

From Straightforward Purchasing to Well-Organized Supply Management in a Decentralized Environment

Date:

30th of March, 2016

Author:

Steven A. Hol

Master Program:

Industrial Engineering and Management

Specialization Track:

Production and Logistics Management

Examination Committee

Dr. N. Pulles (University of Twente)

Dr. ir. P. Hoffmann (University of Twente)

Ing. G. Douma (PinkRoccade Healthcare)

Management Summary

PinkRoccade Healthcare is an IT-service provider, supplying almost the complete healthcare industry with their own specific IT-solutions. Due to the removal of their central purchasing department in 2013, the organization currently experiences difficulties in the area of Purchasing and Supply Management (PSM). The bottom-line of the organization's problem is that PSM is far from mature (i.e. professional). There is no overview, structure and knowledge throughout the organization. For this reason, the organization has launched a project, with as objective to design a new PSM-function, that should allow the organization to purchase and manage suppliers more effectively.

From an analysis of the current situation, it appears that at PRHC almost every activity in the area of PSM is handled based on intuition. This is caused by the fact that purchasing employees do not know what is expected from them and responsibilities are fairly unknown. Although most managers acknowledge that the organization is at risk in areas like information security and dependency on certain suppliers, little is done to improve PSM.

According to scientific literature, there are five common organizational requirements to enable successful PSM, which are: human resources, organizational design, information technology, measurement, and commitment (Weele, 1998) (Monczka, et al., 2009). In addition, organization with an immature or unprofessional PSM-function can benefit from adopting a clear PSM structure (Schiele, 2007) (Rozemeijer, 2000). Finally, by implementing an overall strategy for PSM, activities like purchasing and supplier management, can be better aligned.

To support PRHC in restructuring their PSM-function, we have developed a solution design for the organization. This solution design consists of four components, which are:

1. The Foundation for Successful PSM (i.e. organizational requirements);
2. Organizational Structure for PSM;
3. Integrated PSM Strategy;
4. Organization-Wide PSM Policy (regarding the purchasing process and supply base management).

PRHC should start with adopting the right foundation for PSM. This can be done by, selecting a committed group to manage PSM, educating purchasing employees, making PSM information widely

available and measuring PSM performance. Next, the organization should adopt a structure for PSM, based on both centralized and decentralized PSM, and including responsibilities and communication lines. Finally, the organization should implement a portfolio strategy to categorize the supplier portfolio. This strategy can be used to determine activities for purchasing and supplier management. A brief review of our solution design is displayed below.

If the solution design will be implemented correctly, the organization will directly benefit from a more standardized and structure way of PSM. There will automatically provide more overview on purchases and suppliers. In addition, supply risks will be better assessed and PSM activities can be performed more consistently. To support the organization with the implementation of our solution design, we have developed a plan of approach in *Chapter 7*.

Preface

The thesis that lies before you is written based on a graduation assignment in order to finalize my Master's programme Industrial Engineering and Management at the University of Twente. Looking back upon the time of carrying out this assignment, I can easily say it has been the most enjoyable and educational period of my complete school career.

I would like to thank PinkRocca Healthcare for giving me the opportunity for executing my graduation assignment as part of their organization. The combination of project work and writing my thesis has been very pleasant, due to the freedom and opportunities the organization gave me. In particular, I would like to thank Gert Douma, for guiding me throughout my whole internship. Your knowledge and support has helped me a lot during my research.

Next, I would like to thank Petra Hoffmann and Niels Pulles. As my supervisors, you have both assisted much during my graduation assignment. The conversations that we had, containing both positive feedback and criticism, helped me a lot in writing this thesis.

Finally, I would like to thank my girlfriend, family and friends, for their overall support. I would not have come this far without you.

I hope you enjoy reading this thesis.

Steven Hol

Eerbeek, 30th of March, 2016

Table of Contents

1	Introduction	1
1.1	PinkRoccade Healthcare	1
1.2	Research Motivation	3
1.3	Problem Identification	4
1.4	Research Objectives.....	8
1.5	Research Questions	9
2	Research Methodology.....	10
2.1	Current Situation.....	11
2.2	Theoretical Framework	12
2.3	Gap Analysis	14
2.4	Solution Design.....	14
2.5	Plan of Approach	15
2.6	Conclusions.....	15
3	Current Situation	16
3.1	Purchasing and Supply Management at PRHC	16
3.2	The Purchasing Process	19
3.3	Supplier Management	21
3.4	Contract Management.....	22
3.5	Supply Risks	23
3.6	Summary	24

4	Theoretical Framework	26
4.1	Purchasing and Supply Management in General	26
4.2	Organization-Specific PSM for PRHC	29
4.3	PSM Strategies.....	31
4.4	Principles and Practices regarding PSM	35
4.5	Summary	40
5	Gap Analysis	42
6	Solution Design	46
6.1	Foundation for Successful PSM.....	47
6.2	PSM Structure for PRHC.....	49
6.3	PSM Strategy for PRHC	52
6.4	PSM Policy for PRHC	56
6.5	Summary	62
7	Plan of Approach.....	66
8	Conclusions and Recommendations	70
8.1	Conclusions.....	70
8.2	Recommendations.....	73
	References	75
	Appendix	79

List of Abbreviations

PRHC	PinkRoccade Healthcare
PSM	Purchasing and Supply Management
BU	Business Unit
ERP	Enterprise Resource Planning
SLA	Service Level Agreement
F&C	Finance and Control
SBM	Supply Base Management
IT	Information Technology
HRM	Human Resource Mangement
PR	Product-Related
NPR	Non-Product-Related
ISO	International Organization of Standardization

1 Introduction

This thesis is written based on a graduation internship at PinkRoccade Healthcare, headquarters located in Apeldoorn, the Netherlands. The internship concerns a project/ research within the organization on the subject of Purchasing and Supply Management (PSM). The first chapter of this thesis gives a broad introduction, in which the organization is described, as well as its problems regarding PSM and the overall objectives of this research.

1.1 PinkRoccade Healthcare

PinkRoccade Healthcare (PRHC) is an information technology provider in the healthcare industry. The core business of PRHC is providing IT-solutions (i.e. software products and related services) to a large proportion of this industry. The organization is part of Total Specific Solutions (TSS), which consists of six software companies that all serve different markets with their own specific IT products and services. In 2014, TSS became part of Constellation Software Inc. (CSI). The core operation of CSI consists of acquiring, managing and building industry specific software companies. Despite the acquisition by CSI, the organizational structure of TSS remained largely intact.

The biggest change for PRHC due to the acquisition, is a shift from five divisions into five completely separate Business Units (BUs), which will all be described separately on the following page. This change is still in progress and the desired result is that PinkRoccade Healthcare will be nothing more than just the name for a collection of five separate businesses. Through this change the organization tries to get closer to their customers and react faster on changes in the specific markets. General departments, such as marketing, finance and HRM, are transferred into the five Business Units as much as possible. For example, every Business Unit has access to their own HR-consultant and marketing specialist.

Despite the fact that PRHC is separating their BUs, all five units keep sharing the same strategy and organizational key values. By understanding the market PRHC tries to add value to a major part of the healthcare industry. Market knowledge is obtained by cooperation with healthcare professionals, caregivers and patients. PRHC connects these groups of stakeholders by enabling the exchange of information. In addition, PRHC provides consultancy and other services to support healthcare institutions in their core operations. Ultimate goal of PRHC is to improve healthcare by simplifying activities and operations. To achieve this goal PRHC uses personally developed software-products.

Some of these products are (niche) market specific, while others are suitable for more than one market. A description of all five Business Units, including their markets and most important products, is given below.

ZKH Applications

This is one of the two Business Units that supports hospitals with their everyday activities. This unit has the objective to supply hospitals with specifically made software products. The primary product of ZKH Applications is CareCTRL, which is an SAP-based ERP-solution that connects many different daily processes of hospitals. A second important product of this unit is CuliCart, which supports the food distribution in hospitals.

ZKH Services

The second Business Unit that supports hospitals is ZKH Services. The creation of this unit is due to the fact that PinkRoccade did not succeed in establishing their own Electronic Health Record (EHR) for hospitals. This Business Unit's main objective is to assist hospitals with the implementation of EHRs from other suppliers like Epic, Siemens and ChipSoft.

GGZ

The third Business Unit is GGZ. This unit is specialized in supporting mental healthcare institutions, such as psychiatric institutions. PRHC's core product for this market is *mijnQuarant*, an EHR specifically designed for mental healthcare institutions.

Care

The Business Unit Care focusses on all healthcare institutions that do not belong to the previous mentioned units. The largest market in which they operate are the nursing homes. The primary product for this unit is *mijnCaress*, PRHC's own EHR, specifically designed for care institutions. PRHC also developed their own smartphone application called *iCaress*, which facilitates the use of this EHR.

ZCC

The fifth and final Business Unit is ZCC. This unit is different from the previous four units. Most products from the other four Business Units are implemented at the customer. The core operation of ZCC is hosting customers information systems of healthcare organizations within data centers owned by PRHC. These information systems largely consists of products sold by the other units and therefore hosting is a more overarching operation.

1.2 Research Motivation

At the beginning of a project/ research it is often useful to explore the real motives of the project initiator. This section will describe PRHCs point of view regarding their PSM-function. This point of view gives better understanding of the importance and expectations of this research. In the upcoming sections this information will be used as a foundation for identifying core problems and defining research objectives.

In 2012, PRHC started some major changes in organizational vision and structure. Currently these changes are still ongoing and the common aim is to professionalize the organization by ensuring more clarity towards customers and creating transparency within the organization. The overall strategy to achieve this is by decentralizing most of the business operations. By removing intermediate layers, PRHC tries to shorten the communication lines within the organization and operate closer to their customers. In addition, the organization tries to gain more insight in their performance by keeping track of performance indicators. As part of the new strategy, in 2013, PRHC decided to quit with centralized PSM. The corresponding activities were transferred into the five Business Units. The main goals of this adjustment were to reduce costs and purchase and manage suppliers more directly. The overall changes had a positive impact on the organization, both in operational and financial ways, but at the same time this relocation was (part of) the origin of the PSM-problems of today.

During the relocation, PRHC did not make any clear regulations or procedures for PSM. The Business Unit managers were given the responsibility to arrange PSM within their own units. These managers were not aware of all the tasks and duties associated to PSM. They tried to resolve this by appointing random employees, without proper knowledge or experience of purchasing, to take care of certain suppliers and/or parts of PSM. Because these employees were also unfamiliar with the PSM-tasks, they acted mostly on intuition. In addition, at PRHC most purchases are based on long-term relationships with suppliers. Every year only one or two new suppliers are contracted. Because the supplier portfolio only changed little over time, the sense of importance of PSM declined. Consequently, management commitment and control became less, allowing the appointed employees to do only what they considered necessary.

Altogether this resulted in a situation where there is no overview of suppliers, a significant number (signed) contracts are missing or outdated and valuable contact with suppliers is rare. The responsible

Business Unit managers are aware that there are risks posed by the current situation and that things have to change in order to regain overview of purchasing and suppliers. A recent example of the risks is that for a certain supplier, after years without contract-negotiations, the supplier was apparently overpaid by 30% for several years.

In order to regain grip on the situation and become aware of what is going on within their businesses, the Business Unit managers now want to restructure the organization's entire PSM-function. To achieve this the organization has launched a project, with as overall goal to purchase and manage suppliers in a more transparent, structured and standardized way. Despite the decentralization of PRHC in general, this project is overarching and applies to all five Business Units. The outcome of this project should be concrete and practical applications for the organization to redevelop their PSM-function. This thesis takes the reader through this project, resulting in clear recommendations and describing the process of defining them.

1.3 Problem Identification

The comprehensive problem of the organization is that there is no structure, strategy, and knowledge regarding PSM throughout the organization. However, to tackle the core of this overall problem, it is useful to conduct a thorough problem analysis. This section contains a problem identification based on short interviews with internal stakeholders. To acquire an unbiased representation of the problems we have interviewed a relatively wide group of stakeholders, consisting of: Business Unit managers, employees responsible for quality-assurance and information security, financial controllers, and a selection of employees who actually carry out purchases and supplier management within the organization.

In this problem identification, we will first describe all generally recognized problems during the interviews. After that we will illustrate the interrelation between these problems by developing a comprehensive problem-cluster. Within this problem-cluster we will highlight those problems that are accountable for a major part of the current difficulties within the organization. This highlighting will be based on the causality with other problems and the overall relevance to the research. The highlighted problems will be the problems that need to be solved, while keeping the other problems from the cluster in mind. The list of generally recognized problems starts on the following page.

1. No one within the organization feels truly responsible for PSM. Management is not committed to organize PSM, because they not consider it important enough. In addition, the actual purchasing employees do not feel responsible for the all the operations arising out of a certain purchase.
2. The organization has no overall conception or strategy for PSM. In addition, the few available regulations, procedures, and guidelines are barely used, mainly because they are outdated or too general. For example, the available purchasing authorization-scheme contains names of people who do not work for PRHC anymore.
3. Purchasing activities can currently be performed by almost every employee within the organization. Most of these employees do not possess the right skills and knowledge for PSM-activities, making them act mostly on intuition.
4. Because PSM is highly decentralized, without having any overall procedures and regulations, there is no overall view on purchases, suppliers and purchasing contracts.
5. The purchasing process usually consists of fxed stages. At PRHC however, there is no structure in the purchasing process. The execution of the purchasing process is therefore highly dependent on the person who actually carries it out, making it very inconsistent
6. During the purchasing process often only one suppliers is considered. Alternative suppliers are not assessed, making it uncertain if the most suitable supplier is chosen.

4. PRHC has many long-term relationships with suppliers, making partnerships and extensive cooperation very important. Better collaboration with suppliers will logically lead to better products and services. However, PRHC does not manage any supplier relationships and suppliers are usually only contacted when this is highly necessary.
5. PRHC does not evaluate or monitors suppliers, making it unclear how suppliers are performing. It is currently unknown if all suppliers act as agreed upon. Also opportunities for improving suppliers products and services are not really examined.
6. PRHC is quite dependent on some of its suppliers. If one of these core suppliers has (financial) difficulties, this can have major consequences for the continuity of (parts of) the organization. This dependency on suppliers is not managed. For example, recently one of PRHCs suppliers stopped

updating one of the provided software-products, forcing PRHC to look for an alternative product. PRHC was not prepared for this situation, resulting in difficulties for the continuity of one of their own products.

7. Information security is currently a hot topic in the IT-industry. This is especially the case for an organization like PRHC, who works with confidential patient data. The organization finds information security very important. However, when it comes to suppliers, information security is often not even evaluated.

8. Purchasing contracts are usually developed by the supplier. The degree of involvement during this developing process depends mainly on the buyer. Even though PRHC acknowledges (contractual) risks, the organization is rarely involved in the development of purchasing contracts. This has led to a situation where many contracts do not meet the requirements PRHC pursues, such as rules for ownership, incident management procedures, and service-level agreements (SLAs).

9. Contracts are not stored consistently, making it difficult to evaluate and monitor contracts. Many contracts are already expired or have been renewed automatically, while the organization is still being supplied based on the “outdated” versions of these contracts. There is currently no complete overview on current contracts and the existence of most of the contracts is only known by a select group of people.

The following page illustrates the before mentioned problems in the form of a comprehensive problem-cluster. In this the relationships between all the problems have been identified, which automatically resulted in five clear problem-areas.

The bottom line of the organization’s problems is that the right foundation for well-organized PSM is lacking (I). There is no management commitment, the organization has no overall strategy for PSM, operating personnel does not possess the right skills and knowledge to perform the related tasks and duties and there is no overview on PSM within the organization. A lacking foundation makes it is impossible to create or maintain a structured PSM-function. Because there is no structured PSM-function, the purchasing process is very inconsistent (II), suppliers are not managed effectively (III), and purchasing contracts are not being monitored or evaluated (VI). As a result, it is practically unknown what is actually going on within the organization in the area of PSM, putting the organization at risk in multiple areas, like information security and supplier-dependency (V).

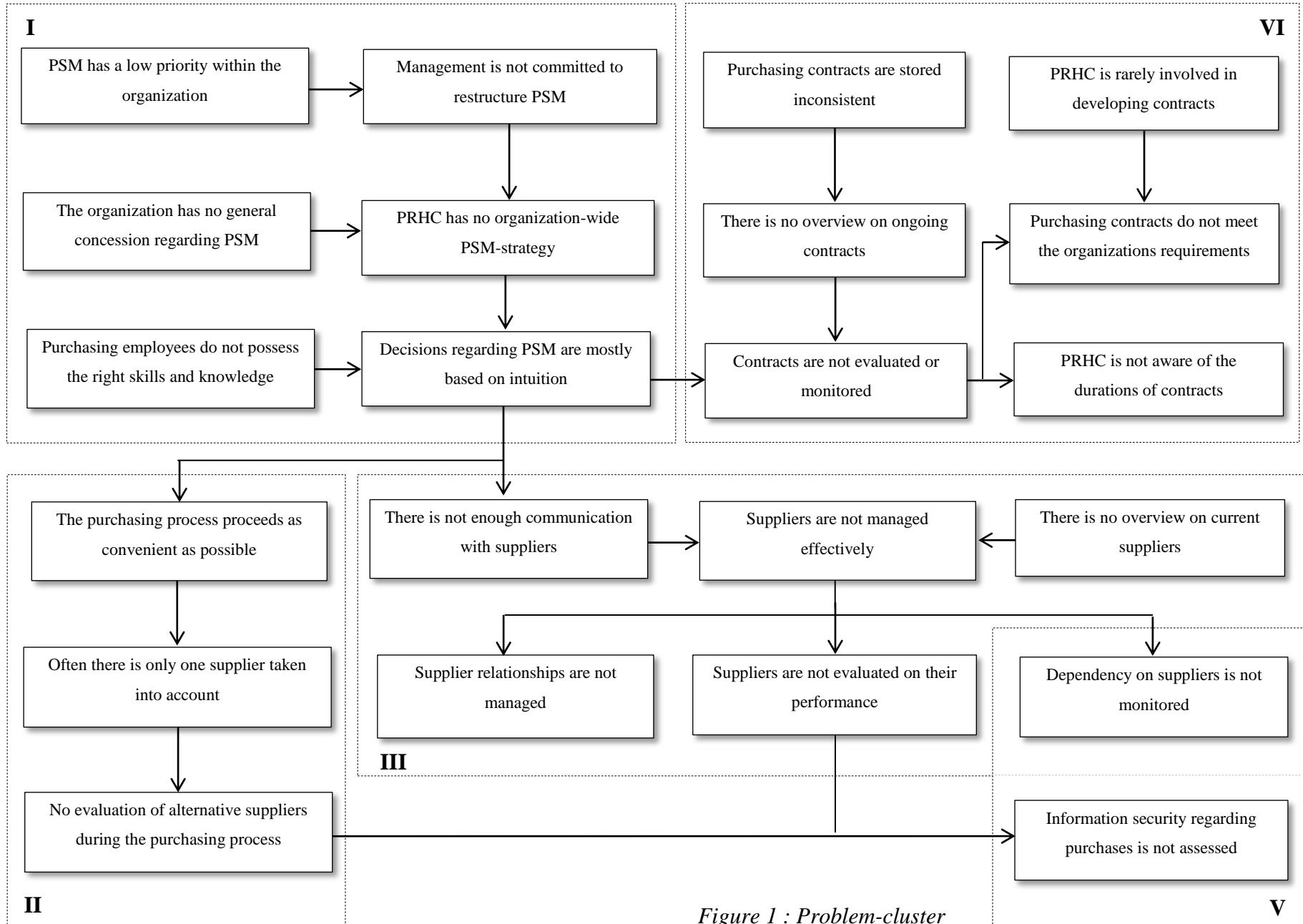


Figure 1 : Problem-cluster

1.4 Research Objectives

By determining a certain scope and establishing clear research objectives, it becomes easier to align a research toward its goals. This section will give a brief description of our scope and objectives, based on the problem identification of previous section.

The general objective of this research is the development of a design for the PSM-function of PRHC. As can be seen from the problem identification, the organization would like to have more structure and overview regarding their purchases, suppliers, and purchasing contracts. In addition, PRHC would like to adopt a PSM strategy, as well as methods for operational purchasing and supplier management. Finally, the organization wants to reduce current supply risks, in the areas information security and dependency. The question that arises is, “Why is it important for an organization to have a structured and well-organized PSM-function?”.

In the recent years, purchasing volume, expressed as a percentage of total organizational costs, has increased substantially (Schiele, 2007). This means that better PSM performance can make a considerable contribution to the overall performance of organizations. According to Schiele (2007), purchasing maturity (i.e. the level of professionalism in the purchasing function) is essential for enabling this increase of financial performance. By setting up a more sophisticated PSM-function, organizations are more likely to benefit from PSM cost-reductions. In addition, Schiele (2007) describes a minimum maturity point, below which there is nothing to be gained from introducing methods, tools and practices.

PSM at PRHC is currently far from mature. To effectively improve PSM, we therefore need to professionalize this function. This can be done by designing an overall organizational structure with a reasonable maturity-level, which will allow the organization benefit more from PSM in general. In addition, this will enable the organization to adopt methods, tools and practices for managing purchases and suppliers. The overall objective of this research is described in the statement below.

to design a Purchasing and Supply Management function for PRHC, so that the purchasing process, suppliers, and purchasing contracts are managed in a more structured and organized way, to gain better overview on purchases and suppliers, whilst reducing supply risks, and allowing the organization to develop their Purchasing and Supply Management activities in the future.

1.5 Research Questions

Given the objectives from previous section our research is obviously a design study. The goal of the research is to develop a new organization-specific design for the overall PSM-function. This thesis walks the reader through the process by which the proposed design is developed. In order to align our approach and achieve the desired results, we have translated the research objective into a main research question. This question is written below and should be answered at the end of this research.

Main research question: How can PinkRoccade Healthcare restructure its Purchasing and Supply Management function in a more professional and structured way, so that the organization acquires better overview regarding PSM, whilst reducing supply risks, and allowing the organization to develop their PSM-activities in the future?

Since it is impossible to answer this main research question at once, we have also defined multiple sub-questions. Each chapter of this thesis will be used to answer one of these sub-question. When all the sub-questions have been answered, this should automatically provide us sufficient information to answer our main research question. Because answering some of the sub-questions will require specific information originating from answering other questions, all questions will be answered in sequential order. Our five sub-questions are as follows:

Sub-question 1: How is PinkRoccade Healthcare's Purchasing and Supply Management function currently organized?

Sub-question 2: How is Purchasing and Supply Management, according to scientific literature, ideally managed by an IT-provider, using a decentralized organizational structure?

Sub-question 3: What are the differences between Purchasing and Supply Management at PinkRoccade Healthcare and Purchasing and Supply Management as described by scientific literature?

Sub-question 4: What should the new design of the Purchasing and Supply Management function of PinkRoccade Healthcare look like?

Sub-question 5: How can the organization implement the newly developed Purchasing and Supply Management design?

2 Research Methodology

The previous chapters has provided us with a comprehensive introduction of the research, containing the problems that the organization is dealing with, the overall objective of this research, and our pre-developed research questions. This chapter will describe how our research will be conducted. First we will describe the overall structure of this research, after which we will discuss the methodologies used for each chapter. To create a common thread in our research we have decided to devote one chapter to every pre-developed sub-question from *Section 1.5*. The following figure illustrates the overall structure of our research.

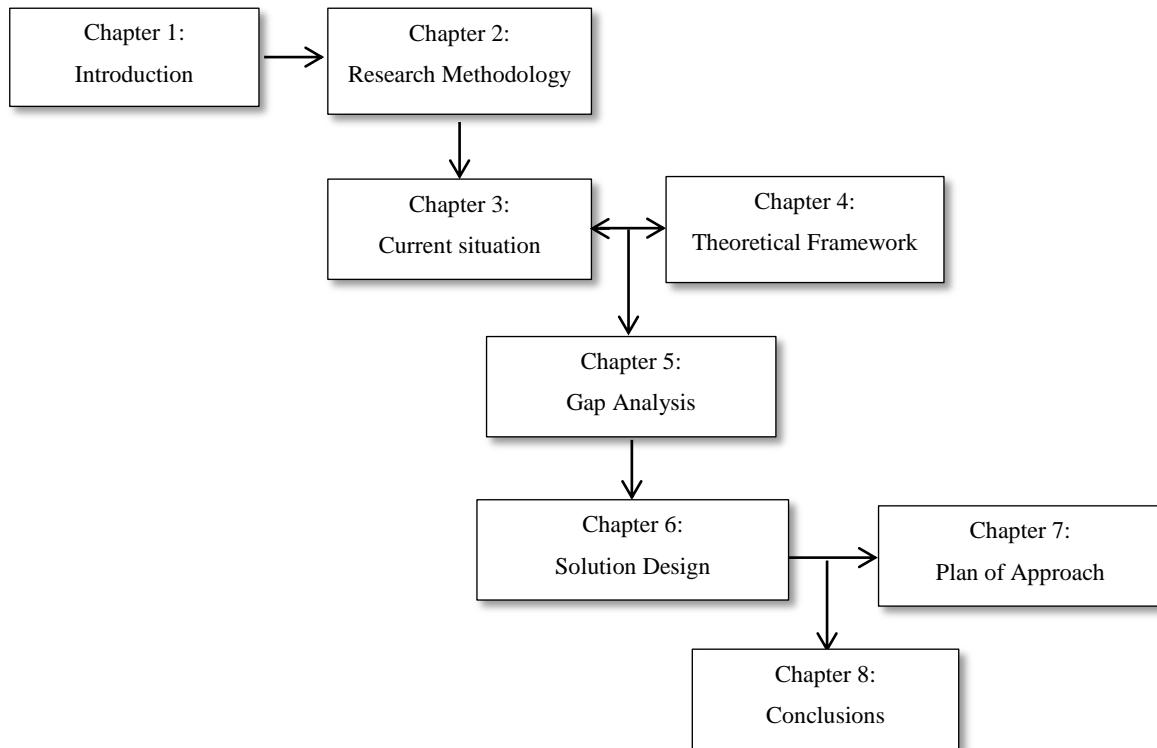


Figure 2 : Research outline

After our introduction and describing our research methodologies, we will try get a good impression of the current situation at PRHC in the area of PSM (3). Next, we will try to find out what both scientific and academic literature suggests in this field of study (4). If both the current situation and the ideal situation as described by literature have been defined, both will be compared to determine the main differences between the present and desired situation of the organization (5). These differences will be

used to develop a solution design, containing possibilities for improvement (6). To implement our solution design, we will develop an overall plan of approach for PRHC (8). Finally, the research will be concluded and our recommendations for further research will be announced (9).

Because each part of the research requires a different approach, we will use the remainder of this chapter to describe the methodologies used for each chapter. As can be seen from the figure, the first step of this research will be to investigate the current situation at PRHC further.

2.1 Current Situation

(Chapter 3)

Since we intent to develop a new design for PSM, it is very important to determine our starting point. Therefore we will use *Chapter 3* to investigate the current situation at the organization. In *Section 1.3* we have already determined some key problems and problem-areas, but in order to get a good overall impression we will use this chapter to describe the current situation in more detail.

The problem identification of *Section 1.3* has been based on short interviews with several internal stakeholders. This has provided us more with insight in the organization itself and the generally recognized problems. However, these interviews were fairly superficial and the number of interviewees was limited. Therefore, we will again discuss the current situation with stakeholders.

In order to get an unbiased view and broad perspective, this time we will make use of an even wider variety of employees, which are selected more carefully. In addition, we will also interview external partners to determine how things are done at other organizations. In contrast to the earlier interviews, this time we will also make use of more structured interviews containing pre-developed interview questions. These questions will be based on the organizations problems and research-objectives from *Chapter 1*. Finally, we will also store the responses more properly. The general interview questions and a list of interviewed stakeholders can be found in *Appendix A*.

In addition to these interviews, we will also make us of so called ‘desk-research’ (Verschuren & Doorewaard, 2010). Desk-research is the process of identifying and analyzing all available past and present information regarding PSM at PRHC. There is still a lot of information available from the time that PRHC used a central purchasing department. This information must be located in the archives of the organizational network and contains guidelines, used processes, and supplier information.

The chapters outline will be based on the organizations problems and overall objectives as defined in *Chapter 1*. Each section will describe the current situation of one of the problem-areas. The chapter will end with an overall summary of current deficiencies and difficulties in the area of PSM.

2.2 Theoretical Framework

(Chapter 4)

Our theoretical framework will be used to determine how PSM is ideally applied in organizations. We have chosen to develop our theoretical framework after evaluating the current situation, so that we can focus our search for scientific literature based on the current deficiencies of the organization. In addition, if we would conduct our search for literature first, it is possible that we will look for the wrong kind of information. Finally, if topics of the theoretical framework are derived based on the description of the current situation, it will be easier to align both research components into a substantive gap analysis.

Our theoretical framework will start with a general theoretical representation of PSM to provide us with background information. Thereafter, we will determine the major exceptions and differences for IT-service providers and decentralized organizations, like PRHC. Finally we will determine principles and practices regarding PSM, based on the current difficulties and deficiencies within the organization originating from *Chapter 3*.

Our overall search process is based on the literature review process as defined by Justinia (2013). The first step of this search process is to select the databases and search engines that will be used. The databases that we will primarily use are Web of Science and Scopus. In addition, we used the search engine Google Scholar, which can provide a wide variety of articles and books. This search engine is mainly used for more general background information. When using Google Scholar it is important to verify the found literature in terms of reputable researchers and publishers. Web of Science and Scopus are more profound database, which are used to acquire in-depth information about certain topics.

The second step of the search process is defining the search terms. To get most out of the search process, it is important to draft and select search terms in an organized way. In addition, determining synonyms of search terms can increase the likelihood of finding all the desired information. We will use a brainstorm-session to define potential search terms. Thereafter we will select our search terms and determine possible synonyms. The brainstorm session will be based on the results of the description of

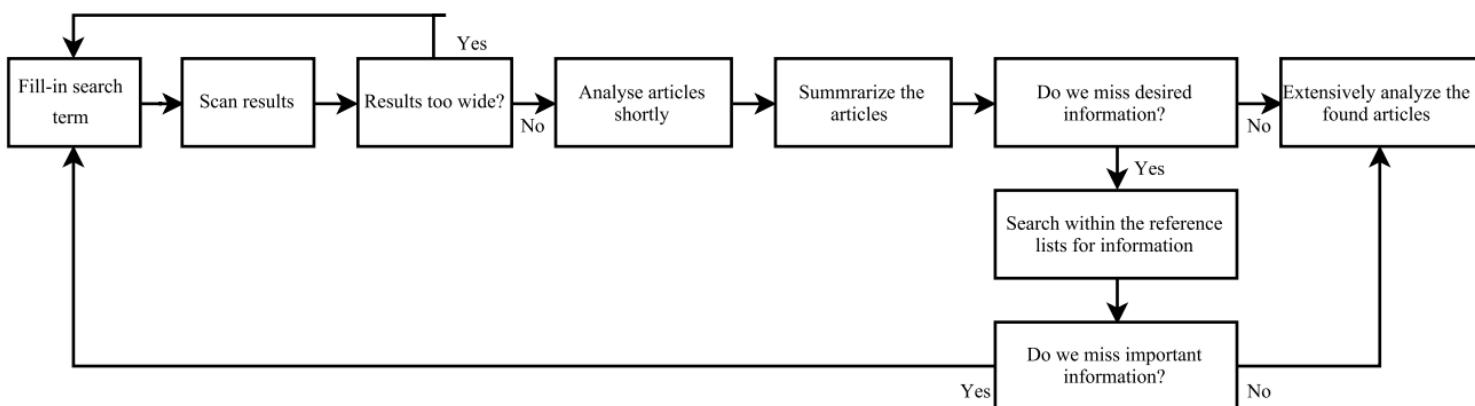
the current situation from *Chapter 3*. The search-terms that we will use for our literature search, are shown in Appendix B.

Apart from good databases and search-terms, it is also important to apply a structured search process. Without a thought-out process it will be impossible to review all available information. To structure our search process we have therefore developed an action plan, based on the findings of Justinia (2013). All the following steps should be carried out for each search-topic.

1. Fill-in a pre-developed search term and scan the results (/start with a more generic search term);
2. Are the results too wide? Yes: Adjust the search term or add criteria to the search-engine. No: Continue to step 3.
3. Analyze the found articles based on a quick scan (/read the introduction and conclusion and scan the main text).
4. Concisely summarize the main purpose of the articles in a shortlist.
5. Is relevant information regarding a certain topic missing within the shortlist? Yes: Check the references of already found articles to look for other relevant articles. No: Continue to step 6.
6. Is necessary information missing? Yes: Go back to step 1. No: Continue to step 7.
7. Extensively analyze the found articles and determine their relevance to the research.
8. Is the desired result achieved? Yes: continue to the next research topic. No: Go back to step 1.

This search process is recursive, so that adjustments can be made throughout the whole process. The decisions that have to be made during the search process (i.e. too wide results and missing information), are subject to the criticism of the actual ‘searchers’, which continuously have to define if the outcome is sufficient. An illustration of this search process is displayed below.

Figure 3 : Search process



2.3 Gap Analysis

(Chapter 5)

After both the current and ideal situation have been defined, next step is to determine the differences between both. This gap analysis will be in the form of an extensive table, and will be used to determine what is needed for PRHC to get closer to the ideal situation as described by literature. Again, the basis of this gap analysis will be the difficulties and deficiencies that the organization is currently dealing with. For each topic from our theoretical research, we will briefly display the current situation at PRHC. In addition, we will show how this subject should be treated according to scientific and academic literature. Both will be done by a enumeration of key points for each of the topics.

After that we have defined the main differences between PRHC and scientific literature, we will describe our findings in more detail. This description will highlight the most important differences from our analysis and will be used to determine well-founded possibilities for improvement and will be the basis for our overall solution design.

2.4 Solution Design

(Chapter 6)

Now that we know what the organization needs to get closer to the desired result, our next step will be to determine how to get there. By evaluating several key points from our gap analysis and practical ways of applying PSM, based on academic literature, a new organization specific design for purchasing and managing suppliers can be developed.

Our solution design will begin with the general organizational requirements for successful PSM. Thereafter we will develop an organizational structure that can be used for PSM. Next, an organization-wide PSM-strategy will be defined. Finally we will translate this structure and strategy into practice, by developing methods, guidelines, and regulations in the form of a PSM-policy. The key points of our solution design will be shown a figure containing the definite design for the PSM-function of PRHC.

When this new design will be taken into use, the organization should directly benefit from the more organized way of PSM. The organization should have more overview regarding their purchases, suppliers, and supplier agreements. In addition, roles, responsibilities, and reporting lines for purchasing employees will be clear. Finally, the organization will benefit from strict guidelines and regulations, which can be used for managing the purchasing process and suppliers.

2.5 Plan of Approach

(*Chapter 7*)

Like all organizational changes, we do not expect our newly developed PSM-function to automatically adopt within the organization. To implement our design, we will therefore provide PRHC with a plan of approach. This plan of approach will be based on Kotter's eight-stage process for successful organizational transformation (Kotter, 1996). For each step of this plan of approach, we will provide objectives, define roles, and describe the desired results. After each step, PRHC has to evaluate on the implementation, by looking back at the process, which can be used to improve the proceeding of following steps.

2.6 Conclusions

(*Chapter 8*)

Finally we will conclude our research. We will use this chapter to answer our main research question as established in *Section 1.5*. This will be done by briefly looking back at our complete research and answering of our pre-developed sub-questions. After that we have answered our main research question, this chapter will also be used to define recommendations for further research.

3 Current Situation

This chapter investigates the current state of PSM at PRHC and will be used to get a better understanding of the current organizational structure, daily PSM-activities, and deficiencies in the current processes. As mentioned before, this chapter is based on structured interviews with internal stakeholders and ‘desk-research’. The information from this chapter will be used as a foundation for our theoretical framework and gap analysis. In this chapter we will build upon the five problem-areas as derived in *Section 1.3*, which are:

1. PSM in general;
2. The purchasing process;
3. Supplier management;
4. Contract management;
5. Supply risks (with regard to dependency and information security).

Each of these problem-areas will be described in a different section of this chapter. In the final section, a summary of all the current difficulties and deficiencies for PRHC in the area of PSM will be listed.

3.1 Purchasing and Supply Management at PRHC

In general, PSM is responsible for all the purchased products and services that enable organizations to perform their business operations. As we know from *Chapter 1*, PSM at PRHC is currently far from mature (i.e. unprofessional). We will use this section to determine how PSM is incorporated at PRHC even further. First we will determine the overall importance of suppliers for the organization. Next, we will look into the supplier portfolio of the organization. Finally, we will describe the current organizational structure that is used for PSM. All this information will provide us a good overview on overall PSM at PRHC.

3.1.1 The Importance of Suppliers for PRHC

PRHCs suppliers are part of the core business and support the organization in meeting customers’ demands. Many products and services from the organization are directly related to suppliers. For example, software solutions that PRHC delivers to customers are often built upon software products purchased from suppliers. Because of this quality of operations is dependent on the performance of

suppliers. Currently, PRHC has many long-lasting relationships and/ or partnerships with suppliers in order to fulfill their operations. To get the most out of these relationships, it is very important that PSM is handled effectively within the organization. However, as is apparent from the problem identification from *Section 1.3*, this is currently not really the case.

The impact of suppliers on the overall business can be indicated financially. In 2014, PRHC had a total revenue of 62.1 million euros. In the same year, the organization purchased for more than 22.4 million euros from 540 different parties, which covers up 36% of the total revenue in that year. PRHC made a profit of almost €9 million in 2014, meaning that expenditure on suppliers is accountable for almost half of the total costs per year. In addition, the amount spent on the 100 biggest suppliers of the organization is approximately equal to 1/3 of the yearly revenues (i.e. € 20 million).

Altogether, suppliers are of high value for PRHC, both substantive and financially. To find out how important suppliers truly are, we have to take a closer look at the products and services that are actually purchased by the organization.

3.1.2 PRHC's Supplier Portfolio

Analyzing the organizations supplier portfolio will allow us to identify the necessity of suppliers even further. The easiest way to obtain a clear view on all different suppliers is by classifying them. We will use this section to classify PRHCs suppliers, based on the actual products and services that are purchased. Almost all of the organization's suppliers can be allocated to one of the following five groups of products and services, which are: co-development, software licenses, hardware products, advisory services, and facility services. With some minor differences, this sub-division is broadly the same as PRHC currently uses.

1. Co-development

PRHCS has many long-lasting relationships with suppliers, in which products and/ or services are developed and provided by co-operation. These partnerships are often with other IT-providers, that carry specific knowledge about certain IT-platforms. It basically comes down to purchasing knowledge and manpower. These close partnerships require a considerable amount of attention and a lot of communication, to meet customers' demands as best as possible. Because PRHC is very close to their

customers and markets, PRHC usually ‘purchases’ the services from these partners. This way the organization tries to keep in control of the final delivery to their customers.

2. Software Licenses

As an IT service provider, PRHC requires many software licenses. The more general software licenses are purchased from major software-providers, like IBM and Red Hat. More specific licenses are purchased at highly specialized software providers. The actual purchases of licenses are usually just once for a period of one or more years. In addition, PRHC also requires general licenses for their own use, like for example to use of Microsoft Windows and Office.

3. Hardware Products

Like every other organization, PRHC logically needs among others, computers, smartphones and copiers for their own use. In addition, the organization sometimes also provides hardware to their customers, together with their IT-products. This can be computers, but also for example hand-scanners or data storage devices.

4. Advisory Services

It is impossible to excel in all areas of business. PRHC focusses on IT products and services, but has less understanding of financial matters, pensions and in the legal field. For these areas, the organization makes use of external advisory services. Sometimes the organization also makes use of advisory services regarding their own products. Just like with co-creation, lack of knowledge in certain IT-platforms, is often the reason for this.

5. Facility Services

Every organization needs facilities to perform their operations. PRHC needs office buildings, office suppliers and catering. These type of products and services are required by almost every organization, and can be classified as facility services.

3.1.3 The PSM-structure of PRHC

As mentioned before, PRHC currently uses a highly decentralized organizational structure. For PSM this means that corresponding activities are conducted at the same place within the organization as the purchased products and services are used. Business Unit specific purchases are therefore usually

performed deep within the corresponding units, and the more general purchases are performed on a central within the organization. Most purchases are carried out in small groups of two or three employees. The majority of the organization is usually not aware of these purchases.

General responsibility and accountability for PSM are undefined within the organization and therefore, no one is truly engaged with the overall operations, regulations and general processes. In addition, there is no initiator or promoter for improving the current situation. Procedures about how to operate or act regarding PSM are limited and the available descriptions are usually outdated. For example, the purchasing authorization scheme contains employees that do not work for the organization anymore and the lists of current suppliers is based on the situation in 2012.

At PRHC, almost every employee is allowed to purchase after acquiring approval from the right manager. Because responsibility is undefined, the actual purchaser and his/ her manager are on their own regarding the tasks and duties related to PSM. As a result, a great number of different employees are involved with all the different suppliers and PSM-activities within the organization. All these employees look at PSM differently. If PSM is applied by many different people, all without specific knowledge, and in absence of procedures and regulations, it is logical that PSM at PRHC is currently very unorganized.

As derived from the problem identification, this unorganized way of managing purchasing and supplies and lack of overview results in problems in multiple areas, which are purchasing, supplier management, and contract management. The current PSM-structure also leads to significant risks for the organization in the areas of dependency on suppliers and information security. These topics will be described in more detail in the following sections, starting with the purchasing process.

3.2 The Purchasing Process

Everything within an organization that is related to PSM, starts with purchasing. As mentioned before, there is no central PSM function at PRHC and even within the Business Units, PSM is decentralized. This section will describe what this decentralization currently means regarding the general purchasing process at the organization.

The purchasing process at PRHC starts with a “random” employee encountering the need for a certain purchase. This employee can be practically everyone within the organization. He or she intuitively

selects the most suitable supplier. This can, for example, be based on publicity or past experience. After a supplier is selected, the employee lets the supplier prepare an offer or contract. By using a pre-developed authorization-scheme, the employee can determine which manager has to approve this specific purchase. In practice, this authorization-scheme is not always used. After a certain purchase is (or is not) approved by the right manager, it will be executed. In the case of incoming bills, the F&C department can ask for a justification from the related managers or actual purchasers. Further action are based on personal interpretation and necessity. A figure containing the general purchasing process at PRHC is shown below.

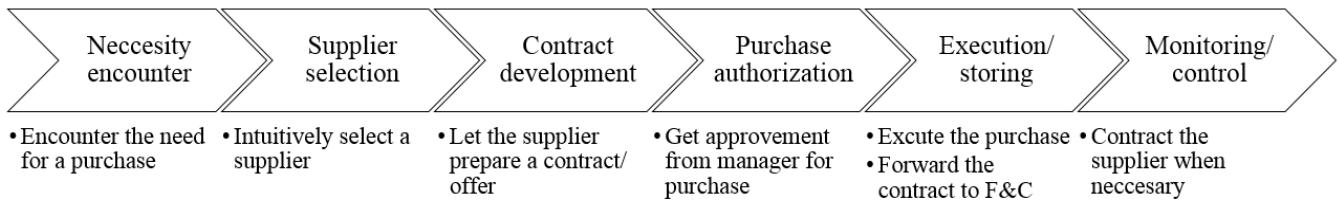


Figure 4 : General purchasing process at PRHC

As is clear from the previous paragraph and the figure above, PRHC bears most of the responsibility of the purchasing process to the actual purchasers. There is a single check by a responsible manager, but this check is often very superficial. There are no regulations or general procedures and the actual purchasers do not have any specific purchasing expertise. Therefore these purchasing employees act mostly on intuition. In addition, because the purchasers are not employed to take care of PSM-activities, and the importance of structured purchasing is not acknowledged by the managers, the purchasers tend to spend as little time as possible to the purchasing process. All in all, the actual purchasers have little purchasing knowledge and supervision on the purchasing process is minimal.

The cause of the current situation is that no one within the organization is responsible for enhancing overall purchasing. This makes it impossible to create a structured and well-organized process, containing all the important purchasing steps. Despite the fact that well-organized purchasing can be very beneficial for an organization, the purchasing process is not considered important among a large majority of the employees and managers.

Finally, purchasing is the basis for all subsequent activities in areas like supplier relationship management and supplier performance management. Because of the unorganized purchasing process, a lot of necessary information is not exchanged between PRHC and the selected supplier.

3.3 Supplier Management

In general, suppliers are considered one of the most important stakeholders of organizations. In almost every organization suppliers play a key role in the overall business success. As mentioned before this is no different for PRHC. Many suppliers are closely linked to the products and services of the organization. Managing these suppliers can improve the collaboration and increase performance. In this section we will closely analyze the actions that PRHC performs in the area of supplier management.

As can be seen from the final stage of the general purchasing process at PRHC, suppliers are usually only contacted when this is highly necessary. Just like the purchasing process, management of suppliers is very dependent on the executing employee (i.e. the purchaser or responsible manager). If a certain manager or employees acknowledge the importance of a supplier, he or she automatically tends to spend more time on managing this supplier. If this is not the case, supplier management is limited to highly necessary matters. Currently some suppliers are therefore contacted on daily basis, while others are not even contacted once per year.

In the area of supplier management at PRHC we can clearly distinguish two types suppliers; highly involved suppliers and less involved suppliers. In this division, highly involved suppliers are usually partnerships and/ or co-development of products. Less involved suppliers are suppliers for which the actual supply requires significantly less communication, such as for example software purchases. Both types of relationships, including how they are currently managed, are detailed below.

For highly involved suppliers, contact is indispensable and therefore there is automatically a lot of communication between PRHC and these suppliers. However, this communication is usually in a very unorganized and superficial way. Supplier performance is not being recorded and conversations are usually without preparation. This allows important matters to be easily overlooked. In relationships with less involved suppliers, there is logically less to discuss. Communication is usually only obligated when significant problems arise. PRHC has no procedures or regulations to remain in contact, causing communication with these suppliers to be extremely limited. If supply automatically continues without any form of communication, it is even possible that in course of time some of these suppliers are lost out of sight, resulting in outdated agreements and unknown performance. This lack of overview can lead to major problems for the organization. Poor supplier performance can go unnoticed, as well as supplier continuity.

3.4 Contract Management

As determined during the analysis of the purchasing process, PRHC lets their supplier usually prepare the offer and/ or contract for the supply agreement. PRHC is rarely involved in this developing phase, making the contracts often not favorable for the organization. After contracts have been developed, they are only superficially inspected by the actual purchaser. Managers and/ or legal experts are usually not consulted. Given that well-developed contracts are the foundation for a good relationship with suppliers, this inactive behavior may lead to challenging situations during the actual cooperating period. Especially when quality or delivery problems arise, it is very supportive to have proper contractual agreements with suppliers.

After a contract has been developed, checked and signed, all relevant purchasing information should be forwarded to the Finance and Control (F&C) department. By scanning the documents and archiving them in a digital database, F&C has to make sure that the contracts and other important purchasing information is being stored. In the digital database, all supplier records are mixed together, containing both expired and new contracts, as well as addendums and other documents. This database is accessible to every employee of PRHC. However, because of the many different files and documents, for an average employee it usually takes a lot of time to find what is being looked for. Which files are in the database is not kept track of. In addition, it sometimes occurs that contracts are not even redirected to F&C and only stored on a personal computer. Since this situation is for years now, the database does not contain necessary purchasing information.

After contracts and other purchasing documents are stored, they are often no longer viewed or monitored. As a result, in course of time, the terms and durations of many contracts become unknown by the responsible employees. Some of these contracts will automatically renew with the same conditions, while others expire and supply continuous based on non-existent agreements. If contracts have to be disbanded, periods of notice are not checked, allowing the duration of contracts to be undesirably extended by certain amount of months or years.

Overall there is absolutely no overview on current supply agreements, which leads to a lot of uncertainty in all areas of PSM. Supplier performance cannot be checked, because it is unknown which performance level is agreed upon. In addition, it is difficult to switch to another supplier, because abandoning conditions are often also unknown.

3.5 Supply Risks

During the interviews, two major supply risks were revealed. These risks are dependency on suppliers and information security risks. In this section we will closely analyze both risks and their possible impact on the organization, starting with dependency on suppliers.

For PRHC there are two main causes for becoming dependent on certain suppliers. First, there are products and services with only one or a few different suppliers. If supply is limited, organizations automatically become dependent on their suppliers. In such supplier-purchaser relationships, the purchasing party usually has little say. However, it also makes it very important to extensively manage these relationships, because the impact of termination of the cooperation can be extremely high. In addition, by having a good view on these dependencies, for these purchases PRHC should look for alternative suppliers more actively.

The second reason for dependency on suppliers is PRHCs preference of long-term relationships with suppliers. For the actual business processes, long-term relationships are often favorable, but at the same time some suppliers become deeply linked within the organization. Setting up the same type of relationship with a different supplier usually takes a lot of time and a large amount of money. After a long period of time it can become almost impossible to switch to a different supplier.

Information security is currently a common trend in the IT-industry. Especially for an organization like PRHC, who works with confidential patient data, information security is even more important. To get along with this trend, PRHC hired an information security manager, who is fulltime involved with securing all types of data.

Since there is very little overview on current suppliers and supply agreements, this security manager is struggling with adopting information security in supply. If purchased software products are not secure, or close partners deliver unsecure products to customers, this can cause major problems for the organization. The reputation of the organization will be greatly harmed if secure patient information is leaked. In addition, large claims can be filed when responsibility is not arranged correctly. For these reasons, it is highly important that PRHC starts with adopting information security in purchasing and supply relationships.

3.6 Summary

In this section, all the information from the previous sections, regarding the current situation of PSM at PRHC, will be combined. The objective of this section is to detect the true weaknesses and deficiencies of the current processes within the area of PSM.

As can be seen from previous sections, there is no real PSM-function at PRHC. There is no management commitment and employees are not engaged with the task and duties of PSM. In addition, responsible employees do not possess any specific knowledge about purchasing or supply management. Both together make most activities in the area of PSM based on intuition. Finally, there is also no complete overview on current supplier relationships and supply agreements.

Secondly, the organization has no PSM policy. No one within the organization is responsible for overall PSM. In addition, roles and responsibilities for purchases and other PSM-activities are practically unknown. Since procedures and regulations are also very limited and/or outdated, employees do not know what is expected from them.

PRHC has bright ideas about organizational structures and business strategies. In addition, the organization strongly focusses on professionalism and transparency. However, in the area of PSM the organization has not strategy at all. All purchases are executed based on intuition of the actual purchasers, making it very unprofessional and unclear what is actually going on. According to Schiele (2007), purchasing maturity (i.e. the level of professionalism in the purchasing function) is essential for enabling an increase of financial performance. By setting up a more sophisticated PSM-function, organizations are more likely to benefit from PSM cost-reductions.

Despite the fact that supplier relationships, contract management, and risk assessments, are all considered important by both managers and employees, the organization has no design or methods for these activities. Since commitment and engagement regarding to PSM is minimal, practically nothing is done on these issues.

The following list summarizes the abovementioned deficiencies and difficulties for PSM:

- The organization has no overall PSM-strategy, making processes and activities unambiguous;
- The organization has no regulations or guidelines regarding operations in the area of PSM;

- Roles, responsibilities and communication lines are undefined;
- The purchasing process is inconsistent and mainly based on intuition of the actual purchasers;
- Employees do not possess specific knowledge regarding PSM;
- There are no regulations for consistently storing and monitoring suppliers agreements;
- There are no general methods for managing supplier relationships and supplier performance;
- Information security and dependency risks are not assessed.

Almost all of the interviewed employees believe that if these points of interest will be improved, PSM will be more organized, allowing the organization to benefit more from its suppliers. In addition, it will provide the organization with a good basis for further development of the PSM-function. These eight points of interest will therefore be used as the basis for our theoretical framework, in which each of these points will be researched in depth. After the theoretical framework has been developed, the points of interest will be the basis of our gap analysis in *Chapter 5*.

4 Theoretical Framework

After acquiring sufficient organizational background and defining the current deficiencies and points for improvement for the organization, next step of our research is to review academic and business literature, in order to learn more about the true meaning of PSM. We will begin this chapter by describing the general essence, as well as organizational requirements and general objectives for PSM, in *Section 4.1*. Since PRHC is a very specific business with a distinctive organizational design, *Section 4.2* will be used to discover more theoretical background on PSM in decentralized organizational structures and IT-related businesses. *Section 4.3* will describe several general PSM strategies, which can be used to organize PSM within organizations. *Section 4.4* will be used to describe principles and practical application possibilities for PSM. Finally, in *Section 4.5*, we will give a summary of our main findings from scientific literature.

4.1 Purchasing and Supply Management in General

In 1983, Peter Kraljic wrote: “Purchasing, perhaps more than other business functions, is still wedded to routine”. During the last decades, supply chain management as a field of study has received increased attention (Sinclair, 2010). PSM has been increasingly recognized as a critical element in effective supply chain management (Zsidisin & Ellram, 2001). When PSM is perceived as an important function and a valuable contributor to organizational success, it will logically be given greater responsibility within organizations (Zsidisin & Ellram, 2001). In this section we will define the basic meaning and different components of PSM, as well as general organizational requirements for successful PSM.

4.1.1 Purchasing and Supply Management Defined

All organizations purchase a large variety of goods and services. PSM is broadly defined as the horizontal, integrated process that encompasses all key areas of spending and all core supplier networks (Chapman et al., 1998). Simply stated, PSM consists of all activities within organizations that are related to its suppliers. However, in order to discover the true meaning, we need to recognize the difference between purchasing and supply management.

Purchasing is a functional process, consisting of multiple activities in order to ensure maximum supply value to the organization (Monczka, et al., 2009). The purchasing process usually consists of two stages,

a tactical and an operational stage. Both stages can be divided into three overarching activities (Van Weele, 2010). Tactical purchasing starts with defining (i.e. specifying) the features and qualities of a desired product or service. Next, potential suppliers have to be identified and compared, after which the most suitable supplier is selected. The final step of the tactical purchasing process is contracting the supplier. Tactical purchasing often takes place once per supplier and purchased product or service. Operational purchasing is a repeating process. The steps of operational purchasing are ordering, receiving, expediting and evaluating the purchased product or service. Although we defined contract management as a distinct processes in the previous chapter, it can be seen as part of the purchasing process. The figure below describes the general purchasing process as defined by Van Weele (2005).

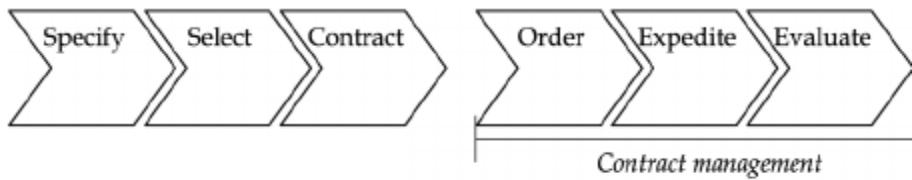


Figure 5 : General purchasing process by Van Weele (2005)

Supply Management is not just a new name for purchasing, it is a more inclusive concept. Supply management is a strategic approach to planning and acquiring the organization's current and future needs through effectively managing the supply base, utilizing a process orientation in conjunction with cross-functional teams to achieve the organizational mission (Monczka, et al., 2009). In short, supply management is a more strategic approach toward purchasing within organizations. The Institute for Supply Management defines supply management as the identification, acquisition, access, positioning and management of resources and related capabilities an organization needs or potentially needs in the attainment of its strategic objectives. According to van Weele (1998), beyond the purchasing process, most important aspect of supply management is Supply Base Management.

4.1.2 Organizational Requirements for Successful PSM

Now that we better understand the definition of PSM, next step is to investigate how PSM can be beneficial for organizations. Without superior suppliers—and without superior purchasing—no supply chain can successfully compete in today's marketplace (Fitzgerald, 2000). It is therefore important to understand how to optimize PSM within organization. This section will describe the business requirements for the integration of PSM within organizations.

What separates organizations that experience real benefits of PSM from those that fail to achieve the benefits, is commitment to the enablers of purchasing and supply chain excellence (Monczka, et al., 2009). The enablers support the development of strategies and approaches that align with an organization's philosophy, which support the attainment of purchasing, supply chain, and organizational objectives (Monczka, et al., 2009). According to Monczka, et al. (2009), these enablers support progressive approaches and strategies that begin to define PSM.

The first enabler for PSM excellence is *Human Resources*. The key to any business success is the quality of the employees. Knowledge and skills are specifically important for purchasing. Purchasing professionals need to understand the business model and have a proper view on the supply chain. (Monczka, et al., 2009). According to Rozemeijer (2003), the quality of people involved in PSM can deliver the desired results. In addition, successful PSM requires effective internal communication (Sinclair, 2010).

The second enabler is *Organizational Design*. Organizational design refers to the process of assessing and selecting the structure and formal system of communication, division of labor, coordination, control, authority, and responsibility required to achieve organizational goals and objectives (Monczka, et al., 2009). Organizational design depends on many different factors, for example size, core operations and philosophy. Supply chain goals have to be integrated into the overall organizational design (Rudzki, et al., 2006).

Information Technology is the third important enabler for PSM excellence. Proper information technology enables real-time information sharing between all the internal and external stakeholders, and can be used for demand planning, order commitment and distribution. Information technology investments can be used to support purchasing, by using systems that focus on purchasing-specific applications that support supplier communication and transaction processing (Stump & Sriram, 1997).

The fourth enabler is *Measurement*. For every organization and every department, performance measurement provides better understanding in organizational results. This understanding can support decision-making, communication and control (Monczka, et al., 2009). For PSM, measurement makes it possible to quantify the value, establish supplier performance targets, feature efficiency, and assign ownership and accountability. The next step involves taking action on the measured data (Hofman, 2006).

According to van Weele (1998), the fifth and final enabler for successful PSM is top-management *Commitment*, combined with functional leadership. The degree to which top-management shows active interest and is actively involved in purchasing and supply management is crucial to the success (Weele, 1998). In addition, the management style which is employed to manage change within the organization is determines the success of professionalizing PSM (Weele, 1998).

4.2 Organization-Specific PSM for PRHC

As described earlier, PRHC believes decentralization is best for their business. In addition, PRHC is an IT-service provider. These are both very specific preconditions that have to be taken into account during the design of a new PSM-function. This section will therefore be used to investigate key issues in the event of purchasing in the IT-industry, as well as defining opportunities and threats for decentralized PSM.

4.2.1 Sourcing Information Technology

Most of the academic literature about PSM focusses on manufacturing companies and is therefore not always applicable to the IT-industry. According to van der Valk & Rozemeijer (2009), buying services requires a different approach than buying than buying goods. For information technology companies, the purchasing portfolio mainly consists of software and corresponding services. This results in significantly less concerns in areas like inventory control and logistics. On the other hand, information technology sourcing makes new issues arise, like questions about ownership and information security risks.

Successful information technology sourcing decisions require purchasers to know the sourcing market and identify the true IT needs, develop significant contract-crafting skills and pay attention to buyer-supplier relationships (Lacity, 2002). These aspects seem obvious, but for information technology sourcing these aspects require extra attention. In this industry suppliers are limited, contracts are usually long-term and communication is mainly indirect and often seems unnecessary. This makes proper buyer-suppliers relationships in this industry even more important. The most important lessons for managing IT-sourcing are described below.

According to Lacity (2002), IT-sourcing requires specific knowledge about information technology, which is often not present at purchasing departments. It is essential to involve employees with this specific knowledge in order to identify the true needs and make founded sourcing decisions. If some of

the technical requirements are still uncertain, organizations can consider time and materials contracts, allowing them to pay only for what is actually delivered. For highly standardized noncore activities net-sourcing will provide the lowest costs. In the case of core activities insourcing is usually the best option (Lacity, 2002).

Because of a considerable degree of uncertainty, IT-sourcing contracts have to be more detailed than average contract, including all responsibilities and change mechanisms (Lacity, 2002). Costs, confidentiality, service-level agreements, contingency, and ownership are all aspects that need to be considered while developing the contract. It is also important to be able monitor, review and adapt contracts. Research has also shown that for IT sourcing, short-term contracts are usually more beneficial than long-term contracts, because of the rapidly changing market (Wilcocks & Lacity, 2001).

Partnerships and long-term relationships are very common in the information technology industry. This makes cooperation and collaboration even more important than in other industries. Organizations should strive for good communication, fairness, goal alignment and supplier development, which can be accomplished by successfully executing IT assessment, supplier evaluation, and contracting processes (Lacity, 2002).

IT security has become an important consideration in IT sourcing (Manzoor, 2006). Despite the importance, many organizations do not give information security a high priority. There are several standards and models for IT security. However, many IT suppliers do not have the resources or knowledge to entirely implement these standards. By investigating and assessing security risks, organizations have a better chance of keeping themselves secured. Therefore, for every new purchase, and once in a while for every continuous supplier, this list has to be gone through to identify information security threats for the organization. Manzoor (2006) has defined the following nine criteria which makes it possible to minimize IT security risks.

1. Organizational Design	6. System Security
2. Employee Security	7. Identity Management
3. Change Management	8. Event Management
4. Network Security	9. Asset Security
5. Application Security	

4.2.2 Decentralized Purchasing and Supply Management

In recent years, many companies adopted innovative organizational design practices, including a greater decentralization of decision-making. (Zabojnik, 2002). Decentralized decision-making comes with both advantages and disadvantages, which is also the case for decentralized PSM. Centralization increases a company's purchasing influence, resulting in economies of scale, but is also more inflexible (Kraljic, 1983). This flexibility of decentralized PSM can be translated into better a understanding of the market, faster response times, easier supplier development support, and less ownership issues within the organization (Monczka, et al., 2009). Another advantages for decentralized purchasing is the more direct availability of information (Dimitri, et al., 2006).

According to Rozemeijer (2000), the decision between centralized or decentralized purchasing should be based on two factors, which are homogeneity of the Business Unit and level of maturity of the purchasing within the Business Units. Classical central purchasing is usually more suited for high Business Unit homogeneity and low purchasing maturity in the Business Units (Rozemeijer, 2000).

The current issue is not only about whether PSM should be completely centralized or decentralized within organizations, but more on when a certain purchase should be executed centralized or decentralized (Karjalainen, 2011). In order to benefit from both centralized and decentralized purchases, organizations need to adopt some form of hybrid PSM. In a hybrid structure, the authority for some tasks lies centrally, while authority for other tasks remains at the operating level (Monczka, et al., 2009). This way, organizations can benefit from the advantages of both centralized and decentralized purchasing. However, according to Monczka, et al (2009) the most important thing is to be flexible and responsive, regardless of whether PSM is centralized, decentralized or hybrid.

4.3 PSM Strategies

Now that we know more about PSM in general, purchasing in the IT-industry, and decentralized PSM, we can start with obtaining sufficient theoretical background for designing our own PSM-function for PRHC. This section will focus on general strategies for PSM.

One of the common PSM objectives is to develop a matching PSM strategy or method. Since PRHC desires a highly decentralized form PSM, we limit ourselves to strategies that are useful in decentralized organizational structures. The strategies that we describe in this section are all portfolio models.

Portfolio models are partitioning models that segment the organization's supply portfolio, after which purchases and suppliers can be classified into several categories. Each category requires a different way of management, which all activities and processes should be aligned to.

The first portfolio model that we describe is *Commodity Management*. By using this method, all purchases are classified based on general families of purchased products and services (Monczka, et al., 2009). Commodities can for example be office supplies, outsourced processes, raw materials, or electronics. The success of the commodity strategy is based on maximizing cost reduction advantages, using market experts, and forming strong supplier relationships (Rendon, 2005). By using this strategy organizations typically restructure their PSM into commodity teams, corresponding to the commodities that have to be managed. According to Rendon (2005), the use of cross-functional teams is considered a critical success factor for this strategy. A commodity team is often composed of personnel from the different departments, like the operational group, product design, process engineering, marketing, finance, and supply management (Monczka, et al., 2009). The more important the commodity, the more likely that cross-functional team members are involved.

A second model that can be used is *ABC Analysis*, which is an inventory categorization method that can also be used for PSM (Lee & Drake, 2009). This method classifies suppliers into three categories (A, B and C), based on the total purchasing costs per year. ABC Analysis is easy to understand and use, but its major weakness is overestimating the importance of costs (Lee & Drake, 2009). This model also does not provide any purchasing strategies corresponding with each categories.

A third interesting model is *Risk-Based Supply Management*. A supply risk assessments can reduce uncertainties and risks in many different areas of PSM (Zsidisin, et al., 2000). The objective of this strategy is to create a portfolio typology that classifies suppliers into clusters based on their corresponding risks (Hallikas, et al., 2005). Each cluster should be accompanied with a specific sourcing and supplier strategy. According to Hallikas, et al. (2005), the selection and description of the dimensions and the number of categories are critical for risk-based supply management. It is important to get the right number of suppliers per category, allowing both suitable strategies and correct allocation.

According to Kraljic (1983), this risk-based sourcing strategy should be based on strategic importance of the supplier and the supply risk accompanying the purchase. He developed a matrix that divides suppliers into four quadrants, based on these two criteria. Each quadrant requires a different approach

towards suppliers, which can be translated in purchasing, relationship management or performance management. The quadrants of the matrix are: (1) strategic suppliers, (2) bottleneck suppliers, (3) leverage suppliers, and (4) routine suppliers.

Although several authors think differently about the best approach towards each of the four supplier categories, the principles are often the same. In most cases, an organization's performance can be improved by closely aligning with strategic suppliers. (Carter, et al., 1998). In the case of bottleneck suppliers, supply should be assured. For leverage suppliers to buying company should exploit its buying power. Finally, for routine (non-critical) suppliers effort should be minimized and PSM-processes should be handled as efficient as possible (Kraljic, 1983). A brief overview of Kraljic's matrix, is illustrated below.

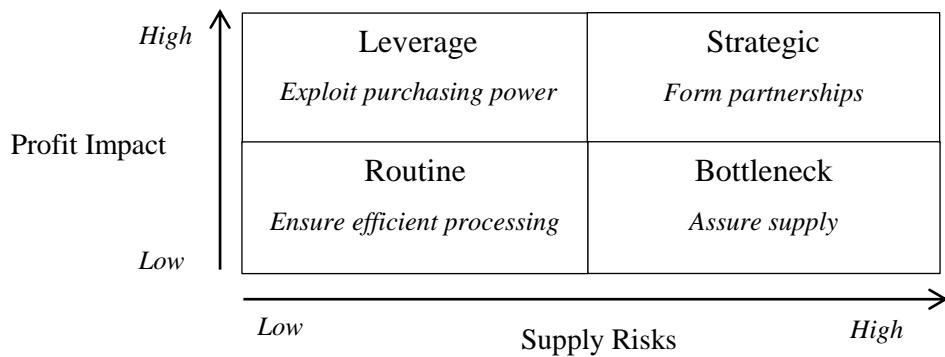


Figure 6 : Kraljic matrix (1983)

The Kraljic (1983) matrix is a widely supported model. However, as mentioned before, the accompanying strategies for each of the four quadrants have the same essence, but can still be very diverse. According to Gelderman & Van Weele (2003), strategies should not only focus on the supplier's current position in the matrix, but can also be used to move suppliers from one quadrant to another. This way, buyers can benefit even more from certain suppliers. So there are two types of strategies: strategies to hold the same position in the matrix, and strategies to pursue other positions in the matrix (Gelderman & Van Weele, 2003).

For this, it is necessary to first determine whether a supplier is located in the desired quadrant. After that, the organization has to determine if it is possible to move this supplier from one quadrant to another. After both have been defined, the right strategy can be determined. Strategic directions for each supplier category, according to Gelderman & Van Weele (2003), are listed on the following page.

Routine suppliers:

- *Moving to another position: pooling of requirements.* By putting multiple non-critical items together in larger quantities at a single suppliers, buyers can benefit from more purchasing power.
- *Holding the position: efficient processing.* If it is not possible or not desired to pool multiple purchases into larger quantities, the buying company should continue individual ordering and focus on an efficient process.

Bottleneck suppliers:

- *Moving to another position: decomplex the product/ find a new supplier.* Bottleneck suppliers are of low value and high risks and therefore it can be beneficial to look for other solutions. By reducing complexity, supply risks can be lowered. Another option is to look for suppliers with less risks.
- *Holding the position: assure supply.* If moving is no option, buying companies have to accept the dependency and assure supply and manage risks as much as possible.

Leverage suppliers:

- *Moving to another position: develop strategic partnerships.* For leverage suppliers it sometimes can be more beneficial to develop strategic partnerships. Examples are when buying companies need assistance in supplying their customers or have little knowledge about the purchased products.
- *Holding the position: exploit buying power.* In most other cases the leverage position is generally desired and can be used for aggressive PSM in the form of short-contracts and focusing on cost reductions.

Strategic suppliers:

- *Moving to another position: terminate the partnership and look for new supplier(s).* Sometimes partnerships can develop in an undesired way. For example if a partner's performance is too low or if a partner gets in financial trouble. In these cases it is necessary to look for other suppliers before the problems affect the buying organization.
- *Holding the position: maintain the strategic partnership.* If the strategic partnership is desired and improves overall organizational performance, the strategy should be to maintain the partnership as long as possible.

All in all, there are multiple different strategies that can be considered for managing purchases and suppliers. Choosing the right strategy can depend on many different factors, and can only be determined by employees that are standing close to their suppliers and have sufficient knowledge of the purchased products or services. Information regarding the overall business strategy, specific situations in supply markets, and capacities of suppliers, can all affect which strategy is most the appropriate one. PSM-strategies can also change over time, for example due to the evolutionary development of the organization's PSM-function (Moser, 2007). In addition, other unforeseen changes may demand strategy changes, like supply shortages on the market or 'outgrowing' a supplier (Weele, 1998).

4.4 Principles and Practices regarding PSM

As derived in *Section 4.1*, PSM consists of two main components, which are the purchasing process and supply base management. In this mixture, the purchases process is composed of tactical purchasing and contract management and supply base management deals with managing supplier relationships and supplier performance (Weele, 1998). The only way to manage both more consistent is by adopting an organization-wide PSM policy, including strict guidelines and regulations.

4.4.1 PSM Policy

A policy is a set of purposes, principles, and rules of action than guide an organization (Klein & Murphy, 1973). Documented policies provide a framework for consistent decision-making behavior (Monczka, et al., 2009). In addition, policies are an opportunity for top-management to define and clarify objectives, which is one of the pre-conditions for successful PSM (Rozemeijer, 2000). A second pre-condition for successful management of PSM is the implementation of a well-designed organizational structure, including working rules, clear communication and reporting lines, and balance between incentives and contribution (Rozemeijer, 2000). Purchasing policies, however, will only have an impact if they are perceived to be important (Quayle, 2002).

Even more than other organizational departments, coordinated purchasing, in the form of a policy, can provide multiple benefits for organizations. The top five benefits of coordinated purchasing are: (1) better internal exchange of information, (2) improved market negotiation strategy, (3) significant cost savings, (4) more impact on monopolistic supply markets, (5) improved insight in market and cost structures (Faes & Matthijssens, 1998).

For policies it is important to provide guidance and direction to employees based on the organizational strategy. Limited purchasing influence in corporate strategy is a critical issue, because usually there is also a significant number of non-purchasing employees involved in sourcing decisions and supplier management activities (Zheng, et al., 2007). To develop a well-designed policy, according to Monczka (2009) the following characteristics have to be taken into account. When these characteristics are used in the preparation of a purchasing policy, behavior will be consistent, making the policy more effective.

- Action oriented;
- Relevant;
- Concise;
- Unambiguous;
- Timely and current;
- Guide problem solving and behavior.

The actual content of a well-designed purchasing policy is strongly affected by the needs and wishes of the organization. Firms that have been most successful in implementing best PSM practices assigned roles, responsibility and accountability (Moore, et al., 2002). In addition, objectives and rules of action are important for proper policies. In order to align all these aspects with the business strategy, organizations should add some form of model/ method into the PSM policy (Lee & Drake, 2009).

4.4.2 Managing the Purchasing Process

As mentioned before, the general purchasing process consists of six stages, which are specifying, selecting, contracting, ordering, expediting, and evaluating. According to van Weele (2010), the first three stages can be seen as tactical purchasing, and often occur once for a longer period of time. The final three stages can be seen as operational purchasing or contract management. These stages are ongoing during the complete contact period. In this section, scientific literature regarding both types of purchasing will be researched.

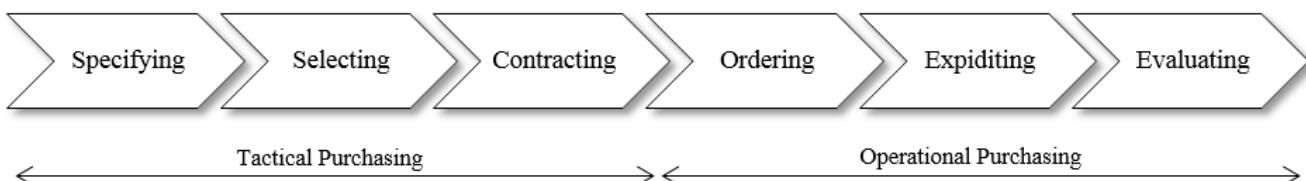


Figure 7 : General purchasing process by Van Weele (2010)

The first step of tactical purchasing is specifying the desired purchase. Developing specifications is a complex and time-consuming process. The importance of this step of the purchasing process is often underestimated (van der Valk & Rozemeijer, 2009). A concise specification is crucial for properly executing all the following purchasing stages. For purchasing services, specifying is even more difficult, but at the same time also more important. According to van der Valk & Rozemeijer (2009), all relevant internal stakeholders should be involved during this step. In addition, buying companies should already have interaction with suppliers during this stage, by making use of requests for information to develop complete and accurate specifications.

The second step of tactical purchasing is selecting the most suitable supplier. This should be done by developing supplier selection criteria based on the pre-developed specifications of the purchase (van der Valk & Rozemeijer, 2009). All potential suppliers should be assessed based on a list of selection criteria, and the most suitable supplier should be selected. The most structured way of selecting a supplier is by developing weights for each of the criteria and scoring the potential suppliers to the complete set. This method is the most basic linear weighted model (de Boer, et al., 2001).

The final step of tactical purchasing is contracting. Contractual agreement are the basis for the complete supplier relationship, but can also bring significant risks to organizations. These risks should be taken into account during the complete contracting process. The most important types of contractual risks, based on the research of Davison & Sebastian (2009), are shown below.

- Ambiguous specifications;
- Poor supplier performance;
- Change in the scope of work;
- Buyer-supplier conflicts;
- Unspecified use of sub-contractors.

When purchasing services it is important to specify desired service levels in the form of a Service Level Agreement (SLA), which can also be based on the pre-developed specifications. Therefore, the complete purchasing process depends primarily on the clarity and preciseness of the specification (van der Valk & Rozemeijer, 2009).

Operational purchasing consists of ordering, expediting and evaluating the supply agreement. According to van Weele (2010) this part of the purchasing process can also be seen as contract management, which is the process of storing, fulfilling and monitoring contractual agreements. Contracts define rights and obligations of the involved parties, as well as conditions under which they arise and become discharged (Boulmakoul & Sallé, 2002). Active contract management is a key success factor for successful service purchasing (van der Valk & Rozemeijer, 2009).

According to Boulmakoul & Sallé (2002), contract management can be divided into three stages that manage the whole contract lifecycle: drafting, formation, and fulfillment. In the drafting phase, basic elements are agreed upon in the form of a template. These templates are an initial input for contract formation. In the formation phase contractual details about basic roles, interactions, and situations are defined and the contract is signed and stored. In the fulfillment phase the products or services are delivered and invoiced. Communication, monitoring interaction and evaluating performance are essential during in this phase. In order to make contract management work it is important to assign roles and responsibilities for every phase (Boulmakoul & Sallé, 2002).

Advanced knowledge about the likelihood of occurrence and severity of consequences will allow organizations to identify and control contractual risks (Davison & Sebastian, 2009). With this information PSM can develop a proactive contract management plan. By using the right methods (type of inspection, type of monitoring, and type of specification), contract management can be used as an effective risk mitigation tool.

4.3.3 Supply Base Management

The operational purchasing process is closely linked to Supply Base Management (SBM). However, since managing supplier relationships and performance is of significant importance for PRHC, we have decided to research SBM separately and in more depth in the following section.

In supply base management we can distinct two closely aligned processes, which are supplier relationship management and supplier performance management. These processes can be used to develop the linkage between buyer and supplier. Both the buyer and supplier should be able to benefit from this improved collaboration.

Supplier Relationship Management

The importance of supplier relationship management has been researched extensively and most of the findings indicate that successful PSM requires effective and efficient management of relationships (Gelderman & Semeijn, 2006). The easiest way to adopt supplier relationship management is by linking it to a portfolio models, by developing distinct strategies for managing each type of supplier.

The overall goal of supplier relationship management is developing the buyer-supplier linkage. Supplier development is defined as any effort of an organization with its suppliers to increase performance and capabilities of the supplier to meet the organizations supply needs (Krause & Ellram, 1997). Supplier development can be an important tool for improving overall business performance and developing long-term relationships (Melnyk, et al., 2010). Improving supplier performance and capabilities can especially be beneficial for strategic and bottleneck suppliers. Top-management involvement, cross-functional teams, good communication, and a long-term perspective are critical for successfully implementing supplier development (Krause & Ellram, 1997). In addition, Krause & Ellram (1997) state that an organizations suppliers can be developed by expecting more from them, communicating these expectations, and have willingness to participate in supplier development.

Supplier Performance Management

As mentioned before, the performance of suppliers is critical for an organizations success. Also, to manage supplier relationships and develop the supplier, it is essential to know how a certain supplier is currently performing. To manage supplier performance it is first necessary to closely measure actual performance of suppliers . Based on this actual performance organizations can then try to improve this performance.

The most common tool for measuring a suppliers performance is *Supplier Evaluation* (or Supplier Assessment). In supplier evaluation, the performance of suppliers is evaluated against multiple criteria (Ho, et al., 2010). Well executed assessment eases communication, and allows both supplier and buyer to gain advantages. Also, when suppliers are being monitored they are likely to perform better (Monczka, et al., 2009). The supplier assessment process should assess all key areas of a suppliers business, as well as the key attributes of the relationship (Briggs, 1994). Based on the vendor management model of Briggs (1994), these key areas are all listed on the following page.

- Price
- Delivery
- Quality
- Flexibility
- Communication
- Culture
- Innovation
- Current reputation
- Commercial awareness
- Technological capability

However, IT-service providers perform different activities than manufacturing companies and require more buyer-supplier collaboration . Therefore measuring performance of IT-suppliers requires a somewhat different approach. Cho, et al. (2012) have formulated four extra key areas for supplier assessment in the service industry, which are: service level, risk sharing activities, efficiency, and quality assurance. As we know from *Section 3.2*, a final key are that can be taken into account in supplier evaluation is information security, which is an important topic for PRHC and the IT industry in general.

4.5 Summary

In this section we will review our main findings from this theoretical framework. The key issues from each section will be concisely described in the form of a list.

- Purchasing and Supply management is broadly defined as the horizontal, integrated process that encompasses all key areas of spending and all core supplier networks (Chapman et al., 1998). In practice this means that PSM can be seen as a collective term for all activities related to buying products and/ or services.
- According to Mockza en Van Weele, there are six organizational requirements to integrate PSM successfully within organizations. These requirements are: human resources, organizational design, information technology, measurement, and management commitment.
- For successfully purchasing information technology, purchasers need to understand the sourcing market, should be able to identify the true needs, develop contract-crafting skills, and pay attention to buyer-supplier relationships (Lacity, 2002).

- According to Karjalainen (2011), the issue in decentralized PSM is not only about whether it should be completely centralized or decentralized within organizations, but more on when a certain purchase should be executed centralized or decentralized, so that organizations can benefit from both structures.
- An organization's PSM strategy can be developed based on a portfolio model, which is used to segment the purchasing portfolio into multiple categories. Three of the most common portfolio models are Commodity Management (Monczka, et al., 2009), ABC-analysis (Lee & Drake, 2009), and Risk-Based Supply Management (Zsidisin, et al., 2000) (Kraljic, 1983).
- Policies are an opportunity for management to define and clarify objectives. Good policies include working rules, clear communication and reporting lines, and balance between incentives and contribution (Rozemeijer, 2000). Firms that have been most successful in implementing PSM practices assigned roles, responsibility and accountability (Moore, et al., 2002)
- Purchasing must be a structured and standardized process, that is both tactical and operational (Van Weele, 2010). The tactical purchasing process should consist of specifying the need, selecting the most suitable supplier, and contracting. The operational purchasing process is composed of ordering, expediting, and evaluating, and can also be defined as contact management (Van Weele, 2010).
- Successful PSM requires effective and efficient management of relationships (Gelderman & Semeijn, 2006). In addition, the performance of suppliers is critical for an organizations success (Krause & Ellram, 1997).

5 Gap Analysis

In *Chapter 1*, we have defined that the PSM at PRHC is far from mature. Because of this lacking professionalism, overall benefits from PSM are limited. In addition, the organization is not able to truly adopt desired methods and practices for PSM. In order to determine how PRHC can professionalize and restructure its PSM-function, we will use this section to compare the desired situation as described by the theoretical framework (*Chapter 4*) with the description of the current situation (*Chapter 3*).

This overall gap analysis is based on five key areas from the theoretical framework. The key areas are: (1) Foundation (i.e. organizational requirements and objectives), (2) PSM Structure, (3) PSM Strategy, (4) Managing the Purchasing Process, and (5) Supply Base Management. The table below contains three columns. The first column mentions the key area, the second column described the current situation of PRHC, while the third column describes the desired situation as described by academic and business literature.

Table 1 : Gap analysis

Key area	Current situation at PRHC	Desired situation
(1) Foundation	<ul style="list-style-type: none">▪ Clear organizational structure▪ Purchasing employees do not possess the right skills and knowledge;▪ No top-management commitment;▪ No overview on current suppliers and supplier contracts.▪ PSM objectives are undefined	<ul style="list-style-type: none">▪ Purchasing professionals need to understand the business model and have a proper view on the supply chain;▪ Top-management commitment is critical for successful PSM.▪ The organization requires a clear view of the supply base.▪ Organization-specific PSM objectives;
(2) Structure	<ul style="list-style-type: none">▪ Organizational design is not translated into PSM structure;▪ Roles and responsibilities are undefined;▪ Rules for authorization are outdated.▪ Decentralized PSM with lacking purchasing maturity.	<ul style="list-style-type: none">▪ PSM design must be in line with the organizational design;▪ Assigned roles, responsibility and authorities are essential for successfully implementing PSM practices;▪ Cross-functional teams support organizations in achieving PSM objectives.

Key area	Current situation at PRHC	Desired situation
(3) Strategy	<ul style="list-style-type: none"> ▪ The organization has no overall strategy for PSM; ▪ No models or methods to adopt PSM; ▪ Supply risks are not assessed; ▪ No sourcing or management strategies regarding PSM. 	<ul style="list-style-type: none"> ▪ Adopt a portfolio model to categorize the supply portfolio; ▪ Apply risk-based assessment; ▪ Define sourcing/ management strategies based on the supply base categories.
(4) Managing the Purchasing Process	<ul style="list-style-type: none"> ▪ Policy is limited to a purchasing process description; ▪ The purchasing process is executed based on intuition; ▪ Handling the purchasing process is based on personal interpretation; ▪ No rules or procedures for contract management; ▪ Contracts are expired or missing; ▪ No overview on current agreements; ▪ Supply contracts are usually of low quality. 	<ul style="list-style-type: none"> ▪ The general purchasing process consists of six consecutive stages; ▪ Organizations should have guidelines on how to execute the purchasing process; ▪ Standardized contract management is based on three stages, which are drafting, formation, and fulfillment ▪ Detect contractual risks (i.e. ambiguous specifications, poor supplier performance, change in the scope of work, buyer-supplier conflicts, unspecified use of sub-contractors);
(5) Supply Base Management	<ul style="list-style-type: none"> ▪ Supplier relationships are not managed; ▪ Supplier performance is unknown; ▪ No structure for supplier development. 	<ul style="list-style-type: none"> ▪ Supplier relationships should be managed in order to maximize the value of interactions; ▪ Measure supplier performance by using supplier evaluation/ assessment; ▪ Top-management involvement, cross-functional teams, good communication, willingness to participate, and a long-term perspective are critical for developing suppliers.

The previous table contains all main differences between the current situation at PRHC and the ideal situation as defined from scientific literature. This gap analysis can be used to develop a new and more mature design for the PSM-function of PRHC. Below, all main differences from our gap analysis are briefly described.

Firstly, the organization should acquire the right **Foundation** for well-organized PSM by implementing organizational requirements and developing organization-specific objectives. The overall decentralized organizational design of PRHC should be the basis for PSM. Top-management should be made aware of the current risks to make them committed to improve the PSM-function. In addition, purchasing employees should have sufficient knowledge to perform their tasks and it is essential to have a clear overview on all the current suppliers. Finally, the organization should establish clear objectives for PSM.

Secondly, PRHC has to develop a PSM **Structure**, to professionalize the PSM-function. For this, the organization has to decide whether to manage purchases and supplier centralized, decentralized or in a hybrid form. In addition, the organization has to document roles, responsibilities, and communication lines, which can best be done by developing an organizational chart including a clear hierarchy.

Next, an organization-wide PSM **Strategies** has to be defined. A portfolio model is a good method for managing suppliers and purchases. Since one of PRHCs objectives is to reduce supply risks, a suitable portfolio model for categorizing the supply base is risk-based supply management. The Kraljic (1983) matrix, with the extensions from Gelderman & Van Weele (2003), uses supplier impact and supply risks as criteria for categorization of the supplier portfolio. After the portfolio model has been defined, next step is to determine regulations and guidelines to manage the different categories.

These regulations and guidelines can best be defined in the form of a policy. Developing a policy makes it able to document purposes, principles, and rules of action, which will lead to consistent decision-making. The policy should consist of two main parts, which are the purchasing process and supply base management.

The **Purchasing Process** is currently a big issue for PRHC. Purchasing is very unorganized and mainly based on intuition of purchases. In addition, contracts are often expired, missing, or inconsistently stored. A standardized purchasing process based on the six steps purchasing process as defined by van Weele (2010), including rules and guidelines, can improve the purchasing process significantly. Rules of action

for storage of contracts can clarify a lot within the organization. In addition, managing contract more structured, based on the three phases (drafting, formation, and fulfillment), creates more overview on suppliers and can reduce contractual risks significantly.

To benefit more from its current suppliers, the organization should make use of **Supply Base Management**. By evaluating performance and managing suppliers relationships, organizations can try to develop their suppliers into long-term partners. Success factors for supplier development are top-management involvement, cross-functional teams, good communication, and willingness to participate. By being actively engaged in the performance, suppliers are likely to perform better.

6 Solution Design

In the previous chapter we have determined the differences between the current situation at PRHC and the theoretically grounded ways of PSM as described by scientific and academic literature. This ‘gap’ will be used to provide the organization with a well-founded solution design for the complete PSM-function of the organization. In this chapter we will discuss organization specific methods to diminish this gap. We will first define the outline of our solution design in this section. The remainder of this chapter will be used to equip this outline with sufficient content, into a solid solution design.

Since PRHC wants to adopt a strategy for PSM, including methods and practices, according to Schiele (2007) the organization first needs a certain level of maturity. As derived from the gap analysis, it is therefore first important that the organization ensures a proper foundation for PSM. After that, the organization should develop a structure that can be used for PSM and is in line with the overall organizational design. Next, we can start to define a PSM-strategy to manage purchases and suppliers in a standardized and structured way. In order to apply this PSM-strategy in practice, the organization needs a policy, describing strict regulations and guidelines for managing the purchasing process and supply base management. A figure containing the outline of our solution design is illustrated below.

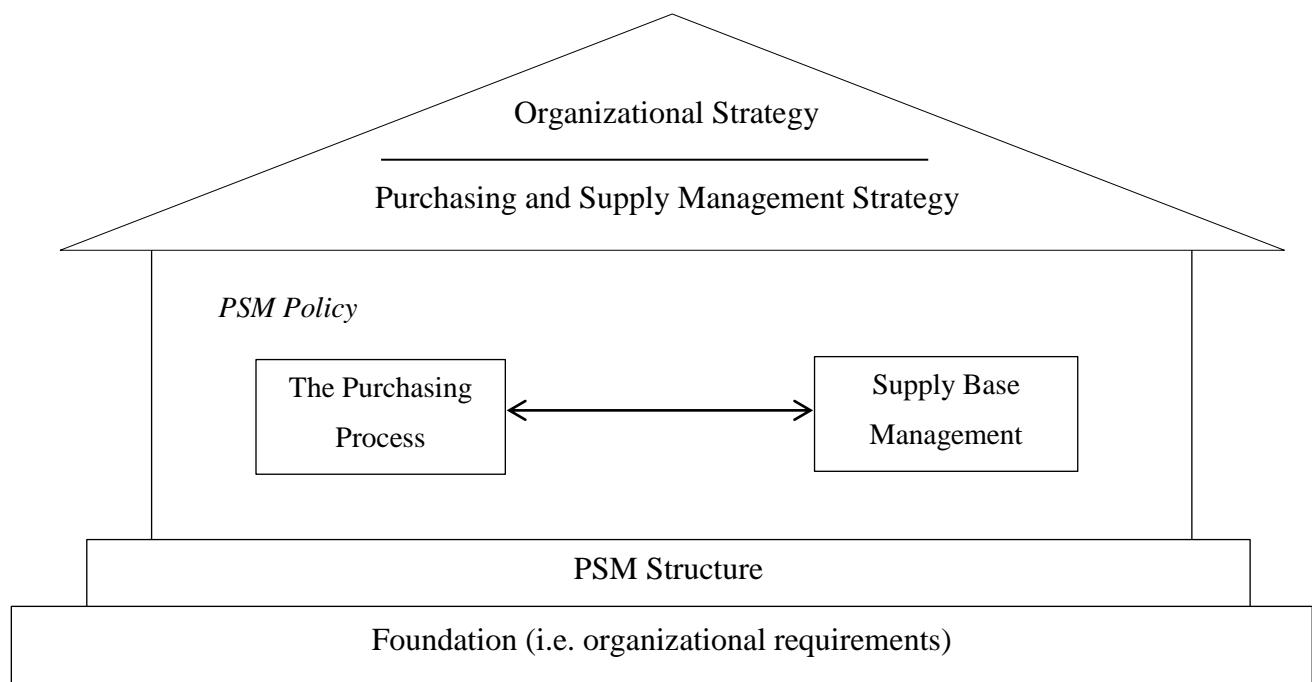


Figure 8 : Solution design outline

6.1 Foundation for Successful PSM

- Purchasing professionals need a proper view on the supply chain;
- Top-management commitment is critical for successful PSM.
- The organization requires a clear view of the supply base.
- Organization-specific objectives regarding PSM;

As mentioned before, PRHC currently does not possess the right foundation for PSM. According to the literature, the four enablers of PSM excellence are human resources, organizational design, information technology, and measurement. In addition, like for every process of change within organizations, top-management commitment is essential. In this section we will describe how PRHC should adjust these enablers in order to obtain a proper foundation for PSM.

Literature often describes purchasers as ‘professionals’. At PRHC however, the actual purchasers do not have any specific skills or knowledge about PSM. Given that **Human Resources** is one of the enablers for PSM excellence, this area has to change drastically to provide the organization with a proper foundation (Monczka, et al., 2009). Currently almost all employees are allowed to deal with purchasing and supply management, but none of these employees is educated or trained in the area of PSM. PRHC should make a selection of employees with different functions, working at various levels within the organization, and educate them in the area of PSM. According to Lacity (2002), knowledge of the market is essential for purchasing IT products and services. Therefore it is important that the selection of employees contains sufficient programmers and IT-consultants. Since these employees also have other duties and responsibilities, it is important that training is concise and to the point. In addition, it is important for purchasing employees to keep up with new techniques and methods.

The second enabler for effective PSM is a suitable **Organizational Design** (Monczka, et al., 2009). PRHC is almost finished with re-organizing and the development of a new decentralized design has been one of the biggest changes. A clear structure, good coordination and effective communication are currently all present. However, PSM is not included in this new design. During the latest portfolio allocation, responsibility for PSM was assigned to the Business Unit ZCC, but still little has changed. We therefore have to determine how PSM can be truly adopted in this design. The organization should acquire a clear PSM-structure, including general communication lines and pre-defined responsibilities (Rozemeijer, 2000).

Since PRHC uses a decentralized organizational design, the organization wants PSM also to be partly decentralized. For decentralized PSM, low homogeneity between Business Units and high purchasing maturity are both enhancing (Rozemeijer, 2000). Low homogeneity between Business Units is already the case at PRHC. However, PSM is far from mature, which makes it even more important to adopt a structured PSM-design rapidly.

The third enabler for PSM is **Information Technology** (Monczka, et al., 2009). One would think that an organization that is specialized in delivering IT-products to its customers, itself has a highly advanced information technology network. However, regarding PSM, this is currently not the case at PRHC. As mentioned before, contracts are stored in a large database without any structure or overview and there is no overall list of current suppliers. PSM information is not readily available. By improving information technology regarding PSM, PRHC will be able to provide purchasers, managers and other employees with way more overview. This can be done by simply structuring the database of supply agreements and by creating a generally available list of all the current suppliers. In addition, the organization should develop policies, regulations and procedures and upload them on the local network.

The fourth enabler for PSM excellence is **Measurement** (Monczka, et al., 2009). By measuring PSM activities, organizations are able to quantify the value of agreements, establish supplier performance targets, feature efficiency, and assign ownership and accountability. At PRHC, measuring PSM activities is limited, causing a lot of uncertainty at both strategic and operational level. Financial purchasing information is available, but is rarely used. The financial value of suppliers is only known by a select group of employees. In addition, actual performance of suppliers is not measured at all.

Finally, **Management Commitment** is critical for all organizational changes (Weele, 1998). At the start of this project, there was no commitment at all. In course of time, when the project prospered, management commitment became bigger. We expect that by taking initiative and continuing with the project, management commitment will automatically become bigger. In addition, a truly committed team should get overall responsibility regarding PSM. This team should also be assigned to implementing the changes within the organization.

All five enablers will be taken into account during each step of the development of our solution design and plan of approach for implementing structured PSM at PRHC. In the next section we will develop organization-specific objectives and strategies for managing purchases and suppliers.

6.2 PSM Structure for PRHC

To manage purchases and suppliers in a consistent and standardized way, an organization need some form of structure for PSM. However, as determined in our analysis of the current situation, PRHC currently has no structure at all for PSM. This section will therefore be used to develop an organizational structure for PSM. First, we need to determine what type of structure to use (centralized, decentralized or hybrid). Which type of structure to use depends on many different factors, like organizational design, homogeneity of business units and purchasing maturity. Thereafter we can concretize our structure by developing an organizational chart for PSM.

6.2.1 Centralized vs. Decentralized PSM

Like many other business operations, PSM can be managed centralized or decentralized within organizations. Since purchasing maturity is currently low at PRHC a completely decentralized structure is not recommended (Rozemeijer, 2000). On the other hand, a completely centralized PSM structure is not in line with the organizational design and vision. According to Karjalainen (2011), the issue is not about whether PSM should be completely centralized or decentralized within organizations, but more on when a certain purchase should be executed centralized or decentralized. This way, organizations can benefit from both types of structures.

In *Section 3.1* we have already determined five different commodities, as we divided PRHCs suppliers into five different groups based on the actual supplies. We can divide these commodities even further, into mostly product-related (PR) and mostly non-product-related (NPR), which is a commonly used division based on the specific characteristics of NPR products and services (Telgen & De Boer, 1995). For PRHC, PR-suppliers are usually Business Unit specific, while the NPR-suppliers are more overarching. Approximately 70% of all the organizations suppliers are PR.

Most Business Unit specific, PR- purchases are in the form of co-development or purchasing software licenses. These purchases can benefit strongly from specific knowledge and direct communication lines with suppliers. For this reason, PSM-activities for PR-suppliers can best be executed within the Business Units, involving actual users. This is completely in line with the overall organizational strategy and design of PRHC. The purchasing employees will have great knowledge about the purchased products and services, which is an important criteria for IT-sourcing (Lacity, 2002).

The more general and overarching NPR-purchases can best be executed on a central within the organization. These products and services are often used by multiple Business Units and can benefit from ‘bulk discounts’. These purchases are usually facility services, advisory services, and general hardware supplies. By managing these purchases on a central level within the organization, top-management can remain engaged and aware of what is going on in the area of PSM.

To adopt this form of hybrid PSM within the organization, it is important to develop a clear structure. This structure should contain responsibilities for decentralized purchasing and communication lines. The figure below shows our division based on PR and NPR purchases and suppliers, as well as the five different commodities as developed in *Section 1.3*. This division ensures sufficient knowledge regarding specific PR-purchases. In addition, the organization can benefit from combined purchases of NPR products and services.

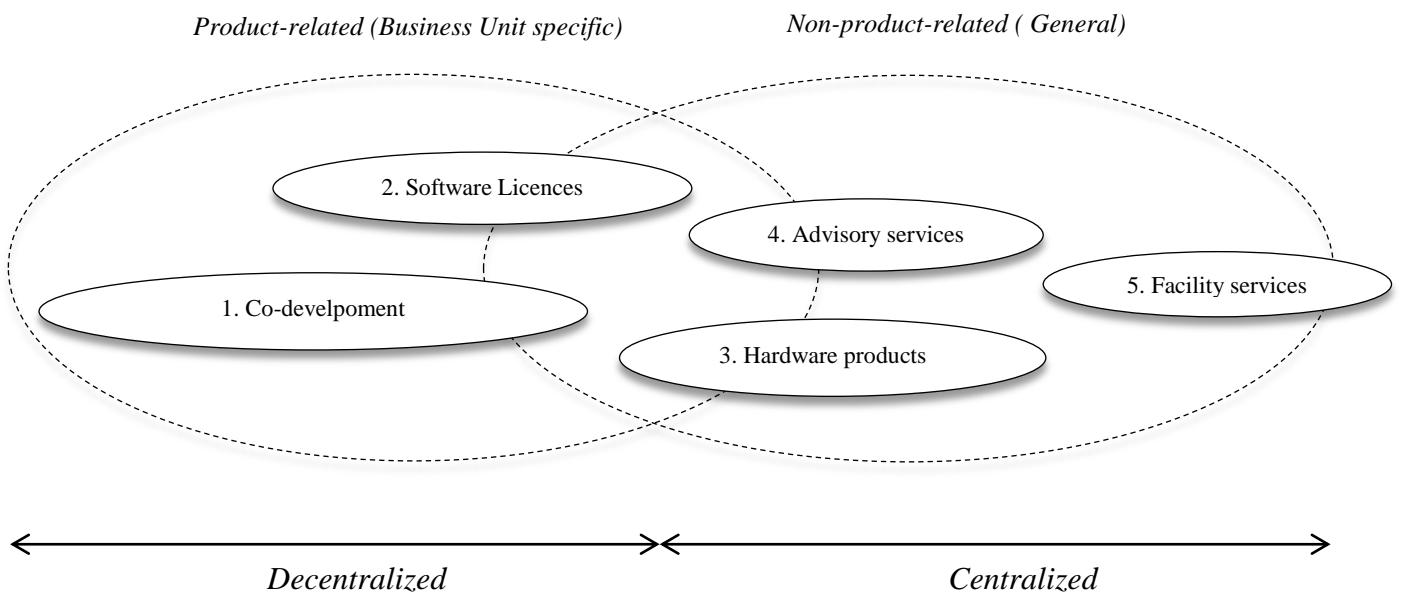


Figure 9 : Centralized vs. Decentralized PSM

6.2.2 Organizational Structure for PSM

During the latest portfolio allocation, overall responsibility for PSM was assigned to the Business Unit ZCC. This unit has most interest in managing general purchases and suppliers, since this Business Unit only operates internal. In addition, ZCC already takes care of some big overarching suppliers. The Business Unit Manager is currently accountable for PSM. However, since PSM is completely unfamiliar for this manager (and the organization), we think the Business Unit Manager should get support from a compact group of employees with broad knowledge and interest. This group should serve as a steering group that sets up the parameters of PSM. In addition this group should manage and control the strategy, policies and processes regarding PSM. Since management commitment is critical, this group should contain committed employees. Based on personal experience during the execution of this research, a committed steering group should be led by the Business Unit Manager ZCC and consist of the Quality Assurance Manager, ICT Manager and Senior Controller. The Quality Assurance manager has knowledge of the process of change, information security and applying policies within the organization. The ICT Manager currently manages some of the biggest and most important suppliers of the organization and has experience in PSM. Finally, the Senior Controller has insight in purchasing costs of (most of the) supply agreements. This group should be able to manage PSM within the organization. If it turns out that the steering group does not function in this formation, the Business Unit Manager should be able change the members of the steering group.

In *Section 6.2*, we have already determined that PR-purchases should be managed decentralized and NPR-purchases on a more central level within the organization. For central PSM issues, cross-functional teams can developed by selecting employees from the complete organization. Cross-functional teams should consists of at least two employees, of which at least one should have a PSM-background and significant knowledge about the purchased products and/or services. The actual size of the cross-functional teams should be based on the supplier category as defined by the risk-based supply strategy.

In order to keep overview, every Business Unit should appoint one PSM-responsible. These ‘PSM-professionals’ should have some PSM background or have to expand their knowledge in this area. The professionals should be responsible for PSM within their Business Unit and the corresponding Business Unit Manager is accountable. Every purchase should again be managed by a cross-functional team of which the size depends on the supplier category, as defined in the previous section.

The figure below shows an organizational chart of our developed PSM structure.

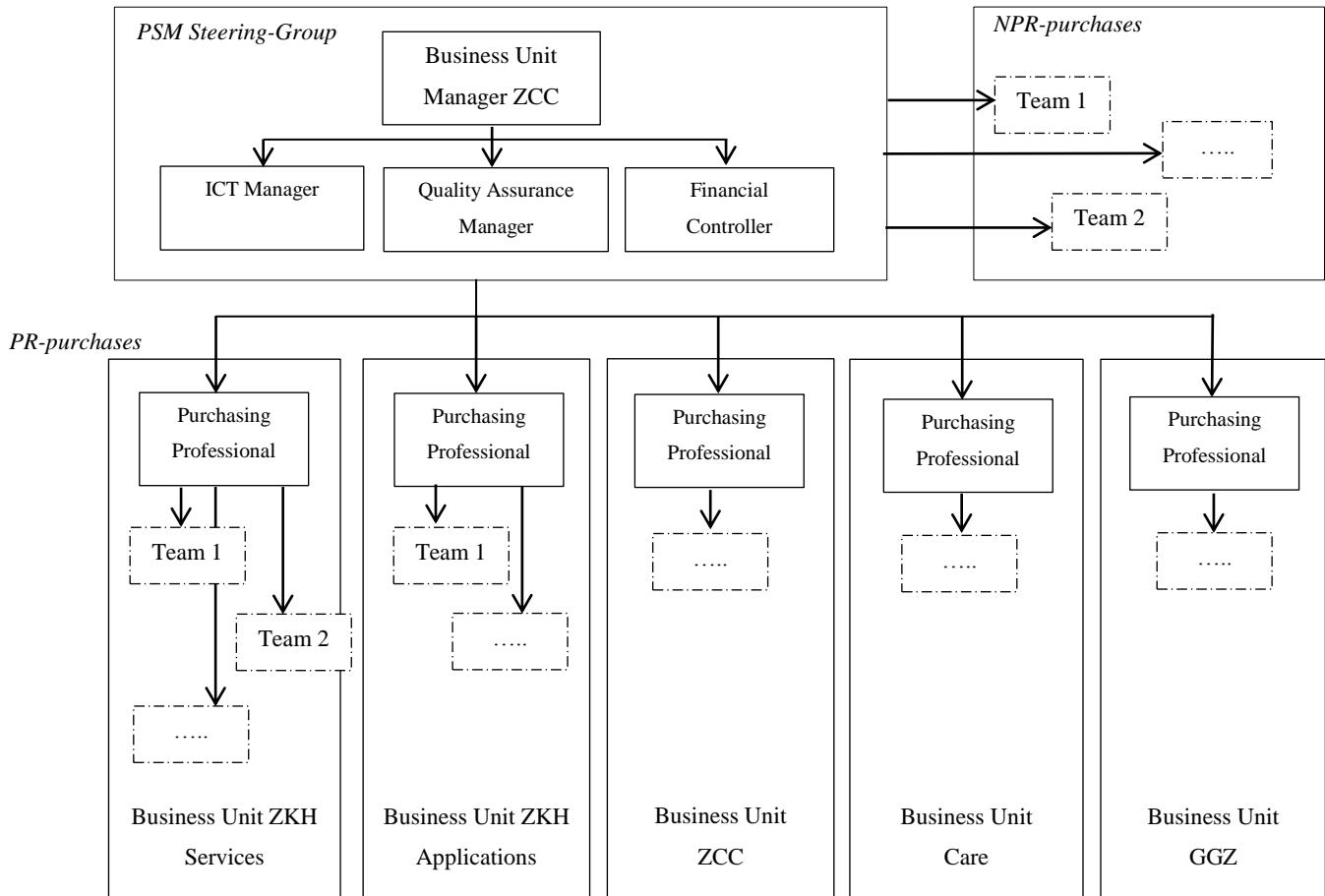


Figure 10 : Organizational structure for PSM

6.3 PSM Strategy for PRHC

- Adopt a PSM-strategy, based on sound objectives and in line with the overall organizational strategy;
- Use a portfolio model to categorize the supply base;
- Apply risk-based assessment in the categorization of the supply base;
- Define sourcing strategies based on the supply base categories.

After establishing a proper foundation and clear organizational structure for PSM, next step is to develop an organization-wide PSM strategy. For every organization it is impossible to manage all suppliers extensively. At the same time, it is also unnecessary to manage all suppliers in the same amount. To

develop a good overarching strategy we need to take the overall organizational strategy, organization-specific objectives, and specific business context into account. Our strategy will be based on a portfolio model, which is used to segment the supplier portfolio into different categories.

By using the portfolio model risk-based supply management, suppliers are categorized in four groups based on their profit impact and the associated supply risks (Kraljic, 1983). This method categorizes suppliers into one of the following classes: routine (non-critical), leverage, bottleneck and strategic. For strategic and leverage suppliers profit impact is high. For strategic and bottleneck suppliers supply risks are relatively high.

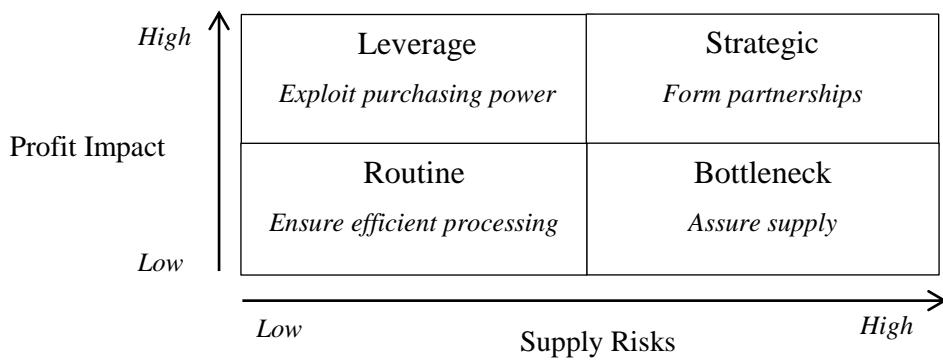


Figure 11 : Kraljic matrix (1983)

To use this model in practice, PRHC should develop organization specific measures to give value to both decision-criteria. We therefore will explore both criteria in depth, after which we can develop concise and easy measures to allocate suppliers.

For profit impact this allocation is relatively easy, as profit impact can be measured by the yearly purchasing costs per product (or supplier). We simply need to determine a range for low profit impact and high profit impact, so that suppliers which require more attention are managed more actively. The organization therefore has to determine a certain value of total purchasing costs per year (in euros) from where purchases can be identified as high profit impact purchases.

To define this value, a group of internal should look into all supply agreements and determine which suppliers should be managed more actively based on the total costs. As a starting point, we recommend a boundary value of €75.000 costs per supplier per year. However, internal stakeholders should verify whether this value ensures a logical allocation.

The profit impact of a certain supplier will be defined by the following question:

- Are the total yearly purchasing costs for this specific product and/or service relatively high?
 - Yes
 - No

Developing the right measures to valuate supply risk is a bit more difficult. In our analysis of the current situation at PRHC we determined the two most important supply risks for PRHC, which are dependency on suppliers and information security. Based on these two criteria we need to develop a simple but solid method to determine the degree of supply risks. The degree of dependency on certain suppliers can be measured by an estimation of the costs of terminating the supply agreement, as well as the likelihood of this to happen. Since the likelihood can change, it is important to redefine this probability yearly. By using the two questions below dependency risk can be assessed clear and simple.

- Are the additional costs for termination of the supply relationship relatively high?
 - Yes
 - No
- On a scale from 1 to 5, what is the probability of termination of the supply agreement in the current year?

If the additional costs of termination of the agreement are high and the probability is somewhere between 3 and 5, supply risk can be defined as '**high**'.

Information security in supply relationships is even more difficult to define, because this risk depends on more different factors. To determine the risk of non-secure information regarding a suppliers or purchase, we can first assess the level of access to data. A supplier can have no access at all, access to confidential information and data of PRHC, and access to confidential information and data of PRHCs customers. Access to customer data has the highest risk, since healthcare information systems and patient data should be highly protected. Access to the information systems of PRHC can also be critical, but is less risky for the continuity of the business. Information security risk can also be measured by influence in products delivered to PRHCs customers. If a certain suppliers directly produces (a part of) a software product of PRHC, it is unclear if this product is completely secure. Every IT-provider has its own standards for information security and therefore some suppliers may have lower security standards

than PRHC. If a supplier has access to confidential information, or provides (parts of) products that are directly implemented at customer, supply risk can be defined as '**high**'. Therefore we can assess security risks in supply by using the following questions.

- What level of access to data/ information does the supplier have?
 - Supplier has no access to any confidential information/ data at all;
 - Supplier has access to confidential organizational information, customer information or patient data/ records.
- Does the supplier provides (parts of) a product that is directly implemented/ used at customers?
 - Yes
 - No

Every supplier can be categorized based on the five previously defined questions and now that the right measures have been defined, suppliers and/ or purchases can be categorized. The essence of this strategy is that each supplier-category requires a different way of management. The way of management of each category should be predefined by organization-specific regulations and guidelines (Kraljic, 1983). In addition, PRHC can try to move suppliers from one quadrant to another, to benefit even more from their suppliers (Gelderman & Van Weele, 2003).

Routine suppliers require least attention, so for these type of suppliers a reactive approach is usually sufficient. Leverage suppliers are characterized by a high financial impact, so for this category of suppliers it is important that PRHC benefits as much as possible from the supplier relationship. In the case of Bottleneck suppliers, PRHC has to manage supply risks as best as possible. Finally, in the case of strategic suppliers, the organization has to form partnerships, so that the organization can both benefit from the relationship and manage supply risks, by aligning with these suppliers.

PRHC should also seek for opportunities for changing suppliers from a certain category to a more suitable one (Gelderman & Van Weele, 2003). By reducing the risk of, for example information leakage, a bottleneck supplier can be changed into a routine supplier, which relationship requires less time and effort. In addition, by working together with a certain supplier on a larger scale, PRHC can benefit from closer alignment and forming partnerships. However, the current state of the PSM-function of the organization forces PRHC to first manage suppliers based on their current category, after which opportunities for development can be determined.

6.4 PSM Policy for PRHC

In the previous section we have determined a PSM-strategy that is well-suited to the overall organizational strategy and in line with our specific PSM-objectives. In this section we will translate this strategy into a policy, including purposes, principles, and rules of action to guide the organization in their PSM behavior. Our policy will consist of three parts. First we will define an organizational structure for PSM, including reporting relationships and communication structures. After that, we will define guidelines for executing the purchasing process. Finally, we will develop a method for supply base management.

6.4.1 The Purchasing Process

- *The general purchasing process consists of six consecutive stages;*
- *Organizations should have guidelines on how to execute the purchasing process;*
- *Standardized contract management is based on three stages, which are drafting, formation, and fulfillment;*
- *Contractual risks should be detected during the execution of the purchasing process.*

Although there is a lot of scientific research available on how to execute a purchasing process, at PRHC this process is often based on intuition of the actual purchaser. In theory, a structured purchasing process should consist of the six general stages that are displayed below (Weele, 1998).

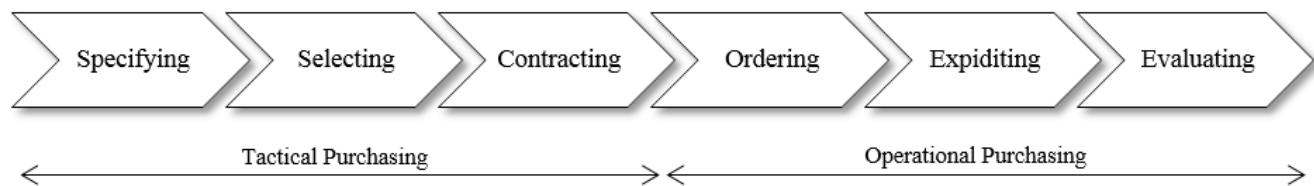


Figure 12 : General Purchasing Process by Van Weele (2010)

These six stages can easily be implemented at every organization. To ensure that the processes are carried out, management has to provide strict guidelines and adopt some form of control (van der Valk & Rozemeijer, 2009). In this section these organization specific guidelines and control mechanisms for the purchasing process will be developed. For each purchase, all stages should be executed by a cross-functional purchasing team of at least two employees, as described in previous section. The guidelines and regulations that will be defined in this chapter should be used by this purchasing team, which will automatically lead to a more organized purchasing process.

Specifying:

The main objective of the specifying stage is to explicitly define the desired products and/or services. First step is to describe the product or service broadly by brainstorming what is truly searched for. Next, the purchasers should determine the most important demands that should be fulfilled by the purchases. These demands can be translated into specific requirements of the desired product and/or service, which can later on be used to assess potential suppliers. Finally, the purchase should be assigned to a purchasing category by using the organization-specific risk-based supply management matrix as develop in *Section 6.2.2*. This matrix will help determining what type of supplier-relationship is going to be entered into (i.e. routine, leverage, bottleneck or strategic). This type of supplier is decisive for the further course of the purchasing process.

A template that can be used during the specifying stage is shown in *Appendix C*. The purchasing professional has to evaluate the completed specification template before the purchasing team can proceed to the next stage. In addition, the purchasing professional should decide whether the purchasing team is composed well enough and contains enough knowledge regarding the purchased product/ service and PSM in general.

Selecting:

Multiple suppliers should be assessed based on the overall description and specific requirements as defined during the specifying stage. In addition, the type of supplier should also be taken into account in the evaluation of potential suppliers. If the risks regarding information security are relatively high, a selected supplier should be able to give proof that they provide secure products and services, like for example an ISO 27001 certificate. At the same time, for routine purchases it is less important to select the very best supplier.

The whole selection process should be documented precisely by the purchasing team and has to be evaluated by the responsible purchasing professional. Only after the purchasing professional approves the selection of a certain supplier, the purchasing team can continue to the next stage of the purchasing process, which is contracting.

Contracting:

Contracting consists of developing, signing and storing a contractual agreement with the supplier.

Especially the developing phase can be extremely important, since the contract is the basis of the complete buyer-vendor-relationship (Boulmakoul & Sallé, 2002).

According to van der Valk en Rozemeijer (2009), active contract management is a key success factor for successful service purchasing, so in high supply risk agreements (i.e. strategic and bottleneck suppliers) it is very important to be actively involved in the development of the supply agreement. If specific knowledge regarding information security is required, the quality assurance manager or information security manager have to be involved in this process. For all non-routine purchases, the final contract should be reviewed by the responsible purchasing professional and a member of the steering group. For routine suppliers the contract can be reviewed by the purchasing team and the responsible purchasing professional only.

After the contract is signed, all information has to be send to both the F&C department and the quality assurance manager. F&C needs this information to be able trace down incoming bills. The quality assurance manager makes sure the contract and other purchasing information will be stored in a generally available database.

Ordering:

This stage of the purchasing process is relatively simple and consists of placing the actual order(s). For IT-related purchases, ordering is often just once for a longer period of time (e.g. software licences). The non-IT-related suppliers of PRHC are usually specialized in their way delivery, and since the organization does not have to deal with inventory levels, ordering these products and services is also relatively simple. For low profit impact purchases, the purchasing team should therefore be able to execute order(s) by themselves. For high profit impact purchases, in which every single order is billed, the purchasing professional should acquire authorization from the purchasing professional (PR) or steering group (NPR).

Expediting

Expediting is particularly important in the case of high risk purchases. By expediting PRHC will be able to constantly manage the supply risks related to these purchased products and services. For low risk purchases, expediting only has to be applied when difficulties arise. Expediting will be performed by the purchasing team. Expediting can be seen as part of supply base management and guidelines and regulations regarding this step will be discussed in more detail in *Section 6.5*.

Evaluating:

The final stage of the purchasing process is evaluating. This stage is concerned with measuring the performance of suppliers. Important suppliers should logically be evaluated more often than less important suppliers. Therefore, routine suppliers will not be evaluated. All other types of suppliers should be evaluated at least twice per year. Evaluation should be performed by the purchasing team and the final evaluation should be approved by the purchasing professional. Guidelines and regulations, as well as a supplier evaluation form will be developed in *Section 6.5*. An overall scheme regarding execution and authorization of all purchasing stages is displayed in *Appendix D*.

6.4.2 Supply Base Management

- *Manage supplier relationships to maximize the value of interactions;*
- *Measure supplier performance by using supplier evaluation/ assessment;*
- *Top-management involvement, cross-functional teams, good communication, willingness to participate, and a long-term perspective are critical for developing suppliers.*

As mentioned in *Section 6.4*, both the expediting stage and evaluating stage will be discussed in more detail in this section. According to Monczka et all (2009), managing the supply base is one of the common PSM-objectives, so to cover-up the more detailed meaning of expediting and evaluating, both stages will be renamed into respectively supplier relationship management and supplier performance management. We believe both subjects are currently too important for PRHC to review them as just a part of the overall purchasing process.

First we will develop guidelines and regulations for supplier relationship management. Next, we will define a method for measuring supplier performance. Both are strongly linked and have to be applied simultaneously within the organization in order to achieve the desired result.

Supplier Relationship Management

According to van Weele (1998), beyond the purchasing process, most important aspect of PSM is supplier relationship management. In addition, paying attention to buyer-supplier relationships is critical for successful IT-sourcing (Lacity, 2002). Currently, PRHC does not manage most of their supplier relationships, and if a relationship is managed this is often in a very unstructured way. In this section we will define a generally applicable method for supplier relationship management, based on the risk-based

supply management matrix as developed in *Section 6.2*. The goal of supplier relationship management is to get most out of the supplier by developing the buyer-vendor-relationship (Gelderman & Semeijn, 2006). There are two general approaches for supplier relationship management, which are reactive management and strategic management (Moser, 2007). Each category from our risk-based supply management matrix requires a different approach and therefore we will develop distinct relationship management strategies for each type of supplier.

For *Routine* suppliers, reactive supplier management is usually sufficient. There are no significant supply risks and profit impact is limited, so therefore for these suppliers we can limit ourselves to incident management. By using this approach the purchaser or purchasing team only has to respond in the case of emerging issues.

Leverage suppliers have relatively high purchasing costs and limited supply risks. Supplier management should therefore be focusing on cost reduction and quality assurance. The purchasing team should review the purchasing costs and quality of the products or services twice per year. Other potential suppliers should be explored, as well as possibilities for closer alignment towards strategic partnerships. In addition, cost savings programs can be developed by the purchasing team. Additional relationship management can be completely reactive.

For *Bottleneck* suppliers, which have relatively high supply risks and a low profit impact, relationship management should be completely focusing on monitoring and minimizing supply risks. In this case, direct (verbal) communication is very important. We therefore recommend that suppliers are contacted at least every three months. Prior to this contact, the purchasing team should analyze the current situation regarding supply risks and determine possibilities for improvements. If the purchasing team requires additional information regarding the supply risks, the purchasing professional, quality assurance manager and/ or information security manager should be consulted. Based on the conversations with the supplier, a mutual continuous improvement plan regarding supply risks has to be established. By continuously minimizing risks bottleneck suppliers can possibly become routine suppliers.

Strategic suppliers are the most critical group of suppliers. Since both supply risks and profit impact are relatively high, relationship management is extremely important. We therefore recommend monthly communication regarding strategy, goals, objectives, and supply risks. The purchasing professional has to be actively involved in relationship management of strategic suppliers. An overall joint improvement

plan should be established and this plan has to be updated monthly. If it is possible to minimize supply risk, by reducing dependency or improving information security, strategic suppliers can possibly become leverage suppliers, which can be very beneficial for the organization.

To monitor supplier management, the purchasing team should submit all discussion reports with suppliers to the responsible purchasing professional. This purchasing professional has to make sure that the reports are stored in the supplier record on the shared network of the organization.

Supplier Performance Management

The easiest way to acquire more information regarding the performance of suppliers is by evaluating them (Ho, et al., 2010). In this section we will develop a method for supplier evaluation, which will be closely linked to relationship management as defined in the previous section. To keep performance measuring simple, we will developed a generally applicable method, which can be used for all the organization's suppliers.

Performance measurement will serve as the basis for this relationship management. Scientific literature has provide us with several key areas regarding supplier evaluation (Briggs, 1994) (Cho, et al., 2012). Based on these key areas, the criteria that are important for PRHC are: price, quality, service level, flexibility, communication, innovation, risk sharing activities, and technological capability (Briggs, 1994). By evaluating these areas explicitly, the organization will be able to get a good impression of the overall performance of the supplier.

To measure supplier performance we have developed an evaluation form, which is shown in *Appendix E*. To encourage supplier evaluation, we have decided to make this form as simple as possible. Supplier evaluation always has to be executed before a moment of contact with a certain suppliers. For strategic suppliers and bottleneck suppliers supplier evaluation will be executed every three months, leverage suppliers will be evaluated twice per year, and routine suppliers do not have to be evaluated at all. The evaluation form will be the basis for the upcoming conversation with the supplier. After the evaluation form is filled in, the form has to be reviewed and signed by the purchasing professional. Thereafter, the evaluation form has to be send to the QA-manager, which will make sure the evaluation form is added to the generally available supplier record. The purchasing professional is responsible for the execution of supplier evaluations. The QA-manager has to keep track of evaluations and can ask the purchasing professional for clarification if evaluations are not being executed.

6.5 Summary

In this section we will summarize the key points of our solution design into a definite design for the PSM-function of PRHC. This final design consists of four main components, which will together give PRHC a good basis for well-organized PSM. When this final design has been implemented correctly, PRHC will directly benefit from a more standardized way of purchasing and supplier management. The four components of this design are:

1. The Foundation for Successful PSM (i.e. Organizational Requirements);
2. Organizational Structure for PSM
3. Integrated PSM Strategy;
4. Organization-Wide PSM Policy (regarding the purchasing process and supply base management).

Preparing the right foundation for successful PSM

The foundation for successful PSM consists of five organizational requirements, which are: human resources, organizational design, information technology, measurement, and management commitment. The organizational design of PRHC is appropriate for PSM. However, all four other requirements are largely missing. In order to comply with these organizational requirements, PRHC therefore has to adopt some changes before even starting to implement the new PSM-design. These changes are listed below.

- A selection of employees, with different functions and working at various levels within the organization, have to be trained and educated in the area of PSM. This can be done by hiring reputable external purchasing professionals to teach employees the basics of PSM.
- Information regarding suppliers, contracts, and regulations, have to be easily available throughout the whole organization. This can be done by restructuring the contract database, creating a list of all the current suppliers, and storing regulations on the organizational network.
- Both the financial value and performance of suppliers have to be measured, in order to get a clear view on the importance of PSM and more transparency throughout the organization.
- The organization should create a truly committed steering-group for implementing the changes and managing PSM organization-wide. This steering group should contain reputable and committed managers, with broad interests in the area of PSM.

Adopting a clear organizational structure for PSM

Although the organization clearly uses a decentralized organizational structure, we think PRHC should adopt a hybrid form of both centralized and decentralized PSM. This way general organization-wide purchases can benefit from bulk advantages and singularity. In addition, business unit specific purchases can benefit from direct communication with suppliers and knowledge about the purchases products and services. Product-related purchases will therefore be managed on a decentralized level, while the more general, non-product-related purchases should be executed and managed centrally. Approximately 70% of all the organization's purchases are product-related, so most purchases will be managed decentralized.

Product-related purchases (+/- 70%)

(Mostly co-development and software licenses)

- Managed decentralized (within the business units)
- Purchasing professionals are responsible
- Specific knowledge and direct communication lines

Non-product related purchases (+/- 30%)

(Mostly hardware and general services)

- Managed centralized (controlled by business unit ZCC)
- Steering group is responsible
- Bulk advantages

Table 2 : PR vs. NPR purchases

In addition, the organization has to assign an overall responsible steering committee and business unit specific purchasing professionals. Operational PSM should be performed by cross-functional teams, with employees throughout the whole organization. Figure X in Section 6.2.2 shows an organizational chart of this structure.

Developing an integrated PSM strategy

After the right foundation and a clear organizational structure have been established, next step will be to implement a PSM-strategy that is in line with the overall organizational strategy. This strategy will determine how the organization will manage all their purchases and suppliers in more a structured and standardized way.

For this we made use of the portfolio model as developed by Kraljic (1983) and elaborated by Gelderman & Van Weele (2003), which is named Risk-Based Supply Management. Based on five pre-developed questions, regarding financial value, dependency and information security, purchasing

employees can easily determine which type of supplier or purchase the organization is dealing with. The type of supplier has to be verified by either the purchasing professional (PR) or steering committee (NPR). The supplier types are: strategic, leverage, bottleneck, and routine. All four types of suppliers have their own characteristics, which have been used to determine specific regulations and guidelines. These regulations and guidelines have been developed in the form of a PSM policy.

Implementing a strict PSM policy

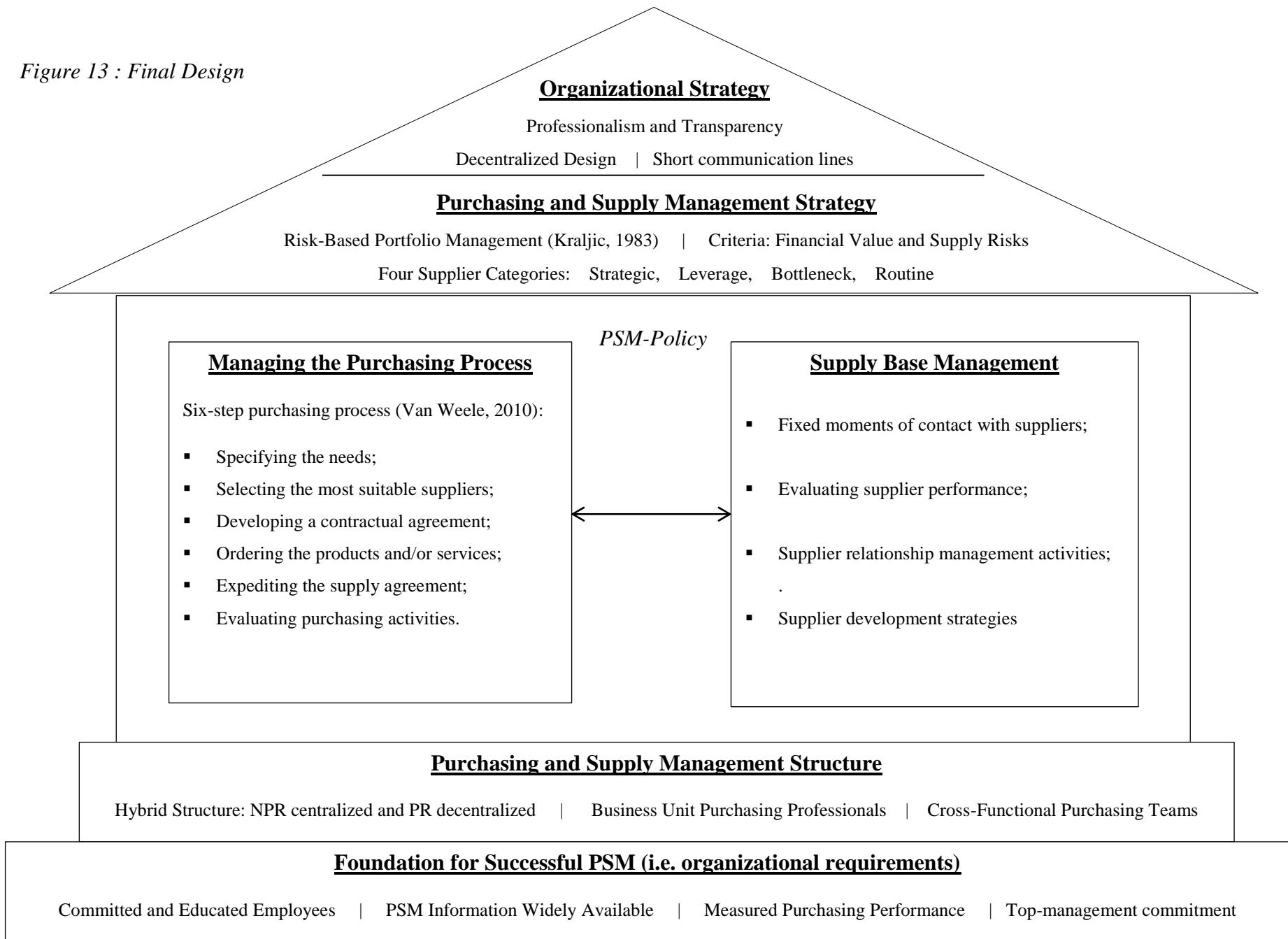
Especially in the case of decentralized PSM it is important to make clear arrangements, so that behavior towards supplier is consistently. We have therefore developed an organization-wide PSM policy, containing specific guidelines and regulations for the actual purchasing employees. This policy consists of two main parts, which are: the purchasing process and supply base management.

The purchasing process will be executed in six distinct stages, which are: specifying, selecting, contracting, ordering, expediting, and evaluating. For every supplier type, roles, authorities and tools for each stage of the purchasing process have been developed and are shown in *Appendix D*. Every stage has to be completely finished before launching the next stage. It is important that every stage is documented by the purchasing team, so that the both the process and final decisions can be verified by the purchasing professional or steering committee.

Supply base management consists of relationship management and performance evaluation. Different types of suppliers require different types of attention. For *Routine* suppliers, supply base management can be completely reactive and supplier performance does not have to be measured explicitly. In the case of *Leverage* suppliers, relationship management should focus on costs and quality and performance should be measured every six months. For *Bottleneck* suppliers, the corresponding supply risks are most important and therefore performance should be measured every three months. Finally, *Strategic* suppliers have both high purchasing costs and significant supply risks. In this case PRHC should manage relationships extensively and try to form strategic partnerships. Performance measurement should be executed (at least) every three months.

On the next page our final solution design is shown in a comprehensive figure, based on the solution design outline from the beginning of this chapter. This figure is self-explaining and can provide support towards employees of PRHC regarding the desired changes.

Figure 13 : Final Design



7 Plan of Approach

It is difficult to put a comprehensive solution design directly into operation. For implementing major changes like the ones proposed, it is therefore necessary to develop a solid plan of approach. The objective of a plan of approach is to define how the solution design can be implemented effectively within the organization. In addition, a plan of approach provides guidance to the project initiators.

This section will be used to describe multiple steps that can be applied to implement the proposed solution design within the organization. This plan of approach will be partly based on Kotter's process for successful organizational transformation (Kotter, 1996). We have chosen this process because some of these stages have similarities to our series of findings and can therefore be easily aligned to our solution design. Several stages have already been finished during the execution of our research, so we will limit ourselves to those stages that still need to be performed, which are the following five in consecutive order:

Stage 1: Enlist a volunteer army;

Stage 2: Enable action by removing barriers;

Stage 3: Generate short-term wins;

Stage 4: Sustain acceleration;

Stage 5: Institute change.

Stage 1: Enlist a volunteer army

Who: PSM Steering Group and Business Unit Directors.

Why: Generating support and ensuring sufficient knowledge.

It is widely known that committed employees are essential for successful organizational change. According to our new organizational structure for PSM, each Business Unit Director should assign one 'purchasing professional' from within their unit. These purchasing professionals have to become completely familiar with the strategic vision and PSM principles and practices. These employees should therefore meet with the steering group multiple times. In these meetings, the steering group has to present the objectives, strategy, guidelines, and other important aspects regarding PSM. The purchasing

professionals should have the possibility to deliver feedback on the proposed changes. The objective of these meetings is to make the purchasing professionals able to manage PSM within their business units.

Since the organization already has multiple suppliers that will be managed actively based on our new PSM strategy, the purchasing professionals and steering group together need to assign teams of employees that will be responsible for managing the current suppliers. These purchasing teams will deal with supply base management and performance evaluation. Because there is little knowledge regarding PSM, it is important that all these employees will be educated in the area of PSM. We recommend to hire an external PSM-specialist to teach the purchasing employees, purchasing professionals, and steering group, the most important aspects regarding PSM.

Stage 2: Enable action by removing barriers

Who: PSM Steering Group and Purchasing Professionals.

Why: Creating overview and enabling change.

At this moment there are still a few barriers that have to be removed before the new strategy and activities can be implemented. As derived from problem identification, one of the biggest issues for organized PSM at PRHC, is the lack of overview regarding current suppliers and supply agreements.

To create more overview, we have analyzed data from the F&C department regarding all purchases of PRHC in the years 2013, 2014 and 2015. We have used this information to create an overview of all current non-routine suppliers, which is shown in *Appendix F*. The quality assurance manager will be responsible for keeping this list up to date by reviewing the organization's suppliers yearly.

Now that we have an overview of all suppliers that will be actively managed, our next step is to seek out the corresponding supply agreements. Most of the current supply agreements are already present in a database held by the F&C department. However, this database contains many expired contracts and supplier records of suppliers that are no longer used by PRHC. Therefore it is necessary to recreate a supplier database, only containing supplier records of the current suppliers. Since the organization uses a decentralized organizational structure, the database should be generally available for the complete organization.

Creating a generally available database can be simply done by creating a folder on the organizational network. Within this folder, only the suppliers that are present on the list of current suppliers, should get a supplier record containing the supply agreement and all other relevant purchasing information. Just like the list of current suppliers, the quality assurance manager will also be responsible for updating this supplier database. When certain suppliers are not used anymore, the supplier records should be transferred into an archive.

Stage 3: Generating short-term wins (by implementing Supply Base Management)

Who: Purchasing Teams.

Why: Understanding the value of PSM and managing current supplier relationships.

Since the organization has many long-term suppliers and limited new suppliers, the easiest way to generate short-term wins is by implementing Supply Base Management practices. Therefore, purchasing teams should start with measuring suppliers performance. For measuring supplier performance, purchasing teams should make use of the evaluation form as shown in *Appendix E*. For strategic suppliers, this form has to be completed four times per year. For leverage and bottleneck suppliers the form can be completed once every six months.

Every completed evaluation form should afterwards be discussed with the supplier. These discussions will be the basis for relationship management and supplier development. The results of the evaluation give an overview of the suppliers performance on the most important aspects of the relationship. Purchasing employees should also tend to develop the supplier relationship. By focusing on issues arising from the evaluation form, the purchasing team can try to improve the performance of suppliers. It is important that all meetings with suppliers are documented, so that progress of actions can be measured.

Stage 4: Sustain acceleration (by adopting the new Purchasing Process)

Who: Purchasing teams

Why: Finalize implementation and purchase more professional

After Supply Base Management for current suppliers has been implemented, next step will be to adopt the newly developed six-step purchasing process. *Appendix D* can be used as a guideline for this new

purchasing process. The only way to make sure that all purchasing steps will be executed is by closely monitoring this process. The scheme from *Appendix D* therefore shows moments of authorization during the execution of the purchasing process.

Stage 5: Institute change (by improving continuously)

Who: PSM Steering Group, Purchasing Professionals and Purchasing Teams.

Why: Continuously improving PSM and keep performing activities.

After the implementation, the complete process has to be analyzed extensively. By delivering feedback on this process, the steering group will be able to find out which parts of the implementation require extra attention. When necessary the steering group can even develop a following plan of approach to work out PSM in the organization even further.

Finally, it is necessary to keep changing and innovating the PSM-function. The PSM steering group should therefore define yearly innovation projects, so that both purchasing and supplier management will continuously evolve within the organization.

8 Conclusions and Recommendations

In this final chapter of this thesis, our complete research will be concluded. This conclusion will start with a summary of the main findings from each chapter. These findings will then be used to answer the main research question as established in *Section 1.5*. After this research question has been answered, we will also use this section to describe the limitations of our research. Finally, we will give some recommendations for further research.

8.1 Conclusions

To structure our research, *Section 1.5* has been used to define a main research questions, as well as several sub-questions. In this section all sub-questions will be answered concisely, after which it should be easy to give an answer on the main research question.

The first research question is: “*How is PRHC’s PSM function currently organized?*”. To answer this question we have conducted interviews among the most important stakeholders. These interviews have resulted in a list of generally recognized problems of PRHC in the area of PSM. Altogether, this list comes down to the fact that the PSM function of PRHC is not as organized as desired. There is no overview on purchases and suppliers, roles and responsibilities are undefined, and the organization has almost no regulations and guidelines. As a result, the purchasing process and supplier management are both very inconsistent and often based on intuition of the employees. Finally, risks in the areas information security and dependency are not assessed.

Our second sub-question is: “*How is PSM, according to scientific literature, ideally managed by an IT-provider, using a decentralized organizational structure?*”. According to scientific literature, PSM can only be successful if the organization has the right foundation, consisting of the following five requirements: human resources, organizational design, information technology, measurement of data, and commitment (Monczka, et al., 2009) (Weele, 1998). If all these requirements are present in the right way, organizations can start with developing organization-specific objectives and an organizational structure for PSM. This structure can be centralized, decentralized, or hybrid, and should be based on the characteristics of the organization (Rozemeijer, 2000). Subsequently, the organization has to develop a PSM strategy, which is in line with the overall organizational strategy. To design a strategy for PSM,

organizations can use multiple portfolio models. Finally, strict regulations and guidelines, regarding the purchasing process and supply base management, should be translated into a strict PSM policy.

The third sub-question of this research is: *“What are the differences of PSM at PRHC and PSM as described by scientific literature?”*. The answer to this question can be given by comparing the answers on both previous sub-questions. In short, PRHC currently does not possess the right requirements for successful PSM, also the organization has no structure, strategy or policy for PSM and accompanying activities.

Our fifth sub-questions is: *“What should the new design of the Purchasing and Supply Management function of PinkRocca Healthcare look like?”*. The final design consists of four topics, which together provide the organization with a good basis for PSM. These four topics are:

1. The Foundation for Successful PSM (i.e. organizational requirements);
2. Organizational structure for PSM
3. Integrated PSM strategy;
4. Organization-wide PSM policy (including the purchasing process and supply base management).

The right foundation can be acquired by, training and educating employees in the area of PSM, making purchasing information available throughout the whole organization, measuring PSM performance, and creating a truly committed steering group.

Next, the organization has to adopt an organizational structure for PSM. Based on the organizational design and purchasing maturity of the organization, we have chosen for a hybrid form of both centralized and decentralized PSM, in which PR-purchases are managed decentralized and NPR-purchases on a more central level.

As the organization recognizes the importance of assessing supply risks, we have chosen the portfolio model Risk-Based Supply Management (Kraljic, 1983) as the basis for our strategy. In this strategy, suppliers or purchases are categorized into four categories. To assign suppliers to categories we have introduced five pre-developed questions, originated from three criteria, which are financial value, dependency and information security. The four categories makes it possible to standardize processes, based on the characteristics of suppliers.

Finally, we have developed a policy, containing guidelines and regulations for the two main parts of PSM, which are the purchasing process and supply base management. For each supplier category, we have determined how the purchasing process should look like. In addition, we have defined which supplier-relationships have to be managed actively and developed a way to measure supplier performance.

Our final sub-question is: *“How can the organization implement the newly developed Purchasing and Supply Management design?”* To implement the newly developed design, *Chapter 7* describes a comprehensive plan of approach. This plan of approach is based on Kotter’s eight-stage process for successful organizational transformation (Kotter, 1996). By following these eight steps, the organization can concisely implement all organizational changes.

Now that all our sub-question have been answered, we should be able to give a concise answer on the main research question, which is:

“How can PinkRoccade Healthcare restructure its Purchasing and Supply Management function in a more professional and structured way, so that the organization acquires better overview regarding PSM, whilst reducing supply risks, and allowing the organization to develop their PSM-activities in the future?”

To restructure the PSM function, PRHC should start with acquire the right foundation by adopting organizational requirements for successful PSM. Next, the organization has to implement a hybrid organizational PSM structure, which is a combination of both centralized and decentralized PSM. Overall responsibility for PSM is assigned to a committed steering group. This steering group will be supported by educated Business Unit purchasing professionals en multiple purchasing teams. Thirdly, the organization has to implement an organization-wide strategy for PSM, which is in line with the organizational strategy. For this, PRHC can use the portfolio model Risk-Based Supply Management, which categorizes the supplier portfolio based on financial value and supply risks. Finally, the organization should apply practices for both the purchasing process and supply base management. These practices are documented in the form of a policy, containing strict guidelines and regulations. All these changes can be implemented by using the plan of approach as developed in *Chapter 7*.

By using a clear organizational structure and categorizing the supplier portfolio, PRHC will be able acquire more overview on both purchases and suppliers. In addition, supply risks can be reduced by assessing them and by evaluating supplier performance. Finally, a clear organizational structure for PSM, an integrated PSM strategy, and a strict policy for managing purchases and suppliers, will provide the organization with good basis to build upon in the future.

8.2 Recommendations

In this section multiple recommendations for further research will be discussed. These recommendations all aroused during the execution of this thesis. At the start of this research, PSM at PRHC was extremely limited. Since it is impossible to develop an advanced PSM function out of (almost) nothing, we decided to focus on developing a good basis for PSM, on which the organization can build in the future. Therefore, there are still many areas that can be studied in more depth.

First, the organization should research how PSM can be managed more effectively. This can be done by defining and measuring KPIs for PSM. Information regarding performance indicators can provide more transparency and will simplify control of the hybrid form of PSM. In addition, KPIs will give top-management and the PSM steering group the ability to determine strengths, weaknesses, opportunities and threats. KPIs can also be used to focus on improving specific areas of PSM.

Secondly, the guidelines and regulations that we have established in the form of a policy, for both the purchasing process and supply base management, are vague. The reason why we have decided to develop this policy, is that it can be used to directly implement concrete operational changes. We think this will ease the implantation process and can lead to short-term wins for the organization. However, these guidelines and regulations are only partly substantiated. We therefore recommend to research both areas separately in more depth. The six-step purchasing process can be elaborated in more detail. In addition, for supply base management, the organization should investigate the most effective ways of managing supplier relationships and developing suppliers.

Thirdly, PRHC has indicated that current supply agreements are not of the desired level. The content of many contracts is outdated or completely compiled by the supplier. This can lead to multiple issues and risks for the organization. Our solution design will lead to more involvement in purchasing and supplier management throughout the organization. However, to manage contract specifically, we recommend to

research how to evaluate the content of supply agreements. The supplier categories that we have defined can be used as a basis, since each supplier category requires a different amount of attention.

Our final recommendation is to continue developing PSM. As mentioned before, this research has developed a good basis for PSM-activities, but for PSM to become truly effective, PSM at PRHC needs to become more mature.

References

Boulmakoul, A. & Sallé, M., 2002. *Integrated contract management*, HP Laboratories, Bristol, UK: Hewlett-Packard Company.

Briggs, P., 1994. Case study: vendor assessment for partners in supply. *European Journal of Purchasing and Supply Management*, 1(1), pp. 49-59.

Carter, P. et al., 1998. *The Future of Purchasing and Supply: A Five- and Ten-Year Forecast*, Tempe, AZ: Center for Advanced Purchasing Studies.

Cho, D., Lee, Y., Ahn, S. & Hwang, M., 2012. A framework for measuring the performance of service supply chain management. *Computers & Industrial Engineering*, 62(3), pp. 801-818.

Davison, B. & Sebastian, R., 2009. An Analysis of the Consequences of Contract Administration Problems for Contract Types. *Journal of Management Research*, 1(2), pp. 1-32.

de Boer, L., Labro, E. & Morlacchi, P., 2001. A review of methods supporting supplier selection. *European Journal of Purchasing & Supply Management*, Issue 7, pp. 75-89.

Dimitri, N., Dini, F. & Piga, G., 2006. When should procurement be centralized?. In: *Handbook of Procurement*. Cambridge: Cambridge University Press, pp. 47-81.

Faes, W. & Matthijssens, P., 1998. *Managing purchasing coordination: how to build an effective intra-company relationship*. London, Proceedings of the 7th IPSERA Conference.

Fitzgerald, K., 2000. Purchasing Occupies Key Position in Supply Chain. *Supply Chain Yearbook 2000*, p. 21.

Gelderman, C. J. & Semeijn, J., 2006. Managing the global supply base through purchasing portfolio management. *Journal of Purchasing & Supply Management*, Issue 12, pp. 209-217.

Gelderman, C. & Van Weele, A., 2003. Handling measurement issues and strategic directions in Kraljic's purchasing portfolio model. *Journal of Purchasing and Supply Management*, 9(5-6), pp. 207-216.

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

Hofman, D., 2006. Getting to World-Class Supply Chain Measurement. *Purchasing*, 1 October.

Ho, W., Xu, X. & Dey, P., 2010. Multi-criteria decision making approaches for supplier evaluation and selection: A literature review. *European Journal of Operational Research*, 202(1), pp. 16-24.

Justinia, T., 2013. *Literature Reviews & Literature Searches*, Saudi Arabia: King Saud bin Abdulaziz University for Health Sciences.

Karjalainen, K., 2011. Estimating the cost effects of purchasing centralization - Empirical evidence from framework agreements in the public sector. *Journal of Purchasing & Supply Management*, Issue 17, pp. 87-97.

Klein, W. & Murphy, D., 1973. In: *Policy: Concepts in Organizational Guidance*. Boston: Little Brown, p. 2.

Kotter, J. P., 1996. *Leading Change*. 1 ed. Boston: Harvard Business School Publishing.

Kraljic, P., 1983. Purchasing Must Become Supply Management. *Harvard Business Review*.

Krause, D. R. & Ellram, L., 1997. Critical elements of supplier development The buying-firm perspective. *European Journal of Purchasing & Supply Management*, 3(1), pp. 21-31.

Lacity, M., 2002. *Lessons in Global Information Technology Sourcing*. L'Aquila, Italy, s.n.

Lee, D. & Drake, P., 2009. A portfolio model for component purchasing strategy and the case study of two South Korean elevator manufacturers. *International Journal of Production Research*, pp. 1-66.

Manzoor, K., 2006. *Vendor Security Risk Assessment*, Champaign, IL: University of Illinois.

Melnyk, S., Cooper, M., Griffis, S. & Philips, C., 2010. *Supplier Base Management: Managing the Whole, Not Just the Parts*. East Lansing, MI, Michigan State University.

Monczka, R., Handfield, R., Giunipero, L. & Patterson, J., 2009. *Purchasing and Supply Chain Management*. 4th ed. Mason, OH: South-Western Cengage Learning.

Moore, N., Baldwin, L., Camm, F. & Cook, C., 2002. *Implementing Best Purchasing and Supply Management Practices: Lessons from Innovative Commercial Firms*, Santa Monica, CA: RAND.

Moser, R., 2007. *Strategic Purchasing and Supply Management: A Strategy-Based Selection of Suppliers*. 1 ed. Wiesbaden: Deutscher Universitätsverlag.

Quayle, M., 2002. Purchasing Policy in Switzerland: An emperical study of sourcing decisions. *Thunderbird International Business Review*, 2(44), pp. 205-236.

Rendon, R., 2005. Commodity sourcing strategies: processes, best practices, and defense initiatives. *Journal of Contract Management*, pp. 7-20.

Rozemeijer, F., 2000. How to manage corporate purchasing synergy in a decentralized company? Towards design rules for managing and organising purchasing synergy in decentralized companies.. *European Journal of Purchasing & Supply Management*, 6(1), pp. 5-12.

Rudzki, R., Schmock, D., Stewart, S. & Katzorke, M., 2006. *Straight to the Bottom Line: Getting Senior Management's Attention For Procurement Transformation*. s.l., s.n.

Schiele, H., 2007. Supply-management maturity, cost savings and purchasing absorptive capacity: Testing the procurement–performance link. *Journal of Purchasing & Supply Management*, Issue 13, pp. 274-293.

Sinclair, M., 2010. Developing a model for effective stakeholder engagement management. *Asia Pacific Public Relations Journal*.

Stump, R. L. & Sriram, V., 1997. Employing Information Technology in Purchasing: Buyer-Supplier Relationships and Size of the Supplier Base. *Industrial Marketing Management*, Issue 26, pp. 127-136.

Telgen, J. & De Boer, L., 1995. *Developments in Purchasing of Non-Production Items*. Eindhoven, Proceedings 4th IPSERA Conference, pp. 1-8.

van der Valk, W. & Rozemeijer, F., 2009. Buying Business Services: Towards a Structured Service Purchasing Process. *Journal of Service Marketing*, Issue 1, p. 8.

Van Weele, A., 2010. *Purchasing and Supply Chain Management: Analysis, Planning and Practice*. London, England: Cengage.

Verschuren, P. & Doorewaard, H., 2010. *Designing a Research Project*. 2e ed. The Hague: Eleven International Publishing.

Weele, A. v., 1998. *Professionalising purchasing in organisations: towards a purchasing development model*. London, London/Bath: IPSERA.

Wilcocks, L. & Lacity, M., 2001. *Global IT Outsourcing: Search for Business Advantage*. New York: John Wiley & Sons.

Zabojnik, J., 2002. Centralized and Decentralized Decision Making in Organizations. *Journal of Labor Economics*, 1(20).

Zheng, J. et al., 2007. An analysis of research into the future of purchasing and supply management. *Journal of Purchasing & Supply Management*, 2007(13), pp. 69-83.

Zsidisin, G. & Ellram, L., 2001. Activities related to purchasing and supply management involvement in supplier alliances. *International Journal of Physical Distribution & Logistics Management*.

Zsidisin, G., Panelli, A. & Upton, R., 2000. Purchasing organization involvement in risk assessments. *Supply Chain Management: An International Journal*, 5(4), pp. 187-197.

APPENDIX

Appendix A - Interviews

- Interview questions -

1. General

- 1.1 How is the organization's PSM-function currently operating?
- 1.2 On a scale from 1 to 10, how do you score the performance of the PSM-function?
- 1.3 Which problems do you recognize in the current ways of PSM?
- 1.4 How do you think the organization can benefit more from PSM in general?

2. Purchasing

- 2.1 What does the general purchasing process at the organization looks like?
- 2.2 On a scale from 1 to 10, how do you score the purchasing performance of the organization?
- 2.3 What threats do you see in the current ways of purchasing?
- 2.4 How do you think the organization can improve its general purchasing process?

3. Supplier Management

- 3.1 What activities does the organization carry out for managing suppliers?
- 3.2 On a scale from 1 to 10, how do you score the supplier management activities of the organization?
- 3.3 What threats do you see in the current ways of supplier management?
- 3.4 How do you think the organization can improve its supplier management activities?

4. Contract Management

- 4.1 How does the organization currently manages contractual agreements with suppliers?
- 4.2 On a scale from 1 to 10, how do you score the contract management activities of the organization?
- 4.3 What threats do you see in the current ways of contract management?
- 4.4 How do you think the organization can improve its contract management activities?

5. Supply Risks

- 5.1 Do you perceive any risks in the current ways of managing purchases and suppliers?
- 5.2 If yes, what kind of risks do you consider most dangerous for the organization?

- *List of interviewees* -

Name	Function
Gert Douma	<i>Quality Assurance Manager</i>
Lex Jansze	<i>Information Security Officer</i>
Jan van Dijk	<i>Business Unit Director ZCC</i>
Hans Spierings	<i>Senior Controller</i>
Alex van den Bersselaar	<i>Business Unit Director Care</i>
Wim de Haan	<i>ICT Manager</i>
Lex van de Water	<i>Manager BT GGZ</i>
Olaf Hendriks	<i>Business Unit Director ZKH Services</i>
Roel Derkens	<i>Technology Manager & Architect</i>
Iman Ghazi	<i>Business Unit Director ZKH Applications</i>
Rob van Eijbergen	<i>Financial Director</i>
Marc Middendorf (Kadaster)	<i>Contract Manager</i>

Table 3 : List of interviewees

Appendix B – Search terms

During our search process, we have made use of pre-developed search terms. These search terms have been developed based on a brainstorm-session with internal two stakeholders. The table below contains eight subjects, each containing synonyms and similar terms. In the search process, combinations of these search terms and general search operators have been used to maximize the value of the results.

1.	<i>PSM</i>	<i>“Purchasing and Supply Management”</i>	<i>Procurement</i>	<i>Purchasing</i>
2.	<i>Foundation</i>	<i>Basis</i>	<i>Requirements</i>	<i>Basics</i>
3.	<i>“Purchasing process”</i>	<i>Procurement</i>	<i>Purchasing</i>	
4.	<i>“Supplier management”</i>	<i>“Supply management”</i>	<i>“Supplier relationship management”</i>	<i>“Supplier performance”</i>
5.	<i>“Contract management”</i>	<i>Contracting</i>	<i>“Contractual agreements”</i>	
6.	<i>“Supply risks”</i>	<i>“Information security”</i>	<i>Dependency</i>	<i>Continuity</i>
7.	<i>Strategy</i>	<i>Structure</i>	<i>Professionalism</i>	<i>Successful</i>
8.	<i>Tools</i>	<i>Methods</i>	<i>Regulations</i>	

Table 4 : Search terms

Appendix C - Execution and authorization scheme for purchasing

Type of purchase	Purchasing stage	Executed by	Approved/authorized by	Tools
Routine	<i>Specifying</i>	Purchasing team	Purchasing professional	Specifying template
	<i>Selecting</i>	Purchasing team	X	X
	<i>Contracting</i>	Supplier or purchasing team	Purchasing team and purchasing professional	X
	<i>Ordering</i>	Purchasing team	X	X
	<i>Expediting</i>	X	X	X
	<i>Evaluating</i>	X	X	X
Leverage	<i>Specifying</i>	Purchasing team	Purchasing professional	Specifying template
	<i>Selecting</i>	Purchasing team	Purchasing professional	X
	<i>Contracting</i>	Supplier or purchasing team	Purchasing team, purchasing professional and member of the steering group	X
	<i>Ordering</i>	Purchasing team	Purchasing professional	X
	<i>Expediting</i>	Purchasing team	X	X
	<i>Evaluating</i>	Purchasing team (every six months)	Purchasing professional	Evaluation form
Bottleneck	<i>Specifying</i>	Purchasing team	Purchasing professional	Specifying template
	<i>Selecting</i>	Purchasing team	Purchasing professional and QA manager/security manager	X
	<i>Contracting</i>	Purchasing team and QA manager/security manager	Purchasing professional and a member of the steering group	X
	<i>Ordering</i>	Purchasing team	X	X
	<i>Expediting</i>	Purchasing team	X	X
	<i>Evaluating</i>	Purchasing team (every three months)	Purchasing professional and QA manager/security manager	Evaluation form
Strategic	<i>Specifying</i>	Purchasing team	Purchasing team	Specifying template
	<i>Selecting</i>	Purchasing team and QA manager/security manager	Purchasing professional and a member of the steering group	X
	<i>Contracting</i>	Purchasing team and Quality Assurance Manager/ Information Security Manager	Purchasing professional and a member of the steering group	X
	<i>Ordering</i>	Purchasing team	Purchasing professional	X
	<i>Expediting</i>	Purchasing team	X	X
	<i>Evaluating</i>	Purchasing Team (every three months)	Purchasing professional and QA manager/security manager	Evaluation form

Table 5 : Execution and authorization scheme

Appendix D - Specification template (Dutch)



Van: Steven Hol
Aan: PinkRoccade Healthcare
Datum: 27-10-2015
Classificatie: Vertrouwelijk

Specificatie-template

Deze specificatie template t is bedoeld om een duidelijk beeld te krijgen van de gewenste producten of diensten die ingekocht worden door de organisatie. Op basis van viermaal aantal vragen	
Beschrijf kort het gewenste product of de gewenste dienst:	
Waaraan moet dit product/ deze dienst voldoen?	
Wat zijn mogelijke criteria voor beoordeling van verschillende leveranciers?	
Wat is de financieel waarde van een mogelijke contractuele overeenkomst?	
Wat zijn de risico's voor de organisatie m.b.t. informatiebeveiliging en afhankelijkheid?	
Welk type leverancier zal dit product/ deze dienst leveren?	Strategisch/ Bottleneck/ Leverage/ Routine

Appendix E - Supplier evaluation form (Dutch)



Van: Steven Hol

Aan: PinkRoccade Healthcare

Datum: 27-10-2015

Classificatie: Vertrouwelijk

Leveranciersbeoordeling

Deze beoordelingslijst is bedoeld om een duidelijker beeld te krijgen van de prestaties van onze leveranciers. Dit formulier moet twee maal per jaar worden ingevuld voor alle leveranciers met een contractwaarde hoger dan € 30.000,- of significante risico's voor de organisatie (leverancierstypen I & II). Ingevulde beoordelingsformulieren dienen te worden toegevoegd aan het betreffende leveranciersdossier.

Leverancier:		Contract looptijd:	van	tot
Contract waarde:	€	Business Unit:		
Periode beoordeling:		Leverancierstype:		

Antwoordmogelijkheden

Uitstekend	Goed	Voldoende	Onvoldoende	Slecht	N.v.t.
Niks aan te merken op de prestaties van de leverancier. Het wordt gewenst dat de leverancier de huidige wijze de dienstverlening doorzet.	Leverancier presteert goed. Er is kleine ruimte voor verbetering, maar de algehele dienstverlening door de leverancier is van een passend niveau.	Niveau van dienstverlening door de leverancier is voldoende. Er is duidelijk ruimte voor verbetering. Het is gewenst om hier aandacht aan te besteden.	Prestaties v.d. leverancier zijn te laag. Middels verbeteringen is het echter mogelijk een voldoende niveau te bereiken. Het is van belang om hier aandacht aan te besteden.	Niveau van de dienstverlening is ver onder de maat en er is geen uitzicht op verbetering. Het wordt aangeraden op zoek te gaan naar een andere leverancier.	Dit aspect is niet van toepassing voor deze leverancier/ de beoordelaar beschikt over onvoldoende kennis om hier een passend antwoord op te geven.

Prestatieniveau	Opmerkingen				
Prijsniveau	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.				
Kwaliteit	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.				

Communicatie	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Betrokkenheid	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Incident/ klachtenmanagement	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Informatiebeveiligingsniveau	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Flexibiliteit	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Serviceverlening	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Kwaliteit van facturen	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	
Naleving van verbeteracties	Uitstekend Goed Voldoende Onvoldoende Slecht N.v.t.	

Eendoordeel:

Uitstekend Goed Voldoende Onvoldoende Slecht

Voorgestelde verbeteracties en/of opmerkingen:

Beoordelaar:

Datum:

Managing
Director:

Datum:

Appendix F - List of all current (non-routine) suppliers of PRHC

- CONFIDENTIAL -