



Mika Matela

PROCUREMENT IMPROVEMENT IN THE PUBLIC AGENCY



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Abstract

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Public sector procurement and innovations have been sources of economic and industrial competitiveness in the European Union (European Commission, 2022). Public procurement accounts for 12% of the EU's gross domestic product (GDP) (OECD, 2019). Procurement improvement could positively affect purchasing performance and innovativeness in public sector agencies; thus, scholars want to understand better the causalities and interrelations that explain purchasing performance and innovativeness. This knowledge could help public organisations improve their procurement competencies. This thesis studies the antecedents explaining purchasing performance and innovation orientation in public procurement. Working supply markets are essential for efficient procurement. This research identifies potential supply market development actions that may improve purchasing performance or attract innovative suppliers to participate more often in public sector tendering.

This research contributes to the field by identifying the antecedents of purchasing performance and innovation orientation in public procurement. This research seeks potential procurement actions for competency and supplier market development in the public sector. This thesis studies the interaction between suppliers' innovativeness and supply chain ambidexterity and their perceptions of innovation enablers in tendering and the customer attractiveness of public organisations. This research focuses on the case organisation, professional services purchasing category, and the government sector rather than the municipal sector.

The first part of the thesis presents an overview of the relevant literature, the research design and the conclusions. The latter part presents publications which considerably use a survey study methodology where questionnaires, in-depth interviews and focus group interviews are the primary data collection methods. This research presents initial conceptual models for purchasing performance, innovation orientation and customer attractiveness in public procurement. In addition, areas for purchasing category and supply market development are studied in the case organisation. The results illustrate how contemporary public sector topics can be analysed and propose further development opportunities.

Keywords: public procurement, innovation orientation in public procurement, customer attractiveness, competency development, supply market, purchasing performance

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The thesis has offered a journey into the procurement world and views on public procurement. This work was carried out in the LUT School of Business at Lappeenranta-Lahti University of Technology LUT, Finland, between 2015 and 2023.

I want to first thank my family for enabling me to finish this thesis while working by being adaptive and understanding for many years. Furthermore, I am grateful for having an employer and motivated workmates during the years of my studies. My journey would not have been possible without the support of my employer, co-workers in procurement, and fellow scholars at the university.

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Abstract

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List of publications

This thesis includes the following papers. The listed publications are in chronological order. The rights for publishing have been received either via publishers' licensing terms or granted by publishers so these papers can be included in this thesis.

- I. Matela, M., and Hallikas, J. (2015). Antecedents of purchasing performance in public procurement. *Proceedings of the 24th International Purchasing and Supply Education and Research Association (IPSERA) Conference (extended version), 29.3.-1.4.2015, Amsterdam, Netherlands.*
- II. Matela, M., Jauhiainen, T., Mäkinen, J., and Hallikas, J. (2018). Supply market development at a public agency. *Proceedings of the 27th International Purchasing and Supply Education and Research Association (IPSERA) Conference, 25.-28.3.2018, Athens, Greece.*
- III. Matela, M., and Hallikas, J. (2020). Development of purchasing competence in service procurement – Case transportation public agency. *Book chapter.* In: Rosa M. Søndergaard, ed., *Public Services: Management, Opportunities and Challenges*, pp. 169-200. ISBN: 978-1-53617-477-9. New York: Nova Science Publishers.
- IV. Matela, M., and Hallikas, J. (2021). The antecedents of innovation orientation in public procurement. *International Journal of Business and Systems Research*, 15(6), pp. 727-747.
- V. Karttunen, E., Matela, M., Hallikas, J., and Immonen, M. (2022). Public procurement as an attractive customer: A supplier perspective. *International Journal of Operations and Production Management*, 42(13), pp. 79-102.

Author's contribution

Mika Matela is the principal author and investigator for papers I–IV. For publication V, Dr Karttunen, E. is the corresponding author. The author's contributions to the publications are summarised below.

As a corresponding author, the author:

- I. was responsible for planning research, reviewing the literature and considering the implications of the study; participated in conducting a survey and quantitative research, including interpreting the results; and wrote most of the publication.
- II. was responsible for planning research, reviewing the literature, analysing the collected data and considering the implications of the study; participated in expert focus group surveys, interviews and workshops; and wrote most of the publication.
- III. was responsible for planning research, reviewing the literature, analysing the collected data and considering the implications of the study; wrote most of the publication; participated in the data collection; and participated in expert focus group surveys, interviews and workshops.
- IV. was responsible for planning research, reviewing the literature, and considering the implications of the study; participated in conducting a survey and analysing the collected data; wrote most of the publication; and participated in expert workshops, interviews and group interviews.
- V. participated as a member of the research group in the literature review, hypothesis construction, conceptual model creation and interpretation of results of the conceptual model; and was responsible for considering managerial implications.

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List of Abbreviations

AD	affinity diagrams
AHP	analytical hierarchy Process
ANOVA	analysis of variance
AVE	average variance extracted
BSC	balanced scorecard
C&E	cause and effect
CMB	common method bias
CR	composite/construct reliability
CSPC	consulting services purchasing category
ESI	early supplier involvement
EU	European Union
FTA	Finnish Transport Agency
FTIA	Finnish Transport Infrastructure Agency
GDP	gross domestic product
KBT	knowledge-based theory
KBTF	knowledge-based theory of the firm
NPS	net promoter score
OECD	Organization for Economic Cooperation and Development
OEM	original equipment manufacturer
PCP	pre-commercial procurement
PLS-SEM	partial least squares structural equation model
PMS	performance measurement system
PPI	public procurement of innovation
PSM	purchasing and supply management
RBV	resource-based view
RFP	request for proposal
RQ	research question
SCA	sustainable competitive advantage
SEM	structural equation model
SET	social exchange theory
TCE	transaction cost economics
VIF	variance inflation factor
VRIN	valuable, rare, inimitable, non-substitutable

1 Introduction

1.1 Background

In recent years, the world has faced several crises, such as the COVID-19 pandemic and Russia's war in Ukraine. In times of crisis, the importance of different public services of public sector services has often been highlighted, e.g., in healthcare and national security. Many of these publicly produced services are produced more or less via procurement. In the public sector procurement and its policies, the topical subjects for procurement development are procurement competencies, innovativeness, purchasing performance, cooperation with the supplier market and functioning supplier markets. This thesis addresses public procurement topics concerning innovativeness, performance, supply market customer attractiveness and competencies. These topics are relevant in the development of the procurement and procurement processes. This thesis contributes to the field of public procurement, as existing research has not comprehensively investigated how public agencies can improve their public procurement. For example, studies of public procurement improvement exist about how value is created (Malacina *et al.*, 2022).

The decline in resources in the public sector has prompted governments to look for new innovative ways to produce and improve agency-provided services (Hartley, 2005). Meanwhile, agencies are re-evaluating existing service production processes and attempting to find novel solutions to deliver legislation-defined mandatory services with fewer resources and greater efficiency. Innovativeness and innovation orientation in the public sector may improve public service productivity, efficiency and quality.

Understanding the antecedents for an efficient and effective public service and public procurement is also emphasised in times of crisis, when some factors, such as time, money or supply chain problems, limit the production of services. A few years ago, public procurement was adversely affected by both the financial crisis and the global recession. At the same time, increasing percentages of ageing populations in many countries have led to increased public spending. As a result, there is growing pressure on the public sector to improve its performance and decrease its purchasing budgets when tax incomes and other revenues diminish in the long run. These improvement needs have motivated public organisations to improve their procurement and innovativeness.

The previous innovativeness term means the ability to develop and utilise innovations (Välimäki *et al.*, 2004) which are something new. Innovation enablers in tendering or orientation mean procurement actions or policies that reduce innovation barriers' impact. These previous terms and other key research concepts are described more in section 1.5 and chapter 2.

Innovations are the essential sources of Europe's competitiveness (European Commission, 2022). In the EU, public procurement accounts for almost one-third of government expenditure and 12% of the gross domestic product (GDP)(OECD, 2019). Previous information indicates that the development of Europe's public procurement to be more innovative could considerably and positively impact Europe's competitiveness. Similarly, a high-impact public purchasing organisation, such as in this thesis' studied Finnish Transport Infrastructure Agency (FTIA, known as the Finnish Transport Agency before 2019), with over two billion euros in annual purchases, may also contribute positively to Europe's competitiveness. The agency may contribute to the innovations by improving its innovativeness by being more innovation-oriented or enabling more innovations in its procurement.

Best practices can be used to develop innovativeness and the use of innovative public procurement or supplier markets. Organisations typically gather and analyse the results of their operations to learn about, improve and share their operation experiences. Different actors can also collect, analyse and share government practices and experiences, such as the Organization for Economic Cooperation and Development (OECD) and the European Commission. The OECD (2015) advises governments to focus on people, put knowledge to good use, work together and rethink the rules to enable innovation. The European Commission (2019) has also shared information on how governments enable innovative and sustainable public procurement.

The EU Commission and individual countries have plans for improving government purchasing innovativeness. For example, the Finnish government aims for 10% of public-sector procurement to be innovative (Räsänen and Vilén, 2021). At the same time, European countries are making efforts to measure and invest in government innovations (European Commission, 2010; Hughes, Moore and Kataria, 2011; Arundel and Huber, 2013; Bloch and Bugge, 2013). However, it is a challenge for governments to measure and quantify public sector innovations (Kattel *et al.*, 2013). Many countries plan to improve procurement innovation, but concrete innovation measurement systems and guidelines often do not exist (OECD, 2017).

Currently, in Finland, the buyer reports in a procurement notice whether the procurement considers innovation aspects. However, it is unclear which criteria organisations use to evaluate the innovation aspects of procurements. This thesis investigates the antecedents of innovation orientation in public procurement in an organisation based on procurement survey results for employees in different procurement roles. These antecedents provide information about which topics influence innovation orientation in public procurement and may positively affect procurement innovations.

A lack of competition has become a common concern in EU countries because a lack of competition in public tendering does not motivate suppliers to innovate or develop their offerings. As a result, an uncompetitive tendering environment may decrease the quality and increase the costs of the bought services and products in the long run. In 2021 in all EU countries except Iceland, Malta and Sweden, more than 10% of all public contracts had single bidders, and 19 EU countries had 20% or more of the contracts for single bidders (European Commission, 2023). Based on these indicator results, public procurement should improve its attractiveness for suppliers to have real competition in tendering. This lack of supplier bids (European Commission, 2023) means customer attractiveness and its antecedents are topical for public procurement managers. Attractive customers are thought to attract also innovative and high-performing suppliers (Schiele, 2020).

In innovativeness and purchasing performance improvements, procurement competencies and skills are essential. Prior research has found a positive relationship between supply management competencies and firm performance; a higher level of skills may predict improved performance (Carr and Smeltzer, 2000). It is challenging to develop and foster innovativeness in public procurement, but trained procurement personnel could introduce innovative solutions in different phases of the procurement process. The public procurement process aims to find and procure solutions that fulfil needs at the best possible value for the money.

The doctoral research is based on the resource-based view theory (RBV) because the thesis results provide information on how to use resources for enduring competitive advantage, like information on how to develop procurement competencies in the studied agency (Barney, 1991). The knowledge-based theory of the firm (KBTF) and the social exchange theory (SET) expand the theoretical examination of the thesis (Spina *et al.*, 2016). Chapter 2 describes the use of theories in doctoral research.

1.2 Research gaps and questions

This thesis focuses on three topical identified public procurement development subjects in section 1.1. These topics are according to existing public procurement policies in Finland and researched with the help of three sub-questions and one main question. Sub-questions research the antecedents of purchasing performance and innovativeness in a public agency and improvement of procurement competencies. A common theme for the sub-questions is a procurement improvement of a public agency according to its procurement policies. The thesis's research questions (RQs) may help public agencies implement their procurement development according to current public procurement policies.

Prior studies have revealed the shortcomings of the public buyer's perspective on purchasing performance (Sánchez-Rodríguez *et al.*, 2006) and innovation orientation (Johnsson, 2017) (e.g. Pub I and IV regarding research gap). Understanding the antecedents of performance and innovation orientation in procurement can help organisations with their continuous improvement efforts. Knowing these antecedents could also be valuable when implementing a performance measurement system (PMS) or attempting to increase innovativeness in public procurement.

Prior research has not discussed to a significant extent how to develop supply markets in public sector organisations with different purchasing categories, each with its own supply market characteristics (Pub II). Instead, studies exist, e.g., about supplier development (Chen, Ellis and Holsapple, 2015). The literature lacks information on which procurement competencies are most valued during different phases of the procurement process of the public sector (Pub III). This thesis includes a case study of the consulting services category from the public agency. Existing literature also neglects how innovative suppliers see public buyers' attractiveness (Pub V). Public buyers can attract more suppliers via supply market development; however, knowledge of how this can be done in a high-impact public agency from a buyer perspective is scarcely addressed in previous research. This research aims to bridge these research gaps.

The main research question of this thesis is:

How can a public agency improve its procurement?

The sub-questions of this thesis are:

RQ1: How can purchasing performance be improved?

RQ2: How can innovativeness be improved in procurement?

RQ3: How can procurement competencies be improved?

The case study organisation for most of this research is the FTIA, aside from Pub V, which researches the views of public sector suppliers in Finland. Pub III focuses mainly on the consulting purchasing category perspective of the studied agency. Pub III examines which procurement competencies, measurements, best practices and development suggestions are relevant in the studied agency (RQ1–3). Future procurement development in public agencies may benefit from the study's found best practices and development suggestions to improve public procurement's performance and innovativeness.

Table 1 shows which publications in this thesis contribute to which research questions.

Table 1. Research questions addressed by each publication.

T H E S I S	MAIN QUESTION:		
	How can a public agency improve its procurement?		
P U B L I C A T I O N S	SUBQUESTIONS:		
	RQ1: How can purchasing performance be improved?	RQ2: How can innovativeness be improved in procurement?	RQ3: How can procurement competencies be improved?
	I: Antecedents of purchasing performance in public procurement		
	II: Supply market development at a public agency.		
	III: Development of purchasing competence in service procurement - Case transportation public agency		
		IV: The antecedents of innovation orientation in public procurement	
		V: Public procurement as an attractive customer: A supplier perspective	

1.3 Positioning of the study

This thesis's research fields and disciplines are performance management, innovation (Drucker, 2002) and purchasing and supply management (PSM) in the public sector context, shown in Figure 1. This thesis contributes primarily to the PSM discipline (Spina *et al.*, 2016) and the intersections of other fields and disciplines shown in Figure 1.

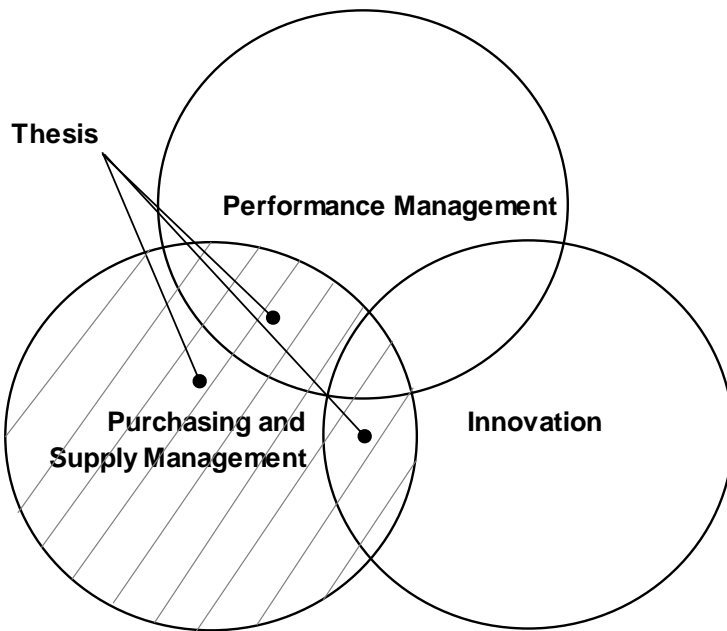


Figure 1. Main research fields of this thesis in the public sector context.

The survey was chosen as the main research strategy. Online questionnaires and interviews were the primary data collection methods of this thesis. The collected data were cross-sectional.

The main survey research strategy was complemented with mixed research methods, including quantitative and qualitative research methods. The quantitative and qualitative research methods (e.g. interviews and surveys) in this thesis are listed in Table 3.

1.4 Outline and structure of the thesis

This thesis has two parts. Part I provides an overview of the study and Part II consists of five publications in this thesis. Section 1 of the first part includes an introduction, background, research gaps, research questions and the positioning of the study. Section 2 explains the theoretical framework of the study and explores the main terms and research topics of the thesis. Section 3 discusses the research design of the thesis, including the research methodology, research approach, research goal, data collection and limitations of the publications. Overviews of the publications are in Section 4. Finally, section 5 discusses concluding marks about the contributions of the study and proposes future research topics.

Figure 2 summarises the structure of the thesis.

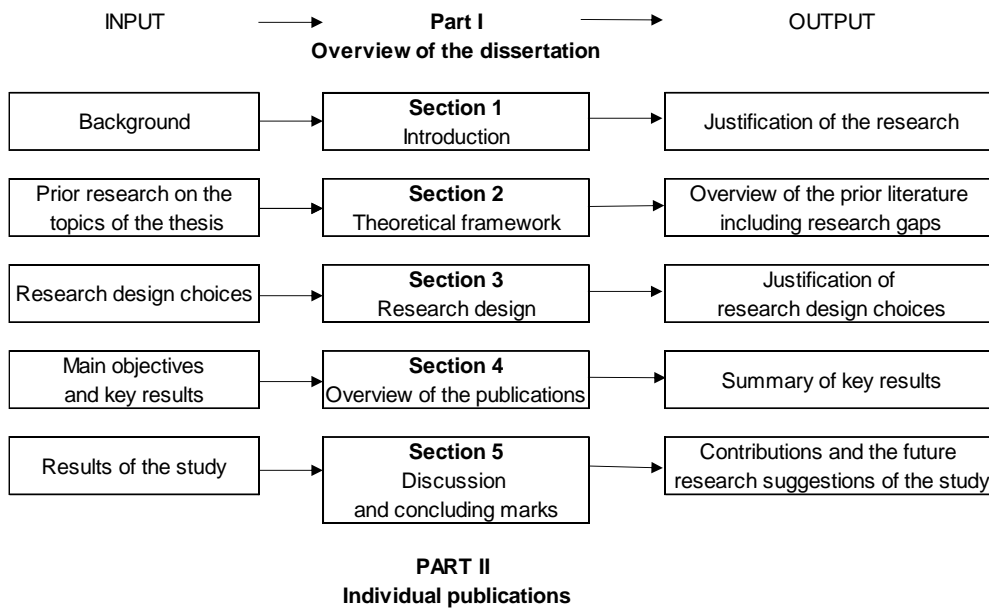


Figure 2. Structure of the thesis.

1.5 Definitions for key concepts of the research

This section concisely defines key concepts' definitions and meanings in this thesis before more comprehensive discussions in chapter 2.

Customer attractiveness refers to how much a customer is preferred. Preferred customer status is buyer attractiveness from a supplier's point of view (Schiele, Veldman and Hüttinger, 2011). Preferred customer status is a priority criterion in deciding the allocation of resources to customers in a company's portfolio (La Rocca, Caruana and Snehota, 2012). A preferred customer status from suppliers can improve suppliers' commitments, improve the development of more efficient relationships, and create positive outcomes over time for both the customer and the supplier (Christiansen and Maltz, 2002; Harris, O'Malley and Patterson, 2003; Schiele, Veldman and Hüttinger, 2011)

In this thesis context, innovation means that innovation creates and implements a new or significantly improved solution to a meaningful problem (Rogers, 1995). Innovation does not have to be new to the world, but it should be a novel introduction to the market or industry where the innovation is intended for use (Edquist C., Hommen L., Tsipouri, 2000; Keeley *et al.*, 2013).

Innovativeness is the ability to develop and utilise innovations (Välimäki *et al.*, 2004). An innovation is something new. Therefore, innovativeness often measures an innovation's newness degree (Garcia and Calantone, 2002). Innovativeness can refer to

the characteristics of an organisation or a person (Hansen, 2014), can appear due to the early adoption (Rogers, 1995) or creation of new technologies, products or concepts, and can create a competitive advantage for an organisation (Porter, 1985).

Procurement competencies in this thesis are the competencies of individuals that enable the effective management of the procurement process. In Pub III procurement process includes the cooperation development phase related to the procurement process. Procurement is a broader concept than purchasing, focusing on the process of buying goods and services (Murray, 2009). In this thesis, purchasing and procurement competencies terms are synonyms. According to Le Deist and Winterton (2005), competencies are skills, knowledge and other characteristics of an individual that lead to superior job performance. Boyatzis (1991) says, “a job competency is underlying characteristic of a person in that it may be motive, trait, skill, aspect of one’s self-image or social role, or a body of knowledge which he or she uses” (p. 21). In addition, competencies can be conceptual (e.g. cognition, knowledge and understanding) or occupational (e.g. technical knowledge or applied skills). Therefore, procurement competencies are also diverse (Tassabehji and Moorhouse, 2008; Derwik and Hellström, 2017).

Purchasing performance measures the effectiveness of management and improves the purchasing function (Chao, Scheuing and Ruch, 1993). Purchasing performance evaluations provide feedback to the purchasing function and top management to assess the effectiveness of the organisation’s purchasing strategies and decision-making. Purchasing performance evaluations depend on the different aspects of an organisation, such as the type of organisation and the characteristics of personnel in different roles (Chao, Scheuing and Ruch, 1993). The evaluation of the purchasing activity and its methods are often determined based on the management’s view of the importance and role of the organisation’s purchasing activity (Van Weele, 1984).

Public procurement refers to the acquisition of goods and services by government or public sector organisations (Uyarra *et al.*, 2014). Public procurement enables public sector organisations to deliver key services effectively and efficiently, for instance, by buying innovative products and solutions. According to Murray (2009) procurement is tactical, and its cycle has a “make-or-buy” decision phase, which is not included in the purchasing cycle.

Purchasing often refers to the process of buying (Van Weele, 2005). Purchasing translates to a purchasing cycle or process with phases such as determining the need, selecting the supplier, contracting, ordering, expediting and following-up/evaluating (Murray, 2009). The purchasing cycle translates desired outcomes into the specification of a purchase. In the literature, purchasing and procurement terms are used interchangeably (Van Weele, 2005). The procurement term is preferred instead of the purchasing term in this introduction part of the thesis. In publications of the thesis, purchasing and procurement terms are used interchangeably. Purchasing and procurement terms are explained more in section 2.2.

2 Theoretical framework and background

This chapter describes the theoretical background of this thesis, summarising the main concepts, constructs and theories from the literature included in this thesis (Varpio *et al.*, 2020). Detailed descriptions of the concepts, constructs and theories are in the publications.

The publications in this thesis are connected to different grand theories. The following paragraphs cover these grand theories and connections. According to Swamidass (1991), grand theories are general or unified theories that provide comprehensive views of reality. Grand theories often solve conflicts coming from middle-range theories or empirical generalisations (Behling, 1978; Swamidass, 1991). Characteristics of grand theories in operations management explain the interactions of variables in the system, predict the values of variables in the system, organise knowledge, inspire new research and have practical implications (Swamidass, 1991). According to Wacker's (1998) definition, a theory is based on conceptual definitions, domain limitations, predictions and relationship-building.

Public procurement agencies also aim for more effective and efficient procurement. According to Penrose (1959), the resource-based view emphasises available internal resources, not those which are externally purchased (Coates and McDermott, 2002). According to (Spina *et al.*, 2016), RBV and transaction cost economics are the most frequently adopted frameworks in PSM. This thesis's results can help public agencies identify the resources that will potentially develop their purchasing performances, supply markets, procurement competencies, procurement of professional services, innovation orientations and customer attractiveness more effectively and efficiently. Therefore, this thesis (Pub I–V) belongs to the RBV of grand theories in PSM.

This thesis examines what variables explain purchasing performance, innovation orientation and customer attractiveness. In addition, this dissertation gathers best practices concerning supply market development actions. In other words, this thesis collects procurement knowledge, which a public organisation can use in its procurement development. The knowledge-based theory of the firm (KBTF) explains how knowledge is managed within an organisation and how it contributes to the organisation's SCA, which leads to superior profits via optimising the deployment of existing resources (Grant, 1996b). The KBTF relates to Pub I–V because these publications produce knowledge to improve procurement. Instead, procurement improvement can create a competitive advantage and help optimise the deployment of existing resources to procurement. Pub V studies buyer-supplier relations and belongs to the social exchange theory. SET refers to establishing, developing and maintaining successful relations, which may provide more rewards than costs and generate both bilateral trust and attraction (Spina *et al.*, 2016).

The theory term means mostly an explanation of observed regularities and to explain why something occurs, and abstract-level grand theories give few indications for studies of how a collection of empirical evidence might be guided or influenced (Bell, Bryman and Harley, 2011). Grand theories can impact how the studied variables are treated, considered, evaluated, measured and discussed in the research.

The main connections of this research to grand theories are described in Table 2, which summarises how publications associate with external grand theories and includes brief characteristics of each theory and a short explanation of how each publication is connected to a particular theory.

Table 2. Connections of publications to the identified grand theories (Grant, 1996a; Spina *et al.*, 2016).

PUBLICATIONS	Resource-based View (RBV) Theory - Resources of a firm are the source of enduring competitive advantage when those are valuable, rare, inimitable and non-substitutable - Purchasing itself may provide SCA - Organisation's certain assets, capabilities and competencies are a source of competitive advantage	Knowledge-based Theory of the Firm (KBTF) (e.g., Grant 1996a) - Embraces knowledge creation and application - The emphasis is on creating information by individuals and individuals as the main repository of information - Knowledge is the most strategically important resource of the firm and can be the source of competitive advantage - Organisation role is knowledge application	Social Exchange Theory (SET) - Refers to activities establishing, developing, and maintaining successful relations - For studies of buyer-supplier or supply chain relations of dependence
Pub I - The antecedents of purchasing performance in public procurement	The study researches the antecedents of purchasing performance. These research results can provide knowledge of which assets, capabilities and competencies can effectively and efficiently provide a competitive advantage.	The antecedents of purchasing performance are knowledge that can be strategically important for the organisation, and developing these antecedents can bring a competitive advantage.	
Pub II - Supply market development at a public agency	Organisations' resources enable the execution of the paper's prioritised supply market development actions. These development actions found by the study can be potential sources of competitive advantage.	The study creates information about which supplier development actions existed in different purchasing categories and knowledge of which supplier market development actions have the most impact and feasibility. The development actions with the highest impact and/or feasibility can be a source of competitive advantage for the case organisation's different purchasing categories or organisations similar to the case organisation.	
Pub III - Development of purchasing competence in service procurement	Identifies and prioritises the most important purchasing competencies for purchasing development, which may be the organisation's sources of enduring competitive advantage.	The research gathers the most important purchasing competencies, best practices, metrics and suggestions for purchasing development. The organisation can apply collected and analysed knowledge of the research to develop its own competitive advantage.	
Pub IV - The antecedents of innovation orientation in public procurement	The study creates knowledge about the antecedents of innovation orientation in procurement. This can provide information on which assets, capabilities and competencies can effectively and efficiently provide a competitive advantage.	The antecedents of innovation orientation in a public organisation are knowledge which can be strategically important for the organisation, and developing these antecedents can bring competitive advantage to the organisation.	
Pub V - Public procurement as an attractive customer: A supplier perspective	Knowing the antecedents of customer attractiveness or innovation enablers in tendering can provide knowledge of which assets, capabilities and competencies can effectively and efficiently provide a competitive advantage.	The knowledge of the antecedents of customer attractiveness or innovation enablers in tendering can help the case organisation to improve its attractiveness to suppliers. Innovative suppliers can bring SCA to the buyer organisation.	The conceptual model of the paper explains customer attractiveness, which helps establish, develop and/or maintain successful relations between buyer and supplier.

2.1 The resource-based view in the context of procurement

The RBV has been developed over nearly 40 years. The main development of the RBV occurred between 1984 and the mid-nineties (Kraaijenbrink, Spender and Groen, 2010). The theory has been widely used and criticised. It is one of the most significant and quoted models in management theorising. The RBV claims that the internal sources of a firm may maintain sustainable competitive advantage (SCA) if prerequisites exist. This section contains details about the RBV and examples of criticism it has received (Fredendall, Hopkins and Bhonsle, 2005).

According to the RBV, the tangible resources, intangible resources and tied assets of a firm are the strengths or weaknesses of the organisation. These resources or assets must be heterogeneous and immobile, which makes them competitive resources for producing capability and earning rent (Barney, 1991). These resources or assets can yield a competitive advantage, especially when the resources are valuable, rare, inimitable or non-substitutable (VRIN). The RBV explains that the internal resources of an organisation can maintain SCA if the organisation can acquire and control these sources (Kraaijenbrink, Spender and Groen, 2010). A prerequisite for the RBV is that an organisation can absorb and apply SCA-giving resources (Barney, 1991).

Procurement itself can also provide SCA by finding suppliers with complementary capabilities. Spina et al. (2016) recommend that a firm does not outsource resources which yield a competitive advantage. Alternatively, these resources may partly come from outside of the firm. A firm can buy or use an alliance to obtain capabilities (Spina et al., 2016).

The RBV has been criticised. For instance, it has been argued that the VRIN characteristics of the resources and assets are not sufficient or necessary for SCA (Armstrong and Shimizu, 2007; Newbert, 2007); the RBV is a tautology, meaning it is not useful theory (Kraaijenbrink, Spender and Groen, 2010); the definition of a resource is overly inclusive (Priem and Butler, 2001); and the RBV does not recognise a firm's dynamic capability, which enables the firm to use capabilities dynamically when the firm's market environment evolves (Kraaijenbrink, Spender and Groen, 2010). Another limitation of the RBV is that it cannot be applied in unpredictable environments, such as markets with changing new technologies or emerging markets where the value of a resource can change drastically.

Kraaijenbrink, Spender and Groen (2010) suggest that improving the RBV would mean explicitly recognising differences between types of resources by distinguishing, for instance, deployed, dynamic, financial, human, intangible, non-perishable, technological and static resources.

2.2 Purchasing, procurement and public procurement

Purchasing and procurement terms are similar and used interchangeably but have different meanings (Van Weele, 2005). This section explains more about these two terms and public procurement concepts.

Purchasing refers to the process of buying goods and/or services to fulfil organisational needs (Van Weele, 2005). Van Weele (2005) defines purchasing as “the management of the company’s external resources in such a way that the supply of 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”. Monczka et al. (2009, p. 8) mention that purchasing can refer to a functional group aside from being a functional activity. A formal entity in the organisation may be responsible for purchasing. The purchasing group optimises purchases to deliver maximum value to the organisation. Purchasing aims to get the right quality, in the right quantity, at the right time, for the right price and from the right source.

The procurement process can have phases including planning purchases and recognising customer needs, creating purchasing requirements, selecting and bidding on suppliers, delivering orders, controlling and tracking follow-ups, and ensuring supplier and buyer cooperation (Simpson, Siguaw and White, 2002; Knoppen and Sáenz, 2015; Nair, Jayaram and Das, 2015; Jiang, 2009). Figure 3 illustrates these procurement process phases.

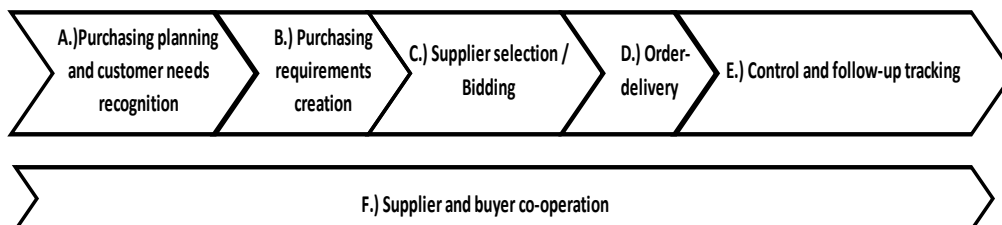


Figure 3. Phases of the procurement process.

Procurement is a broader term than purchasing because it includes procurement process phases and all activities that get the product or service from the supplier to the customer. Procurement contains the purchasing function, stores, traffic and transportation, arrival inspection, and quality control and assurance (Van Weele, 2005). Procurement and purchasing are part of supply chain management, which include activities, information, knowledge and financial resources related to the creation of services or products from the raw materials to the end users of the purchase, including, for example, logistics activities (Van Weele, 2005).

Public procurement is a well-established concept. Uyarra et al. (2014) define public procurement as “the acquisition of goods and services by government or public sector organisations”. Similarly, the European Commission states, “public procurement refers to the process by which public authorities, such as government departments or local authorities, purchase work, goods or services from companies” (European Commission, 2023). Also, Edquist and Zabala-Iturriagagoitia (2012) say that “public procurement means that a public organization buys a product (a good or a service or a combination of the two, which might be called a system.)”.

Public procurement is a major function of government and has a long history dating back to 2400–2800 BCE in Syria (Thai, 2001). Public procurement enables public sector organisations to deliver key services effectively and efficiently by buying innovative products and solutions. Procurement is tactical, and its cycle has a “make-or-buy” decision phase, which is not included in the purchasing cycle (Murray, 2009). Instead, purchasing function is often thought as an operational activity (Van Weele, 2005). According to Guarnieri and Gomes (2019), public procurement can be strategic, and these strategic practices can be related to, e.g. sustainability, partnerships and supplier management, information systems and technology.

2.3 Purchasing performance

Organisations are interested in measuring their performances. Also, in public procurement, purchasing performance measurements either indicate the degree that predefined targets are achieved or inspire specific improvements to purchasing. Purchasing performance topics are also connected to business performance (Sánchez-Rodríguez *et al.*, 2006).

Purchasing performance typically includes purchasing effectiveness and efficiency elements (Van Weele, 2005). According to Van Weele (2005), on the one hand, “effectiveness often refers to the relationship between planned and realised performance of any human activity”. Efficiency, on the other hand, is related to the objectives of the purchasing function. If the activity achieves the planned goal, then the activity is effective. Van Weele (2005) defines purchasing efficiency as the resources required to realise the previously established goals and objectives and their related activities. Purchasing efficiency essentially refers to the planned and actual costs. Purchasing efficiency improvements try to maximise the purchase outputs for given purchase inputs or minimise purchase inputs for given purchase outputs. Purchasing performance metrics often assess how the predefined goals and objectives of the purchasing function are achieved at the minimum cost of the organisation’s resources. Therefore, purchasing evaluations should include both effectiveness and efficiency elements. Evaluations and measurements of purchasing activities can be based on a price/cost, product/quality, logistics, or organisational dimension (Van Weele, 2005).

Prior research fails to precisely define purchasing performance, measurement or evaluation (Van Weele, 1984). Purchasing performance evaluations are often challenging because organisations have unclear purchasing function objectives and inaccurate purchasing performance measurements, purchasing scopes, responsibilities and tasks (Van Weele, 2005). A purchasing performance evaluation is also related to the type of organisation and the perspectives of personnel in different roles (Chao, Scheuing and Ruch, 1993).

Murray (2001) found that purchasing objectives differed between the private sector and the local government. Some objectives were common for both sectors, which included quality improvement and cost reduction. Other local government objectives included value for money, local economic development, environmental stewardship, quality of life, United Nations sustainable development local agenda 21 and customer focus in service delivery (Murray, 2001). In the EU, one of the development objectives is to increase innovation procurement in public procurement of the EU member states (European Commission, 2021). Improvement of innovativeness and both innovation orientation and enablers in public procurement supports the achievement of set ambition targets of the EU.

These purchasing performance targets are needed and used in PMS implementations (Bourne *et al.*, 2000). The best-known integrated PMS in most countries is the balanced scorecard (BSC) (Rantanen *et al.*, 2007), which is a value-adding process in public sector organisations (Wisniewski and Ólafsson, 2004). Purchasing performance objectives using PMS implementations may face problems such as stakeholders with conflicting needs, undefined end products and goals, a lack of property ownership and a lack of management skills (Rantanen *et al.*, 2007). Radnor and McGuire's (2004) indicate that the role of managers is far more administrative than managerial concerning performance measurement and management. One reason for this is that the various stakeholder staff must spend their time filling out forms and chasing information instead of changing or managing the process. As a result, performance measurements can be considered an evaluation instead of a tool for improvement (Radnor and McGuire, 2004) or seen as an entitlement for privatisations or government spending reductions (Gianakis, 2002). These findings can bring their own challenges to the implementation of purchasing performance measurements. Performance measurements in the public sector have also been troubled by the unsolved problems of defining indicators, the quality of indicators and the reporting of indicators (Fryer, Antony and Ogden, 2009). Knowing the antecedents of an organisation's purchasing performance can be valuable for planning effective and efficient procurement development despite its challenges.

2.4 Innovation, innovativeness and innovation orientation in public procurement

2.4.1 Innovation

In the literature, there are no commonly accepted definitions for “innovation” (Dunleavy *et al.*, 2006) or “procurement innovation”. Innovation often refers to originality and effectiveness, and the term originates from the Latin *novare*, meaning renewing or introducing something new (Schiele, 2006). Innovation can also be understood as doing things differently in economic life (Schumpeter, 1939). Product and process innovations include introducing new products, quality and production methods or handling methods, according to Schumpeter’s (1912). In public purchasing management, innovation generally has received managerial and academic attention (Schiele, 2006; Edler and Georghiou, 2007; Moore and Hartley, 2008; Bekkers, Edelenbos and Steijn, 2011; Pollitt, 2011; Arundel, Casali and Hollanders, 2015; Luzzini *et al.*, 2015).

According to Rogers (1995), innovative work creates and implements a new or significantly improved solution to a meaningful problem. Another interpretation of the term is that innovation does not have to be new to the world, but it should be a novel introduction to the market or industry where the innovation is intended for use (Edquist C., Hommen L., Tshipouri, 2000; Keeley *et al.*, 2013). Sources of innovations (Figure 4) include organisational mergers, imitation, the purchase of innovations, the development of new products and continuous improvement (Schiele, 2006). Depending on the previous personnel experiences of a newly merged organisation, a single solution could be considered innovative or standard. However, organisation mergers may not positively impact the merged firms’ innovation activities and may negatively affect competitors’ R&D incentives (Haucap, Rasch and Stiebale, 2019). As a result, a merger can even reduce an industry’s innovativeness. Several previously mentioned innovation sources exist in the public sector, e.g., public agencies may merge, and public agencies may imitate observed innovations from foreign public agencies. Instead, the public sector does not normally acquire firms as innovation sources (Figure 4) or develop new products for markets. However, in the digitalisation era, many governments make new digital service development, and these internet-accessible web services may produce innovations and include supplier involvement (Figure 4).

A process can demonstrate the structure of innovation. Walker (2008) defines “innovation as a process through which new ideas, objects, and practices are created, developed or reinvented, and which are new for the unit of adoption”. The innovation process has phases such as understanding, creating solution ideas, creating solutions and commercialising. Innovations can have either a positive or negative effect on employment. For example, rapid innovations using productivity improvements can destroy jobs and negatively affect the accumulation of welfare and human capital (Bogliacino, 2014). Innovations can be categorised as processes, services, ancillary (Damanpour, 1987) or inter-organisational (Mandell and Steelman, 2003). Process innovations include technological and management innovations. Walker’s (2014) review of government process innovation indicated that the internal antecedents of process innovation matter more than their external equivalents.

Innovations can be incremental or discontinuous, and innovation can occur as an individual, discrete occurrence. However, innovation may also result from the strategic decisions of the board of directors, for example, if they were to buy innovations instead of internally develop them. Such innovations may be considered continuous occurrences. Close supplier relationships support incremental innovation, whereas new and temporary relationships favour discontinuous innovation (Phillips *et al.*, 2006). Organisational factors and characteristics, such as the industry area, production (manufacturing or service), profitability model (for-profit or not-for-profit) and sector (public or private), can influence innovation (Damanpour, 1991). Innovations can be applied in public procurement areas such as transport and logistics, e-health, pharmaceuticals, energy, environment, security and digital content sectors (Edler and Georghiou, 2007).

According to Grandia, Steijn and Kuiper (2015) governments, need to adapt their procurement activities to innovations in the market to achieve greater sustainability. Nidumolu *et al.* (2009) research states that “smart companies now treat sustainability as innovation’s new frontier”. Sustainable procurement evaluates the environmental, social and economic effects of acquisitions. Supply chains present considerable innovation potential for sustainable development (Isaksson, Johansson and Fischer, 2010). A critical type of power in the buyer-supplier context is an organisation’s ability to innovate and create new ideas for its partners (Green, Morton and New, 1998).

Figure 4 illustrates and summarises innovation sources.

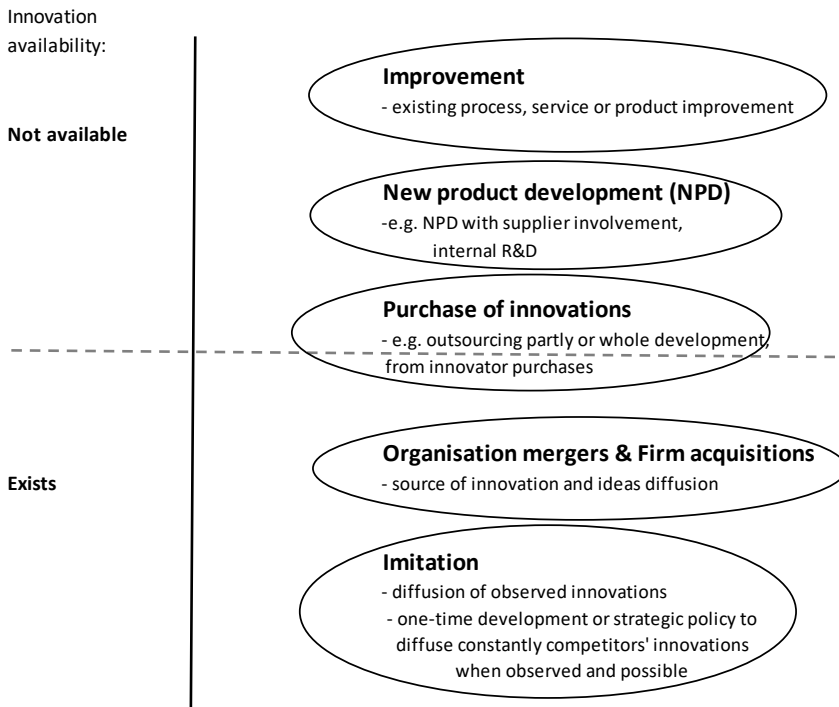


Figure 4. Origins of innovation (Schiele, 2006).

2.4.2 Innovativeness

The term innovativeness has varying definitions. The Merriam-Webster dictionary states that innovativeness means the skill and imagination to create new things. Rogers and Shoemaker (1971) describe innovativeness as “the degree to which an individual is relatively earlier in adopting an innovation than other members of his system”. In their definition, “relatively earlier” refers to the actual time of adoption. In other words, innovativeness means adopting innovation before others adopt the same innovation.

Organisations trying to innovate more have an interest in developing their innovativeness. These organisations are motivated to understand the antecedents of innovativeness. These antecedents may be development areas and targets for innovativeness measurements. Increased innovativeness is a key dependent variable in diffusion research (Rogers, 1995) and can be measured (Goldsmith and Foxall, 2003).

Innovativeness is one key factor in developing innovations and new products (Droge, Calantone and Harmancioglu, 2008). Innovativeness likely improves firm performance (Calantone, Cavusgil and Zhao, 2002; Petroni and Panciroli, 2002). According to Inemek and Matthyssens’ (2013), buyer support may increase suppliers’ innovativeness in the relationship between an international original equipment manufacturer (OEM) buyer and

a first-tier supplier. This relationship is not as significant for lower-tier supply networks. To improve supplier performance, the buying firm may have to invest directly in the supplier's operations by helping through visits, training programmes and employee assistance to improve the efficiency of the supplier's process (Krause, Scannell and Calantone, 2000). Information sharing between firms involves imitation, which is also considered one of the sources of innovation (Schiele, 2006).

Sustainable purchasing components, such as ethical behaviour, have been part of measuring innovativeness in the literature (Miemczyk, Johnsen and Macquet, 2012). In addition, supplier base management can help buyers concentrate on suppliers with strong innovativeness potential (Schiele, 2006). However, there is no certainty that innovative suppliers would see public procurement differently than other private buyers (Uyarra *et al.*, 2014).

2.4.3 Innovation enablers in public tendering and innovation orientation in public procurement

Innovation enablers in public tendering and innovation orientation in public procurement are not extensively researched in the literature. Innovation barriers in public procurement have been studied more in previous research. According to Uyarra *et al.* (2014), suppliers' innovation barriers in public procurement include a lack of interactions with purchasing organisations, the absence of outcome-based tendering specifications, procurers' inadequate competencies and poor risk management. For example, established procurement actions or policies that reduce the impact of innovation barriers can be considered innovation enablers or orientations. Based on Uyarra *et al.* (2014) findings, Karttunen *et al.* (2022) define innovation enablers in tendering as "suppliers' judgement of the ability of buyers to deal with the delivery history of suppliers, adopt ideas from the market, give feedback, and share information for tendering". Uyarra *et al.* (2014) reported that the primary concerns for capturing innovation through public procurement are a lack of feedback from unsuccessful bids, little appreciation for unsolicited ideas and previous private sector delivery history, and participation difficulties caused by preselection procedures and conditions.

2.5 Customer attractiveness improvement

Customer attractiveness and its antecedents are topical for public procurement managers because public tendering has suffered from a lack of supplier bids. Recent EU procurement statistics (European Commission, 2023) show that the single-bidder indicator was unsatisfactory in 19 EU countries in 2020 (20% or more of the proportion of contracts). Public procurement should understand factors related to customer attractiveness that explain their attractiveness to their suppliers because attractive buyers draw more probable innovative and high-performing suppliers (Schiele, 2020). Public procurement may reduce single-bidder cases and nurture real competition by improving its attractiveness.

Only a few existing studies address customer attractiveness and the antecedents of suppliers' perceptions of public customers (Georghiou *et al.*, 2014; Uyarra *et al.*, 2014; Schiele, 2020). However, the relational behaviour of the public sector has been a factor in explaining supplier satisfaction (Schiele, 2020). Supplier satisfaction towards both private and public customers is explained by growth opportunity, profitability, relational behaviour and operative excellence (Schiele, 2020).

Satisfied suppliers serve first and are more likely to offer their privileged services to their preferred customers when all customers cannot be served (Pulles *et al.*, 2016). However, there are obstacles for public organisations to act as intelligent and informed customers (Georghiou *et al.*, 2014; Uyarra *et al.*, 2014). Insufficient interactions and communication between public buyers and potential suppliers are a barrier between public buyers and potential suppliers (Erridge and Greer, 2002; Uyarra *et al.*, 2014). This barrier is caused by the public procurement manager's rigorous application of procurement practices and policies, risk-avoiding or shortage of skills (Erridge and Greer, 2002; Uyarra *et al.*, 2014). Recent research has proposed further studies on customer attractiveness and relationships in public procurement because such studies may explain how public procurement can increase suppliers' satisfaction (Schiele, 2020).

3 Research design

This chapter explains the structure of the research and how the research was conducted. Figure 5 shows the designed areas of this research. These scientific research areas of this thesis have been partially covered in previous chapters. The reasons for and goals of this thesis are explained in the Introduction.

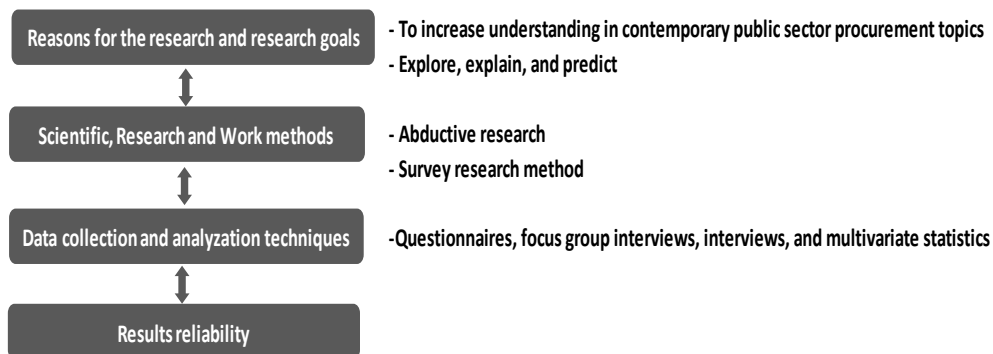


Figure 5. Designed areas of this scientific research (applied Figure 2.2 from Dresch, Lacerda and Antunes Jr, 2014).

This thesis uses a multi-method research and strategy approach. Different methods, such as interviews and questionnaires, are used for different purposes in publications, and a multi-method approach enables triangulation to achieve more in-depth views of the studied topics.

The thesis includes an abductive research approach. Pub II and III aim to understand, for example, via focus group interviews, how supply markets or procurement competencies can be developed in different market sectors and purchasing categories. In these papers, the abductive research approach is used to better understand the research context with the help of collected evidence (Niiniluoto, 1999). Pub I–IV use data collected from one public agency and Pub V from a single country. Therefore, these publications apply an abductive approach since their results are based on data received from a single agency or country, and the generalisability of the research results is limited.

The research strategy of surveys is used most often in this thesis (Pub I, II, IV and V). In this thesis, two separate self-administered online questionnaires are conducted, one from suppliers of the Finnish public sector and one from a studied public agency. Pub I–IV include case study questions of the researched public organisation. Pub III has a case study research strategy. It uses a variety of evidence (one-on-one and focus group interviews) to examine contemporary topics of procurement development in the purchasing category of the studied agency. Pub III describes, for example, how to develop and prioritise competencies with the help of purchasing performance and innovation targets.

Table 3 summarises the applied scientific methods, research approaches, and data collection methods in this thesis.

Table 3. The research approaches of the publications related to public procurement.

Pub	Main perspective	Research approach	Research methods	Primary data
I	The antecedents of purchasing performance	Abductive	Survey	Online questionnaire
II	Supply market development	Abductive	Survey, focus group interviews	Online questionnaire, semi-structured and structured interviews
III	Purchasing competency development	Abductive	Focus group and in-depth interviews	Structured interviews
IV	The antecedents of innovation orientation	Abductive	Survey	Online questionnaire
V	Public procurement as an attractive customer: A supplier perspective	Abductive	Survey	Online questionnaire, government invoices

The time horizon of this thesis is cross-sectional because longitudinal research would have noticeably extended the necessary length of the time horizon. The applied data collection methods include mainly survey and interview methods. In Pub V, secondary data from a government invoice database is used in addition to a questionnaire.

The thesis uses several research methods (Table 3) and data sources (Figure 6), which are enabled due to the role of the PhD candidate in the studied case organisation. The candidate worked during the research years in procurement development areas. The PhD candidate has had responsibilities related to professional services, R&D, ICT and information systems purchasing categories in the case organisation. The candidate's role made it possible to collect and analyse the research topics with procurement professionals. Furthermore, each study had at least one LUT researcher, which introduced an outside view to the studies.

3.1 Mixed methods and triangulation

This thesis uses mixed methods, which combines methods and theories to add breadth and depth to the research analysis. This research includes an abductive research approach (Table 3) and both qualitative (e.g. in-depth interviews) and quantitative research methods (e.g. surveys). The mixed methodologies can provide a more detailed understanding of the studied topics (Sreejesh and Mohapatra, 2014). The quantitative data from the surveys permitted a deep understanding of some of the thesis research topics, and the qualitative interview questions complemented the research. The focus of the thesis is on quantitative methods. Qualitative research questions provided an understanding of development actions used in supplier market development in different purchasing categories in the case organisation.

Mixed methods providing triangulation are used to increase a study's validity and interpretability (Rocco *et al.*, 2003). Triangulation was introduced in the 1950s (Campbell and Fiske, 1959). The concept of triangulation means that an issue of research is considered from two or more perspectives (Flick, 2018). A reason for triangulation and using multiple methods, data sources and researchers is to enhance the validity of research findings (Mathison, 1988). Figure 6 shows this thesis' use of surveys, focus group interviews and databases.

Mixed methods can be used if the research questions and research purpose require both qualitative and quantitative research methods, there is a need to explore (qualitative) and validate results empirically (quantitative), and there is insufficient prior information in the literature (Sreejesh and Mohapatra, 2014). Quantitative research was part of Pub I-V. Pub II-III also used qualitative research.

3.2 Survey research method

The survey is the primary research method of this thesis (Table 3). Four of the articles in this thesis use the survey method because it provides an efficient way to collect a large amount and broad range of data in a relatively short period. Besides semi-structured research methods and cross-sectional designs, surveys are typical in prior social science articles, according to Bryman (2006).

The survey research method enabled this research to collect data relatively quickly from members of the studied public organisation and the suppliers of the public sector, and to create concept models for the studied topics.

3.3 Focus group and in-depth interview methods

The interviews provided insight into the research topics in relation to the challenges, best practices and beneficial development areas of supply markets. The use of semi-structured interviews enabled discussions of themes and questions. The interviews used a list of questions. The interview questions mostly followed the planned order. The semi-structured interview method allows a more relaxed schedule. For example, interviewees' answers may invite the interviewer to ask a more relevant subsequent question (Bell, Bryman and Harley, 2011, p. 467). In-depth interviews provided face-to-face interaction and permitted more in-depth information to be gathered than surveys could allow (Gubrium and Holstein, 2001, pp. 113–119). Applied focus group interviews provided a flexible, widely accepted research method for data gathering techniques (Gubrium and Holstein, 2001, pp. 141–159).

The contents of the qualitative interviews were analysed using a lightweight AD method. However, the studies acknowledge that thorough content analysis of qualitative empirical interview data is recommended (e.g. using Atlas.ti software) and would have improved the quality of the analysis of the qualitative interviews.

3.4 Data sources and the timeline of research

Figure 6 illustrates the data sources in this research and the timeline of publications. The research for the publications occurred such that the topical Finnish government procurement development themes were prioritised in the planning phase of the thesis.

The procurement competence development research (Pub III) was partially built on the understanding of purchasing performance of Pub I. The order of publications also depended on the acceptance of the research papers by journals (e.g. Pub IV).

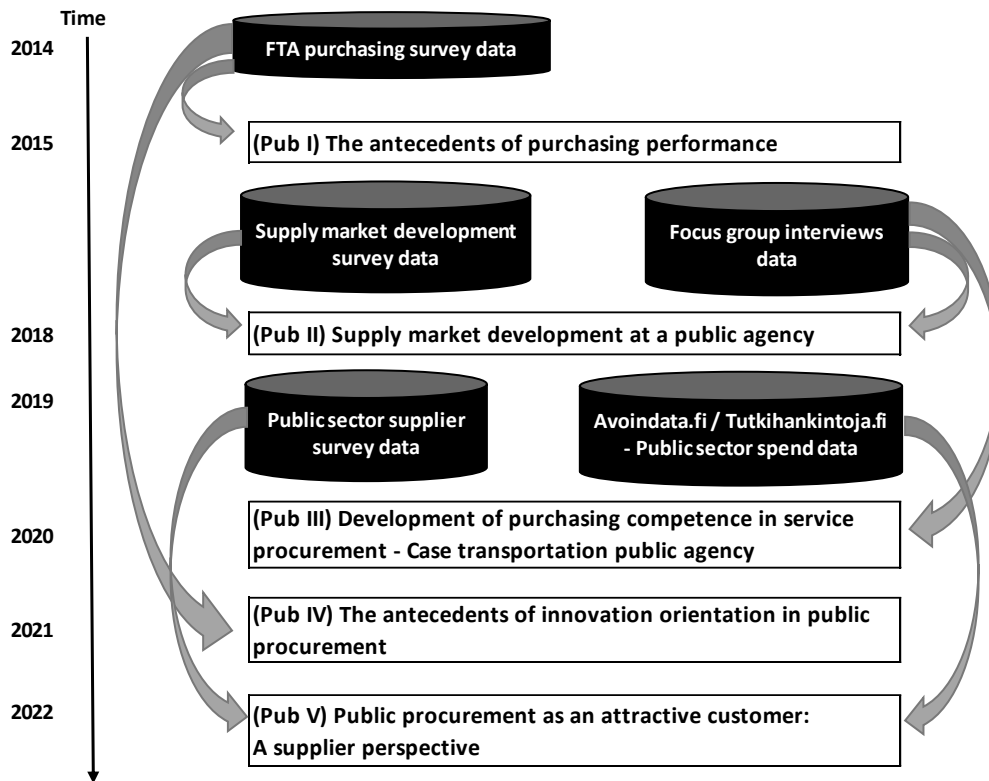


Figure 6. Research workflow; research data and publications.

3.5 Data collection and analysis methods

This section summarises the main aspects of the data collection and analysis methods used in this thesis. Publications include detailed information about the data collection and data analysis methods used.

The following data collection and analysis methods are used as follows: Pub I includes survey and linear regression; Pub II includes focus group interviews; Pub III includes focus group interviews, interviews, analytical hierarchy process (AHP) and cause and effect (C&E) matrix; Pub IV includes survey and the partial least squares structural equation model (PLS-SEM); and Pub V includes survey and PLS-SEM. Interviews are also used as follows: Pub II includes focus group interviews, and Pub III includes focus group interviews, interviews and affinity diagrams (ADs). This research analyses data from surveys, including 269 responses. This research features 60–80 participants in total from all focus groups and other interviews.

Interviews were semi-structured or structured expert interviews. Focus group interviews were conducted simultaneously using group decision online tools and included structured questions. Those interviews included questions which were discussed in a more free manner. The group decision online tools used in focus group interviews automatically created documentation about interviewees' answers. Two or more interviewers documented small focus group or individual interviews by making personal notes and comparing notes afterwards before making final notes about observations and answers to the research questions.

This thesis uses different data sources for data collection, as shown in Figure 5. The main sources for quantitative data analysis are primary data sources. The only secondary data sources are the Digital and Population Data Services Agency's "Avoindata.fi" website and the Ministry of Finance "Tutkihankintoja.fi" website, which provide government sector spend data (Pub V). Primary data were collected using surveys, focus group interviews and in-depth interviews using online questionnaires and semi-structured interviews (Table 3).

In Pub I and IV, there were 115 responses to the survey. In Pub V, there were 137 responses for quantitative analysis. Pub II included a total of 16 interviews and focus group interviews. Pub III included one focus group interview and 23 other interviews. The Pub II survey produced 17 responses illuminating the importance of the supply market development and purchasing category features. Pub II uses structured and semi-structured focus group methods for data collection and analysis. Pub II's analysis phase of workshop participants included valuing the impact and the feasibility values of identified supply market development actions.

Pub III uses a structured focus group method for data collection and evaluation. In addition, the cause and effect (C&E) matrix tool analysed collected data. The C&E matrix identifies the key process input variables that need to be addressed to improve the key process output variables (George, Rowlands and Price, 2005; Sokovic, Pavletic and Fakin, 2005). Furthermore, Pub III includes the use of a modified AD method (George, Rowlands and Price, 2005; Plain, 2007) to group interview data, the AHP decision-making method (Vargas, 1990; Vaidya and Kumar, 2006) and the C&E matrix method (Sheehy *et al.*, 2002). The publications describe in greater detail the pertinent data collection and analysis methods.

3.6 Validity and reliability

This section discusses the validity and reliability issues of this thesis, which the publications cover in greater detail. According to Yin (2018), four common tests of the quality of most empirical social research are construct, internal and external validity, and reliability. Construct validity aims to identify the right operational measures for the studied concepts. Conversely, internal validity focuses on finding causal relationships where certain conditions lead to other conditions. Finally, external validity means that research results are generalisable. In quantitative research, a study's validity relates to

how the research accurately measures a concept (Heale and Twycross, 2015). In qualitative research, validity is the precision with which the findings accurately reflect the data (Noble and Smith, 2015). Reliability describes how the operations, such as data collection procedures, of research can be repeated to produce the same outcomes, and the target of reliability is the mitigation of the faults and biases of the research (Yin, 2018). However, the reproduction of the research is difficult or even impossible in a case study.

The validation and reliability of research are part of establishing the trustworthiness of the study. Other terms to describe trustworthiness include credibility, authenticity, dependability, confirmability and transferability, and similar terms for internal and external validation include reliability and objectivity (Lincoln and Guba, 1985, p. 300; Creswell, 2013, p. 246). A naturalistic researcher targets confirmability rather than objectivity when estimating the value of data. According to Creswell (2013, p. 250), a study's accuracy can be improved if the researcher spends extended time in the field, includes rich and detailed descriptions, and becomes close to attendees in qualitative research. Creswell and Miller (2000) determined which validity procedures (e.g. qualitative lenses and paradigm assumptions) should be used in qualitative inquiry (Table 4). Table 4 also shows three paradigms labelled by (Guba and Lincoln, 1994), and the validity procedures applied in this thesis are in bold.

Table 4. Validity procedures and their different paradigm assumptions and qualitative lenses (Creswell and Miller, 2000).

		Paradigm assumption:		
		Postpositivist or Systematic Paradigm	Constructivist Paradigm	Critical Paradigm
Lens of:	The Researcher	Triangulation	Disconfirming evidence	Researcher reflexivity
	Study Participants	Member checking	Prolonged engagement in the field	Collaboration
	People External to the Study (Reviewers, Readers)	The audit trail	Thick, rich description	Peer debriefing

The first postpositivist paradigm in Table 4 assumes the use of rigorous methods and systematic forms of inquiry (Creswell and Miller, 2000). The second constructivist paradigm assumption accepts perspectives of reality, including contextualised (e.g. place- and situation-sensitive), interpretive, open-ended and pluralistic perspectives. These previous validity procedures of constructivist thinking differ from quantitative approaches such as authenticity (e.g. improved understanding of constructions of others) and trustworthiness (e.g. confirmability, credibility, dependability, transferability). The final critical paradigm assumes that researchers find the concealed assumptions of how narrative accounts are constructed, read and interpreted. In this paradigm, the validity of the research is questioned and challenged. According to the critical paradigm, researchers need to be reflexive and reveal their effects on a narrative (Creswell and Miller, 2000).

Through the lens of the researcher, one investigates how the researcher could improve the validity and reliability of a study (Campbell and Stanley, 2015). In a quantitative study, researchers evaluate the amount of error within either the method instrument (reliability) or the data produced by the instrument (validity) in the research. In quantitative research, the internal and external validity of experimental and quasi-experimental designs are also considered when evaluating the validity of the study (Campbell and Stanley, 2015).

In a qualitative study, researchers may determine when the validity criteria are attained, for instance, when collected data is saturated enough for the investigated themes or categories. Additionally, the study participants may establish the research's validity. People external to the study, such as reviewers and readers, can also help establish the study's validity.

This thesis often uses the quantitative survey research method for the empirical research. In addition, a literature-derived conceptual model testing utilised the survey data in this research. For example, Cronbach's alpha (Cronbach, 1951) and composite/construct reliability (CR) values tested the reliability of constructs in the conceptual models. Depending on the source, the acceptable lower limit level in exploratory research for Cronbach's alpha is either 0.60 (Robinson, Shaver and Wrightsman, 1991) or 0.70 (Nunnally, 1975).

The validity of instruments can be divided into three parts. First, question items should represent the dimensions of the measured construct (Hu *et al.*, 2012). Question items are typically assessed through the literature and reviewed by domain experts (Straub, Boudreau and Gefen, 2004). Second, the discriminant validity of constructs means that there is either no correlation or a very low correlation between measures of unrelated constructs. Previous research literature review explains which instruments should be discriminant and which convergent. Convergent validity measures whether constructs are related when they theoretically should be related. In these studies, common method bias (CMB) can threaten the validity of a conclusion drawn from the statistical results of the implemented surveys. CMB can be caused by respondents (e.g. social desirability and consistency motif), item characteristics and contexts, and measurement contexts (Podsakoff *et al.*, 2003).

This thesis applies different validity-increasing procedures (Table 4) and other tests such as triangulation, member checking, collaboration, peer debriefing, prolonged engagement in the field, Cronbach's alpha, average variance extracted (AVE), analysis of variance (ANOVA) test, Harman's single-factor test and variance inflation factor (VIF) to ensure the validity of the research. Section 3.1 explains the use of triangulation. Pub II, III and V use multiple data sources (section 3.4) and different research methods (chapter 3). When plausible, the research applied a member-checking procedure at the end of focus group interviews, where an online questionnaire tool was used (Pub II and III). One purpose of member checking was for participants to confirm that the gathered data made sense; member checking also enabled short discussions with participants about how to interpret initial results.

This thesis also uses a collaboration procedure. As a result, several study participants and authors of publications participated in the research process (Pub I–IV). For example, topics of studies, research questions and research design were influenced by participants of the studied organisation.

Peer reviewing was done by people external to the study. External reviewers commented on, questioned and challenged the decisions in the papers. Peer reviewing often included several iterations.

Prolonged engagement in the field procedure (Pub I–IV) is utilised to some extent in the research. The PhD candidate had worked in the studied case organisation for several years. In the field, the researcher can build trust with participants, find people, establish rapport and give back to the studied people (Creswell and Miller, 2000). In addition, this procedure enables the researcher to compare interview data with observational data and better understand the contexts of participants' views.

Pub I tests variable reliability by calculating Cronbach's alpha values for constructs. Pub IV and V assess the research instrument reliability using the CR and construct validity using the AVE. Pub V examines the discriminant validity of the instrument using the square root of AVE, the cross-loadings of the measurement items and the heterotrait-monotrait criterion. The ANOVA test with the early and late responses assesses the non-response bias (Pub V).

In Pub IV, Harman's (1976) single-factor test evaluates the CMB problem. Pub V has the full collinearity test, including calculating the VIF of the latent constructs. The quality of the structural model of Pub IV is validated by testing collinearity issues and overall fit, explanatory power and path significances. The quality of the structural model of Pub V includes previous tests and an assessment of the potential endogeneity of the model.

4 Overview of the publications

The publications in this thesis consist of different procurement development themes topical to the Finnish public sector and the studied organisation. Figure 6 illustrates the timeline of the data collection for and publication of these studies.

4.1 Publication I – Antecedents of purchasing performance in public procurement

4.1.1 Main objective

The main objective of this paper is to identify the antecedents of purchasing performance in the studied Finnish public sector organisation. This research includes a survey conducted by one Finnish government agency, which yielded 115 responses. Knowing the antecedents of purchasing performance can improve future measurements of the procurement function and the organisation's procurement development. The public sector's purchasing budgets are affected by ageing populations in many countries while public expenditures are increasing. In addition, the public sector must produce legislation defining mandatory services. These service production needs and the lack of budgets motivate public agencies to optimise their procurement and supplier performance management functions. Knowing the purchasing performance antecedents help organisations to evaluate the efficiency and the effectiveness of the development actions with appropriate metrics.

4.1.2 Main findings and implications

The regression analysis results showed that customer need fulfilment and supply risks were statistically significant and affected purchasing performance ($p < 0.05$). Procurement innovativeness and purchasing support had statistically weak significances ($p < 0.1$) on purchasing performance in the studied organisation. Sustainable purchasing development did not statistically affect purchasing performance. The studied public organisation may utilise these research findings for performance management and measurement. These findings indicate that customer fulfilment should be considered throughout the phases of the procurement process when the studied public organisation is developing its purchasing performance. The case organisation may use these antecedents of the purchasing performance in the PMS. Supply risks had a significant adverse effect on purchasing performance.

4.2 Publication II – Supply market development at a public agency

4.2.1 Main objective

This study aims to identify potential solutions for supply market improvement in different purchasing categories of the studied public organisation. In addition, this study examines how supplier market development actions impacted feasibility from the viewpoint of purchasing categories.

Public agencies avoid monopolistic or oligopolistic supplier situations because such suppliers often do not have the incentives to act efficiently from the buyer's perspective (Van Weele, 2005). A monopolistic or oligopolistic supply market may increase the costs of purchases, and the quality of purchases may decrease.

The supply market development actions in this study may ease the buyer's situation in demanding and risky markets. Supply market development actions can lower supply chain risks (Sodhi and Tang, 2012).

4.2.2 Main findings and implications

The results of focus group interviews show that most of the ideas and supplier market development actions came from categories that considered their supplier markets challenging (Matela et al., 2018). The themes of the results vary, but communication is a common theme. In addition, the study identified supply market development actions, such as early communication with suppliers, supplier cooperation, customer feedback, information sharing among procurers, feedback discussion with suppliers, supplier dialogues and supplier meetings.

According to the results of the workshops, the highest impact and feasibility values received supply market development actions related to supplier and buyer communication (e.g. "market dialogues are utilised systematically more often and in a larger scale"; "open buyer-suppliers meeting days are arranged more often"; "presence in buyer-supplier and buyer-buyer collaboration networks are developed in each category"; and "peer support networks are created for purchasing categories having monopoly or oligopoly supplier situations"), the standardisation of procedures and tools (e.g. "procurement planning instructions are developed in decentralised categories" and "standardised automated tools are developed to support purchasing and supplier monitoring in existing ICT systems") and continuous improvement (e.g. "it is verified that purchasing models and document templates of purchasing products are renewed systematically by utilising both supplier and buyer feedback information" and "more resources for the implementation of quality measurement during purchasing contract period").

The highest impact value of supply market development action concerned the creation of procurement planning instructions in decentralised purchasing categories. Procurement of these decentralised categories is done in different departments and units of the organisation. This supply market development action indicates that procurement planning introductions benefit buyers who receive infrequent advice from nearby co-workers or other purchasing category-specific instructions.

In prior studies, the standardisation of purchasing procedures has positively affected business performance, inventory performance, on-time delivery from suppliers and quality of material (Sánchez-Rodríguez *et al.*, 2006). Therefore, instructions for the planning phase of the procurement process might include standardised procedures for procurement planning and supplier-buyer communication, supplier market information of the purchasing category and market dialogue implementation.

Purchasing category managers or other purchasing professionals, especially in the public sector, can benefit from this study's results by planning and identifying ways to develop their supply market in their categories.

4.3 Publication III – Development of purchasing competence in service procurement – Case transportation public agency

4.3.1 Main objective

This study examines which and how procurement competencies, best practices and measurements were relevant, especially to the CSPC development, in the studied FTIA. This research also investigates how different competencies are essential in the procurement process phases. This paper examines which competencies have the greatest impact on the purchasing performance and innovativeness of the CSPC from the category manager aspect. The research found development suggestions for the CSPC in the case organisation.

4.3.2 Main findings and implications

Figure 7 summarises the focus group workshop results in which procurement competencies were considered the most relevant in the different phases of the procurement process. Figure 7 shows the importance of each competency in a specific procurement process phase. In Figure 7, a value of 1 indicates that workshop participants have evaluated the competency as not crucial to the professional services procurement development; a value of 5 means that the competency was considered very important to the procurement development of professional services.

A.) Purchasing planning and customer needs recognition		B.) Purchasing requirements creation		C.) Supplier selection / Bidding		D.) Order - Delivery		E.) Control and follow-up tracking	
	Mean		Mean		Mean		Mean		Mean
Substance	4.15	Substance	4.07	Comparison of bids	4.29	Courage to address errors and charge sanctions	4.29	Purchasing knowledge transfer	3.86
Communication	3.86	Specification	3.86	Specification and valuation of supply quality factors	4.14	Early step in if needed	4.00	Checking utilization of delivery	3.86
Understand how purchasing can enable innovations	3.71	Identify various purchasing procedures	3.71	Usage of quality and scoring procedures	4.14	Documentation	3.86	Document filing	3.71
F.) Co-operation development									
	Mean		Mean		Mean		Mean		Mean
Listening of final customer	3.86	Service producers involvement in the early stages of purchasing	3.29	Collaboration with suppliers to strengthen their willingness to serve	3.14				

Figure 7. Procurement process phases and results of the focus group workshop on competency development potential from professional services (Matela and Hallikas, 2020, table 2).

The three highest-rated competencies in the focus group workshop in terms of development potential were comparison of bids, courage to address errors and charge sanctions, and substance (Matela and Hallikas, 2020, tables 2 and 3). Three of the six development competencies, with the most potential, focus on supplier selection, which underlines the importance of the bidding phase in procurement. The development themes of top-ranked competencies were bidding and substance. Also, courage to communicate errors and charge sanctions was ranked second among the highest development potential actions.

In the study's second phase, the CSPC manager evaluated how much each competency contributed to the purchasing performance and innovativeness targets (RQ1 and 2). Evaluated highest weight values of these competencies were for communication, substance, knowledge of customer needs, listening of end customers and service producers' involvement in the early stages of procurement. The order of average procurement competency weight values of procurement process phases was, from highest to lowest, procurement planning and customer needs recognition, procurement requirements creation, cooperation development, supplier selection/bidding, control and follow-up tracking, and order-delivery (Matela and Hallikas, 2020, tables 2 and 3).

The third phase of the study researches what indicators of professional service existed and how important they were according to focus group evaluations. According to the results (Matela and Hallikas, 2020, table 7), the net promoter score (NPS) metric had the highest mean score in the focus group evaluation. The other top-scoring metrics were the validity of created information, cost efficiency, customer feedback, clarity and understandability, and on-schedule implementation. The themes of high-scoring metrics were customer satisfaction, information and quality of service, costs, time and scope. The professional services purchasing category may use these metrics to evaluate whether category development actions positively affected identified procurement development areas (Matela and Hallikas, 2020, table 8) in category procurements in the long run. In the next phase, 23 participants from the case organisation, including procurers, managers and persons involved with procurement, were interviewed in groups in one-on-one settings. The interview themes include successful procurements, information quality, origin, and applications concerning best procurement practices and development areas.

Two researchers created over 100 items from interview observations (Matela and Hallikas, 2020). Then the CSPC manager mapped these items to competency development needs in procurement. In this evaluation, the most frequently occurring competencies were communication, project management and analytical competencies (Matela and Hallikas, 2020, table 9).

This paper provides insight into how procurement competencies can be identified and valued in different phases of the procurement process in the studied public agency. This study also describes how the development areas of competencies can be prioritised according to the purchasing category's goals, such as purchasing performance and innovativeness. The research results indicate the importance of procurement competencies in the early phases and the cooperation development phases of the procurement process in the studied CSPC.

4.4 Publication IV – The antecedents of innovation orientation in public procurement

4.4.1 Main objective

The paper's target is to identify the antecedents of innovation orientation in public procurement. This study uses the literature review to create an initial conceptual model for the buyer's innovation orientation in procurement.

For the empirical phase of the research, an online survey was administered within the FTA. The survey data included 115 responses with a response rate of 35% among personnel working with procurement. The collected survey data were then analysed using the conceptual PLS path model. The survey instruments used customer needs, procurement support and procurement policies, procurement risks, supplier market development, purchasing category management, innovation orientation in procurement and purchasing performance constructs.

4.4.2 Main findings and implications

Procurement support and procurement policies – and purchasing category development – constructs had statistically significant and strong effects on the supplier innovation orientation in procurement (Matela and Hallikas, 2021). Furthermore, the analysis results illustrate that innovation orientation in procurement affected the purchasing performance in the studied conceptual model.

The research results indicate that procurement policies may instruct buyers to use innovative enabling procurement procedures, contracts and RFPs. These innovative enabling policies might be reused in organisation-level and/or purchasing category-level procurement policies in public organisations that use purchasing categories.

The study results indicate the importance of professional procurement support, which can enable the use of negotiation procedures with an innovation focus, buyer-offeror and supply market dialogues, and an innovative enabling of incentive and sanction contract clauses in tendering.

The results provide evidence that purchasing category development statistically significantly affects the innovation orientation in procurement construct, which includes items of continuous improvement and purchasing category management-related items in this study (Matela and Hallikas, 2021). Therefore, based on this study's results, it is possible that some procurement development best practices could explain innovation orientation in procurement.

One managerial insight from this paper is that improving innovation orientation in procurement requires support from management, which makes decisions about procurement support, category management resources and the content of procurement policies. This study also reveals the importance of skilled procurement personnel who

- are often part of procurement support,
- develop actions in purchasing categories and
- deploy procurement policies.

If management and support personnel are not involved in or committed to procurement development, then the innovation orientation of the organisation's procurement may be insufficiently developed.

4.5 Publication V – Public procurement as an attractive customer: A supplier perspective

4.5.1 Main objective

This research investigates the innovativeness of suppliers and the impact of supply chain ambidexterity strategies on their views of public procurement in terms of innovation enablers and customer attractiveness (RQ2).

This study includes a survey of 137 suppliers to the public sector in Finland. The study creates a conceptual model based on models implemented in the literature and uses the survey data and PLS-path model for hypothesis testing. The survey includes customer attractiveness, supply chain exploration, supply chain exploitation, innovation enablers and supplier innovativeness constructs.

4.5.2 Main findings and implications

The analysis phase of the conceptual model found that supplier innovativeness has a positive statistically significant effect on supply chain exploration and supply chain exploitation, supplier innovativeness has a statistically significant positive influence on innovation enablers, supply chain exploration has a statistically significant negative influence on innovation enablers and supply chain exploitation has no statistically significant effect on innovation enablers (Karttunen *et al.*, 2022). In addition, the research shows that the innovation enablers construct had a statistically significant positive influence on customer attractiveness.

This study indicates that supply chain exploration has a negative statistically significant effect on customer attractiveness, but supply chain exploitation has no such effect. This negative effect indicates reduced customer attractiveness in organisations involving new methods of problem-solving, risk-taking and experimentation in the supply chain. Furthermore, the post hoc tests show that when supply chain exploration is a mediator, supplier innovativeness indirectly has statistically significant negative effects on customer attractiveness and innovation enablers. Conversely, when the innovation enablers construct is a mediator, supplier innovativeness has a statistically significant and positive indirect influence on customer attractiveness. Figure 8 summarises the statistical influences, hypotheses and analysis results. In Figure 8, “n” means that the research did not find a statistically significant effect between constructs.

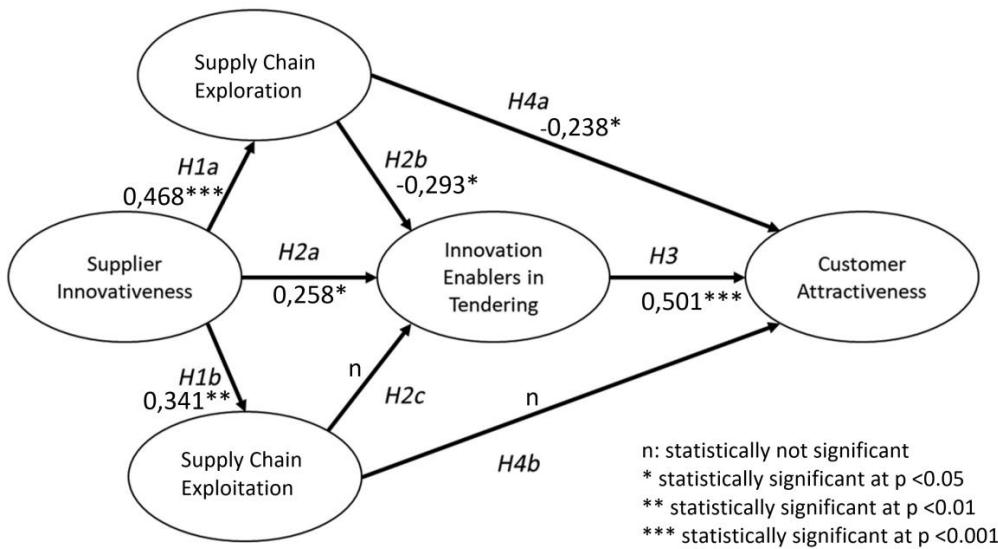


Figure 8. Conceptual model of the study and influences between constructs (Karttunen et al., 2022).

This study has theoretical implications (Karttunen *et al.*, 2022). Supplier innovativeness positively influences supply chain ambidexterity (H1a, H1b), meaning that the public buyer, concerned about the development of both the attractiveness of the buyer and innovation enablers in the tendering process, can benefit the results of the study. Innovative suppliers perceive innovation enablers in the tendering process (H2a) likely because of their ability to exploit knowledge.

Based on the research results (H2b), the public buyer, which attempts to acquire suppliers that explore the supply chain, should encourage dialogue and openness to ideas to support suppliers' exploration. The research shows that innovation enablers in tendering increase customer attractiveness; thus, in the research context, public buyer attractiveness is increased by innovation enablers of tendering (H3). The analysis results indicate that suppliers who vigorously explore the supply chain find less attractive customers in public procurement (H4a).

This study's findings may help public procurement attract suppliers to ensure sufficient competition and avoid single-bidder cases in tendering. In addition, a public sector buyer may increase its customer attractiveness by clarifying suppliers' perspectives, sharing information (e.g. via open market dialogues with suppliers) and enabling innovative solutions for public sector problems.

5 Discussion and concluding remarks

The thesis studies how to improve procurement in a public agency. The research explores the main research question with the help of three research sub-questions which address various procurement improvement development subjects such as the investigation of purchasing performance, innovation orientation and procurement competencies. This thesis also covers topics related to supply market development and customer attractiveness. In addition, this thesis demonstrates how to identify and prioritise existing public procurement development needs in the studied FTIA organisation and purchasing category.

This thesis studies the antecedents of purchasing performance (RQ1, Pub I) and innovation orientation in the case organisation's public sector procurement (RQ2, Pub IV). Knowing the elements of performance and innovation orientation can help an organisation to develop its procurement more efficiently. Through examples, this research shows how public organisations could find potential targets for procurement competency (RQ3, Pub III) and supply market development (RQ1–2, Pub II). Furthermore, the research shows how ambidextrous exploration and exploitation in the supply chain affect innovation enablers in tendering (RQ2, Pub V). This thesis also includes suggestions to improve procurement competencies development areas (Pub III) and actions for supply market development (Pub II). The implementation of these development areas and actions may positively affect the purchasing performance (RQ1) and innovativeness in procurement (RQ2) of the studied public organisation. Finally, this research indicates how innovation enablers in tendering may increase the attractiveness of the public sector buyer (RQ2, Pub V).

The thesis provides information on how the studied public agency could improve its procurement, for example, its supplier markets and its procurement competencies. Development-oriented public sector organisations may be interested in these results. For example, Pub II shows that supplier and buyer communication, standardisation of procedures and tools, and continuous improvement are the main themes in supplier market development actions found in the study. In Pub II, the supplier market development actions with the highest evaluated impact are procurement planning instruction creation in decentralised purchasing categories, market dialogues utilised more often and on a larger scale, and purchasing categories' supplier-buyer-collaboration networks development. Pub II finds that supply market development actions with high impact and lowest feasibility values are about purchasing category managers having sufficient resources and support, and need for more resources for quality measurement during the purchasing contract period. The focus group workshop from Pub III indicates the development potential of the following competencies: comparison of bids, courage to address errors and charge sanction, substance, evaluation and order of quality factors, and the use of quality and scoring procedures. In addition, Pub III's study results indicate that communication, knowledge of customer needs and project management might also benefit the CSPC of the studied case organisation.

This thesis studies topics in the public sector procurement policies. This thesis' results may be valuable for public organisations' procurement improvement when organisations plan to implement procurement development actions, continuous improvement actions or further studies, e.g., about improving purchasing performance, innovation orientation/enabling, or procurement competencies.

5.1 Contributions to the literature

This thesis contributes to the existing literature by studying public procurement topics, including purchasing performance (Sánchez-Rodríguez, Martínez-Lorente and Clavel, 2003; Sánchez-Rodríguez *et al.*, 2006), supply market development (Parniangtong and Parniangtong, 2016), procurement competencies development (Johnson, Leenders and Flynn, 2011), innovation orientation (Arundel, Casali and Hollanders, 2015), and customer attractiveness (Schiele, Calvi and Gibbert, 2012). Pub I highlights the importance of considering the needs of public procurers' customers and the purchasing risks when the public sector must investigate the antecedents of purchasing performance. Earlier research has connected purchasing performance to business performance (Sánchez-Rodríguez *et al.*, 2006).

Existing literature has addressed topics related to supply market development, such as supply base development (Monczka, Trent and Callahan, 1993), supplier development (Krause and Ellram, 1997; Krause, 1999; Handfield *et al.*, 2006; Monczka *et al.*, 2009; Johnson, Leenders and Flynn, 2011) and supply market analysis (Parniangtong and Parniangtong, 2016). However, prior research has not addressed which supply development actions have the most impact and which are the most feasible in the public sector. Pub II researches these topics and therefore contributes to research regarding the supply market development of the public sector. In addition, the publication investigates purchasing category managers' views of the studied supply market development topics.

The existing literature includes studies about the competencies of public procurement (Thai, 2001) and purchasing managers (Tassabehji and Moorhouse, 2008; Wilson and Barbat, 2015). However, previous research does not address which competencies of public procurement during the different phases of the procurement process are the most valued among buyers of the consulting services purchasing category in the public sector. Pub III investigates this previously unexplored topic and provides a pragmatic view of the public agency's development efforts in CPSC. Pub III shows how the CPSC could identify the most potential competencies in different phases of the procurement process using a focus group workshop. The detected competencies were further analysed using a modified C&E matrix and AHP to determine how each noted competency contributed to specific purchasing performance and innovativeness targets. The same paper also contributed to the continuous improvement theme of procurement because the study investigated which metrics were the most important in the focus group evaluation. It is often beneficial to verify that development results meet the pre-set targets by measuring

development targets before and after improvement actions during the continuous improvement process.

Pub IV contributes to innovation research in the public sector (Edler and Georghiou, 2007; Hughes, Moore and Kataria, 2011; Arundel and Huber, 2013) by researching the antecedents of innovation orientation in the case organisation. In addition, this publication contributes to performance management research since it is found that innovation orientation directly affects purchasing performance.

The final research paper (Pub V) contributes to the research field of buyer-supplier relationships (Dwyer, Schurr and Oh, 1987; Wang and Bunn, 2004) and customer attractiveness (Schiele, Calvi and Gibbert, 2012; Pulles *et al.*, 2016; Schiele, 2020) in the public sector. This paper indicated the importance of innovation enablers and highlighted the impact of the supplier's ambidexterity in the supply chain from the supplier's perspective.

5.2 Managerial implications

The results of this thesis have managerial implications concerning the public agency case and its consulting services purchasing category. However, the implications in this section may also benefit other public organisations, competency developers, professional services buyers and procurement decision-makers. The topics in this thesis serve the needs of purchasing performance, innovation, competencies and supply market development in public sector organisations. For example, the procurement developers of the case organisation can benefit from knowing the antecedents of developed targets, such as innovativeness and potential procurement development areas. Competency developers may benefit from the results of Pub III. Public organisations' resourcing decision-makers may utilise these research results in their improvement efforts. Using this research, decision-makers could secure adequate resources and support in procurement for those responsible for purchasing categories (Pub II).

Pub I reports as a managerial implication that purchasing functions near actual buyers could better identify customer needs for the purchase and make purchasing services easier during planning, tendering and the contract period. The paper also notes that the risk management activities throughout the purchase life cycle should benefit overall purchasing performance.

The results of Pub II provide potential supply market development themes that could be applied in the organisation. In the study, the themes of supplier and buyer communication, the standardisation of procedures and tools, and continuous improvement received the highest impact and feasibility values in the conducted workshop. The highest impact score belonged to an action regarding the creation of procurement planning instructions in decentralised purchasing categories. The paper concludes that buyers of decentralised purchasing categories might receive infrequent advice from nearby co-workers, which might be why written instructions are appreciated in such situations. The paper also

mentions that procurement instructions could include standardised procedures of procurement planning. Procurement planning instructions can describe how to implement the most valuable supply market development actions, such as supplier-buyer communication related to market dialogues. The study results suggest the importance of verifying and upgrading procuring models, procedures and documents based on supplier and buyer information. The paper also found that a lack of decision-makers' support had a high impact value on supply market development, but feasibility values were low. Similar values were documented for actions related to quality control activities during the purchase contract period. One managerial implication of this research is that organisations should consider more resources for supporting category managers.

Pub III's results can be valuable for continuous procurement competency development, especially for the studied organisation. The case study indicates that in the consulting services category, the two competencies with the greatest potential for development (comparison of bids and courage to address errors and charge sanctions) were from the supplier selection and bidding stage and the order delivery phase of the procurement process (Matela and Hallikas, 2020, table 3). When competencies were evaluated against purchasing performance and innovation targets, the results showed the importance of competencies in the early phase of the procurement process, including the procurement planning and customer needs recognition phase and the purchasing requirements creation phase. A practical implication of previous results is that the responsible for competency development should be aware that the preferences of individual procurement experts regarding the competencies with the most potential for development and the competencies with the greatest impacts on purchasing performance and innovation can differ from each other (Matela and Hallikas, 2020, tables 2 and 4). Pub III also provides practical examples of measuring professional services and suggests procurement development areas in the case organisation. These results may benefit other organisations when evaluating similar purchasing topics.

One insight from Pub IV is that improving innovation orientation in procurement requires management and procurement personnel support. Management support enables sufficient resources for procurement support and purchasing category management. Management also makes procurement policies which can advance or hinder innovation orientation in procurement. Similarly, personnel involved in procurement support, development actions in purchasing categories and the deployment of procurement policies can either enable or block innovation orientation in procurement.

The final paper (Pub V) can help public procurement increase customer attractiveness by clarifying supplier perspectives. A managerial implication of Pub V is that a public buyer could increase its attractiveness by providing sufficient information to suppliers about tender opportunities and feedback. A public buyer could also encourage communication by increasing the frequency of market dialogues, public competitive tendering, supplier events and openly published procurement programmes. The study results indicate that the public buyer could support explorative suppliers in supply chains by allowing more risk-taking (e.g. permitting more experiments and pilots), continuous development and

openness to spontaneous ideas. In practice, this could mean that the risk management or procurement policies of public buyers, which allow greater autonomy for suppliers during the delivery phase of procurement and procurement policies, allow interactive strategic relationships with suppliers that apply explorative supply chain strategies.

5.3 Limitations of these studies

The results of this thesis have limitations which should be noted before future research on these topics is conducted. First, Pub I–IV are about one public organisation and data collection was cross-sectional, while Pub V mainly focuses on suppliers of the Finnish government sector. These characteristics weaken the generalisability of the research results, e.g., to the public sector in different countries. Pub I–IV utilise case study research. Case study findings are criticised for not being generalisable (Gomm, Hammersley and Foster, 2000). Eisenhardt (1989) recommends using 4 to 10 cases in a study and states that a case study with fewer than 3 cases may cause difficulties in generating too complex theory; conversely, if a study contains more than 10 cases, it can be challenging to cope with the complexity and volume of the data.

This work uses the research methods listed in Table 3, including surveys used for testing created conceptual models. The statistical method of factor analysis formed the constructs of models in the publications. Cronbach's alpha values tested the item reliability of the constructs. One weakness of the first publication is that several Cronbach's alpha values were at 0.6 level. The constructs used in the models were products of factor analysis; thus, items of each variable define the meaning of a variable in this research. The quality of the research methods was improved by testing and piloting interview and survey questions before the actual events. The studies in this thesis could be repeated for several public sector organisations. The results of these repeated studies could create more evidence that the results of this thesis are generalisable to different types of public organisations or countries. However, organisational surveys and studies are difficult to repeat identically in other organisations since there are no identical public organisations in practice; organisations have their own working cultures, structures, internal functions, sizes, purchasing volumes, values and strategies.

The study topics of this thesis provide examples and information concerning the procurement development of the public sector, especially regarding organisations applying the purchasing category management model and including the professional services purchasing category. Overall, the applicability of these research results to different purchasing categories (e.g., Pub III), public organisations (e.g., Pub I, II, III and IV) and different areas in the world (e.g., Pub V) call for further investigation.

5.4 Future research topics

Pub II finds two supply market development actions with relatively low feasibility and high impact values regarding the decision-making of extra resources and support. Future research could study why these high-impact supply market development actions were considered the least feasible. Such research could help a public organisation better understand the root causes for low feasibility and remove possible barriers to the implementation of high-impact procurement development actions. The lack of resources and support from critical actors in procurement may conceal, for example, other development actions of supply markets. According to the study results and procurement professionals of the CSPC, the highest development potential of the competencies is mainly in the supplier selection and bidding phase of the procurement process (Matela and Hallikas, 2020, tables 2 and 3). Future research could further investigate why public procurers tend to consider the procurement competencies of the supplier selection and bidding process phase the area with the most potential for development as well as the root causes for this conclusion. These future research questions are noteworthy because the results of Pub III (Matela and Hallikas, 2020, tables 4 and 6) indicate that the development of competencies in the procurement planning and customer needs recognition, procurement requirements creation, and cooperation development phases in the procurement process might improve even more outcomes of purchasing performance and supplier innovativeness targets.

Future research could examine the competency development of risk management during bidding and contract management in public organisations. Pub III reveals the importance of a procurer having the courage to address errors and charge sanctions. This courage is needed in the phases of the procurement process, for instance, during contract management. In addition, competency development actions, which lower risks in the tendering and purchasing contract management phases of the procurement process, are potential topics for future investigation. Other research could investigate how much professional procurement resources are allocated to different procurement process phases and whether the existing personnel competencies and resources are sufficient to procure effectively and innovatively. Pub IV studies the antecedents of innovation orientation in procurement from the buyer's perspective in a public agency. Future studies similar to Pub IV from other public organisations would improve the understanding of which antecedents explain innovation orientation in procurement. Also, a study from a supplier perspective could provide more insight into the research questions of Pub IV.

Pub V identifies that future research could control the type of public organisation and investigate the extent to which the results of Pub V apply to suppliers with only local government customers. The Pub V study respondents may have had the local government and the government types in their customer bases. Future research could also investigate firms which still need to engage with public procurement, while other future research could examine why suppliers with exploration strategies in the supply chain consider public buyers less attractive and how public organisations could attract more of these suppliers. New research could improve the accuracy of customer attractiveness in the public sector since the measures used in previous research were from the private sector. In addition, the measure of innovation enablers in tendering could be made more valid and reliable because this measure has not been used as a latent construct in previous research. Future studies could replicate this research in other countries with larger samples to increase the generalisability of the results of the present study.

The organisations investigated in this thesis are from Finland. Equivalent studies could include more extensive samples in other countries to improve the generalisability of the results. Similarly, purchasing category-specific studies of this research could be replicated in different purchasing categories to improve the generalisability of these research results.

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