

Panu Aikala

THE DEVELOPMENT OF A PERFORMANCE MEASUREMENT SYSTEM FOR INDIRECT PROCUREMENT

Master's thesis
Faculty of Engineering and Natural Sciences
Examiner: Senior Research Fellow Aki Jääskeläinen
Examiner: Professor Jussi Heikkilä
March 2021

ABSTRACT

Panu Aikala: The development of a performance measurement system for indirect procurement

Master of Science Thesis, 101 pages

Tampere University

Master's Degree Program in Industrial Engineering and Management

March 2021

Many studies have shown that procurement has a significant impact on the overall performance of the organization. An efficient and effective purchasing is argued to be tied to the organization's operational performance, which in turn is reflected in the organization's market performance and financial performance. Thus, procurement performance should be monitored accurately and continuously measured through appropriate purchasing performance management systems. Strategic vision and operation efficiency develop as the procurement begins to manage and evaluate its performance systematically. Procurement performance measurement enables to manage the procurement operation more efficiently, and therefore to achieve the objectives of the case company. This study is limited to examine the measurement of indirect procurement performance. However, it has been recognized that academic knowledge about indirect procurement is highly limited in comparison to direct procurement.

First, this study examined the current state of the case company's indirect procurement performance measurement, followed by identifying the needs of the internal stakeholders towards procurement. Lastly, the key performance metrics based on the company's strategy, current state analysis, and academic literature were designed. This thesis applied two common theoretical performance frameworks that appear in the academic literature: Purchasing Balanced Scorecard and Performance Prism. Based on these performance frameworks, the appropriate key performance indicators were designed to measure the performance of indirect procurement.

The research was carried out as a multi-method case study, in which both qualitative and quantitative data collection techniques were utilized. The theoretical part consists of a literature review that presents the core findings of the academic literature. The theoretical part of the study discusses the key concepts related to performance management, performance management in procurement, and developing purchasing measurement system. The material of the empirical part of the thesis was collected through semi-structured thematic interviews, in which the internal stakeholders of the procurement were interviewed. The main goal was to design comprehensive key performance metrics with a clear link to the company's strategy and the needs of the internal stakeholders. Quantitative data was collected from the organization's ERP-system and used in the measurement development process.

The current state analysis revealed that the case company's way of measuring indirect procurement performance was very one-sided and focused strongly on financial metrics. Cost-savings measurement undoubtedly got the most attention of all procurement metrics. It has been identified that there is a need to create a balanced set of measures, which is able to present information comprehensively about the desired measurement objects. The case company should gain insight into the performance from multiple areas simultaneously to ensure efficient and effective purchasing.

This study proposed to measure indirect procurement performance from the five different perspectives of purchasing balanced scorecard: financial perspective, internal business processes perspective, supplier perspective, employee perspective, and internal customer perspective. The key performance indicators from these five perspectives enable a case company to get comprehensive information about procurement performance from multiple areas simultaneously. The purchasing balanced scorecard includes success factors from the organization's strategy that forces management to focus on measuring performance on a few important metrics.

Keywords: purchasing, purchasing function, procurement, indirect procurement, performance management, measurement, productivity, efficiency, effectiveness

The originality of this thesis has been checked using the Turnitin OriginalityCheck service.

TIIVISTELMÄ

Panu Aikala: Epäsuoran hankinnan suorituskyvyn mittauksen kehittäminen
Diplomityö, 101 sivua
Tampereen yliopisto
Tuotantotalouden diplomi-insinöörin tutkinto-ohjelma
Maaliskuu 2021

Monet tutkimukset ovat osoittaneet, että hankintatoimella on merkittävä vaikutus yrityksen kokonaissuorituskykyyn. Tehokkaan hankinnan väitetään olevan sidottu yrityksen operatiiviseen suorituskykyyn, mikä puolestaan heijastuisi organisaation markkinasuorituskykyyn ja taloudelliseen suorituskykyyn. Hankinnan suorituskykyä tulisi seurata tarkasti ja mitata yhtäjaksoisesti sopivien mittausjärjestelmien kautta. Strateginen visio ja operatiivinen tehokkuus kehittyvät, kun hankinnan suorituskykyä johdetaan ja mitataan systemaattisesti. Hankinnan suorituskyvyn mittaaminen mahdollistaa hankintatoiminnan tehokkaamman hallinnan ja siten saavuttaa yritykselle asetetut tavoitteet. Tämä tutkimus on rajattu tutkimaan epäsuoran hankinnan suorituskyvyn mittaamista. On kuitenkin havaittu, että akateeminen tieto epäsuorista hankinnoista on hyvin rajallinen verrattuna suoriin hankintoihin.

Ensin, työssä tutkittiin tapausyrityksen epäsuoran hankinnan suorituskyvyn mittaamisen nykytilaa, jonka jälkeen selvitettiin sisäisten sidosryhmien tarpeita hankintaa kohtaan. Lopuksi suunniteltiin sopivat avainsuorituskykymittarit perustuen yrityksen strategiaan, nykytila-analyysiin ja akateemiseen kirjallisuuteen. Tässä työssä sovellettiin kahta yleistä suorituskyvyn teoreettista mallia: tasapainotettu mittaristo sekä suorituskykyprisma. Näiden kahden teoreettisen suorituskykymallin pohjalta suunniteltiin sopivat avainsuorituskykymittarit epäsuoran hankinnan suorituskyvyn mittaamiseen.

Tutkimus toteutettiin monimenetelmäisenä tapaustutkimuksena, jossa hyödynnettiin sekä kvalitatiivisia että kvantitatiivisia tiedonkeruumenetelmiä. Teoreettinen osa koostuu kirjallisuuskatsauksesta, joka esittelee akateemisesta kirjallisuudesta keskeiset havainnot. Tutkimuksen teoreettinen osa käsittelee avainkäsitteitä suorituskyvyn hallinnassa, suorituskyvyn johtamista hankinnassa sekä hankinnan suorituskyvyn mittausjärjestelmän kehittämistä. Diplomityön empiirisen osan aineisto kerättiin puolistrukturoidulla teemahaastattelulla, joissa haastateltiin hankinnan sisäisiä sidosryhmiä. Pää tavoitteena oli suunnitella kattavat avainsuorituskykymittarit, joilla on selkeä yhteys yrityksen strategiaan ja sisäisten sidosryhmien tarpeisiin. Tutkimuksen määrällinen tieto kerättiin organisaation ERP-järjestelmästä, ja sitä käytettiin mittareiden kehittämisprosessissa.

Nykytila-analyysi paljasti, että tapausyrityksen epäsuoran hankinnan suorituskyvyn mittaaminen oli hyvin yksipuolista ja se keskittyi voimakkaasti taloudellisiin mittareihin. Kustannussäästöjen mittaaminen sai epäilemättä kaikkein eniten huomiota verrattuna muihin hankinnanmittareihin. On tunnistettu, että tulisi kehittää tasapainoinen joukko mittareita, jotka pystyisivät esittämään kattavasti tietoa halutuista mittauskohteista. Kohdeyrityksen tulisi saada käsitys sen suorituskyvystä useilta alueilta samanaikaisesti, jotta voidaan varmistaa tehokas hankinta.

Tämä tutkimus ehdottaa mittaamaan epäsuoran hankinnan suorituskykyä viidestä eri tasapainotetun mittariston näkökulmasta: taloudellinen näkökulma, sisäisten prosessien näkökulma, toimittajan näkökulma, työntekijän näkökulma ja sisäisen asiakkaan näkökulma. Avainsuorituskykymittarit näistä viidestä näkökulmasta mahdollistaisivat tapausyritystä saamaan kattavaa tietoa hankinnan toiminnoista useilta alueilta samanaikaisesti. Tasapainotettu mittaristo sisältää menestystekijöitä organisaation strategiasta, joka pakottaa johtoa keskittämään suorituskyvyn mittauksen muutamaankin tärkeään mittariin.

Avainsanat: hankinta, hankintatoimi, epäsuorat hankinnat, suorituskyvyn johtaminen, mittaaminen, tuottavuus, tehokkuus, vaikuttavuus

Tämän julkaisun alkuperäisyys on tarkastettu Turnitin OriginalityCheck –ohjelmalla.

PREFACE

This study was a master's thesis from the field of Industrial Engineering and Management, and it has been carried out at Tampere University. The research was a very educational experience as it allowed for a deeper understanding of the procurement business environment. This study has also provided me with the knowledge that will support me in the challenges of working life in the future.

I would like to thank the case company for this master's thesis opportunity. I had the pleasure of meeting many new people through research interviews and gained valuable insights from them on developing the performance of indirect procurement. Special thanks to Johanna Pokela and Mikko Vuori, who have supported and assisted me throughout the conducting of the thesis. Secondly, I wish a special thanks to professors Aki Jääskeläinen and Jussi Heikkilä for their guidance during the study.

Lastly, I want to address all my love for all the closest people to me. The greatest thanks belong to my family and my friends for encouraging me throughout my studies. You have always supported me in whatever challenges I have decided to take. I really appreciate it.

Tampere, 1 March 2021

Panu Aikala

CONTENTS

1. INTRODUCTION	1
1.1 Research background and context.....	2
1.2 Motivation	3
1.3 Research objective	3
1.4 Theoretical framework and scope	4
1.5 Structure of the thesis	6
2. LITERATURE REVIEW.....	7
2.1 Defining relevant concepts.....	7
2.2 Performance measurement.....	8
2.2.1 Key performance indicators	9
2.2.2 Classification of performance indicators.....	10
2.2.3 Performance measurement frameworks	12
2.3 Purchasing.....	15
2.3.1 Different roles of purchasing	16
2.3.2 Purchasing process	18
2.4 Indirect purchasing.....	21
2.4.1 Categorization of indirect purchases and services	22
2.4.2 The difference between direct and indirect purchases	24
2.5 Purchasing performance measurement.....	24
2.5.1 Perspectives of purchasing performance	26
2.5.2 Indirect procurement standard	27
2.6 Purchasing balanced scorecard	29
2.6.1 Financial perspective	30
2.6.2 Process perspective.....	32
2.6.3 Supplier perspective	34
2.6.4 Employee perspective.....	35
2.6.5 Internal customer perspective	36
2.7 Summary	37
3. RESEARCH METHODOLOGY	39
3.1 Research design.....	39
3.2 Data collection	41
3.3 Data analysis	43
4. RESULTS AND ANALYSIS.....	45
4.1 Current state description and challenges	45
4.1.1 Organization of procurement.....	45
4.1.2 Current state and challenges	47
4.1.3 Management of suppliers.....	51
4.2 Current performance measurement practices	52
4.2.1 Cost-savings	53
4.2.2 RFQ-activity.....	55
4.2.3 Complaints.....	56

4.2.4 Three-way matching	56
4.2.5 Spend	56
4.3 Needs of the internal stakeholders regarding the development of procurement performance.....	57
4.4 Proposed measures	60
4.4.1 Financial perspective's measures	65
4.4.2 Process perspective's measures.....	70
4.4.3 Supplier perspective's measures	72
4.4.4 Employee perspective's measures.....	74
4.4.5 Internal customer perspective's measures	75
5. CONCLUSIONS.....	77
5.1 Key findings	77
5.2 Managerial implications.....	81
5.3 Limitations and criticism of the study	82
5.4 Objectives for further research	84
REFERENCES.....	85

LIST OF FIGURES

Figure 1. The key concepts of the thesis and the links between them.	5
Figure 2. The original balanced scorecard model (Kaplan & Norton 1992, 72).	12
Figure 3. The cause-and-effect relationship of four perspectives.	14
Figure 4. The performance prism (adapted from Neely, 2002).	15
Figure 5. The role of procurement in company performance (according to Foerstl et al. 2016).	17
Figure 6. Purchasing process model and some related concepts (according to van Weele 2018, p.8).	19
Figure 7. Indirect Material Procurement Process (adapted from Nandeesh et al., 2015).	21
Figure 8. Perspectives of the purchasing balanced scorecard (Adapted from Hofmann et al., 2014, p.136).	29
Figure 9. Complexity of measurement systems (Adapted from Nollet et al., 2008).	32
Figure 10. Graphic presentation of optimum order volume (adapted from Hofmann et al., 2014, p.89).	37
Figure 11. A key literature background for the study at different stages.	37
Figure 12. Chosen research methodologies (adopted from Saunders et al., 2016, p. 124).	40
Figure 13. The data analysis process.	44
Figure 14. Organizational chart of the case company.	46
Figure 15. MRO spot savings per PO size category.	48
Figure 16. MRO-purchases time span of paper mills.	49
Figure 17. RFQs documentation.	55
Figure 18. Companies' sizes in NACE Rev. 2 classification.	66
Figure 19. Savings as a percentage of influenced spend (adopted from Limberakis & Fond 2018).	68

LIST OF TABLES

Table 1. <i>From reactive towards more proactive purchasing (Baily et al., 2005).</i>	18
Table 2. <i>Categorization of indirect purchases (according to Iloranta & Pajunen-Muhonen, 2015, p.62).</i>	23
Table 3. <i>Differences between direct and indirect purchases (Based on Heikkilä et al., 2013; Boer et al., 2003; van Weele, 2018, p.6).</i>	24
Table 4. <i>Typical problems among companies that make it difficult to measure purchasing performance. (Based on van Weele, 2018; Huuhka, 2017; Laitinen 2003)</i>	26
Table 5. <i>COPC core indirect procurement standards.</i>	28
Table 6. <i>The interviews of the research.</i>	43
Table 7. <i>Comparison of direct and indirect purchases by the case company.</i>	49
Table 8. <i>The key challenges related to the indirect procurement.</i>	51
Table 9. <i>The current procurement performance measurement metrics.</i>	53
Table 10. <i>Annual saving % of manually handled purchases. Comparison 2015, 2016, 2017, 2018, 2019 YTD.</i>	55
Table 11. <i>The key needs regarding the development of procurement performance.</i>	59
Table 12. <i>The purchasing balanced scorecard strategy map.</i>	62
Table 13. <i>Proposed indirect procurement KPIs.</i>	64
Table 14. <i>MRO price index benchmarking.</i>	67
Table 15. <i>Realized savings examples.</i>	69
Table 16. <i>Spend metrics for indirect procurement.</i>	70
Table 17. <i>The example of an internal customer satisfaction survey.</i>	76

LIST OF ABBREVIATIONS

3WM	Three-way Matching
BSC	Balanced Scorecard
DAP	Delivered at Place
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization.
ERP	Enterprise Resource Planning
FCA	Free Carrier
GHO	Group head office
JIT	Just-In-Time
KPI	Key Performance Indicator
MRO	Maintenance, Repair and Operations
NPR	Non-product Related
P-BSC	Purchasing Balanced Scorecard
PO	Purchase Order
PPI	Producer Price Index
PSM	Purchasing and Supply Management
PVA	Purchasing Value Added
RFQ	Request for quotation
RFx	Request for x
TCO	Total Cost of Ownership

1. INTRODUCTION

Procurement, once seen as just a cost-cutting function, has now significant impact on a company's performance. The importance of procurement for a company's competitiveness and financial performance has been emphasized in recent years as companies become more focused on their own core competencies, outsource their operations, and procure the goods and services they need from other organizations. (Huuhka, 2017) The procurement organization must therefore continuously improve its performance and focus on its value creation activities. The importance of procurement is especially emphasized in difficult economic times, as purchase savings have a direct link to the company's profitability (Hofmann, Maucher, Kotula & Kreienbrink, 2014, p.1), and it is known to be an important part of a company's strategic success (Cousins et al., 2008). It is common for modern manufacturing companies to spend more than half of their turnover on services and products (Presutti, 2003). Thus, it can be concluded that optimal and efficient purchasing has a major impact on the profitability and competitiveness of the company.

When it comes to supply chain performance, it has been recognized that sharing and capturing information in real-time have a significant impact on supply chain success (Devaraj et al., 2007). There have been significant upheavals in organizations' Enterprise Resource Planning systems (ERP-system) in recent decades, which has helped companies obtain data on their purchases more efficiently and accurately. However, companies may have challenges in validating their measurements. They can get very diverse data from their purchasing process but may not be able to choose the right performance indicators or correct measurement practices to measure procurement performance. A typical challenge is to identify direct input-output relationships. The reason for this is the intangible nature of inputs and outputs. In addition, some outputs may only be identified in the long run. (Lönqvist et al. 2006, p. 96)

In this situation, several questions arise. Do metrics produce the kind of information that the management of a modern company needs in their work? Is the data from the metrics presented in a form that the company benefits from? Do the metrics really have a link to the company's strategy?

Companies make purchases on a daily basis that are not directly related to the organization's end product or service. These purchases are called indirect purchases that include, for example, MRO (Maintenance repair and operations) purchases. In this thesis, the emphasis will be on indirect purchases, focusing on MRO purchases. The reason for the research on this topic is that indirect procurement is still a fragmented, even partially unmanaged, and unreported area in most organizations. Indirect procurement has been identified as a significant component of purchasing. However, it has been largely ignored by scholarly research because indirect procurement represents only a small part of manufacturing firms' expenditures. Academic knowledge about indirect procurement is highly limited in comparison to direct procurement. (Israel & Curkovic 2020) So, the purpose of the literature review is to find out what is known about indirect procurement. However, the main goal of the thesis was to improve the procurement performance measurements and practices in a global forest industry company. Proposals for the development of the procurement measurement practices are derived from existing literature, research data, and interview results.

1.1 Research background and context

The thesis was commissioned by the company as part of the master's degree at Tampere University. This is a case study of a global forest industry company that is one of the world's leading producers in this field. The case company is a Finnish forest industry company operating in 12 countries. Business operations of the company cover the entire value chain for wood. It focuses on paper, pulp, plywood, sawn timber, labels and composites, bioenergy, biofuels for transport, biochemicals, and nanoproducts. The annual sale of the case company is about €10 billion euros, and it has approximately 18,700 employees. The study is conducted in the case company's procurement organization, which is responsible for indirect procurement of the company's four paper mills. The procurement organization is organized as a so-called hybrid model. This means that some procurement is handled centrally and some decentrally. Purchases are organized by product and service groups. When buyers focus on one controlled product or service group or a limited number of product or service groups, they can focus properly on one industry or industry group. This allows buyers to familiarize themselves with the cost structures, technologies, companies, people who work in the industry, and to understand the success factors of the business and the logic of competition (Iloranta & Pajunen-Muhonen, 2015, p.323).

1.2 Motivation

The motivation for this study is based on the fact that the case company has identified a need to improve its indirect procurement performance measurement and harmonize measurement practices. The company has a lot of measurable data available about the purchasing process, but the challenge for a company is to target metric resources correctly. The company does not have a clear systematic way to measure the performance of MRO-purchasing. The case company mainly focuses on saving measurement and various spend measurements. So, the company's way of measuring purchasing performance is very one-sided and focuses strongly on financial metrics. It has been identified that there is a need to create a balanced set of measures, which is able to present information holistically about the desired measurement objects. The procurement organization should gain insight into the performance from multiple areas simultaneously to ensure efficient and effective purchasing. This also helps prevent sub-optimization and forces management to see the key performance metrics as a whole. This makes it possible to assess how improvements in some factors require sacrifices from another.

The study also found a gap in the existing academic literature. There is no in-depth study in the literature on how measures should be weighted in a hybrid procurement organization for indirect procurement in a manufacturing company. In an organization like this, where procurement is partially centralized and decentralized, collaboration with stakeholders plays an important role. Despite the distances, the procurement organization must be able to meet the needs and expectations of stakeholders.

1.3 Research objective

The main purpose of the thesis is that the theoretical and empirical parts of the thesis provide a strong basis for solving the research problem. The study examined the viewpoints of both buyers and key internal stakeholders. These stakeholders included, for example, case company's maintenance department, production and warehouse. As a result, comprehensive purchasing performance measurement KPIs are proposed for the case company, which would meet the needs and challenges of the case company. Proposals for the development of the procurement performance measurement practices are derived from existing literature and research data, as well as the results of interviews.

The first objective of the thesis is to examine the current state of the procurement process of indirect goods in the case company. The information of the current state is collected mainly through thematic interviews, which also examine the needs of different stakehold-

ers regarding the procurement process. The second objective is to develop the performance of procurement and its measurement in a global forest industry company. The purpose of the procurement performance measure set is to guide the procurement to perform correctly both in operative tasks and in terms of the strategic goals.

The research questions have been formed on the basis of the study's objectives and present research problems in the form of questions. Therefore, the main research question is formulated into the following:

How to improve the procurement performance of a large paper and pulp industry company in indirect purchases?

In order to be able to answer the main question comprehensively, the research must go deeper into the context. The study will be deepened by three sub-questions formed on the basis of the main research question. The purpose of the first sub-question is to describe the current state of the case company indirect procurement measurement practices. Therefore, the first sub-question is as follow:

SQ1) How is indirect procurement currently measured in a case company?

The aim of the second sub-question is to identify the needs of procurement stakeholders regarding procurement and its measurement. Different stakeholders of the procurement organization were interviewed in the form of a thematic interview. The respondents from the different stakeholders are detailed later in Table 6. The second sub-question is as follow:

SQ2) What kind of purchasing performance needs procurement's internal stakeholders have?

According to Israel & Curkovic (2020), academic knowledge about indirect procurement is highly limited in comparison to direct procurement. However, the purpose of the final sub-question is to provide an understanding of how companies' performance of indirect procurement should be measured based on theoretical findings. Therefore, the third sub-question is as follow:

SQ3) How should indirect procurement performance be measured in a forest industry production company?

1.4 Theoretical framework and scope

The aim was to select peer-reviewed and highly referenced sources to make sources as reliable as possible for the study. The theory was collected by performing a keyword search in multiple comprehensive databases. The sources consisted mostly of scientific

publications. The scientific publications have been searched mainly through Andor, Researchgate, and Google Scholar -search services. The material is mainly collected from the literature on purchasing and supply chain management.

The conceptual framework is illustrated in Figure 1. It presents the relations between the key concepts. This framework is based on theoretical claims that procurement can enhance the purchase process with a balanced performance management system (Hofmann et al., 2014, p.136). However, this study focuses in particular on developing metrics for the “Order function” stages of the purchasing process. An efficient and effective purchasing is tied to operation performance, which in turn is reflected in the organization’s market performance and financial performance (e.g., Foerstl et al., 2016).

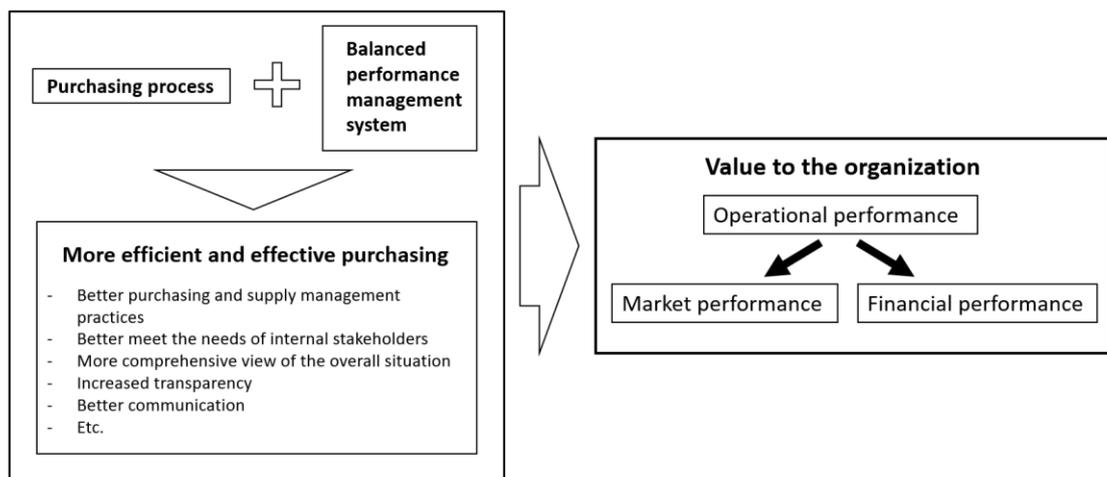


Figure 1. The key concepts of the thesis and the links between them.

The scope of a study focuses on indirect procurement by the case company, which includes all goods and services not related to the final product or service, such as MRO purchases (Maintenance, Repair, Operating). These orders represent the indirect procurement category. The categorization of indirect procurement is presented in chapter 2.4.1. The study is especially focused on component purchases that are purchased through the company ERP system. The results of this study take into account only the internal perspective of the buying firm. The current state of the company’s procurement and stakeholders’ needs is based on 22 interviews with buyers and different stakeholders. The aim of the interviews was to involve people with different views and experiences on purchasing in order to get a broad picture of the stakeholders’ needs and the current state with purchasing performance measurement. The scope is limited to examining and designing the purchasing performance measures. The aim is to find best practices and metrics for measuring indirect procurement performance from the latest knowledge in

the area and then design the most appropriate key performance indicators for the case company.

1.5 Structure of the thesis

This thesis can be divided into two parts: a literature review and an empirical study. The research material consists of quantitative as well as qualitative source material. The thesis consists of five chapters, which are organized as follows.

The first part of the thesis presents the background of the study and defines the research questions. After the introduction chapter, the theory related to the topic will be examined in a literature review in six subchapters. The literature review is conducted for the chosen body of knowledge, including relevant concepts, performance measurement, purchasing in general, indirect purchasing, purchasing performance measurement, and purchasing balanced scorecard. The purpose of the literature review is to present the key findings of the academic literature related to the research topic. After the literature review, the study continues to the empirical part of the thesis. Chapter three presents the methodological choices. The research method of this thesis is a case study. The research data in this study consists of both primary data from interviews and secondary data from the case company's documents and ERP-system. The results and analysis from the empirical part of the thesis are presented in the fourth chapter. The results regarding the company's current state and measurement of indirect purchasing are presented first, followed by the results of the interviews regarding the needs of the stakeholders. In the discussion part, the most important findings and contributions are presented as well as possible further research topics are discussed.

2. LITERATURE REVIEW

In this chapter, a look is taken at the key concepts, models, and findings from the literature regarding performance measurement and purchasing. In the first part, the relevant concepts are defined. The second part discusses performance measurement overall, and after that, in the third part purchasing process is defined. The fourth part focuses on indirect procurement. In the fifth part, the purchasing performance measurement is discussed and, in the last part, purchasing balanced scorecard is presented.

2.1 Defining relevant concepts

In the early stages of the thesis, it is important to define and form a consensus on the key concepts. To clarify the research topic and the related factors, this subchapter defines briefly concepts related to procurement and performance measurement.

Procurement is the process an organization uses to procure goods or services (Iloranta & Pajunen-Muhonen, 2015, p.50). Over the years, in the literature, there are multiple different terms describing related to procurement. The terms “procurement” and “purchasing” have been commonly used in this context. According to Van Weele (2018, p.7), sometimes even the terms “sourcing” or “supply management” may be used. There are many similarities, but also differences between the definitions. In this study, the above terms are used synonymously and defined according to Van Weele (2018, p.7) as follows:

“The management of the company’s external resources in such a way that the supply of the all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company’s primary and support activities is secured at the most favourable conditions.”

Van Weele (2018, p.303-606) classified **the purchasing performance** in two groups: effectiveness and efficiency. Trent (2007, p.62) clarified these previous performance definitions as follows: effectiveness means *doing the right things*, and efficiency means *doing things right*. According to Neely et al. (2005), efficiency refers to a measure of how economically the company’s resources are used to achieve particular level of customer satisfaction, while effectiveness refers to the extent to which customer requirements are met.

Performance measurement refers to measuring the success and profitability of an organizational unit (e.g., organization, business unit, department, workgroup, or individual)

from selected perspectives (Lönqvist, Kujansivu & Antikainen, 2006, p.19). According to Laitinen (2003, p.21), effective management of a company is not possible without information. Performance measurement can be defined as the process of collecting and analyzing information regarding the performance of business factors. The process identifies the key success factors for the objectives, measures them, and uses the information from the indicators to develop the organization. (Lönqvist, Kujansivu & Antikainen 2006, p.11) Laitinen (2003) defines performance as the ability to maximize the benefit to owners and adequately satisfy the needs of other stakeholders. Other different definitions of performance have also been found in the literature. In this study, performance is defined as the ability of a measured object to achieve set goals. The business performance and related measurements will be covered more in-depth in chapter 2.2.

Purchasing and supply management practices refer to the activities that relating the purchasing-supply base interface (Narasimhan & Das, 2001), including both supplier-facing practices and internal PSM practices (Zimmermann & Foerstl, 2014). Barney (1991) suggests that purchasing and supply management practices can improve an organization's competitiveness in accordance with resource-based theory. According to Zimmermann & Foerstl (2006), PSM practices can contribute to various performance dimensions of the organization, such as operational performance, market performance, and financial performance.

In general, the concept of **value** in business-to-business relationships can be divided into two value elements, benefits and sacrifices, which together determine the extent of value realized for the buying company (Ahola et al., 2008). The concept of value can be considered the cornerstone of the supply chain (Francis, Fisher, Thomas & Rowlands, 2014). Some researchers define the value of a procurement primarily in economic terms (Hofmann et al., 2014), while some may use a broader definition that includes non-financial benefits, such as competitive advantages, predictability, social relations, know-how, and time spent (e.g. Flint, Woofruff & Gardial, 1997). Various studies have found that in order to create valid and reliable metrics, one must be able to define the added value created by the procurement and understand how it affects a company's profitability and competitiveness (e.g. Lindgreen & Wynstra, 2005; Ulaga, 2003).

2.2 Performance measurement

Organizations need a variety of metrics to be able to measure different dimensions of modern business performance. It is possible to achieve a big picture of the company and its potential for strategical success with specific metrics. The metrics used by companies

are often very similar, although the strategies chosen are very different. A well-functioning measurement system reflects the chosen strategy, and it is even possible to deduce the company's strategy from a well-designed metric. (Kankkunen et al., 2005) Komatina et al. (2019) argue that the same performance measurement system cannot be applied well in two different organizations or two business processes. The application of models can be influenced by many factors, such as the type of organizations (serviceable or productive, etc.), enterprise size, industry branch, etc. Thus, it can be concluded that there is no standard measurement system model for measuring the performance of organizations. Organizational performance is considered a very multidimensional thing. When talking about performance, all the organization's key stakeholders and their need should be considered (Lönqvist, Kujansivu & Antikainen, 2006, p.19). In order to keep stakeholders satisfied, a company must take extensive care of its performance because an inefficient company meets the needs of stakeholders less than an efficient company (Laitinen, 2003, p.21).

Komatina et al. (2019) state that the main goal of performance measurement is to find out which aspect of the organization's business does not achieve the desired business goals and to take action to improve it on the basis of the measurement analysis. They also note that it is also possible to measure the success of the realization of business processes. As a result, the company is able to determine which process activities need to be improved in order to achieve the goals of the process.

2.2.1 Key performance indicators

This subchapter describes briefly what the key performance indicators are and what they are used for. These will be returned to in more detail in chapter 2.5, which specifies what kind of KPIs should be used in which procurement measurement category.

The characteristics of key performance indicators differ from other types of performance indicators. For example, Parmenter (2015) classified performance measures into four types as follows:

1. Key result indicators (KRIs): provide overall summary of how the company is performing
2. Result indicators (RIs): describe what you have done.
3. Performance indicators (PIs): describe what you should do.
4. Key performance indicators (KPIs): tell you how the company is performing in their critical success factors and, by monitoring then, company is able to increase its performance significantly.

Well-defined key performance indicators (KPI) help companies to identify performance gaps between current and desired performance, as well as provide information on progress towards closing the gaps. The measures need to be reliable, accurate, and information that is presented in an understandable way. (Muchiri et al., 2010) Metrics helps companies to identify essential links between strategy, execution, and ultimate value creation (Melnik, Stewart & Swink, 2004). Companies should not follow just one KPI because it cannot provide a comprehensive view of the overall situation. Multiple KPIs should be involved in a company's performance management system, allowing the company to focus on multiple factors such as productivity, cost, quality, employees, supplier-specific issues, and strategic alignment. (Kaskinen, 2007).

Kaskinen (2007) suggests a roadmap that a company could follow if they have the vision to establish an effective KPI program in the purchase-to-pay process. It includes the following practices: set program goals; select balanced, actionable KPIs; align your KPIs with your strategy; establish benchmarks; determine your baseline; determine what you need to view and establish reporting needs. Before beginning, companies should consider what they want to accomplish, and they should decide their priorities. It is not practical to monitor all metrics at the same time. Companies should consider their financial goals and ways to achieve the most strategic benefit.

2.2.2 Classification of performance indicators

The literature related to performance measurement revealed that there are many ways to classify performance indicators. One of the most common ways is to divide the metrics into financial and non-financial metrics (Lönqvist, Kujansivu & Antikainen, 2006, p.30). The literature has found that financial value is usually easy to measure, while non-financial value is already difficult to determine (e.g. Möller & Törrönen 2003; Jääskeläinen, Thitz & Heikkilä, 2016). Procurement performance management has traditionally focused on direct spend as its financial impact has been noted to be easier to assess (Fedele & Dolan, 2004). Non-financial indicators are generally considered to be more concrete than financial indicators, as they are typically simpler and may clarify objectives, and their communication (Lönqvist et al., 2006, p. 30–31). For example, ROI, EBITDA, and return, can represent financial metrics (Zimmermann & Foerstl, 2014), while product quality, know-how, and delivery reliability can be non-financial metrics (Jääskeläinen & Heikkilä, 2019). There also many challenges associated with non-financial metrics. Many of the problems associated with financial metrics, such as the risk of sub-optimization, can also be related to non-financial metrics. In addition, their calculation criteria

are not well established, data is not necessarily reliable, and their results are rarely comparable between different organizations. (Lönqvist et al., 2006, p.30–31)

Alongside financial and non-financial metrics, the terms hard and soft metrics are sometimes used. This method of classification is not synonymous with financial and non-financial metrics, but measures are defined on the basis of different characteristics. Hard metrics are based on unambiguous output values such as business transactions and performance volumes (Neilimo & Uusi-Rauva, 2007, p.304). Soft metrics, in turn, are based on people's attitudes, views, and feelings. Thus, soft metrics may be partially subjective. Soft metrics include, for example, various surveys, such as a customer satisfaction survey or an employee satisfaction survey. (Lönqvist et al., 2006, p.31; Neilimo & Uusi-Rauva, 2007, p.304)

Metrics can also be classified into objective and subjective metrics. Objective metrics are based on the quantitative information obtained from an organization's operations or results. In most cases, financial metrics are classified as an objective metric. Subjective metrics, in turn, are based on estimates of the status of the success factor being measured. Most non-financial metrics, in turn, are subjective metrics. At a general level, it can be thought that an objective metric means the same as a hard metric and a subjective one the same as a soft metric. (Lönqvist et al., 2006, p.31; Simons, 2000, p.235)

The performance of an organization can be seen as a value that can be measured directly or indirectly by applying qualitative or quantitative indicators (Enos, 2010). According to (Lönqvist, et al., 2006, p.31), when the object to be measured cannot be measured directly, some factors known to be closely related to the object can be measured. They demonstrated that a typical example of such a case is the measurement of productivity. Productivity is part of the overall performance. An organization's productivity refers to how well it is able to utilize its inputs and turn them into outputs. They define productivity as follows: $\text{productivity} = \text{outputs}/\text{inputs}$. Outputs are, for example, products, services, and various performed functions. Inputs, in turn, are labor, materials, energy, and capital. When considering outputs and inputs, both quantity and quality components should be taken into account. Productivity is often difficult to measure directly. However, it can be measured indirectly by measuring, for example, the number of errors, the work atmosphere, waiting time, or absences.

In summary, the need to measure business performance has been recognized for a long time. However, the performance measurement field has changed constantly, and its importance to businesses has evolved, especially in recent decades. Nowadays, it is perceived as an important tool in implementing an organization's strategy and controlling

organizational operations. Performance metrics can be classified differently depending on their characteristics.

2.2.3 Performance measurement frameworks

There are many developed performance measurement models in the relevant literature with various advantages and disadvantages. The most well-known performance theory models were chosen to support the theory of this study. Presenting a few well-known measurement models helps to understand the big picture of performance measurement. The purpose of this chapter is to understand the basic idea of performance measurement as well as to understand the factors that may influence the application of models.

One of the most well-known performance theory models is **the balanced scorecard** (BSC) introduced by Kaplan & Norton in 1992. The main idea of the model is to allow managers to look at the business from four important perspectives (Kaplan & Norton 1992, p.72). The four perspectives are illustrated in Figure 2. The BSC aims to provide answers to four basic questions: how do customers see us? (customer perspective), how do we look to shareholders? (financial perspective), What must we excel at? (internal perspective), can we continue to improve and create value? (innovation and learning perspective).

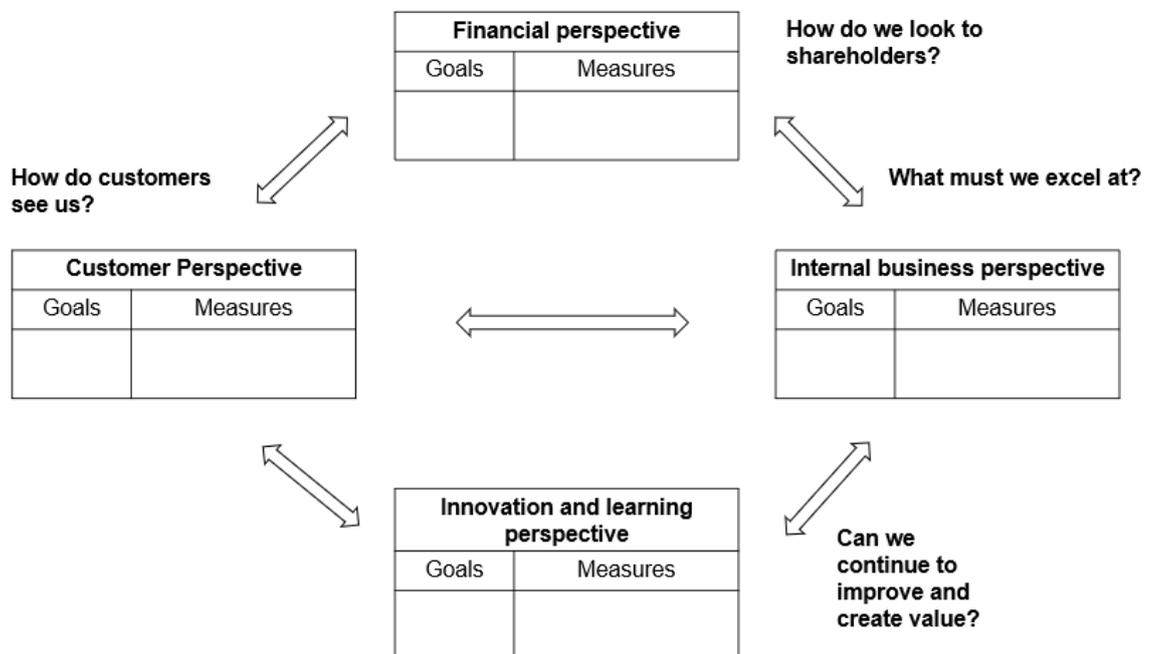


Figure 2. The original balanced scorecard model (Kaplan & Norton 1992, 72).

According to Kaplan & Norton (2009, p.1253), their interest in measurement for driving performance improvement arose from a belief stated more than a century ago by a prominent British scientist, Lord Kelvin (1883):

"I often say that when you can measure that you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a vague and unsatisfactory kind.

If you can not measure it, you cannot improve it."

The balanced scorecard model was developed as a result of the study, which was made with 12 world's leading companies. BSC is defined as a set of metrics that give managers a quick but comprehensive overview of the company's situation (Laitinen, 2003, p.375-376). BSC includes financial measures that describe the results of actions already taken. Financial measures are complemented by various operational measures, such as internal processes, customer satisfaction, and the organization's improvement activities. These measures have been considered as the drivers of future financial performance. (Kaplan & Norton, 1992) Each of these perspectives has its own objectives, targets, measures, and initiatives (Kaplan & Norton, 1996). Objectives are related to what the strategy aims to achieve, the targets represent value sought for each measure, measures are indicators that will be used to measure the achievement of the goal, and finally, the initiatives relate to actions that should be taken to achieve goals (Kaplan, Norton & Lahnaoja, 2007).

The customer perspective is based on the overall satisfaction of customer needs. The company's performance from its customer's perspective has become a priority for top management, as many companies focus on being number one in delivering value to customers (Kaplan & Norton, 1992). Metrics of this dimension usually measure, for example, speed, product quality, service, and cost to the customer (Laitinen, 2003, p.376-377). The financial perspective measures how customer satisfaction is reflected in the company's financial performance (Laitinen 2003, 377). Typical financial goals are related to profitability, growth, and shareholder value (Kaplan & Norton, 1992). It is measured by traditional economic metrics such as return on capital and growth rate (Laitinen 2003, 377). The internal business perspective, in turn, relates to metrics that measure the performance of internal processes that critically affect a company's capability to meet customer needs. This dimension includes metrics such as process cycle time, quality, employee skills, and productivity. (Laitinen, 2003, p.377) Companies should also strive to identify and measure the company's core competencies needed to ensure continued market leadership (Kaplan & Norton, 1992). Finally, the innovation and learning perspective is related to a company's capability to innovate, improve, and learn methods to meet customer needs better. Measurable things are related to, for example, the development of new products and the ability to create more value for the customer. (Laitinen, 2003, p.377)

Each of these four perspectives is interconnected through the cause-and-effect relationship see Figure 3. For example, developing employees' skills (the innovation and learning perspective) improves customer service (the internal business perspective), which in turn leads to higher customer satisfaction and loyalty (the customer perspective), and finally increases the company's profit margins (the financial perspective) (Kaplan, Norton & Lahnaoja, 2007).

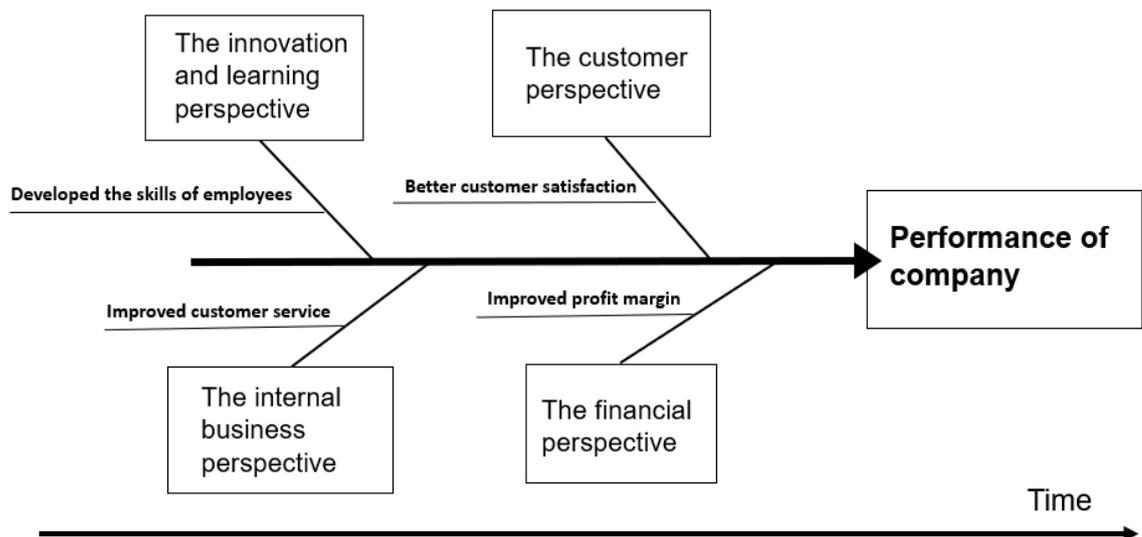


Figure 3. *The cause-and-effect relationship of four perspectives.*

To summarize, these four perspectives allow a company to get comprehensive information about its performance from multiple areas simultaneously. Each perspective has its own objectives, targets, initiatives, and measures. The best sides of the BSC model are that it links with the objectives of the organization (Jeston & Nelis, 2006, p.27), takes into account all employees, and enables management to easily follow the successes of functions (Budd, 2010).

The second theoretical performance measurement model to be presented is **the performance prism**. The procurement can be seen as very stakeholder-oriented (e.g. Lönnqvist, Kujansivu & Antikainen, 2006), so this model was considered appropriate in this context. The performance prism was developed in 2002 by Neely, Adams & Kennerley, which adopts stakeholder centric view of performance measurement in order to reflect the growing importance of satisfying stakeholder requirements. The performance prism is designed to form a vision of four facets that are demonstrated in Figure 4: strategies, capabilities, processes, stakeholder satisfaction, and stakeholder contribution. When defining a set of performance measures, companies need to first define the stakeholders and what they need, as well as what contributions the company requires from their stakeholders. After these, the company must develop a strategy that satisfies the wants and

needs of key stakeholders. Moreover, the company must identify the capabilities and critical processes needed to operate and enhance those processes. When considering these questions at an organizational level, it provides a comprehensive overview of the organization's performance in a similar way as the balanced scorecard does. The framework has considered to being multidimensional, reflecting all of the areas of performance that influence the performance of a company. The performance prism provides a balanced picture of the business highlighting external (stakeholder) and internal (process, capability, and strategy) measures. In addition, it enables measures of effectiveness and efficiency throughout the organizations and non-financial and financial measures.

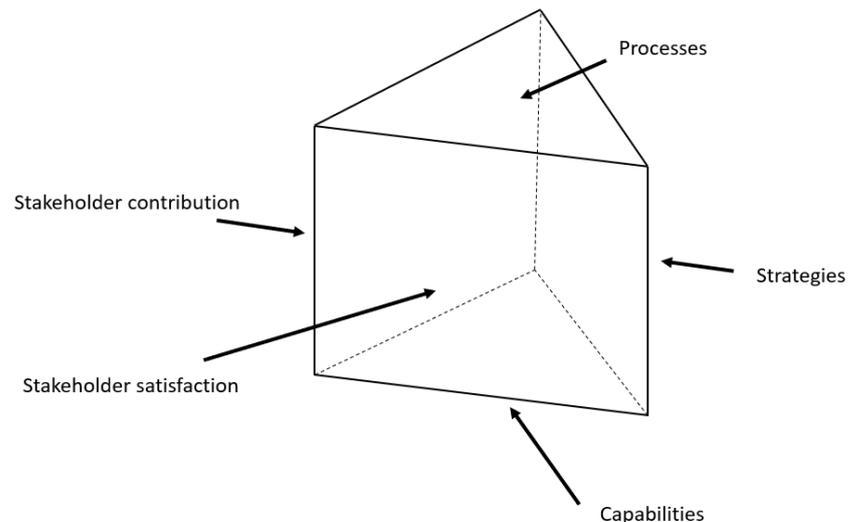


Figure 4. *The performance prism (adapted from Neely, 2002).*

2.3 Purchasing

Traditionally, purchasing has been quite production-oriented, but these days we see a trend to pay more attention to center-led non-production purchasing (Rozemeijer & van Weele, 1996). Optimal and efficient purchasing has a major impact on the company's profitability and competitiveness. The average manufacturing company uses about 50% of its revenue to purchase products and services for the manufacture of their end products (Presutti, 2003). Therefore, it can be calculated that a saving of one percentage point in the company's purchase costs could improve the company's profit by up to half a percentage point, as Janda & Seshadri (2001) have also noted in their study. In other words, if the company's sales remain the same and the purchase costs decrease, the company's margin and profitability increase.

2.3.1 Different roles of purchasing

The purpose of this subchapter is to briefly describe the different roles of purchasing. (Iloranta & Pajunen-Muhonen, 2015, p.53) states that the procurement responsibilities include the purchase of services and products needed by the company, expert and financial services, and fixed asset management services. Outsourcing enables the company to better utilize its resources, be more flexible and responsive to changing needs, which in turn creates added value for the company's operations (Kannan & Tan, 2006). They continue that outsourcing allows a company to leverage the expertise, capabilities, technologies, and efficiencies of its suppliers. As global and competitive markets grow, the importance of procurement as a value-creating function has increased. The procurement department should ensure an optimal delivery system that is focused on the needs of production and material planning needs. In other words, the purchasing function is a very important link in the production and supply chain of organizations (Van Weele, 2018, p.4). Thus, it is important to understand which purchasing methods are efficient and effective so that they can contribute to their overall success and profitability in the market by reducing indirect costs of wastage, rework, returns and after-sales, etc. (Janda & Seshadri, 2001). Skjott-Larsen (2007) describes that the traditional role of procurement is to negotiate the lowest prices from suppliers and ensure adequate material flows for production (Skjott-Larsen, 2007).

When it comes to company performance, it has been recognized that procurement has a significant impact on the company's competitiveness (e.g., Iloranta & Pajunen-Muhonen, 2015, p.22). Thus, procurement is one of the key players in business performance and profitability, and it has been examined a lot in the last few decades. According to Komatina et al. (2019), procurement plays an important role in the planning of financial resources, and they affect the overall results of the company. Dimitri (2013) states that procurement plays a crucial and strategic role in both upturn and downturns. He continues that in an upturn as revenue grows, efficient purchasing allows a company to increase its profit margin and make better advantage of economic expansion, while in a downturn, it can mitigate margin loss by controlling costs and keeping quality at the desired level.

Many studies have found that PSM-practices (purchasing and supply management practices) have a significant impact on the performance of the company (e.g. Barney 1991; Zimmermann & Foerstl, 2014; Foerstl et al., 2016). Over the past two decades, a large number of empirical studies have been made on the relationship between PSM practices and company performance (Chen, Paulraj & Lado, 2004).

Corporate value chains have become global disaggregated supply chains. Thus, purchasing and supply management has been recognized as a strategic function that can affect to company's performance and, ultimately, to the competitive advantage. However, empirical evidence of the 'performance-PSM practice link' is widely scattered that has been led to a limited understanding of the different interplay of PSM practices and how they affect company performance. (Foerstl et al., 2016) Zimmermann & Foerstl (2014) also demonstrated through empirical research that PSM-practices are positively correlated with the three performance components of the buying firm, such as operational performance, financial performance, and market performance. Figure 5. illustrates the conceptual research model used by Foerstl, Franke, H. & Zimmermann (2016) in their study. According to the model, the performance achieved by the procurement for the organization can be divided into three parts: operation performance, market performance and, financial performance.

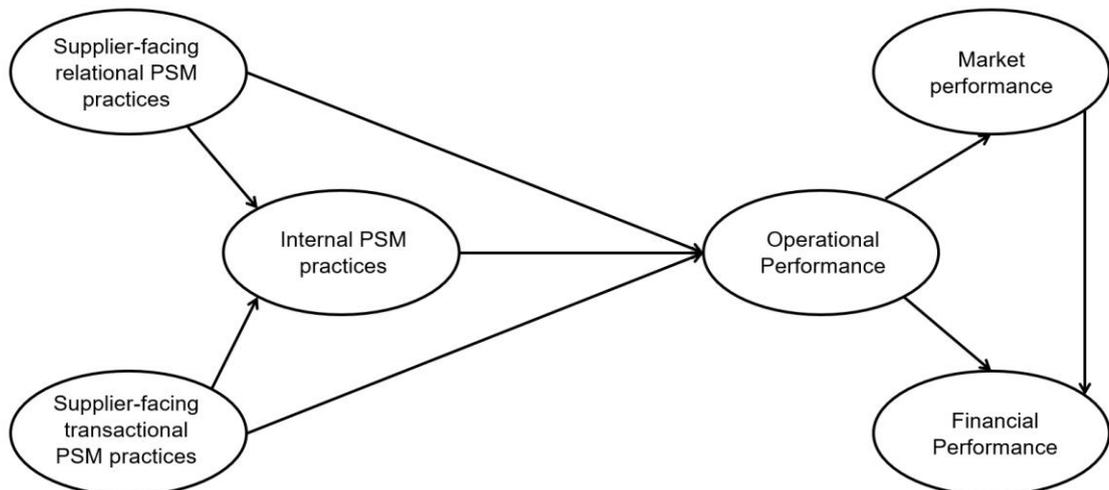


Figure 5. The role of procurement in company performance (according to Foerstl et al. 2016).

The procurement function has evolved from a reactive role to a strategic role (Skott-Larse, 2007; Baily et al., 2015). Nowadays, procurement is concentrating more upon such activities as total cost reduction, supplier development and negotiating longer-term relationship, rather than ordering and replenishing routines (Baily et al., 2015). With the importance of the strategic role, the company's operations have become increasingly proactive. When looking at advanced companies in terms of procurement, it is noticed that only a small part of the daily working time of buyers is spent on operational tasks. Most of their time is spent selecting suppliers and developing supplier collaboration. This indicates that procurement will proactively seek to take advantage of the changing opportunities in the supplier market, while traditional purchasing would be reactive and seek

to adapt to changes that have already taken place. Iloranta & Pajunen-Muhonen (2015, p.95). Table 1. contrasts and compares reactive with proactive purchasing.

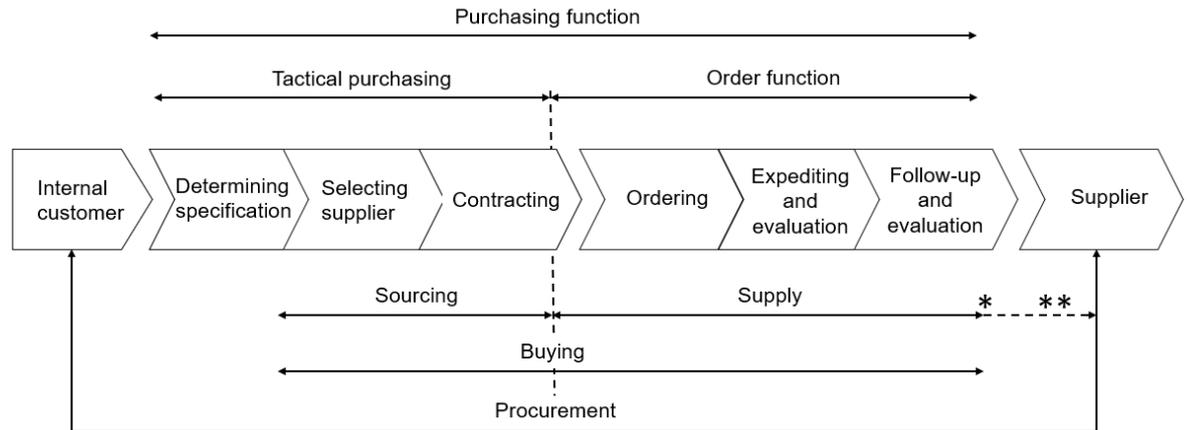
Table 1. *From reactive towards more proactive purchasing (Baily et al., 2005).*

Reactive buying	Proactive buying
Purchasing is a cost centre	Purchasing can add value
Purchasing receives specifications	Purchasing (and suppliers) contribute to specifications
Purchasing rejects defective material	Purchasing avoids defective supplies
Purchasing reports to finance or production	Purchasing is a main management function
Buyers respond to market conditions	Purchasing contributes to making markets
Problems are supplier's responsibility	Problems are a shared responsibility
Price is key variable	Total cost and value are key variables
Emphasis on today	Emphasis strategic
Systems independent of suppliers	Systems may be integrated with suppliers' systems
Users or designers specify	Buyers and suppliers contribute to specification
Negotiations win/lose	Negotiations win-win (or better)
Plenty of suppliers = security	Plenty of suppliers = lost opportunities
Plenty of stock = security	Plenty of stock = waste
Information is power	Information is valuable if shared

2.3.2 Purchasing process

In literature purchasing process was found to be a quite fragmented concept. The purchasing process is an essential part of purchasing performance, so its definition is important for this study. However, defining it precisely is challenging, as purchasing processes may vary between companies or industries. In addition, the same purchasing process cannot be used in every purchasing situations. Different purchasing models and related concepts have been discussed in many academic writings. The processes can be divided into direct and indirect purchasing processes. (e.g., Van Weele, 2018, p.7-11; Iloranta & Muhonen, 2015; Nandeesh et al., 2015)

Van Weele (2018, p.7) defines the purchasing process as the task of securing all the products, services, capabilities, and knowledge from external sources to manage and maintain the company's primary and support activities under the most favorable conditions. The purchasing process model, according to van Weele (2018, p.8), is visualized in Figure 6. Procurement includes all the activities between the internal customer and supplier. Van Weele (2018, p.7) emphasizes the interdependence of these stages, which means that the outputs of the earlier stages are reflected in the quality of the later stages.



Note: *= USA; **= UK

Figure 6. Purchasing process model and some related concepts (according to van Weele 2018, p.8).

Determining the specifications

The purchasing process begins with the determining of requirements, which is also considered the most important step in the purchasing process. During this initial stage, different purchasing requirements are determined, and the 'make-or-buy' question is solved (van Weele, 2018, p.36; Iloranta & Pajunen-Muhonen, 2015, p.271). The company needs to determine which products or services will be produced by themselves and which will be purchased from the supplier. The need should be considered from different perspectives. Opportunities in the supplier market are compared, and its economic impact is assessed (Iloranta & Pajunen-Muhonen, 2015, p.217).

Supplier selection

The supplier selection represents the second stage of the purchasing process, which has been highlighted in several studies as an important value-creating function (e.g. Spekman et al., 1999; Iloranta & Pajunen-Muhonen, 2015; Aksoy & Öztürk, 2011; Hofmann, Maucher, Kotula & Kreienbrink, 2014). Nowadays, companies face constant fierce competition, forcing them to consider activities to improve quality and reduce costs and delivery time (Aksoy & Öztürk, 2011). A good supply market intelligence is a key prerequisite for making the right supplier choices, good contracts, and developing the best co-operation models (Iloranta & Pajunen-Muhonen, 2015, p.368). Supplier selection is usually a very time-consuming process that compares suppliers on different criteria such as raw material cost, quality assessment, cost of production, delivery system, etc. (Mwikali

& Kavale, 2012). According to Doney et al. (1997) study, in the procurement of an industrial company, the key criteria for selecting suppliers were delivery performance and relative price/costs.

Negotiating and making a contract

The prequalification of suppliers is followed by the third phase of the purchasing process, which is negotiation and contract making. A contract must be made with the selected supplier unless there is already an annual contract covering the order. The quotation can also be accepted directly with the purchase order if there is no need to draw up a separate contract. (Nieminen, 2017) The contract may refer to specific additional conditions and terms (van Weele, 2018, p.39). Typically, the content of contracts depends on the product or service purchased by the company. Van Weele (2018, p.39-41) describes the main tasks of the buyer in the contracting and negotiating are the following: supply the required contracting expertise, determine right price and conditions, preparation of contractual arrangements, conduct the negotiations about all conditions and terms of the contract and lastly, edit the purchase agreement.

Ordering and expediting

After the negotiating and contract making phase, the order can be placed. At this stage of the purchasing process, information is concretely sent to the supplier about what and when to deliver (Nieminen, 2017). The purchase order must include the order number or other reference, an unambiguous description of the product or service with quality requirements, unit price, order quantity, delivery time, delivery address, invoicing address, delivery term, payment term, possible invoicing surcharges, penalty for delayed delivery, warranty terms and other terms, such as general terms of delivery in the industry (van Weele, 2018, p.44; Nieminen, 2017). Typically, the supplier confirms the order by sending an order confirmation. It is a document in which the supplier states the delivery terms of the order. Expediting demands continuous attention. It is usually conducted based on an overdue list, which includes details of all deliveries that are late. When the order is delivered, it must be inspected to ensure that the specified requirements are met. (van Weele, 2018, p.45)

Post-purchase activities

The responsibility of the buyer continues even if the product has already been taken into production. The buyer must always report any extra work so that the purchase costs remain clear. Furthermore, experiences related to individual suppliers should be docu-

mented systematically, such as supplier quality, delivery time, competitiveness, and innovativeness. Reporting information like this is very important because it is one of the main sources of the added value contributed by the buyer. This allows the purchasing company to choose better suppliers who have proven their competence to meet the needs of the company. (van Weele, 2018, p.45) Procurement, suppliers, and cooperation are monitored, measured, and evaluated to make better decision-making. These practices are also intended to improve communication between the various parties, achieve better transparency in procurement, and motivate different parties to perform better. (Nieminen, 2017)

Indirect procurement has different characteristics than direct procurement, which should also be considered when modeling indirect procurement process. Nandeesh et al. (2015) present a simple model of the indirect material procurement process that is visualized in Figure 7. A model like this includes eight steps: material search & selection, purchase requisition, supplier selection, requisition approval, purchase order generation, order tracking and notification, goods receipt as well as invoice and payment. It can be concluded that there are differences between van Weele's (2018) linear purchasing process model illustrated in Figure 6. and the indirect purchasing process. A model like this includes also the purchase requisition stage and requisition approval stage. According to Heikkilä et al. (2013) indirect procurement has ten times more active number of suppliers than direct procurement. Thus, it can be concluded that supplier selection has even more important role in the indirect procurement process. The following subchapter presents the characteristics of indirect procurement in more detail.

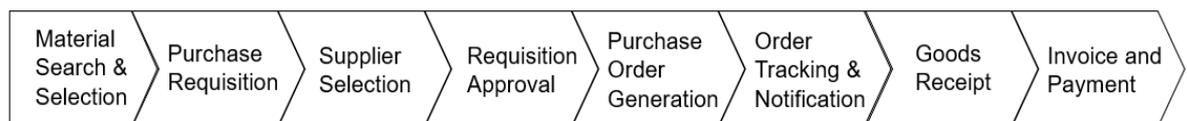


Figure 7. *Indirect Material Procurement Process (adapted from Nandeesh et al., 2015).*

2.4 Indirect purchasing

This chapter focuses on indirect purchases. In order to understand indirect purchasing performance, the term indirect purchasing needs to be defined. There are subchapters, which concentrate more specifically on characteristic differences between direct purchases and indirect purchases and categorizing indirect goods and services. Because indirect purchases represent only a small part of the expenditures of the manufacturing

company, indirect procurement has been mostly ignored by scholarly research (Israel & Curkovic 2020).

There are many definitions in literature for indirect purchasing, but they all seem to be unanimous. Indirect purchases and services are known by several names: non-product related goods and serviced (NPR), non-bill of materials, goods not for resale. However, in this study, indirect purchasing is defined as follows: indirect purchases include all purchases that maintain the overall operations of the organization and are not directly involved in the products or services provided by the company, for example, purchases related to maintenance, repair and operations, also known as, MRO purchases (Van Weele, 2018, p.16; Iloranta & Muhonen, 2015, p.62). So, the distinct characteristic of indirect purchases is that they are not part of the primary production processes (de Boer & Sitar 2001). Barry et al. (1996) argue that maintenance, repair and operating supplies have been studied as the most problematic and one of the least systematic areas of purchasing. Therefore, the application of progressive procurement practices can significantly increase the productivity of the company and reduce costs. However, in this thesis, all of these concepts (e.g., indirect, non-product related) mean the same thing, so they are used as synonyms.

De Boer et al. (2003) argue that typically a large corporation uses about 30% of its revenue to buy indirect purchases. Thus, if the company does not give enough attention to indirect purchases, they can lose the opportunities to achieve substantial savings and add value. AT&T, for example, reveals that they spent 60% of their \$20 billion on indirect purchases for instance, travel, maintenance, etc. Another good example is Xerox, who found out that they purchased \$6 billion in total, of which over \$4 billion is in the indirect purchases area. Therefore, they spent over 66% of their total spend on indirect purchases, most of it on transportation and health insurance. (Rozemeijer & van Weele, 1996)

2.4.1 Categorization of indirect purchases and services

There are very many ways to categorize indirect goods and services. (e.g. Iloranta & Pajunen-Muhonen, 2015; Huuhka, 2017). The categorization of indirect purchases illustrated by Iloranta & Pajunen-Muhonen (2015) is presented in Table 2.

Table 2. Categorization of indirect purchases (according to Iloranta & Pajunen-Muhonen, 2015, p.62).

Group	Examples of content
Real estate and infrastructure	Building Technical systems and services Maintenance and repairs Security systems and services Energy Cleaning services Environmental services Moving services Waste disposal Office furniture Research equipment
Human Resources	Lunch restaurant and catering Work clothes Health care Distractions Pension schemes Temporary and seasonal labor Recruitment services Travel services Accommodation services Training and development services Professional services
Information technology	Devices Computers and software licenses ERP and IT -systems Printers Data transfer networks Telephone systems and devices Support services Information services
Office supplies	Office supplies Copiers Office services Printing papers Packaging materials Brochures and marketing materials Books and trade journals
Other services	Transport services Market research services Communication and PR services Marketing and promotional services Media services Event services Legal services Financial services Administrative services

2.4.2 The difference between direct and indirect purchases

For this study, it is important to understand the differences between direct and indirect purchases. As stated earlier, the procurement of indirect goods and services should not be managed in the same way as direct goods and services. There are several differences which are presented in Table 3.

Table 3. Differences between direct and indirect purchases (Based on Heikkilä et al., 2013; Boer et al., 2003; van Weele, 2018, p.6).

	Direct purchasing	Indirect purchasing
Stakeholders	Few, expert, global	Many, fragmented, with different maturity
Compliance to contract	Automatic	Highly variable and critical to value delivery
Supply markets	Global	Either global, regional or local
Active number of suppliers	100s, transparent	10,000s, not transparent
Transactional processes	Fully automated	Semi-automated
Measuring cost benefits	Clear impact on Cost-of-Goods-Sold (COGS)	Impact on operational expenses
Number of purchase orders	Considerable	Very Large
Average order size	High	Small
Control	Depends on type of production planning	Limited, forecast-related or project related buying
Spend of revenue	Very large, considerable	Limited

2.5 Purchasing performance measurement

According to Van Weele (2018, p.304), when asked what benefits can be derived from a systemic performance evaluation, the most common answers from purchasing managers are: purchasing performance evaluation can lead to better decision making, it may lead to better communication with other departments, it makes things visible, and it may contribute to better motivation. These indicate that measuring purchasing performance should lead to the higher added value.

Because the performance of purchasing department has been shown to have a significant impact on a company's profitability, it needs to be accurately monitored and measured through appropriate purchasing performance management systems (van Weele, 2018; Laitinen, 2003; Baily et al., 2005). However, according to van Weele (2018, p.305), some academics have found that the procurement department is one of the most difficult departments to evaluate. The easiest way to follow purchasing performance is to evaluate the financial outcomes of the procurement department (Hartmann et al. 2012). On the other hand, when evaluating purchasing performance through financial outcomes, it could limit understanding of the benefits of PSM practices and does not provide an overall picture of purchasing performance (Ellram et al. 2002).

Van Weele (2018, p.305) states that ERP solutions have improved companies' possibilities to track and trace purchasing information considerably. However, there are many

problems among companies that make it difficult to measure purchasing performance. The first problem relates to the lack of definition. In the case of many companies, purchasing efficiency, purchasing effectiveness, and purchasing performance have not been precisely defined. As noted earlier in the theory of this study, there are clear differences between these definitions. Nevertheless, some companies may even use these concepts interchangeably. The second problem is the lack of clear objectives and performance standards. If targets and strategies of purchasing function are not clearly defined, it will be difficult to measure purchasing performance in objective terms. The third problem is that direct input-output relationships are challenging to identify. For example, an increased number of purchasers in a procurement department will not necessarily lead to improved performance. (van Weele, 2018, p.305)

The metrics have certain basic criteria that they must meet. This enables measurement data to be considered reliable and used to support company management decision-making. According to Huuhka (2017), the characteristics required of the metrics are relevance, reliability, validity, as well as appropriate measurement costs, while Laitinen (2003) would add a fifth characteristic, credibility. The relevance of the metric refers to the usefulness of the metric in decision making. The relevance is based on the value of the information produced by the metric in making operational decisions or controlling the process. The reliability of a metric means that the measurement result does not vary between the measurements. This presupposes that there are no changes in the measurement object. The validity of a metric means that the metric measures what it is intended to measure. (Huuhka 2017) Metrics should also be cost-effective. The sacrifices required to obtain the information must be proportionate to its subjective relevance. In addition, the value of the metric must be credible. In other words, the decision-maker must rely on it. No matter how effective a metric is, its value remains small if it is not credible and not used by the decision-maker. (Laitinen 2003, p.162) Table 4. summarizes the typical problems in purchasing performance measurement.

Table 4. Typical problems among companies that make it difficult to measure purchasing performance. (Based on van Weele, 2018; Huuhka, 2017; Laitinen 2003)

The key challenges	Further context
The lack of definition	Purchasing efficiency, purchasing effectiveness, and purchasing performance may not be precisely defined.
The lack of clear objectives and performance standards	It will be difficult to measure purchasing performance in objective terms if strategies and targets are not clearly defined.
Challenges in identifying in direct input-output relationships	For example, an increase in the number of employees does not necessarily lead to increased performance.
Lack of meeting the metric's basic criteria	Relevance The usefulness of the metric in decision making.
	Reliability Refers to the overall consistency of a metric. The metric is considered reliable if it get the same result repeatedly.
	Validity Refers to the metric's ability to measure what it is supposed to measure.
	Cost-effective The sacrifices required to obtain the information must be proportionate to its subjective relevance.
	Credibility The credibility of metric value must be at a sufficient level which means the decision-maker can rely on it.

2.5.1 Perspectives of purchasing performance

Purchasing performance can be measured from a variety of perspectives. One way is to divide purchasing performance into two dimensions, internal and external performance (Pohl & Förstl, 2011; Jääskeläinen, 2018). External performance relates to the performance of suppliers and internal performance to the performance of the internal purchasing function. The case companies of a study by Pohl & Förstl (2011) evaluated a wide range of internal and external performance measures. Internal measures included, for example, internal customer satisfaction, maverick buying ratio, and order positions per employee. The external measures, in turn, were supplier satisfaction, supplier performance in terms of delivery, quality cost and flexibility and number of active suppliers, etc.

According to Hesping & Schiele (2015), the five levels of strategy development in purchasing can be distinguished: (1) firm strategy guiding a company's approach toward product markets, 2) purchasing strategy, referring to an aspect of functional strategies that guide company's purchasing activities, 3) category strategies guiding activities regarding groups of materials and services, (4) sourcing strategies referring to tactics used to plan activities to execute category strategies, and finally (5) supplier strategies guiding how to approach suppliers of sourcing category. Thus, purchasing performance can be monitored from many different levels because the presented hierarchy of strategy development in purchasing also indicates a hierarchy of performance, for example, purchasing's functional performance, category performance, and relationship performance.

The purpose of this study is to consider both internal and external performance perspectives. However, the main focus of this study is on the level of purchasing's functional

performance, but the supplier performance aspect is also taken into account. The supplier performance aspect focuses on measuring the existing suppliers of the case company. Because the objective of the study is to establish a comprehensive and balanced system for managing indirect procurement performance, the purchasing balanced scorecard is illustrated in chapter 2.6. In the empirical part of the study, suitable KPIs are designed for each of the five perspectives of the purchasing balanced scorecard.

2.5.2 Indirect procurement standard

There are many guidelines and standards for direct procurement, but indirect procurement has received less attention. The global certification and training company COPC Inc began developing standards for indirect procurement in 2014, and they were finally released in 2017. A gap in the industry was recognized by academic leaders from the Center for supply chain management at Western Michigan University, Microsoft Corporation, and industry executives responsible for large indirect procurement organizations. These companies include Hewlett Packard Enterprise, Cisco, Abbott, Harley-Davidson, Google, etc.

The COPC Indirect Procurement Standard is a performance management system designed to present a set of best practices and key metrics for companies seeking to manage their indirect procurement strategically. According to Israel & Curkovic (2020), the developed standard was an essential step in ensuring organizations can apply appropriate best practices and benefit from the latest knowledge in the area. The standard is an integrated and comprehensive system for managing the indirect procurement operations that cover five areas: leadership and planning; business processes; support processes; people processes; and performance. The objective of the standard is to create efficient and high-performing procurement operations by providing indirect goods and services at an optimal value-balancing cost, quality, and risk. Table 5. represents release 1.1., the latest evolution of the COPC Indirect Procurement Core Standard.

Table 5. COPC core indirect procurement standards.

Item #	Item Name	Item Description	Metric Name	Metric Description
1	Stakeholder Relationship Management	Developing strategy for engaging stakeholders; identifying their needs/requirements etc.	On Time	e.g., Percent of Stakeholders contacted by initial planned contact date
2	Developing Sourcing Requirements	Preparation of combined sourcing requirement by commodity; including individual business unit and Enterprise requirements	On Time	e.g., On time preparation of the initial sourcing requirements and strategy
			Quality	Quality: e.g. Accuracy and completeness of the sourcing requirements
3	Developing Sourcing Strategy	Developing the overall sourcing strategy	On Time	e.g., On time preparation of the initial sourcing strategy
4	Developing/ Issuing RFXs	Drafting, reviewing obtaining approval for and issuing Requests for Information and Proposals. Includes identifying the Suppliers to receive the	On Time	e.g., Percent of RFXs issued on time
			Quality	e.g., Error rate of completed RFXs; number of corrections made to RFXs after issuance.
5	Contracting Suppliers	Working with Stakeholders, selected Suppliers, and internal support organizations to negotiate contract terms and conditions etc.	On Time	e.g., Percent of contracts signed on or before target date
6	Implementing/Onboarding Suppliers	Ensuring that Supplier is included in all appropriate systems; that valid P.O.s are in place and Stakeholders can order from Supplier etc.	On Time	e.g., Percent of requirements implemented on or before target dates; ability of Stakeholders to order from Supplier by target date
7	Paying Suppliers	Reviewing supplier invoices and approving and issuing payments for goods and services	On Time	e.g., Percent of payments made on time
			Quality	e.g., Accuracy of payments made
8	Supplier Relationship Management	Managing Supplier Performance to corporate and contract requirements	On Time	e.g., On time delivery to contract items
9	Terminating Supplier Relationships	Ceasing a Supplier's involvement with the company or for a particular SOW. This may be due to program termination for cause or convenience; the goods or services are no longer needed etc.	On Time	e.g., Percent of terminations closed by target date
10	Key Stakeholder Satisfaction	Assessment of how satisfied Stakeholders are with the performance of the IP organization	Satisfaction	e.g., Percent of stakeholders providing a satisfied and very satisfied rating of the IP organization's performance
11	Cost Management and Measurement	Identification of Cost Savings and management of costs	Cost Saving	e.g., Saving derived from price reductions; movement from one Supplier to another etc.
		% of Indirect Spend managed by the Indirect Procurement Organization.	SUM	e.g. % Spend Managed by the Indirect Procurement Organization

2.6 Purchasing balanced scorecard

The original BSC performance model by Kaplan & Norton (1992) was presented in chapter 2.2.3. It is the most adopted model for performance measuring. According to Kaplan and Norton, managing organizations today is so complex that management needs to gain insight into a company's performance in multiple areas simultaneously. The metrics include key elements of a company's strategy that forces company management to focus on measuring performance on a few important metrics. The BSC brings seemingly incomparable metrics into the common framework. It also provides protection against possible sub-optimization by forcing strategic management to see all important metrics as a whole and assess how improvements in some factors require sacrifices in others. (Laitinen, 2003, p.376) The BSC can also be tailored to the procurement organization's measurement purposes. There are several studies that have developed different approaches to tailor the BSC model to the PSM function. For example, Hofmann et al. (2014, p.136) developed a purchasing performance model of five perspectives based on the BSC model. They called it "purchasing balanced scorecard" (P-BSC), which takes into account both monetary and non-monetary perspectives. It differs from the original BSC model in that it involves five different perspectives: financial perspective, process perspective, supplier perspective, employee perspective, and internal customer perspective. Thus, P-BSC is supplemented by the supplier perspective, and for the customer perspective, externals are replaced by internals. Figure 8. illustrates the P-BSC model's perspectives and related components.

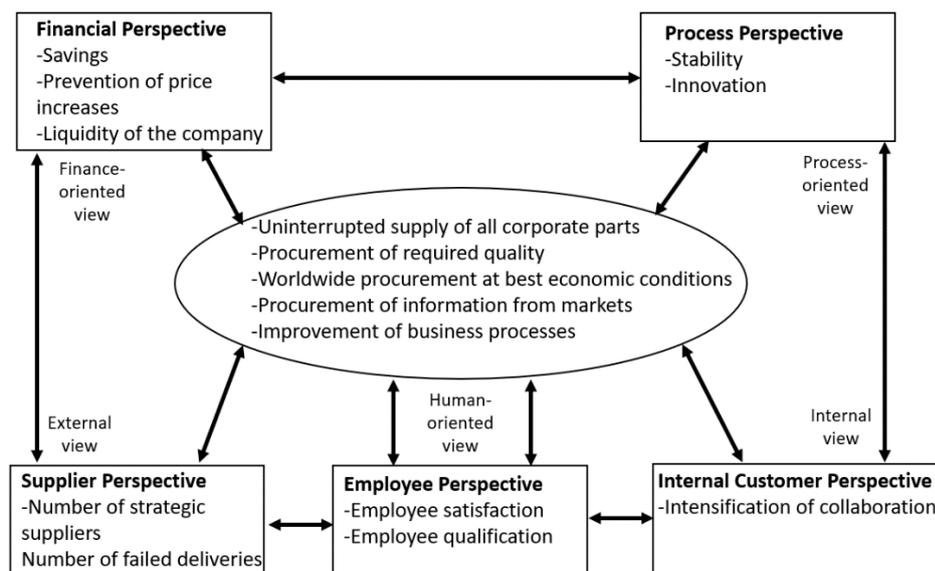


Figure 8. Perspectives of the purchasing balanced scorecard (Adapted from Hofmann et al., 2014, p.136).

Each of these five perspectives is interconnected through the cause-and-effect relationship, as in the original balanced scorecard model. For example, when developing employees' skills, it will lead to more innovates towards processes. This will, in turn, enhance decision making and ultimately increases financial performance. (Bhagwat & Sharma, 2007) The following chapters present the factors found in the literature that relate to purchasing balanced scorecard perspectives.

2.6.1 Financial perspective

The study by Caniato, Luzzini & Ronchi (2012) provided answers for three research questions; what companies are measuring, what are the key elements of the measurement process, and what are the differences among different organizational levels and categories. Nine case companies were selected for the study, and their empirical evidence showed that purchasing management systems have developed in recent years, but there is still a gap for improvement. Most companies measured the performance of suppliers, and only a few focused-on monitoring internal processes. The most used indicators were related to cost, quality and time; while innovation, flexibility and sustainability measures were less adopted. To summarize, the purchasing departments are still focusing on measuring cost-savings rather than on the other performance indicators.

The aim of the financial perspective is usually to achieve cost-savings. In a study by Evans (2003), it was revealed that about 95% of organizations evaluate the cost-savings contributed by the purchasing department. According to Rudzki & Trent (2011), cost-savings opportunities are usually higher in indirect materials and services than in categories of direct purchases. Thus, savings in indirect purchases can be major if they are approached correctly. In the academic literature, savings are commonly discussed in a theoretical approach rather than an empirical approach (Nollet et al., 2008). Cost-saving opportunities are generally classified as *hard* and *soft* savings (e.g., Nollet et al., 2008; Ashenbaum, 2006, Huuhka, 2017). In most articles, savings were based on the Total Cost of Ownership or *soft savings* (e.g., Ellram, 2003). When it comes to *hard savings*, only a few scientific articles discussed the evaluation of hard savings, although it is recognized as an important component of evaluating the performance of procurement. On the other hand, soft savings are almost impossible to measure without evaluating hard savings (Nollet et al., 2008). Cost-savings can also be formed into a third category, *cost avoidance* (Ashenbaum, 2006). While cost-savings represent realized cost changes, the cost avoidance is related to future cost changes (Nollet et al., 2008).

Hard savings are quantitative in nature. Thus, they can be quantified and can be expressed in monetary terms (Huuhka, 2017). Every purchasers' actions that directly affect

the bottom line can be classified as hard savings, such as reductions in price, transaction costs, or the workforce (Nollet et al., 2008). Referring to van Weele (2018, p.308), hard savings should be measured by continuously monitor and evaluating activities that have been initiated to structurally reduce material costs. Cost reductions can be obtained by searching new suppliers or substitute materials, co-ordination of purchasing requirements among business units, or value analysis. Hard savings are very important in actual measurement savings systems because the evaluation of the purchasing performance of most organizations is based on the price paid (Nollet et al., 2008).

The second category is soft savings. They are qualitative, so soft savings do not have a direct impact on the company's result in the short term. Calculating the value of soft savings is often more difficult than calculating hard savings and is often based on subjective perceptions of the effects. (Huuhka, 2017) Soft savings occur, for example, when work efficiency increases but does not lead to a reduction in personnel costs. The effect of soft savings occurs over a longer period of time, and the exact moment cannot be determined. However, Keen (1997) argues that it is possible to convert soft savings into hard savings when using industrial standards or other measures that are presented in the literature.

The third category, cost avoidance, can be considered as reduction or elimination of a future cost (Nollet et al., 2008). van Weele (2018, p.313), in turn, defines cost avoidance as a variance between the actual and historical purchase price paid per unit. Cost avoidance is related to securing an unchanged cost level at increasing market prices. For example, if cost increases are avoided through negotiations, it can be defined to cost avoidance. (Hofmann et al. 2014) Cost avoidance is only considered to be temporary (van Weele, 2018, p.313).

Instead of the purchase price, all savings methods can also be evaluated using the TCO (Maucher & Hofmann, 2013). The total cost of purchase (TCO) is emphasized in the purchasing process because the low price of the product to be purchased does not directly mean the lowest total cost of purchase for the company. Savings in the early part of the life cycle may be reflected later in, for example, poor product characteristics or performance. The company must be able to understand the costs of the product throughout its life cycle. The total cost thinking is based on the ability to calculate time spent and costs for each individual function, task, and work step in an organization (Iloranta & Pa-junen-Muhonen, 2015, p.152).

Figure 9. presents the evolution of savings measurement systems over time. As illustrated in phase 1, the first measurement savings systems were initiated, and, in those

days, only hard savings were taken into account. However, over time, getting better prices can become more and more challenging, so the amount of savings usually begins to decline. In phase 2, less emphasis is placed on the hard savings, and more attention was paid to the measurement of soft savings. At some point (interface between phase 2 and phase 3), there comes a time when too many measures are used to measure savings. In this case, the performance measurement process may consume more resources than bring benefits. Due to the too complex measurement system, it needs to be rationalized in order to be more efficient and effective.

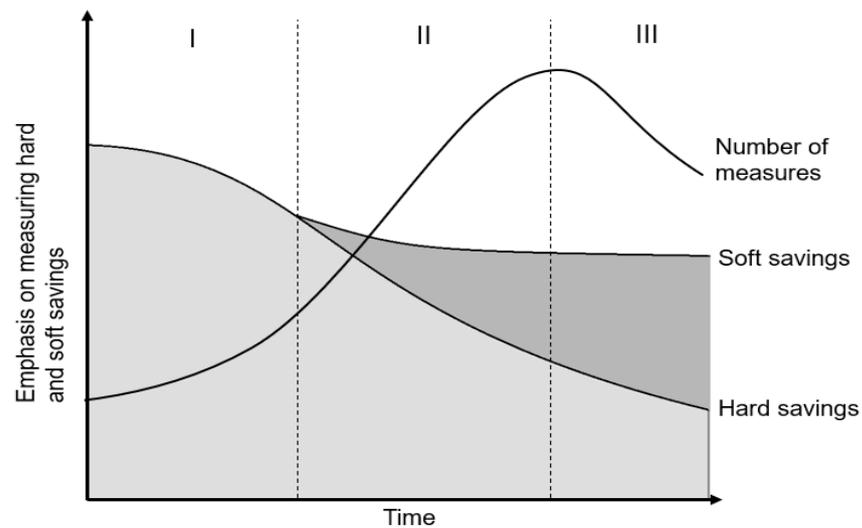


Figure 9. Complexity of measurement systems (Adapted from Nollet et al., 2008).

However, because procurement can also contribute to many benefits other than just economic benefits, which can play a significant role in a company's strategic success (Lindgreen & Wynstra, 2005), the company needs to evaluate its performance from multiple perspectives.

2.6.2 Process perspective

Several benefits can be achieved when processes work properly throughout the supply chain: 1) reduced waste and surpluses, can be achieved by eliminating duplicate processes, harmonizing systems and processes, and lowering stock levels, etc. 2) shorter lead times and reduced tied-up capital 3) more flexible processes, this means the capability to meet the requirements of internal customers, for example in terms of products and delivery times 4) reduced costs 5) more innovations. (Kaplan et al., 2007)

Process-related metrics provide an understanding of the economic efficiency of procurement processes. These metrics also examine the extent of correctly and effectively carried out processes. By monitoring process-related metrics, internal processes can be

optimized, and comparisons made with other procurement organizations. This dimension includes metrics such as the number of articles per million Euros of the purchasing volume, the percentage of orders with electronic invoice processing, the percentage of purchasing volume via e-procurement, the percentage of active suppliers using e-procurement, the percentage of purchasing volume via online auctions, as well as the rate of innovations of purchasing. (Hofmann et al., 2014, p.81)

Within the area of strategic purchasing, the extent of the supply base and its optimization is a critical component (Talluri, DeCampos & Hult, 2013). Effective management of the procurement process requires close cooperation with a few suppliers. In close cooperation with suppliers, leverage and synergy are critical success factors. (Spekman, Kamauff & Spear, 1999) Large numbers of suppliers usually enhance transaction purchasing performance. However, strategic purchasing is generally enhanced by smaller numbers of suppliers that maintain long-term relationships (Talluri, DeCampos & Hult, 2013). The rationalization of the supply base reduces the number of transactions and the associated costs (Spekman, Kamauff & Spear, 1999). The goal of the supply base rationalization is to determine what companies should be removed from the supply base and what companies should remain (Talluri, DeCampos & Hult, 2013).

Innovations are a vital part of procurement performance and have been found to have a significant impact on the organizational success (van Weele, 2018, p.227). When PSM has access to its supply base, it can develop much more strategically significant, and cost-reducing innovations than any organization could achieve from its internal resources alone (Ramsay & Croom, 2008). van Weele (2018, p.227) also emphasizes that close collaboration with external partners enables the effective implementation of innovations. Once partners learn to organize their business and adapt to the relationship, it may lead to new solutions and innovations (Lindgreen et al., 2012). PSM can contribute to innovation by integrating PSM internally into the product development process by focusing on innovative tasks instead of transactions, and finally, by actively identifying various innovative new products and capabilities available in the supply market (Hartmann et al. 2012). Several studies have shown that innovation management plays an important role in purchasing; however, it is rarely reflected in companies' procurement strategy (Hofmann et al. 2014, p.85).

Several studies have emphasized that e-procurement can create value for a company (e.g., Presutti, 2003; Angeles & Nath, 2007; Subramaniam & Shaw, 2002). E-procurement technology refers to any technology designed to facilitate the procurement of goods for a commercial or public sector organization via the internet. This will enable companies to focus on automating workflows, consolidating, and leveraging purchasing power, and

identifying new sourcing opportunities over the internet. (Davila, Gupta & Palmer, 2003) The benefits of e-procurement can be divided into five different categories: price benefits, transaction benefits, flexibility benefits, information benefits, and payment benefits (Eakin, 2003).

2.6.3 Supplier perspective

According to Ulaga (2003), in the modern trend, firms have significantly reduced the size of their supplier base and shifted their focus to closer collaboration with carefully selected suppliers, while traditional understanding would maintain a large supplier portfolio with only purchases at the lowest possible price (Skott-Larsen, 2007; Håkansson & Gadde, 1992). According to Iloranta & Pajunen-Muhonen (2015, p.33), when a company is constantly inferior to its competitors in exploiting external opportunities, the company loses the opportunity to succeed in the market. For this reason, the company must be able to anticipate a dynamic environment by selecting the most potential suppliers from the market. Developing suppliers and finding new suppliers worldwide require resources and expertise from the company. Kannan & Tan (2006) argues in their study that developing supplier relationships with key suppliers would be seen at the operational level as better delivery service, quality development, reduced costs, or even a combination of them, while at the strategic level, it should develop product quality and innovation, improve company competitiveness, and increase company market share. They further mention that these benefits should ultimately be reflected in the development of the company's financial performance. Janda & Seshadri (2001) suggest that in order to improve procurement performance, the company should look into adopting the following four procurement strategies: controlling the supplier base to a minimally manageable size, cooperative negotiations with suppliers, committing to long-term relationships with the suppliers, and collaborating with the selected suppliers including sharing of strategic information. A study created by Jandan & Seshadr (2001) showed that purchasing performance can be enhanced by maintaining a long-term relationship with only a few suppliers and using a cooperative process for negotiating with suppliers. The empirical findings of the study were that cooperative negotiations led to cost reductions, while long-term relationships with a few suppliers enhanced the intangible qualities of the procurement.

The role of suppliers in creating value for the buying company has grown significantly in recent decades. Therefore, evaluating and monitoring upstream performance in the supply chain is critical (Maestrini, Luzzini, Caniato, Maccarrone & Ronchi, 2018). Supplier control and monitoring help provide feedback to suppliers and develop operations on a long-term basis (Huuhka, 2017). The study by Maestrini et al. (2018) proved empirically

that measuring supplier performance positively affects supplier performance. Huuhka (2017) lists a few metrics related to supplier performance: quality of the product, accuracy of the delivery, price competitiveness, and compliance with the contract terms.

2.6.4 Employee perspective

The employee perspective refers to all parameters and measurements regarding the employees of the procurement organization. These include, e.g., the personnel structure, employee satisfaction and, employee qualification. (Hofmann et al., 2014, p.138) The performance of procurement employees is related to their skills and efficiency at different stages of the procurement process. Procurement can create value for its company when the skills and performance of its employee are a sufficient level (Zimmermann & Foerstl, 2014). The performance of buyers can be improved through validated and reliable metrics (Pohl & Förstl, 2011). Several studies have proven that procurement performance is directly related to a company's profitability. For example, Iloranta & Pajunen (2015, p.23) state that in the most successful procurement organizations, clear goals were set, and their achievement was widely measured. The measurements of companies not only took into account cost-savings but also focused on overall identified objectives. In addition, training was actively provided for the company's employees, and the most potential people with specific expertise in the product and service categories were recruited. In the best companies, procurement organizations also worked closely with other functions.

The performance and expertise of procurement employees have become increasingly important during the past decade (Carr & Smeltzer, 2000). Buyers need to constantly focus on new skills and new ways of thinking to help their business grow profitability and maximize existing resources. The employees of procurement can improve purchasing performance, for example, through their soft skills. Soft skills are related to interaction with people, long-term implementations, and satisfaction in the group. Efficiency, communication skills, flexibility, and creativity, are part of soft skills. (Zanardi, 2017)

Based on the resource-based theory, purchasing and supply management practices can improve the performance of a purchasing company (Barney, 1991). For example, Zimmermann & Foerstl (2014) conducted an empirical study on this topic. They provided evidence that PSM practices were positively correlated with operational performance ($\rho = .355$). The operational performance included, for example, quality, capacity utilization, the unit cost of the purchased items, and delivery speed. They also found that PSM practices correlated positively ($\rho = .264$) with financial performance of the company. The

financial performance included, for example, ROI, EBITDA, and profit. Moreover, practices also correlated positively ($\rho = .272$) with market performance. The market performance included, in turn, market share and customer satisfaction.

2.6.5 Internal customer perspective

The internal customer perspective focuses on the satisfaction of internal customers and stakeholders and the support provided by the procurement organization (Huuuhka, 2017). The perspective comprises the collaboration of purchasing with the organization's internal functions, such as production, research and development, distribution and, logistics (Hofmann et al., 2014, p.138). The benefits for all customers should include improved quality of products and services, shorter delivery delays, better availability, greater flexibility, and value. (Kaplan et al., 2007)

In this context, it is possible to see the customer-supplier relationship internally between the buyer and the internal customers. The customers have a certain level of expectation in terms of specific performance factors of purchasing. There are several internal customer-related measurements, for example, the satisfaction of the internal customer, time of a purchase order, and the costs of the ordering process. Measurements related to internal customers are important because this will influence the ranking of purchasing within the company. However, as other business functions can also affect ratios of purchasing, the challenge is to provide a clear separation in this respect. (Hofmann et al., 2014, p.89)

The early involvement of procurement is an important factor in a cost-effective supply chain. According to Carr & Pearson (2002), the early involvement of procurement enables a better understanding of what materials are needed and when the materials will be needed. They also emphasized that it enables procurement to involve the supplier early in the product development process. When buyers are aware of the materials and the desired delivery time, they can add value by bundling demand from several internal customers (de Boer, 2003). The variable incidental costs of procurement can be reduced by larger order volumes and a smaller number of orders. In addition, fixed incidental costs of procurement can be distributed over a higher product count. However, as illustrated in Figure 10, when the volume of orders increases, higher warehousing costs are expected. Thus, it is important to carefully consider which degree an increase in the number of orders will be financially worthwhile. (Hofmann et al., 2014, p.88)

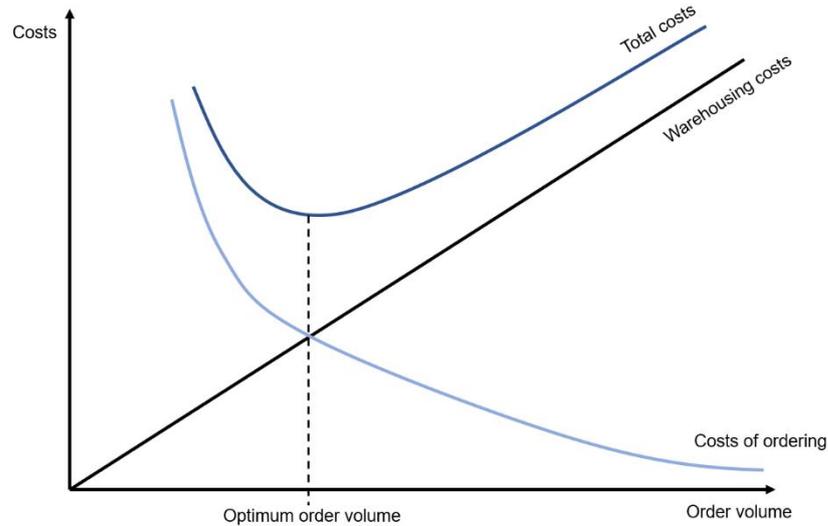


Figure 10. Graphic presentation of optimum order volume (adapted from Hofmann et al., 2014, p.89).

2.7 Summary

The literature review is used to support answering the research questions of the study. The use of literature in the study can be divided into three parts: the current state of indirect procurement, identifying challenges and needs of the internal stakeholders, and the development of performance measurement. The utilization of the literature areas covered in the study at different stages is illustrated in Figure 11.

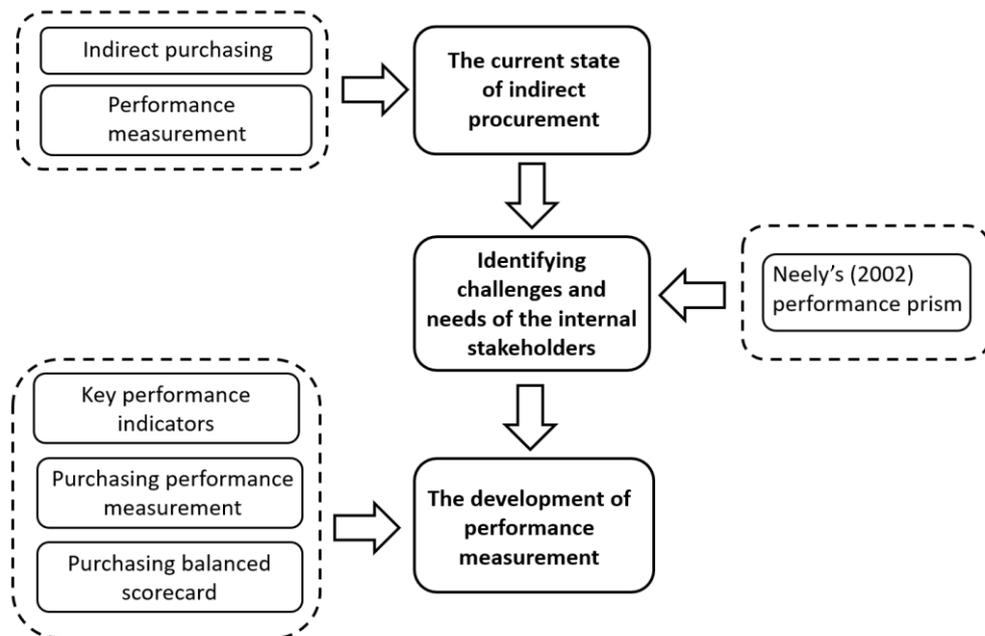


Figure 11. A key literature background for the study at different stages.

Literature related to the purchasing process and indirect purchasing was used to determine the current state of the indirect procurement of the case company. Literature related to purchasing process was used as support when the study outlined the case company's current state of procurement. In addition, the study mapped current performance measurement practices and KPIs, which were also analyzed with the literature.

The performance models presented in the literature were used to support the empirical part of this study. The performance prism by Neely (2002) was considered the best model for identifying the challenges and needs of the internal stakeholders. The performance prism model was chosen because it adopts stakeholder centric view of performance measurement in order to reflect the growing importance of satisfying stakeholder needs.

The literature related to the key performance indicators, purchasing performance measurement, and purchasing balanced scorecard was used in the design of performance measurement practices and key performance indicators for indirect procurement. However, the literature on purchasing balanced scorecard plays the most central role, as the study aims to create a comprehensive and balanced system for managing indirect procurement performance.

3. RESEARCH METHODOLOGY

The theoretical background of procurement performance measurement and practices were presented in the previous chapters. A good basis for research has been created when the researcher's choices at the four levels - research problem formulation, philosophy of science, research strategy, and theoretical understanding - are coherent (Hirsjärvi, Remes & Sajavaara, 2009, p.124). Thus, at this stage, it is important to justify the philosophy of science and data collection methods used in this study. However, the nature of the research objective already provides a strong basis for why the research is conducted as a mixed method, inductive research, and a case study.

3.1 Research design

The time horizon of this study is **cross-sectional**, as according to Saunders et al. (2016, p. 200), a study is a cross-section when it studies a certain phenomenon at a specific time or over a short period of time. Due to the nature of the study and the quality of the research data collected, this study is multiple methods research using a mix of qualitative and quantitative data collection methods. **Mixed methods research** represents the branch of multiple methods research that combined the use of qualitative and quantitative data collection methods and analytical procedures (Saunders et al., 2016, p.169).

As examined in the theoretical chapter, the success of procurement performance measurement is influenced by many factors. Moreover, the performance measurements and practices should not be generalized to the use of other organizations straightforwardly because measures of performance should always be developed based on the company's strategy and context (Neely et al., 1997). Consequently, **a single case study** was chosen as the research methodology of this study. The case study is a research strategy that involves the empirical examination of a particular contemporary phenomenon within its real-life context (Saunders, Lewis & Thornhill 2016) and aim to seek the answer to research problems that are in the form of "how" and "why" (Yin, 2009).

The approach of this work was chosen to be **inductive**. As the aim of this study is to develop the procurement measurement practices and the research data is mainly qualitative, an inductive research approach was seen as appropriate. According to Bell et al. (2019), the deductive strategy is typically associated with a quantitative research, while an inductive strategy of linking theory and data is typically associated with qualitative research approach. Delimiting the scope of the subject, the study was focused on the

case company's procurement organization, which is part of a large and global company operating in a forest and paper industry. Both qualitative and quantitative data were utilized in the study in order to establish an understanding of current measurement practices and to develop performance measurement.

Saunders et al. (2016, p.135-144) state that there are four dominant philosophies on conducting the empirical study, pragmatism, post-modernism, interpretivism, critical realism, and positivism. Because in this study, both qualitative and quantitative methods are used for pursuing a holistic view of the problem, **a pragmatist view** has been seen to fit this purpose well. According to Saunders et al. (2016, p.143-144), in pragmatism philosophy, it has been recognized that there are multiple ways of interpreting the world and undertaking research that no single point of view can ever gain the overall picture. Thus, mixed methods are common in pragmatism philosophy. In summary, the study's methodology and research choices are illustrated in Figure 12. based on the research onion framework of Saunders et al. (2016, p.124).

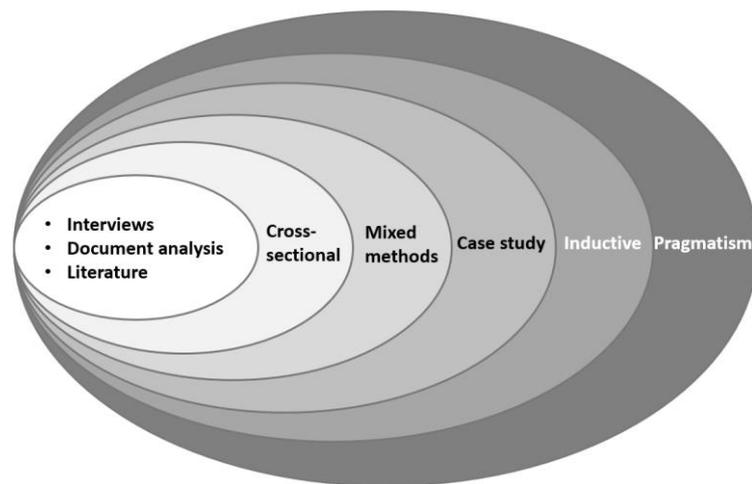


Figure 12. Chosen research methodologies (adopted from Saunders et al., 2016, p. 124).

The case study begins by holding a joint meeting with the director of MRO-sourcing and inventories and the director of asset management to clarify the organization's needs and expectations for the study. This is followed by interviewing the various stakeholders in the procurement organization through semi-structured thematic interviews, which represent the primary data of the study. In addition, secondary data is from the case company's documents and ERP-system.

The first objective of the study is to determine the current state of the procurement organization and to identify the current KPIs of the purchasing. This helps to gain a deeper understanding of the context and identify potential areas for development already at this

stage. Academic literature, the case company's documents, and interviews are used to find the answer to the first research question: *How is indirect procurement currently measured in the case company?*

The second research question in the study, *“What kind of purchasing performance needs procurement's internal stakeholders have?”* is a follow-up question to the first research question. To answer this question, the primary data from internal stakeholder interviews will be utilized as well as the results of the first research question. In order to get a broad picture of internal stakeholders' needs, people with different experiences and views were selected.

The third research question in the study is the broadest one, which should also take into account the results of the first two research questions. The last research question seeks to find out *“How should indirect procurement performance be measured in a forest industry production company?”*. The answer is sought by utilizing interviews, observation, secondary data of the company's systems, and literature related to purchasing performance measurement. The purpose of the literature was to provide appropriate and best practices for measuring indirect procurement performance. By answering these three research questions, the aim is to make comprehensive proposals to the case company to develop measurement of procurement performance. The data collection methods of the study are described in more detail in chapter 3.2.

3.2 Data collection

As discussed in the previous subchapter, the data collection method for this study is a mixed method. The study contains both qualitative and quantitative data. The data was mainly collected via semi-structured theme interviews, observations, coffee table discussions, and the organization's ERP-system.

According to Yin (2003), the interview is one of the most important sources of case study information. The qualitative data was mainly collected using **semi-structured theme interviews** because it allows interviewees to familiarize themselves with the questions in advance and express their opinions more freely. During the study, there were 22 interviews. The interviewees included, for example, directors, managers, engineers, supervisors, advisors, work planners, and controllers from the Group head office (GHO) and the case company's production, warehouses and maintenance departments. The aim was to get access to people with different views and experiences on purchasing to get a broad picture of the stakeholders' needs and the current situation with purchasing performance measurement. The selection of the interviewees was made on a discretionary basis, as

the aim of the study was not to achieve broad statistical generalizability but to gain a deeper understanding of the phenomenon. Individuals who were believed to know best about the phenomenon were selected for interview. In addition to interviews, information is obtained informally in the form of coffee table discussions during working days. The qualitative material of the study consists mostly of the interview data, but another available secondary material was also used, such as existing procurement analytics data and various documents. The quantitative data is collected from the organization's ERP system. At the beginning of the thesis, the ERP system was examined for what kind of raw data was available. Afterward, potential raw data were used in the measure development process.

In the original plan, all the interviews were planned to be done face to face. Due to the COVID-19 pandemic, some of the interviews had to be conducted through Microsoft teams. According to Bell, Bryman & Harley (2019), interviews conducted remotely can be considered as situations similar to telephone interviews, where there is less opportunity to engage in observation. This means that the conversation lacks visible signs that provide the context for the interview (Hirsjärvi & Hurme, 2008, p.64). However, remote interviewing may not be the best option, but due to the current constraints and the research schedule, some interviews had to be conducted remotely. To improve the reliability of the interview, interviewees were sent interview material in advance so that they had enough time to familiarize themselves with the interview questions and prepare for the interview.

Interviews may have limitations in some cases, such as reliability. The behavior of the interviewees affects the accuracy and reliability of the answers. The interviewees may find the interview situation or its recording to be threatening or intimidating. Thus, respondents can avoid speaking the truth and hide certain things. In addition, the validity of responses is affected by several factors. Organizing interviews can be challenging in some cases. Respondents can be busy, so agreeing on interview time can be difficult. Moreover, another possible problem is that respondents may not have time to familiarize themselves with the interview material in advance, which may affect the validity and reliability of the answers. In a situation like this, the answer may be very narrow, and the respondent may not be able to say everything he wants.

Table 6. presents the dates of the interviews, the interviewees, and the duration of the interviews. The interviewees were asked in advance for permission to record the interview. Each of the interviews was recorded, which later allowed for accurate transcribing of the interviews. Most of the interviews lasted from 45 minutes to 70 minutes.

Table 6. *The interviews of the research.*

Day	Interviewee	Group	Topic	Time (h:mm)
11.9.2020	Manager 1	Maintenance	2	0:46
18.9.2020	Buyer 1	Procurement	1	0:52
18.9.2020	Supervisor 1	Maintenance	2	0:40
22.9.2020	Manager 2	GHO	1	1:26
22.9.2020	Director 1	GHO	1	1:20
22.9.2020	Director 2	GHO	1	1:22
24.9.2020	Manager 3	Maintenance	2	0:52
25.9.2020	Work planner 1	Maintenance	2	1:05
25.9.2020	Buyer 2	Procurement	1	1:20
25.9.2020	Manager 4	Maintenance	2	0:49
28.9.2020	Manager 5	Finance	2	1:18
28.9.2020	Buyer 3	Procurement	1	1:20
28.9.2020	MRP planner 1	Warehouse	2	1:03
29.9.2020	Manager 6	Maintenance	2	1:17
30.9.2020	Manager 7	Warehouse	2	0:54
2.10.2020	Engineer 1	Maintenance	2	0:46
2.10.2020	Supervisor 2	Maintenance	2	0:58
6.10.2020	Director 3	Production	2	0:46
6.10.2020	Engineer 2	Maintenance	2	1:01
6.10.2020	Senior advisor	Maintenance	2	1:35
8.10.2020	Supervisor 3	Maintenance	2	1:01
9.10.2020	Work planner 2	Maintenance	2	0:51
Topic 1: Current state of the indirect procurement				
Topic 2: Examining challenges and needs towards indirect procurement.				

3.3 Data analysis

The analysis of the material was carried out by thematizing and typing the transcribed material into the main themes. The statements of the internal stakeholders were compared, and the purpose of the analysis was to identify the most potential areas for development related to the procurement organization.

The data analysis process consisted of four phases, transcription of interviews, initial analysis, sorting the results, and writing the conclusions. Figure 13. illustrates the data analysis process of the study.

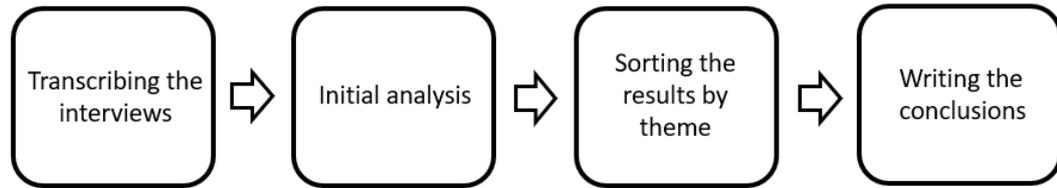


Figure 13. *The data analysis process.*

The processing of the study material was divided into four phases. In the first phase, when interviews were completed, the recorded answers were transcribed to words. The purpose of this phase was to make the interview material easier to handle. This was made in a pragmatic manner. To avoid wasting too much resources on non-important matters, the interviews were not always written exactly word for word because the comments of respondents in the interviews were sometimes repetitive, and the comments were not always related to the topic. In the second phase, the material was analyzed in one interview at a time, and the main points of the interviews were highlighted. In the third phase, Microsoft Excel was used as a tool to help to analyze the data. A Sheet of excel was divided into separate themes. Depending on the nature of the responses, they were written next to the appropriate theme. For example, current state description comments were labeled as theme 2, and ideas regarding performance measurement were labeled as theme 3. In the last phase, after the answers have been sorted into the Excel sheet, they were written into the study to answer its research questions.

The results chapter begins with an introduction to the current state and challenges of the procurement organization, which are mainly based on observation and thematic interviews. Then the text moves on to describe the needs of the case company's internal stakeholders, and finally, the development proposals for the case company are presented, which are based on both empirical material and theory. To ensure the appropriateness of the content and results of the research, the study was reviewed with the research supervisors.

4. RESULTS AND ANALYSIS

The purpose of this chapter is to describe the key findings. The study results are divided into four parts. First, in the 4.1 chapter, the current state of the procurement organization is analyzed. In the 4.2 chapter, the current measurement practices of procurement organization are described, followed by, 4.3 chapter, where the needs of the stakeholders are introduced and evaluated. In the last 4.4 chapter, the procurement performance measures are developed based on the needs of the procurement organization and its internal stakeholders.

4.1 Current state description and challenges

This subchapter describing the context and the current state of the procurement organization. The description of the current state and challenges is based on interviews and data available from the case company's ERP-systems.

The results of the interviews revealed that mill-level employees have clearly different perspectives on things when comparing management-level interviews. Responses from the employee level were very strongly related to concrete examples of problems at different stages of the procurement process, while management saw things in a broader scope. According to Lönnqvist et al. (2006, p. 21), often at the group or business unit level, different issues are considered than, for example, at the workgroup, team or individual level. It is essential to be aware of the hierarchy of the organization and how changes at different levels affect other levels. An individual employee should understand how his or her work affects the performance of the entire organization.

4.1.1 Organization of procurement

It was pointed out in the theory that over the last decades, the importance of procurement has been significantly emphasized among various industries, as companies have become increasingly focused on their core competencies and thus increasingly procure goods, services, capabilities, and knowledge from external sources. This phenomenon is also reflected in the case company, as the role of indirect procurement has increased. Director 2 details that the indirect costs of the Finnish paper and pulp mills currently cover about 20% of the company's turnover if IT, investment projects, and logistics costs are included. Based on this information, it is possible to calculate that if the company saves around 5% of the indirect cost, it would increase the company's profit by 1%. Spend of

indirect purchases differs from the theoretical one, where de Boer et al. (2003) argue that a typical large company spends about 30% of its turnover on buying indirect purchases. This difference may be due to the fact that companies can have different organizational structures or operating models than others, which in turn may be reflected in the amount of spend. Director 1 says that if we are talking about a new or evolving business area, innovation will play a big role there. When it comes to a business area that competes in the shrinking market area, such as the paper business, procurement must focus more on spend management and value creation functions.

The group consists of separate businesses, the Group's parent company, and the various Group services. The structure of the group is illustrated in Figure 14. The sourcing of the case company can be divided into two categories: direct and indirect sourcing. The responsibility for direct procurement is centralized in the Group. Responsibility for indirect procurement lies with the businesses, but the largest investments are made in cooperation with the Group's sourcing.

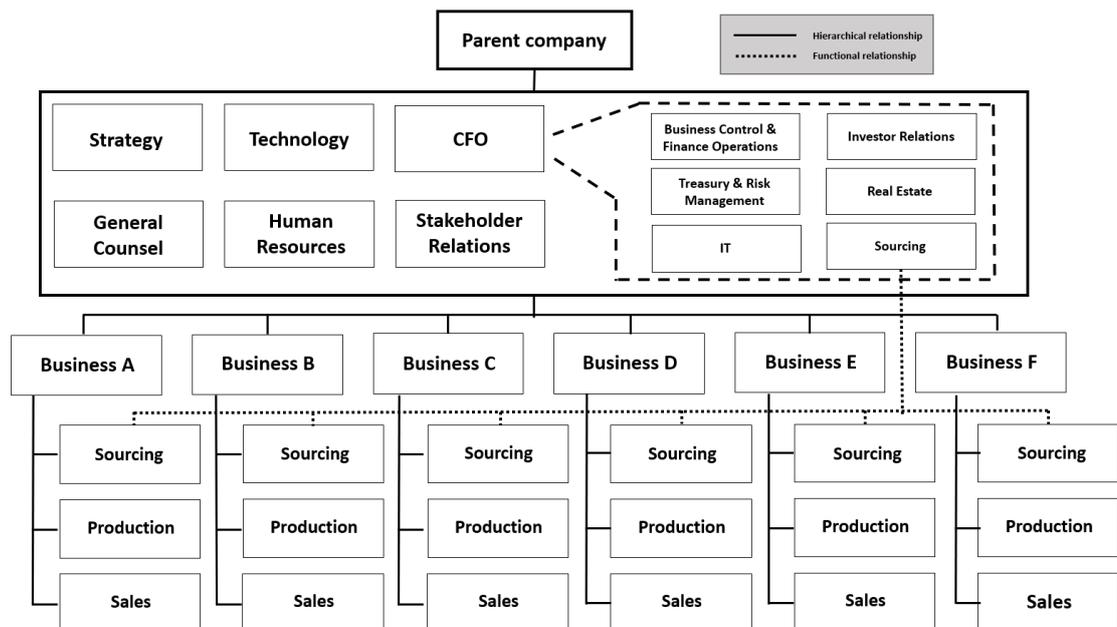


Figure 14. Organizational chart of the case company.

The case company has a total of two MRO sourcing teams in the Finnish pulp and paper businesses, one in Pulp, another in the Paper organization. The sourcing teams are responsible for the procurement of seven paper and pulp mills in Finland. There are two MRO sourcing managers and 20 buyers in total in the MRO sourcing teams. The indirect procurement organizations are organized to the so-called hybrid model, which means that organization has chosen a mix between centralization and decentralization. In this way of organizing, the case company seeks to maximize synergy benefits by combining mills' indirect purchases into larger entities. Manager 7 noted that procurement should

always take into account the possibility of bundling, which requires good transparency between different mills. The cross-mill purchasing enables balancing and scaling resources between mills according to workload, ensure keeping the best resources in case of headcount reduction as well as allocate responsibilities based on buyers' working experience, technical skills, and education. In addition, organizations have organized purchases by product and service groups. An organization model like this, where buyers focus on one controlled product or service group, allows them to focus properly on one industry. This, in turn, enables buyers to know the cost structures, technologies, companies, and people who work in the industry and to understand the success factors of the business and the logic of competition. Good knowledge of the supplier market helps to identify the best suppliers and gain a strong position in negotiations. (Iloranta & Pajunen-Muhonen, 2015, p.323)

4.1.2 Current state and challenges

During the interviews, a few challenges related to centralized procurement were also raised. Manager 4 says that centralized procurement creates additional challenges when you are unfamiliar with people, processes, or the environment. In addition, when different internal customers may be located in different parts of Finland, the procurement organization must be able to communicate and meet their needs regardless of distance. However, almost all respondents agreed that the hybrid model has worked well so far.

The main internal stakeholder of the procurement organization is the maintenance department. This can also be seen as a customer-supplier relationship, where the customer's needs are particularly emphasized. Manager 5 says that in the old days, the aim was to make the operation of the machine more efficient through maintenance and procurement, but the company's production no longer aims for more production capacity but focuses on maintaining production and quality. Therefore, forecasting can be perceived to be even more challenging today. In the past, when maintenance was more about making paper processing more efficient, schedules could be predicted more easily. Nowadays, the role of the maintenance department is more to ensure the continuous operation of the machines, in which case unexpected situations may occur. Manager 3 says that plans are usually short-term, so purchases must be able to be prioritized with the procurement department. Because production operates 24/7, excluding downtime maintenance, it is important that procurement is able to meet the maintenance department's needs in the best possible way. Delivered products need to be the right quality and quantity, in the right place and time, also known as JIT-philosophy. Products delivered late or poor quality of them may cause additional costs, in the worst case, may stop

the entire production line. The other side of the coin is that products delivered too early incur additional storage costs and tie capital. The capital tied up in inventory can be considered to incur costs because, for example, the same amount could alternatively be used for other types of investment. When delivery times are agreed in advance with suppliers, it can minimize inventory levels and optimize inventory value. Buyer 1 says that as many procurements as possible should have a contract with agreed delivery times, especially for the most critical deliveries.

The case company has several different supply channels available, such as sourcing from its own warehouse, automatic orders, catalog orders, shelving service, and manual orders. However, based on the interviews, the optimization of supply channels mentioned to be challenging. Optimization of supply channels means that the case company must place the right products in the right supply channels and utilize suppliers correctly. Manager 2 says that if the buyer has to place an order manually, it is more expensive than a possible alternative supply channel. The company should optimize the use of supply channels because this would free up more time for buyers to make value-added purchases. Those purchases that are low in value or do not have a high potential for savings must be able to be optimized for certain types of supply channels, e.g., catalog, automatic orders, or shelving services. As Figure 15. illustrates, about 81% of the total savings come from the +10000eur PO size category. The case company is doing continuous development work to be able to shift manual work to more value-creating functions. Currently, 70% of the transactions are automated, and the remaining 30% are manually handled. However, there are still about 11,000 manual transactions annually in Finnish pulp and paper mills.

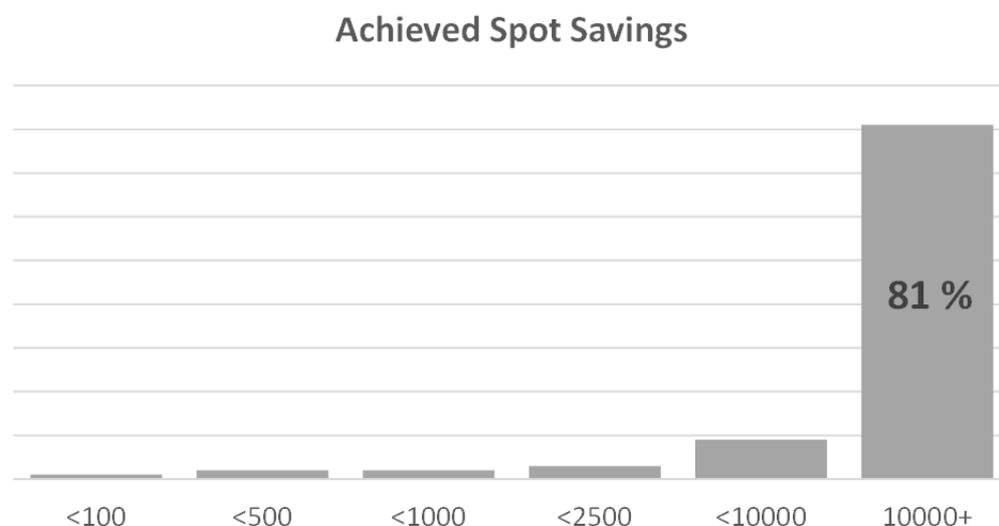


Figure 15. MRO spot savings per PO size category.

Table 7. illustrates the comparison of direct and indirect purchases. Indirect purchases are more fragmented and less planned than direct purchases. Currently, the case company uses about 32% of the spend on indirect procurement and procures from over 2,000 different suppliers per year. As previously pointed out in theory, indirect procurement typically has ten times more suppliers than direct procurement. The differences in the number of suppliers in the case company are quite close to the numbers presented in the literature.

Table 7. Comparison of direct and indirect purchases by the case company.

Annual:	Direct purchasing	Indirect purchasing
Share of spend	about 68%	about 32%
Active number of suppliers	~ 400	~ 2 000
Transactional processes	Almost fully automated	Semi-automated
Number of transactions	~ 4 000	~ 20 000
Average order size	High	Small
Supply markets	Global	Either global, regional, or local

The company’s equipment base has evolved over the decades, and production lines have been partially or gradually renewed several with newer technology. The same production line may contain technology of different ages and implemented by different manufactures. As illustrated in Figure 16, only about 25% of spare parts and supplies are purchased once a year or more often. However, most spare parts are procured less than once a year. Some spare parts are only renewed every 10-15 years. Because the technology life cycle is relatively short and products evolve rapidly, the procurement of some spare parts is challenging, especially for electrical and automation parts. The need for a single spare part is typically not very predictable, e.g., on an annual basis. Thus, many parts are not replaced until a fault is detected.

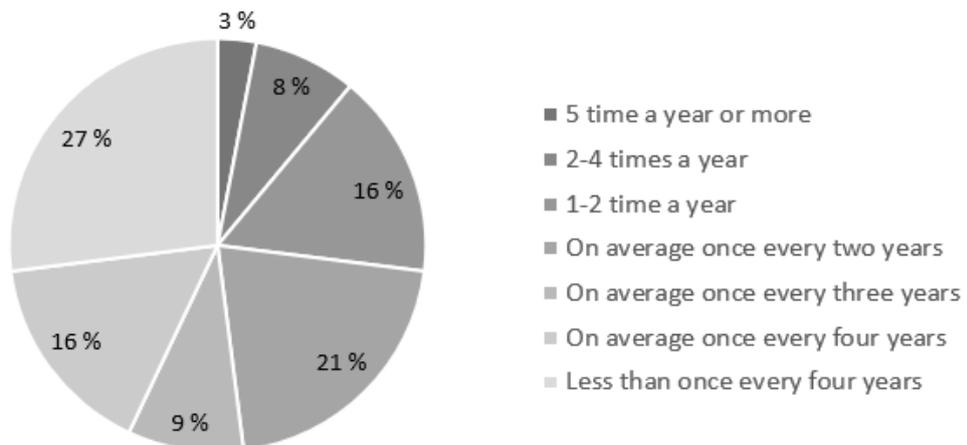


Figure 16. MRO-purchases time span of paper mills.

Several respondents mentioned that the case-company faces challenges in finding substitute suppliers for monopoly suppliers. Some of their products in the product portfolio consist of very old or special products that only a few suppliers can offer. There can be a large savings potential for these purchases. Thus, it is important to be able to expand the supplier portfolio with new potential suppliers. Engineer 2 says that there should be courage towards new suppliers and not always go through the old formula. Even if the procurement is carried out with little risk, this can lead to new experiences and various innovations. If the same suppliers are always selected, other competing suppliers may, at some point, refuse to respond to the RFQs. Thus, this could then also affect the credibility and reliability of the savings metric.

“There is a huge amount of measurement data available, but it is not being utilized effectively enough.” (Manager 2)

Interviews revealed that the case company has comprehensive tools and information systems, such as the ERP-system, which enables a large amount of different data. However, manager 2 mentioned that the case company has a lot of data available, but it is not utilized effectively enough. The respondents also agreed that the data available in a company's ERP-system is very fragmented, and there is a lack of information sharing. Fragmented data may indicate that there may be different practices and ways to document data between different mills. Consequently, there are variations in the quality of the master data. Senior advisor mentioned that these differences in practices might be due to the fact that the current organization was once born as a result of a merger of several different organizations. According to him, harmonization between mills has been a big development issue. Several respondents also mentioned that the organization's procedures are not sufficiently standardized, and the guidelines are not always followed correctly. Manager 6 says that the foundation of an organization must be in order because it can be considered as one of the cornerstones for creating credible and reliable metrics. Harmonizing master data between the mills has been ongoing for a long time but still requires further work. The harmonization process is quite slow, especially on the stakeholder side. Director 2 emphasizes that business models and practices could potentially be improved by better utilization of synergies and standardization between businesses. This would make it possible to automate more and more, which would improve, for example, the time taken to complete invoices. The organization also has several systems in use simultaneously, which may be part of the reason for fragmented data.

As mentioned earlier, the relationship between maintenance departments and procurement organizations can be seen in the so-called as customer-supplier relationship. This

means that the buyers are internal service providers to the maintenance departments. Despite the varying distances, the procurement organization must be able to meet the needs and expectations of all internal customers, which must also be considered when designing KPIs. However, in this study, the KPIs are fully tailored to the expectations and needs of the indirect procurement organization.

“Less is more.” (Director 2)

Director 2 mentions in the interview that the case company sometimes has too much measurement data to monitor. When designing a scorecard, it is important to think carefully about how many KPIs should be involved because there are easily too many indicators to monitor. He emphasizes that less is more. It is more important to focus on a few important KPIs than to trying to monitor a large number of different metrics. In his opinion, only a few KPIs should be selected for each performance measurement perspective. Manager 2 also emphasized that a new set of KPIs should have a clear link to the company’s strategy and goals. Table 8. summarizes the key challenges.

Table 8. The key challenges related to the indirect procurement.

The key challenges	Further context
Some of the procurement’s internal customers are located in different parts of Finland	Challenges related to centralized procurement, for example, distance to the internal customers.
Forecasting can be perceived to be even more challenging today	Plans are usually short-term. Delivered products need to be the right quality and quantity, in the right place and time.
Optimization of supply channels	The right products and services must be placed on the right supply channel and suppliers need to be utilized correctly.
Management of suppliers	Indirect procurement has more suppliers than direct procurement. Currently, indirect purchases are procured annually from 2,000 different suppliers.
Procurement is challenging for some spare parts	Technology life cycle is relatively short and products evolve rapidly.
Finding substitute suppliers for monopoly suppliers	The product portfolio consist of very old or special products that only a few suppliers can offer.
Harmonization of master data	It has been identified that the information available in a company’s ERP system is very fragmented and there are variations in the quality of the master data.

4.1.3 Management of suppliers

The supplier portfolio of indirect procurement consists of thousands of different suppliers around the world from different industries. The case company has given a lot of emphasis on supplier management, and the aim has been to ensure that the supplier base is risk-

free. As mentioned in the theory part, the performance of suppliers has been shown to have a direct impact on the overall performance of the procurement.

The case company aims to be a trustworthy business partner and believes that responsible and ethical practices create long-term value for both its own organization and its stakeholders. All the case company's suppliers need to comply with the standards set in the Supplier and Third-Party Code or demonstrate their compliance with similar standards defined in their own code of conduct or company policies. The case company's Supplier and Third-Party Code defined the minimum level of performance that the case company requires from all its suppliers and third parties. There are additional requirements for certain materials and services. The case company's Supplier and Third-Party code is based on the ten principles of the United Nations Global Compact initiative, the United Nations Guiding Principles on Business and Human Rights, and the International Labour Organization's Declaration on Fundamental Principles and Rights at Work.

In addition, the case company has begun to design a supplier-specific segmentation. The basic idea of supplier segmentation is to group suppliers in a supply base by their impact on the business. Supplier segmentation is a process of dividing suppliers into distinct groups with different needs and characteristics or behavior. Business impact segmentation will be performed based on dependence and spend. Suppliers are classified into the following categories: critical, strategic, tactical, and tail.

However, these alone cannot ensure risk-free supplier management, as Maestrini et al. (2018) stated that continuous evaluating and monitoring upstream performance in the supply chain is critical. The interviews revealed that suppliers of the case company are currently evaluated mainly on an occasional basis. Thus, it can be concluded that the case company may not have a sufficient level of supplier performance monitoring.

4.2 Current performance measurement practices

The purpose of this subchapter is to describe the metrics that currently exist in the procurement organization. The procurement does not have a concrete performance KPI set that would be monitored and reported. Currently, the case company has a great number of different metrics. However, the procurement team monitors only a few metrics actively. These metrics are systematically reviewed mainly on a monthly or an annual basis. The savings metric is the only metric that has been monitored regularly, and RFQ-activity, complaint, three-way matching, and spend metrics are monitored on an occasional basis. As can be seen from Table 9, the case company's way of measuring purchasing

performance is quite narrow and focuses mainly on financial metrics. Comparing purchasing balanced scorecard's five perspectives, the current metrics lack an internal customer perspective.

Table 9. The current procurement performance measurement metrics.

Metric	Perspective	
Cost savings	Financial	Internal
RFQ-activity	Employee	Internal
Complaints	Supplier	External
Three-way matching	Internal business processes	Internal
Spend	Financial	Internal

4.2.1 Cost-savings

Cost-savings measurement undoubtedly got the most attention of all procurement metrics. The procurement team has held monthly meetings outlining buyers' biggest purchases and related savings. More detailed savings percentages are reviewed annually. Although many pitfalls have been identified in the savings metric, it is widely used in procurement performance evaluation. Saving reporting templates are used for monitoring purchasing efficiency from a different point of views like saving % of total spend, saving performance in different euro-level of purchase, number of PO's of all, where saving has been reported, amount of spend and PO's where saving has not been reported, etc.

In current savings measurement practices, the baseline is determined by the nature of the procurement. Prior period price is the main principle that is the preferred method for determining the baseline for materials and services that are recurring purchases. This method should only be used if the product was previously purchased within 12 months. The savings is the difference between the price paid in the previous purchase and the negotiated price.

However, in some cases, new materials and services may be sourced for the first time, or they may have been purchased intermittently, so historical pricing may not be representative of the market. For any of these purchases, buyers should aim to obtain at least three or more bids. In this case, the baseline will be the lowest of three bids that are received prior to any negotiation. When only one bid is available, buyers shall document the validity of the bid against some external sources such as price lists for similar materials or services. Savings associated with this type of purchase will be based on the difference between the final negotiated price and the baseline.

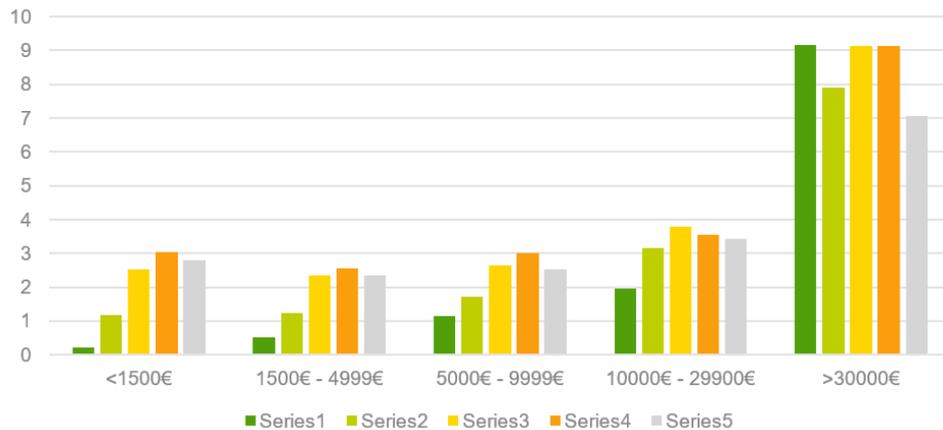
In a single source or sole source negotiations case, the baseline for the contract resulting from that negotiation will be the documented pre-negotiations. Baseline spend for the contract resulting from that negotiation will be the documented first price quoted by the supplier. The savings shall be based on the final price against the baseline spend.

Currently, measuring savings plays the biggest role in measuring procurement performance. However, this current measurement practice faces a number of challenges, as it alone will not be able to create an overall picture of procurement performance. Buyer 2 says that the one challenge is that savings measurement practices may differ between case company's procurement teams in different countries, in which case the performance of procurement teams may not be directly comparable. Not everyone necessarily has a clear picture of what are the real savings, and different buyers may record savings differently. Thus, benchmarking of different procurement teams based on saving metric data may not always be reliable. Director 2 says that measuring savings leads easily to a tendency to tender even small purchases, from which it is possible to obtain only a small amount of savings. The buyers should have an insight into the time spent and process steps to understand the real savings. In addition, suppliers see that the case company is a big organization, so they may intentionally put a higher price on the quote than usual. Therefore, the savings data may not always be reliable for this reason as well.

Current savings measurement practice does not take into account cost avoidance or TCO costs. When buyers make purchases with big savings in mind, the TCO cost perspective of purchases may be easily forgotten. Many interviewees, especially internal customers, emphasized that buyers should not only aim for a low purchase price but also consider the total cost of the product. The low price of a product does not mean that it has the lowest cost over its entire life cycle. The company should consider costs of the product throughout its life cycle because savings in the early part of the life cycle may be reflected later in, for example, poor product performance.

Table 10. illustrates the saving percentage of all manually handled purchases of all European mills on an annual basis. The series represents the years 2015-2019, and the spend is categorized into five categories. The saving percentages have reached their maximum value during 2017 and 2018. When it comes to current savings measurement practices, it can be seen from Table 10. that the savings achieved by the procurement are declining in all five categories, which may be due to a large number of factors. When savings opportunities become exhausted, the dilemma is how to reorganize the resources and get the proper mix of tools and talent for the meeting wider objectives of stakeholders (Limberakis & Fond, 2018).

Table 10. Annual saving % of manually handled purchases. Comparison 2015, 2016, 2017, 2018, 2019 YTD.



4.2.2 RFQ-activity

Requests for quotations (RFQs) returned by the suppliers, which including information of offered prices and promised delivery times, allow the company to compare quotations to find the best supplier option. RFQ-activity is not monitored as actively as the savings metric. Currently, RFQ-activity is reviewed on a quarterly basis. The metric has been actively monitored for about 2-3 years, and its purpose has been to encourage buyers to negotiate more effectively with suppliers.

The data used by the RFQ-activity is based on requests for quotations documented by buyers to the ERP-system. The buyers have been instructed that if purchase orders exceed a certain value, they must send RFQs to suppliers. The aim is to receive at least 3 bids. The buyers document the requests for quotations into the order attachments and record the number of RFQ vendors and the RFQ description into the “realized savings” section. However, there are situations where there are no competitive suppliers for a particular product, in which case the description should be marked “no alternatives.” This indicates that the supplier is the only one of its kind or that there is no reason to ask for bids from other suppliers. Figure 17. illustrates RFQs documentation options.

Delivery/Invoice	Conditions	Texts	Address	Communication	Partners	Additional Data	Org. Data	Status	Vendor Data	Realised Savings
Realised Saving	<input type="text" value="0"/>									
Currency	<input type="text" value="EUR"/>									
Savings Description	<input type="text"/>									
Number of RFQ Vendors	<input type="text" value="0"/>									
RFQ Description	<input type="text" value="0"/> <ul style="list-style-type: none"> 1 PRICE NEGOTIATED 2 NO TIME FOR SEARCHING ALTERNATIVES 3 NO CHANCE FOR PRICE NEGOTIATIONS 4 LOWEST OFFER NOT SELECTED 5 NO ALTERNATIVES 									

Figure 17. RFQs documentation.

RFQ-activity measures how actively buyers are requesting quotations from different suppliers, and it indicates how purchases are progressing, as well as whether purchase prices are justified. The metric takes into account orders that exceed the set price limit. The current formula for the measurement is orders without documented RFQ or no valid reason for no quotations/number of purchase orders.

4.2.3 Complaints

If a case company receives an incorrect or incomplete delivery, employees can create a complaint through the company's ERP system. The number of these complaints is monitored on a supplier-by-supplier basis that describes the qualitative performance of different suppliers. However, based on the interviews, the number of complaints is monitored entirely on an occasional basis, because in any case, the management level is always directly aware of the largest complaints without monitoring specific indicators.

There are some challenges with the complaint metric. According to the interviewees, the current maintenance departments have a culture where no complaints are made about small things, or the complaint threshold is not clearly understood. However, efforts have been made to change these practices and to encourage employees to complain about even minor product defects.

4.2.4 Three-way matching

The procurement team does not currently monitor a three-way matching indicator on a fully regular basis. However, many considered the three-way matching metric very important and suggested that it should be monitored regularly in the future.

Three-way matching takes into account three components purchase order, receipt of goods, and supplier invoice. The 3WM-indicator refers to these three components that need to match within certain tolerance levels. This makes it possible to monitor that invoicing process has been completed on time and efficiently enough. The 3MW also indicates how well the Procure to Receipt -process has been successful. In other words, it indicates whether prices have been up to date and whether invoices have been made correctly.

4.2.5 Spend

In addition to existing metrics, various spend analyzes are actively monitored. Usually, the spending data are reviewed on a monthly basis with the procurement team. The data from the case company's ERP-system allows for different spend analysis variations. For

example, it provides information to the management team on what and how many products and services are purchased. The information generated by the spend analysis can be used, for example, for operational planning and resource allocation.

The spending is monitored from many different levels. At its broadest, the amount of spend is compared between the case company's European mills. The spending is also monitored more closely, such as by product group. Each product group has its own six number code. For example, items beginning with 06xxxx represent MRO material. The MRO-material category can also be looked at in more detail by product type. For example, the category of pumps, which in turn is classified under code 0604XX. In addition, one important variation is to monitor how the spending is distributed to different suppliers. This provides an understanding of which suppliers play the biggest role in the delivery of products and services.

4.3 Needs of the internal stakeholders regarding the development of procurement performance

Kankkunen et al. (2005) stated that an organization cannot succeed simply by maximizing the benefits to an individual stakeholder. As discussed in theory earlier, when talking about performance, all stakeholders in the organization and their needs should be considered. The early stage of the procurement performance metrics designing was based on the performance prism model developed by Neely (2002). As presented in the theory part, the idea of the performance prism is to identify and prioritize key stakeholders and their needs. In this study, people from several stakeholder groups were selected for the interview to obtain a comprehensive view of different perspectives. However, external stakeholders were excluded from the interviews. The goal was to achieve a very comprehensive understanding of the current state of the purchasing process and the needs of stakeholders.

The interviewees were asked to describe what are the main goals of the indirect procurement. According to the interviewees, the main goal is to ensure the competitiveness of materials and services in all market situations. It means e.g., ensuring availability, pricing and innovations through new products, and solutions. However, it was emphasized that procurement must consider all aspects of the procurement: safety, cost, quality, and schedule.

Director 1 says that the core value created by the procurement is to maximize business benefits in the short and long term. Benefits can be generated, for example, through spend management or new innovations. He emphasized that the procurement should be integrated with different businesses. The procurement must understand the needs of the

businesses and, at the same time, understand the supplier base and how it should be best utilized.

In the literature review, PSM was found to be difficult to define precisely. Interviewees emphasized the lack of a big picture of PSM performance. PSM concept was understood in various ways among stakeholders. Several interviewees were not aware of what kind of metrics are currently used for procurement. Interviews also revealed that many of the case organization's metrics were created decades ago, so nowadays, people may not even remember how they were built and what their ultimate purpose was.

Stakeholder interviews revealed different views and needs regarding the development and measurement of procurement performance. Optimizing supply channels and measuring it were the most commented things in the interviews. Optimizing supply channels would free up more time for buyers to make value-added purchases. According to director 1, the organization should develop a metric to monitor the utilization of supply channels. In his opinion, this could be measured by measuring the development of work, e.g., how much the catalogs are utilized and how much manual work is centralized. Many interviewees also mentioned that supply channels should be standardized.

Director 2 says that the organization has a lack of monitoring supplier performance. There are no systematics and metrics for this area. There is too little information on the performance of suppliers, although it is also related to the monitoring of procurement performance. Many other interviewees also agreed that procurement should improve the measurement of supplier performance.

Many interviewees raised the issue of the savings metric and related challenges. According to many interviewees, the method of calculating the savings may not be at a sufficiently reliable level. There are numerous challenges associated with the measurement method. However, many interviewees mentioned that procurement team should actively monitor the savings, as it is a good indicator of procurement performance, but also consider other indicators to achieve a more comprehensive picture.

Several interviewees also emphasized that cooperation between stakeholders is an important value element. Manager 4 stated that the procurement team should actively measure stakeholder satisfaction in the future. He suggested that satisfaction surveys should be conducted regularly, especially for the maintenance departments. According to him, measuring internal customer satisfaction would be very important as the buyers are internal service providers for maintenance departments.

Several interviewees emphasized that three-way matching is an important indicator in measuring procurement performance. They also mentioned that three-way matching

would help to monitor how much time is spent on unnecessary things and show how well the procure-to-receipt process has been successful. Have the prices been up to date? Have the payments been made complete and accurate?

Many interviewees mentioned that information sharing should be developed. According to senior advisor, when there is a sufficient level of transparency, it also improves bundling opportunities. Internal customers from the maintenance departments were interested in receiving more detailed information, especially about the progress of their own purchases and the fulfillment of delivery times promised by suppliers. This would help them to resource and schedule their work more efficiently. Thus, it is important that the procurement team actively inform end-users of any changes in delivery times in order to avoid potential additional costs due to late deliveries. Manager 7 stated that deliveries should always be on time in order to minimize inventory levels and optimize inventory value.

Senior advisor emphasized that there should not be too many KPIs. He also mentioned that if there are too many KPIs, the efficiency of individual metrics will be reduced. However, manager 4, for his part, states that there should be enough metrics to get a comprehensive picture of the procurement performance. Director 2 suggested that procurement performance could be measured from several perspectives such as financial, internal processes, innovation, and supplier. Table 11. summarizes the key needs of the stakeholders.

Table 11. *The key needs regarding the development of procurement performance.*

The key needs	Stakeholder group
Improve information sharing. E.g. the progress of their own purchases and the fulfillment of delivery times promised by suppliers	Maintenance department
Maintain good component availability	Maintenance department
Deliveries must be on time to minimize inventory levels and optimize inventory value	Warehouse
Optimization of supply channels and its measurement	Management level
Development of the supplier performance and stakeholder satisfaction measurement	Management level
Maintain good cooperation with the other functions	Management level
Improve transparency between different functions in order to maximize bundling opportunities	Warehouse and management level

4.4 Proposed measures

Limberakis & Fong (2018) state in the Hackett Group research that it should also be understood that metrics change over time as the organization's objectives and the business environment evolve. Thus, procurement's performance scorecard must become more dynamic. Based on the interviews and the theoretical framework, both qualitative and quantitative KPIs are proposed as performance indicators for the procurement organization. The proposed KPIs are divided into five perspectives such as financial, internal processes, suppliers, employees, and internal stakeholders. The goal of this study is to propose appropriate metrics for MRO material procurement. Because this study focuses on component purchases, it does not take a position on metrics for service purchases. The case company has comprehensive tools and information systems, such as ERP-system, that facilitate real-time measurement and can obtain data from various mills and business units. Thus, capabilities for measuring performance exist at a general level. Collecting data and processing it into potential new metrics will not be a problem.

As discussed in theory, when talking about performance, all stakeholders in the organization and their needs should be considered. Thus, several interviewees from different internal stakeholder groups were selected for the interviews to gain a comprehensive view. The interviews revealed that the most important things were stock level management, component availability, and keeping the delivery information as reliable as possible.

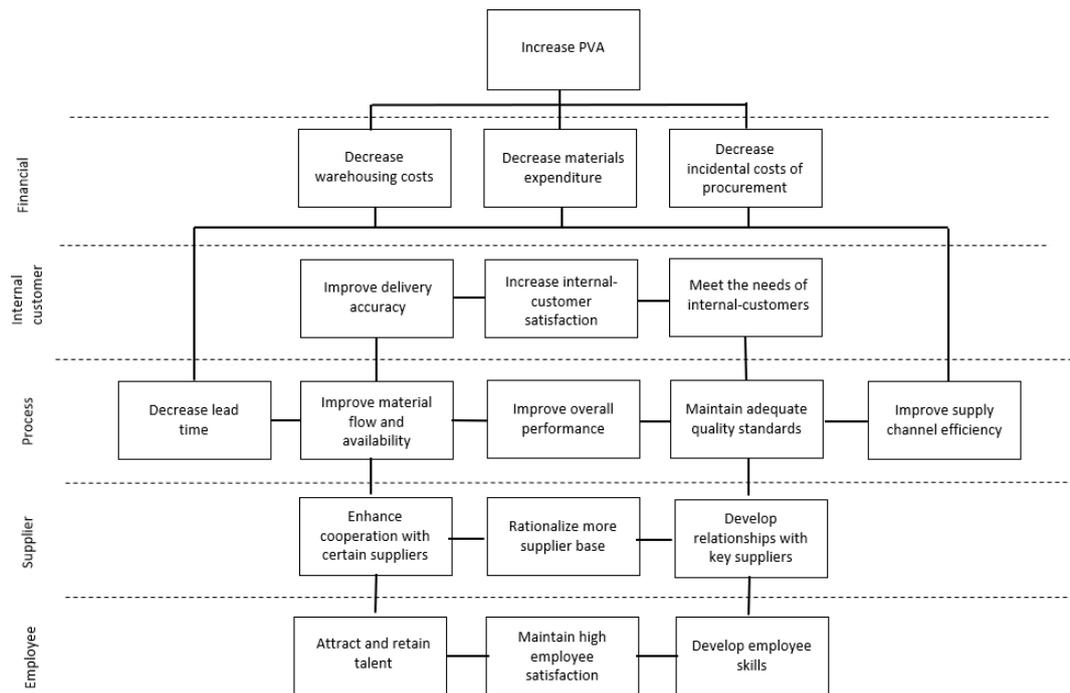
In the theoretical part of the work, it was pointed out that indirect procurement typically has ten times more suppliers than direct procurement. Therefore, supplier screening and supplier performance measurement are important practices to minimize potential risk factors. Several interviewees also mentioned that the case company does not currently have specific metrics to measure supplier performance. There are no systematic and standardized metrics for this area. This study proposes a few potential metrics for the supplier perspective.

This study suggests procurement organization move to a more balanced measurement approach. For example, Iloranta & Pajunen (2015, p.23) stated that in the most successful procurement organizations, clear goals were set, and their achievement was widely measured. The organizations not only monitored cost-savings but also focused on overall identified objectives. In order to avoid the metrics becoming too one-sided, it was decided to apply the Kaplan and Norton balanced scorecard presented in theory as well. Today, managing organizations is so complex that management needs to gain an insight

into the performance from multiple areas simultaneously. The scorecard includes success factors from an organization's strategy that forces management to focus on measuring performance on few important metrics. It also reduces potential sub-optimization risk by forcing strategic management to see all important metrics as a whole and assess how improvements in some factors require sacrifices in others. Unlike Kaplan and Norton's BSC model, the proposed procurement performance scorecard consists of five perspectives, as Hofmann presented in his book. The perspectives will be financial perspective, process perspective, supplier perspective, employee perspective, and internal customer perspective. Correspondingly to the P-BSC presented in the theory part, the scorecard is supplemented by the supplier perspective, and for the customer perspective, externals are replaced by internals.

The main goal was to design comprehensive key performance metrics with a clear link to the company's strategy. The key performance indicators were designed based on literature, the interview suggestions and the organization's own needs. Later, the suitability of the metrics was discussed with procurement's management level. The aim was to find the real most critical success factors and appropriate metrics for them. According to Lönnqvist et al. (2006, p.43), building a strategy map can be useful already at the design stage of the metrics. The strategy map method was originally developed by Kaplan and Norton, which was used as a support tool for the construction and use of the Balanced Scorecard metrics. The strategy map is a visual representation that illustrates an organization's strategy through the cause-and-effect relationship between measurable success factors. (Lönnqvist et al. 2006, p.43) Table 12. illustrates with dashes the relationships between objectives classified into five perspectives. For example, good employee satisfaction is believed to improve productivity, which in turn is believed to improve the company's profitability. The case company's strategy map was constructed in accordance with the perspectives of the Purchasing Balanced Scorecard presented in the theoretical part.

Table 12. *The purchasing balanced scorecard strategy map.*



The main goal of the procurement is to increase Procurement Value Added (PVA) for the company. In this study, the added value created by procurement is seen in the way presented in theory, where procurement can enhance the performance of a company from many perspectives. Academic studies have empirically proven that procurement can create added value for a company through successful PSM practices (e.g., Zimmermann & Foerstl, 2006). It can be assumed that there is a causal relationship between PSM practices and the three performance dimensions of operational, market, and financial performance. First, PSM practices have a positive impact on profit and loss account through cost-savings and successful performance (Hofmann et al. 2014, p.43). Second, PSM practices have a positive effect on the balance sheet as asset utilization improves, capital lock-up reduces, service levels improve, and lead times are shortened (Ellram & Liu, 2002). Third, PSM practices contribute to an organization's sales growth and market share through, for example, improved innovation performance and quality improvements (Foerstl, Franke & Zimmermann 2016). Based on these hypotheses, successful PSM practices are expected to enhance operational performance, which in turn is reflected ultimately in the organization's financial performance and market performance (Foerstl et al., 2013).

The study also found a gap in the existing academic literature. The existing studies have not examined in more detail which KPIs would be particularly suitable for a hybrid procurement organization operating for a manufacturing company for indirect procurement. The literature review presented COPC standard KPIs that are developed for indirect procurement. However, the metrics are not developed in accordance with the COPC standard because the procurement organization has its own environment and needs. Some of the proposed metrics can be found in the standard, but some of the metrics are formed entirely according to the organization's strategy and needs. The principle of less is more was taken into account in the design of the proposed scorecard. Table 13. presents 16 key performance indicators that were selected for the organization's performance metrics. The aim has been to design the KPIs to take into account hard savings, soft savings, and cost avoidance. The information to be collected on the proposed KPIs is mainly obtained from the case company's ERP system, but for example, a different type of data collection is suggested to examine employee and stakeholder satisfaction.

The P-BSC indicators are not intended to replace all other monitored metrics in an organization. The goal of this study is to propose the core metrics that should be particularly actively monitored. Therefore, in addition to P-BSC indicators, a number of other indicators are still needed to monitor operational activities.

Table 13. Proposed indirect procurement KPIs.

Goal	Possible measurement	Frequency	Source of data	Further context
Financial				
The right kind of price development	<i>Company's price development benchmarked against producer price Index</i>	Quarterly	Data is collected from Eurostat's database and ERP-system	Monitoring allows the company to understand if it performs better or worse than market in general. C2895, Manufacture of machinery for paper and paperboard production. NACE Rev. 2.
Cost-savings	<i>Savings (%)</i>	Monthly	Data is collected from ERP-System	Cost-savings remain the principal way procurement is assessed and this metric is often referred to as 'hard' cost savings. Cost avoidance, or 'soft' cost savings, is harder to measure, effectively a decrease in cost that is not detected by yearly comparisons as it mitigates a cost increase.
	<i>Cost avoidance per commodity group in € p. a.</i>	Monthly		
Increased managed spend	<i>Indirect Spend YTD</i>	Quarterly	Data is collected from ERP-System	Helps to manage and control procurement expenditure.
	<i>Spend per category YTD</i>	Quarterly		
	<i>Spend per supplier YTD</i>	Quarterly		
Internal business processes				
Improved efficiency	<i>Share of different supply channels</i>	Quarterly	Data is collected from ERP-System	Supply channel efficiency metrics can help to follow if products and services are in defined supply channels
Increased managed spend	<i>The share of purchases not submitted through the appropriate systems and/or processes (Maverick buying)</i>	Quarterly		A common functional-level KPI attempting to drive procurement coverage and control.
Improved efficiency	<i>Three-Way Matching</i>	Monthly		Matching data on a PO, a GRN and an invoice.
Supplier				
Improved delivery accuracy	<i>Gap between confirmed delivery date and GR date</i>	Monthly	Data is collected from ERP-System	KPI indicates the performance of suppliers and encourages procurement teams to focus on meeting stakeholder needs in a time-effective manner.
Improved quality	<i>Number of complaints</i>	Monthly		Very few complaints are created for MRO.
Improved supplier management	<i>Supplier performance index</i>	Quarterly		Measuring an average of supplier performance scorings will encourage quality enhancement objectives.
Employee				
Optimized workload	<i>Number of POs per buyer / team</i>	Monthly	Data is collected from ERP-System	Time and effort used to create a PO and RFx varies a lot.
	<i>Number of RFxs per buyer</i>	Monthly		
Increased employee satisfaction	<i>Survey</i>	Annually	Data is collected from a sample of respondents that took a survey.	Employee satisfaction correlates positively with procurement performance (e.g. Kessler et al. 2020).
Internal customer				
Increased internal customer satisfaction	<i>Survey</i>	Annually	Data is collected from a sample of respondents that took a survey.	Any holistic perspective of procurement performance should incorporate stakeholder assessments.

4.4.1 Financial perspective's measures

Financial metrics have long played an important role in measuring procurement performance. As revealed earlier in the theory part, the aim of the financial perspective is usually to achieve cost-savings. The following metrics for the category of financial perspective are proposed: MRO price index benchmarking, savings, and spend metrics.

MRO price index benchmarking

The first proposed KPI for the financial perspective is MRO price index benchmarking. This KPI can be used to monitor the historical price development and to compare the case company's own price development against a market index or against the different mills of the case company. In this way, it allows the procurement to gain a broad view of its own performance in the long run. However, several questions arise. What is a correct external index? At what level of materials should be chosen?

The appropriate external index was considered to be the industrial producer price index (PPI). The industrial PPI describes the price development of industrial products over time. Data on producer price index in the industry can be found in Eurostat's public database. However, in order to maximize the reliability of the data, PPI data must be filtered as closely as possible to fit the purpose of the case company.

Because the case company's procurement organization has many suppliers globally and major part operates in Europe, the most appropriate geopolitical entity is the current European Union, which includes price data from 27 different countries. The closest suitable classification of economic activities – NACE rev.2 for MRO procurement is the category C2895, Manufacture of machinery for paper and paperboard production. According to the Orbis database, NACE Rev.2 includes a total of 4038 company price data. Figure 18. illustrates the distribution of companies in the NACE Rev.2 classification. Most companies have a turnover of less than 10 million. As can be seen, only 1.5% of companies have a turnover of more than 100 million. This category includes large organizations such as Valmet, Andritz and, Neles, which are also part of the case company's supplier portfolio.

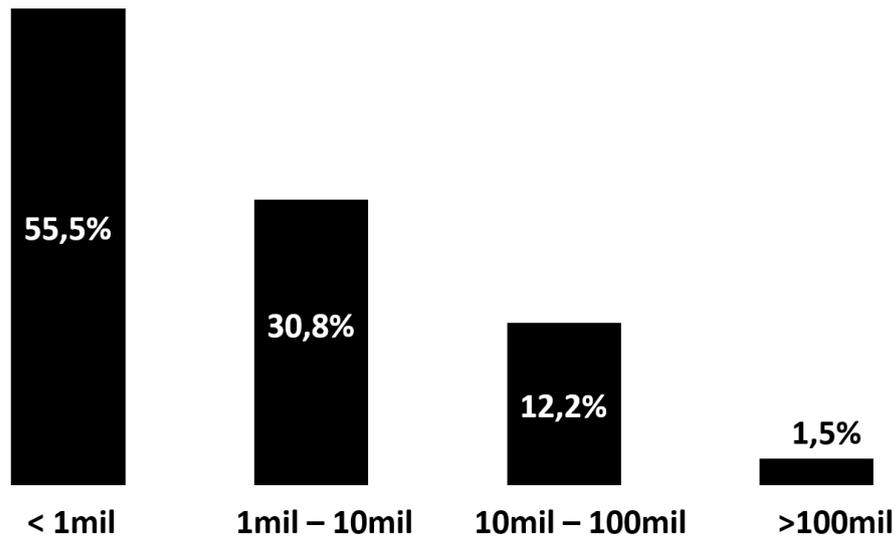
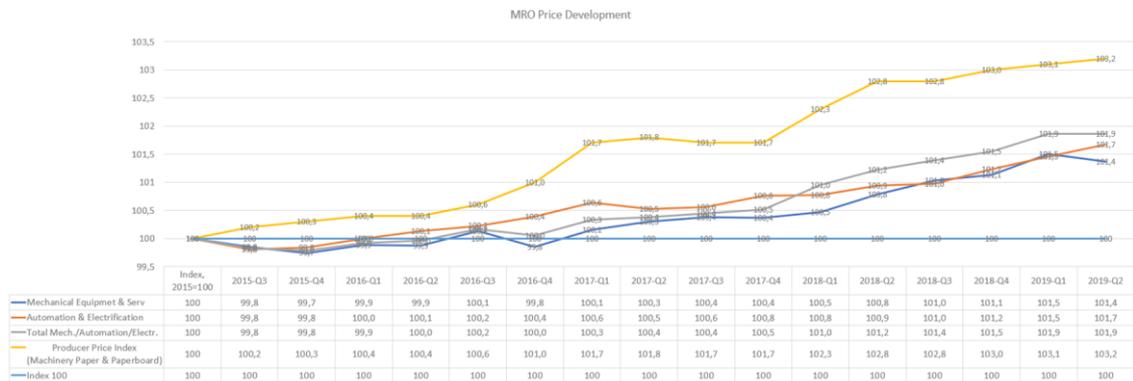


Figure 18. Companies' sizes in NACE Rev. 2 classification.

The market basket method can be used in MRO price index benchmarking. In this method, the desired items can be selected for the basket, and then the development of their prices in relation to the supplier price index can be compared. In addition, MRO price index benchmarking can also be used to compare the price development of different product groups as well as different mills.

During this study, MRO price index benchmarking was also tested in practice. Table 14. illustrates the results of the test phase. Quantitative data were obtained from the case company's ERP system, which was analyzed using Power BI and Microsoft Excel tools. The time span was chosen to be five years, which was considered the most appropriate. The producer price index presents price developments from 2015 onwards, as the latest updated data from Eurostat represent an index, 2015=100. A 12-month rolling average was used to form the market basket. The market basket was not formed according to a fixed point because the fixed time cannot take into account possible innovations and material changes. The rolling average allows the basket to stay up-to-date and does not need to be manually updated. The report is automatically updated with new materials, and outdated materials are removed. On an annual basis, the market basket includes about 32,000 items. The report can also be filtered to present even more accurate data. The price development could be filtered to show, for example, the price development at the level of a certain product group.

MRO Price Development (Production consumables excluded)



Index, 2015=100
C2895, Manufacture of machinery for paper and paperboard production
European Union – 27 countries (from 2020)

Table 14. MRO price index benchmarking.

A metric like this could also be later customized for many different purposes. Index measurement can be used in the future, for example, to forecast price developments, where the forecast could be based on historical data and past trend changes. However, the implementation of this requires a lot of in-depth study of the topic and extensive analysis.

Cost-savings

Based on interviews and observations, procurement performance has long been measured based on cost-savings. As presented earlier, according to the savings metric, the annual saving percentage is declining. Although the saving percentage appears to have decreased, it does not necessarily indicate changes in procurement performance. Limberakis & Fond (2018) mention in the Hackett Group research that procurement organizations typically face challenges increasing savings year over year due to diminishing opportunities over time. As illustrated in Figure 19, when major spend categories are properly procured, and suppliers are rationalized, savings benefits tend to reduce. This means that when the larger part of the spend is influenced, the less savings it is possible to achieve.

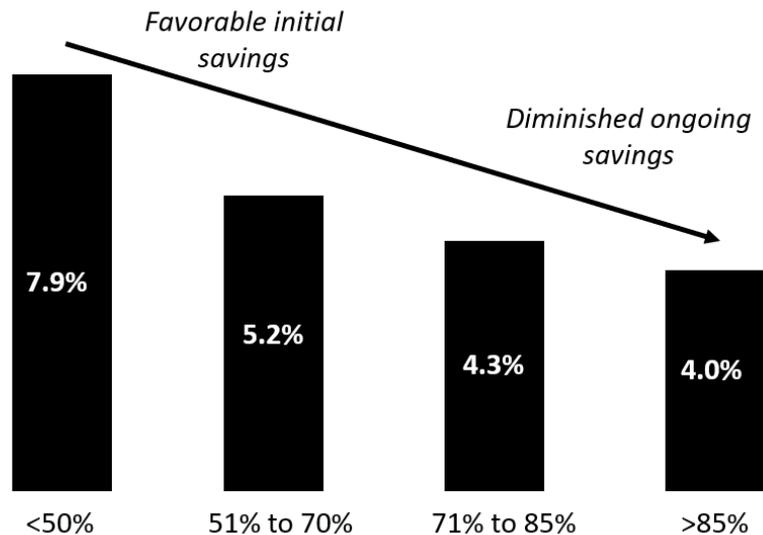


Figure 19. Savings as a percentage of influenced spend (adopted from Limberakis & Fond 2018).

Since the case company is a large organization, it must continue to take advantage of its large size and bargaining power in tendering. Many respondents mentioned in the interviews that the savings metric is important and should continue to be measured in procurement. However, respondents were of the opinion that practices for measuring savings should be developed. This study proposes continuing current practice, but some adjustments are recommended. However, the savings metric should be standardized across all of the case company's procurement teams. In this way, it is possible to clarify everyone's understanding of real savings and harmonize practices. This would make measurement data more comparable between procurement teams and make the data more reliable. This study divides savings into two categories: realized savings and cost avoidance. The following sections present measurement principles for calculating these savings categories.

Table 15. demonstrates the principles of realized savings calculations. The top example represents the purchases that are purchased for the first time or that are purchased infrequently. In this scenario, the historical price is not representative of the market. The baseline will be the lowest of three bids received. So, savings will be based on the difference between the final negotiated price and the baseline. The second example represents recurring purchases that are purchased within 12 months. In this situation, the baseline is determined based on the prior period actual price. Savings associated with this type of purchase will be based on the difference between the price paid in the previous purchase and the negotiated price.

Previous purchase price, supplier A: 100.000 (Last Time Purchased 5 years ago)

RFQ 1st round	Last RFQ	Savings
A: 105.000	A: 102.000	3.000
B: 120.000	B: 113.000	
C: 115.000	C: 112.000	

Previous purchase price, supplier A: **100.000** (Last Time Purchased 1 years ago)

RFQ 1st round	Last RFQ	Savings
A: 105.000	A: 102.000	0
B: 120.000	B: 113.000	
C: 115.000	C: 112.000	

Baseline is bolded

Table 15. *Realized savings examples.*

The Hackett Group research, written by Limberakis & Fond (2018), suggests an alternative way to calculate the baseline for first-time purchases. They propose that baseline is the average (typically the mean) of all initial quotes from suppliers that meet base requirements. They also determine that a minimum number of bids is required (e.g., 3). In addition, the highest and lowest bids that differ from the next closest bid by 15% should be removed. The difference in average and the final pricing represents cost-savings. However, this calculation method would require additional manual work, and the margin of error could also increase. For this reason, this study proposes a more straightforward baseline determination method.

The hard savings metric alone cannot provide a comprehensive picture of the state of procurement performance. In this case, organizational definitions and calculations should be extended to cover metrics from a broader perspective, for example, cost avoidance. Because the case company has not currently defined a way to calculate cost avoidance, a few related changes are proposed. Many different ways to measure cost avoidance have been discussed in the academic literature. However, this study suggests only one potential calculation method.

Hofmann et al. (2014, p.136) state that the monetary assessment of any negotiation success can be determined in a rough estimate. However, savings from bypassed price increases or cost avoidances must be demonstrated as accurately as possible, as well as price claims need to be plausible and verifiable. In addition, the negotiated price needs to be correspondingly documented. Equation 1. demonstrates suggestions on how determinations of price claim and the negotiated result can be shown.

Equation 1. Cost avoidance formula (Hofmann et al., 2014, p.136).

$$\sum KV_{commodity\ group} = \left(\sum_{i=1}^n PfA_i \times M_i \right) - \left(\sum_{i=1}^n PvA_i \times M_i \right)$$

where

$KV_{commodity\ group}$	Cost avoidance per commodity group in € p. a.
PfA	Price demand per item in €
PvA	Price negotiated per item in €
M	Planned volume per item in pieces p. a.
i	Item

Spend metrics

In addition to the indicators presented above, the study suggests continuing to monitor existing spend metrics, such as total indirect spend, spend per category and spend per supplier. These metrics are listed with the description in Table 16. The MRO price index benchmarking provides information on price developments and spend KPIs allow the procurement organization to analyze the behavior of procurement costs in even more detail.

Table 16. Spend metrics for indirect procurement.

Spend metrics	
<i>Indirect spend</i>	The total monetary value of indirect spend.
<i>Spend per category</i>	The monetary value of each indirect procurement category.
<i>Spend per supplier</i>	The monetary value of each supplier.

4.4.2 Process perspective's measures

Process perspective metrics enable to monitor the efficiency of procurement processes. This study proposes to include three different metrics in this perspective: supply channel efficiency, maverick buying, and three-way matching.

Supply channel efficiency

Interviews revealed that many respondents had the opinion that measurement resources should be focused more on optimization of supply channels. Optimizing supply channels would free up more time for buyers to make value-added purchases. This study proposed that a separate KPI is built to monitor the placement of products and services in the different supply channels.

The proposed KPI measures the share of different supply channels. This could be used to monitor how effectively each supply channel is being utilized. The aim is to place purchases that are low value or do not have a high potential for savings to the certain types

of supply channels, e.g., catalog, automatic orders, or shelving services. In turn, purchases that are high value or have a high potential for savings should be made manually.

Supply channel efficiency = Share of different supply channels

Equation 2. *Supply channel efficiency formula.*

Maverick buying

There are many ways to define maverick buying in the purchasing process. However, in this study, maverick buying means that a purchase order has been created after products have been ordered and billed by the supplier. Maverick buying can occur with direct purchases, but according to Karjalainen et al. (2009), maverick buying is most often associated with indirect procurement and especially with maintenance, repair, and operations items. They state that maverick buying is mainly seen to have only negative consequences, which they would divide into two categories: increased procurement costs and reduced purchasing leverage. Maverick buying is claimed to affect both the actual purchasing prices as well as the purchasing process costs, leading to an increase in procurement costs. Maverick buying reduces the ability to take advantage of actual market position and potential buying power. According to Cox et al. (2005), the maverick buyer is unlikely to have access to the necessary supply market information and does not have the requisite competence in negotiating and contracting. Consequently, there will be further fragmentation of the company's spend, resulting in reduced an organization's purchasing leverage.

Many interviewees mentioned that the invoice handling process is sometimes very slow. This may be partly due to maverick buying. The invoice handling process suffers when a PO has not yet been created when the invoice sent by the supplier arrives in the organization's ERP-system. Investigating these invoices costs both time and money to the organization. In addition, with the wrong supplier choices, maverick buying incurs potential extra costs and loss of quality. This study proposes a KPI to monitor the state of maverick buying. The proposed KPI measures the share of purchases that are not created through the appropriate systems and/or processes.

$$\text{Maverick Buying} = \frac{100\% * \text{Unqualified transactions}}{\text{Transactions}}$$

Equation 3. *Maverick buying formula.*

Three-way matching

During the interviews, many respondents mentioned that three-way matching would be a good indicator for measuring procurement performance. Three-way matching has long been an important indicator of invoicing performance, describing how well the three different components (purchase order, receipt of goods, and supplier invoice) matching. However, the procurement team does not currently monitor this indicator on a fully regular basis.

Many interviewees mentioned that the procurement should actively monitor three-way matching to gain a better understanding of the invoice processing performance. Because manual invoice processing is slow, time-consuming, and requires a lot of human resources, the procurement should actively monitor the 3WM-indicator, as also suggested by many interviewees. Three-way matching can reduce invoice processing time and therefore reduce costs per invoice. The 3WM should be monitored regularly on a monthly basis. The proposed 3MW-formula measures how many invoices are performed through the process automatically.

$$\text{Three – Way Matching} = \frac{100\% * \text{Number of automatically handled invoices}}{\text{Number of all completed invoices}}$$

Equation 4. *Three-way matching formula.*

4.4.3 Supplier perspective's measures

As the case company does not have a systematic way to monitor the performance of suppliers and many interviewees saw this as an important element in a successful procurement, this study proposes a few metrics from a supplier perspective. The supplier perspective's metrics consist of delivery accuracy, product quality, and overall supplier performance index.

Delivery accuracy

Currently, the procurement organization has not specifically monitored supplier delivery accuracy. This is due to the fact that end-users of the products may set an unrealistic demand date, which in turn distorts the measurement data. This logic doesn't illustrate the delivery accuracy as hoped. The new proposed measurement logic would focus on measuring how well suppliers stay within the original delivery time specified in the order confirmation.

The delivery accuracy can be measured by utilizing data from the case company's ERP system. It measures the difference between the originally confirmed delivery date and

the receiving date. However, there are also situations where the supplier does not provide an order confirmation at all. In this case, the comparable date is the requested date marked to the purchase order. Delivery terms must also be considered in the calculation of delivery accuracy. If delivery terms are specified as “Delivered at Place, DAP,” the confirmed delivery date is the date when the order arrives at the organization’s warehouse or to the place agreed between the seller and the buyer. In the case when the seller has confirmed delivery terms as “Free Carrier, FCA,” the delivery date is the date when the carrier picks the order up from the supplier.

$$\text{Delivery accuracy} = \frac{100\% * \text{Number of purchase orders delivered on time}}{\text{Number of delivered purchase orders}}$$

Equation 5. *Delivery accuracy formula.*

Product quality

This study proposes to evaluate the product quality of the supplier. The quality performance of suppliers can be assessed by monitoring the number of complaints per supplier. When the procurement team monitoring the complaint metric actively, it will help them to choose the best and most reliable suppliers and thus reduce potential risks.

However, the interviews revealed that only a few complaints are made about MRO-purchases each year. The internal customers may have a habit of not making a complaint about very small things, or the complaint threshold is not clearly understood when a complaint should be made to the supplier. The case company should encourage employees to always complain about even minor product defects. The buyers should always be informed if supplier’s products have been defective. If the complaints are not recorded accurately, the information cannot be utilized, for example, to evaluate supplier performance or to negotiate new agreements. Additionally, monetary compensations from the suppliers may be missed if the complaints are not made systematically.

$$\text{Product quality} = \text{Number of complaints per supplier}$$

Equation 6. *Product quality formula.*

Supplier performance index

The last KPI for the supplier perspective is the supplier performance index. In order to ensure that products meet relevant quality standards, a company must select suppliers based on their overall performance. If the overall performance of the supplier is at the desired level, it can also help the organization to implement a just-in-time (JIT) strategy. The idea of the supplier performance index is to combine several KPIs into one measure. The supplier index should take into account elements that all genuinely contribute to the

same measurable outcome. This study suggests that the index is based on three elements: complaints, price development, and delivery accuracy. In particular, the case company should monitor the performance index of its key suppliers.

This study does not present a more detailed formula for forming the supplier performance index, as it requires a lot of design. For example, it should be carefully considered the logic of how KPIs interact. In addition, different KPIs have different importance. Thus, each element should be weighted to reflect their importance to the final score.

$$\text{Weighted supplier performance index} = \text{Sum of (Weightage * Score)}$$

Equation 7. Supplier performance index.

4.4.4 Employee perspective's measures

This study suggests that the learning and growth perspective of the traditional balanced scorecard is replaced by the employee perspective. According to Hofmann et al. (2014, p.136), this adjustment strengthens the position of employees since their activities provide a measurable performance for the implementation of the organization's overall strategy.

Workload

This study proposes measuring employee workload in two different dimensions. The workload metrics provide information about the workload development of the buyers. The first proposed metric measures number of POs per buyer. However, it must be noted that different buyers have their own responsibilities and different categories of purchases, which means that the time and effort spent creating a purchase order varies a lot between buyers.

$$\text{PO workload} = \text{number of POs per buyer}$$

Equation 8. Purchase order workload per buyer.

Another proposed metric is RFX (request for x) workload. RFX refers to any document that is a request for something. It includes, for example, requests for information or quotation documents. The workload could be compared in different price categories. In this way, the management level would gain a broader understanding of what kind of purchases buyers have spent more time and effort on.

$$\text{RFX workload} = \text{number of RFXs per buyer}$$

Equation 9. RFX workload per buyer.

Employee satisfaction

It is important to evaluate the level of employee satisfaction in order to maximize a good work atmosphere in the organization. When employees are motivated and satisfied, they put their best effort to make the organization successful. Many studies have proven that the level of employee satisfaction is positively correlated with the performance of the company (e.g., Kessler, Lucianetti, Pindek, Zhu & Spector, 2020). Measuring employee satisfaction is timely, as remote working has increased significantly recently. Due to the changed working conditions, the management level should especially monitor the comfort of the employees.

Satisfaction surveys could be based, for example, on the Likert-scale (1 = not important, 5 = very important). Factors that are assumed to be important for employee satisfaction can be selected for the survey. The employee satisfaction indicator could measure, for example, the share of employees who are very satisfied with the job and the organization. Equation 10. presents the formula of employee satisfaction.

$$\text{Employee satisfaction} = \text{Share of employees who are very satisfied}$$

Equation 10. *Employee satisfaction formula.*

4.4.5 Internal customer perspective's measures

This study suggests that the customer perspective of the traditional balanced scorecard is replaced by the internal customer perspective. The maintenance department can be considered as an internal customer of the procurement. It is important to actively evaluate the internal customer's level of satisfaction because the main objective of the procurement team is to meet the maintenance department's needs in the best possible way.

Internal customer satisfaction

The procurement organization does not currently use a metric to measure internal customer satisfaction. Director 3 said in the interviews that measuring internal customer satisfaction would be a good idea, especially as several changes have been made to the organization, and new employees have been recruited recently. He suggests that the customer satisfaction survey could ask questions about the general disposition toward the procurement, but also some specific questions should be included. In addition, it is important to get enough people in the sample to make the results as reliable as possible. As previously emphasized, the maintenance department can be considered as an internal customer of the procurement organization. Therefore, it is important to monitor the maintenance departments' satisfaction level. The internal customer satisfaction KPI can

be classified as a subjective performance measure. Subjectivity refers to a person's personal interpretation or perception view. Consequently, this can cause uncertainty in the metric results due to the subjectivity of the responses. On the other hand, the internal customer can be seen as the most appropriate person to respond to how well they have been served.

The information could be collected, for example, from an evaluation form addressed to the maintenance departments, which can be either in electronic form or on paper. However, the electronic form is usually more practical, making it easier to implement. This makes it easier to summarize the results and lowers the threshold for answering the questions. It is typical that measuring the output of procurement is challenging. However internal customer satisfaction measure is one way to obtain information about the quality of a procurement organization's output.

Table 17. presents a simple example of an internal customer satisfaction survey. The internal customer satisfaction survey could be done on a Likert scale, for example, a scale of 1 to 5, and in the middle being neutral. This should be done, for example, on an annual basis or in the longer term because if surveys are conducted too often, respondents' interest in answering surveys decreases. From customer satisfaction feedback, it is possible to see what things the procurement organization should improve.

Table 17. *The example of an internal customer satisfaction survey.*

	Performance				
	Poor		Neutral		Excellent
Communication level	1	2	3	4	5
Quality of delivered of products	1	2	3	4	5
Reliable delivery of information	1	2	3	4	5
Responsiveness to internal customer needs	1	2	3	4	5
On-time delivery of products	1	2	3	4	5
Overall service level to internal customers	1	2	3	4	5

In summary, the proposed scorecard for the case company is divided into five perspectives: financial perspective, internal process perspective, supplier perspective, employee perspective, and internal customer perspective. For each perspective, a few core KPIs have been proposed that should be actively monitored. The purpose of these five perspectives is to provide a balanced view of procurement performance.

5. CONCLUSIONS

This chapter assesses how well the objectives of the work have been achieved and what their significance is for the case company. Furthermore, the study is critically evaluated, and objectives for further research are discussed.

5.1 Key findings

Companies' Enterprise Resource Planning systems have undergone significant upheavals in recent decades. Modern information technology and its development have enabled the implementation of new and faster monitoring and analysis systems. As a result, data processing and analysis is more efficient and accurate today. According to Devaraj et al. (2007), when it comes to supply chain performance, it has been recognized that the sharing and capturing of information in real-time have a significant impact on supply chain success. The current state analysis revealed that the case company faced numerous challenges in measuring procurement performance, and it was monitored from a rather narrow perspective. The main purpose of the thesis was to develop comprehensive purchasing performance measurement practices for the case company. Therefore, the main research question of the thesis was the following:

How to improve the procurement performance of a large paper and pulp industry company in indirect purchases?

The literature review and empirical findings were considered in the design of the procurement measurement practices. As the main result of the study, 16 KPIs were designed to develop the measurement of procurement performance. The literature review presented COPC standard KPIs for indirect procurement that has been developed with several different organizations. However, the KPIs proposed in the study are not based on this standard, but the proposed indicators are tailored to meet the case company's strategy and the needs of internal stakeholders. The proposed purchasing balanced scorecard includes success factors from an organization's strategy that forces management to focus on measuring performance on few important metrics. Monitoring procurement performance simultaneously from multiple perspectives reduces potential sub-optimization risk by forcing strategic management to see all important metrics as a whole and assess how improvements in some factors require sacrifices in others.

The developed procurement performance scorecard was divided into five perspectives: financial perspective, process perspective, supplier perspective, employee perspective,

and internal customer perspective. Each perspective has its own objectives, targets, initiatives, and measures. First, financial perspective metrics consist of hard and soft metrics that are used to monitor and evaluate monetary purchasing performance. Second, process perspective's metrics are used for evaluating the time and quality of procurement processes. Third, supplier perspective metrics are used in evaluating supplier performance. Fourth, the employee perspective refers to the metrics regarding the employees of the procurement organization. This includes workload and satisfaction metrics. Lastly, the internal customer perspective is focused on measuring the satisfaction and needs of the internal customers. Proposed P-BSC makes it possible to map all different measures of an organization's performance onto a single framework, and thus it is easier to identify where there is a need for better focus. The KPIs from these five perspectives enable a case company to get comprehensive information about procurement performance from multiple areas simultaneously. However, the proposed purchasing balanced scorecard is not intended to replace all other monitoring metrics in an organization. Therefore, in addition to the proposed KPIs, a number of other indicators are still needed to monitor operational activities.

In order to be able to answer the main question comprehensively, the study had to be deepened by three sub-questions. Sub-questions 1 and 2 were answered on the basis of thematic interviews and observations made during the empirical part of the study. In addition to this, the purpose of the literature review of the study was to find appropriate and best practices for measuring procurement performance. Based on these results, sub-question 3 was answered. The first sub-question of the thesis was the following:

How is indirect procurement currently measured in the case company?

The procurement does not have a concrete set of performance KPIs that would be systematically monitored and reported. The savings metric got the most attention of all the procurement metrics. In addition to this, the procurement monitored RFQ-activity, number of complaints, three-way matching as well as various spend metrics. The case company's way of measuring indirect procurement performance was very one-sided and focused strongly on financial metrics. According to Hartmann et al. (2002), the easiest way to follow purchasing performance is to evaluate the financial outcomes of the procurement department. However, Ellram et al. (2002) stated that when evaluating purchasing performance through financial outcomes, it could limit understanding of the benefits of PSM practices and does not provide an overall picture of purchasing performance.

The empirical part revealed that the case company has comprehensive tools and information systems, such as ERP-system, that enable efficient and accurate data processing. However, the case company faces challenges in selecting the most appropriate KPIs to measure procurement performance. In addition, there is a huge amount of measurement data available, but it is not being utilized effectively enough. The second sub-question of the thesis was the following:

What kind of purchasing performance needs procurement's internal stakeholders have?

During the study, the needs and expectations of the internal stakeholders towards procurement were recognized. Because the case company's MRO-procurement is organized as a hybrid model, continuous identification of stakeholder needs is important. In a model like this, some purchases are handled centrally and so decentrally. Despite the distances, the procurement must be able to meet the stakeholder's needs and expectations. The design of the case company's performance scorecard was based on the performance prism model developed by Neely (2002), which first identified and prioritized key stakeholders and their needs. The empirical part of the study began with interviews addressed to internal stakeholders of the indirect procurement team. The internal stakeholders of the procurement included, for example, production, warehouse, and maintenance department. Thus, external stakeholders were excluded from this study. The purpose of the interviews was to map the current state and identify their needs and expectations in relation to the procurement performance.

According to the internal stakeholders, the most important things were stock level management, component availability, and keeping the delivery information as reliable as possible. These factors strongly affect the operational performance of the stakeholders. For example, products delivered too late or poor quality of them may cause additional costs, in the worst case, may stop the entire production line. Products delivered too early should also be considered, as products delivered too early will lead to additional storage costs and tie capital. Some stakeholders were interested in receiving more detailed information about the procurement, especially about the progress of their own purchases and the fulfillment of delivery times promised by suppliers.

The interviews also raised some good suggestions regarding suitable key performance indicators. However, several interviewees mentioned that a procurement team should not monitor too many metrics at the same time, as this would reduce the effectiveness of individual metrics. The third sub-question of the thesis was the following:

How should indirect procurement performance be measured in a forest industry production company?

In theory, it has often been pointed out that the performance metrics should be built on the basis of the company's long-term objectives and strategy. The idea of the strategy map approach is to outline the cause-and-effect connection between strategic objectives. The strategy map method was originally developed by Kaplan & Norton, which was used as a support tool for the design and use of the Balanced Scorecard metrics. Therefore, in the empirical part of this study, a strategy map was created based on the case company's strategy and the needs of the internal stakeholders. The strategic objectives were divided into five perspectives of the P-BSC, and the cause-and-effect connection of the objectives was outlined. Thus, these categorized objectives were taken into account in the design of appropriate KPIs. It is not enough that the activities of the organization meet only a part of the objectives of the perspectives. For example, financial success alone does not guarantee long-term success. The organization must operate in such a way that the goals of all perspectives can be achieved. This will also enable long-term success.

Strategic vision and operation efficiency develop as the procurement begins to manage and evaluate its performance systematically. A procurement performance metrics may enable, when used correctly, to manage the procurement operation more efficiently, and therefore to achieve the objectives of the case company. Once the procurement has reached a sufficient degree of maturity in performance management, it will improve the overall performance of the case company in the long run and thus ultimately develop its competitive position.

In this thesis, numerous subjective indicators to measure procurement performance were proposed to the case company. There are usually many difficulties associated with the use of subjective productivity measures, but there are also many positive things. They are a good complement to the objective metrics already in use by the organization. Although the relationship between subjective and objective metrics is not perfect, they are generally positively correlated (Lönqvist et al., 2006, p.96). They also stated that the cause of an incomplete correlation can be due to many things. Subjective metrics are likely to measure different aspects of productivity than that measured by objective metrics. Subjective metrics can be used to look at a measurable phenomenon from many different dimensions and thereby create perhaps a more complete picture than objective metrics can.

It has been recognized that academic knowledge about indirect procurement is highly limited in comparison to direct procurement (Israel & Curkovic 2020). The forest industry in which the case company operates makes this study interesting from a research perspective, as no studies have been published in the literature examining the measurement of indirect procurement performance from the perspective of a forest industry manufacturing company.

One notable finding from the academic literature was the COPC Indirect Procurement Standard, which was a performance management system designed to present a set of best practices and key metrics for indirect procurement. However, there is no in-depth study in the literature on how measures should be weighted in a hybrid procurement organization for indirect procurement in a manufacturing company. This study selected only a couple of COPC metrics for the case company's scorecard because the case company has its own business environment and needs. The key performance indicators proposed in this study were largely based on the company's strategy and related success factors. For example, Komatina et al. (2019) support the approach of this study, as they argue that the same performance measurement system cannot be applied well in two different organizations or two business processes. According to Kankkunen et al. (2005), a well-functioning measurement system reflects the chosen strategy. Thus, it is essential to design key performance metrics with a clear link to the company's strategy.

There is only a small amount of research in academic studies on the balanced scorecard model presented by Hofmann et al. (2014). Thus, this study complements the existing literature by applying the P-BSC model to the indirect procurement of a large manufacturing company. The P-BSC model was seen as well suited to the context of this study, as it also takes into account the internal customer perspective, which played an important role in designing suitable metrics for the case company. This study also recommends using a strategy map as a support tool for the construction and use of the purchasing balanced scorecard metrics. The strategy map helps to design comprehensive metrics that have a clear link to the company's strategy.

5.2 Managerial implications

The management should consider the development suggestions presented in this study, because the procurement does not have a concrete set of performance KPIs that would be systematically monitored, and it has been argued that procurement can improve the purchase process with a balanced performance management system (Hofmann et al., 2014, p.136). However, this study focused mainly on the design phase of the scorecard

and did not take a more detailed view on how the KPIs should be implemented or visualized. Management should also consider that the implementation phase of some indicators can take a lot of time. The implementation of the KPIs may require several steps. For example, the information system may have to be modified to produce the information needed for the indicators, and the employees may need to be trained in the use of the metrics, as well as the scorecard must also be tested. According to Kankkunen (2005), index indicators have been developed when management believes that there are too many indicators to monitor, and several indicators have been desired to be monitored at the same time. Thus, if there is no time to monitor individual metrics, the proposed KPIs can be combined later into one performance index measure, where each KPI is weighted according to its importance.

Because the proposed metrics are designed based on the organization's strategy and the needs of the internal stakeholders, it reinforces the proposition to be suitable in measuring the case company's procurement performance. This study also recommends the case company standardize the metrics between the case company's different procurement teams. The standardized metrics would provide a good basis for reliable measurement and good transparency between different mills.

The management level should consider that metrics change over time as the organization's objectives and the business environment evolve (Limberakis & Fong 2018). The procurement performance scorecard must therefore be dynamic, and the metrics must always be derived from the company's strategy. In this way, it enables to manage the procurement operation more efficiently and to achieve the goals of the case company.

5.3 Limitations and criticism of the study

This study has several limitations that are important to acknowledge. Due to the single case study, the results **should not be generalized** to the purposes of the other cases, especially without any consideration. Some of the concepts in this study, e.g. procurement performance measurement, are case-specific. The concept may change between different industries, and in different companies, they may be tailored to different purposes. However, there maybe be some characteristics that can be generalized to other organizations as well.

Service purchases are excluded from the study, so the thesis is limited to the company's component purchases only. Service purchases represent a large proportion of indirect procurement expenditures. Thus, managing the indirect services would be an interesting and useful topic of research. However, indirect services are a separate entity,

and it requires different approaches. In addition, **an external perspective was excluded** from the study. An external perspective refers to factors related to performance of suppliers. Thus, further studies are strongly recommended in a broader empirical term, such as a study from suppliers' perspectives. It has also been stated in the academic literature that, for example, the performance of suppliers is positively correlated with the performance of the purchasing company (e.g., Kannan & Tan, 2006).

The study **does not focus specifically on the implementation and visualization of performance measures**. So, its further evaluation is excluded from the study because implementing the proposed measures and monitoring them would take a lot of time. Especially in terms of strategic benefits, as they can typically be achieved in the long term. In addition, the metrics should be visualized to ensure easy monitoring.

The interviews of the thesis were limited to the internal stakeholders of the case company, which only provides an internal perspective on the development of the procurement performance measurement. The results thus do not consider the possible views and needs of external stakeholders. The study could have led to even better results if the interviewees had also been selected from outside the organization, and the interviews had been conducted over a longer period of time.

The reliability of the results is also strongly influenced by the results of the interviews conducted in the empirical section and how they have been interpreted. Also, interviewees have their own personal views and experiences that can make interview results very subjective. However, several people from different stakeholders were selected for the interviews, and thus many perspectives were obtained, which increases the reliability of the results.

The materials and data sources behind the results of the study also largely affect the reliability of the results. However, the aim was to select peer-reviewed and highly referenced sources to make sources as reliable as possible. In addition, the suitability and functionality of the proposed KPIs in the study have not yet been concretely tested in the business environment of the case company. Thus, the implementation of the proposed KPIs should be implemented gradually and tested in practice to ensure their suitability.

Assessing the validity of a study is more challenging than reliability. The validity of the study is weakened by the fact that the practical functionality of the proposed KPIs was not tested in a real situation because the time window of this study was not sufficient for the implementation process. To tackle the problems of the validity, the aim of the theoretical part was to find the best measurement practices from the latest knowledge in the area, and several interviewees from different internal stakeholder groups were selected

for the interviews to gain a comprehensive view. Given the broad theoretical framework and its implications for the results, it can be considered that the validity of this study is adequate. The research of the topic was also facilitated by the researcher's own knowledge and previous experience in the topic area and industrial operating environments.

5.4 Objectives for further research

The study opened several directions for further research. In this study, the procurement performance measures were developed based on the needs of the procurement organization's internal stakeholders. Further examination could be done, for example, in the field of the key suppliers. In theory, it turned out that supplier selection and supplier relationship management are an important part of a successful procurement.

Moreover, this study is a master's thesis from the field of indirect procurement, so there remains a need to understand better the company's procurement performance measurements and measurement practices of direct purchases. As stated in theory, the purchasing process and measurement criteria for direct purchases differ from indirect procurement. Thus, the results should not be generalized to the measurement of the direct procurement. As this thesis was limited to component procurement, the proposed set of KPIs should be supplemented in the future with indicators of the service perspectives.

REFERENCES

- Ahola, T., Laitinen, E., Kujala, J. & Wikström, K. (2008). Purchasing strategies and value creation in industrial turnkey projects. *International Journal of Project Management*. [Online] 26 (1), 87–94. Available from: <https://www-sciencedirect-com.libproxy.tuni.fi/science/article/pii/S0263786307001238?via%3Dihub>, 30.9.2020.
- Aksoy, A. & Öztürk, N. (2011). Supplier selection and performance evaluation in just-in-time production environments. *Expert Systems with Applications*. [Online] 38 (5), 6351–6359. Available from: <https://www-sciencedirect-com.libproxy.tuni.fi/science/article/pii/S0957417410013424?via%3Dihub>, 25.9.2020.
- Angeles, R. & Nath, R. (2007). Business-to-business e-procurement: success factors and challenges to implementation. *Supply Chain Management: An International Journal*, 104-115.
- Ashenbaum, B. (2006). *Defining Cost Reduction and Cost Avoidance, Critical Issues Report*, Tempe, AZ: CAPS Research.
- Baily, P., Farmer, D., Jesspo, D., & Jones, D., (2005). *Purchasing Principles and Management*, 9th ed., Harlow: Pearson Education Limited.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*. [Online] 17 (1), 99–120. Available from: [https://josephmahoney.web.illinois.edu/BA545_Fall%202019/Barney%20\(1991\).pdf](https://josephmahoney.web.illinois.edu/BA545_Fall%202019/Barney%20(1991).pdf), 28.9.2020.
- Barry, J. et al. (1996). A development model for effective MRO procurement. *The journal of supply chain management*. 32 (3), 35–44.
- Bell, E., Bryman, A. & Harley, B. (2019). *Business research methods*. Fifth edition. Oxford: Oxford University Press.
- Bhagwat, R., & Sharma, M. K. (2007). Performance measurement of supply chain management: A balanced scorecard approach. *Computers & Industrial Engineering*, 53(1), 43-62.
- Budd, C. S. (2010). Traditional measures in finance and accounting, Problems, Literature Review, and TOC measures. *Theory of constraints handbook*. 335-371. New York: McGraw-Hill.
- Caniato, F. et al. (2012). Purchasing performance management systems: an empirical investigation. *Production Planning & Control*. [Online] 25 (7), 616–635. Available from:

https://www.researchgate.net/publication/249322491_Purchasing_performance_management_systems_An_empirical_investigation, 20.10.2020.

Carr, A. S. & Smeltzer, L. R. (2000). An Empirical Study of the Relationships among Purchasing Skills and Strategic Purchasing, Financial Performance, and Supplier Responsiveness. *The journal of supply chain management*. [Online] 36 (2), 40–54. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1745-493X.2000.tb00250.x>, 30.10.2020.

Carr, P. (2002). The impact of purchasing and supplier involvement on strategic purchasing and its impact on firm's performance. *International journal of operations & production management*. [Online] 22 (9), 1032–1053. Available from: <https://www.emerald.com/insight/content/doi/10.1108/01443570210440528/full/html>, 30.10.2020.

Chen, I. J., Paulraj, A., & Lado, A. A. (2004). Strategic purchasing, supply management, and firm performance. *Journal of Operations Management*, 22 (5), 505–523.

Cousins, P., Lawson, B., Squire, B. (2008). Performance measurement in strategic buyersupplier relationships – The mediating role of socialization mechanisms, *International Journal of Operations & Production Management*, 238-258.

Cox, C., Chicksand, D. & Ireland, P. (2005). Overcoming demand management problems: The scope for improving reactive and proactive supply management in the uk health service. *Journal of public procurement*. 5 (1), 1–22. *Journal of business ethics*. 85 (2), 245–261.

Davila, A., Gupta, M. & Palmer, R. (2003). Moving Procurement Systems to the Internet: The Adoption and Use of E-Procurement Technology Models. *European Management Journal*. 21 (1), 11–23.

de Boer, L. et al. (2003). Purchasing as an organizational design problem: the case of non-product-related items and services. *Management Decision*. 41 (9), 911–922.

de Boer, L., & Sitar, C. P. (2001). Managing purchasing of non-product related (NPR) goods and services-On horizontal frictions and vertical ignorance. In *Proceedings of the 10 th International Annual IPSERA Conference, Jönköping*, 131-140).

Devaraj, S., Krajewski, L. & Wei, J. (2007). Impact of eBusiness technologies on operational performance: The role of production information integration in the supply chain. *Journal of operations management*. [Online] 25 (6), 1199–1216. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0272696307000034>, 10.10.2020.

- Dimitri, N. (2013). 'Best value for money' in procurement. *Journal of Public Procurement*. 13 (2), 149–175. [online]. Available from: <http://search.proquest.com/docview/1667938289/>, 30.9.2020.
- Doney, P. M. & Cannon, J. P. (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journal of Marketing*. 61 (2), 35–51.
- Eakin, D. (2003). Measuring e-procurement benefits. *Summit: Canada's magazine on public sector purchasing, United Kingdom*. Available from: <http://search.proquest.com/docview/230358148/>, 20.10.2020.
- Ellram, L. (2003). A taxonomy of total cost of ownership models. *Journal of Business Logistics* 15 (1), 171–191.
- Ellram, L. M., Zsidisin, G., Siferd, S, & Stanly, M. (2002). The Impact of Purchasing and Supply Management Activities on Corporate Success. *Journal of Supply Chain Management*. 38 (4), 4–17.
- Ellram, L.M. & Liu, B., (2002). The financial impact of supply management. *Supply Chain Manag. Rev.* 6 (6). 30-37.
- Enos, D.D. (2010). *Performance Improvement: Making it Happen, Second Edition*. London: Auerbach Publications.
- Evans, E. (2003). Beyond savings. *Supply management* 8 (3), 17.
- Fedele, K. M. (2004). KPIs: Measuring Indirect Material Suppliers and Service Providers.
- Flint, D. J., Woodruff, R. B. & Gardial, S. F. (1997). Customer value change in industrial marketing relationships: A call for new strategies and research. *Industrial Marketing Management*. [Online] 26 (2), 163–175. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0019850196001125>, 20.09.2020.
- Foerstl, H. (2013). Cross-functional integration and functional coordination in purchasing and supply management: Antecedents and effects on purchasing and firm performance. *International journal of operations & production management*. 33 (6), 689–721.
- Foerstl, K., Franke, H. & Zimmermann, F. (2016). Mediation effects in the 'purchasing and supply management (PSM) practice–performance link': Findings from a meta-analytical structural equation model. *Journal of purchasing and supply management*. [Online] 22 (4), 351–366. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S1478409216300516>, 30.09.2020.
- Francis, M., Fisher R., Andrew, T. & Rowlands, H. (2014). The meaning of 'value' in purchasing, logistics and operations management. *International Journal of Production*

- Research. [Online] 52 (22), 6576–6589. Available from: <http://www.tandfonline.com/doi/abs/10.1080/00207543.2014.903349>, 28.09.2020.
- Hartmann, E. et al. (2012). Top and bottom line relevance of purchasing and supply management. *Journal of purchasing and supply management*. 18 (1), 22–34.
- Heikkilä, J., Vuori, M., & Laine A.T.L., (2013). *Purchasing Business Services*. Tampere: Tammerprint Oy. ISBN 978-952-238-114-9.
- Hesping, F. H., & Schiele, H. (2015). Purchasing strategy development: A multi-level review. *Journal of purchasing and supply management*, 21(2), 138-150.
- Hirsjärvi, S. & Hurme, H. (2008). *Tutkimushaastattelu: teemahaastattelun teoria ja käytäntö*. Helsinki: Gaudeamus Helsinki University Press.
- Hirsjärvi, S., Remes, P. & Sajavaara, P. (2009). *Tutki ja kirjoita*. 15. uud. p. Helsinki: Tammi.
- Hofmann, E., Maucher, D., Kotula, M. & Kreienbrink, O. (2014). *Performance Measurement and Incentive Systems in Purchasing*, Springer. 182 s. ISBN 978-3-642-38438-7
- Huuhka, T. (2017). *Tehokkaan hankinnan työkalut*. 2. uudistettu painos. Helsinki, Suomi: BoD - Books on Demand.
- Håkansson, H. & Gadde, L. E. (1992). *Supplier relations*, in *Professional Purchasing*, London, Routledge.
- Iloranta, K. & Pajunen-Muhonen, H. (2015). *Hankintojen johtaminen: ostamisesta toimittajamarkkinoiden hallintaan*. 4. tark. laitos. Helsinki: Tietosanoma.
- Israel, C. & Curkovic, S. (2020). Indirect Procurement: A Literature Review and Study of Trends. *American Journal of Industrial and Business Management*. 10 (4), 775–792.
- Janda, S. & Seshadri, S. (2001). The influence of purchasing strategies on performance, *Journal of Business & Industrial Marketing*, 294-308.
- Jeston, J., & Nelis, J. (2006). *Business process management, Practical guidelines to successful implementations*. Oxford: Butter-Heinemann, Elsevier Ltd., Jordan Hill.
- Jääskeläinen, A. & Heikkilä, J. (2019). Purchasing and supply management practices in customer value creation. *Supply Chain Management: An International Journal*. [Online] 24 (3), 317–333. Available: <https://www.emerald.com/insight/content/doi/10.1108/SCM-04-2018-0173/full/html>, 20.9.2020.

- Jääskeläinen, A. (2018). Comparison of performance measurement in different purchasing and supply management practices. *International journal of productivity and performance management*. [Online] 67 (8), 1290–1309. Available: https://www.researchgate.net/publication/327849825_Comparison_of_performance_measurement_in_different_purchasing_and_supply_management_practices, 20.01.2020.
- Jääskeläinen, A., Thitz, O., & Heikkilä, J. (2016). The role of the purchasing function in non-financial value creation. In *25th Proceedings of IPSERA 2016 conference: 20-23.3. 2016, Dortmund, Germany*.
- Kankkunen, K. et al. (2005). *Mittareilla menestykseen: sokkolennosta hallittuun nousuun*. Helsinki: Talentum.
- Kannan, V. R. & Tan, K. C. (2006). Buyer-supplier relationships: The impact of supplier selection and buyer-supplier engagement on relationship and firm performance. *International Journal of Physical Distribution & Logistics Management*. [Online] 36 (10), 755–775, Available from: <http://search.proquest.com/docview/30939363/>, 30.9.2020.
- Kaplan, R. S. & Norton, D. P. (1996). Linking the Balanced Scorecard to Strategy. *California management review*. 39 (1), 53–79.
- Kaplan, R. S. (2009). 'Conceptual Foundations of the Balanced Scorecard', in *Handbooks of Management Accounting Research*. Elsevier Ltd, 1253–1269.
- Kaplan, R. S. et al. (2007). *Strategian toteutus: synergiaetujen luominen balanced scorecardin avulla*. Helsinki: Talentum.
- Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard: measures that drive performance. January-February 1992. *Harvard business review*. 71-79.
- Karjalainen, K., Kemppainen, K. & Raaij, E. (2009). Non-Compliant Work Behaviour in Purchasing: An Exploration of Reasons Behind Maverick Buying. *Journal of business ethics*. [Online] 85 (2), 245–261. Available from: <https://link.springer.com/article/10.1007/s10551-008-9768-2>, 10.1.2021.
- Kaskinen, J. (2007). Creating a Best-in-Class KPI Program. *Strategic finance (Montvale, N.J.)*. 89 (4), 29–.
- Keen, J. M. (1997). Turn 'soft' benefits into hard savings. *Datamation*. 43 (9), 38–.
- Kessler, L., Lucianetti, L., Pindek, S., Zhu., Z. & Spector, P. (2020). Job satisfaction and firm performance: Can employees' job satisfaction change the trajectory of a firm's performance? *Journal of applied social psychology*. [Online] 50 (10), 563–572. Available

from: https://www.researchgate.net/publication/343220915_Job_satisfaction_and_firm_performance_Can_employees'_job_satisfaction_change_the_trajectory_of_a_firm's_performance, 10.1.2021.

Komatina, N., Nestic, S. & Aleksic, A. (2019). Analysis of the performance measurement models according to the requirements of the procurement business process.

Laitinen, E. K. (2003). Yritystoiminnan uudet mittarit. 3. uud. p. Helsinki: Talentum.

Limberakis, C. & Fond, A. (2018). Procurement Value: Moving Beyond Price Savings Toward Strategic Value Recognition. The Hackett Group.

Lindgreen, A. & Wynstra, F. (2005). Value in business markets: What do we know? Where are we going? *Industrial Marketing Management*. 34 (7), 732–748.

Lindgreen, A., Hingley, M.K., Grant, D.B. & Morgan, R.E. (2012). Value in business and industrial marketing: Past, present, and future. *Industrial Marketing Management*. [Online] 41 (1), 207–214. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0019850111002434>, 31.10.2020.

Lönnqvist, A., Kujansivu, P. & Antikainen, R. (2006). Suorituskyvyn mittaaminen: Tunnusluvut asiantuntijaorganisaation johtamisvälineenä (2. uud. p.). [Helsinki]: Edita.

Maestrini, V., Luzzini, D., Caniato, F., Maccarrone, P. & Ronchi, S. (2018). The impact of supplier performance measurement systems on supplier performance: A dyadic lifecycle perspective. *International journal of operations & production management*. [Online] 38 (11), 2040–2061. Available from: <https://www.emerald.com/insight/content/doi/10.1108/IJOPM-10-2016-0589/full/html>, 29.10.2020.

Maucher, D. & Hofmann, E. (2013). Savings measurement for capital equipment purchasing challenges and conceptual model. *International Journal of Productivity and Performance Management*. [Online] 62 (5), 490–513. Available from: https://www.researchgate.net/publication/227983517_Savings_Measurement_for_Capital_Equipment_Purchasing_Challenges_and_Conceptual_Model, 28.10.2020.

Melnyk, S. A. et al. (2004). Metrics and performance measurement in operations management: dealing with the metrics maze. *Journal of operations management*. 22 (3), 209–218.

Muchiri, P., Pintelon, L., Martin, H. & Meyer A. (2010). Empirical analysis of maintenance performance measurement in Belgian industries. *International Journal of Production Research*. [Online] 48 (20), 5905–5924. Available from: https://www.researchgate.net/publication/245331620_Empirical_Analysis_of_Maintenance_Performance_Measurement_in_Belgian_Industries, 10.10.2020.

- Möller, K. E. K. & Törrönen, P. (2003). Business suppliers' value creation potential: A capability-based analysis. *Industrial marketing management*. [Online] 32 (2), 109–118. Available from: https://www.researchgate.net/publication/222422518_Business_Suppliers'_Value_Creation_Potential_a_Capability-Based_Analysis, 28.9.2020.
- Nandeesh, S. et al. (2015). 'A multi-step recommendation engine for efficient indirect procurement', in [Online]. June 2015 IEEE. 377–380. Available from: https://www.researchgate.net/publication/283093293_A_multi-step_recommendation_engine_for_efficient_indirect_procurement, 1.10.2020.
- Narasimhan, R. & Das, A. (2001). The impact of purchasing integration and practices on manufacturing performance. *Journal of operations management*. [Online] 19 (5), 593–609. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0272696301000559>, 28.9.2020.
- Neely, A. D. (2002). *Business Performance Measurement Theory and Practice*. Cambridge: Cambridge University Press.
- Neely, A. et al. (2005). Performance measurement system design: a literature review and research agenda. *International journal of operations & production management*. 25 (12), 1228–.
- Neely, R. (1997). Designing performance measures: a structured approach. *International journal of operations & production management*. 17 (11), 1131–1152.
- Neilimo, K. & Uusi-Rauva, E. (2007). *Johdon laskentatoimi*. 6. – 8. painos. Helsinki, Edita.
- Nieminen, S. (2017). *Hyvä hankinta - parempi bisnes Helsinki*: Talentum Pro.
- Parmenter, D. (2015). *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs*. Third edition. Somerset: John Wiley & Sons, Incorporated
- Pohl, M. & Förstl, K. (2011). Achieving purchasing competence through purchasing performance measurement system design—A multiple-case study analysis. *Journal of Purchasing and Supply Management*. [Online] 17 (4), 231–245. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S1478409211000185>, 10.11.2020.
- Presutti, W. D. (2003). Supply management and e-procurement: creating value added in the supply chain. *Industrial Marketing Management*. [Online] 32 (3), 219–226. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S0019850102002651>, 25.9.2020.

- Ramsay, J. & Croom, S. (2008). The impact of evolutionary and developmental metaphors on Purchasing and Supply Management: A critique. *Journal of purchasing and supply management*. 14 (3), 192–204.
- Rozemeijer, F. & Weele, van (1996). Revolution in purchasing: building competitive power through proactive purchasing. *European journal of purchasing & supply management*. 2 (4), 153–160.
- Rudzki, R. A. & Trent, R. J. (2011). *Next Level Supply Management Excellence: Your Straight to the Bottom Line® Roadmap*. Ft. Lauderdale: J. Ross Publishing, Inc.
- Simons, R. (2000). *Performance measurement & Control Systems for Implementing Strategy*. New Jersey: Prentice Hall.
- Skjott-Larsen, T. (2007). *Managing the global supply chain*. 3rd ed. Copenhagen: Copenhagen Business School.
- Spekman, R. E., Kamauff, J. & Spear, J. (1999). Towards more effective sourcing and supplier management. *European Journal of Purchasing and Supply Management*. 5 (2), 103–116.
- Subramaniam, C. & Shaw, M. (2002). A Study of the Value and Impact of B2B E-Commerce: The Case of Web-Based Procurement. [Online] 6 (4), 19–40. Available from: <http://www.tandfonline.com/doi/abs/10.1080/10864415.2002.11044245>, 23.10.2020.
- Talluri, S., DeCampos, H. & Hult, G.T. (2013). Supplier Rationalization: A Sourcing Decision Model. *Decision sciences*. 44 (1), 57–86
- Ulaga, W. (2003). Capturing value creation in business relationships: A customer perspective. *Industrial Marketing Management*. 32 (8), 677–693.
- Weele, A. J. van (2018). *Purchasing and supply chain management*. Seventh edition. Australia: Cengage.
- Yin, R. K. (2009). *Case study research: design and methods*. 4. ed. Thousand Oaks (Calif.): Sage Publications.
- Zanardi, M. (2017). Buyer and business partner relationship supporting purchasing performance. *Strategic Direction*. 33 (2), 30–32.
- Zimmermann, F. & Foerstl, K. (2014). A Meta-Analysis of the 'Purchasing and Supply Management Practice–Performance Link'. *Journal of Supply Chain Management*. [Online] 50 (3), 37–54. Available from: https://www.researchgate.net/publication/261142232_A_Meta-Analysis_of_the_Purchasing_and_Supply_Management_Practice-Performance_Link, 30.9.2020.