



Master's degree thesis

LOG950 Logistics (Advanced Supply Chain Management)

Procurement category management: a case study of purchasing in a municipal government

Jocelyn Go Taknæs

Number of pages including this page: 101

Molde, 22nd of May 2017



Mandatory statement

Each student is responsible for complying with rules and regulations that relate to examinations and to academic work in general. The purpose of the mandatory statement is to make students aware of their responsibility and the consequences of cheating. Failure to complete the statement does not excuse students from their responsibility.

Please complete the mandatory statement by placing a mark <u>in each box</u> for statements 1-6 below.		
1.	I/we hereby declare that my/our paper/assignment is my/our own work, and that I/we have not used other sources or received other help than mentioned in the paper/assignment.	<input checked="" type="checkbox"/>
2.	<p>I/we hereby declare that this paper</p> <ol style="list-style-type: none"> 1. Has not been used in any other exam at another department/university/university college 2. Is not referring to the work of others without acknowledgement 3. Is not referring to my/our previous work without acknowledgement 4. Has acknowledged all sources of literature in the text and in the list of references 5. Is not a copy, duplicate or transcript of other work 	<p>Mark each box:</p> <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> 2. <input checked="" type="checkbox"/> 3. <input checked="" type="checkbox"/> 4. <input checked="" type="checkbox"/> 5. <input checked="" type="checkbox"/>
3.	I am/we are aware that any breach of the above will be considered as cheating, and may result in annulment of the examination and exclusion from all universities and university colleges in Norway for up to one year, according to the Act relating to Norwegian Universities and University Colleges, section 4-7 and 4-8 and Examination regulations section 14 and 15.	<input checked="" type="checkbox"/>
4.	I am/we are aware that all papers/assignments may be checked for plagiarism by a software assisted plagiarism check	<input checked="" type="checkbox"/>
5.	I am/we are aware that Molde University College will handle all cases of suspected cheating according to prevailing guidelines.	<input checked="" type="checkbox"/>
6.	I/we are aware of the University College's rules and regulation for using sources	<input checked="" type="checkbox"/>

Publication agreement

ECTS credits: 30

Supervisors: Per Engelseth, Geir Arne Svenning

Agreement on electronic publication of master thesis

Author(s) have copyright to the thesis, including the exclusive right to publish the document (The Copyright Act §2).

All theses fulfilling the requirements will be registered and published in Brage HiM, with the approval of the author(s).

Theses with a confidentiality agreement will not be published.

I/we hereby give Molde University College the right to, free of

charge, make the thesis available for electronic publication: yes no

Is there an agreement of confidentiality? yes no

(A supplementary confidentiality agreement must be filled in)

- If yes: **Can the thesis be online published when the period of confidentiality is expired?** yes no

Date: 22nd of May 2017

Acknowledgements

The completion of this thesis could not have been possible without the participation and assistance of so many people whose names may not all be mentioned. Their contributions are sincerely appreciated and gratefully acknowledged. However, I would like to express my deep appreciation to the following people:

First and foremost, I would like to thank my supervisor, Associate Professor Per Engelseth, who generously provided his support and guidance. I appreciate all of the time he spent helping me with this thesis, from helping me understand the dynamics of academic writing to providing thoughtful suggestions for editing and nudging me away from dead-end topics.

I would also like to express my gratitude to my other supervisor, Professor Geir Arne Svenning, for introducing this research topic, and for imparting his knowledge in this study. His contagious enthusiasm about my research definitely boosted my motivation through hard times.

While it is necessary to maintain the confidentiality of the municipal government, I would specifically like to acknowledge Asle and Wenche for their invaluable contributions.

Last but not least, I am infinitely indebted to my husband, Tommy B. Taknæs, for his unconditional support. He has given me the freedom and determination to pursue this goal, and I will be forever grateful.

Abstract

In financial year 2015, the studied Organization A, a municipal government in Norway, acquired more than NOK 443 million in goods and services. This represents a fourteen percent growth in real terms from financial year 2011. However, this research has found that this spending is not being managed efficiently due to degree of fragmentation and lack of integration. In order to manage the integration challenge, this case study explores on how Organization A's procurement structure can be designed through the application of the category-based framework devised by Trautmann and associates.

Spend analysis is used to identify the seven categories with synergy potential. Thereafter, the appropriate form of integration mechanisms across dispersed purchasing business units is applied. The findings suggest that Organization A can improve performance and achieve better value for money by pursuing an increasingly strategic-led approach to acquiring similar goods and services. Taking this form of a strategic approach involves a range of activities – from designing the procurement structure at category level, developing a better picture of what and how much the organization is spending, creating an integrative approach to procuring product categories, and involving the top management in managing synergies.

A main theoretical contribution of this study is that the applied framework proposed by Trautmann and associates is empirically grounded through this study of purchasing in the public sector. The study concludes with limitations and suggestions for future research.

Keywords: organizational structure, category management, category, public procurement, purchasing synergy, spend analysis.

Table of Contents

List of Tables.....	6
List of Figures	7
List of Acronyms.....	8
1 Introduction.....	9
1.1 Research background.....	9
1.2 Research gap.....	12
1.3 Aim and objectives	13
1.4 Significance of the research.....	14
1.5 Structure of thesis	14
2 Literature review	16
2.1 Category management	16
2.1.1 Category formation	18
2.1.2 Category teams.....	21
2.1.3 Category strategies	23
2.1.4 Category management process.....	25
2.1.5 Technology as an enabler.....	26
2.1.6 Challenges of category management.....	28
2.1.7 Benefits of category management.....	29
2.2 Procurement structure at category level	31
2.2.1 Integration mechanisms.....	34
2.2.2 Economies of scale.....	35
2.2.3 Economies of information and learning.....	36
2.2.4 Economies of process.....	37
2.2.5 Responsibility of managing synergies	37
2.3 Public procurement.....	38
2.3.1 Public procurement structures.....	39
2.3.2 Principles of public procurement	42
3 Research methodology.....	45
3.1 Research method.....	45
3.2 Data collection.....	45
3.2.1 Interviews	47

3.2.2	Documents.....	48
3.3	Validity and reliability.....	49
4	Empirical background.....	51
4.1	Organization background	51
4.2	Organizational structure	51
4.2.1	Procurement structure	51
4.2.2	Category team	53
4.2.3	The categories	55
4.3	Processes and tools	59
4.3.1	Organization-wide processes.....	59
4.3.2	Spend analytics.....	60
4.3.3	E-procurement tools	62
5	Case analysis.....	64
5.1	Designing the procurement structure at category level	64
5.1.1	Categories with economies of scale	65
5.1.2	Categories with economies of information and learning	73
5.1.3	Categories with economies of process	76
5.2	Managing the purchasing synergy	80
6	Conclusion	84
7	Study limitations and future research directions.....	86
	References	88
	Appendix	98

List of Tables

Table 1 Strategic sourcing vs. category management	23
Table 2 Factors affecting the integration level	33
Table 3 Overview on integration mechanisms	35
Table 4 Interview schedule	47
Table 5 Internal documents used in data analysis	49
Table 6 Framework agreement list.....	59
Table 7 Preview of supplier master data	61
Table 8 Organization A’s category description.....	65
Table 9 Organization A’s category characteristics.....	65
Table 10 Prices paid across different suppliers	67
Table 11 Proposed category tree	68
Table 12 Integration mechanisms of categories with economies of scale	70
Table 13 Category team’s responsibilities	71
Table 14 Integration mechanisms of categories with economies of information and learning	74
Table 15 Integration mechanisms of categories with economies of process	77

List of Figures

Figure 1 Spend for year 2015	9
Figure 2 Norway's public spending 2011 - 2015 (in million NOK)	12
Figure 3 Spend analysis.....	19
Figure 4 An example of a category tree	20
Figure 5 Category opportunity analysis matrix example	21
Figure 6 The eight-step category management process	25
Figure 7 E-enabling category management.....	27
Figure 8 Category management savings rate	31
Figure 9 Relationship assessment diagram	38
Figure 10 Centralized public procurement structure.....	40
Figure 11 Decentralized public procurement structure	41
Figure 12 Hybrid public procurement structure	42
Figure 13 Principles of public procurement	43
Figure 14 Data triangulation	46
Figure 15 Organization chart.....	51
Figure 16 Hybrid procurement structure	52
Figure 17 Category team structure	54
Figure 18 Pareto chart of spend by category.....	56
Figure 19 Pareto chart of spend analysis of suppliers by category	57
Figure 20 Pareto chart of spend analysis of business volume by category	57
Figure 21 Miscellaneous consumables spend data 2015.....	62
Figure 22 Screenshot on how to procure online.....	78
Figure 23 Proposed e-procurement procedures.....	79
Figure 24 Relationship assessment diagram in Organization A	82

List of Acronyms

AP	Accounts Payable
BI	Business Intelligence
BU	Business Unit
CEO	Chief Executive Officer
CPO	Chief Procurement Officer
CPV	Common Procurement Vocabulary
ERP	Enterprise Resource Planning
GR	Goods Receipt
HR	Human Resources
IT	Information Technology
MNC	Multinational Corporation
MRO	Maintenance, Repair and Operations
PO	Purchase Order
RFID	Radio Frequency Identification
RFQ	Request for Quotation

1 Introduction

This section presents the research background, research gap, aim and objectives, research significance and the thesis structure.

1.1 Research background

Procurement has been regarded by managers and scholars as a significant area of cost (Husted and Reinecke 2009). In public procurement, goods and services represent a large portion of the government’s expenditure. It is estimated that procured goods and services account for one third of total public spending (Husted and Reinecke 2009). Generally, public sectors procure a plethora of goods such as information technology (IT) hardware and software, school supplies, cleaning materials, utilities and motor vehicles, as well as services from maintenance to healthcare and security services.

This thesis represents a case study conducted within a single organization in the public sector – a local municipal government in Norway. For reasons of confidentiality, the name of the municipal government has been withheld, and will be referred to as Organization A.

In 2015, the total spend of Organization A was NOK 1.8 billion (Figure 1), which exceeded its budget by NOK 147 million. Almost one-third of that amount, or NOK 443 million, was spent on basic goods and services such as office supplies, hospital supplies and equipment, training services and IT systems.

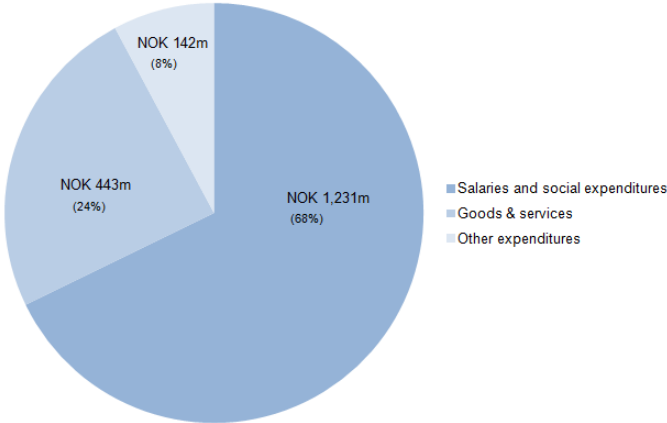


Figure 1 Spend for year 2015

The purchased goods and services is the portion of the municipal government's spend where it has the most control, and therefore this is where it can most likely realize savings by adopting best procurement practices. As (Cadwallader 1988) indicates, adopting best practices in procurement, like category management (Bechtel and Patterson 1997), can lead to a decrease in transaction costs and subsequently the purchase price.

Category management as defined by (Webb 2015) is the bundling and centralizing of similar goods into a single contract. It is a paradigm for purchasing that moves from managing purchases and cost individually across many procuring business units to grouping together similar areas of spend, and consider how best to address each in terms of the supply market.

Several improvements that have been achieved by organizations through category management initiatives include economies of scale, economies of information and learning, total spend under management, reduced supply chain risk, improved financial performance, and reduced total cost of ownership (Rozemeijer 2000, O'Brien 2015, Mitchell 2012).

Further, category management has been heralded as a key means by which public agencies have experienced significant gains in increased value for money and improve spend transparency for taxpayers. In 2011/12, the UK government's category management efforts on IT spend have delivered £140 million price savings (Gov.UK 2012). While the US government's category management initiatives have generated \$2 billion in savings (Rolfe 2016).

Although category management in general is agreed to support value for money, the municipal government in this research manages 25-30% only of its categories. Thus I posit that Organization A can be categorized as a 'follower'¹ or having an 'improving' category management.

Fully implementing category management within the organization has been hindered by the following:

¹ According to (Future Purchasing 2017), there are two types of organizations when it comes to category management initiative, and these are: (1) 'leaders' (have embedded/optimized category management), and (2) 'followers' (have improving, basic or not started category management).

- Broadly defined categories;
- Central procurement capacity;
- High employee turnover rate;
- Incongruent naming conventions; and
- Lack of spend data analytics.

Another contributing factor is the strict compliance to public procurement principles of accountability, transparency, open to competition, confidentiality, integrity and value for money. Particularly, there are a lot of bureaucratic demands if contracts are above the national threshold of NOK 1.1 million that it is time consuming, according to the Procurement Manager.

Lastly, the municipal government's procurement structure is also a drawback. Since its procurement structure is a hybrid model, its purchases and prices are not only managed by the central procurement unit but also by its 184 purchasing business units². For instance, investment related categories are mainly procured and managed by these units. These units work highly autonomously with occasional collaboration as well as little sharing of information and best practices across the organization. Further, these units continue to undertake expensive procurement activities rather than using existing framework agreements to procure standard categories, such as stationery and contract labor services. Even within the existing framework agreements, the dispersed purchasing business units are paying a wide range of prices for the same categories because of broad specifications. This lack of integration and degree of fragmentation drive costly inefficiencies and redundancies in Organization A's procurement activities and overall acquisition efforts, causing price variance of similar articles sometimes as much as a 770 per cent price variance.

According to (van Weele 2014), decentralized procurement structure is preferable when different categories of goods or services are purchased by each business unit, while centralized procurement structure becomes attractive when the same products or services are bought by several business units. However, in hybrid type of procurement structure, like the organization has in this thesis, there is a great challenge to identify the synergy potential of

² Figure is based from the conducted spend analysis of 2015 purchasing statistics data.

different categories and the appropriate form of integration (Trautmann et al. 2009). Thus, the way an organization’s procurement structure is designed is dependent on the category related synergies across dispersed units.

This leads to the fundamental research issue of the thesis, which will be:

How should the procurement structure of Organization A be designed to improve its category management initiative?

1.2 Research gap

From a research standpoint, a number of articles and books about procurement have been published but there are not that many that cover the public sector. Yet this sector spends enormous amounts of taxpayer’s money in the acquisition of goods and services. For Norway alone (Figure 2), total public spending for goods and services is about NOK 480 billion in 2015, which is an increase of NOK 19 billion from the previous year (Statistisk sentralbyrå 2016).

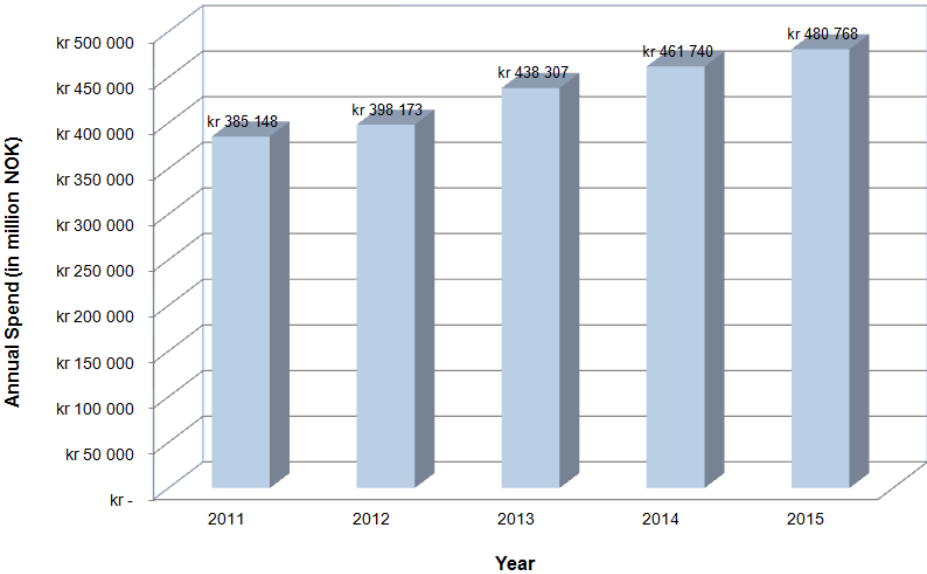


Figure 2 Norway’s public spending 2011 - 2015 (in million NOK)

In addition, the review of previous studies has found little research evidence that draws together the public procurement environment and the adoption of category management simultaneously. While this may signal that there is little happening in practice, the recognized interest in public procurement and category management by academics (for example (O'Brien 2015) and (Emmett and Wright 2011)) does support the value in my undertaking an exploratory study on how procurement category management be approached to increase utilization of public spending.

1.3 Aim and objectives

The specific objectives of the research include:

- *Review current practice and implementation approaches of procurement category management in the municipal government*
- *Investigate existing category management frameworks, theories and strategies*
- *Apply a novel approach in improving the municipal government's category management initiative with the application of theory*

Based on the above three objectives which focus on a municipal government in Norway, an overarching and important aim has arisen: *How to design a municipal government's procurement structure for the improvement of its category management initiative.*

In order to meet the aim and objectives, this thesis follows the framework of (Trautmann et al. 2009) which is based on the model developed by (Tushman and Nadler 1978). (Tushman and Nadler 1978)'s framework implies focus on organizational integration of tasks. This is extended by (Trautmann et al. 2009) to the purchasing context where the focus is on identifying the categories with synergy potential and applying the appropriate integration mechanisms across geographical units. So, in this paper, I applied (Trautmann et al. 2009)'s model in designing the appropriate procurement structure in Organization A because it is a category-based approach, which is relevant in improving a category management initiative. It is also my intention to empirically ground (Trautmann et al. 2009)'s framework to purchasing in public sector which is different from their study on private multinational corporations (MNCs).

1.4 Significance of the research

It is my intention that this paper can be useful to the following parties:

- Professional managers holding the procurement roles and positions, and other stakeholders in Organization A;
- Professionals in all public sector with procurement responsibilities and positions; and
- Lecturers and students of Molde University College who are studying business topics such as purchasing, procurement and supply chain cost management.

1.5 Structure of thesis

The thesis is composed of seven sections, each of them dealing with different aspects.

Section 1 is introductory. The section is subdivided into five parts. Part 1 describes the main research problem by presenting Organization A's current issues. Part 2 addresses the research gap of procurement category management in a public agency. Part 3 deals with the aim and objectives of this research. Part 4 presents the intended parties to which this thesis can be useful of. Lastly, part 5, which is this part, deals with the structure of this thesis.

Section 2 examines relevant literature. This section consists of three parts. Part 1 focuses on category management definition, its advantages and disadvantages, and the needed infrastructure such as information systems, category formation, and category teams. Part 2 illustrates the approach of designing a procurement structure at category level with the use of category characteristics, supply environment and integration mechanisms. Part 3 addresses the compliance issues in public procurement principles of public accountability, transparency, open to competition, confidentiality, integrity and value for money. This part also presents the common public procurement structures such as centralized, decentralized and hybrid structure.

Section 3 is subdivided into three parts and provides an outline of the methodology for this thesis. Part 1 presents the research method used in this thesis: a case study. Part 2 illustrates the approach to data collection. Part 3 explains the trustworthiness of this thesis.

Section 4 concentrates on the empirical findings. Part 1 presents and illustrates Organization A's traditional functional organization structure. Part 2 looks at how the procurement structure is designed, how the purchasing from dispersed business units is integrated, and how categories and category teams are formed. Part 3 describes the extent to which rules, procedures and communications are written down, and the tools used to support the municipal government's category management initiative.

Section 5 presents the case analysis by combining the case study, spend data analysis and literature review, thereby addressing the research question.

Conclusions are then drawn in Section 6. And lastly, study limitations and future research directions are provided in Section 7, followed by the reference list and appendix.

2 Literature review

The purpose of this section is to present reviews of relevant literatures. This section starts with an introduction on category management. This is to be followed by a description of category and category teams' formation, various category strategies and category management process. Challenges in achieving a category management's full potential as well as benefits if well executed are also presented. Next, the approach of designing procurement structure at category level with the use of category characteristics, supply market and integration mechanisms are explained. Lastly, a literature review on public procurement, focusing on the general principles, and the different procurement structures are described and explained.

2.1 Category management

Category management is a term that was first coined in retail (CIPS 2007), where decisions about product selection, placement, promotion and pricing were made on a category-by-category basis rather than as individual items. So, supermarkets looked at the whole product category and how to maximize profit for that category. They looked at things like the total product range, pricing strategies or where in the shop to display the items. The concept was soon taken by large consulting firms and pretty quickly by large companies into the more general procurement world though not quite the same as retailers but enough similarity.

There are many definitions of category management. Some of the most significant ones, including the definition of (Webb 2015) that was explained earlier in the introductory section, are presented here, but the list is by no means exhaustive:

“The process of clustering and centralizing similar goods into bigger contracts which are easier to administer and lowers prices.” (Webb 2015)

“The management of product categories as strategic business units. The practice empowers a category manager with full responsibility... to judge more accurately the consumer buying patterns... and market trends of that category.” (Council of Supply Chain Management Professionals 2016)

“A strategic approach which organizes procurement resources to focus on specific areas of spends... and conduct in depth market analysis to fully leverage their procurement decisions on behalf of the whole organization.” (Chartered Institute of Procurement & Supply 2017)

These three definitions emphasize category management as a strategic approach of segmenting similar goods or services into product categories according to their function and supply market characteristics, and assigning procurement resources (e.g. category team, category manager) to manage them as strategic business units. It is about developing expertise in each category in terms of understanding the product, the market, or the suppliers. Moreover, it is taking a proactive view on what the organization is spending and what will be spent on the future as well as planning and strategizing around that (Smith 2017).

In a public agency like Organization A, it is about buying smarter, eliminating redundancies, increasing efficiency and effectiveness, and boosting satisfaction with the services and products it delivers. In order to do this, category management focuses on three key principles: (1) aggregation, (2) rationalization and (3) standardization (Smith 2014).

Aggregation is to group together similar spend and demand across the organization to obtain best value for the organization (Smith 2014). With aggregation, synergy benefits like economies of scale can be gained.

Rationalization is to look for a range of suppliers that can provide the goods and services within a category (Smith 2014). This delivers benefits of supply base reduction.

Standardization is linked to the previous two approaches. It is about focusing on the requirements and specifications of purchased goods and services and, where appropriate, refine and standardize them based on market availability and dynamics to obtain better value for money (Smith 2014).

These principles contribute to lowering overall organization costs through reduced duplication, availability of consistent data, improved market intelligence that allows learning of best practices, improved public offerings, and increased demand capture accuracy of specific categories.

So how are categories formed? The steps are outlined in the next section.

2.1.1 Category formation

There are very few research articles available about category formation. According to one of the few articles, category is defined as follows (Trautmann et al. 2009):

“A category encompasses a group of similar items that are required for specific business activities of the firm.”

Examples of categories are logistics, contract labor, office supplies, facilities management and utilities (O'Brien 2012). According to (O'Brien 2015), the most important characteristic of a category is that it must reflect their market-facing nature or organization of individual marketplaces. For instance, an organization might segment a category into 'travel' since there are corporate travel agencies that provide all sorts of travel solutions. However, such agencies are not the market itself as they are only acting as intermediaries between customers and multiple markets. The real market-facing travel components are 'air travel', 'hotel', and 'taxi' (O'Brien 2015). These different components can be the subcategories under the umbrella of 'travel' category.

Identification of categories

To identify categories, a spend analysis is required. Spend analysis is defined as a tool that provides information on an organization's buyers, suppliers, spend on goods and services, and areas of opportunities to leverage buying power (Hawkins, Nissen, and Rendon 2014). It is used to identify opportunities to rationalize the supplier base, aggregate spend, reduce transactions, leverage spend volume, standardize requirements and estimate potential savings.

As shown in Figure 3, conducting an effective and ongoing spend analysis involves five key steps (Aberdeen Group 2003):

1. *Extract* – obtain spend data from internal and external systems. This would include the organization's accounts payable (AP) data as well as purchase card data from external vendors' systems, supplier's financial status and performance information

(Anonymous 2005). Extracting as much information as possible ensures complete understanding of the purchasing spend.

2. *Validate* – ensure data files are accurate, complete and consistent.
3. *Cleanse* – extensively review the data for accuracy and consistency.
4. *Classify* – standardize the data in the same format by using industry-standard classification systems like Common Procurement Vocabulary (CPV) codes, a single classification system used in public contracts.
5. *Sort and analyze* – organize the data into comprehensive categories of suppliers and commodities; and establish category managers or cross-functional category teams to analyze the spending information with the use of standard reporting and analytical tools (Anonymous 2005).

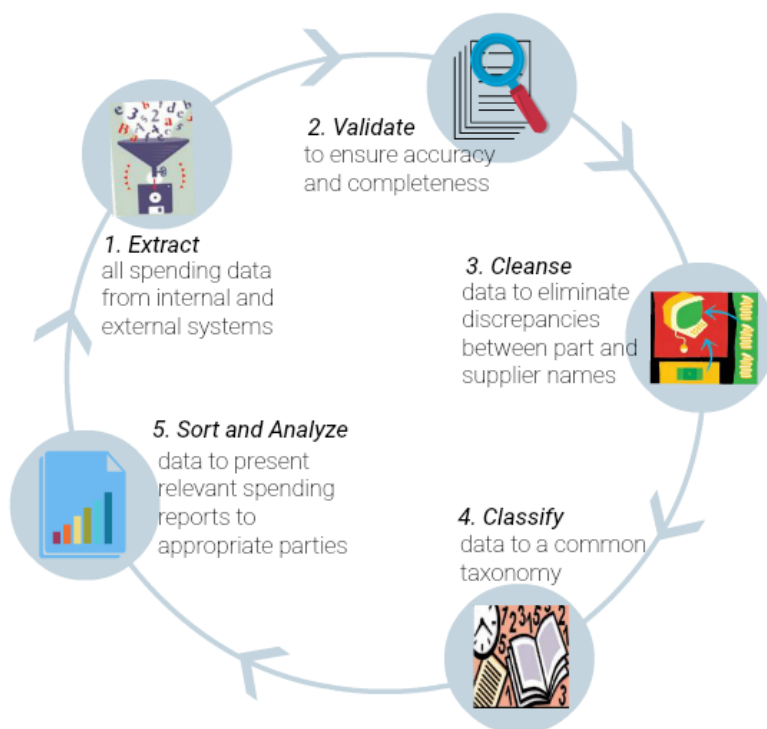


Figure 3 Spend analysis

Source: adapted from (Aberdeen Group 2003)

Based on this detailed spend data, a *category tree* is set up (Figure 4) where the spend data is further classified into three areas: *categories*, *non-addressable* and *rest of spend* (O'Brien 2015). *Non-addressable spend* is the area of spend that is impossible or difficult to influence such as rates or charges by governmental bodies. *Rest of spend* is spend that is not categorized

because it represents the small spend areas, hence not viable to expend effort working on. For the spend that is segmented into *categories*, the Pareto principle typically applies, and organizations should focus on the 80 per cent of purchases where 20 per cent of suppliers are concentrated (O'Brien 2015). Once the organization has mapped the categories, it has to prioritize which ones to work on first and in what sequence the remainder should be handled.

IT Infrastructure Mainframes Midrange systems (W)Intel servers Other professional Hardware Database software Application software Middleware software Security software PCs Monitors Printers Other peripherals Outsourced computer services Telecom hardware (voice) Telecom utilisation (voice) Telecom hardware (data) Telecom utilisation (data) Mobile telecom services	Professional services Financial services Information services Legal services Management consulting services Other professional services	Office buildings Security services Construction services Technical installations Interior construction Office furniture Catering equipment Household/office removals Parking services Rental/lease buildings Energy Interior decorating	Office supplies Stationery White paper Copier services Other office equipment
	Marketing and communication Commercial printed matter Organization printed matter Media/communication Promotional items Sales/promotion events Photography services Translation services Market research Building displays Sponsorship	Facility services Waste disposal Food and beverage machines Catering Plant and flower services Cleaning services	HR Books and magazines Contributions Training and tuition Clothing Medical services Staff facilities Travel Hotels and conferences Representation costs Recruitment services Childcare Transport (staff) Car lease (private) Fuel (private) Temporary staff
IT Contracting Compliant suppliers Resellers Non-compliant suppliers	Industry related Raw materials Packaging	Transport and logistics Courier services Storage services Archiving services Packaging Vehicles Fuel (business) Post handling equipment Secured transport Postal services Safes	Not relevant Internal invoices via A/P Unknown suppliers Non-procurement spend Vat Suppliers

Figure 4 An example of a category tree
 Source: (vanWeele 2010, p. 212)

Prioritization of categories

Before cross-functional teams are assigned to work on specific categories, category prioritization is to take place through the use of a Category Opportunity Analysis Matrix (Figure 5). Here, categories are assessed based upon two criteria: potential benefits (y-axis) and ease of implementation (x-axis) (O'Brien 2015). Potential benefits here could be in the form of a reduction in price and cost if the organization replaces a customized solution with an off the shelf solution, buys modular items rather than individual components, expands the number of potential suppliers in a tender procedure, and mitigates buyer-supplier dependence (vanWeele 2010). While common criteria for ease of implementation includes internal technical expertise, supply market and contracting expertise, degree of resistance to change

within the organization (vanWeele 2010), and degree of difficulty to switch suppliers (O'Brien 2015).

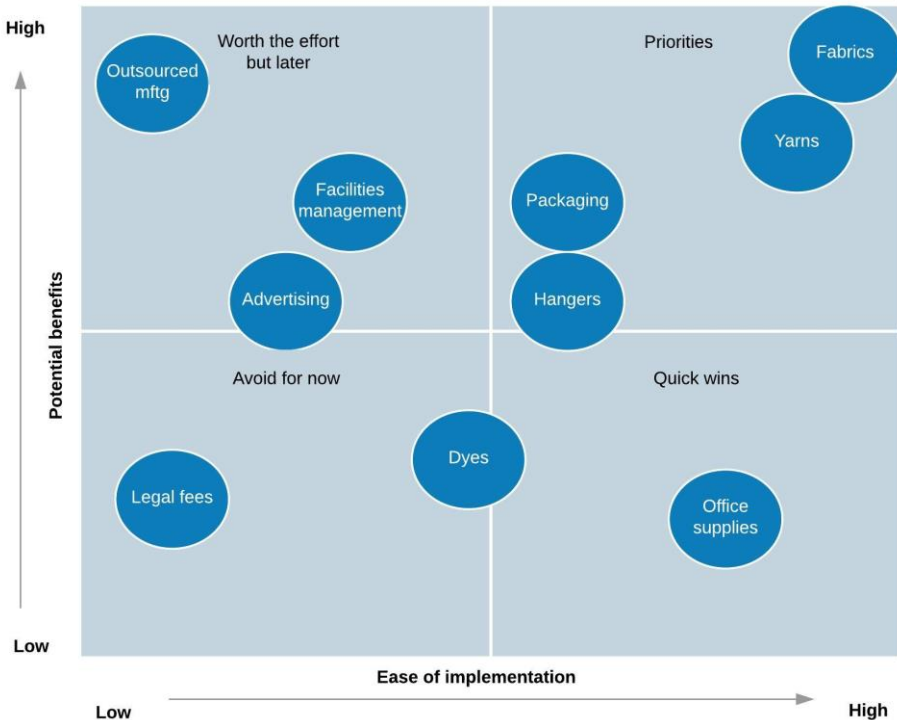


Figure 5 Category opportunity analysis matrix example
 Source: adapted from (O'Brien 2015)

According to (vanWeele 2010), the category project comes in waves and usually starts with *Priorities* in the upper right of the quadrant - the high value categories. This, however, is refuted by (Smart and Dudas 2007) saying that in most cases, maintenance, repair and operations (MRO) products, commodities, and indirect materials are the preferred items when organizations start pooling initiatives.

2.1.2 Category teams

In category management projects, a cross-functional team plays an integral role. This team is comprised of representatives from the relevant business units who have a major interest in the area of spend that might be affected by any change or familiar with the commodity being evaluated (O'Brien 2015), and whose responsibility, authority and accountability for procurement activity are clearly defined (CIPS 2011).

How an organization forms its category team is dependent on the category characteristics (Trautmann et al. 2009). Since it can be different for different categories, the team members should be located differently throughout the organization. For example, if the team is tasked with the supply management of 'IT hardware', then it would be a good idea to include engineers who are familiar with the characteristics of these commodities. If the category is 'contract labor', then the optimum team might comprise Human Resources (HR) and high users of temporary labor from different business units.

The construct of a team can involve the core team members and extended team members (O'Brien 2015). The extended team may comprise of sponsors, or facilitators. The responsibilities of these members can differ in terms of workload such as providing guidance or removing barriers to progress. The extended team will also involve the different stakeholders. These are the people in the organization who are accountable and responsible for that business area, and must be consulted and kept informed. These are the same people that must be fully supportive to any category management so there won't be any resistance once change is implemented (O'Brien 2015).

Meanwhile, the core team members should have the right commitment, executive support and availability as category management projects are not full-time tasks but require a series of work days (O'Brien 2015). Within the core team, a project leader or category manager, typically from the purchasing department, is normally appointed. This category manager might work on one category as a whole, say 'IT', but is also responsible for five or six subcategory projects within it like IT hardware and software. He is fully responsible for implementing strategic sourcing for a specific category (Trautmann et al. 2009) to drive down total costs and improve overall performance for that category.

Table 1 provides a comparison of category management and strategic sourcing.

	Strategic Sourcing	Category Management
Goal	<ul style="list-style-type: none"> • Reduce purchased costs for a given commodity, most often by selecting lower-cost suppliers through demand aggregation, competitive bidding and negotiation. 	<ul style="list-style-type: none"> • Maximize realized category value to the organization, including total cost of ownership, risk, operational performance, innovation, etc.
Frequency	<ul style="list-style-type: none"> • Periodic and project-based. Triggered over one or more years in the course of managing a commodity. 	<ul style="list-style-type: none"> • Ongoing, day-to-day process. Triggers project-based activities and other operational improvements as needed.
Approach	<ul style="list-style-type: none"> • Conducted via an n-step sourcing methodology culminating in transition to a new supplier contract. 	<ul style="list-style-type: none"> • Develops a category strategy and applies appropriate value levers and supporting techniques/tools as needed to meet value objectives (e.g., strategic sourcing, value engineering, process reengineering, demand and compliance management).
Results	<ul style="list-style-type: none"> • Reduced contract pricing translating to actual realized savings hitting the bottom line. 	<ul style="list-style-type: none"> • Category value is targeted, including validated savings and broader value measurement.

Table 1 Strategic sourcing vs. category management

Source: (Mitchell 2012, p. 2)

Ideally, the competencies and skills required to effectively manage a category are strategic thinking, team work, supply market analysis, total cost of ownership, influential, persuasive and change management (NSW Government: Procurement Board 2013, p. 5)

2.1.3 Category strategies

Category strategy is explained by (Monczka et al. 2011, p. 204) as:

“A decision process used to identify which suppliers should provide a group of products or services, the form of the contract, the performance measures used to measure supplier performance, and the appropriate level of price, quality, and delivery arrangements that should be negotiated.”

Kraljic’s purchasing portfolio model is a commonly used tool in formulating category strategies (Caniëls and Gelderman 2007), and has since inspired other portfolio models which are quite similar to the Kraljic matrix in essence. One of them is the Strategy Portfolio Matrix for Category Management by (Monczka et al. 2011) (see Appendix 1). Their portfolio model

suggests four types of purchase categories and the key purchasing strategy for each type. They are as described below:

Bottleneck commodities, where goods and services, such as electronic parts or spare parts for equipment (Kraljic 1983), have low value, and are vulnerable with regard to their supply because of few, if any, alternative suppliers. A purchasing strategy directed towards acceptance of dependence and reduction of the negative consequences are pursued (Caniëls and Gelderman 2005). The alternative is to search for other suppliers and move towards the routine quadrant.

Routine commodities are goods and services that are of low value (Kraljic 1983). These items have many alternative suppliers and are purchased regularly, hence, cause high administrative costs (Gelderman and Van Weele 2005). Examples are office supplies, janitorial services, maintenance supplies, and facilities management. Several enablers are necessary to successfully reduce such costs. Among them are pooling of purchasing requirements, standardization of processes, reduction of supplier base, use of purchasing cards, and use of e-procurement solutions and framework agreements.

Leverage commodities where goods and services make up a large portion of an end product's cost price, and can be purchased from many suppliers. Examples are electric motors, raw materials, steel, packaging and bulk chemicals. Buyers have a dominant power position for this category, and have the incentives to negotiate, as small percentages of cost savings will involve large sums of money (Olsen and Ellram 1997). The purchasing strategy that is recommended for this spend area is exploitation of purchasing power (Caniëls and Gelderman 2005). Long-term supply contracts are unnecessary, but a centrally negotiated framework agreement with preferred suppliers is preferred.

Critical commodities where goods and services like high-value components (Kraljic 1983) and large infrastructure projects are of high supply risk and high value. This spend area requires more collaboration between buyer and seller to counter balance the supply risk (Gelderman and Van Weele 2005). Maintaining a strategic relationship will lead to improvements in product quality, delivery reliability, lead times, and cost reduction (Caniëls and Gelderman 2005).

In the next section, the following eight steps provide a brief understanding of the basic overall category management sourcing process.

2.1.4 Category management process

Variations of category management process in the literature are few. I am using a model, with a minor adjustment, that was published in 2015 by (Webb 2015) which illustrates the different steps within category management (Figure 6):

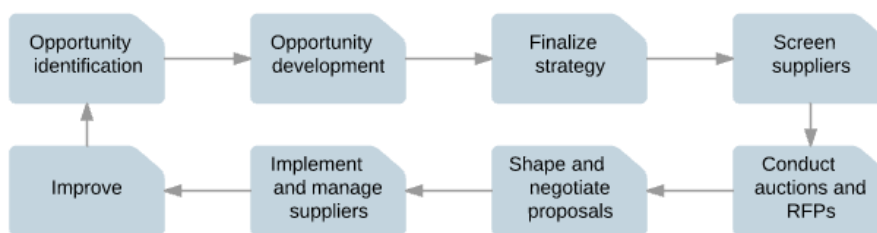


Figure 6 The eight-step category management process
Source: adapted from (Webb 2015)

1. *Opportunity identification* is a set of internal tasks which includes understanding the organization spend and the main stakeholders. This is the spend analysis which has been mentioned earlier in Section 2.1.1.
2. *Opportunity development* involves examining the supply market in order to identify the major suppliers of a specific category. Some helpful tools are Porter's Five Forces of Competition, PEST analysis, SWOT analysis, portfolio analysis, risk and vulnerability analysis, and supplier preferencing (Baily et al. 2015).
3. *Finalizing strategy* is the third step in category management process. This is when a single sourcing strategy for a category is to be developed to best position the organization in the market after gathering data from internal and external environment analysis (O'Brien 2015).
4. To *screen the suppliers* is to determine which suppliers have the capabilities to fulfill the requirements. This may also come in the form of reaching out to new or potential suppliers.
5. *Conduct auctions and RFPs* is the step to find the best supplier with the most competitive price and the most appropriate solutions or products. In government

agencies, this is about tendering. The objective of tendering procedure is to establish which is the best offer based upon the predefined criteria, e.g. the lowest price, or the most economically advantageous tender (MEAT) or the best value for money (Emmett and Wright 2011). For the latter criteria, it includes things such as price, terms of payment, any commercial qualifications, compliance with specification, performance parameters, or disposal costs.

6. *Shape and negotiate proposals* is the evaluation of the received bids, and may involve post tender negotiations. Post tender approach may be carried out in the private sector but this is not appropriate in the public sector (Emmett and Wright 2011).
7. *Implement and manage suppliers* is the step after contract is awarded to a supplier. This step is about supplier management – day to day management, interaction, contract management, and performance management (O'Brien 2015).
8. *Improve* involves looking for ways to improve the overall sourcing arrangement or continually finding improvements. A decision to start the process again requires a yes to at least one of five questions (O'Brien 2015):
 - Has the business risk increased considerably?
 - Is there new opportunity, innovation or technology that would add significant value?
 - Is there an unknown breakthrough or source of value that would bring great benefit?
 - Have the business requirements changed greatly?
 - Has there been a significant change in the market that creates a need to act, or presents either great opportunity or risk?

If yes to any five, then there is a need to restart category management. In the public sector, though, it has to be synchronized with contract expiry as it is simply not possible to just bolt it in an existing contract (O'Brien 2015).

2.1.5 Technology as an enabler

Nowadays, all purchasing transactions are almost entirely electronic, often with little or no human intervention at all. The use of technologies have revolutionized business on a global scale, with potential benefits including improved efficiency, reduced transaction costs, enforced on-contract buying, improved business processes, and quality data on total spending

(Neef 2001) as well as strengthen collaborative procurement activities and enable sharing of information between partners (Leach 2012).

One type of e-procurement tools to receive particular attention for its potential to improve category performance is e-sourcing tools. According to (O'Brien 2015), e-sourcing tools have enabled category management to become more effective, and therefore consume fewer resources to carry it out. Specifically, the author suggests that electronic tools e-enabled category management by eliminating the manual, paper-based processes. Moreover, the use of such tools such as e-tendering (requests for information, proposal and quotation), reverse e-auctions and electronic supplier database have made the process of category sourcing from need specification to final negotiation and supplier selection much simpler and quicker (Presutti Jr 2003). Also, such e-tools increase visibility of potential suppliers, giving buyers greater choice (Evans and Wurster 2000), and creating the ability to leverage price to the best point in the market (O'Brien 2015).

Some of the technologies that are presumed to e-enable category management are shown in Figure 7.

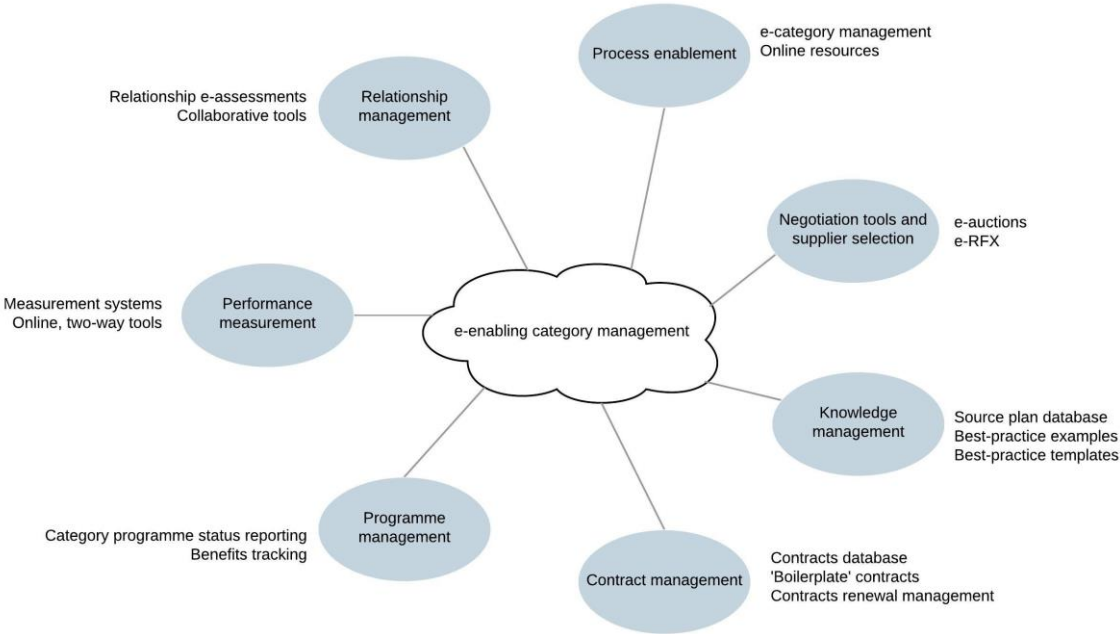


Figure 7 E-enabling category management
 Source:(O'Brien 2012, p. 267)

Meanwhile, in a recent report by (Deloitte 2016), *Procurement: At a digital tipping point?*, from a survey sample of 324 most senior procurement leaders in organizations from 33 countries, investment in spend analysis technology came up as the top priority of the Chief Procurement Officers (CPO) to maintain access to high quality market data, and better allocate significant human resources to tasks that are strategic. A robust spend analytics platform is important in category management since spend can be easily classified to a single target hierarchy and segmented to different category structures. In addition, it will help identify all on-and off-contract spend at the category and contract level as well as identify categories for sourcing opportunities (Bartolini and Dwyer 2008).

A study by (Kauppi et al. 2013) points out that the use of electronic tools has an effect on category performance. But their study also point out that by merely implementing these tools without human interface will not lead to category performance improvements. The same view as that of (Mata, Fuerst, and Barney 1995) that technologies, without the other organization capabilities, cannot in itself bring sustained competitive advantage.

2.1.6 Challenges of category management

In a study conducted by CIPS Australasia in 2011, 43% of the respondents identify the availability of quality data as the major challenge for category management initiatives (CIPS Australasia 2011). The absence of a uniform article coding system to classify what was purchased from a certain supplier and how much were spent is the main factor that contributes to the challenge of obtaining detailed purchasing spend (vanWeele 2010). But (Falgione et al. 2008) point out that it is possible to obtain this by investing in a modern IT platform like an Enterprise Resource Planning (ERP) system to chart purchasing expenditure in detail. Such platform should have the capability to sort the data per category or item, per supplier and per cost center (vanWeele 2010).

Stakeholder engagement and availability of procurement resources make up the top three challenges for the respondents. Other challenges mentioned in the research are supplier capability, leveraging scales or synergies, access to supply market intelligence and technical procurement capability.

Meanwhile, (O'Brien 2012) argues that driving change within an organization is also a drawback. To resist change is a natural human tendency, and there is no way of avoiding it. However, according to the author, it can be minimized through hard work, involvement and communication. This means the purchasing department has to work cross-functionally, requiring support, cooperation and active participation from other departments. Senior management support is also important in realizing success in implementing change. A category manager, who does not only possess the skills in carrying out the purchasing function but also the skills in leading a team, must also be appointed. Further, the organization structure of the purchasing function has to undergo some changes as well. If the required goods by business units have the same characteristics such as raw materials and high-tech components, the more benefits can be obtained by pooling volumes and centralization (vanWeele 2010).

Managing compliance is also one of the pressing issues. For category management in the commercial sector, buyers might build a collaborative relationship with suppliers, use different approaches for running a competitive bidding process or conduct additional negotiation after the bidding process (O'Brien 2015). However in the public sector, these practices are at odds with the legislative provision.

Although there are challenges for category management, there are also a number of benefits.

2.1.7 Benefits of category management

Since category management entails cross functionality, it creates the purchasing synergies of economies of scale, process, and information/learning (Rozemeijer 2000). Purchasing synergy as defined by (Rozemeijer 2000) is the added value when two or more purchasing business units work together and/or share resources, information, and/or knowledge in the area of purchasing.

Economies of scale relate to obtaining lower unit costs through volume bundling and standardization of categories through framework agreements (Trautmann, Bals, and Hartmann 2009). Others like (Tella and Virolainen 2005) attribute the main reason for better prices to increased negotiation power. The study of (Karjalainen 2011) shows that a central

procurement department can provide an average of 19% lower price than on the market, and 37% lower under framework agreements. But, of course, the whole organization has to be loyal to the framework agreements to achieve the required volume, otherwise there will be a 20 – 30% unrealized savings (Kulp et al. 2006).

Economies of information and learning relate to sharing purchasing information and knowledge on suppliers, new technologies and internal users (O'Brien 2015). Common template or single process and toolkit for everyone in the organization establish a means of sharing key information. In particular, centralization assures the efficient use of available purchasing skills because categories are managed by specialists (Joyce 2006). By exchanging and sharing information about product specifications, organization-wide contracts, suppliers, prices, procedures, and supply market developments, business units can improve their financial results, and buying position (Rozemeijer 2000).

Meanwhile, *economies of process* relate to establishing a common way of working, sharing best-practice procedures across the organization and decentralizing decision-making to purchasing units (Trautmann et al. 2009). Here, e-procurement solutions like catalogs are a means to achieve efficiency.

Since category management requires some form of spend analysis, this in turn will provide an organization, especially a public agency, greater transparency and better framework agreements through improved market understanding (O'Brien 2015). A clear indication of the value of this tool in the public sector is demonstrated by the US government's Air Force Information Technology Commodity Council's \$4 million savings in 2003 after they analyzed and consolidated their desktop and notebook computer purchases (Tiboni 2004). Another large independent US governmental agency, the United States Postal Service, has achieved a reduction on its MRO suppliers from more than 1,000 to just two through a comprehensive spend analysis (Duffy 2005).

If well executed, category management will result in dramatic value and benefits for an organization. 'Value' might take the form of reduction in price, cost drivers and supply chain risk, and improvement in business profitability (Future Purchasing 2015). The potential of category management in delivering substantial value to an organization was recently affirmed

in the 2016-17 Global Category Management Leadership Report (Future Purchasing 2017). The survey results were gathered from 320+ participants in 14 industry sectors across the globe.

According to the report, by increasing the percentage of spend that is covered by category management, and by improving delivery from such approach, ‘leaders’ (respondents who are categorized as having embedded/optimized category management) have achieved €71,000 savings per €1 million spend, compared to €26,000 for ‘followers’ (respondents who are categorized as ‘improving’, ‘basic’ or ‘not started’) – a near 3x performance difference. All in all, the total percentage that can be achieved by optimizing category management is estimated at 16.3% or €130,000 savings per €1 million spend (Figure 8).

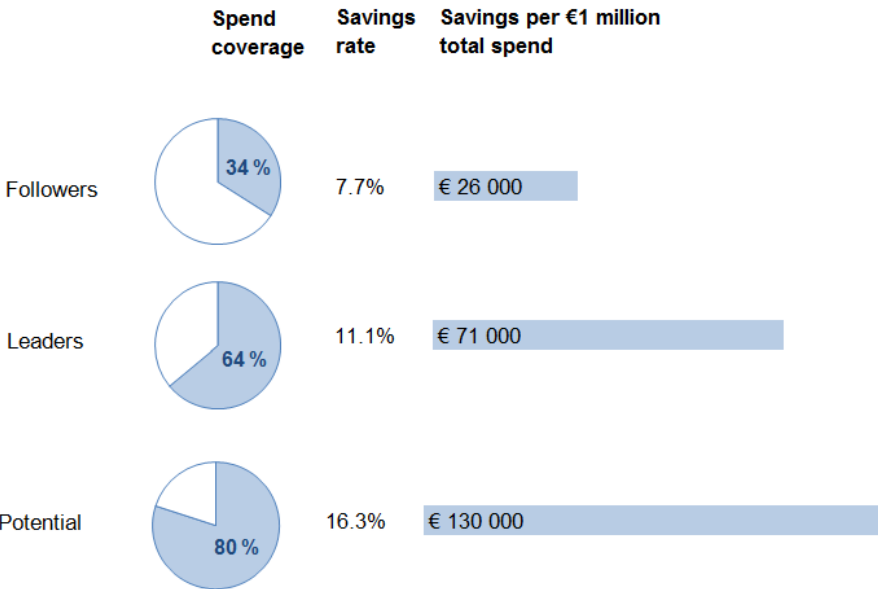


Figure 8 Category management savings rate
Source: (Future Purchasing 2017)

2.2 Procurement structure at category level

According to (van Weele 2014), decentralization is preferable when unique and markedly different categories of goods or services are purchased by each business unit, while centralization becomes attractive when the same products or services are bought by several business units. However, in hybrid type of procurement structure, like the organization has in this thesis, there is a great challenge to identify the synergy potential of different categories

and the appropriate form of integration (Trautmann et al. 2009). Thus, the way an organization's procurement structure is designed is dependent on the category related synergies across dispersed business units. (Monczka et al. 2011) also affirm that deploying procurement strategies should start at the category level.

Here, I present a review on (Trautmann et al. 2009)'s framework on purchasing structure at category level which is a result from their study on large MNCs with hybrid procurement structures and had success with category management. Their research concludes that different categories require different ways of integration.

Integration (or coordination) is the process of different groups, functions, or organizations working together, either formally or informally, physically or by information technology, on a strategy or problem to accomplish a common business-related goal (Monczka et al. 2011). In an organization with dispersed business units, like Organization A, coordination or integration of purchasing requirements across these units is not easy to master (Rozemeijer, Argan van, and Weggeman 2003).

According to (Trautmann et al. 2009), the three contingencies of category characteristics, supply environment characteristics and interdependence of purchasing business units affect the level of integration in dispersed purchasing business units.

Category characteristics include purchase novelty, purchase importance, category complexity and demand volatility (Table 2). These are internal to the organization and relates to organization's purchasing experience on an item, degree of product customization, risk perceived and purchase volume, and demand fluctuations (Trautmann et al. 2009). These contingencies are recognized to significantly affect how purchasing organizations are designed across different categories. *Supply environment* characteristics, as described in Table 2, are external to the organization. This includes the degree of item availability, uncertainty of supply as well as stability of supply (Trautmann et al. 2009).

Contingency	Definition	How and why it affects
Purchase novelty	Experience the firm has on purchasing the item: new task, straight rebuy or modified rebuy	New tasks are more uncertain because the firm does not have the experience and knowledge of the purchase
Product complexity	Degree to which the product is a commodity or highly customized	Customization increases the understanding of product characteristics and purchasing process, making the situation more uncertain
Purchase importance	Degree and type of risk perceived in the purchasing situation and purchase volume	High volume and risk increase the exposure to loss, making the purchase more uncertain
Demand volatility	Degree to which the demand of the purchased item changes across periods	Strong demand fluctuations make the planning of purchase difficult, increasing uncertainty of the situation
Supply market characteristics	Degree of item availability, uncertainty in production and supply, stability of supply	A turbulent environment characterized by a rapid rate of change and lacking transparency of supply markets, making the situation more uncertain

Table 2 Factors affecting the integration level

Source: (Trautmann et al. 2009, p. 60)

Lastly, *interdependence of purchasing business units* relates to the interdependence of purchasing units that are located in different locations. This type of contingency is internal to the organization and creates higher task uncertainty (Tushman and Nadler 1978). (Jain 2005) defines the three types of interdependence based on (Thompson 1967)'s contingency theory:

- *Pooled interdependence* requires no interaction among purchasing business units because each unit performs separately.
- *Sequential interdependence* requires one unit to complete its task before another unit can perform its task.
- *Reciprocal interdependence* requires each unit's output to serve as input to other units in the organization (Jain 2005).

Interdependence is the expression of power structure in the supply chain (Emerson 1962). In the case of buyer and supplier, power does not necessarily have to be zero-sum since buyer and supplier can each have power over each other making them interdependent. Or taking the case organization in this research for the IT hardware category, the central procurement unit is dependent on its business units to fulfill contract compliance. At the same time, the business units are dependent on the central procurement unit because it is the unit that is responsible for carrying out the strategic purchasing activity of selecting the supplier that can best deliver the right product at the right price.

2.2.1 Integration mechanisms

The managerial tools to integration, referred to as integration mechanisms are divided into vertical and lateral mechanisms (Galbraith 1973, 1977, 2000). Vertical mechanisms include centralization, formalization, and information systems. Centralization is the degree to which decision making is delegated to the top level in an organization, while formalization describes the extent to which rules, procedures and communications are written down (Bozkurt, Kalkan, and Arman 2014). Lateral mechanisms are characterized by cross-functional teams in the form of category teams and a category manager (Trautmann et al. 2009).

Both mechanisms vary in their capacity to facilitate information processing in an organization and the costs of use (both managerial time and monetary costs). For instance, the use of vertical mechanism like centralization needs less investments but their capability to facilitate information processing is lower than that of lateral mechanisms. While the use of numerous complex lateral mechanisms may require high investments, it facilitates high information processing. Because of different information processing requirements, effective management of dispersed sourcing units requires implementation of different types of integration mechanisms (Trautmann et al. 2009).

Table 3 is (Trautmann et al. 2009)'s framework which illustrates the different integration mechanisms to exploit purchasing synergy potential in a category management initiative.

Overview on integration mechanisms				
Synergy benefits	Vertical mechanisms			
	Centralization	Formalization	Information systems	Lateral mechanisms
Economies of scale	Strategic purchasing centralized at category manager (specification setting, market analysis, sourcing strategy, contract placement). Operation purchasing at each business unit.	Standardized purchasing process with clear definition of roles and responsibilities.	IT system to leverage information on local needs, prices, contract structures and suppliers across all units.	Category manager and local managers work in teams to develop strategies for a category. Local knowledge and requirements are considered in strategy development and acceptance across business units is ensured.
Economies of information and learning	Category manager must approve RFQ list and sourcing decision	Purchasing processes differ across business units, but comparable outputs for each major activity defined. Decision gates for important activities (supplier selection, category strategy) defined a priori by category manager	IT system to leverage information on best price, suppliers and contracts across sites. Knowledge database with detailed information, templates, etc. about projects, best practices.	Category manager to transfer category and market knowledge by being involved in the purchasing transaction and working together with the respective units
Economies of process	Full purchasing authority is decentralized to business units.	Manuals, guidelines and instructions with best-practice purchasing process and related tools	Database with manuals and instructions	None

Table 3 Overview on integration mechanisms
Source: (Trautmann et al. 2009, p. 64)

2.2.2 Economies of scale

Category characteristics of categories with synergy potentials as economies of scale are standardized with similar specifications across business units, low risk and subject to few design changes. Hence there is low purchasing uncertainty since purchasing task can be planned for and requires less need to collect more information during task execution. In addition, the *supply market* is characterized with high competition, transparent market, and suppliers can deliver cost-effectively to the different locations of their customers (Trautmann, Bals, and Hartmann 2009). In terms of *interdependence*, uncertainty is high. The purchasing units are characterized by reciprocal interdependence because the strategic purchasing activities are concentrated at one location (Trautmann et al. 2009). To exploit economies of

scale, contract compliance is a must. When reciprocal interdependence is high, the information processing requirement and integration mechanisms are also high, hence the need to use both vertical and lateral mechanisms (Trautmann et al. 2009).

To achieve economies of scale, strategic purchasing process is centralized to a category manager while the daily purchasing is decentralized. Standardized purchasing process and information systems must also be in place. Lastly, category management teams are the appropriate lateral mechanisms for organizations to exploit economies of scale for these categories (Trautmann et al. 2009) (see Table 3).

2.2.3 Economies of information and learning

Here, the category being purchased is characterized by high purchasing uncertainty since the *category characteristics* are high level of complexity, volatile demand pattern, high category performance and either new buy or modified rebuy (Trautmann et al. 2009). The complexity of the category requires careful analysis, extra information and additional effort to handle the purchase because these are mostly project-based purchases. While these are primarily related to category characteristics, uncertainty can also be induced by factors external to the organization, stemming from the supply environment (Trautmann, Bals, and Hartmann 2009).

The *supply environment* is characterized by a low number of suppliers and fluctuating prices. Further, substitution possibilities are not prevalent, and supply market is lacking transparency. Because of this high level of uncertainty, there is a need to obtain more detailed supply market information in order to identify feasible suppliers that can provide the right quality in right demand quantities and for the right price (Trautmann, Bals, and Hartmann 2009). This gives an indication that business units can benefit by exchanging category and market information which creates a high reciprocal *interdependence*. And when reciprocal interdependence between business units is high, the need for integration mechanisms with high information processing capacity is also high. Thus (Trautmann et al. 2009) again suggest the use of both vertical and lateral mechanisms (see Table 3).

To attain economies of information and learning, information systems are to be in place for transparency on contracts, suppliers and prices as well as best-price comparisons across

business units. Further, decision making is to be centralized to a category manager who in some cases approves request for quotation (RFQ) and sourcing decision and in other cases assumes responsibility for the whole purchasing process. As a lateral mechanism, the category manager acts as a liaison between different units by ensuring that dispersed knowledge across these units are aggregated (Trautmann et al. 2009).

2.2.4 Economies of process

This third synergy form is characterized by low purchasing uncertainty since the *category characteristics* are straight rebuys, highly standardized, low importance, and regular or recurring demand pattern. The *supply environment* of the categories is stable and transparent with large competitive suppliers and high supply availability (Trautmann et al. 2009). As opposed to the previous two synergies where *interdependence* is reciprocal, here it is pooled. Pooled interdependence exists when purchasing business units are capable of executing the purchasing task independently once new purchasing processes are implemented and established.

The major challenge for this category is the demand planning because of high number of purchasing transactions. Purchasers may spend 80 per cent of their time on less than 20 per cent of their spend volume, hence minimizing transaction costs is the ultimate goal (Trautmann et al. 2009). In order to create an appropriate information processing capacity that fits the category requirements, the authors suggest the use of multiple vertical mechanisms, such as organization wide standardization of best practice processes and use of e-procurement solutions, without the lateral mechanisms (as shown in Table 3).

2.2.5 Responsibility of managing synergies

(Rozemeijer 2000) points out in his study that one of the most critical issues in managing purchasing synergies from economies of scale, information and learning, and process is the issue of responsibility. He also points out that in a purchasing synergy initiative, there are four parties that play a significant role in managing them: 1) the CPO, 2) the chief executive officer (CEO), 3) the business unit management, and 4) the business unit purchasing management. Each of them has a specific role and responsibility, and the better the

relationships are structured, the more successful the purchasing synergy initiative will be. They should maintain a relationship since (Rozemeijer 2000)'s study results show that without a mandate from the CEO, it is very difficult for a CPO to change the behavior of business unit managers. The CPO will have the supporting role because in the end, he should be responsible (Rozemeijer 2000).

Figure 9 shows the nature of relationship between these four. The arrows show a two-way relationship and the same intensity (line thickness), but according to (Rozemeijer 2000)'s study, it can be one-way and/or more intense (in terms of involvement and communication) in practice.

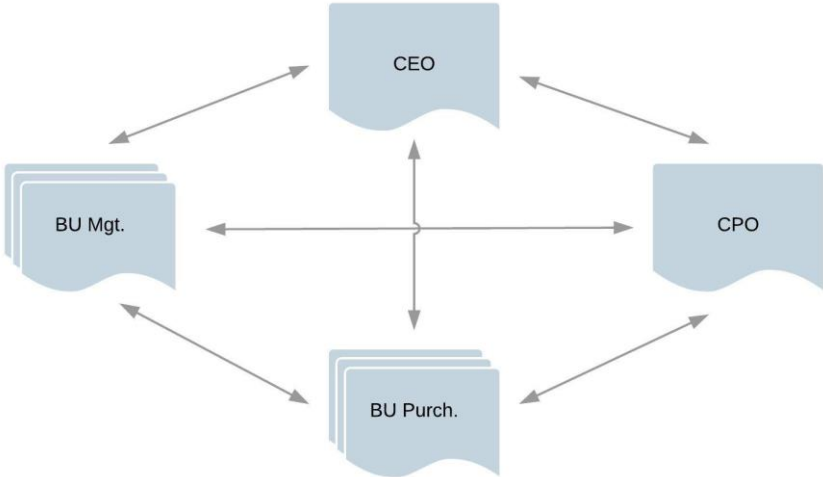


Figure 9 Relationship assessment diagram
 Source: (Rozemeijer 2000, p. 11)

2.3 Public procurement

(van Weele 2014) defines procurement as the buying of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing an organization's primary and support activities at the most favorable conditions. It involves the recognition of purchasing needs, supplier selection, order issuance, delivery of the goods or services, and payment of suppliers.

When the purchase of goods or services is conducted by governments or state-owned enterprises, it is called public procurement (Uyarra and Flanagan 2010). Similarly, the

(European Commission 2017) defines public procurement as “*the process by which public authorities, such as government departments or local authorities, purchase work, goods or services from companies*”.

2.3.1 Public procurement structures

One of the key debates in the organization literature concerns the relationship between strategy and structure. The term «*structure follows strategy*» is famously coined by (Chandler 1962). The author argues that every strategic change in an organization will cause new administrative problems such as personnel and facilities which in turn require a new structure for the strategy to be successfully implemented. This concept, however, is argued by other authors, (Hall and Saias 1980), who suggest that strategy precedes structure. While (Mintzberg 1990) takes a balanced view noting that none takes precedence over the other, and both strategy and structure support any type of organization.

In this section, the different purchasing structures that are prevalent, especially in the public sector, are presented. The purpose is not only to present the different public purchasing structures, but also to identify the most advantageous structure for different categories.

The different types of procurement structures used in the private sectors are well researched. According to (Johnson, Leenders, and Flynn 2011), the typical procurement organization structures are centralized, decentralized and hybrid. While other authors refer to them as coordinated devolved, centralized and consultative (Lysons and Farrington 2012) or centralized, decentralized, coordinated and hybrid (Mena, Hoek, and Christopher 2014).

In the public sector where the policy making, authority and process are established according to hierarchy, the three common procurement structures are centralized, decentralized and centralized/decentralized, according to (McCue and Pitzer 2000) (see Figures 10, 11 and 12).

Centralized procurement structure

A fully centralized organizational form exists when purchasing is handled by one special department (Joyce 2006). (McCue and Pitzer 2000) also suggest that centralized purchasing means that the full authority and responsibility for the purchasing function is assigned to a

central purchasing department to ensure integrity of the purchasing process. This is the traditional form of public procurement system as it replicates the hierarchical form of control and command. This is most suited for managing relationships with critical suppliers, implementing organization-wide best practices, developing electronic procurement systems, managing critical commodities, negotiating organization-wide supply contracts, and standardizing procurement processes (Monczka et al. 2011). Centralized structure is also preferable when several units buy similar goods (Trautmann et al. 2009).

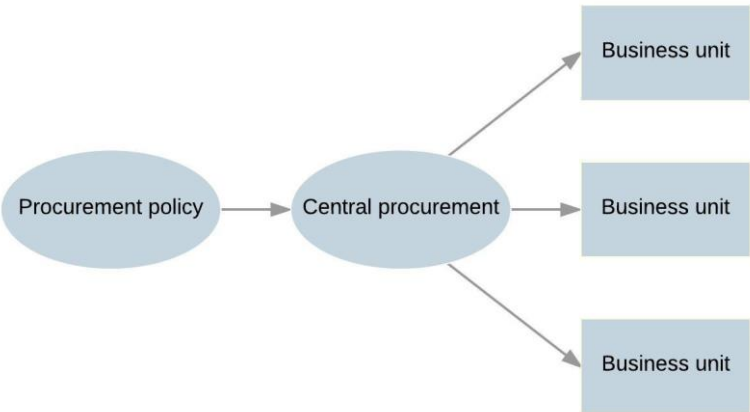


Figure 10 Centralized public procurement structure
 Source: adapted from (McCue and Pitzer 2000)

But centralization has its drawbacks. Among those mentioned in literature are maverick buying, difficulty of controlling processes remotely, excessive overhead costs and slow responses to issues from business units (Karjalainen 2011). Bundling can also decrease competition because small suppliers will be unable to compete due to the large purchasing volumes, and oligopolies might be formed in the market (Nollet et al. 2008). In the public tendering procedures, there is real concern that too few suppliers can fulfill the total volume requirements (Caldwell et al. 2005).

Decentralized procurement structure

The second organization form is a purely decentralized structure. This exists when there is no central purchasing department. The different business units do their own purchasing and are responsible for the outcome of their purchasing practices. This structure is also preferable

when several units buy unique or different products since bundling common requirements will only provide limited savings or advantages (vanWeele 2010, p. 284)

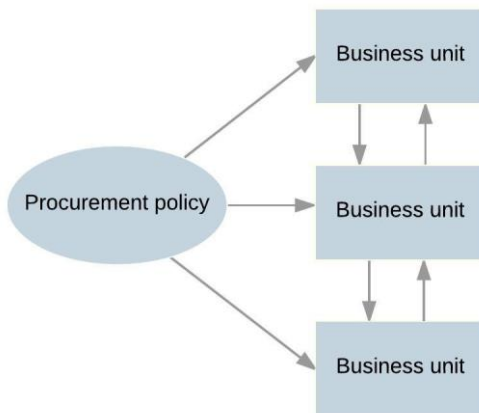


Figure 11 Decentralized public procurement structure

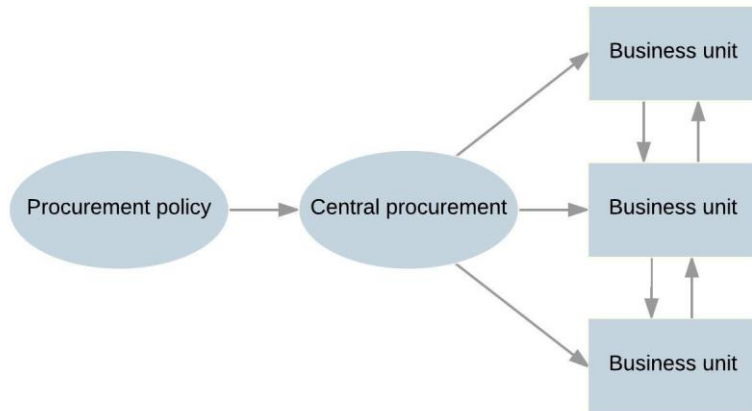
Source: adapted from (McCue and Pitzer 2000)

According to (Cousins et al. 2008), the disadvantage of decentralization stem largely from corrupt and opportunistic suppliers that charge different business units with different prices for the same product category. Other disadvantages include lack of standardization, limited expertise, reduced leverage (that exists when purchases are not consolidated), and less opportunities of cross-functional collaboration (Lysons and Farrington 2012). Moreover, decentralized purchasing may lead to a loss of spend oversight as it will be difficult to control spend (Cousins et al. 2008).

However, decentralized purchasing is not without its advantages. Several benefits of decentralization are closer to users, better understanding of business unit needs, response time to divisional needs may be rapid, closer relationships with suppliers and lower transportation costs (Lysons and Farrington 2012).

Hybrid procurement structure

The last public purchasing system is the centralized/decentralized model. It exists when purchasing function is decentralized but strategy and sourcing control are coordinated by the central procurement team. Needless to say, the hybrid structure encapsulates the advantages of the previous two purchasing structures.



*Figure 12 Hybrid public procurement structure
Source: adapted from (McCue and Pitzer 2000)*

The division of tasks for this purchasing model will then be that the activities up to and including completion of contract or framework agreement and contract management are centralized to the central procurement department, while the activities after contracting like creating a purchase order (PO) or performing goods receipt (GR) are decentralized to the business units (Karjalainen 2011).

The case organization in this research, a municipal government, has a hybrid model of procurement where the central procurement unit sets the guidelines but the day to day purchasing is at the business unit level. They purchase a lot of goods and services from office to medical supplies and from maintenance to health services. For every purchase, the municipal government strives at making sure everything is purchased in adherence to the public procurement principles.

2.3.2 Principles of public procurement

Procurement in public sector demands a balance between internal efficiency as well as external conditions regarding corporate social responsibility. The overriding principles are public accountability, transparency, open to competition, confidentiality, integrity and value for money (Ekambaram, Kumaraswamy, and Ng 2003) (see Figure 13).

Expenditures by governments are funded by the taxpayers money that they are expected to operate with a sense of efficiency and accountability (Matthews 2005) on the way public

funds are managed. All necessary information, including the selection procedures and evaluation criteria, should be provided to the tenderers for increased transparency (Ekambaram, Kumaraswamy, and Ng 2003).

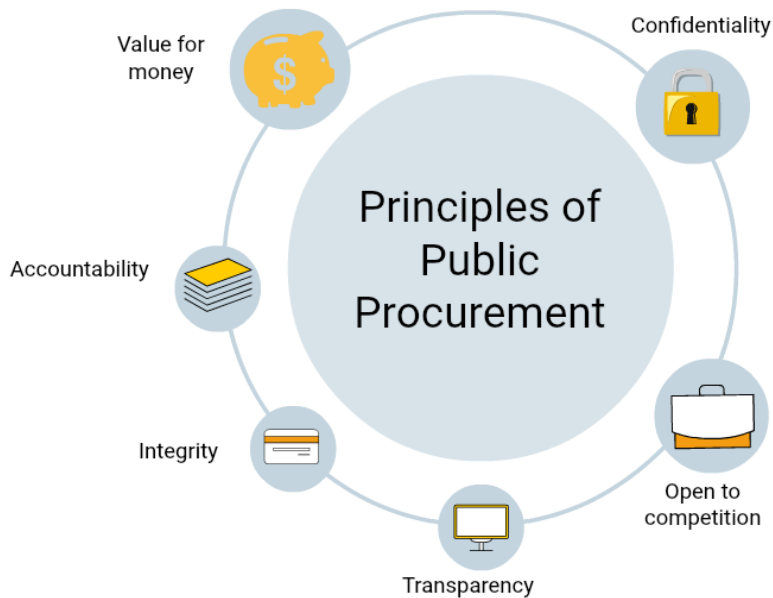


Figure 13 Principles of public procurement

To promote open and fair competition, the government should treat all tenderers in an equitable manner without any discrimination or bias (Ekambaram, Kumaraswamy, and Ng 2003). Information like trade secrets of tenderers should also be protected to ensure adequate confidentiality (OECD 2009). Specific measures and mechanisms for the monitoring of public procurement and the detection and sanctioning of misconduct are to be put in place to prevent risks to integrity in public procurement (OECD 2009). Clear integrity standards should be set, and be followed.

To improve value for money, selection of supplier should consider competitiveness, compliance with requirements, reliability of performance, qualitative superiority, and life-cycle costs (Ekambaram, Kumaraswamy, and Ng 2003). Value for money is to pay for a good or service only to the extent that its quality or availability is justified (Glendinning 1988). In complex or big projects, value for money can be derived through comprehensive tendering process, which occurs in two distinct stages: 1) identifying properly the competent bidders based on assessment of their best value delivery potentials, and 2) selecting the optimal bid

based on an assessment of identified best value parameters (Ekambaram, Kumaraswamy, and Ng 2003). On the other hand, in simple or small projects, price-based competition is the focus since analyzing all value elements in detail may not be optimal.

Although tendering is a valuable tool for the public sector, it is a considerable cost to the government as it requires time and resources (Emmett and Wright 2011). It is a burdensome process since to send information, handle queries, and read and evaluate tenders can be extensive, increasing with the number of received tenders (Heijboer and Telgen 2002). However, the study of (Karjalainen 2011) suggests that centralizing the procurement structure in public sector eliminates this burdensome process, and at the same time significant volume discounts from pooling can be achieved.

3 Research methodology

In this section, the research method, the different techniques for data collection and the trustworthiness of this thesis are presented.

3.1 Research method

In this thesis, one type of research methods is utilized: case study. A case study has been used to understand the category management practice in Organization A and the integration of purchasing activities. A case study can be defined as “*an intensive study of a single unit for the purpose of understanding a larger class of (similar) units*”(Gerring 2004, p. 342). The case study is a preferred research methodology when the researchers seek to understand “how” or “why” something occur or is as it is (Yin 2014); or when a bounded system is the main focus of the study (Merriam 1998). Case studies can involve single case studies, multiple case studies or longitudinal case studies where data can be collected by means of several tools like observations, interviews and documents (Yin 2014, Saunders, Lewis, and Thornhill 2012).

In this thesis, the decision to use a case study method was made because this study proposes to obtain a depth of understanding on how procurement activities at the category level in a municipal government in Norway are integrated, which cannot be answered through experimentation. The main focus of my study is also a bounded system, that is, one organization within the public sector. Further, case study method allows me to do statistics analysis, conduct interviews, and read internal reports and documents from Organization A. However, I have no intention to test a theory or collect quantitative data that will lead to generalizability, but instead present Organization A’s situation (Arbnor and Bjerke 1997).

3.2 Data collection

Data collection is considered to be extremely important for doing case studies. As (Stevens et al. 2006, Saunders, Lewis, and Thornhill 2012) point out, there are two types of data, namely, the primary data and secondary data. Primary data are data collected specifically for the research project being undertaken. This data can be obtained through observation, the use of interviews and the use of questionnaires. Secondary data are archives such as books, journals,

newspapers, surveys, and government publications. This may also include internal firm documents such as purchasing data and financial reports. These may be available by permission of the party collecting the data, free to access, or may require payment fee (Ellram and Tate 2016).

I chose a combination of documents, spend data analysis and interviews as the data collection methods for my research because according to (Yin 2003) this triangulated methodology is a major strength for case study data collection (see Figure 14). Overall, the objective has been to gain an in-depth understanding on how purchasing category management is practiced in Organization A, and also the integration between the central procurement unit and the different purchasing business units. As a result, some recommendations were presented, such as loyalty to framework agreements, increase usage of e-procurement, supplier master data clean up, aggregate requirements, standardize specifications, install catalog agreements for low value, low importance routine items, eliminate contract duplication, leverage spend analysis, adapt the right integration mechanisms, involve top management in driving change across the organization, and standardize common way of working, just to name a few.

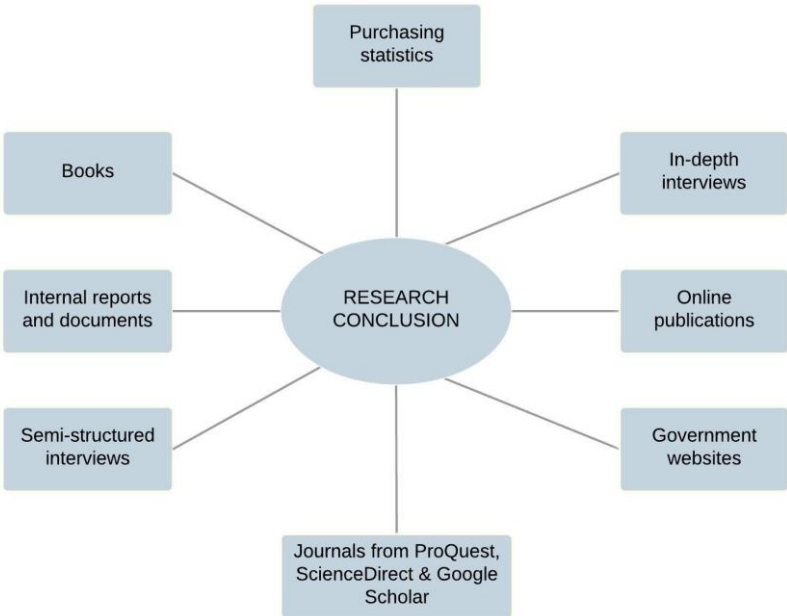


Figure 14 Data triangulation

3.2.1 Interviews

The interviews with the Procurement Manager and Procurement Advisor were conducted face-to-face at their offices. These interviews were held in the municipal government's finance department premises during the period from 15 December 2016 to 9 March 2017. Prior to each interview, I sent out an email explaining the key features of the research and outlining the probable questions to be addressed in the interview. In this email, I also asked them to specify the date and time that were convenient for them to have the interview. The interview schedule within the municipality is outlined in Table 4.

Date	Position in the organization	Duration
15-Dec-16	Procurement Manager	45 minutes
9-Feb-17	Procurement Manager	1 hour
23-Feb-17	Procurement Advisor	1 hour 30 minutes
9-Mar-17	Procurement Manager	1 hour

Table 4 Interview schedule

In line with the recommendations of (Saunders, Lewis, and Thornhill 2012), I used both the in-depth and semi-structured interviews as the method of collecting the primary data for this study. Because of the explorative nature of the study, the authors recommend that these two interview types allow the use of probing questions, where responses from the informants can be explored, and the use of open questions, where informants can define and describe a situation. If structured interviews were used then it would limit the data collection for they only support the descriptive aspect.

The probing and open questions were used to understand Organization A's problem better (i.e. what categories are centrally managed, how is the purchasing of different categories across dispersed business units integrated, what challenges are they experiencing) as well as understand the relationship between the central procurement department and the different purchasing business units in the municipality.

Moreover, all the interviews were audio-recorded, which allowed me to fully concentrate on asking questions and responding to the interviewees' answers. Full transcription of the audio-recorded interviews was done by me, which enabled me to get a good grasp of the collected data.

3.2.2 Documents

Documentary secondary data regarding category management, and public procurement were gathered from books, government reports, some online publications, and existing research publications and literatures from Science Direct, ProQuest and Google Scholar databases. Furthermore, details about Organization A's tender notice publications were accessed from Doffin or Merzell websites. Additionally, sources of company documentation included various internal reports, purchasing statistics data, RFQs, letters issued to bidders and supplier invoices.

When I collected information of past supplier invoices for seven hours, I had to do it in the procurement department's premises whereby I was given access to their accounting system. The information from these invoices was used to calculate the price variation across different suppliers for the office and school supplies category. A sample size of 422 out of 1,589 transactions was assessed.

On the other hand, the 2015 purchasing statistics data were obtained from the Purchasing Manager of the municipality. About 30,222 transactions from the purchasing statistics were used in the spend analysis by category, number of transactions or suppliers. Conducting this purchasing spend analysis was important in counteracting the biases of the interviews because interviews can be subjective. However, the spend data was only obtained from the internal accounting system of the municipality, and did not consider supplier internal data. Further, I did not pursue to correct the spend data limitations such as coding errors and supplier master code duplication.

A list of the internal documents analyzed is shown in Table 5.

Internal documents used	
Purchasing statistics reports	List of current framework agreements
Supplier invoices	Tender evaluation documents
Financial plan for 2016-2019	Request for quotation (or RFQ)
Operating expense reports	Letters to bidders

Table 5 Internal documents used in data analysis

3.3 Validity and reliability

According to (Ellram 1996), researchers must be concerned with reliability and validity. Reliability boils down to consistency – the extent to which a study could be repeated over time and across researchers and methods (Miles and Huberman 1994). In the context of qualitative research, reliability is concerned with this question: If multiple field-workers are involved, do they have comparable data collection protocols?(Miles and Huberman 1994). To bolster reliability, I am the only person who did all interviews and conducted the spend analysis therefore the problem of differences in data collection procedures has been eliminated.

Validity, on the other hand, refers to whether the method really provides a good measure of what it intends to measure (Bryman and Bell 2011). It is strengthened by triangulation and use of feedback loops (Meyer 2001). Triangulation is the use of multiple sources of evidence to establish good measures for the problem that is being studied. My study responds to these requirements because multiple sources of data were used, various spend categories were examined, and key procurement personnel at different levels and had different roles were interviewed.

However, in the case of interviews, researcher’s personal bias can affect the validity of the study. To avoid this problem, I had the interviews recorded then transcribed. Also, I made use of feedback loops where I had informants review the documented responses to ensure that there were no misunderstandings and that their responses were captured accurately. Further, I made use of quantitative data like the purchasing statistics data. This was important to counteract the biases from interviews as two different informants may have different views

which result to different answers for the same question. Lastly, I sent a preliminary draft of the thesis paper to the Procurement Manager for comments and to validate the factual description. These processes increased the accuracy of the study, corroborated facts, and hence, increased validity and reliability (Yin 2014).

4 Empirical background

This section of the research provides the empirical data obtained during the study.

4.1 Organization background

Organization A has a traditional functional organization structure with five separate functional divisions. The functional divisions include responsibility for finance, health and care services, technical and cultural affairs, personnel and administration, and education (Figure 15).

Functional organization even extends to the business unit layout. Each division has its own division head and the business units with their own managers. But the person who has the authority to delegate the execution of defined tasks and responsibilities in each division or business unit is the chief municipal executive or *rådmann* who sits at the city council.

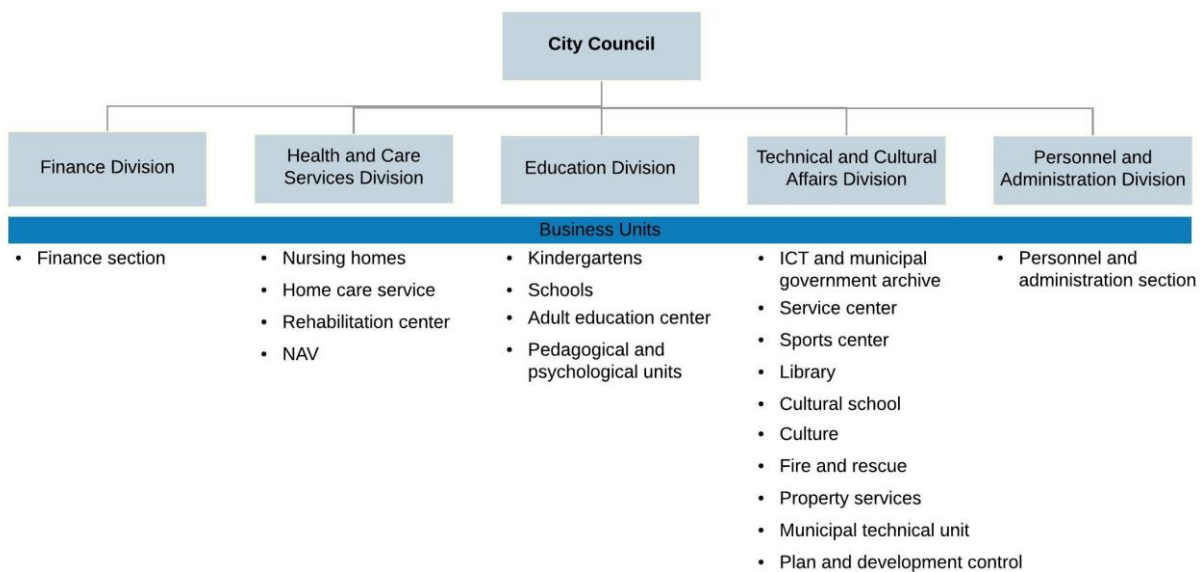


Figure 15 Organization chart

4.2 Organizational structure

4.2.1 Procurement structure

The procurement structure of Organization A is a mixed hybrid model as the purchasing function is shared between the central procurement unit and the 184 business units, but the management structures in contracting and procurement are centralized (see Figure 16). Every

one of these business units can also decide independently on the use of their budgets, allocated by the municipality’s city council, for purchases, and the operational daily purchasing is decentralized.

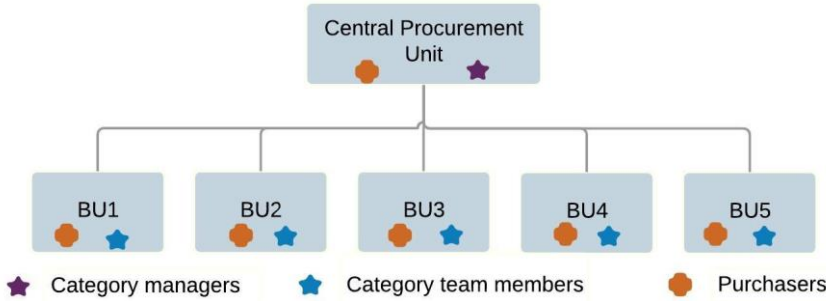


Figure 16 Hybrid procurement structure

The central procurement unit is under the umbrella of the municipal’s Finance Division which is headed by the assistant chief municipal executive. It has a procurement manager and three other procurement professionals at the functional level, where two work exclusively for the municipality and the other two works for the group of municipalities where the municipal government has a collaborative procurement arrangement. These are the same people who also generate the procurement procedures and guidelines for the hybrid organization to follow. In addition, they serve as the category managers with spend on specific categories like office supplies, IT hardware and consultancy services, and facilitate the tendering procedures for framework agreements normally valued above the Norwegian national threshold of NOK 1.1 million.

All the municipality’s units, such as finance, health care services, technical and cultural affairs, personnel and administration, and education, are recommended to use these framework agreements. The major contributing factors for using framework agreements are the desire to gain purchasing savings by pooling the large volumes of the municipality’s purchases and standardization of processes. In spite of these facts, the framework agreements have, however, been estimated by the municipality’s Procurement Manager to have a low usage rate.

The rest of the purchasing organization is distributed on divisions and business units throughout the organization. 138 purchasers are responsible for the small value purchases and

30 purchasers are delegated the purchasing role for high value items. The category team members also come from the different purchasing business units.

Purchase of capital expenditures like IT systems, cars and furniture are carried out by these business units. Occasionally, the central procurement unit assists them in making the specification and criteria, or the RFQ, and sends the offers to qualified suppliers. They are also allowed to purchase goods or services without informing the central procurement unit as long as the transactions are below the Norwegian national threshold of NOK 1.1 million.

Currently, Organization A has intercommunal procurement cooperation with eleven other municipalities. The main motivation for this is to streamline the procurement processes through framework agreements and with increased volume gives greater bargaining power and reduced transaction costs for them.

4.2.2 Category team

As briefly mentioned in the previous section, the category core team in Organization A is a cross-functional team comprising a small group of representatives from across the different business units in the municipality plus a category manager (see Figures 16 and 17). These business unit representatives are appointed by the head of their departments, and are only fulfilling a part-time task as their main tasks are related to the core function of their unit (for instance, an IT engineer from the IT department, or a doctor from the hospital). Members have expertise in technological efficiency of an IT hardware or software, or quality of medical supplies, and they are capable to develop sourcing strategies in these categories. Each member contributes unique insight into the development of criteria for supplier selection, according to the Procurement Manager. For the extended team, it is comprised of the different stakeholders in the municipality – the different business units who purchase certain products or services, end-users, city council, suppliers and taxpayers.

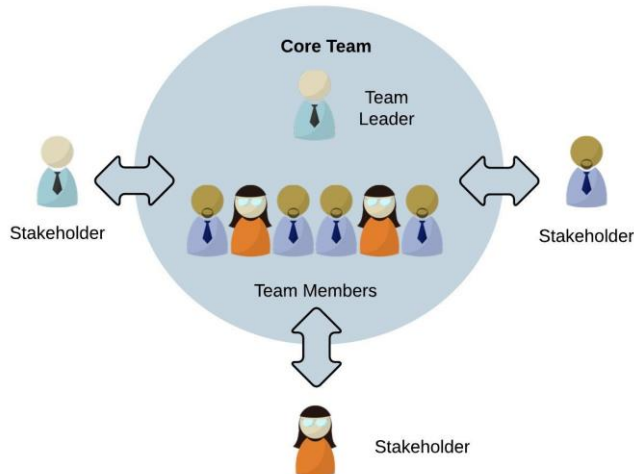


Figure 17 Category team structure

Leading the team is a representative from the central procurement unit. This employee serves as the team leader – or category manager – who is responsible for the development of the sourcing strategy for the group, the contracting and the implementation. The category manager has the sole responsibility for managing several categories, while the team members are only there to support the category manager to develop the contract requirements, attend meetings and work as part of the team.

Generally, two or three team meetings are conducted to work on the category sourcing strategy. The team prepares a forecast of what and how much will be purchased as well as the evaluating criteria for the awarding of contract or framework agreement. Evaluating criteria varies on different categories, which may include some or all of those that are mentioned below:

- Price
- Quality
- Service
- Environment impact
- Performance parameters
- Operations/scheduling/technical capability
- User-friendly ordering system

- Certifications and competence of supplier's personnel.

Depending on the characteristics of the category and complexity of the evaluation criteria, the number of hours that this team uses – from development to tendering and implementation – varies per category project. For instance, around 300 hours was used for medical supplies category, and 244 hours was used for office and school supplies but only a half of that was used for the photocopier paper. Reason behind the difference was the number of products and specifications that were included in the contract. For the photocopier paper, there are 18 product specifications of A3 and A4 paper, while the office and school supplies category has 179 products and 488 different products and specifications for medical supplies. Other contributing factors are when complaints are received during the tendering process which entails additional time and resources to evaluate the complaints and give feedback, or the tendering process has to be run again because of these complaints. For example, the category team consumed 350 hours for contract labor category because of received complaints when tender was published.

4.2.3 The categories

The municipal government has around 40 areas of spend or categories. Previously, these categories were created as per discussion and agreement between the Head of Finance and some people in the department as well as the management group in the municipal government. These categories were identified based on their internal spend data and forecasts. Over the years, it has evolved and fine-tuned to current state, and is now managed by the Procurement Manager.

However, most categories are too wide. Like the *Samlepost annet forbruksmateriell* (miscellaneous consumables), NOK 21.1 million of purchased goods and services are posted to this account instead of classifying them to the correct category. And this is because the purchasers are unsure as to which category the invoice belongs to or probably the training is not enough, the Procurement Manager explains:

“I think that’s because people are insecure where they should park the invoice. So they just put in this one. It is up to the leader of that department to train them properly. Maybe some of them are not trained well enough.”

(Procurement Manager, February 9, 2017)

From the 2015 purchasing data obtained from the municipal government, this research identified the top 10 categories by descending number of suppliers, transactions and value of purchase, which are illustrated in Figures 18 to 20. As shown in Figure 18, the category that has the highest level of spend is building and construction at NOK 255.6 million (which includes investments and operating costs). Meanwhile in Figures 19 and 20, the category of trainings and seminars represents the highest number of suppliers within it with 233 suppliers, and food category as the category with the highest number of transactions at 4,108 in 2015, respectively.

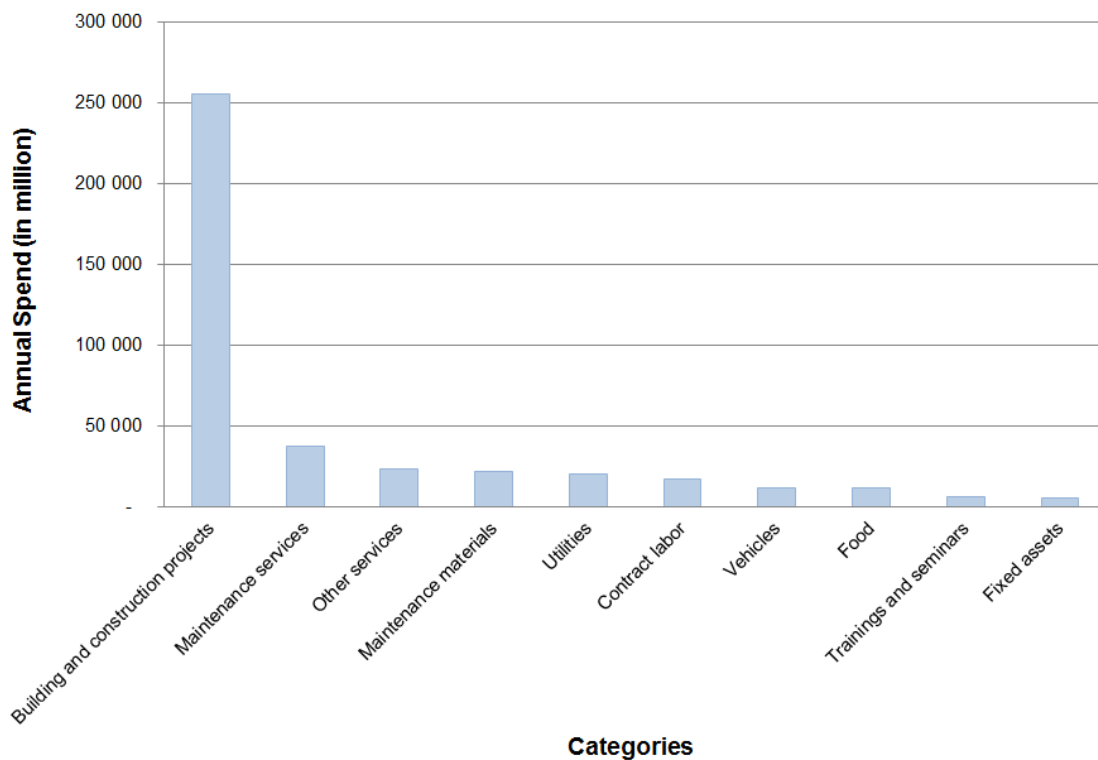


Figure 18 Pareto chart of spend by category

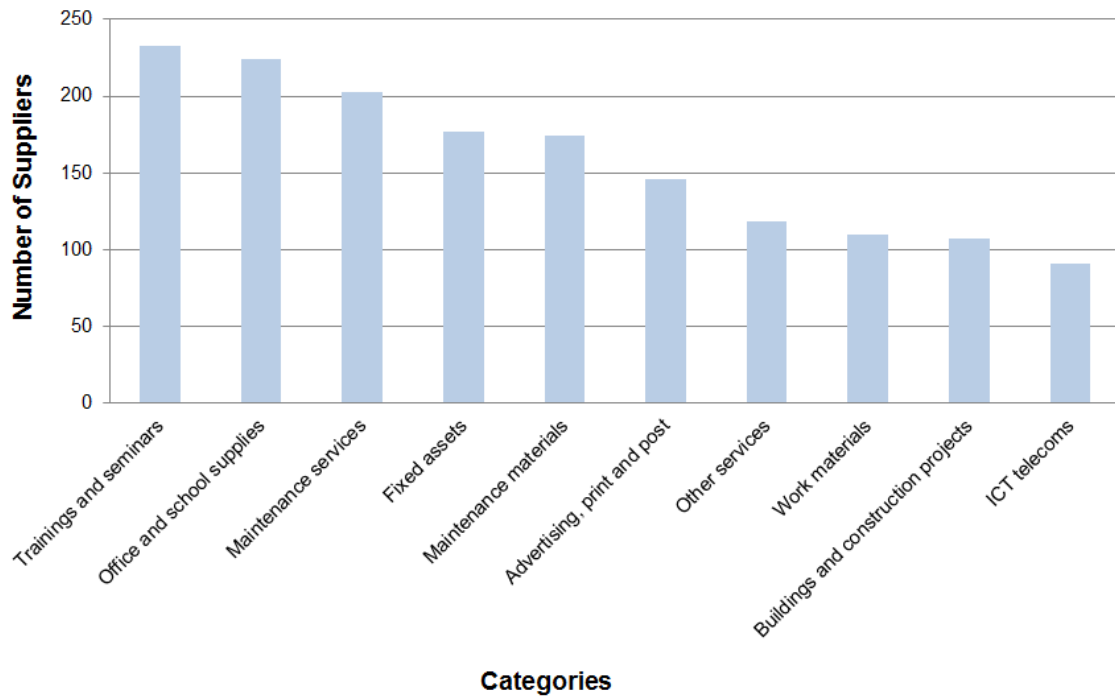


Figure 19 Pareto chart of spend analysis of suppliers by category

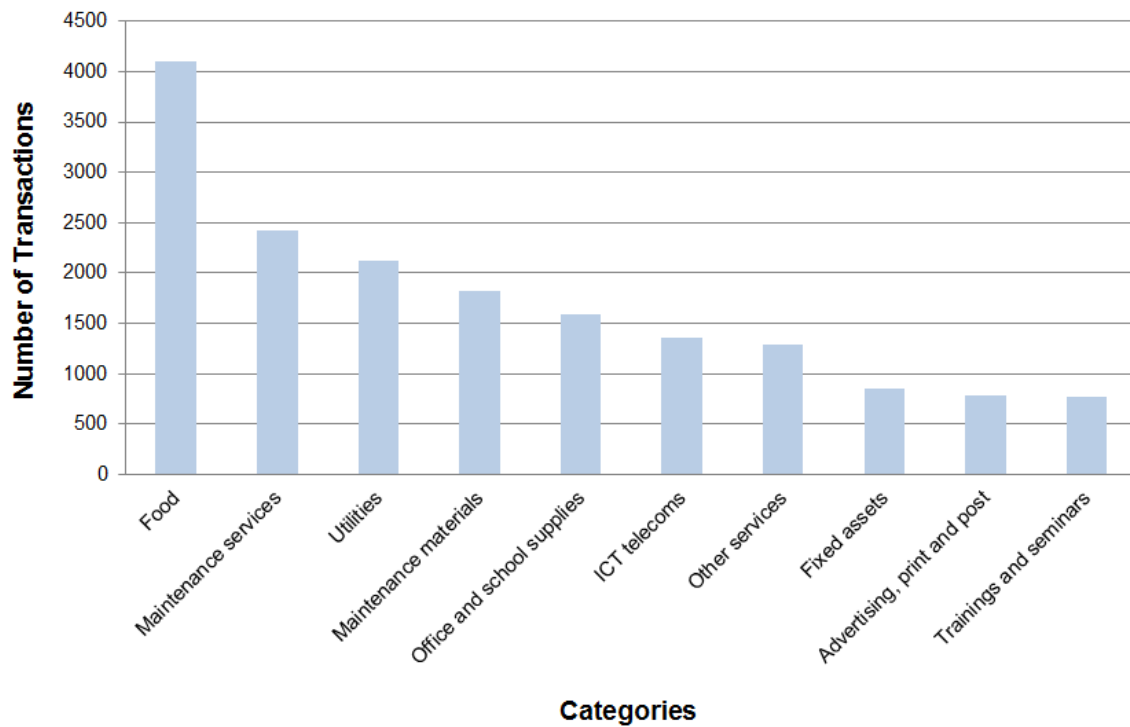


Figure 20 Pareto chart of spend analysis of business volume by category

Cost savings potential and efficiency are the most used criteria when Organization A decides which categories to prioritize or focus their efforts on and work on a framework agreement. Specifically, these are the high value, high volume categories. However, as the Procurement Manager claims, they don't have standardized tools or methods in calculating the potential savings:

“Our decisions are mostly based on what we think will save us the most, or contribute to better services or a more effective organization. At the end of the day, much of it is about efficiency and economic efficiency - price. Because what saves us time, saves us money. So it's a way to make the organization more effective.”

(Procurement Manager, November 29, 2016)

Before conducting the tender process for these framework agreements regardless of the nature of categories, the municipality reaches out to companies or potential bidders and promotes the existence of a forthcoming tender that might potentially be interesting for them. Advertising a tender opportunity is important for the municipal government to ensure that adequate competition exists and that achievable requirements are developed. Since last year, the municipality has started communicating this through different routes:

- Publication on www.mercell.no (a web based procurement /e-tendering portal)
- Direct contact with potential suppliers through phone call, physical meeting or Skype meeting.

In all cases, the municipality asks questions such as:

“Is there any criteria or something that makes it difficult for you to deliver or make it uninteresting?”

“Could we do something different that would give us a better price?”

At present, the central procurement unit oversees about 21 framework agreements which are mostly outsourced services. While under the intercommunal cooperation, it has 20 framework agreements with different suppliers within the categories of office and school supplies, food, cleaning, medical supplies, catering, and others. The list of framework agreements is shown in

Table 6. These are purchases above the Norwegian national threshold of NOK 1.1 million, and are acquired mostly through open tender procedure. The agreements have been the same for the last five years because of high employee turnover and lack of capacity at the central procurement unit to work on other categories. But the evaluation criteria are improved and modified in accordance with the prevailing market condition or business needs before a new tender is conducted, according to the Procurement Manager.

Framework agreement list		
Asphalt and asphalt laborers	Photocopier paper	Bank services
Company health services	Pharmaceutical products	Electrician services
Catering supplies	Car rental	Consultancy services
Printing supplies	Analog and digital teaching aids	Sale and licence control
Insurance services	Medical supplies	Plumbing services
Fruits and vegetables	Dairy products	Sprinklers - maintenance services
Hotel	IT hardware and accessories	Service agreement elevator
Meat and meat products	Cleaning supplies	Contract labor to health services
Grocery, frozen fish, and poultry products	Pipe	Painting services
Office and school supplies	Telephone - fixed and mobile	Safety alarm central
		Carpentry services

Table 6 Framework agreement list

Because of the hybrid purchasing organization and lack of capacity at the central procurement unit, some commodities like IT systems, furniture, and cars are purchased without informing the central procurement unit. These are single procurements that are carried out by the different business units in the municipal government, and each transaction can be below or above the Norwegian national threshold of NOK 1.1 million.

4.3 Processes and tools

4.3.1 Organization-wide processes

Some of Organization A’s procurement procedures and guidelines are readily available in the intranet for everyone’s easy access. These include the framework of procurement laws, internal policies, archiving procedures, and a procurement handbook which provides the requirements for workflow processes such as ordering, performing receipt, inspection and processing payments. Templates for tenders, protocols, and contract documents are also available in the intranet.

Further, information on existing framework agreements such as the terms and conditions, price lists, and contact persons within the organization and the supplier can be found in the intranet. All these are updated and managed on a manual system based on Excel, Outlook and SharePoint.

However, there is no documentation with regards to category sourcing process. The central procurement unit believes that because there are only four them, whereby they can discuss things together on a daily basis and have experience with contracts, process documentation is not necessary. There is ‘trust’ that each of them will make the best decision about how to carry out the process. It also gives them more ‘flexibility’ to procure goods and services since each category is unique and the approach can be different every time. The Procurement Manager also believes that such documentation only works if an organization has no central procurement unit and if the size of the organization is big.

4.3.2 Spend analytics

Although spend analysis can be used to sort important categories, identify savings opportunities and measure contract compliance, the central procurement unit does not use it a lot and has not been a priority since they don’t have the spend analytics technology. The organization only started to do spend analysis when the current procurement manager joined the procurement unit. The reasoning here, is that the spend data or purchasing statistics data have to be downloaded from the accounting system to Excel. Once data is extracted, it has to be scrubbed carefully before analyzing it to locate inconsistencies and incomplete fields.

The spend data identify purchasing business units by a Business Unit Number. Suppliers have their own Supplier Number. Some suppliers, however, have more than one supplier number or supplier name even though they contain the same company tax registration number (Table 7). This means that simple statistical analysis of spend data can fail to reveal true contracting totals for these suppliers.

Supplier number	Supplier name	Remarks	Supplier number	Supplier name	Remarks
101878	Adresseavisen AS	Different supplier nos.	100106	Nordmøre Energiverk	Different supplier nos./names
103530	Adresseavisen AS	Different supplier nos.	100105	Nordmøre Energiverk AS	Different supplier nos./names
100085	Cappelen Damm AS	Different supplier nos.	100080	Nordvest-Nytt AS	Different supplier nos.
102166	Cappelen Damm AS	Different supplier nos.	100081	Nordvest-Nytt AS	Different supplier nos.
102204	Cappelen Damm AS	Different supplier nos.	100013	Norsk Bibliotekforening	Different supplier nos.
100161	Danske Bank	Different supplier nos.	100014	Norsk Bibliotekforening	Different supplier nos.
102509	Danske Bank	Different supplier nos.	101216	Norsk Rikskringkasting AS	Different supplier nos.
102672	Danske Bank	Different supplier nos.	103499	Norsk Rikskringkasting AS	Different supplier nos.
100194	DNB Bank ASA	Different supplier nos.	100099	Organisasjonen for Voksne og Barn	Different supplier nos./names
102394	DNB Bank ASA	Different supplier nos.	100098	Organisasjonen Voksne for Barn	Different supplier nos./names
100035	DNB Livsforsikring AS	Different supplier nos./names	100100	Organisasjonen Voksne for Barn	Different supplier nos./names
100037	DNB Livsforsikring ASA	Different supplier nos./names	103145	Organisasjonen Voksne for Barn	Different supplier nos./names
100414	H. Aschehoug & CO	Different supplier nos.	103469	Organisasjonen Voksne for Barn	Different supplier nos./names
103150	H. Aschehoug & CO	Different supplier nos.	100438	Princess-Gruppen	Different supplier nos./names
101240	MOT	Different supplier nos.	102786	Princess-Gruppen AS	Different supplier nos./names
102706	MOT	Different supplier nos.	101923	Sentraldistribusjon ANS	Different supplier nos./names
100026	Nordea Bank Norge ASA	Different supplier nos.	103439	Sentraldistribusjon AS	Different supplier nos./names
102278	Nordea Bank Norge ASA	Different supplier nos.	100594	Trøndelag Bomveiseelskap AS	Different supplier nos.
			103070	Trøndelag Bomveiseelskap AS	Different supplier nos.

Table 7 Preview of supplier master data

In addition, some data elements are missing significant data like the category name. A total of 1,368 transactions with the total value of NOK 31.8 million are unclassified in 2015. Another limitation is that some categories cover a wide range of purchased goods and services that it is difficult to drill down to details. Moreover, specific items are not coded so the accounting system can only provide general information on the type of good or service purchased.

The spend data also contains ‘dirty data’, where information had been incorrectly entered. For instance, when looking at the Miscellaneous consumables account, some purchases like office supplies, hotel, cleaning supplies, rentals and others are parked in this account and not to their respective categories. Thus this category is not included in the Pareto spend analysis presented in Figures 18 to 20 (Section 4.2.3). The spend data for this account is shown in Figure 21.

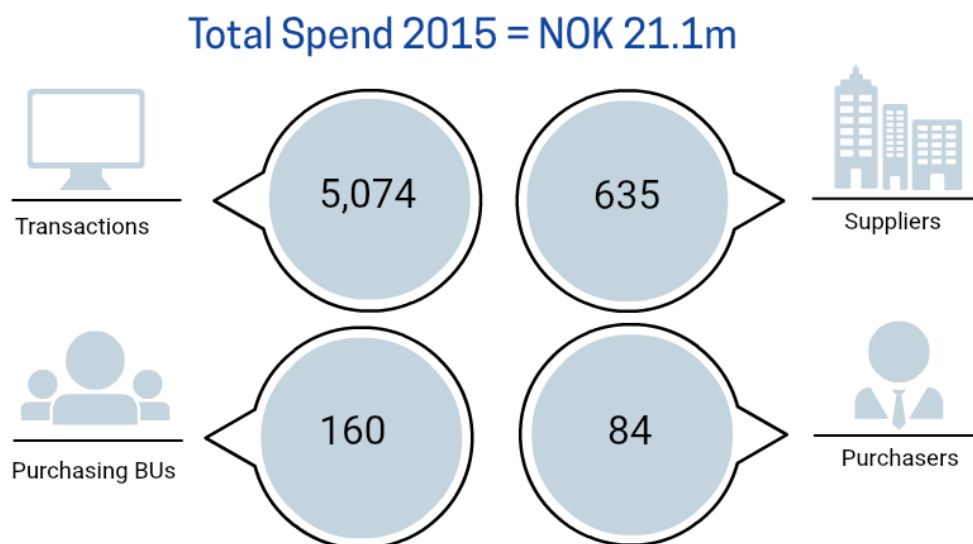


Figure 21 Miscellaneous consumables spend data 2015

So with these limitations, conducting spend analysis is both time consuming and labor intensive at the moment. But, according to the Procurement Manager, they have currently purchased a new business technology called Visma BI (Business Intelligence). A tool he hopes can automate the spend analysis report, provide real time information, and generate quality spend data.

4.3.3 E-procurement tools

To support and deliver benefits of category management, Organization A started to use an online portal (www.mercell.no) last year. MERCELL is a type of e-sourcing tool that can be used from the development of category sourcing strategy to tendering and contract awarding. The portal is designed to be the starting point for the category team to work on the criteria for each category. This tool also serves as a medium to communicate with potential suppliers for the development of evaluation criteria of a contract.

All suppliers' feedbacks received through this portal are consolidated and considered by the category team. After taking into consideration these feedbacks, the contract requirements are finalized and the tender process is conducted. All tenders are published online through MERCELL, and depending on the threshold value will be posted automatically to either DOFFIN or TED websites. For tenders above the Norwegian national threshold of NOK 1.1

million, procurement notices are announced via DOFFIN, Norway's national public procurement database (Doffin). For public tenders above the EEA threshold of NOK 1.75 million, a publication in TED (Tenders Electronic Daily) database is posted. TED is a database where suppliers across Europe can compete for public contracts in other European countries (European Union 2016). These tenders are also published in DOFFIN.

Once the team reaches the consensus, the successful and unsuccessful bidders are informed on the decision on the award of contract through MERCELL. At the same time, the contract can only be signed until the end of the 10 day period. This is called the Standstill or Alcatel period where unsuccessful bidders can challenge or appeal the decision (Emmett and Wright 2011) of the municipality. Any complaints can be lodged through MERCELL. Usually, the unsuccessful bidders will require the municipality to provide details on all received bids. However, particular details may not be released if they constitute trade secrets. When no complain is lodged during the so-called Standstill period, the contract is awarded to the winning bidder. Signing of contract or framework agreement is done electronically through MERCELL.

Aside from MERCELL which serves as an electronic support tool, the organization has implemented an e-commerce solution for electronic catalog ordering and electronic invoice matching or posting. Yet not all business unit purchasers use this tool. A few of them still buy in stores, place an order by phone or send an order by fax.

5 Case analysis

This section includes a discussion of the main findings in the case study and relates these findings to the theoretical perspectives outlined in the literature review. To elucidate these findings, the following paragraphs focus on explaining how category management can be improved from the perspective of a structure using a category-based approach. By this, seven categories are analyzed based on the possible synergy benefits of economies of process, economies of scale and economies of information and learning. First, the contingency factors of category characteristics, supply environment and interdependence of purchasing units are presented; thereafter the corresponding integration mechanisms are applied.

5.1 Designing the procurement structure at category level

To design the procurement structure at the category level in Organization A, I applied (Trautmann et al. 2009)'s framework. The framework, as mentioned earlier, is to achieve the fit between the required information processing needs and the information processing capacity of the organization.

Here, seven of Organization A's categories are assessed on their respective information processing requirements, and an effective way of managing these categories is suggested through the three contingencies of category characteristics, supply environment and interdependence of purchasing units, as suggested by (Trautmann et al. 2009). For each group, the appropriate level of integration mechanisms are applied to achieve a fit of information processing capacity to the extent required.

Table 8 and 9 provide detailed description of each category.

Category	Description
IT hardware	Mainly desktops, laptops and tablets
Printing supplies	Mainly toner and ink cartridge
Office and school supplies	Materials required for daily use in offices and schools (including printing supplies except toner and ink)
Photocopier paper	Mainly photocopier paper
IT system	Project-based and capital expenditures like RFID and operating systems
Working clothes	Clothes for working at construction sites, rehabilitation center, school, home for the aged, etc
Arts and crafts materials	Materials used for art projects and DIY activities in schools

Table 8 Organization A's category description

Synergy potential	Category	Purchase novelty	Purchase importance	Category complexity	Demand volatility	Supply environment	Type of interdependence
Economies of scale	IT hardware	Straight rebuy	Medium volume, high importance, high value	Standardized item	Regular and recurring	Competitive supplier base, transparent, low delivery risk, dynamic market, open tender	Sequential/reciprocal
	Printing supplies	Straight rebuy	Medium volume, low criticality, low value	Highly standardized item	Irregular	Competitive supplier base, high supply availability, high transparency, low delivery risk, open tender	Reciprocal
	Office and school supplies	Straight rebuy	High volume, low importance, low value	Highly standardized item	Irregular, high quantity of orders	Large competitive supplier base, easy to substitute, high transparency, low delivery risk, open tender	Reciprocal
	Photocopier paper	Straight rebuy	Medium volume, low criticality, low value	Highly standardized item	Irregular	Large competitive supplier base, stable market, high transparency, low delivery risk, substitution possible, open tender	Reciprocal
Economies of information and learning	IT system	New buy	High importance, high value	Specifications set by supplier/Customized specifications	Irregular and infrequent	Few local suppliers, low transparency, dynamic market, high delivery risk, RFQ/tender	Reciprocal
Economies of process	Working clothes	Straight rebuy	Low volume, low criticality	Standardized item	Irregular	Competitive supplier base, stable market, high transparency, low delivery risk	Pooled
	Arts and crafts materials	Straight rebuy	Low volume, low criticality, low value	Highly standardized item	Irregular	Competitive supplier base, high supply availability, high transparency, low delivery risk, easy to substitute	Pooled

Table 9 Organization A's category characteristics

5.1.1 Categories with economies of scale

The categories 'IT hardware', 'office and school supplies', 'photocopier paper' and 'printing supplies' with high economies of scale as the motive for category management were chosen as a sample on how Organization A should structure its purchasing organization at the category level.

The 'IT hardware' category is necessary for most of the organization's workforce sitting in offices or at schools. This is mainly desktops, laptops, and tablets which represents capital expenditures, and is posted under 'Fixed Assets' (see Appendix 2 Organization A's 2015 spend data). Currently, the 'Fixed Assets' category is too wide and does not only contain IT hardware but also some other IT related products like application software, security software and accessories. Organization A has a plan to break down this category into a number of sub categories.

Based on the conducted spend analysis, some users purchase different specifications, like for instance, one business unit bought a Hewlett-Packard hybrid laptop which costs 8,553kr and another bought a Hewlett-Packard ProBook laptop which costs 7,975kr.

Here, there is an opportunity for Organization A to standardize requirements and specifications of IT hardware. Let's say its 184 business units require five laptops per year. If the specification for each unit is different, then approaching the market with a request to quote 920 laptops, consist of five of each of two or three different types of unit then the aggregation without standardization is of little value. As another option, if Organization A can standardize its IT hardware configurations for common requirements and approach the market with a specification of a single laptop and a requirement of 920 units, then they would achieve some economies of scale on that model, says (Smith 2014). With common requirements and harmonized specifications, the demand planning for this category would be easy. Hence, purchasing uncertainty will be low for 'IT hardware' category.

On the other hand, as shown in Table 6 under Section 4.2.3, there are three separate contracts of printing supplies, office and school supplies, and photocopier paper. The contract for 'printing supplies' is mainly toners and ink cartridges, while 'photocopier paper' is mainly photocopier paper. While the framework agreement for 'office and school supplies' has to do with materials required for daily use in offices and schools as well as printing supplies except toners and ink cartridges.

Printing supplies, photocopier paper, and office and school supplies are spend of similar goods from similar supply source, according to (O'Brien 2015). Therefore, Organization A is awarding multiple contracts for similar goods which results to unnecessary procurement

activity duplication and increases administrative costs both to the organization and its suppliers. Contracting is also made overly complex with specifications that are overly prescriptive. For instance, the RFQ for photocopier paper contains one requirement for A5 paper, but six different specifications for A3 paper and twelve dissimilar specifications for A4 paper (see Appendix 3).

From the conducted spend data analysis, Table 10 illustrates the significant variation in the prices paid by Organization A across different suppliers. The analysis also revealed that brand choice contributed to price variation. Examples are the envelopes which are bought from two different brands: Staples and Mailman, and the black toner cartridge from Hewlett-Packard, Lexmark and Brother, where Brother is the most expensive at 0.5196kr per page. Other contributing factor was the type of packaging, for instance the A4 photocopier paper which either comes in 2500 sheets of paper per box or 500 sheets of paper per ream in a 5 reams per box. As illustrated, the average price of one A4 paper sheet with same broad specifications was 0.1504kr, with the highest unit price paid at 0.3698kr and the lowest at 0.0425kr. The difference was 770 per cent for A4 photocopier paper and 3085 per cent for black toner cartridges.

Category	Item	Average price			Percentage variation
		(mean) NOK	Low price NOK	High price NOK	$\frac{((high-low)/low) * 100}{}$ %
Photocopier paper	A4 photocopier paper 80g - NOK/sheet	0,1137	0,0425	0,3698	770
Photocopier paper	A3 photocopier paper 80g - NOK/sheet	0,2660	0,0844	0,3052	262
Office and school supplies	C4 envelope 100g - NOK/piece	0,3303	0,2144	0,5580	160
Office and school supplies	C5 envelope 80g - NOK/piece	0,0509	0,0485	0,0546	13
Printing supplies	Toner cartridge (black) - NOK/page	0,2194	0,0163	0,5196	3085
Printing supplies	Toner cartridge (blue) - NOK/page	0,2431	0,0225	0,3438	1429
Printing supplies	Toner cartridge (gold) - NOK/page	0,2229	0,0225	0,3371	1399

Table 10 Prices paid across different suppliers

As category management is a strategic approach to procuring similar goods with the purpose of minimizing the category cost as a whole (CIPS 2011), Organization A should group together this similar spend of printing supplies, office and school supplies, and photocopier paper into one framework agreement to reduce contract duplication. Although tendering is a valuable tool for the public sector, it is a considerable cost to Organization A as it requires

time and resources (Emmett and Wright 2011). Having multiple contracts for similar goods result to high acquisition costs especially for relatively low value and low importance routine or MRO purchases (Emmett and Wright 2011) like photocopier paper.

By reducing the number of contracts, Organization A can eliminate the burdensome process of sending information, handling queries, and reading and evaluating tenders which can be extensive, increasing with the number of received tenders (Heijboer and Telgen 2002). Other benefits would include increased efficiency and administrative savings as the organization will spend less time and money in purchasing, maintaining and managing a diverse office and school supplies portfolio.

In addition, Organization A should standardize or reduce product specifications and approach the supply market with a common, aggregated requirement. For instance, reduce the product specification requirement of an A4 photocopier paper from twelve to one. With common requirements and harmonized specifications, the organization can achieve best value for money, economies of scale (Smith 2014), and low purchasing uncertainty.

Lastly, a key success factor to having an accurate spend visibility for these categories is through a creation of a common organization-wide category tree (vanWeele 2010). This category tree is comprised of distinct categories of spend based on common characteristics like the one shown in Table 11.

Office and school supplies	IT	Non-addressable
Stationery Photocopier paper Copier services	IT hardware IT software IT consulting Telecommunication	VAR fees MVA Property taxes Bad debts

Table 11 Proposed category tree

In terms of *product characteristics*, ‘IT hardware’ category represents a straight rebuy, high value, high importance and recurring demand pattern. While the categories ‘office and school supplies’, ‘photocopier paper’ and ‘printing supplies’ are also straight rebuys but the demand pattern can be volatile and their value and importance to the organization are low. These

categories are all under a framework agreement which does not require additional information when performing the purchasing task. Owing to the presented characteristics of these categories, the information processing requirements for purchasing business units are low, hence the low purchasing uncertainty (Trautmann et al. 2009).

Also, uncertainty induced by the *supply environment* is low. There exists a competitive supplier base and transparent market. Further, the suppliers are local so there is low risk that products are not delivered on time. However, tendering increases the uncertainty in the purchasing process because of the need to obtain more information from the market. But this diminishes once the framework agreement is implemented and established.

Although the business units need not interact with each other regarding the purchase of IT hardware, the internal policy requires them to get an approval first from the IT department before they can place their orders via the e-procurement system. Getting an approval from IT department before a business unit can complete its purchasing task creates a *sequential interdependence* but only between the business unit in need and the IT department.

The *reciprocal interdependence* is a result of strategic purchasing centralized at a category manager while operational purchasing is decentralized to units. To exploit economies of scale, the compliance to framework agreements also increases the dependency of these units as well as the information processing requirement. This results to a high purchasing uncertainty, and thereby requires high information processing with the use of various mechanisms (Trautmann et al. 2009).

For creating an appropriate fit between the required information processing and Organization A's capacity for information processing, (Trautmann et al. 2009) suggest to implement both vertical and lateral integration mechanisms (see Table 12).

Overview on integration mechanisms					
Synergy benefits	Category	Vertical mechanisms			Lateral mechanisms
		Centralization	Formalization	Information systems	
Economies of scale	IT hardware, printing supplies, office and school supplies, photocopier paper	Strategic purchasing centralized at category manager (specification setting, market analysis, sourcing strategy, contract placement). Operation purchasing at each business unit.	Standardized purchasing process with clear definition of roles and responsibilities.	IT system to leverage information on local needs, prices, contract structures and suppliers across all units.	Category manager and local managers work in teams to develop strategies for a category. Local knowledge and requirements are considered in strategy development and acceptance across business units is ensured.

Table 12 Integration mechanisms of categories with economies of scale

Centralization

To attain economies of scale, decision making is to be centralized to a category manager (Trautmann et al. 2009). Currently, for the categories ‘IT hardware’, ‘office and school supplies’, ‘photocopier paper’ and ‘printing supplies’, this has been the case in Organization A. One of the procurement professionals at the central procurement unit acts as the category manager being responsible for consolidating organization-wide requirements and exploring supply markets, while business units remain responsible for daily purchasing activities.

Formalization

Second, standardized purchasing processes should be defined (Trautmann et al. 2009). In Organization A, there is no documentation with regards to the sourcing process (Section 4.3.1). Since category management initiative is a collaborative effort, specific purchasing roles and responsibilities of category members should be clearly defined for each purchasing step like market analysis and strategy development. This would eliminate misunderstanding between the category manager and the team members (Trautmann et al. 2009), and ensure successful implementation and management of the initiative. Table 13 provides an example of such roles and responsibilities.

Team leader responsibilities	Team member responsibilities
<ul style="list-style-type: none"> • Define and track the team's development and activities • Provide the overall direction • Negotiate scope, targets and requirements • Manage the project • Keep necessary records • Lead the development and implementation of category solutions 	<ul style="list-style-type: none"> • Gather, aggregate and analyze market, demand and spend data • Serve as subject matter experts within the category • Work with stakeholders to aggregate requirements • Attend meetings and work as a team • Promote the CM project in the organization • Assist in the implementation

Table 13 Category team's responsibilities
Source: adapted from (O'Brien 2015, p. 110)

Information systems

Third, information systems should be implemented to enable efficient analysis of spend data (Trautmann et al. 2009). Currently, Organization A's spend data or purchasing statistics data can be downloaded from the accounting system to Excel. However, the spend data has a lot of limitations. As mentioned in Section 4.3.2, some data elements are missing significant data like the category name. Other limitation is that some categories cover a wide range of purchased goods and services that it is difficult to drill down to details. Moreover, specific items are not coded so the accounting system can only provide general information on the type of good or service purchased. The spend data also contains 'dirty data', where information had been incorrectly entered. Further issue is the duplicate suppliers and supplier coding issues (see Table 7 in Section 4.3.2).

According to the Procurement Manager, they have currently purchased a new information systems called Visma BI (refer to Section 4.3.2). Thus, the organization should assess whether this BI technology can really provide the type of spending data that they need to provide better management and oversight of its suppliers. Such data can for example include how many suppliers are being used for IT hardware category, what types of hardware are being purchased and how much is spent on specific hardware, in total and with each supplier. To exploit economies of scale, (Trautmann et al. 2009) claim that the information system should allow efficient exchange and analysis of spend data so that the category manager will have the information about contracts, suppliers, specifications and maverick spend.

If Organization A's newly bought information system can indeed automate the spend analysis or provide real-time quality spend data then it would be easy for the organization to get a 360 degree view of the categories (CIPS Australasia 2011), monitor any spending outside the municipality's contracts, and improve spend transparency for taxpayers. Further, quality spend data would give the organization insight into suppliers' behavior leading them to ask better questions and learn more about the market where they spend the most, making them even better buyers (Shields 2016).

Although such information systems have the ability to reduce purchasing uncertainties, these are standardized tools and cannot in itself bring sustained competitive advantage, without the other organization capabilities (Mata, Fuerst, and Barney 1995). That is, the capability for the whole organization to be loyal to the framework agreements so it can achieve economies of scale, otherwise there will be a 20 – 30% unrealized savings (Kulp et al. 2006).

Moreover, before implementing Visma BI and consolidating it with the current Visma accounting system (where the spend data are currently accessed), supplier master data cleanup has to be executed. As illustrated earlier in Table 7, the current master data contains duplicate records. Finding identical master data within or across the source system (current Visma system) and eliminating them prior to final data upload into the target system has these advantages:

- Accurate and consistent reporting
- Reduces time and cost spend in manually identifying duplicates later
- Improves overall reliability of supplier reports and analysis
- Helps to maintain effective and consistent communication with suppliers

(Subramaniam 2014).

Lateral mechanisms

Finally, category teams should be formed and made responsible for developing category strategy (Trautmann et al. 2009). As mentioned in Section 4.2.2, Organization A already has a category team which is a cross-functional team comprising a small group of representatives from across the organization for categories like office and schools supplies and IT hardware that are under the category management initiative.

5.1.2 Categories with economies of information and learning

The category 'IT system' with economies of information and learning as the potential synergy benefit was selected as a sample on how Organization A should construct its purchasing organization at the category level. This category is project-based, and can be different for each business unit. The demand is also infrequent that category specific knowledge on this could not be developed at each business unit. Examples of an IT system are a Radio Frequency Identification (RFID) system for the library, and an operating system for the health care response center. These are capital expenditures in Organization A.

As opposed to the categories with the focus on economies of scale, here the purchasing uncertainty of the category being purchased is high because of *category characteristics*. The 'IT system' category represents project-based acquisition that each purchase represents a new buy, high level of technical complexity, high category of importance, and fluctuating demand pattern. For example, the operating system for the health care response center or the RFID system for the library is of high relevance to Organization A and specifically tailored to a certain need of a certain unit so it's a new buy. Further, the demand is volatile since another unit may require a different type of IT system. These are project-related purchases that it is not easy to master the knowledge development with regards to these purchases (Trautmann et al. 2009).

Also, the *supply environment* poses high purchasing uncertainty because most cases have low supply availability and capability. Since these are also mostly new buy, purchasing business units have to deal with new suppliers. The need to obtain more category-specific information in terms of RFQs is significant in order to handle the purchase, compare objectively all offers and choose the best supplier because of the different types of IT system. This compensates the uncertainty caused by lack of know-how when purchasing this category (Trautmann, Bals, and Hartmann 2009). Finally, because of product complexity, the risk is high that the quality of the delivered product is not up to par, or that delivery schedules are postponed. For instance, the purchase of an RFID system requires the business unit manager, who is purchasing this product, more information and knowledge with regards to suppliers' technical capacity and product specification to make sure that the product is compatible with the business unit's need.

Because the pool of knowledge is dispersed across different units carrying out similar activities, the interdependence characterized by a reciprocal *interdependence* increases as well as the purchasing uncertainty. Hence, the information processing requirement for Organization A and the required integration mechanisms to successfully perform the purchasing task increase because reciprocal interdependence leads to need for mutual adjustment (Thompson 1967).

To achieve an appropriate fit between Organization A’s information processing capacity to the information processing requirement, it has to implement complex integration mechanisms as what (Trautmann et al. 2009) suggest (see Table 14).

Overview on integration mechanisms					
Synergy benefits	Category	Vertical mechanisms			Lateral mechanisms
		Centralization	Formalization	Information systems	
Economies of information and learning	IT system	Category manager must approve RFQ list and sourcing decision	Purchasing processes differ across business units, but comparable outputs for each major activity defined. Decision gates for important activities (supplier selection, category strategy) defined a priori by category manager	IT system to leverage information on best price, suppliers and contracts across sites. Knowledge database with detailed information, templates, etc. about projects, best practices.	Category manager to transfer category and market knowledge by being involved in the purchasing transaction and working together with the respective units

Table 14 Integration mechanisms of categories with economies of information and learning

Centralization and formalization

Currently, the decision making authority is not centralized to a category manager for the ‘IT system’ category in Organization A. Apparently, the lack of procurement capacity precluded the central procurement unit from being involved in the whole sourcing process, according to the Procurement Manager (refer also to Section 4.2.3).

“We support them during the whole process but not every process because we are only two people. We don’t have the capacity to support every purchasing process in the municipality. So, many purchases are done not centralized but by each department.”

(Procurement Manager, December 15, 2016)

Normally for investment related purchases, these are carried out by the business unit in need. The role of the central procurement unit is to assist the business unit in drafting the RFQ but the final sourcing decision is by the business unit. First, the RFQ is sent to all local suppliers that are presumed qualified. In other cases, if there are no qualified suppliers in the local area and even if the value is below the threshold value, tender will be published in Doffin.

According to (Trautmann et al. 2009), Organization A has to appoint a category manager, with whom the purchase decision making authority will be centralized, for 'IT system' category to exploit economies of information and learning. Depending on the individual transaction, the category manager's role is to approve the RFQ list and makes final sourcing decisions, but can also assume full responsibility of the whole procurement process. It is also important that the category manager has the expertise to manage knowledge and information transfer across units.

Information systems

Since 'IT systems' are highly diverse and each is unique, standardization of purchasing process for this category is very difficult, according to (Trautmann et al. 2009). Gathering of additional information which includes information and knowledge from different purchasing business units reduces the uncertainty in carrying out the purchasing transaction. Hence, Organization A has to leverage its information systems to share information on best prices, suppliers, and project descriptions across units.

Currently for categories that are managed by central procurement unit, information on existing framework agreements such as the terms and conditions, price lists, and contact persons within the organization and the supplier can be found in the intranet. All these are updated and managed on a manual system based on Excel, Outlook and SharePoint. But for investment related purchases like IT systems that are purchased by business units, the central procurement unit does not have the contract list.

Here, there is an opportunity for Organization A to implement a management system that will serve as a one-stop portal to support its category management business model. This portal would contain the populated information gathered from across the organization, and should be validated by the category manager. Specific category content such as best practices, contract

terms and negotiations, transaction information like price and delivery terms, market analysis and information on procurement alternatives will be stored in this portal and used as a shared category content for the purchasing business units. This portal can also be used to share information and strengthen their procurement collaboration with other municipalities (Leach 2012). An example for this kind of system is the Common Acquisition Platform (CAP) by the US government for its category management initiative (US Government 2017).

Lateral mechanism

However, according to (Trautmann et al. 2009), some information is just not feasible to capture in information systems. Intensive knowledge related information like setting up complex contract structures or conducting detailed supplier evaluations can only be effectively transferred to purchasing business units through a lateral mechanism. So here, the role of the category manager will be as a liaison between different purchasing business units, and making sure that dispersed knowledge shared across units is aggregated (Trautmann et al. 2009).

5.1.3 Categories with economies of process

Two categories with economies of process as synergy benefit were selected as samples on how Organization A should construct its purchasing organization at the category level. These categories are ‘working clothes’ and ‘arts and crafts materials’. The ‘working clothes’ category are clothes used at construction sites, rehabilitation center or homes for the aged, while ‘arts and crafts materials’ are materials used for art projects and DIY activities in schools. Currently, these categories have no framework agreements, and the purchasing is decentralized to various purchasing units.

The *category characteristics* indicate low purchasing uncertainty since these are straight rebuy, high degree of standardization and low importance. Also, there exists a high supply availability, competitive market and transparent market, thus the *supplier environment* characteristics pose low purchasing uncertainty according to (Trautmann et al. 2009). Further, the delivery risk is low since these products are highly standardized, and thus the risk that these are not delivered in the desired quality is low.

In terms of *interdependence*, uncertainty is also low. The purchasing business units are characterized by pooled interdependence as each siloed unit is expected to perform the purchasing transaction independently once new purchasing processes are implemented (Trautmann et al. 2009).

For creating an appropriate fit between the required information processing and Organization A’s capacity for information processing, (Trautmann et al. 2009) suggest to use mainly the vertical integration mechanisms (see Table 15).

Overview on integration mechanisms					
Synergy benefits	Category	Vertical mechanisms			
		Centralization	Formalization	Information systems	Lateral mechanisms
Economies of process	Working clothes, arts and crafts materials	Full purchasing authority is decentralized to business units.	Manuals, guidelines and instructions with best-practice purchasing process and related tools	Database with manuals and instructions	None

Table 15 Integration mechanisms of categories with economies of process

Centralization and formalization

To exploit economies of process, decision making is to be decentralized and standardized best-practice processes should be defined (Trautmann et al. 2009) in Organization A. According to the authors, although it is possible to bundle these categories at one supplier, the benefits related to it are limited since the value and importance of the products are rather low. Hence, the main goal for these categories is to minimize transaction costs because items like bobbin cases or nails are of low value. As the order frequency increases for these items, significant transaction costs can accrue and even surpass the purchase cost (Trautmann, Bals, and Hartmann 2009). Organization wide standardization of best-practice processes is a means to induce economies of process (Bartezzaghi and Ronchi 2004) as this increases order efficiency.

Here, there is an opportunity for Organization A to implement simple vertical mechanisms like a standardized cost-effective purchasing process to ensure integration (Trautmann et al. 2009). One way of doing this is by defining the purchasing roles and guidelines within the

organization, for instance, a step-by-step procedure on how to place an order, who is authorized to make purchasing decisions and how the purchasing process is structured (vanWeele 2010). In addition, (vanWeele 2010) suggests that the standardized purchasing procedure should be accessible and utilized by all. Such purchasing procedure has to be simple and easy to use to facilitate a common way of working. An example of such procedure is that all received invoices and claims where a required PO has not been obtained will not be paid, or to simply state that: ‘No PO, No Pay’.

Standardized processes should be defined and established across Organization A because best practices can be incorporated into process descriptions, thereby accelerating learning (Trautmann et al. 2009) and achieving better value for money.

A simple screenshot as per Figure 22 cannot ensure integration across business units.

Hvordan gjøre avrop/bestillinger?

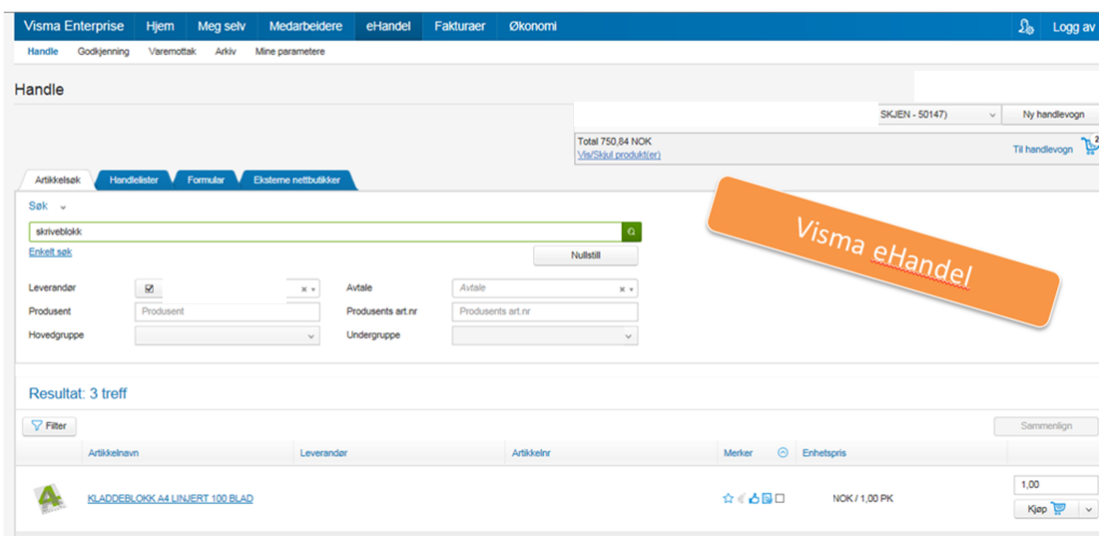


Figure 22 Screenshot on how to procure online
Source: Organization A

A suggested step-by-step e-procurement process is shown in Figure 23. The various purchasing steps are based from the interview of the Procurement Advisor.

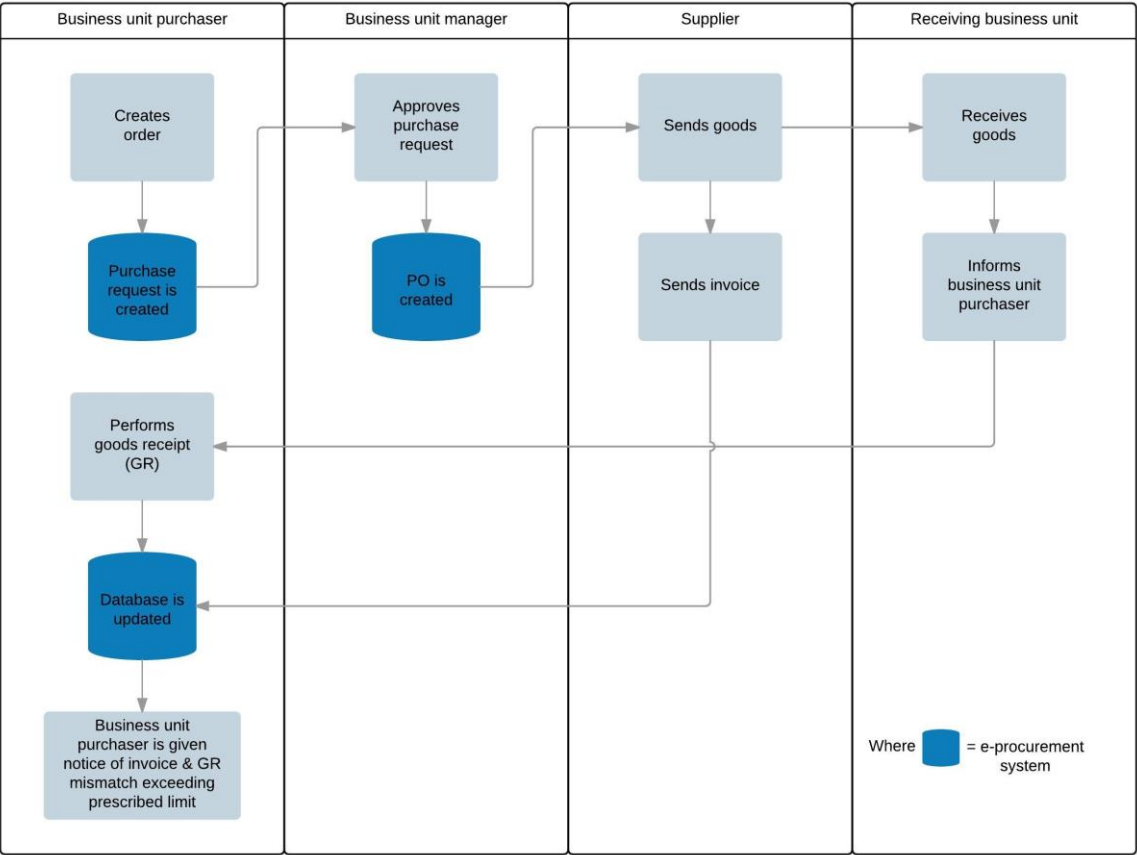


Figure 23 Proposed e-procurement procedures

Information systems

Finally, electronic procurement solutions should be implemented. To attain economies of process, catalog agreements with respective suppliers have to be established across units (Trautmann et al. 2009). Currently, the catalogs that can be accessed in the Visma e-procurement system are only for the high volume and high value purchases thus there are no catalog agreements for ‘working clothes’ and ‘arts and crafts materials’ categories as of the moment. Here, there is an opportunity for Organization A to increase the available catalog agreements to enable each business unit to purchase routine items such as these products independently.

Further, the task of updating e-catalogs in the Visma e-procurement system is currently delegated to the Procurement Advisor. The best way of working, according to (Trautmann et al. 2009), is to provide each business unit the software to install these catalog agreements and the manuals as well as training. Once this new method or process is implemented across the organization, each unit should be capable to perform the purchasing task autonomously.

Streamlined purchasing processes, e-procurement solutions, documents and templates across the units as well as decentralized purchasing authority would create a fit between the information processing requirements of the ‘working clothes’ and ‘arts and crafts materials’ categories and the information processing capacity at Organization A. These would reduce the transaction costs, ensure that goods are procured effectively (Trautmann et al. 2009), and increase value for money of procured goods.

5.2 Managing the purchasing synergy

Here, I will address the four main stakeholders who will play a significant role in managing the purchasing synergy in a category management initiative within Organization A.

(Rozemeijer 2000) points out that responsibility issue is one of the most important points in managing purchasing synergy, and that it would be impossible without a strong CPO capturing corporate synergies. For his study, it also shows that changing the business unit management behavior requires the mandate of a CEO. The CEO, CPO, business unit management and business unit purchasing management are the four parties that play an important role in managing purchasing synergy.

In Organization A, the Procurement Manager is the appointed CPO, the Chief Municipal Executive as the CEO, while the business unit management is the head of each business unit and the business unit purchasing management is the different purchasers in the units. As mentioned earlier, some categories are managed by the other three purchasing professionals in the central procurement unit so the Procurement Manager is not always personally involve in each category management initiative. However, he plays the monitoring and supporting role, and coordinates the procurement team. Further, he reports directly to the assistant municipal executive who is also the head of the finance department. The assistant municipal executive

has a formal relationship with the municipality's category management initiatives by setting the categories for prioritization, approving tenders and signing contracts. While the Chief Municipal Executive is never involve when there is a category to be worked on for bundling or any matter with regard to purchasing.

The role of the business unit managers is to appoint the purchasers that will be part of the core category team, and those that will attend during the meeting of contract implementation. It is also their responsibility to train their purchasers on how to treat an invoice. But somehow, some purchasers are not trained enough. As mentioned in Section 4.2.3, some invoices are not post properly in the accounting system which makes it difficult to monitor the performance of a certain category. Other than that, they are not involved in the category management project.

The business unit purchasers, especially those who are part of the core category teams, are involved in the municipality's category management initiative when it comes to evaluating the supply market, and developing the criteria for supplier selection. But it can be different business unit purchasers for each category management project. The role of the rest of the business unit purchasing management is to comply with the contract, and carry out the purchasing task efficiently, say with the use of the e-procurement.

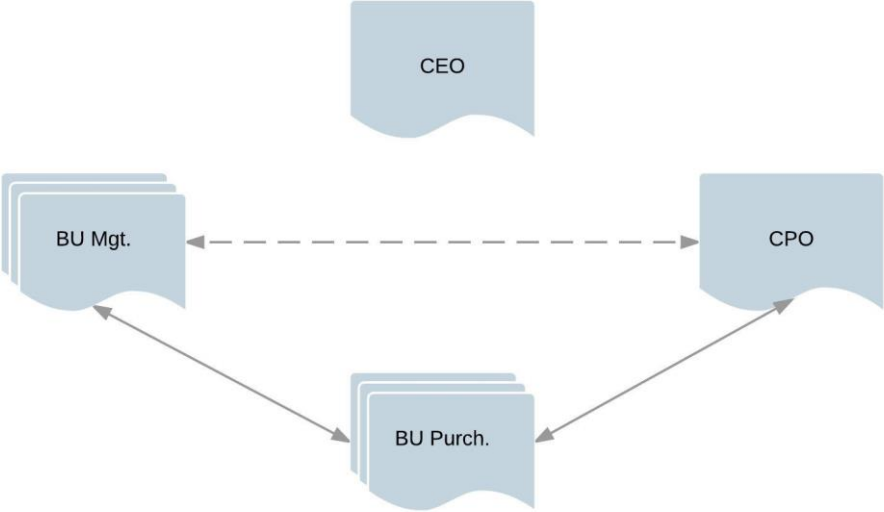
However, these purchasers are not that committed since some of them still buys from a store, fax or call a supplier, or indulge in maverick buying. According to the Procurement Advisor, they are supposed to follow the procurement manual and adopt to change, but some just like to do things the way they did twenty years ago. Most probably because they also knew that there are no consequences for not following the organization's regulations.

“Many have been in the same job for many years, and like to do things the way they have been doing things, or knowing that not using the system has no consequence for the user. I would like to have some consequences but that's not my decision to make.”

(Procurement Advisor, February 23, 2017)

Figure 24 describes the relationship diagram in Organization A, where there is only a formal relationship between the CPO, business unit purchasers and the business unit management, which makes the managing of purchasing synergy within the organization difficult, according

to (Rozemeijer 2000). The dotted lines represent less intensive relationship between the business unit management and CPO since the business unit management’s involvement is only in appointing representatives for category management initiatives. The full lines represent a more intensive relationship since the CPO and business unit purchasing have a more involved relationship in all initiatives, even though it can be a different representative each time. Otherwise, those without lines mean that there are no involvements or communication when it comes to category management projects.



*Figure 24 Relationship assessment diagram in Organization A
Source: adapted from (Rozemeijer 2000)*

Here I conclude that managing purchasing synergy of category management initiatives within Organization A can be difficult since not all key parties are involved. There is evidence that there is difficulty in capturing organization synergies since non contract compliance is common. Hence, there should be an involvement or a mandate coming from the CEO because it’s clear that change should be established at the business unit level.

Since the legislation restricts the municipality outwards, the organization should try and adapt as much as possible inwards. Routines should not be changed until the upcoming change has been thoroughly announced to the involved parties or the different stakeholders in Organization A. This will ensure a better transition by reducing resistance to the change among the staff members. Changing something in one place may cause problems somewhere

else thus making sure everyone that stands to be affected by the change is involved and can have their say in things before the implementation. Further, involvement is crucial so it may be a good idea to make sure current category team members take part in the implementation process.

As (O'Brien 2015) suggests, there should be involvement, hard work and communication both before and during the changeover period. (Rozemeijer 2000) also conforms by suggesting that relationships should be formally structured, interaction between parties should be frequent, and tasks with regard to managing purchasing synergy should be conducted together to make the category management initiative more successful.

6 Conclusion

Given the size of public sector procurement spend in Norway, value for money would be improved if public agencies adopt best procurement practices like category management. The findings presented in this paper have important practical implications for public agencies dealing with category management. First, the results suggest that Organization A, as one of the municipal governments in Norway, can improve its category management initiative by deploying three procurement structures following a category-based approach within the organization. Through this, purchasing synergies of economies of process, economies of information and learning, and economies of scale can be exploited simultaneously by Organization A.

Nonetheless, in taking a strategic approach by changing the public procurement structure can be resisted by some, especially for employees who will feel that their authority or power is threatened by the change. This can be very challenging, particularly in public sectors when people are used to following hierarchy and rules. But if change can achieve the objective of improved value for money then it makes the change all the more important. Starting an initiative in improving the structure, with the top management's involvement, should be accompanied by helping people overcome their resistance to change.

Second, understanding the supply market will enable the organization to negotiate better by using organization volume to win better prices. However, this would not be possible if available purchasing statistics data do not have the necessary level of quality. Establishing a more simplistic routine here is crucial to make the organization able to find where spend can be reduced. The newly acquired BI tool will simplify this process if it is set up and organized in an optimal way.

Third, the results suggest that by conducting an improved spend analysis, this will make the organization smarter and more effective buyers and customers, which should result in suppliers being able to provide better performance, terms and pricing. Analyzing quality and real-time spending data will create a smoother and more direct path to better delivery and more savings for the organization's dispersed purchasing business units if they act as a more integrated entity in managing their spending using the category management model.

Fourth, any of the other solutions suggested such as aggregate volumes of commonly purchased goods and services, standardize product specifications and processes, leverage shared information and best practices, and increase collaboration between business units would also help Organization A to act and buy as a more integrated entity and achieve best-in-class pricing.

Fifth, for further improvement of the collaborative procurement activities that Organization A has with other municipalities, an online portal that can collect and store specific category content information, and is complete with collaborative tools for sharing best practices and discussing challenges and successes on individual category management initiatives should be launched. Provided that Organization A is able to establish agreement with its partner municipalities, it should be possible to implement a system that will improve overall collaboration across individual organizations as well as improving value for money.

The theoretical contribution of this case-based research lies in the use of (Trautmann et al. 2009)'s framework and empirically grounding it to a public procurement context. The understanding of managing interdependence has been extended beyond the dependency of geographical units in MNCs to the current state of dispersed purchasing business units in a public agency. My findings illustrate that for effective category management, Organization A needs to gain commitment and access of its business units. As was highlighted throughout this paper, integrating dispersed units across an organization in a public sector can be a challenging task, but if achieved, Organization A can be more than the sum of its purchasing business units.

7 Study limitations and future research directions

This thesis is not without limitations. First, the spend data was restricted from the municipality's internal accounting system. This clearly limits the visibility into total spending. As much as possible, data information should have been gathered from both internal and external sources to gain a complete understanding of the spending.

Second, the data contained coding errors. For instance, this research found out that some office and school supplies acquisition were not posted under the correct account but instead in the miscellaneous consumables account. Nevertheless, my research did not strive to investigate and correct the coding of 5,074 transactions from said account.

Third, although I relied on multiple informants from the central procurement unit and data sources to triangulate data, future studies would benefit by approaching different respondents from the purchasing business units, for instance IT department.

Last but not least, my study does not provide statistical generalization, and future studies should consider collecting data across various purchase categories and in many municipal governments if the purpose is to improve generalizability.

From this research emerged three potential areas for future research. First, government agencies are receptive about category management, but how about the industry. Further research is needed to understand on whether they are comfortable with the idea of category management, and in what way category management can help them provide the goods and services that they have to government customers.

Second, aggregation or bundling can decrease competition and with too few suppliers, one might not be able to fulfill total volume requirements of public agencies. Hence, further research could explore on how the public procurement agencies ensure that small businesses continue to be able to participate in the market space and do that effectively and competitively. In other words, how they make sure there is a market space that allows small businesses to come in and out of that market, and continue to participate.

Lastly, (Trautmann et al. 2009)'s framework addresses the procurement organizational structure aspects, in particular integration of dispersed purchasing business units by applying a number of different integration mechanisms. Further research could study these integration mechanisms by understanding how public regulations might affect the design and implementation of such mechanisms. Also, by taking into account dependency of the purchasing units, the question on how the different purchasing synergies of economies of scale, economies of process and economies of information/learning can be managed in a public agency could be studied in more detail.

References

- Aberdeen Group. 2003. *The Spending Analysis Benchmark Report: Dissecting a Corporate Epidemic*. Aberdeen Group.
- Anonymous. 2005. "Best Practices: Using spend analysis to help agencies take a more strategic approach to procurement." *Journal of Public Procurement* 5 (2):244-273.
- Arbnor, Ingeman, and Bjorn Bjerke. 1997. *Methodology for Creating Business Knowledge*: SAGE Publications.
- Baily, Peter, David Farmer, Barry Crocker, David Jessop, and David Jones. 2015. *Procurement principles and management*. 11th ed: Pearson.
- Bartezzaghi, Emilio, and Stefano Ronchi. 2004. "A portfolio approach in the e-purchasing of materials." *Journal of Purchasing and Supply Management* 10 (3):117-126.
- Bartolini, Andrew, and Chris Dwyer. 2008. "Spend analysis: Pulling back the cover on savings." *Aberdeen Group*.
- Bechtel, Christian, and James L. Patterson. 1997. "MRO partnerships: A case study." *International Journal of Purchasing and Materials Management* 33 (3):18-23.
- Bozkurt, Özlem Çetinkaya, Adnan Kalkan, and Mutlu Arman. 2014. "The Relationship Between Structural Characteristics of Organization and Followed Business Strategy: An Application in Denizli." *Procedia - Social and Behavioral Sciences* 150:222-229.
- Bryman, Alan, and Emma Bell. 2011. *Business research methods*. 3rd ed. Oxford: Oxford University Press.
- Cadwallader, Richard S. 1988. "Save 25% of MRO Costs While Improving In-Plant Efficiency (Part One)." *Purchasing World* 32 (4):72.

Caldwell, Nigel, Helen Walker, Christine Harland, Louise Knight, Jurong Zheng, and Tim Wakeley. 2005. "Promoting competitive markets: The role of public procurement." *Journal of Purchasing and Supply Management* 11 (5–6):242-251.

Caniëls, Marjolein C. J., and Cees J. Gelderman. 2005. "Purchasing strategies in the Kraljic matrix—A power and dependence perspective." *Journal of Purchasing and Supply Management* 11 (2–3):141-155.

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

Chandler, Alfred D. 1962. *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. Cambridge, MA: MIT Press.

Chartered Institute of Procurement & Supply. 2017. "Category Management." <https://www.cips.org/knowledge/procurement-topics-and-skills/strategy-policy/category-management/>.

CIPS. 2007. "Category Management." <https://www.kbresearch.com/cips-files/Category%20Management.pdf>.

CIPS. 2011. "Advanced Category Management – South Africa Conference 2011." <https://cips.org/Documents/Wed%20track%203%20John%20McClelland%20ADR.PDF>.

CIPS Australasia. 2011. "The state of the art of category management." https://www.cips.org/documents/cipsawhitepapers/2011/the_state_of_the_art_of_category_management.pdf.

Council of Supply Chain Management Professionals. 2016. "CSCMP Supply Chain Management Definitions and Glossary." http://cscmp.org/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx?hkey=60879588-f65f-4ab5-8c4b-6878815ef921.

- Cousins, Paul, Richard Lamming, Benn Lawson, and Brian Squire. 2008. *Strategic Supply Management: Principles, Theories and Practice*: Prentice Hall Financial Times.
- Deloitte. 2016. "The Deloitte global CPO survey 2016 – Procurement: At a digital tipping point?". <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-global-cpo-survey-interactive-doc.pdf>.
- Doffin. "DOFFIN: Database for public procurement." <https://doffin.no/en/Home/About>.
- Duffy, Roberta. 2005. Critical Issues Report: Supply Base Rationalization. CAPS Research.
- Ekambaram, Palaneeswaran, Mohan Kumaraswamy, and Thomas Ng. 2003. "Targeting optimum value in public sector projects through "best value" -focused contractor selection." *Engineering, Construction and Architectural Management* 10 (6):418-431.
- Ellram, Lisa M. 1996. "The use of the case study method in logistics research." *Journal of Business Logistics* 17 (2):93-138.
- Ellram, Lisa M., and Wendy L. Tate. 2016. "The use of secondary data in purchasing and supply management (P/SM) research." *Journal of Purchasing and Supply Management* 22 (4):250-254.
- Emerson, Richard M. 1962. "Power-Dependence Relations." *American Sociological Review* 27 (1):31-41.
- Emmett, Stuart, and Paul Wright. 2011. *Excellence in public sector procurement : how to control costs and add value*. Cambridge: Cambridge Academic.
- European Commission. 2017. "Public procurement." https://ec.europa.eu/growth/single-market/public-procurement_en.
- European Union. 2016. "Tools & databases: TED." http://europa.eu/youreurope/business/public-tenders/tools-database/index_en.htm.

- Evans, Philip, and Thomas S. Wurster. 2000. *Blown to Bits: How the New Economics of Information Transforms Strategy*: Harvard Business School Press.
- Falgione, Justin, Patrick Furey, Rachel Rutkoski, and Bob Zieger. 2008. "Five Best Practices For Category Management." *Inside Supply Management* 19 (8).
- Future Purchasing. 2015. "The Benefit Of Category Management And The Value Levers That Deliver It." <http://www.futurepurchasing.com/blog/2015/09/24/the-benefit-of-category-management-value-levers>.
- Future Purchasing. 2017. "Collaborating for Category Management Success – Bridging the Performance and Value Gap – The 2016-17 Global Category Management Leadership Report." <http://www.futurepurchasing.com/catman-leadership-executive-summary-report-2017>.
- Galbraith, Jay R. 1973. *Designing complex organizations*. MA: Addison-Wesley Pub. Co.
- Galbraith, Jay R. 1977. *Organization design*. MA: Addison-Wesley Pub. Co.
- Galbraith, Jay R. 2000. *Designing the Global Corporation*. San Francisco, CA: Jossey-Bass.
- Gelderman, Cees J., and Arjan J. Van Weele. 2005. "Purchasing Portfolio Models: A Critique and Update." *Journal of Supply Chain Management* 41 (3):19-28.
- Gerring, John. 2004. "What is a case study and what is it good for?" *American political science review* 98 (02):341-354.
- Glendinning, R. 1988. "The concept of value for money." *International Journal of Public Sector Management* 1 (1):42-50.
- Gov.UK. 2012. "One Year On: Implementing the Government ICT Strategy." https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61950/One-Year-On-ICT-Strategy-Progress.pdf.

- Hall, David J., and Maurice A. Saias. 1980. "Strategy Follows Structure!" *Strategic Management Journal* 1 (2):149.
- Hawkins, Timothy G., Mark E. Nissen, and Rene G. Rendon. 2014. "Leveraging strategic sourcing and knowledge management to improve the acquisition of knowledge-based services." *Journal of Public Procurement* 14 (2):215-251.
- Heijboer, Govert, and Jan Telgen. 2002. "Choosing the open or the restricted procedure: a big deal or a big deal?" *Journal of Public Procurement* 2 (2):187-215.
- Husted, Christian, and Nicolas Reinecke. 2009. "Improving public-sector purchasing." *McKinsey Quarterly* 4 (2):18-25.
- Jain, N.K. 2005. *Organisational Behaviour* Vol. 2: Atlantic Publishers & Distributors (P) Limited.
- Johnson, P. Frasers, Michiel R. Leenders, and Anna E. Flynn. 2011. *Purchasing and Supply Management*. 14th ed. New York: McGraw-Hill.
- Joyce, William B. 2006. "Accounting, purchasing and supply chain management." *Supply Chain Management: An International Journal* 11 (3):202-207.
- Karjalainen, K. 2011. "Estimating the cost effects of purchasing centralization—Empirical evidence from framework agreements in the public sector." *Journal of Purchasing and Supply Management* 17 (2):87-97.
- Kauppi, Katri, Alistair Brandon-Jones, Stefano Ronchi, and Erik M. van Raaij. 2013. "Tools without skills: Exploring the moderating effect of absorptive capacity on the relationship between e-purchasing tools and category performance." *International Journal of Operations & Production Management* 33 (7):828-857.
- Kraljic, Peter. 1983. "Purchasing Must Become Supply Management." *Harvard Business Review* (September-October):109-17.

- Kulp, Susan L., Taylor Randall, Gregg Brandyberry, and Kevin Potts. 2006. "Using Organizational Control Mechanisms to Enhance Procurement Efficiency: How GlaxoSmithKline Improved the Effectiveness of E-Procurement." *Interfaces* 36 (3):209-219.
- Leach, Adam. 2012. "Sharing information key to successful supply chain collaboration." *Supply Management*.
- Lysons, Kenneth, and Brian Farrington. 2012. *Purchasing and Supply Chain Management*. Harlow, England: Pearson Education Limited.
- Mata, Francisco J., William L. Fuerst, and Jay B. Barney. 1995. "Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis." *MIS Quarterly* 19 (4):487-505.
- Matthews, Darin. 2005. "Strategic procurement in the public sector: A mask for financial and administrative policy " *Journal of Public Procurement* 5 (3):388-399.
- McCue, Clifford P., and Jack T. Pitzer. 2000. "Centralized vs. decentralized purchasing: Current trends in governmental procurement practices." *Journal of Public Budgeting, Accounting & Financial Management* 12 (3):400-420.
- Mena, Carlos, Remko Van Hoek, and Martin Christopher. 2014. *Leading Procurement Strategy: Driving value through the Supply Chain*: Kogan Page Limited.
- Merriam, Sharan B. . 1998. *Qualitative Research and Case Study Applications in Education*. San Francisco, CA: Jossey-Bass.
- Meyer, Christine Benedicte. 2001. "A Case in Case Study Methodology." *Field Methods* 13 (4):329-352.
- Miles, Matthew B., and A. Michael Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*: SAGE Publications.

- Mintzberg, Henry. 1990. "The design school: Reconsidering the basic premises of strategic management." *Strategic Management Journal* 11 (3):171-195.
- Mitchell, Pierre. 2012. "Category Management: Beyond the "Strategic" in Strategic Sourcing." *The Hackett Group*.
- Monczka, Robert M., Robert B. Handfield, Larry C. Giunipero, and James L. Patterson. 2011. *Purchasing & Supply Chain Management*. 5th ed. USA: South-Western Cengage Learning.
- Neef, Dale. 2001. *E-procurement: From Strategy to Implementation*: Financial Times/Prentice Hall.
- Nollet, Jean, Richard Calvi, Estelle Audet, and Marjorie Côté. 2008. "When excessive cost savings measurement drowns the objectives." *Journal of Purchasing and Supply Management* 14 (2):125-135.
- NSW Government: Procurement Board. 2013. "Goods and Services: Procurement Category Management Planning Guidelines."
<https://www.procurepoint.nsw.gov.au/documents/goods-and-services-procurement-category-management-planning-guidelines.docx>.
- O'Brien, Jonathan. 2012. *Category Management in Purchasing: A Strategic Approach to Maximize Business Profitability*. 2nd ed: Kogan Page.
- O'Brien, Jonathan. 2015. *Category Management in Purchasing: A Strategic Approach to Maximize Business Profitability*: Kogan Page.
- OECD. 2009. "OECD Principles for Integrity in Public Procurement."
<http://www.oecd.org/gov/ethics/48994520.pdf>.
- Olsen, Rasmus Friis, and Lisa M. Ellram. 1997. "A portfolio approach to supplier relationships." *Industrial Marketing Management* 26 (2):101-113.

- Presutti Jr, William D. 2003. "Supply management and e-procurement: creating value added in the supply chain." *Industrial Marketing Management* 32 (3):219-226.
- Rolfe, Catherine. 2016. "Category Management initiatives have generated \$2 billion in savings." <https://about.bgov.com/blog/category-management-initiatives-have-generated-2-billion-savings/>.
- Rozemeijer, Frank. 2000. "How to manage corporate purchasing synergy in a decentralised company? Towards design rules for managing and organising purchasing synergy in decentralised companies." *European Journal of Purchasing & Supply Management* 6 (1):5-12.
- Rozemeijer, Frank A., Weele Argan van, and Mathieu Weggeman. 2003. "Creating corporate advantage through purchasing: Toward a contingency model." *Journal of Supply Chain Management* 39 (1):4-13.
- Saunders, Mark N. K., Philip Lewis, and Adrian Thornhill. 2012. *Research methods for business students*. 6th ed. Harlow: Pearson.
- Shields, David. 2016. "To buy better, government must know what it spends." *Federal Computer Week (Online)* Available at www.fcw.com.
- Smart, Alan, and Andreas Dudas. 2007. "Developing a decision-making framework for implementing purchasing synergy: a case study." *International Journal of Physical Distribution & Logistics Management* 37 (1):64-89.
- Smith, Peter. 2014. *Managing Complex Categories Beware the Complexity of Standardisation!*: Spend Matters and ProProcure Ltd.
- Smith, Peter. 2017. "Collaborating for Category Management Success –Bridging the Performance and Value Gap." *Spend Matters Europe Ltd*.
- Statistisk sentralbyrå. 2016. "Offentlige innkjøp utgjør over 15 prosent av BNP." <https://www.ssb.no/offentlig-sektor/statistikker/offinnkj/aar/2016-12-19?fane=tabell&sort=nummer&tabell=288547>.

- Stevens, Robert E., Morris E. Ruddick, Bruce Wrenn, and Philip K. Sherwood. 2006. *The Marketing Research Guide*. 2nd ed. NY: Best Business Books.
- Subramaniam, Kathiravan. 2014. "De-duplication of Master Data during large SAP Implementation Projects." SAP Data Services.
- Tella, Eija, and Veli-Matti Virolainen. 2005. "Motives behind purchasing consortia." *International Journal of Production Economics* 93–94:161-168.
- Thompson, James D. 1967. *Organizations in Action: Social Science Bases of Administrative Theory*. New Brunswick, NJ: Transaction Publishers.
- Tiboni, Frank. 2004. "Air Force centralizes, streamlines IT purchases." *Federal Computer Week (Online)* Available at www.fcw.com.
- Trautmann, Gerhard, Lydia Bals, and Evi Hartmann. 2009. "Global sourcing in integrated network structures: The case of hybrid purchasing organizations." *Journal of International Management* 15 (2):194-208.
- Trautmann, Gerhard, Virpi Turkulainen, Evi Hartmann, and Lydia Bals. 2009. "Integration in the global sourcing organization - An information processing perspective." *Journal of Supply Chain Management* 45 (2):57-74.
- Tushman, Michael L., and David A. Nadler. 1978. "Information Processing as an Integrating Concept in Organizational Design." *The Academy of Management Review* 3 (3):613-624.
- US Government. 2017. "Acting as one for smarter acquisition." <https://hallways.cap.gsa.gov/homepage/welcome.html>.
- Uyarra, Elvira, and Kieron Flanagan. 2010. "Understanding the Innovation Impacts of Public Procurement." *European Planning Studies* 18 (1):123-143.
- van Weele, Arjan J. 2014. *Purchasing and Supply Chain Management*. 6th ed: Cengage Learning.

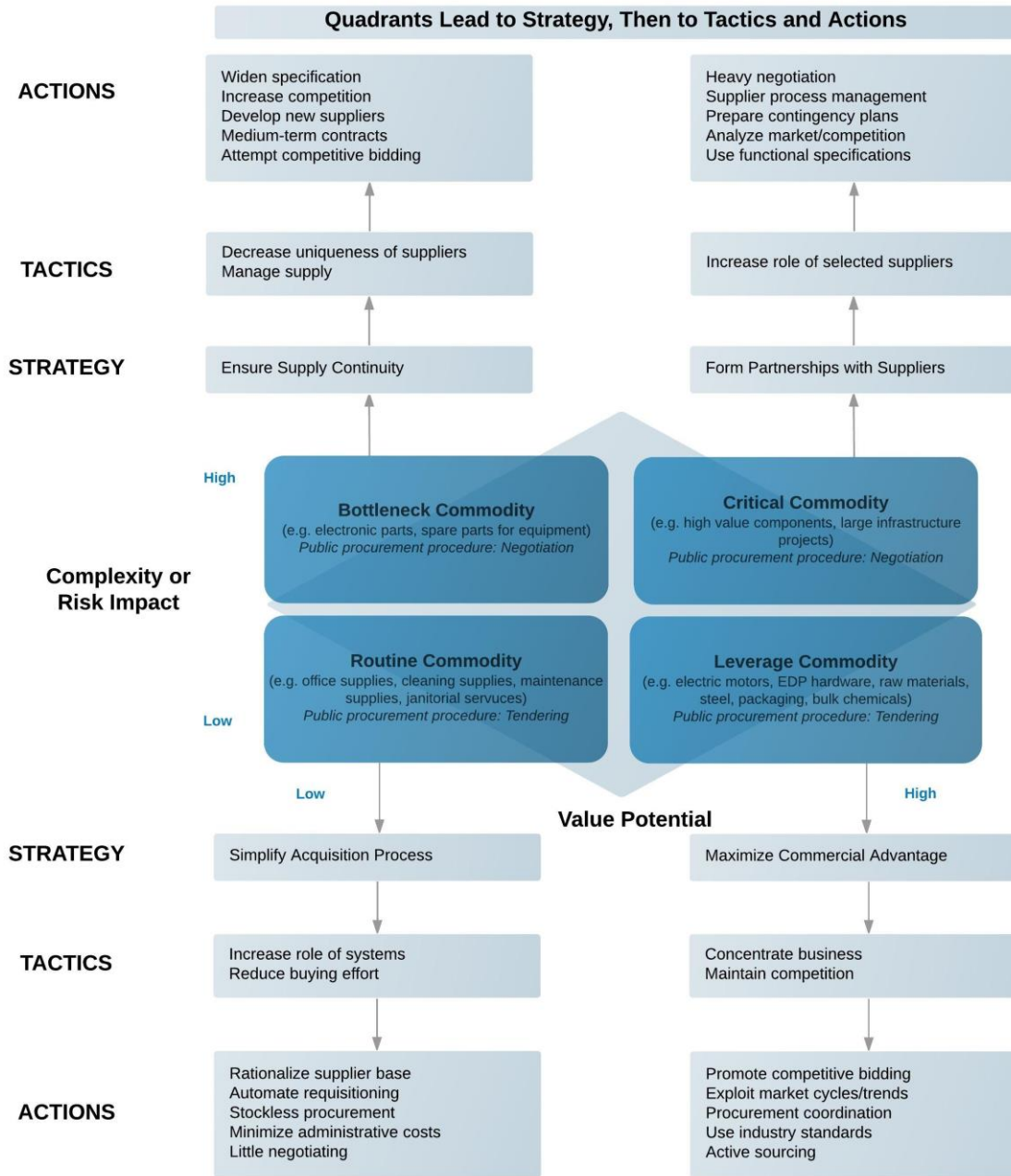
vanWeele, Arjan. 2010. *Purchasing & Supply Chain Management*. 5th ed. UK: Cengage Learning EMEA.

Webb, Jonathan. 2015. "What Is Category Management?" Available at www.forbes.com.

Yin, Robert K. 2003. *Case Study Research: Design and Methods*: SAGE Publications.

Yin, Robert K. 2014. *Case study research : design and methods*. 5th ed. Los Angeles, California: SAGE.

Appendix



Appendix 1 Strategy portfolio matrix for category management

Source: adapted from (Monczka et al. 2011, p. 216) and (Emmett and Wright 2011, p. 293)

Category	Spend (in NOK)	Number of supplier	Number of transaction	Number of purchaser	Number of purchasing business unit
Fixed assets	5 437 200	177	845	57	86
Office and school supplies	2 899 509	224	1589	75	116
Working clothes	370 993	15	104	19	27
Arts and crafts materials	375 530	42	212	18	15

Total number of purchasers within the organization = 168 (estimation from Procurement Manager)

Total number of purchasing business units = 184 (estimation based on spend data analysis)

Appendix 2 Organization A's 2015 spend data on selected categories

Bilag 7 Prisskjema kopipapir				
LINJENR.	VAREBESKRIVELSE	ANSLATT ÅRLIG VOLUM	PRISENHET	MINSTE BESTILLINGS- ENHET
	HVITT KOPIPAPIR HØYKVALITET			
1	Kopipapir Org. A4 80 g (500)	3 700	500 ARK	5 PAKKER
2	Kopipapir Org. A3 80 g (500)	300	500 ARK	1 PAKKE
3	Kopipapir Org. A4 80 g, expressboks	1 000	2500 ARK	1 ESKE
4	Kopipapir Org. A5 80 g (500)	500	500 ARK	1 PAKKE
	HVITT KOPIPAPIR STANDARD KVALITET			
5	Kopipapir A4, hvit, 80 gram	6 000	500 ARK	5 PAKKER
6	Kopipapir A4, hvit, 80 gram, expressboks	3 500	2500 ARK	1 ESKE
7	Kopipapir A3, hvit, 80 gram	550	500 ARK	1 PAKKE
8	Kopipapir A4, hvit, 80 gram, 4 hull	90	500 ARK	5 PAKKER
	SPECIALPAPIR FOR FARGEKOPI OG FARGEPRINT			
9	Kopipapir A4, hvit, 90 gram eller 100 gram	5	500 ARK	1 PAKKE
10	Kopipapir A4, hvit, 120 gram	7	500 ARK	1 PAKKE
11	Kopipapir A4, hvit, 135 gram	5	250 ARK	1 PAKKE
12	Kopipapir A4, hvit, 160 gram	4	250 ARK	1 PAKKE
13	Kopipapir A3, hvit, 90 eller 100 gram	22	500 ARK	1 PAKKE
14	Kopipapir A3, hvit, 120 gram	11	500 ARK	1 PAKKE
15	Kopipapir A3, hvit, 160 gram	2	250 ARK	1 PAKKE
	KOPIPAPIR FARGET			
16	Kopipapir A4, alle farger, 160 gram (kartong kvalitet)	5	250 ARK	1 PAKKE
17	Kopipapir A4, alle farger, 120 gram	5	250 ARK	1 PAKKE
18	Kopipapir A4, alle farger, 80 gram	5	500 ARK	1 PAKKE
19	Kopipapir A3, alle farger, 80 gram	5	500 ARK	1 PAKKE

Appendix 3 RFQ for photocopier paper

Source: Organization A