, fishbone, PDCA, DMAIC and Kaizen tools. In addition, it is suggested that standardization would be applied to the context of the strategy process and strategy template. Based on the findings of the study it is recommended that the case company makes a strategy plan for its digital solutions and invest in systems that collect data from different sources, allow dashboard views and above all, are compatible. This means, among other things, renewing the procurement's contract system. As the new way of operating requires certain competencies from the procurement, it is recommended that the procurement undergoes a comprehensive competence assessment, followed by a competence development plan, training and a change management to support the change.

### **5.3 Limitations and suggestions for the future research**

There are also certain limitations of the research that that should be considered. Research focuses on the category management of indirect categories and the empirical data is collected from the case company representatives who work in different categories of indirect procurement. The interviewees' previous experiences, as well as the specificities of the different categories, can affect the way the interviewees view matters. The nature of the case

study also brings a contextual side to the study, which must be considered when considering the validity and the reliability of the study. In the business environment agility is a relatively new way of working and Lean awareness and tools are just beginning to take root in companies. In evaluating the limitations of the study, it should be noted that, since not all procurement personnel had experience of using the models, their views can be seen to be based more on their understanding of the methods than on practical experience. Leanness and agility also represent a constantly evolving field where the pace of change has been really fast in a short time. When looking at the empirical results of this research, one has to consider that the research focuses on a new and developing topic and Lean tools and agile practises are constantly evolving as companies are trying to keep up with the market and develop their processes. This means that what is today seen as Lean and agile may not be considered so Lean and agile in the next decades. For this reason, this study emphasizes and highlights the practices that are considered Lean and agile at the time this study is conducted.

Based on the limitations of the study, further research topics can be proposed. Given that research focused on indirect procurement, it would be valuable to examine whether the research results would be consistent if the subject of the research were indirect procurement. Based on the research, the interest in repeating the research after the methods have been implemented and the procurement has gained strong practical experience of the methods also emerged as a topic for further research. As agility is a rapidly evolving field, it would be interesting to see what kind of research results would be obtained if the phenomenon were examined over a longer period of time. As contract management is an essential part of category management, it could be valuable to examine how agile contracts can support agility and how they should be built. In addition, further research on Scrum roles in procurement could provide valuable information to support the correct and appropriate allocation of roles in procurement. Comprehensive competency research emerged as a research topic for further research to better understand what competencies are needed and which competencies are best for supporting agile and Lean procurement and category management. As a conclusion, although the role of procurement is seen in today's companies as increasingly strategic, academic literature still provides only a limited amount of information on category management and its development. Therefore, more research is needed around the topic to increase knowledge and further develop category management.

## REFERENCES

- Ahtonen, A-K. & Virolainen, V.M. (2009) Supply strategy in the food industry – value net perspective. *International Journal of Logistics: Research & Applications*, Vol.12, No. 4, pp. 263-279.
- Alasuutari, P. (2011) *Laadullinen tutkimus 2.0*. 2.p. Tampere, Vastapaino.
- Amoako-Gyampah, K., Boakye, K. G., Adaku, E. & Famiyeh, S. (2019) Supplier relationship management and firm performance in developing economies: A moderated mediation analysis of flexibility capability and ownership structure. *International Journal of Production Economics*, Vol.208, pp.160-170.
- Anderson, J. C., & Narus, J. A. (1998) Business marketing: Understand what customers value. *Harvard Business Review*. [Www-document]. [Cited 27.2.2019]. Available: <https://hbr.org/1998/11/business-marketing-understand-what-customers-value>
- Anonymous. (2005) Best practices: Using spend analysis to help agencies take a more strategic approach to procurement, *Journal of Public Procurement*, Vol.5(2), pp.244-273.
- Azanha, A., Argoud, A. R. T. T., Camargo, J. B. & Antonioli, P. D. (2017) Agile project management with Scrum. *International Journal of Managing Projects in Business*, Vol.10(1), pp.121-142.
- Bensaou, M. (1999) Portfolios of buyer–supplier relationships. *Sloan Management Review*, Vol.40(4), pp.35–44.
- Bessant, J., Caffyn, S. & Gallagher, M. (2001) An evolutionary model of continuous improvement behaviour. *Technovation*, Vol.21(2), pp.67-77.
- Bhamu, J. & Singh Sangwan, K. (2014) Lean manufacturing: literature review and research issues. *International Journal of Operations & Production Management*, Vol.34(7), pp.876-940.

Bhuiyan, N., Baghel, A. & Wilson, J. (2006) A sustainable continuous improvement methodology at an aerospace company. *International Journal of Productivity and Performance Management*, Vol.55(8), pp.671–687.

Bohme, T., Childerhouse, P., Deakins, E. & Corner, J. (2008) Balancing power and dependency in buyer-supplier relationships. *International Journal of Electronic Customer Relationship Management*, Vol.2(2), pp.120-13.

Booth, C. (2010) *Strategic Procurement: Organizing Suppliers and Supply Chains for Competitive Advantage*. London, Kogan Page.

Caniëls, M. C. J. & Gelderman, C. J. (2007) Power and interdependence in buyer supplier relationships: A purchasing portfolio approach. *Industrial Marketing Management*, Vol.36(2), pp.219-229.

Caniëls, M. C. J. & Gelderman, C. J. (2005) Purchasing strategies in the Kraljic matrix—A power and dependence perspective, *Journal of Purchasing and Supply Management*, Vol.11(2), pp.141-155

Carnerud, D. (2018) Kaizen and continuous improvement – trends and patterns over 30 years. *TQM Journal*, Vol.30(4), pp.371-390.

Carr, A. S. & Pearson, J. N. (1999) Strategically managed buyer–supplier relationships and performance outcomes. *Journal of Operations Management*, Vol.17(5), pp.497-519.

Carr, A. S & Pearson, J. N. (2002) The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance, *International Journal of Operations & Production Management*, Vol.22(9), pp.1032-1053.

Carr, A. S. & Smeltzer, L. R. (1997) An empirically based operational definition of strategic purchasing. *European Journal of Purchasing and Supply Management*, Vol.3(4), pp.199-207.

Cervone, H. F. (2011) Understanding agile project management methods using Scrum. *OCLC Systems & Services: International digital library perspectives*, Vol.27(1), pp.18-22.

Chang, H.H. (2005) The influence of continuous improvement and performance factors in total quality organization. *Total Quality Management*, Vol.16(3), pp.413–437.

Cherrafi, A., Elfezazi, S., Chiarini, A., Mokhlis, A. & Benhida, K. (2016) The integration of lean manufacturing, Six Sigma and sustainability: A literature review and future research directions for developing a specific model. *Journal of Cleaner Production*, Vol.139, pp.828-846.

Cherrafi, A., Elfezazi, S., Govindan, K., Garza-Reyes, J. A., Benhida, K. & Mokhlis, A. (2017) A framework for the integration of Green and Lean Six Sigma for superior sustainability performance. *International Journal of Production Research*, Vol.55(15), pp.4481-4515.

Christopher, M. (2000) The Agile Supply Chain: Competing in Volatile Markets. *Industrial Marketing Management*, Vol.29(1), pp.37-44.

Christopher, M., Lowson, R. & Peck, H. (2004) Creating agile supply chains in the fashion industry. *International Journal of Retail & Distribution Management*, Vol.32(8), pp.367-376.

Christopher, M. & Towill, D. (2000) Supply chain migration from lean and functional to agile and customised. *Supply Chain Management: An International Journal.*, Vol.5(4).

CIPS (2011) Advanced Category Management - CIPS South Africa Conference 2011. [www-document]. [Cited 3.4.2019]. Available: <https://www.cips.org/Documents/Wed%20track%203%20John%20McClelland%20ADR.PDF>

Coman, A. & Ronen, B. (2009) “Focused SWOT: diagnosing critical strengths and weaknesses”, *International Journal of Production Research*, Vol. 47(20), pp. 5677-89.

Corbett, L.M. (2011) Lean Six Sigma: the contribution to business excellence. *International Journal of Lean Six Sigma*, Vol.2(2), pp.118-131.

Cordell, A. & Thompson, I. (2018) *The category management handbook*. Abingdon (Oxfordshire) and New York, Routledge.

Costello, T. (2012) RACI-Getting Projects "Unstuck". *IT Professional*, Vol.14(2), pp.64-63.

Cox, A. (2015) Sourcing portfolio analysis and power positioning: towards a “paradigm shift” in category management and strategic sourcing. *Supply Chain Management: An International Journal*, Vol.20(6), pp.717-736.

Cox, A. (1996) Relational competence and strategic procurement management: Towards an entrepreneurial and contractual theory of the firm. *European Journal of Purchasing and Supply Management*, Vol.2(1), pp.57-70.

Cox, A., Ireland, P., Lonsdale, C., Sanderson, J., & Watson, G. (2002) *Supply chains, markets and power: Mapping buyer and supplier power regimes*. London, Routledge.

Cox, A., Lonsdale, C., Sanderson, J. & Watson, G. (2005) *The Right Tools for the Job: On the Use and Performance of Management Tool and Techniques*. Basingstoke, Palgrave Macmillan.

Cozzolino, A., Rossi, S. & Conforti, A. (2012) Agile and lean principles in the humanitarian supply chain. *Journal of Humanitarian Logistics and Supply Chain Management*.

Cunningham, M. (1983) An interaction approach to purchasing strategy. In H. Hakansson (Ed.), *International marketing and purchasing of industrial goods*. Chichester, John Wiley.

Dahlgaard, J. J., Kristensen, K., & Kanji, K. (2002) *Fundamentals of total quality management: Process analysis and improvement*. Abingdon, Taylor and Francis.

Day, M., Magnan, G. M. & Moeller, M. M. (2010) Evaluating the bases of supplier segmentation: A review and taxonomy. *Industrial Marketing Management*, Vol.39(4), pp.625-639.

De Koning, H., Verver, J. P. S., Van den Hauvel, J., Bisgaard, S. & Does, R. J. (2006) Lean Six Sigma in a hospital. *International Journal of Six Sigma and Competitive Advantage*, Vol. 2(4), pp.377–388.

Dickson, P. R. (1983) Distributor Portfolio Analysis and the Channel Dependence Matrix: New Techniques for Understanding and Managing the Channel. *Journal of Marketing*, Vol.47(3), pp.35-44.

Drake, P., Lee, D. M. & Hussain, M. (2013) The lean and agile purchasing portfolio model. *Supply Chain Management*, Vol.18(1), pp.3-20.

Drury-Grogan, M. L. (2014) Performance on agile teams: Relating iteration objectives and critical decisions to project management success factors. *Information and Software Technology*, Vol.56(5), pp.506-515.

Dubois, A. & Araujo, L. (2007) Case research in purchasing and supply management: Opportunities and challenges. *Journal of Purchasing and Supply Management*, Vol.13(3), pp.170-181.

Dubois, A. & Pedersen, A-C. (2002) Why relationships do not fit into purchasing portfolio models—a comparison between the portfolio and industrial network approaches. *European Journal of Purchasing and Supply Management*, Vol.8(1), pp.35-42.

Dwyer, F., Schurr, P. & Oh, S. (1987) Developing Buyer-Seller Relationships. *Journal of Marketing*, Vol.51(2), p.11.

Dyer, J., Cho, D. S. & Chu, W. (1998) Strategic supplier segmentation: The next "best practice" in supply chain management. *California Management Review*, Vol.40(2), pp.57-77.

Eisenhardt, K. M. & Graebner, M. E. (2007) Theory Building from Cases: Opportunities and Challenges. *The Academy of Management Journal*, Vol.50(1), pp.25-32.

Ellram, L.M. (1991) Supply chain management: the industrial organization perspective. *International Journal of Physical Distribution and Logistics Management*, Vol.21 (1), pp.13–22.

Eloranta, V-P., Koskimies, K. & Mikkonen, T. (2016) Exploring ScrumBut - An empirical study of Scrum anti-patterns. *Information and Software Technology*, Vol.74, pp.194-203.

Eskola, J. & Suoranta, J. (2014), *Johdatus laadulliseen tutkimukseen*. 10<sup>th</sup> edit. Tampere, Vastapaino.

Fiocca, R. (1982) Account portfolio analysis for strategy development, *Industrial Marketing Management*, Vol.11(1), pp.53-62.

Gebauer, J. & Segev, A. (2000) Emerging technologies to support indirect procurement: two case studies from the petroleum industry, *Information Technology and Management*, Vol.1(1), pp.107-128.

Gelderman, C. J. & Van Weele, A. J. (2005) Purchasing Portfolio Models: A Critique and Update. *Journal of Supply Chain Management Summer*, Vol.41(3), pp.19-28.

Gelderman, C. J. & Van Weele, A. J. (2003). Handling measurement issues and strategic directions in Kraljic's purchasing portfolio model. *Journal of Purchasing and Supply Management*. Vol.9(5), pp.207-216.

Gelderman, C. J. & Van Weele, A. J. (2002) Strategic Direction through Purchasing Portfolio Management: A Case Study. *Journal of Supply Chain Management*, Vol.38(1), pp.30-37.

Geraldi, J. & Lechter, T. (2012) Gantt charts revisited. *International Journal of Managing Projects in Business*, Vol.5(4), pp.578-594.

Giunipero, L. C. & Percy, D. H. (2000), World-Class Purchasing Skills: An Empirical Investigation. *Journal of Supply Chain Management*, Vol.36(3), pp.4-13.

Glaister, K.W. & Falshaw, J.R. (1999) "Strategic planning still going strong", *Long Range Planning*, Vol. 32 (1), pp. 107-16.

Gligor, D. M. (2014) The role of demand management in achieving supply chain agility. *Supply Chain Management: An International Journal*, Vol.19(5/6).

Gruen, T. (2002), The evolution of category management. *International Commerce Review: ECR Journal Spring*, Vol.2(1), pp.17-25.

Hadeler, B. & Evans, J. (1994) Supply strategy: Capturing the value. *Industrial Management*, Vol.36(4), pp.3.

Halinen, A. & Törnroos, J-Å. (2005) Using case methods in the study of contemporary business networks. *Journal of Business Research*, Vol.58(9), pp.1285-1297.

Hallikas, J., Karvonen, I., Pulkkinen, U., Virolainen, V-M. & Tuominen, M. (2004) Risk management processes in supplier networks. *International Journal of Production Economics*, Vol.90(1), pp.47-58.

Hallikas, J., Puumalainen, K., Vesterinen, T. & Virolainen, V-M. (2005) Risk-based classification of supplier relationships. *Journal of Purchasing and Supply Management*, Vol.11(2), pp.72-82.

Handfield, R., Cousins, P., Lawson, B. & Petersen, K. (2015) How can supply management really improve performance? A knowledge-based model of alignment capabilities. *Journal of Supply Chain Management*, Vol.51(3), pp.3-17.

Harland, C. M., Lamming, R.C. & Cousins, P. D. (1999), Developing the concept of supply strategy. *International Journal of Operations & Production Management*, Vol.19(7), pp.650-674.

Heath, S. (2006) Tackling Spend Analysis. *Contract Management*, Vol.46(1), pp.40-42,44-45.

Heikkilä, J. & Kaipia, R. (2009), *Purchasing Category Management - From Reactive to Proactive Management Practice*. Conference proceedings of the 18th IPSERA Conference, Oestrich-Winkel.

Helms, M. & Nixon, J. (2010) Exploring SWOT analysis - where are we now? *Journal of Strategy and Management*, Vol.3(3), pp.215-251.

Hesping, F. H. & Schiele, H. (2015) Purchasing strategy development: A multi-level review. *Journal of Purchasing and Supply Management*, Vol.21(2), pp.138-150.

Hill, A. V., Bell, J. E., Goldsby, T. J. & Autry, C. W. (2013) *Managing the Global Supply Chain*. New Jersey, FT Press.

Hines, P., Holwe, M. & Rich, N. (2004) Learning to evolve: A review of contemporary lean thinking. *International Journal of Operations and Production Management*, Vol.24(9-10), pp.994-1011.

Hirsjärvi S., Remes P. & Sajavaara P. (2005) *Tutki ja kirjoita*. Hämeenlinna, Kustannusosakeyhtiö Tammi.

Holmen, E., Aune, T. B. & Pedersen, A-C. (2013) Network pictures for managing key supplier relationships. *Industrial Marketing Management*, Vol.42(2), pp.139-151.

Howard, W. & Miemczyk, J. (2018) *Purchasing and Supply Chain Management: A Sustainability Perspective*. 2<sup>nd</sup> edit. London, Routledge.

Hübner, A. & Kuhn, H. (2012) Retail category management: State-of-the-art review of quantitative research and software applications in assortment and shelf space management. *Omega*, Vol.40(2), p.199.

Hughes, J. (2008) From vendor to partner: Why and how leading companies collaborate with suppliers for competitive advantage. *Global Business and Organizational Excellence*, Vol.27(3), pp.21-37.

Hughes, J., Ralf, M. & Michels, B. (1998) *Transform Your Supply Chain: Releasing Value in Business*. London and Boston, International Thomson Business Press.

Ivens, B. S., Pardo, C., Salle, R., & Cova, B. (2009) Relationship keyness: The underlying concept for different forms of key relationship management. *Industrial Marketing Management*, 38(5), pp.513–519.

Jabareen, Y. (2009) Building a Conceptual Framework: Philosophy, Definitions, and Procedure. *International Journal of Qualitative Methods*, Vol.8(4), pp.49-62.

Kaufman, A., Wood, C. H. & Theyel, G. (2000) Collaboration and technology linkages: a strategic supplier typology *Strategic Management Journal*, Vol.21(6), pp.649-663.

Kern, D., Moser, R., Hartmann, E. & Moder, M. (2012) Supply risk management: model development and empirical analysis. *International Journal of Physical Distribution & Logistics Management*, Vol.42(1), pp.60-82.

Kisperska-Moron, D. & de Haan, J. (2011) Improving supply chain performance to satisfy final customers: "Leagile" experiences of a polish distributor. *International Journal of Production Economics*, Vol.133(1), pp.127-134.

Knight, A. K., Blessner, P., Olson, B.A. & Blackburn, T.D. (2017) Strategic sourcing and corporate social responsibility: Aligning a healthcare organization's strategic objectives. *Journal of Purchasing and Supply Management*, Vol.23(2), pp.94-104.

Knowles, G., Whicker, L., Femat, J. H. & Canales, F. (2005) A conceptual model for the application of Six Sigma methodologies to supply chain improvement. *International Journal of Logistics Research and Applications*, Vol.8(1), pp.51-65

Kocabasoglu, C. & Suresh, N. (2006) Strategic Sourcing: An Empirical Investigation of the Concept and Its Practices in U.S. Manufacturing Firms, *Journal of Supply Chain Management*, Vol.42(2), pp.4-16.

Kraljic, P. (1983) Purchasing Must Become Supply Management. *Harvard Business Review*, Vol.61(5), pp.109.

Kähkönen, A-K. (2011) Conducting a case study in supply management. *Journal of operations and supply chain management*, Vol. 4(1), pp. 31-41.

Kähkönen, A-K. & Lintukangas, K. (2012) The underlying potential of supply management in value creation. *Journal of Purchasing and Supply Management*, Vol.18(2), pp.68-75.

Lambert, D. M., Emmelhainz, M. A. & Gardner, J. T. (1996) Developing and Implementing Supply Chain Partnerships. *The International Journal of Logistics Management*, Vol.7(2), pp.1-18.

Langabeer, J., DelliFraine, J., Heineke, J. & Abbass, I. (2009) Implementation of Lean and Six Sigma quality initiatives in hospitals: A goal theoretic perspective. *Operations Management Research*, Vol.2(1), pp.13-27

Laureani, A. & Antony, J. (2012) Standards for Lean Six Sigma certification. *International Journal of Productivity and Performance Management*, Vol. 61(1), pp. 110-120.

Layton, M. C. & Morrow, D. (2018) *Scrum for Dummies*. 2<sup>nd</sup> edition. John Wiley Sons Inc.

Lee, H. L. (2004) The triple-A supply chain. *Harvard Business Review*. *Harvard Business Review*. [Www-document]. [Cited 25.4.2019]. Available: <https://hbr.org/2004/10/the-triple-a-supply-chain>

Lintukangas, K. & Kähkönen, A-K. (2010) The Effects of SRM Capability on Supply Management Performance, *International Journal of Business and Management Science*, Vol.3(2), pp.107-120.

Lintukangas, K., Kähkönen, A-K. & Virolainen, V-M. (2013) The antecedents of supply strategy, *European Business Review*, Vol.25(5), pp.396-410.

Lovelace, K., Shapiro, D. L. & Weingart, L. R. (2001) Maximizing Cross-Functional New Product Teams' Innovativeness and Constraint Adherence: A Conflict Communications Perspective. *The Academy of Management Journal*, Vol.44(4), pp.779-793.

Lysons, K. & Farrington, B. (2006) *Purchasing and Supply Chain Management*. 7<sup>th</sup> edition. London, Pearson Education.

Lysons, K. & Gillingham, M. (2003) *Purchasing and Supply Chain Management*. London, Prentice Hall.

Machado, V. C. & Leitner, U. (2010) Lean tools and lean transformation process in health care. *International Journal of Management Science and Engineering Management*, Vol.5(5), pp.383-392.

Martínez-Jurado, P. J. & Moyano-Fuentes, J. (2014) Lean Management, Supply Chain Management and Sustainability: A Literature Review. *Journal of Cleaner Production*, Vol.85, pp.134-150.

Mcivor, R., Humphreys, P. & Mcaleer, E. (1997) The evolution of the purchasing function, *Strategic Change*, Vol.6(3), pp.165-179.

Mehrjerdi, Y. Z. (2011) Six-Sigma: methodology, tools and its future. *Assembly Automation*, Vol.31(1), pp.79-88.

Melnic, A-S. & Puiu, T. (2011) The Management of Human Resources within Projects: The Structures of the Project Team, the Responsibility Assignment Matrix. *Economy Transdisciplinarity Cognition*, Vol.14(1), pp.476-484.

Merrell, P. (2012) *Effective Change Management: The Simple Truth*. Management Services, Vol.56(2), pp.20-23.

Miller, D. (2005) Going lean in health care. Institute for Healthcare Improvement. [www-document]. [Cited 9.5.2019]. Available: <https://www.entnet.org/sites/default/files/GoingLeaninHealthCareWhitePaper-3.pdf>

Moeller, M., Momme, J., & Johansen, J. (2000) Supplier segmentation in theory and practice — Towards a competence perspective. Proceedings of the International Purchasing Supply Education and Research Association Conference. London, Canada.

Mohamed M. N. & Gosling, J. (2011) On leanness, agility and leagile supply chains. *International Journal of Production Economics*, Vol.131(1), pp.342-354.

Monczka R., Handfield, R. Giunipero, L. C. & Patterson, J. L. (2016) *Purchasing and Supply Chain Management*. 6<sup>th</sup> edit. London, Cengage Learning, Inc.

Monczka, R. & Petersen, K. (2012) The Competitive Potential of Supply Management. *Supply Chain Management Review*, Vol.16(3), pp.10-14,16-18.

Mostafa, S., Chileshe, N. & Abdelhamid, T. (2016) Lean and agile integration within offsite construction using discrete event simulation. *Construction Innovation*, Vol.16(4), pp.483-525.

Moyano-Fuentes, J. & Sacristan-Diaz, M. (2012) Learning on lean: a review of thinking and research. *International Journal of Operations and Production Management*, Vol.32(5), pp.551-582.

Narasimhan, R., Swink, M. & Kim, S. W. (2006) Disentangling leanness and agility: An empirical investigation. *Journal of Operations Management*, Vol.24(5), pp.440-457.

Nassaji, H. (2015) Qualitative and descriptive research: Data type versus data analysis. *Language Teaching Research*, Vol.19(2), pp.129-132.

Naylor, J. B., Naim, M. M. & Berry, D. (1999) Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics*, Vol.62(1-2), pp.107-118.

Nellore, R. & Söderquist, K. (2000) Portfolio approaches to procurement: Analysing the missing link to specifications. *Long Range Planning*, Vol.33(2), pp.245-267.

Nielsen, A.C., Karolefski, J. & Heller, A. (2012) *Consumer-Centric Category Management: How to Increase Profits by Managing Categories Based on Consumer Needs*. New Jersey, John Wiley & Sons, Inc.

Nollet, J., Ponce, S. & Campbell, M. (2005) About "strategy" and "strategies" in supply management, *Journal of Purchasing and Supply Management*, Vol.11(2), pp.129-140.

O'Brien, J. (2019) *Category Management in Purchasing: A Strategic Approach to Maximize Business Profitability*. 4<sup>th</sup> edition. Great Britain and United States, Kogan Page.

O'Brien, J. (2009) *Category Management in Purchasing: A Strategic Approach to Maximize Business Profitability*. Great Britain and United States, Kogan Page.

Oghazi, P., Rad, F., Zaefarian, G., Beheshti, H. & Mortazavi, S. (2016) Unity is strength: A study of supplier relationship management integration. *Journal of Business Research*, Vol.69(11), p.4804.

Ohno, T. (1988) *Toyota Production System Beyond Large Scale Production*. New York, Productivity Press.

Pacheco, D., Pergher, I., Vaccaro, G.L.R., Jung, C.F. & Ten Caten, C. (2015) 18 comparative aspects between Lean and Six Sigma. *International Journal of Lean Six Sigma*, Vol.6(2), pp.161-175.

Pandit, K. & Marmanis, H. (2008) *Spend analysis: the window into strategic sourcing*. Fort Lauderdale, Florida, J Ross Pub.

Partida, B. (2012) The Value of Supplier Category Management. *Supply Chain Management Review*, Vol.16(4), pp.82-84.

Patton, E. & Appelbaum, S. (2003) The case for case studies in management research. *Management Research News*, Vol.26(5), pp.60-71.

Pepper, M. P. J. & Spedding, T. A. (2010) The evolution of lean Six Sigma. *International Journal of Quality & Reliability Management*, Vol.27(2), pp.138-155.

Porter, M. E. (1991) Towards a dynamic theory of strategy. *Strategic Management Journal*, Vol.12(S2), pp.95-117.

Procurement Leaders (2018) Building Agility to Drive Performance. Stockholm Summit 2018 (Classified).

Purvis, L., Gosling, J. & Naim, M. M. (2014) The development of a lean, agile and Leagile supply network taxonomy based on differing types of flexibility. *International Journal of Production Economics*, Vol.151, pp.100-111.

Rahman, N. A. A., Sharif, S. M. & Esa, M. M. (2013) Lean Manufacturing Case Study with Kanban System Implementation. *Procedia Economics and Finance*, Vol.7, pp.174-180.

Randel, A. & Jaussi, K. (2003) Functional Background Identity, Diversity, and Individual Performance in Cross-Functional Teams. *Academy of Management Journal*, Vol.46(6), pp.763-774.

Raynus, J. (2016) *Improving Business Process Performance: Gain Agility, Create Value, and Achieve Success*. Boca Raton, FL: CRC Press.

Rendon, R. (2016) The contract management standard: foundation for assessing process maturity. *Contract Management*, Vol.56(11), pp.12-14.

Ruben, R., Vinodh, S. & Asokan, P. (2018) Lean Six Sigma with environmental focus: review and framework. *The International Journal of Advanced Manufacturing Technology*, Vol.94(9), pp.4023-4037.

Sanchez, L. & Blanco, B. (2014) Three decades of continuous improvement. *Total Quality Management & Business Excellence*, Vol.25(9-10), p.986.

Sandelowski, M. (2000) Focus on research methods: Whatever happened to qualitative description? *Research in Nursing and Health*, Vol.23(4), pp.334-340.

Sayer, N. J. & Bruce W. (2011) *Lean for Dummies*. New Jersey, John Wiley & Sons.

Schuh, C., Kromoser, R., Strohmer, M. & Mariscotti, F. (2012). *The Purchasing Chessboard*. AT Kearney. [www-document]. [Cited 14.2.2019]. Available: <http://www.middle-east.atkearney.com/documents/787838/788065/Purchasing+Chessboard+-+English.pdf/e4a9dc5e-5229-47b5-b02c-47de726dcf2b>

Schwaber, K. & Beedle, M. (2002) *Agile Software Development with Scrum*. Upper Saddle River, Prentice Hall.

Schwaber, K. & Sutherland, J. (2017) *The Scrum Guide*. *The Definitive Guide to Scrum: The Rules of the Game*. [www-document]. [Cited 13.3.2019]. Available: <https://www.scrumguides.org/docs/scrumguide/v2017/2017-Scrum-Guide-US.pdf#zoom=100>

Serrador, P. & Pinto, J. K. (2015) Does Agile work? — A quantitative analysis of agile project success. *International Journal of Project Management*, Vol.33(5), pp.1040-1051.

Seuring, S. (2008) Assessing the rigor of case study research in supply chain management. *Supply Chain Management*, Vol.13(2), pp.128-137

Sharon, A. & Dori, D. (2017) Model-Based Project-Product Lifecycle Management and Gantt Chart Models: A Comparative Study. *Systems Engineering*, Vol.20(5), pp.447-466.

Shaw, E. (1999) A guide to the qualitative research process: evidence from a small firm study. *Qualitative Market Research: An International Journal*, Vol.2(2), pp.59-70.

Shokri, A. (2017) Quantitative analysis of Six Sigma, Lean and Lean Six Sigma research publications in last two decades. *The International Journal of Quality & Reliability Management*, Vol.34(5), pp.598-625.

Sibona, C., Pourreza, S. & Hill, S. (2018) Origami: An Active Learning Exercise for Scrum Project Management. *Journal of Information Systems Education*, Vol.29(2), pp.105-116.

Sievo (2019) [www-document]. [Cited 20.3.2019]. Available: <https://sievo.com/resources/spend-analysis-101>

Singh, R., Kumar, S., Choudhury, A. & Tiwari, M. (2006) Lean tool selection in a die casting unit: a fuzzy-based decision support heuristic. *International Journal of Production Research*, Vol.44(7), pp.1399-1429.

Sreedharan, R. V., Sunder, V. M. & Raju, R. (2018) Critical success factors of TQM, Six Sigma, Lean and Lean Six Sigma. *Benchmarking: An International Journal*, Vol.25(9), pp.3479-3504.

Srivastava, P. & Jain, S. (2017) A leadership framework for distributed self-organized scrum teams. *Team Performance Management: An International Journal*, Vol.23(5/6), pp.293-314.

Steele, P. & Court, B. (1996) *Profitable purchasing strategies: A manager's guide for improving organizational competitiveness through the skills of purchasing*. London, McGraw-Hill.

Stellman, A. & Greene, J. (2014) *Learning Agile: Understanding Scrum, XP, Lean, and Kanban*. California, O'Reilly Media, Inc.

Stuart, I., Mccutcheon, D., Handfield, R., Mclachlin, R. & Samson, D. (2002) Effective case research in operations management: a process perspective. *Journal of Operations Management*, Vol.20(5), pp.419-433.

Sutherland, J. (2015) SCRUM - The Art of Doing Twice the Work in Half the Time. UK, Random House.

Svejvig, P. & Andersen, P. (2015) Rethinking project management: A structured literature review with a critical look at the brave new world. *International Journal of Project Management*, Vol.33(2), pp.278-290.

Svensson, G. (2004) Interactive vulnerability in buyer-seller relationships: a dyadic approach. *International Journal of Physical Distribution & Logistics Management*, Vol.34(8), pp.662-682.

Syrjälä, L., Ahonen, S., Syrjäläinen, E. & Saari, S. (1994) *Laadullisen tutkimuksen työtapoja*. Rauma, Westpoint Oy.

Tang, C. S. (1999) Supplier Relationship Map. *International Journal of Logistics Research and Applications*, Vol.2(1), pp.39-56.

Van Hoek, R. I., Harrison, A. & Christopher, M. (2001) Measuring agile capabilities in the supply chain. *International Journal of Operations & Production Management*, Vol.21(1/2), pp.126-148.

Van Ruler, B. (2015) Agile public relations planning: The Reflective Communication Scrum. *Public Relations Review*, Vol.41(2), pp.187-194.

Van Weele, A. J. (2009) *Purchasing & Supply Management: Analysis, Strategy, Planning & Practice*. Hampshire, Cengage Learning EMEA.

Van Weele, A. J. (2005) *Purchasing & supply chain management: Analysis, strategy, planning and practice*. London, Thomson Learning.

Walter, A., Ritter, T. & Gemünden, H. G. (2001) Value Creation in Buyer-Seller Relationships: Theoretical Considerations and Empirical Results from a Supplier's Perspective. *Industrial Marketing Management*, Vol.30(4), pp.365-377.

Wang, F., Du, T. & Li, E. (2004) Applying Six-Sigma to Supplier Development. *Total Quality Management & Business Excellence*, Vol.15(9-10), pp.1217-1229.

Webb, M. (2011) Lean Category Management. [www-document]. [Cited 20.3.2019]. Available: <http://www.futurepurchasing.com/content/private/CatMan/Lean-Category-Management-P1.pdf>

Webster, F. E. (1992) The Changing Role of Marketing in the Corporation. *Journal of Marketing*, Vol.56(4), pp.1-17.

Womack, J. P. & Jones, D. T. (1996) *Lean Thinking Banish Waste and Create Wealth in Your Corporation*. 2<sup>nd</sup> edition. New York, NY: Free Press, Simon & Schuster, Inc.

Wood, D. (2015) Lean Management in Procurement. Institute for Supply Management, pp.22-25. [www-document]. [Cited 20.3.2019]. Available: [https://www.instituteforsupplymanagement.org/files/Pubs/Lean\\_Management.pdf](https://www.instituteforsupplymanagement.org/files/Pubs/Lean_Management.pdf)

Yin, R. K. (2009) *Case Study Research: Design and Methods*. 4<sup>th</sup> edit. Applied Social Research Methods. Volume 5. Sage Publications, Thousand Oaks, California.

Yusuf, Y. Y., Gunasekaran, A., Adeleye, E. O. & Sivayoganathan, K. (2004) Agile supply chain capabilities: Determinants of competitive objectives. *European Journal of Operational Research*, Vol.159(2), pp.379-392.

Yusuf, Y., Sarhadi, M. & Gunasekaran, A. (1999) Agile manufacturing: The drivers, concepts and attributes. *International Journal of Production Economics*, Vol.62(1-2), pp.33-43.

## **APPENDICES**

### Appendix 1. Interview questions

#### **BACKGROUND / CURRENT SITUATION:**

1. How have the categories been managed in the organization before? (Describe in your own words the category management process)
2. How would you describe the current status of category management in your organization?
3. What do you want to achieve with category management in your organization?

#### **INTERVIEW QUESTIONS FOR THE PROCUREMENT:**

4. What are the things you feel that are not agile in your organization's current category management process?
5. How would you change the current category management process to make it more agile and effective?
6. What factors do you think could bring agility and leanness to the category management process?
7. What do you see as a key enabler of agile category management?
8. What do you see as an obstacle / challenge to Lean and agile category management?
9. How do you think digital solutions could be utilized in category management?
10. What kind of challenges do you see in utilizing technology and applications in category management?
11. What kind of role / team structure do you think supports the agile category management process?

**LEAN\*:**

12. In what way are you already familiar with Lean thinking / Lean tools?
13. Do you see that Lean tools can be utilized in the category management process? What tools and how?
14. Do you see any obstacles to using Lean tools? What kind?
15. How and at what stage in the category management process would you use Lean tools?
16. What kind of knowledge / know-how is needed to use Lean tools?
17. What benefits do you see that Lean tools can bring into the category management process?

**SCRUM\*:**

18. How are you familiar with the Scrum method?
19. What are the benefits of using the Scrum method?
20. What are the challenges of using the Scrum method?
21. What do you see as the advantages of the Scrum method over the traditional waterfall project model?
22. Do you see that the Scrum model can be utilized regardless of the type and duration of the project?
23. What do you see as a key prerequisite for using the Scrum method?
24. What role does the Jira application play in leveraging the Scrum method?
25. What impact does the use of the Scrum has on information flow and transparency?

**FINALLY:**

26. Do you have something you would like to mention or add to the topic?

*(\*The questions apply only to those with previous experience with the method)*