Gaining control over MRO procurement

an analysis and redesign of MRO procurement process control

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Master Thesis

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TU/e technische universiteit eindhoven

campina

Final Report
October 2006
Version 1 – November 7th, 2006

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Student ID: 0515509

Graduation Company: Campina Netherlands

University Supervisors: Dr. Ir. E.M. van Raaij
Prof. A.G.L. Romme

Company Supervisor: J. Jongsma

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Preface

This report is the final report of my graduation project, which I have accomplished at Campina Netherlands between February 2006 and November 2006. The graduation project is the final project of my study Industrial Engineering and Management Science at the Eindhoven University of Technology. The project investigates the controlling of a MRO Procurement process in a multi-location company.

I consider this project to be a worthy 'final chord' of my study, which I started in September 2001 and during which my interest in the subject Purchasing grew steadily. It was a pleasure for me to find an interesting research proposal within this field of knowledge. Therefore, I would like to thank all the people who had a part in enabling me to do this project.

First of all, I would like to thank Erik van Raaij, whose support and suggestions were always valuable and with whom I cooperated very pleasantly. Secondly, I want to thank Professor Sjoerd Romme for acting as a second supervisor during this project and for reviewing the project from a different angle.

At Campina, I would first of all like to thank Jan Jongsma for providing me with the opportunity to perform this research within the purchasing department and for giving me valuable and to-the-point feedback to all my suggestions and documents.
Furthermore, I would like to thank all the people at the purchasing department for being helpful and supportive during my project, and moreover for being more than pleasant company during my stay.
Another 'thank you' goes to the Chief Technicians at the various Campina plants and the lead buyers in Tilburg and Veghel, for welcoming me on several occasions and for answering all my questions. Finally, to all other people at Campina who were supportive in any way: thank you!

Furthermore, I want to thank Stan van den Thillart for allowing me to have a view at MRO Procurement at NedTrain and for sharing his valuable view on my project and the subject of MRO Purchasing. Your cooperation added some extra input for my research project and gave me inspiration for the redesigns.

Last but not least would I like to thank my parents for being supportive and interested during my study, and my girlfriend Jenny for being a motivator, a supporter, and a source of inspiration during my study and during this project.

Peter Schroën
Eindhoven, November 2006

Now this is not the end. It is not even the beginning of the end.
But it is, perhaps, the end of the beginning. - Sir Winston Churchill

Abstract

This master thesis examines the Procurement Process for Maintenance, Repair, and Overhaul (MRO) purchases at Campina. The objective of the research is to improve the control over this process. Currently, MRO purchases are largely bought on a decentralized basis, and management misses the overview of the total spend in this area. The thesis presents a redesign of the MRO Procurement Process and a redesign of the Spend Management structure.

Management Summary

This report describes a research project that was conducted at Campina Netherlands. It examines the control of a MRO Procurement process and -spend in a multi-location environment.

Within purchasing, a general classification can be made between Product Related (PR) and **Non-Product Related (NPR) purchases**. Compared to PR purchases, NPR purchases have traditionally been underexposed, which has also been the case at Campina. The control over the spend on PR purchases at Campina is efficient and complete, but this is not the case for NPR purchases. This report focuses on this problem specifically for the NPR purchasing category of **MRO Specific**. Components and services in the MRO Specific category are purchased decentrally, to a great extent. As a result, the overview of what is bought, by whom, and with which supplier is currently lacking. Stakeholders at Campina realized that the costs are not under control, which led to this research project.

An **analysis** of the Procurement Process for MRO Specific led to several insights in the actual problems. The main problems in the process are mentioned in Table 0-1.

Main Problem Area	**Problems**
Monitoring of Process & Performances	- No clear agreements / responsibilities - No Key Process Indicators - Lacking Evaluation and Contract updating
Dispersed Contracts & Agreements	- No overview of total contract base - Missing contract information in the system
Lack of Contracts & Agreements	- Not all (key) suppliers covered by Corporate Agreements - Unsatisfactory agreements
Dissimilar Information Systems	- Different (partially incompatible) versions of SAP - Different software modules/extensions used
Lack of information & Data	- Information not easily accessible - Contract information unavailable - Lacking structure/overview of MRO spend data
Distribution of Knowledge	- Relevant knowledge is dispersed geographically - TCO-based decisions complicated
Different stakes	- Local stakes vs. corporate stakes
Heterogeneous procedures	- (Local) procedures not in harmony with overall process
Heterogeneous commodities	- Variety of commodities / Standardization complex
Sporadic Purchasing Patterns	- Development of purchasing knowledge difficult

Table 0-1: Overview of Problems

Eventually, the **main causes** for the sub-optimal MRO Procurement Process were identified:

- Lack of information
  Contract information is missing at local plants, and spend information is lacking centrally
- Coordination issues
  Central coordination of purchasing brings some difficulties, such as dispersed responsibilities and knowledge, and colliding local and central stakes.

In order to solve the problems mentioned in Table 0-1, two **redesigns** are presented:

- A redesign of the MRO Procurement process, and
- A redesign of the Spend Management information structure, which refers to a proposal for categorization of MRO purchases.

The **MRO Procurement Process Redesign** has been subdivided in five purchasing activities: Specification & Selection, Contracting, Ordering, Expediting, and Evaluation & Feedback.
For each activity, several steps have been described and assigned to either:

- The Central Purchasing department,

- The Business Owner (i.e. the local purchasers), or
- A joint committee (i.e. a committee with local and central representatives)

A preceding analysis of the benefits of centralized and decentralized procurement led to the insight that the Specification activity should be largely decentralized, while the subsequent activities should be largely centralized. By assigning each step in a purchasing activity to one of three options mentioned above, a purchasing process is created that is:

- **Transparent**; responsibilities and tasks are clearly distributed
- **Uniform**; the activities can be deployed at every location in the same way
- **Repeatable**; while steps are structured in the process, it is repeatable and errors are easily traceable

Additionally, some key points of the redesign are:

- More **cooperation** between central purchases and local purchasers (both Chief Technicians and operational buyers)
  New joint steps include a prequalification of suppliers (to avoid unsatisfactory preferred suppliers), contract review (to ensure completeness from both viewpoints), and feedback sessions (including operational buyers to collect genuine supplier comments)
- Introduction of **routines**
  Several routines are to be developed, in which the procurement-related activities are described. Using these routines, activities will be deployed uniformly at various plants, which enhances the controllability. Routines will be used for Ordering, Expediting, and Evaluation
- Introduction of **Contract Sheets**
  To enhance the possibilities for local purchasers to look up (and apply) the agreements made, lead buyers will provide each plant with a single page contract sheet in which the main information (e.g. contact person, tariffs, conditions) are mentioned.

Several **benefits for Campina** can be defined. The redesign ought to make the MRO Procurement process more efficient, effective, and controllable. For example, a 10% reduction of maverick buying might lead to savings of €80.000 per year, only for six plants of CPE Netherlands. Furthermore, an improved identification of preferred suppliers might even add extra savings.

Implementation of the redesigned MRO Procurement process will involve a lot of training and instructing. Moreover, it is essential that the objectives of the changes are communicated to all stakeholders. Additionally, some alterations to the SAP system will be needed and routines ought to be developed. In order to improve the efficiency of the implementation, it should be streamlined wherever possible with current procurement projects.

The **Spend Management Redesign** concentrates on arranging the information structure of Spend Data. The objective is to eventually process MRO purchase data by the relevant systems (SAP and CATIS). This is currently not possible. To enable such processing, a **categorization** for all MRO purchases ought to be developed. Such a categorization might be constructed on an article level (i.e. each article/commodity is placed in a category) or on a supplier level (i.e. each supplier is placed in a category).

Based on discussion with stakeholders, and given the characteristics of MRO purchases, the redesign has been made on a **supplier level**. Each supplier will be assigned a certain code that is linked to a category, based on the SIC Industrial Classification codes. The Business Warehouse system CATIS will use these codes to collect data and produce management reports.

Advantages of this design include:

- Reduced risk of errors (while suppliers are processed automatically)
- Easy identification of key-/bottleneck-suppliers.
- No effort needed to look up correct code (as a result of automatic processing)

One of the disadvantages is that suppliers will be principally restricted to one category to achieve correct management information. Stakeholders, however, indicated that this is practicable for MRO, and especially

for MRO Specific. Eventually, a coding scheme is designed based on SIC codes and tailored to the situation at Campina.

The Procurement Controller will have a leading role during the **implementation** of this redesign. Supplier codes, based on the proposed coding scheme, will be assigned to all MRO suppliers by lead buyers. The definite list will have to be entered in the SAP system. The CATIS system will also have to be adapted in order to be able to process the new categorization. These changes have been validated and verified with the system owner to guarantee the implementability.

Finally, some recommendations for **further research** are presented. The main lead for further research is extending the redesigns to the whole area of NPR. For this research project, only the characteristics and stakeholders of MRO have been involved. An implementation for the complete NPR area will require extra research to investigate the practicability of the suggested solutions. Especially the Spend Management re-design will require reconsideration.

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List of Definitions and Abbreviations

CA	Corporate Agreement	*Agreement or contract that is signed for the whole company and not for one plant or division*
Chief Technician		*The head of the Technical Department at a Campina plant ("Hoofd Technische Dienst").*
CMS	Contract Management System	*The central contract database, whose interface is integrated in the Campina Intranet*
CPE	Consumer Products Europe	*One of the groups in the division structure of Campina.*
DUNS	Data Universal Numbering System	*A 9 digit number created for an organization by Dunn & Bradstreet. A different DUNS number shall be assigned for each physical location, address, and co-located legal division of an organization.*
Maverick Buying		*Purchasing goods or services from a supplier with whom no agreements have been made, and for which an alternative preferred supplier is available.*
MRO	Maintenance, Repair, and Operation/Overhaul	*Components or services that are needed to maintain a process and to support certain services. This might include cleaning materials as well as spare parts and technical services.*
NPR	Non Product Related	*All purchases that are not directly related to the end product of the company. This includes, for example: office supplies, ICT, and MRO.*
PDP	Purchasing Decoupling Point	*The point in the process after which activities are handled centrally.*
PO	Purchase Order	*An order for a purchase in the SAP system*
PR	Product Related	*All purchases (i.e. components, goods, services, etc.) that are directly related to the end product of the company. For Campina, this includes ingredients and packaging, for example.*
Purchasing		*Obtaining from external sources all goods, services, capabilities, and knowledge which are necessary for running, maintaining, and managing the company's primary and support activities at the most favourable conditions*
R@dar		*The Campina Intranet system*
Spend Management		*All activities that are related to the capturing of spend data, translating this data to periodic reports and spend-related predictions, distributing spend-related information (Spend Analysis) and taking correcting measures or actions that are meant to control and optimize the spend (Spend Control).*
TASC	Together Achieving Savings for Campina	*Large-scaled purchasing project launched at Campina in 2004 in order to improve efficiency and enhance synergy*
UNSPSC	Universal Standard Products and Service Codes	*A set of product and service classifications which assigns a unique code to every commodity*

1 Research Environment

This section will serve as an introduction to the environment of the research project.
First, the company Campina itself and the specific department where the project will be carried out (Campina Consumer Products Europe Purchasing) will be described, after which attention will be given to the market in which Campina operates.

1.1 Campina

Campina is a Dutch co-operative dairy company with an international presence. The co-operative nature of the company means that its responsibilities stretch beyond the production and marketing of good quality, reliable products. Campina's members supply their milk to the co-operative, they finance the company and are largely dependent on its performance for their income. The close ties with the company's owners – the 8,794 member-farmers in the Netherlands, Germany and Belgium – imply that Campina and its member-farmers share responsibility for the quality of the milk and the end-products, 'from the cow to the consumer'.

Founded:	1979
Headquarters:	Zaltbommel, the Netherlands
Turnover:	€ 3,569 million (2005)
Nr. of employees:	7099 (2004)
International presence:	>100 countries

Table 1-1: Campina Facts

The commercial activities are carried out by five groups: Campina Netherlands, Campina Germany, Campina International, Cheese and Butter, and Industrial Products (Figure 1-1). The first three groups are jointly referred to as Campina Consumer Products Europe (CPE).

Campina's strategy, as mentioned on their website (*www.campina.com*), is as follows:
"Campina continually takes advantage of opportunities to further strengthen its leading positions in the markets in which it operates and to capture new growth markets. The search for new growth opportunities is based on the strategic principles of international growth, innovation, harmonisation, cost control and quality."

International growth is a key concept for Campina and also a condition for their continuous innovation policy. Moreover, strong market positions will enable Campina to offset the declining milk prices resulting from European policy as far as possible. In the competitive arena Campina holds a strong position, but international growth is essential in the battle with other international companies.
Innovation is another essential aspect of Campina's strategy. Innovation means continually introducing new, value-adding products to the market, but it also means seeking modernisation in the working environment.

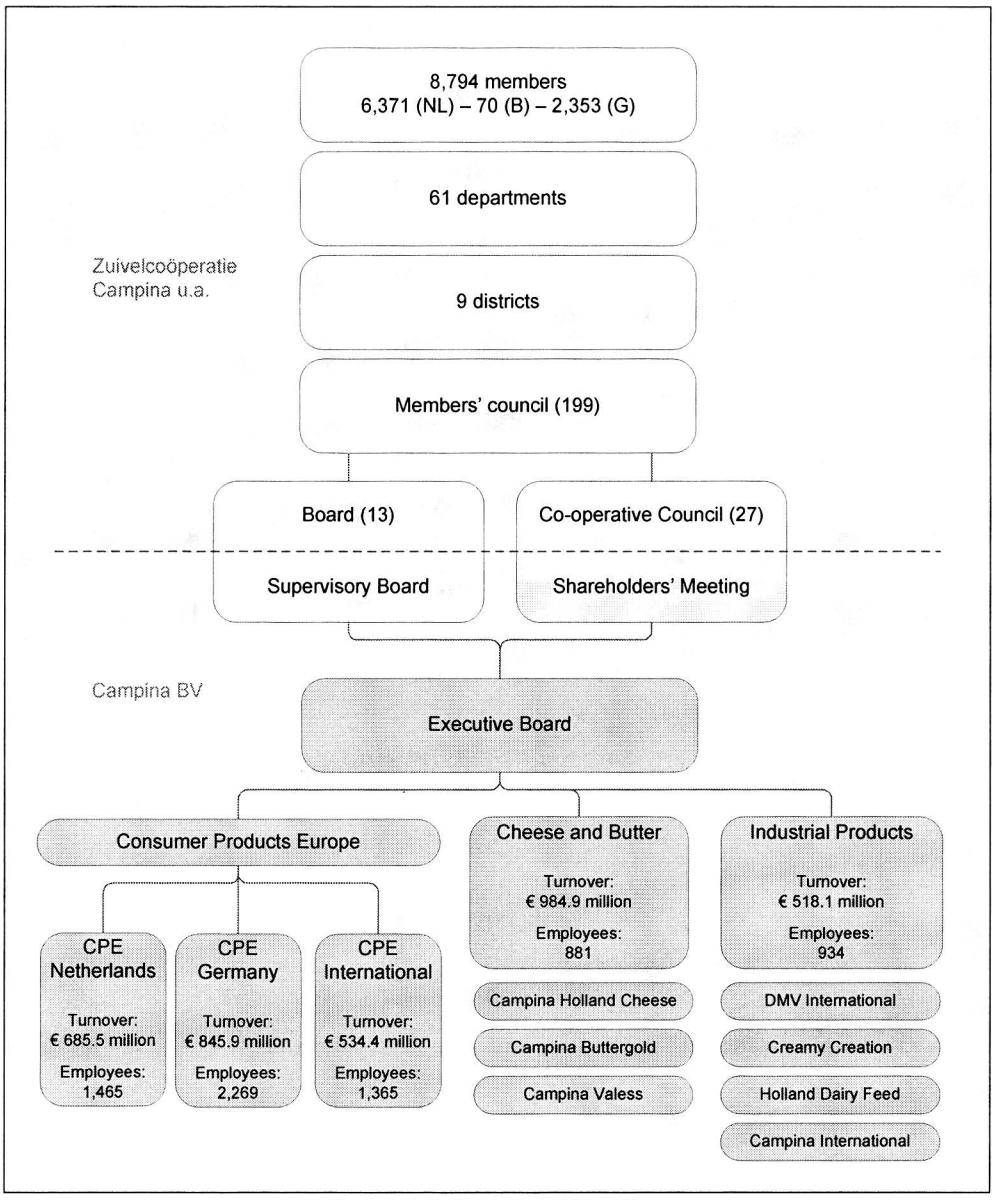

Figure 1-1: Campina Structure

1.1.1 Campina CPE

The Consumer Products Europe (CPE) group is active in liquid milk, dairy drinks, cream, yoghurts, curd and desserts throughout Europe. These products are sold under various brand names. In the Netherlands, Germany and Austria, these brand names include Campina, Landliebe and Mona consumer brands. The Campina brand includes various sub-brands, such as Optimel/Optiwell, Vifit, Yogho Yogho and regional brands in Germany (Tuffi, Mark Brandenburg and Südmilch). Apart from its brand operations, this group has a separate organisation for marketing and producing basic dairy retail brands in the Netherlands and Germany.

In other European countries such as Belgium, Russia, the Baltic States and the UK, the group's products are sold under the Campina brand as well as under sub-brands such as Fruttis, Joyvalle and Yazoo.
The organizational build-ups of Campina CPE and the sub-departments can be found in Appendix A: Organizational Structures. It should be mentioned that the CPE group often cooperates with other groups (e.g. Industrial Products, Cheese & Butter) in a matrix-environment.

1.1.2 Campina CPE Purchasing

The Director of Purchasing is the head of the Purchasing department of Campina Consumer Products Europe. For Campina Netherlands in Woerden, the Managers Procurement Netherlands & Belgium (Product-related and Non-product-related) are the local leaders of the department, in which a number of lead buyers

are supported by three purchasing assistants. A procurement controller supports the purchasing department. Furthermore, the CPE Netherlands Purchasing department takes care of corporate NPR purchasing.

1.2 Market Analysis

In 2005, Leatherhead Food International[1] performed an extensive study of the European dairy market. Total sales of milk, dairy and non-dairy milks & drinks (e.g. soy milk) in Europe (covering seven key countries) were valued at €16,825 million in 2004. The UK was the largest single market with sales of €4.23 billion or 25% of the total market, while the Netherlands took 4% (Figure 1-2).

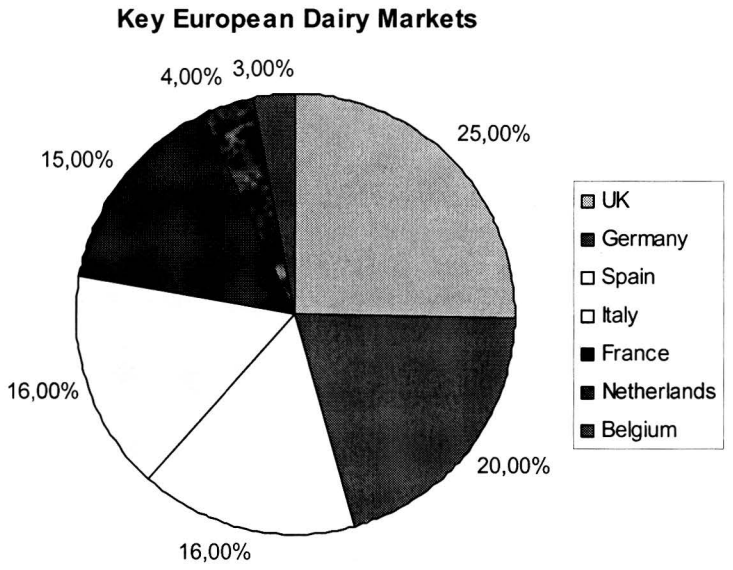

Figure 1-2: Key European Dairy Markets (Leatherhead, 2005)

Campina is market leader for milk in the Netherlands and Belgium. Market leaders in milk for the other key European markets are Arla (UK), Nordmilch (Germany), Capsa (Spain), Parmalat (Italy), and Sodiaal/Candia (France). Other competitors include Danone (France), Friesland Coberco (the Netherlands), Müller (Germany), and Nestlé (Switzerland).

Campina is also market leader in the Netherlands and Belgium for Flavoured Milks and Milk Drinks (i.e. Yazoo, Fruitmelk). For Yoghurt Drinks (e.g. Yogho Yogho, Vifit), Campina is market leader in the Netherlands, Belgium, and Germany. The main markets of Campina CPE are the Netherlands, Germany, and Belgium. Germany is the number one sales area for Campina (Leatherhead, 2005). Furthermore, products are sold in Spain, UK, Greece, Russia, Central and Eastern Europe, and partly Asia (Thailand, Vietnam).

[1] Leatherhead Food International is an international research consultant for food markets, http://www.lfra.co.uk/.

2 Project Overview

This chapter will introduce the initial research project. First, the research context will be discussed. Next, the initial objectives, which were mentioned in the original assignment, are presented. Finally, the relevance of the project for Campina is discussed. This chapter will be followed by an analysis of the research context, after which the definite problem statement will be discussed in chapter 4.

2.1 Research Context

Traditionally, purchasing activities within companies have focussed on direct, product-related (PR) purchases. However, recent developments include a growing attention to non-product related (NPR) purchases (Bechtel & Patterson, 1997; Barry et al., 1996; Tuck, 2004). In their quest for cost reductions, companies have discovered the great potential laying in NPR purchases.

One of these companies is Campina, whose attention to NPR purchases has grown after launching the TASC project (Together Achieving Savings for Campina) in 2004, in which Category Teams were assigned to achieve cost reductions in the procurement of several purchasing categories. The first step of this project entailed a closer co-operation in the purchasing process, resulting in structural cost savings. Product-related categories like packaging and raw materials were the first categories to be purchased more efficiently. From 2005 on, TASC focused on other products and services (e.g. IT, Telecom, Facilities, MRO) in a more structured way. One of the categories within NPR is called 'Maintenance, Repair and Operation (MRO)' (for example spare parts, machine repair services, etc.), this is the main focus of this research. MRO at Campina generally refers to all goods and services related to keeping all processes and activities running. This can entail preventive maintenance to filling machines, as well as repairing elevators, for example.

The MRO category within Campina Procurement is subdivided in two main categories: Generic and Specific. Generic refers to purchases that require little specialized knowledge/suppliers, such as basic electric components, lamps, and plumbing services. This research focuses on the MRO Specific category, which entails specialized or complex purchases, such as complex machinery and laboratory services. Both categories can be split into two aspects: Components and Services (Figure 2-1). Specific Components & Services are together considered as one category, while they are closely linked and are often complementary (e.g. system suppliers that supply both the machine/components and the services). Generic Components and Generic Services are considered as two distinct categories, as their connection is less direct.

<table>
<tr><th colspan="3">MRO</th></tr>
<tr><th colspan="2">Generic</th><th>Specific</th></tr>
<tr><td>Components
e.g. cables, lamps, batteries, and hand tools</td><td>Services
e.g. contractors, installation services, and plumbing</td><td>Components & Services
e.g. filling machines, robots, sensors, packaging lines, and laboratory services</td></tr>
</table>

Figure 2-1: MRO Categorization at Campina

Before the TASC project, the purchase of MRO products and services was done in different locations and by different approaches. TASC introduced coordination by a team approach, which eventually should lead to a decrease in the number of suppliers, a stronger negotiation position, and considerable cost savings. The deployment of these changes is currently ongoing and a strong aspect of the research project context. Within MRO, the project has focussed on Generic Components and Generic Services.

For MRO Specific (e.g. maintenance of processing machinery), few results have been achieved as yet. These services are purchased largely on a decentralized basis, although some tariffs have been agreed on centrally with certain suppliers. The total spend and the purchasing criteria are not transparent and the expenditures appear to be out of control. Moreover, performance-based contracts are not used, while this should be one of the purchasing objectives.

The observation that the purchasing approach to MRO deviates from the approach in other categories (mostly PR) is supported by literature. Several authors suggest that the process of buying MRO can be very complex due to a variety of complicating factors, such as: heterogeneous & specific commodities (van Weele, 2002), lack of product standardization (Tuck, 2004), different channels, sporadic purchasing patterns, and a lack of information (Cox et al., 2005). Nevertheless, MRO is responsible for a considerable part of both purchasing volume (± 80%) and purchasing costs (± 20%) (Barry et al., 1998; van Weele, 2002).

Synchronization of MRO procurement between different departments can be vital, since every stakeholder might have other stakes (i.e. availability vs. price). Information sharing is crucial in optimizing such cross-functional purchasing processes, in order to achieve minimum Total Cost of Ownership (including aspects as price, availability, costs of failure, etc.).

The first experiences within Campina on this subject have been that it is quite difficult to control the MRO purchases. Not only is it hard to abandon the familiarized practices, sharing the right information with the right persons at the right moment also proves to be difficult. This concerns the horizontal sharing of information (e.g. between purchasing and engineering) as well as bottom-up information sharing. These difficulties are a genuine barrier for achieving results in this area. Moreover, management has indicated that the management information on MRO spend is currently insufficient.

2.2 Initial Objectives

The context sketched above indicates that the Spend Control within the purchasing area of MRO Specific Services is not optimal. The initial assignment provided by Campina was processed to an initial project description, which resulted in three main objectives to be achieved in the project:

- Gain **insight** in the MRO spend Specific Services
- Facilitate the **report** of spend information
- Improve the **control** over MRO spend Specific Services

2.3 Relevance of the Project

After the recent changes within Campina Purchasing, a lot of improvements are still to be made in order to achieve optimized processes. Throughout Campina Purchasing, it is clear that cost savings and efficiency improvements can be made in the field of MRO Purchasing. Purchasers are aware of the fact that there is a great intransparency surrounding this area of purchasing. An un-biased research project can be valuable to analyse the current situation and identify improvement potentials. Without such an objective helicopter view, findings and results might be biased by personal and local opinions or preferences.

With regard to the strategy of Campina[2], the relevance of the research project lays in the following Strategic Principles:

- **Harmonisation**: "Campina is synonymous with very strong market positions in the Dutch, German and Belgian consumer markets and is also a fast-growing brand in Russia, for example. The challenge for the company is to combine the best of these market positions and to realise further growth at the lowest possible cost through harmonisation of its brand policy, working methods and organisational structure. Harmonisation also extends to purchasing, product specification systems, product standardisation, information systems and uniformity in Internet communications. Overall, harmonisation leads to a more efficient and effective organisation."
- **Cost Control**: "Campina continually seeks opportunities to reduce costs and realise synergy benefits. The company makes the best possible use of its scale to deploy resources efficiently. Cost awareness is self-evident at Campina."

This research project will have a role in harmonising working methods, purchasing, and information systems, for example. Furthermore, cost reduction, benefits through synergy and efficient deployment of resources through economies of scale will be part of the project.

[2] Source: http://www.campina.com, Strategic Principles

3 Problem Orientation

In this section, the problems or difficulties in the research environment will be analysed based on the developments described in research context. First, I will describe the actual process and introduce the process stakeholders. Using this description, actual problems will be identified. Additionally, some general developments that have an effect on the MRO purchasing process are described and attention is given to the current Spend Management practices. Eventually, the results of this analysis will be used to set a definite research problem.

3.1 Method

In order to gather information for this Problem Orientation, the focus has been on interviews with the stakeholders that will be mentioned later. First, I mailed a set of initial questions to all responsible operational buyers at the plants of Campina Netherlands. Two of them answered via the telephone and several others via e-mail. Subsequently, three operational buyers have provided more insight in their own processes during semi-structured interviews. Information on the environment and the problem areas was also obtained. Semi-structured interviews with some other stakeholders, such as the Procurement Controller and Tactical/Strategical Buyers, and participation in a round-table conversation with the operational buyers extended the insights and added new insights from another level and/or viewpoint.

Desk research has been applied to three main sources: (1) inside documents, such as contracts and agreements, digital as well as on paper, (2) the internal systems, especially the Campina Intranet, SAP and the Business Warehouse CATIS, and (3) relevant literature, which has been used to link the difficulties and problems to several publications.

3.2 MRO Purchasing Process at Campina

This section provides a more detailed exploration in the field of MRO and MRO Purchasing within Campina.

3.2.1 Defining MRO

The purchasing activities at Campina can be divided and subdivided in a set of (sub)categories. In practice, the two most fundamental categories are Product Related (PR) and Non-Product Related (NPR) purchases; PR purchases entail categories like ingredients and packaging, while NPR purchases refer to goods and services that are not directly linked to the primary product or process. One of the NPR categories is MRO, which is an acronym for Maintenance, Repair, and Overhaul. Various classifications are possible for NPR Purchases (e.g. Kapoor and Gupta, 1997; Barry, 1999; de Boer & Pop Sitar, 2001), but what exactly constitutes an NPR or MRO purchase depends on the company and industry concerned. The next section will discuss this matter specifically for Campina.

3.2.2 MRO at Campina: Generic and Specific

The subdivision into MRO Generic and MRO Specific has already been introduced in section 2.1. Now, I will explain these terms in more detail.

Generic Components are all goods or parts that are easily attainable and easily replaceable, thus Routine and Leverage products and services with a low supply risk (Kraljic, 1983). Examples include basic electrical switches, lamps, motors, cogwheels, compressors, bolts, tapes, etc. Generic Services include *basic* electric services, piping services, mechanical services, IT services, etc. In general, a basic (or generic) service needs little specialized training and there is a relatively large potential supply base.

Specific Components are all components and parts that require a specialized supplier. They are hard to replace and thus often represent a supply risk, they are characterised by suppliers in a monopolistic/oligopolistic position, a direct effect on the core-business, and support of the primary process. This category includes spare parts needed for large complex machines, for example valves, pumps, and heat exchangers. The machinery dealt with in this category includes large and complex packaging lines, process support systems, and high value product identification equipment.

Specific Services are all maintenance, repair and overhaul services that are to be performed by specialized service suppliers and/or that require intensive training. These services mostly involve the types of machinery mentioned under Specific Components. In many cases, this machinery is supplied by so-called system sup-

pliers, who also supply the specific spare parts and services. Thus, in most cases a supplier in the 'Specific' category provides machinery as well as (spare) parts and services.

From this point on, 'MRO Specific' will refer to MRO Specific Components *and* Services. In the remainder of this section, I will discuss the Campina purchasing process for MRO Specific and its environment (category team, organisation).

3.2.3 Stakeholders

In order to gain an overview of the MRO Purchasing Process, it has to be clear who the stakeholders (i.e. the problem owners within the research scope) are. These are mentioned in Table 3-1.

Stakeholder	Stake
Central Purchasers	The central purchasers are responsible for a certain purchasing category. Most of them have a role as a lead buyer and as such take place in a category team. Their stake is an efficient, flawless, and controllable purchasing process.
Plant Managers	The Plant Managers are expected to support the TASC MRO implementation and execute the agreements made. They should also authorize spend at non-selected suppliers and might take place in a category team. They need flawless processes and cost minimization at their plant.
Chief Technicians	The Chief Technicians ("Hoofd Technische Dienst") are responsible for the actual implementation and operation. They might take place in a category team as functional expert. They need a flawless and efficient technical process.
Purchasing Assistants	The purchasing assistants are responsible for administrative procedures and support. Their stake is a controllable purchasing process.
Operational Buyers	They are expected to refer to corporate agreements when placing orders. They need an efficient purchasing process which complies to the demands of management without extra effort.
Financial Administration	They are responsible for processing the invoices, matching the Purchase orders and entering the invoices in the Enterprise Information System. They need correct data with regard to Purchase Orders.
Procurement Controller	He is in charge of performing control on the Procurement expenses. He needs usable data for performing spend analysis and control.
Director of Purchasing	He is in charge of the purchasing department and thus the process owner of the MRO Purchasing Process. He needs an efficient and flawless procurement process and a cost optimization, as well as availability of management information

Table 3-1: Stakeholders

3.2.4 The Process

Through discussions with operational as well as strategic buyers, insight has been gained in the actual process of MRO Specific purchasing. The former (mostly technicians and/or planners) are predominantly responsible for the actual (operational) purchasing. Discussions with central purchasers increased the insight in this process on a higher level. In this section, the fundamentals of the process will be discussed.

In most cases, the internal customer for a MRO Specific purchase (either a component or a service) is an employee from engineering, planning or maintenance. This customer detects a certain need, which can be triggered by, for example, machine failure or a process redesign. In case this need requires a certain new (MRO) service or good, a request is made for contracting a new supplier. Such a request is made via the Chief Technician. This request leads to a specification, after which a supplier is selected and a contract (frame agreement) is made[3]. The frame agreement is the basis for all covered services and/or goods delivered by that supplier (to the extent agreed on).

[3] This sequence of activities is based on the Purchasing Process Model (van Weele, 2002)

Supplier selection and contracting for frame agreements is largely the responsibility of the lead buyer for the category, in cooperation with the Project Manager, Engineering Department, and/or the Chief Technician.

The internal customers can place an order at a supplier, using any of the existing frame agreements whenever possible. This action can also be triggered by the warehouse management system at certain locations; when the stock level for a certain component drops below a pre-specified minimum level, an order is either placed automatically or a report is made for the buyer. In case of a very specific order, or an order that needs extra clarification, the Chief Technician/Engineer might contact the supplier before the order is placed. In case of an order for which no frame agreement is available (nor to be made), authorization by the Chief Technician is needed.

After an order has been placed, the expediting and general performance by the supplier should be evaluated and the results added to the supplier data, which is used to update and monitor contracts or to trigger the selection of a new supplier. The evaluation should include the monitoring of the agreements in the frame contract. In the current situation, these last activities (evaluation, contract updating) are not performed in a structured way, mostly due to a lack of time and insufficient general overview. Feedback is only given on an ad-hoc basis and during certain meetings; there is no periodical (or real-time) reporting of experiences.
A model of the Campina CPE MRO Specific purchasing process as described above can be found in Figure 3-1.

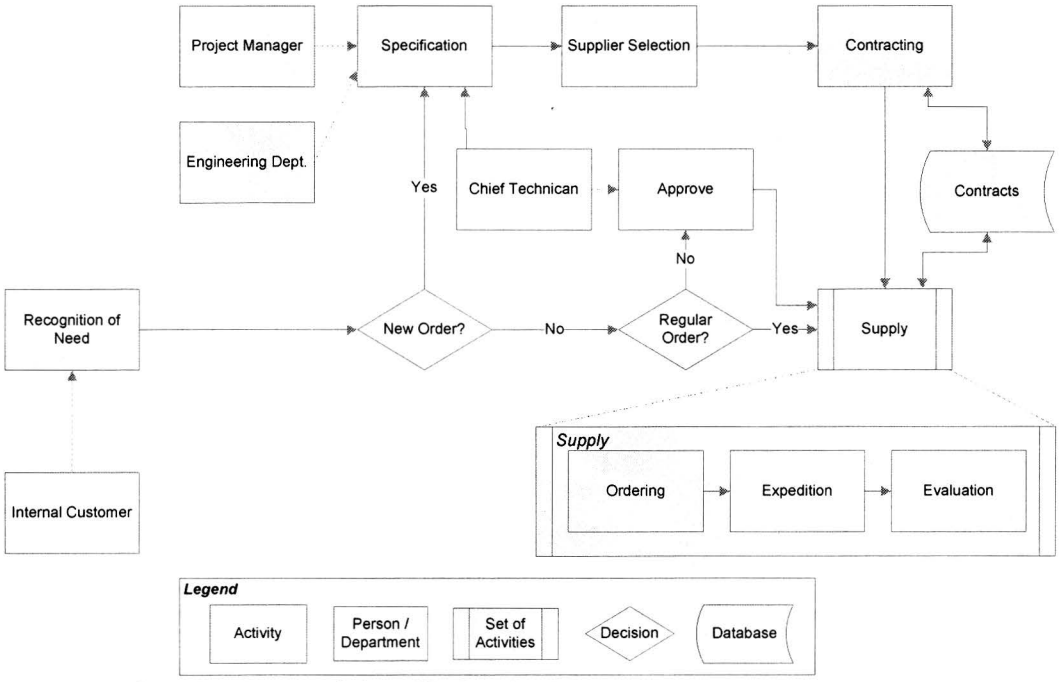

Figure 3-1: Campina CPE MRO Specific Purchasing Process

According to the Procurement Cycle (e.g. Baily et al., 2005), the process should also contain a 'Make or Buy' decision, but this is not considered relevant in this research.

3.3 Difficulties in the Process

The study into the process resulted in a set of difficulties arising during the process. These difficulties will be discussed in this section. Moreover, I will link these difficulties to the complicating factors mentioned before in this report.

3.3.1 Lack of Information (availability)

Operational, local buyers mentioned the need for accessible information regarding frame agreements. Since they are expected to comply with (i.e. order via) these corporate agreements, it is essential that they have easy access to the specific contents (e.g. contract contents, warranties, etc.). Currently, this information is not easily accessible though, which makes it hard to impose contract compliance. In principle, all corporate contracts are available digitally via the Intranet system. However, experiences in practice prove that this is not always the case.

Faes and Mathijssens (1998) mentioned exchange of information as a benefit of centralized procurement. In this case, however, it should be considered an enabler for purchasing synergy rather than a result.

3.3.2 Lack of monitoring, evaluation, and feedback

Several process stakeholders indicated that evaluation of supplier performance is performed on an ad-hoc basis. Approximately 4-6 times per year, all Chief Technicians meet and discuss supplier performance (if needed), among other topics. There is no periodic, or even real-time monitoring of supplier performance. Another point of attention is the monitoring of contract compliance. A lack of evaluation on this field reduces the control over the extent to which buyers use the preferred suppliers. There is no guarantee that local buyers will actually choose the contracted (preferred) suppliers above their familiar suppliers.

On a more general note, links to the aspects mentioned in literature can be identified. For example, de Boer et al. (2003), Porter (1999), and Chapman (2004) have mentioned a lack of management attention and control as one of the complicating aspects of MRO purchasing. This could both refer to attention of top management as attention of middle management.

3.3.3 Geographical distribution of responsibilities and knowledge

As a result of the various sites at which local buyers operate, and different locations where central purchasing responsibilities are settled, communication lines are complicated. Control and management of central agreements can be difficult in such situations (e.g. Tuck, 2004). Empirical research by Faes and Mathijssens (1998) proved that delegation of authority and clear communication lines are important guidelines to improve satisfaction with the implementation of centralized or centrally coordinated purchasing.

Another point of attention mentioned by one of the process stakeholders is that the central purchasing department often lacks the specific knowledge to assess an invoice or a quotation. In the case of tendering and selecting suppliers, this might lead to erroneous decisions.

3.3.4 Lack of corporate agreements

It has already been illustrated that the corporate coverage of agreements is less than optimal, which can lead to a loss of efficiency due to administrative support as well as higher prices. Moreover, some of the current corporate suppliers have underperformed in certain occasions, according to the local users, which implies suboptimal corporate agreements.

3.3.5 Discrepancies between corporate agreements and local considerations

Corporate Agreements might lead to local higher prices, even though company-wide savings can be achieved. This situation can lead to problems, because:

- Local buyers can not oversee the corporate benefits of the agreements and therefore tend to stick to local suppliers. After all, they pay lower prices there.
- The local higher prices cause problems for the local budgets, since each location has to justify its own expenses. If they comply with the corporate agreements and thus, possibly, with local higher prices, they put themselves into budgetary problems.

These discrepancies might feed the 'independence ideal' of local divisions that is discussed by Bechtel & Patterson (1997) and Cox et al. (2005).

3.3.6 Non-compliance with procedures

Obviously, attempts to improve the control on MRO spend in the past resulted in fixed or preferred procedures. For example, local buyers are expected to enter their purchase order in SAP, after which the financial department can link an invoice to the correct purchase order. However, in an effort to avoid discrepancies, local buyers admitted to having developed workarounds.

3.4 Developments in the Process

Several topics have influence on the purchasing process as described earlier. In this section, some of these topics will be discussed in the context of this research project.

3.4.1 Towards Corporate Agreements

It has already been mentioned that there is a lack of corporate agreements (CAs) in some cases. In this section, several aspects of corporate agreements will be briefly discussed.

In recent history, centralization of purchasing contracts has received a lot of attention within Campina MRO Purchasing. Synergy effects can be attained by approaching suppliers as one party, instead of several distinct parties (sites). In order to calculate these effects, however, performance indicators such as total number of contracts, number of suppliers, and number of contracts per supplier are needed. Moreover, input with regard to the time consumed by the various tasks, average tariff reductions and one-off incentives are essential for quantification. A significant difficulty in this process is the availability of the data.

By far the most of the strategic purchasing expertise can be found in the central purchasing department, and not with local buyers at the various sites. Technical knowledge, however, can be found mostly with the local buyers. This latter information is mainly needed in the specification stage. A lack of insight into technical details with regard to MRO Suppliers might undermine a decision based on Total Cost of Ownership. Cross-functional decision teams ought to be helpful in this process. Finally, an important aspect in the move towards corporate agreements is the distribution of information regarding the contents of the agreements.

3.4.2 Contract Compliance

In the current situation, buyers are encouraged to order via existing central corporate agreements, but they are not *'forced'* to do so in any way. Buyers are merely expected to look up these contracts when ordering, and/or referring to the agreements when placing the order. There are various options to enforce contract compliance, such as e-Procurement (e.g. Avery, 2002a), Bottom-Up Persuasion, Top management coercion, Blocking of non-specified suppliers, and the introduction of a Bonus/Penalty System (e.g. Minahan, 2004).

3.4.3 Performance Monitoring

In order to evaluate the corporate agreements, performance monitoring will have to receive attention of purchasing and other stakeholders. A set of auditing and recordkeeping tools might be a valuable asset in this process (e.g. Avery, 1999). Furthermore, it is essential that clear agreements on responsibilities are made regarding supplier performance monitoring and development. Such agreements might approach a co-makership, in which buyer and supplier agree on goals to improve the performance on a continual basis. Using these goals, for example a yearly price reduction of 5%, the monitoring of performance is facilitated.

3.5 Spend Management

In this section, I will discuss data on MRO spend, as well as the Spend Control procedures. First, some numbers on MRO suppliers will be presented in order to create an overview of the purchasing situation.

3.5.1 Supplier & Contract Base

This section will briefly discuss an analysis of the Supplier Base and the Contract Base. The Supplier Base is, in fact, the total pond of suppliers in which Campina 'fishes' for its MRO purchases. Indexing numbers related to the Supplier Base can give an indication of aspects like efficiency and administrative processes. The Contract Base is the total collection of contracts with MRO suppliers at Campina. The size of the contract base is an indicator for the improvement potential through coordination. After all, the less centralized the purchasing activities, the more de-central contracts in the contract base. In fact, each de-centralized contract represents an initial less-than-optimal source of spending. That is not to say, however, that a maximal (classical) centralization is preferable in every situation.

An exploration of the contract base for Campina MRO resulted in a list of 119 MRO suppliers, of which 66 for MRO Specific. Only 14 suppliers could be linked to MRO Generic Components, however. Stakeholders indicated that this number ought to be much higher. This indicates that there currently is no proper overview of the supplier base for MRO, since it was not possible to easily retrieve one list with all of these suppliers.

The suppliers that have been found were valued using two factors: the 'Intensity' of use and the date last used. Using these scores, all suppliers have been subdivided in a classification segment (A1, A2, B, C, or D supplier), which will enhance the possibilities of further analysis. 21 Percent of the MRO suppliers can be placed in the A1 segment, they are responsible for 71% of all orders. For the analysis, a selection has been

made with regard to the locations/sites used, since some locations are not really suitable to be used in the analysis.

Some initial data per location as well as a graphical representation of the distribution of suppliers can be found in Appendix B: Supplier Data.

The term Corporate Coverage refers to the extent to which suppliers are covered by corporate agreements. Analysis showed that Corporate Coverage is highest with key suppliers (i.e. A1 and A2 suppliers), with respectively 42% and 14%[4]. At the same time, these categories inherit the greatest potential for improvements, with the majority of orders taking place with these suppliers. Analysis has shown that average expenditures per month at some of the suppliers without a Corporate Agreement are substantial[5].

3.5.2 Contract locations

In order to analyse (and later optimize) the information availability, the contract locations will be analysed in this section. In an optimal situation, contracts should be easily traceable. Thus, if one needs a certain contract, it should cost little effort to trace the contract. However, it has shown that not all contracts at Campina can be found at the location where one would expect them. Table 3-2 provides an overview of the various locations of the contracts at Campina.

Location	**Comment**
Contract Database	This is the foremost location for (frame) contracts. It can be accessed from any computer on the Campina network by anyone with the right authorization. When logged on, one can search for contracts by description, type of contract, contract status, contract parties, start date, and end date. Digital copies of contracts and, in some cases, updates can be downloaded. The database contains contracts for Campina Holding as well as Campina Netherlands, Campina Germany and Campina International. The scope of a contract is not always clearly mentioned
Local (Plants)	A number of contracts is maintained locally at a plant. In most cases, these are contracts with no value for other Campina sites or for the central purchasing department. Examples include maintenance contracts for elevators, gates, and pieces of machinery that are not used elsewhere at Campina.
Filing Cabinet	Several filing cabinets at the central purchasing department contain documents regarding supplier contacts, including (copies of) contracts. Part of the content of these cabinets is also available digitally in the contract database, part of it is not.
Network Disks	Network disks of departments are used as a storage location for files such as work-in-progress documents, outgoing letters, and various versions of contracts
Miscellaneous	Some contracts are to be retrieved through ambiguous channels. For example, a contract can not be retrieved through any of the channels above, after which the contract is retrieved via e-mails of one or more employees. When this contract has reached its destination, it is still not clear where it was to be found

Table 3-2: Contract Locations

3.5.3 Spend Data

Currently, it is difficult to retrieve an overview of the Spend Data for MRO (either Specific or Generic). This is due to the fact that investments are not separated from out-of-the-pocket expenditures. However, the Technical Budgets can be used to approximate the actual spend, since this budget should cover all (out-of-the-pocket) MRO activities. The technical budget for Campina Netherlands in 2004, 2005, and 2006 was, respectively [redacted]. Approximately 40% of this budget can be allocated to the Technical Department (in-house mechanics, etc.). Looking at Campina CPE in total (i.e. Netherlands, Germany, and Belgium), the budgets for 2004, 2005, and 2006 are: [redacted].

[4] Some errors in these numbers might exist due to missing and incomplete data
[5] Up to 1 million per year for one supplier, at the 6 selected CPE Netherlands plants (data includes investments)

Based on figures of the total MRO expenditures (including investments and projects), we can make an estimation that suggests that MRO Specific forms an essential part of the total MRO Spend: between 55% and 70% of the total MRO spend.

As in any purchasing environment, it is not uncommon that a fraction of the suppliers is responsible for the majority of the spend. Twenty percent of all the MRO suppliers are responsible for more than 85% of the total MRO Spend[6]. Moreover, twenty percent of the MRO Specific Suppliers account for more than 90% of the total spend on MRO Specific. These findings are illustrated in Appendix C: Spend Data Figures.

3.6 Analysis of Problems

In the previous sections, several problems in the process have been signalled. In this section, these problems will be collected/combined and highlighted in order to create an overview of the problem area(s) (Table 3-3). Literature has also suggested some problem areas in MRO Purchasing that will be considered here, although this section will focus on the actual problems signalled in the research environment. Some of these problems have already been discussed more thoroughly in section 3.3.

Monitoring of Process & Performances	- No clear agreements / responsibilities - No Key Process Indicators - Lacking Evaluation and Contract updating
Dispersed Contracts & Agreements	- No overview of total contract base - Missing contract information in the system
Lack of Contracts & Agreements	- Not all (key) suppliers covered by CAs - Unsatisfactory agreements
Dissimilar Information Systems	- Different (partially incompatible) versions of SAP - Different software modules/extensions used
Lack of information & Data	- Information not easily accessible - Contract information unavailable - Lacking structure/overview of MRO spend data
Distribution of Knowledge	- Relevant knowledge is dispersed geographically - TCO-based decisions complicated
Different stakes	- Local stakes vs. corporate stakes
Heterogeneous procedures	- (Local) procedures not in harmony with overall process
Heterogeneous commodities	- Variety of commodities / Standardization complex
Sporadic Purchasing Patterns	- Development of purchasing knowledge difficult

Table 3-3: Overview of Problems

All the problems that were found during the analysis have been processed in a Cause and Effect diagram, which can be found in Appendix D: Cause-and-Effect Diagram.

3.6.1 Main Causes

The cause and effect diagram in Appendix D shows that many problems are related to either Information or Methods. When combining this insight with the findings from the analysis phase, we can select the following main causes:

- Lack of information
  This cause is twofold; the missing information concerns both contract information (and thus, in fact, input *of the process considered) and spend information (and thus* output *of the process). In both cases, a sub-optimal supporting system (respectively the Contract Management System and the SAP infrastructure) is at the root of the cause.*
- Coordination issues
  The process of central coordination of purchasing brings some difficulties, which lead to a sub-optimal purchasing process. The centralization itself is the root of these causes, and it should be reviewed how to optimally implement centralization and in what extent.

[6] Based on spend data for Campina Netherlands, 2005. This data includes investments.

4 Research Approach and Design

The initial assignment entailed three objectives: gain insight, facilitate report and improve control of MRO spend Specific Services. These initial objectives will be extended in this section using the information of the previous chapters. First, a Problem Definition will be developed and the Research Scope will be defined. Subsequently, research questions and deliverables are designed.

4.1 Research Problem and Questions

4.1.1 Problem Definition

The initial orientation within Campina and in relevant literature examined the area of MRO Purchasing and the different approaches to improve and control the Spend Control and Total Cost of Ownership in this area. This orientation, along with input by the process owners at Campina, led to the identification of the problems mentioned in section 3.6 and the main causes in section 3.6.1.
On basis of this, the following central problem statement has been formulated:

It is not possible to control spend on MRO Procurement for Specific Components and Services due to a lack of categorization. Purchases are not registered in a structured and uniform way and as a result, it is not possible to gain an overview of what is spent on MRO Specific and where it is spent. Moreover, some issues with regard to Central Coordination of Purchasing at Campina need to be evaluated closely. Purchasing Information is not distributed in a continuous, fixed and reliable way. Moreover, responsibilities are dispersed through the organization and internal knowledge is not always exploited in decision making processes.

Consequently, this will be used to formulate the following primary research question:

"How to facilitate and improve the spend control of MRO purchases through an improved data- and information structure, and how to improve the MRO purchasing process to achieve cost reductions through purchasing coordination and purchasing synergy?"

4.1.2 Research Scope

The research subject in this study has been defined as 'MRO Procurement' or 'MRO Purchasing'. In this project, the term 'MRO' will refer to all components and services that are needed to support the primary and secondary processes. Difference is made between *MRO Generic* and *MRO Specific*.

The most appropriate definition of purchasing to be applied here is: "Obtaining from external sources all goods, services, capabilities, and knowledge which are necessary for running, maintaining, and managing the company's primary and support activities at the most favourable conditions" (van Weele, 2002).

As can be seen in the Purchasing Process Model (Figure 4-1, (van Weele, 2002)), the term Procurement refers to all activities related to getting the product from a supplier to its final destination.

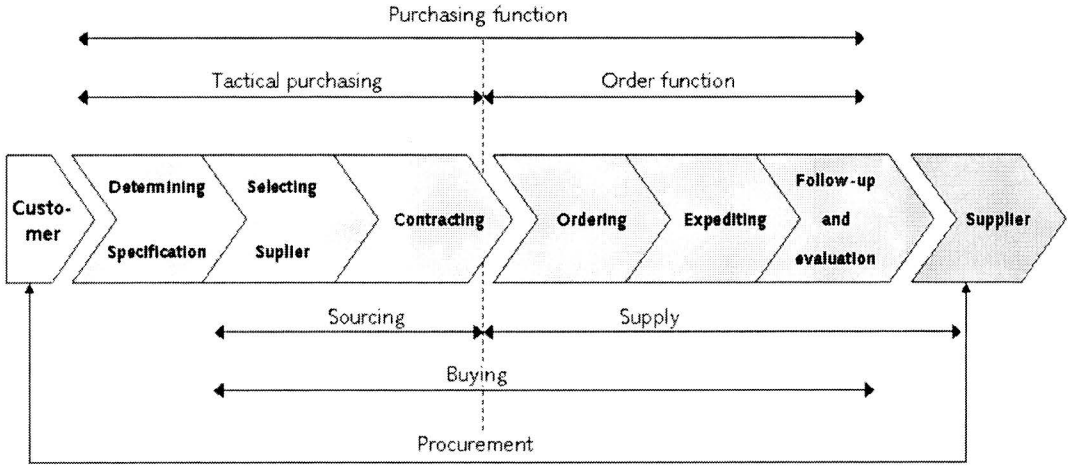

Figure 4-1: Purchasing Process Model (van Weele, 2002)

In this research project, customer and supplier relationships (the far ends in the Purchasing Process Model) will receive less attention than the process that connects them. Thus, the term purchasing seems to cover the project best. Furthermore, follow-up and evaluation will also include the activities of spend management, since the spend considered here only refers to the purchasing spend.

The term Spend Management refers to Spend Control and Spend Analysis and any spend activities in between. Spend Analysis entails all activities that are related to the capturing of spend data, translating this data to periodic reports and spend-related predictions, and the distribution of spend-related information. Spend Control refers to the correcting measures or actions that are meant to control and optimize spend.

4.1.3 Research Objectives

Using the current knowledge, two fundamental research objectives can be defined:

- Improve the insight in the current spend with regard to purchases in the category MRO Specific. Currently there is regulation on a strategic level, but the actual purchasing is done largely decentralized and on an ad-hoc basis. The administration of these purchases proves to be insufficient to perform decent controlling. A thorough analysis of the process and its problems should lead to an improved design of both process and information- & data structure.
- Investigate the potential of purchasing centralization or coordination for Campina. In many cases, similar contracts with certain suppliers are scattered through the organization. An analysis of the process with regard to contract compliance and purchasing synergy effects, for example, should create insights in the improvement potentials in this area and answer whether centralization (and in which form) is the most suitable approach.

4.1.4 Deliverables and Research Questions

The research objectives can be transformed to deliverables and to concrete research questions. The deliverables of the project are:

1. Analysis of the MRO Purchasing Process
2. Analysis of the Spend Control for MRO Purchases
3. Redesign of the procurement process and/or procedures for MRO Specific
4. Enhanced 'Information Structure'[7] for MRO Spend Data / Redesign of the Spend Management process
5. Best Practice for MRO Purchases (Recommendations)

Next to these deliverables for Campina, a scientific deliverable can be set. The goal of any research project is to *create knowledge* on the subject of research. In this case, the subject of research is the procurement of specialized MRO Components and Services. In literature, MRO Purchasing is often considered an 'easy one' for achieving purchasing synergy, implementing e-procurement tools, and improving purchasing efficiency, for example. Although this might be the case for basic MRO components, specialized components and services (i.e. 'MRO Specific' at Campina) require a more sophisticated approach. Such considerations will be explored in this research project, focussing on the subject of purchasing centralization/coordination (e.g. "When and how to centralize purchasing?", "How to include TCO considerations?") in case of complex technical purchases (at multiple locations).

Next to this main scientific deliverable, the research will create a practical exploration of purchasing synergy benefits (or obstacles), internal purchasing intelligence (i.e. importance of and barriers with regard to internal information sharing), and indirect spend in general.

Using the research problem and the set of deliverables, I derived the following research questions:

1) Create insight in the MRO Procurement Process:
   a) What are the difficulties arising within the MRO Purchasing Process?
   b) Who are the stakeholders of the MRO Purchasing Process and how are their responsibilities and activities distributed?
   c) How are MRO Purchases performed?
   d) What does the supplier and contract base for MRO look like?

[7] This Information Structure includes the categorization of the purchase orders/expenditures within the existing infrastructure (SAP/CATIS)

2) Create insight in the current Spend Management for MRO:
   a) What are the difficulties arising with MRO Spend Control?
   b) Which Spend Data is collected and stored?
   c) How is MRO Spend Data stored, distributed and shared?

3) Develop improved Spend Management for MRO:
   a) Is there a more appropriate Information Structure possible for MRO Spend Data? What methods and tools could be used and how should they be used?
   b) How can the findings be combined in an effective and efficient solution for Spend Control?

4) Develop improved MRO purchasing process:
   a) What role does centralization/coordination of purchasing play in the research environment and what are its advantages and disadvantages? How can these be implemented in the redesign?
   b) How can the findings be combined in process improvements for MRO purchasing at Campina?
   c) How can the findings be combined to set-up the procedures and the distribution of responsibilities with regard to MRO purchasing at Campina?

5) Develop additional recommendations:
   a) Which topics (e.g. centralization, supplier base reduction, TCO-based contracting) entail the greatest potential for Campina, why, and how can they be applied?
   b) Which points of improvements can be identified in general with regard to MRO purchasing at Campina?

Wherever 'MRO' is referred to in the questions above, MRO Specific is meant in particular, although MRO Generic Components & Services will also be considered when relevant.

4.1.5 Project Approach

In order to come to a best approach in a structured way, the project followed the so-called 'regulative cycle' (van Strien, 1975).

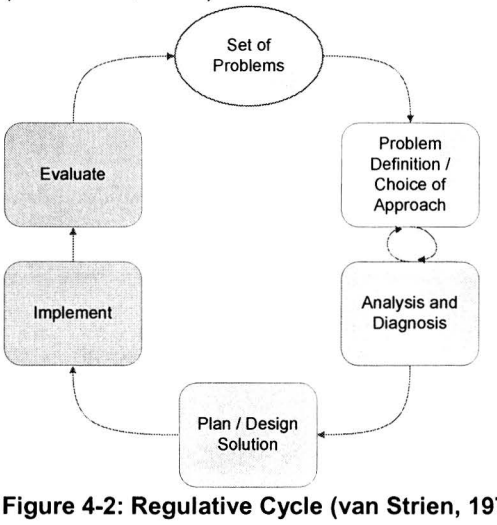

Figure 4-2: Regulative Cycle (van Strien, 1975)

The information gathered in the previous chapters will be used to come to valuable solutions. It should be noted that the steps 'Analysis and Diagnosis' and 'Design Solution' have repetitive nature. Solutions are proposed to stakeholders, whose feedback is used to possibly redesign the solutions. Although I will consider Implementation in the design and planning of the solution, this activity will not actually be a part of the research project. As mentioned in the deliverables, the research will lead to an analysis, recommendations and a redesign. Implementation of these recommendations is ought to be an extensive process, and is considered to be out of the scope of this project.

4.2 Research Methodologies

In addition to van Strien's Regulative Cycle, several other methods and theories will be used during this research. While some of these theories will be discussed later in this report, some of them will be briefly introduced in this section.

4.2.1 Analytical Methodologies

In section 3.1, the use of desk research (i.e. literature study) and field research (i.e. semi-structured interviews) was described. As an addition to these methods for information gathering, a benchmark has been used. For the redesign of the Spend Management infrastructure, the Spend Management practices at NedTrain (rail vehicle maintenance) were used as an inspiration. The fact that a central purchasing department controls the spend in a technical multi-location environment made this company very suitable for a benchmark. The information gathered from NedTrain was used as background information during the redesign of the Spend Management infrastructure.

4.2.2 Design Methodologies

For the redesign of the MRO Procurement Process, Ackoff's 'Constrained Idealized Design' theory (1993) has been used as an inspiration. Basically, this theory suggests that an idealized redesign is made, assuming that anything is possible. This design would be subject to only three constraints:

- The organization designed must be technologically feasible; it may not incorporate any technology that is not currently available.
- The organization designed must be operationally viable. If the organization designed were to come into existence, it must be able to survive in the current environment.
- The design must be one that is subject to continuous improvement from within and without

Moreover, the redesigned 'part' should fit in the existing environment. In other words, the redesigned process should fit into the other processes ('containing systems') without changing the latter. This concept has not been applied entirely as described by Ackoff, however. The idea of designing a process without predetermined constraints and demands set by stakeholders was kept alive, but some other constraints were applied. One of these 'constraints' is the use of van Weele's (1995) six steps in the purchasing process model: Specification, Supplier Selection, Contracting, Ordering, Expediting, and Evaluation. The use of these steps in a purchasing process is widespread. To structure the redesign of the process in this report, these steps will be regarded as one of the 'containing systems' (Ackoff, 1993) in which the redesign should fit. The redesign of the MRO Procurement Process in the following chapter will apply van Weele's steps as a guide through the process.

5 Redesign of the MRO Procurement Process

The redesign of the MRO Procurement Process will be discussed in this chapter. In order to make a new design, the first consideration to be made regards the (degree of) centralization of procurement. Therefore, the first section will discuss Procurement Centralization. The insights gained in this discussion will then be used in the subsequent sections to come to a redesign of the process.

5.1 Procurement Centralization/Decentralization

Centralization, or Central Coordination, of Procurement has been a hot topic in literature (e.g. Rozemeijer et al., 2003; Beker and Faas, 2000; Ribbers and Visser, 1993) as well as in organizations for several years. Numerous authors discussed advantages of centralization (Faes and Mathijssens, 1998; Baily et al., 2005; van Weele, 2005), although literature has also given attention to disadvantages of centralization (or advantages of decentralization) (Gadde and Hakansson, 1994; van Weele, 2005; Baily et al., 2005). Thus, it is clear that centralization is not a magic word that delivers benefits regardless of the situation.

In this section, attention will be given to the question how to centralize, when to centralize (or coordinate centrally), to what extent, and which constraints and other aspects are of importance in this decision. Eventually, this information will help in deciding on what the ideal situation at Campina should look like. First, several methodologies for design will be discussed in order to gain insight in the various design alternatives for purchasing organizations that are mentioned in literature. Next, some stimulators for centralization will be considered. These stimulators might be considered as reasons to implement a certain extent/form of centralization. Next, some barriers to centralization (or reasons not to centralize) will be discussed.

5.1.1 Methodologies for Purchasing Organization Design

In this section, some methodologies for the design of a purchasing organization (with regard to the centralization/decentralization issue) will be considered, and the results will be merged into a final conclusion. First, the Purchasing Decoupling Point by Beker and Faas (2000) will be discussed, followed by the Corporate Purchasing Approaches Matrix by Rozemeijer (2000b) and the Centralized/decentralized and Pooling structures by Van Weele (2005).

Purchasing Decoupling Point (Beker and Faas, 2000)
Beker and Faas (2000) determine which degree of centralization should be preferred on basis of the purchasing activities. These activities are subdivided in strategical (i.e. company policy making, purchasing policy making, evaluating), tactical (i.e. specifying, selecting, contracting, and evaluating) and operational (ordering, monitoring, and expediting) activities. These authors state that strategic activities should be deployed centrally, since these activities concern the tuning between divisions. Operational activities should be deployed decentrally, since these activities are often closely related to the (local) processes, and decisions should be made from a short distance to these processes.

This leaves the tactical activities, for which it is harder to decide on the degree of centralization. One should identify the point in the process from which there should be a combined (central) purchasing, Beker and Faas call this point the Purchasing Decoupling Point (PDP). The PDP can be placed at various stages in the process (Figure 5-1)

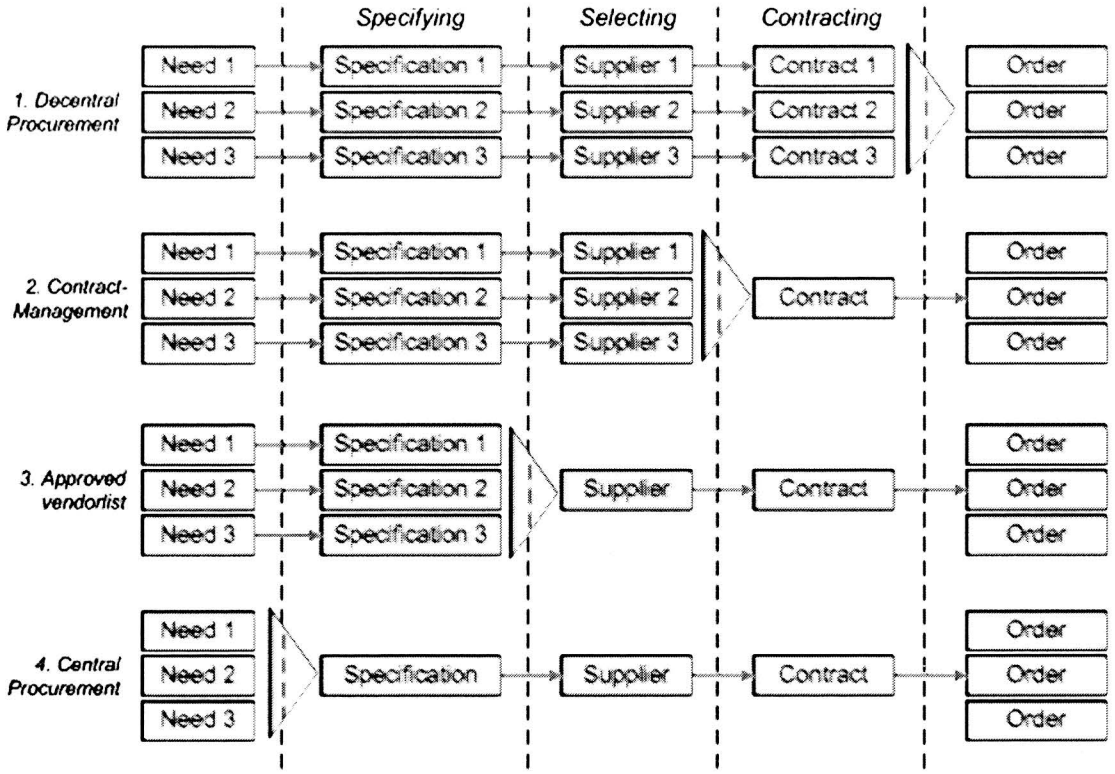

Figure 5-1: Purchasing Decoupling Point

The PDP indicates after which activity the subsequent purchasing activities should be deployed centrally. In case of fully decentralized purchasing, there is no PDP, whereas in the case of fully Centralized purchasing, the PDP is placed before the activity 'Specifying' (hence, after the recognition of a need).

In each of the cases (1 to 4 in Figure 5-1), the organization would be adapted to the situation. In situation 1 (Decentral Procurement), there would be no (supportive) staff department for Purchasing, but only decentral purchasing departments (or purchasing employees without a fixed department). For options 2, 3, and 4, two variations to the central purchasing are possible. The first variation is to let the central purchasing activities be performed by a central employee, the second variation is to assign a lead buyer from one of the decentral purchasers. The advantage of the latter option is a greater commitment of the lead buyer to the process, while the former option has the advantage of a reduced effort for decentral units as well as an objective and professionalized approach to purchasing.

The four alternative options can be used later to determine the optimal design for Campina. With the Strategic purchasing activities deployed centrally and the operational activities executed locally, relatively few changes would have to be implemented.

Corporate Purchasing Approaches Matrix (Rozemeijer, 2000b)

Rozemeijer (2000b) discusses corporate purchasing approaches using three contingency factors: Business Context, Purchasing Maturity and Corporate Coherence. Within the Business Context, competitive pressures play an important role. Generally, Rozemeijer states that 'the higher the competitive pressure to innovate and reduce costs, the higher the drive towards centralized purchasing'. Price competition is also considered an important driver.

Purchasing Maturity refers to the status of purchasing in an organisation. The maturity increases when a firm's purchasing function develops from a traditional operational function towards strategic supply chain management (Rozemeijer, 2000b). Rozemeijer developed a questionnaire to 'measure' the maturity of a purchasing organization. The questionnaire consists of 10 questions and the more questions answered with yes, the higher the purchasing maturity. Although not all questions can be answered directly, I could answer approximately 7 questions with a 'yes', based on my experience within Campina. This indicates a moderate to high purchasing maturity (Appendix E).

Corporate Coherence refers to corporate strategy, corporate structure, and corporate culture. Coherence can be demonstrated by, for example, efficient intra-organizational communication, a good information system, a corporate identity, a mission statement, shared values, trust across divisions, etc. The questionnaire to determine the corporate coherence within a company entails 10 questions. I could answer approximately six of these questions with a strong 'yes', indicating a moderate to high corporate coherence (Appendix E).

Purchasing Maturity and Corporate Coherence are applied by Rozemeijer (2000b) in his Corporate Purchasing Approaches Matrix (Figure 5-2).

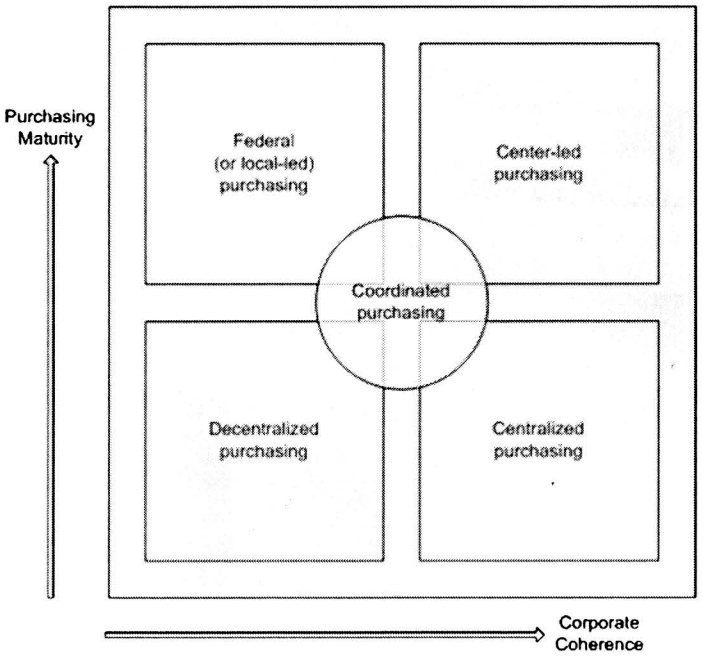

Figure 5-2: Corporate Purchasing Approach Matrix (Rozemeijer, 2000b)

This matrix can be used to reduce the possible designs for the purchasing organization to a few generics/alternatives. Based on the brief analysis in this section (i.e. the questionnaires), the options Decentralized Purchasing, Centralized Purchasing, and Federal Purchasing could be rejected for Campina. This would leave Coordinated Purchasing and Center-led Purchasing. There is no need to make a rigid choice between the two remaining options. The right choice for Campina will probably be an option between Coordinated Purchasing and Center-led purchasing

According to Rozemeijer (2000b) Center-led purchasing might include harmonisation of specifications, centralized sourcing, etc. It is typically chosen in a situation where a fully centralized approach will not work, since decentral purchasing managers would not accept a central purchasing group telling them what to do. Although there are no genuine local 'Purchasing managers' at the Campina plants, it is a fact that they value a certain degree of independence.

In a coordinated purchasing approach, central policies are set up to ensure coordination and to promote professionalism in purchasing. Other options might include joint purchasing with other business units, selecting business units as lead buyers, centralizing certain aspects of negotiation, and hiring central purchasing experts to support the business units.

Centralized/decentralized & Pooling Alternatives (van Weele, 2002)
Rozemeijer's center-led and coordinated purchasing can be compared to respectively van Weele's (2005) Centralized/decentralized purchasing organisation and Pooling structure. According to van Weele, a centralized/decentralized purchasing organization is in general limited to very large international companies. In this structure, procedures and guidelines are designed centrally, while individual business units conduct strategic and tactical purchasing activities. Hence, some purchasing expertise and/or (higher) management is required locally to conduct strategic purchasing activities and there is a rather large degree of independence for local purchasers. These findings make this structure less suitable for Campina.

Van Weele refers to a more coordination-like structure with the term 'Pooling'. Pooling relates to *'efforts aimed at combining common materials requirements among two or more operating units with the objective to improve the leverage of the company in order to reduce overall materials costs and/or to improve the service obtained from outside suppliers'.* There is no central coordinating or controlling purchasing unit, which makes the Pooling alternatives also less suitable for Campina.

Both van Weele's alternatives are somewhat focussed on the 'decentralized' side, which requires more purchasing commitment and local purchasing knowledge than currently present. Both options should be placed at the left side of Rozemeijer's matrix, whereas the situation at Campina might be more suitable for an option on the right side of the matrix.

Given the first analyses, the alternative to be chosen shall be neither completely decentral nor completely central. The discussion of the Purchasing Decoupling Point has shown that a set-up in which centralized purchasing will take place from the supplier selection activity on might be considered. When comparing this finding to Rozemeijer's center-led and coordinated purchasing, it can be remarked that the former shows the most similarities. Coordinated purchasing might be considered too open-ended, while centralized *control* is lacking. Rozemeijer shows that, in order to make this alternative (center-led purchasing) work, Purchasing Maturity is very important, as is Corporate Coherence. For both aspects, Campina seems to score moderate to high, which approaches a hybrid form of Coordinated and Center-led Purchasing.

The overview gained in this section will now be used in the next sections to make a decision.

5.1.2 Reasons to Centralize

Several reasons to establish purchasing centralization can be identified. The reasons most often mentioned in literature can be divided broadly into four categories: Suppliers, Internal, Performance, and Market (Table 5-1). Additional commentary to these reasons can be found in Appendix F: Centralization Issues.

	Suppliers
1	Facilitate and improve supplier relationships through leverage effects (e.g. Baily et al., 2005; Poupaert, 2003)
2	Approach suppliers uniformly (e.g. van Weele, 2005; Arnold, 1997)
3	Enhance possibilities for supplier audits/evaluation
4	Reduce number of suppliers (e.g. Ribbers and Visser, 1993; Poupaert, 2003)
	Internal
5	Avoid price anomalies and competition between group units (e.g. Baily et al., 2005)
6	Improve the local focus on core activities
7	Stimulate internal exchange of information (e.g. Faes and Mathijssens, 1998; van Weele, 2005; Arnold, 1997)
	Performance
8	Achieve cost savings through synergy (e.g. Beker and Faas, 2000; Ribbers and Visser, 1993; Faes and Mathijssens, 1998; Arnold, 1997)
	Market
9	Improve negotiation strength (e.g. Ribbers and Visser, 1993; Baily et al., 2005)
10	Improve market negotiation strategy (e.g. Faes and Mathijssens, 1998)
11	Improve impact on monopolistic supply markets (e.g. Faes and Mathijssens, 1998)
12	Improve insight in market and cost structures (e.g. Faes and Mathijssens, 1998)

Table 5-1: Reasons to Centralize

5.1.3 Reasons not to Centralize

Next to the reasons to centralize procurement, literature mentions various reasons not to centralize procurement. These reasons can be divided into three categories: Suppliers, Internal, and Performance (Table 5-2).

	Suppliers
1	Keep close (short/direct) relationships with suppliers (e.g. Beker and Faas, 2000; Gadde and Hakansson, 1994; van Weele, 2005)
2	Avoid dependence on one or few suppliers
	Internal
3	Keep problem solving capabilities close to where the problems occur (e.g. Gadde and Hakansson, 1994)
4	Improve ability to respond quickly to emergency requirements (i.e. responsiveness in case of machine failure, etc.) (e.g. Baily et al., 2005)
5	Keep responsibility local (e.g. van Weele, 2005; Baily et al., 2005)
6	Prevent purchasers to alienate from core processes/internal customers (e.g. Beker and Faas, 2000; van Weele, 2005; Baily et al., 2005)
7	Enhance relevant detailed knowledge (of internal customers and local suppliers) (e.g. Baily et al., 2005)
8	Contain costs in each profit centre (e.g. Gadde and Hakansson, 1994)
9	Handle heterogeneous purchase portfolios between divisions (e.g. Ribbers and Visser, 1993)
10	Handle geographical spread of divisions (e.g. Ribbers and Visser, 1993)
	Performance
11	Reduce bureaucracy (e.g. Ribbers and Visser, 1993; van Weele, 2005)
12	Improve flexibility (e.g. Beker and Faas, 2000; Ribbers and Visser, 1993; van Weele, 2005)
13	Avoid time consuming centralization project

Table 5-2: Reasons not to Centralize

5.1.4 Other influences

Next to the reasons that might lead to a decision in favour of either centralization or decentralization mentioned in the previous section, there are other considerations that play a role in such a decision. Several situational aspects should be considered.

- Centralization is suitable in a cost minimization strategy (Ribbers and Visser, 1993)
- Decentralization is suitable in a differentiation strategy (Ribbers and Visser, 1993)
- Primary, non-repeating purchases should be handled centrally (Ribbers and Visser, 1993)
- A lack of central management tradition in a company makes it hard to introduce centralization
- Organizational support is essential for centralization to succeed
- The more homogeneity in commodities, the more suitable centralization is (Ribbers and Visser, 1993)
- For centralization to succeed, enough suppliers with sufficient reach should be available

Such factors should be considered before any decision is made with regard to centralization of purchasing.

5.1.5 Discussion of influences

Taking all the reasons for or against centralization as a starting point, this section discusses whether the situation at Campina is suitable for centralization and, if so, to what extent.

In Table 5-3, several considerations between central(ization) and decentral(ization) are mentioned. These considerations are based on the influences mentioned in the previous sections. In the left column, considerations that might lead to a decision pro centralization are mentioned, while the right column contains considerations against centralization or pro decentralization.

Central(ization)	Decentral(ization)
Cost Minimization Strategy	Differentiation Strategy
Strategic Products & Services	Routine & Leverage Products & Services
Homogeneous Purchasing Portfolio	Heterogeneous Purchasing Portfolio
Little Geographical Spread between Divisions	Large Geographical Spread between Divisions
Sufficient alternative suppliers (with adequate reach)	Local suppliers not replaceable
Management-holding	'Entrepreneurial-holding'
Negotiation strength important	Close relationships with suppliers important
Purchasing knowledge essential	Detailed technical knowledge essential
Substantial savings potential	Local cost containment important
Supportive nature of purchasing	Purchasing closely related to core processes
Efficiency important	Flexibility important

Table 5-3: Central or Decentral

I will now put these considerations in the context of Campina one by one.

At Campina, there is an obvious Cost Minimization Strategy. The product portfolio is more or less clear and Campina competes in the market on price and quality, which indicates a preference for *centralization*.
For MRO, the portfolio consists of Strategic, Routine ánd Leverage products and services. For such a portfolio, a mix of central and decentral purchasing is advised in literature. Furthermore, the portfolio is to a certain extent homogeneous, since many components and services purchased are used at most of the locations. This indicates a slight preference for *centralized* purchasing.

The geographical spread between divisions at Campina is minimal, compared to the spread of global buying companies with divisions in Europe, Middle East, and North America, for example. Hence, the geographical spread should be no barrier for *centralization*.

For MRO Generic Components and Services, there are sufficient alternative suppliers. For MRO Specific, however, there are already various non-local suppliers, for which there is often no central agreement and that are considered hard to replace due to specific knowledge or service. The more complex the component or service, the harder to replace a current (local) supplier. This indicates a barrier for synergy through centralization.

The type of holding at Campina is harder to describe. Although it is not defined anywhere, the organization would be best described as a management-holding. Traditionally, all the divisions and plants are controlled by central management, there is little independence with regard to policy-making. This type of holding could mean relatively little resistance to *centralization* of purchasing.

For MRO Specific, negotiation strength is of secondary importance to a close relationship with the supplier, since suppliers for this category are often rather powerful and important, which reduces the effect of negotiation strength of Campina. For MRO Generic, however, negotiation strength is more important since there are more alternative suppliers available, which increases the negotiation position and reduces the need to build a close relationship with a supplier.

A choice between purchasing knowledge and detailed technical knowledge should be avoided. Both areas of knowledge are needed in the process. Technical knowledge is essential in the specification and -to a lesser extent- selection stage of the process, while purchasing knowledge is more important in the contracting phase.

The comparison between 'substantial savings potential' and 'local cost containment important' does not seem to be totally equivalent. However, in this case it should be determined whether there is a priority to achieve savings through synergy effects, or that substantial savings have already been achieved and that the organization is in a state in which it is more important to control the remaining expenditures locally. At the moment, there seems to be enough savings potential at Campina. When synergy effects are achieved, it will become increasingly important to control the costs locally. The role of purchasing differs from activity to activity. In the specification phase, purchasing is closely related to core processes, while it has a more supportive nature in the subsequent phases. This indicates that a strict separation between central/decentral is not optimal.

Finally, it can be mentioned that the change rate in the purchasing portfolio for MRO is rather slow. This means that flexibility in purchasing is of less importance than efficiency. Centralization is the best approach for achieving efficiency benefits.

Although most of the conclusions above indicate that centralization is the right way for Campina, it is also clear that *complete centralization* is a bridge too far. Cooperation between central procurement and local purchasers is important in achieving the optimal performance. So, there should be a choice regarding where to put the line between decentral and central tasks and responsibilities. This conclusion is in accordance with the conclusion made in section 5.1.1. In the next section, the position of this 'line' will be discussed. For this discussion, we can use any of the methodologies discussed earlier as a starting point. Since the Purchasing Decoupling Point (PDP) offers the most possibilities for a 'free' redesign, this methodology will be the main guide for the initial redesign. The remaining methodologies will be utilized on the background.

5.1.6 Basis for Redesign

The previous sections led to an overview of reasons to either centralize or decentralize and factors that might influence this decision. In this section, these reasons will be considered in the light of the various design options discussed in section 5.1.1. As stated previously, the four options mentioned with regard to the Purchasing Decoupling Point will be mainly used.

Using the four situations illustrated in Figure 5-1 (i.e. Decentral Procurement (DP), Contract Management (CM), Approved Vendorlist (AV), and Central Procurement (CP)), the effect of each situation on the reasons for centralization and the reasons not to centralize can be examined. In the matrix in Table 5-4, the effects on the various reasons are valued. When a certain reason is not effectuated in a situation, it is valued by --. When the reason has a large effect in a situation, it is valued by ++.

Not all the reasons are equally important and some might not even be an issue at all (for example, the geographical spread is not of any genuine influence). So, in order to come to a valuable overview for Campina, the valid reasons should be selected first. Before selecting the valid reasons for Campina, the focus on MRO Specific and, to a lesser extent, MRO Generic should be established once again.

The reasons for either centralization or decentralization that are not of any relevance for Campina can now be deleted. These reasons are:

- Avoid price anomalies and competition (There are no reasons to assume that this has been a problem in the past)
- Contain costs in each profit centre (One of the reasons that Campina is considering central coordination of Procurement is to gain more insight in total spend and costs, companywide)
- Handle heterogeneous purchase portfolios between divisions (Although there are some differences between the various locations, purchases within MRO are to a rather great extent homogeneous)
- Handle geographical spread of divisions (There is relatively little geographical spread between the various locations of Campina)

On the contrary, there are some reasons that are in any way especially relevant for Campina:

- Enhance possibilities for supplier audits/evaluation (One of the problems at Campina that has been discussed is the lack of monitoring and evaluation)
- Reduce number of suppliers (Part of the original research assignment was to look for possibilities to reduce the supplier base)

- Stimulate internal exchange of information (Another problem that has been discussed earlier is the lack of information exchange)
- Achieve cost savings through synergy (The TASC Project clearly indicates that cost savings through purchasing are high on Campina's agenda)

These four reasons will be weighted twice as strong as the other reasons, while the reasons mentioned as irrelevant will not be considered. This results in the following matrix.

Reason	Weight	DP	CM	AV	CP
Improve negotiation strength	1	--	+	++	++
Improve market negotiation strategy	1	--	-	+	++
Improve impact on monopolistic supply markets	1	-	+	+	+
Improve insight in market and cost structures	1	--	-	+	++
Facilitate and improve supplier relationships	1	--	-	++	++
Approach suppliers uniformly	1	--	--	++	++
Enhance possibilities for supplier audits/evaluation	2	-	-	+	++
Reduce number of suppliers	2	--	--	++	++
Improve local focus on core activities	1	--	-	+	++
Stimulate internal exchange of information	2	--	++	++	+
Achieve cost savings through synergy	2	--	-	+	++
Keep problem solving capabilities close to where the problems occur	1	++	+	-	--
Improve ability to respond quickly to emergency requirements	1	++	+	+	--
Keep responsibility local	1	++	+	-	--
Prevent purchasers to alienate from core processes/internal customers	1	++	+	+	--
Enhance relevant detailed knowledge	1	++	+	+	-
Keep close (short/direct) relationships with suppliers	1	++	+	-	-
Avoid dependence on one or few suppliers	1	++	++	-	--
Reduce bureaucracy	1	++	+	-	--
Improve flexibility	1	++	+	-	--
Avoid time consuming centralization project	1	++	+	-	--
		-7	*3*	*18*	*9*

Table 5-4: Weighted Centralization Matrix

With the current criteria, it is clear that a situation with the Purchasing Decoupling Point after the Specification activity ('Approved Vendorlist') achieves the best score. This is supported by the outcome of the comparison in section 5.1.5. Hence, an organization with a central purchasing department as well as local purchasers, whose responsibility principally reaches as far as specification is considered, will be taken as a starting point for the current redesign.

Implementing a more centralized option might, according to Table 5-4, lessen the internal exchange of information. Moreover, problem solving capabilities would be more distant from the core processes and responsiveness to local needs would be significantly reduced. Another result might be that purchasers would alienate too much from the processes and that technical details are overlooked in a purchasing decision. Maintaining the specification activity local would reduce these risks. Nevertheless, further centralization might also have positive effects, including enhanced possibilities for supplier audits and evaluation, more cost savings through synergy and even more local focus on core activities.

Choosing for a *less* centralized option, however, would have a negative effect on negotiation strength and strategy, insight in the market, and supplier relationships. These effects would all be due to the fact that each location would approach their own suppliers, probably in their own way, and thus supplier relationships would be more fragmented. The number of suppliers would not be in control in this situation, which reduces the possibilities to improve the efficiency and to reduce costs through leverage effects. Less centralization (e.g. federal or local-led purchasing) might be driven by a belief that business unit (purchasing) managers should have complete control over their day-to-day operations (Rozemeijer, 2000b). However, such an option should be supported by -at least partly- autonomous local purchasing departments, which are currently not present. On the other hand, less centralization enhances the problem solving capabilities close to where

problems might occur and it might improve the 'closeness' of supplier relationships. Furthermore, decentralization improves the purchasing organization's flexibility.

Based on the brief discussions in this section, it can be stated that although the matrix led to a preferred alternative, there is room for alterations. The redesign of the purchasing organization should be tailored to the specific situation and not be restricted to a pre-fixed design option. The eventual redesign will be discussed in the next section.

5.2 Redesign: Introduction

The option 'Approved Vendorlist' as mentioned in Figure 5-1 will be tailored further in the coming sections. The (organizational) basis for this set-up is shown in Appendix G: Organizational Structure for Redesigned Process.

An important aspect of the design will be the distribution of tasks and responsibilities. It should be clear who has which responsibilities and when. Therefore, at each location it should also be clear who is the local responsible purchaser. The function of purchaser might be combined with another function locally, but nevertheless it should be clearly documented who is responsible locally. In advance, it should be noted that general strategic decisions are considered to be a central responsibility.

The redesign will focus on the tactical purchasing and how to perform these purchasing activities. However, some considerations will affect the application of the redesign. After all, not all MRO purchases should be purchased centrally; some goods or services are location-specific and the benefits of central purchasing are minimal. Hence, there should be a decision before each purchasing situation whether the redesigned track should be followed, or that the case should be considered an exception.

5.2.1 Redesign: Requirements & Limitations

Table 5-1 gives an overview of the Requirements and Limitations for the redesign.

Functional Requirements	***Comment***
Improve the availability of information for local purchasers.	*Contract Database should be included in the redesign.*
Clear structure for monitoring, evaluation, and feedback.	*Approach, procedures, and responsibilities should be clear.*
Improve communication regarding corporate agreements.	*Notification and consultation of local users should be warranted. Relevant technical details should be known in any central purchasing decision.*
Document procedures.	*Any procedures that ought to be followed should be documented (for example in a manual).*
User Requirements	***Comment***
Avoid extra effort for operational purchasers.	*Prevent new, time-consuming tasks for operational purchasers, since it is not their regular job.*
Limitations (Containing Systems; Ackoff, 1993)	***Comment***
Maintain current departments	*Head Office in Woerden (including purchasing department and other departments) is one of the 'containing systems'.*
Company culture	*The redesign should fit in the culture of own responsibility and a certain degree of individual independence for employees.*
Fit into current developments	*Current developments, such as TASC and similar projects, should be regarded as a 'containing system' for the redesign.*

Tabel 5-1: Requirements and Limitations

In the coming sections, the main functional requirements will be discussed.

5.2.2 Information Availability

Given the partly decentralized nature of the purchasing organization, it is essential that information is distributed from the central department to the local purchasers (and vice versa). On the one hand, the information that is made available should be as complete as possible. On the other hand, it should be easily accessible and 'navigable'. While the Contract Management System (CMS) offers possibilities to provide complete information on contracts and agreements, it might not be considered easily accessible by all users.

Complete information regards the following points:

- The CMS should provide a complete, up-to-date overview for all the users
- The responsible person(s) adds a copy of every contract-related document to the database
- Relevant (operational) users should be notified when a new contract is added to the database

Accessible information includes the following:

- Avoid extensive official documents when looking up practical implications of a contract
- Optimize the 'ease of use' of the contracts should be optimized; the CMS is often experienced as slow and/or complicated.

The (perceived) 'ease of use' might be improved by training the users of the CMS in using it. Another option is to introduce a sort of manual. This manual might include ordering routines as well as practical information for all the relevant agreements. The practical information might consist of a one page document with all the relevant information (i.e. tariffs, discounts, contact person, customer number, etc.). This document should be provided by the responsible lead buyer to all the local purchasers that are ought to use the contract. These local users maintain their manual and make use of it when placing an order. Exceptions should be made for orders with a high frequency that can be made without applying the manual each time.

5.2.3 Monitoring, Evaluation and Feedback

While suppliers are contracted centrally and used locally, it can be ambiguous whose responsibility it is to evaluate the performance of the supplier. Hence, clear agreements have to be made regarding the monitoring and evaluating of suppliers. Furthermore, feedback channels should be agreed on.

With regard to monitoring, it is important that:

- Supplier performances are monitored locally, where the operational activities are deployed
- Monitoring is a continuous process; local purchasers have to be aware of signals with regard to performance of suppliers ('subjective assessment'; van Weele, 2005)
- Tools should be used to monitor performance structurally ('objective assessment'; van Weele, 2005)

A number of assessment methods, both subjective and objective, will be selected. Local assessments will be partly subjective. Users (e.g. local purchasers, engineers, warehouse employees, etc.) should be continuously aware of signals with regard to supplier-related quality. Objective indicators will also be available, for example delivery reliability and percentage of faulty materials. For all such signals, a form has to be available to keep track of the performances. Ideally, this form would be available digitally, allowing the users to enter any kind of information (structured) on the computer (e.g. after their shift).

Since price agreements will be made centrally, price-related performances will also have to be assessed by the central purchasing department. This central assessment includes spreadsheets to compare and assess quotations in an early stage, as well as combining price issues to quality and delivery performance in a later stage of the process. Supplier audits should also be conducted by the central department, since supplier contacts are maintained centrally as well. However, specialized technical knowledge might be essential during the audit, so the central purchaser should form an audit team with local representatives. Since supplier audits are relatively time consuming, they should only be conducted periodically, for example once in every two year, although a new supplier should be audited after the first year.

With regard to evaluation, the following things should be mentioned:

- The local responsible purchaser should collect the remarks documented by the users and summarize these findings periodically in a subjective supplier evaluation.

- The quantitative data on delivery reliability and product/service quality should be processed on a regular basis in a repeatable way, preferably in the SAP system or in a spreadsheet.
- Centrally, the data collected and received has to be processed and used for management reports

Feedback should be internal as well as external. Internal feedback will be mainly bottom-up. Local evaluation results have to be communicated to the central purchasing department, allowing them to take subsequent steps whenever needed. This type of feedback should be carried out on a regular basis and contain both subjective and objective (e.g. quantifiable) measures. Moreover, evaluation results might be discussed in a meeting with representatives of all locations once or twice every year. During such meetings, there can also be some feedback top-down by the central purchasers. The central purchasers will also have to create feedback towards higher management in the form of periodical management reports. These reports should contain an overview of performance-related developments, results of actions taken and planned actions in the near future.

In order to allow suppliers to improve their performance, there should also be feedback from the central purchasing department towards these parties. Once or twice per year, the supplier should receive a report stating their performance with regard to quality and delivery. The report might be connected to a personal meeting when needed. The supplier might also receive a copy or summary of the audit report.

5.2.4 Improved Communication

The problem mentioned in this report is that the geographical distribution of responsibilities and knowledge leads to a complicated control and management of central agreements. Mainly, this concerns three lines of communication:

- Communication from the central purchasing department towards the local purchasers regarding corporate agreements
    - As suggested in section 5.2.2, lead buyers might submit a document with essential contract and supplier information to the local purchasers. This reduces their dependency.
- Communication from the local users towards the responsible purchasers regarding important technical details related to a purchasing decision
    - Purchasing specialists should remain involved in selection and contracting activities
    - Efficient communication lines should be settled to facilitate communication. Small project teams might offer possibilities in this context
    - Bottom-up feedback, as discussed earlier, is also part of this process.
- Mutual communication regarding responsibilities
    - Ambiguous responsibilities exist, which ought to be reduced by documenting procedures.
    - When monitoring, evaluation, feedback, and communication activities are performed in a structured, repeatable way, everyone will be aware of who has a certain responsibility and who performs a certain task.

5.2.5 Document Procedures

Basically, the documenting of procedures is a logical conclusion of the sections above. It has been suggested that contract information is stored and distributed in a more structured way, and that ordering routines and single page documents regarding main contents of an agreement are distributed to local purchasers. Furthermore, routines for monitoring, evaluation and feedback will be developed and internal communication lines will be deployed more consistently. All of this leads to a set of documented routines that should be available to all whom it concerns. Consequently, it ought to be expected that users apply the routines or procedures whenever performing a certain activity. In order to avoid resistance to these routines, however, they should be developed jointly with central as well as local purchasers.

5.3 Redesign: Activities

The discussion in Chapter 5.2 resulted in input for the eventual process redesign. In this section, the redesign will be presented and discussed for each purchasing activity in van Weele's (1995) Purchasing Process Model. These activities were already mentioned in section 4.2: Specification, Supplier Selection, Contracting, Ordering, Expediting, and Evaluation. The activity Specification has been combined with the Supplier Selection activity in this redesign. Each section will present the redesign of one activity.

The following design steps will be followed in these sections:

1. The points for improvement are discussed
2. The proposed process steps are presented
3. Discussion with stakeholders might lead to some alteration in these initial steps
4. The resulting redesigned activity is presented

The discussions with stakeholders mentioned as step 3 should bring the proposed process steps to a feasible design that ought to be able to deliver the desired results and that is also practicable. Stakeholders that were involved in discussing the design include the project owner (i.e. the Procurement Director), a strategic buyer (i.e. a lead buyer), Chief Technicians, an operational buyer (i.e. a planning employee), and the Procurement Controller.

During the redesign, it should be kept in mind that the preceding analysis resulted in a decision to introduce centralization of procurement *after* the specification activity. However, local commitment will still be needed in the later stages of the procurement cycle. General responsibility will be placed at the central purchasing department.

5.3.1 Redesign: Specification & Selection

The first activity to be redesigned is Supplier Selection, the Specification steps will be included in this redesign. First, the actual points for improvement will be highlighted briefly, after which a redesign for the various steps will be proposed.

1. *Points for Improvement*

The preceding sections of this report have shown that the main point for improvement regarding the supplier selection activity regards the communication between local and central purchasers. Relevant technical details have to be considered by purchasing specialists and local users might have to be heard when selecting preferred suppliers. Technical details should also be properly defined during the specification steps and agreement on these details should be reached before any suppliers are cont(r)acted.

2. *Process Steps*
    1. Set a functional and technical specification for the product or service to be purchased. Since technical details are essential in this step, it should be performed locally. This is in line with the conclusion that the Purchasing Decoupling Point should be placed after the specification activity.
    2. Jointly prepare the final specification and subsequently agree on a prequalification of suppliers. In this prequalification, local users have the opportunity to mention any difficulties with regard to the list of potential suppliers. In case the supplier to be contracted concerns multiple locations, one local representative should be assigned to prepare the final specification and make the prequalification of suppliers with the central purchaser.
    3. Send out RFQs (Requests for Quotation). This is a task for central purchasers, while this step requires purchasing expertise
    4. Jointly review quotations and assure that all details are known and considered.
    5. Final assessment of the suppliers/quotations (by a central purchaser).
    6. Select supplier (centrally)

Since the joint steps mentioned above might require some planning and can therefore be relatively time intensive, it should be noted that these process steps might not be worthwhile in case of a non-repeating purchase of a routine or leverage purchase (hence, a purchase with low supply risk).

3. *Alterations to the Process Steps*
    - The central purchasing department should trigger the process. Recognition of a certain need might occur locally, but initiating a specification procedure should be a task for the responsible lead buyer.

4. *Result*

During this first activity, extra attention has been given to communication and cooperation in this research project. Technical specifications play an essential role in making the right decisions, hence local and central influences should not yet be decoupled in this stage of the process.

The sequence of steps that is illustrated in Figure 5-3 will, however, only be followed during new projects or investments. It should also be noted that the liberty of choices is restricted by decisions made earlier regarding investments. In many cases, the choice for an OEM influences the options for MRO components and services in later stages, as was mentioned by one of the stakeholders.

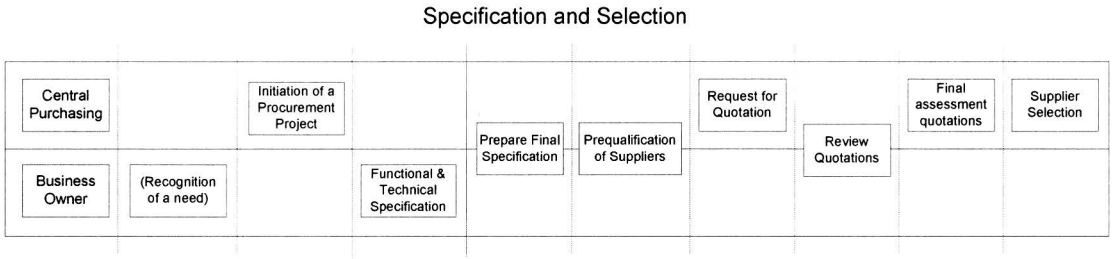

Figure 5-3: Final Redesign of Specification & Selection

An important consideration that should be included in the 'Prequalification of Suppliers' and the 'Review of Quotations' is the replacement of direct (simple) cost considerations with Total Cost of Ownership considerations. Hence, there should be considerable attention to effects that influence the total costs, such as: standstill of machinery (due to delivery times of components), loss of service efficiency due to learning cycle, etc. This might lead to a conclusion that local suppliers should not be neglected, which is currently the main opposition named by local purchasers during the discussions ("Local suppliers have proved to be able to react much quicker than centralized preferred suppliers").

5.3.2 Redesign: Contracting

The next activity in the redesign is the Contracting activity. In order to come to an Approved Vendorlist this activity will be centrally led.

1. *Points for Improvement*

The main point for improvement regarding the contracting activity lies in the sharing of information. The availability and accessibility of information on contracts and agreements is currently unsatisfactory for local users. The CMS can be seen as a part of this problem, since content is not always complete or up-to-date. Moreover, agreements might be so extensive that it is hard to subtract the needed information from digital files.

2. *Process Steps*

The contracting activity concerns mostly genuine purchasing-related tasks, which indicates that most of the steps will have to be performed by central purchasing specialists.

1. Prepare the contract (by the lead buyer).
2. Negotiate the proposed contract with the selected supplier (by the lead buyer).
3. Jointly review the contract internally and assure that any irregularities are taken away.
4. Sign and award the contract (by the lead buyer)
5. Distribute contract information internally and add contract to the CMS (lead buyer). Contract information should be a single-page document with all relevant information needed when placing an order.
6. Store the contract information (i.e. the contract sheets) locally in the ordering manual

3. *Alterations to the Process Steps*

- Existing experiences with (current) suppliers should be included in the negotiation process when a contract is renegotiated. This should not only concern subjective evaluations, but also factual experiences such as: "Which type of engineer do we hire most often?", "Which type of components have caused the greatest expenditures in the past?", and so on.
- A contract should not only be added to the CMS centrally, but the original contract should also be stored in the central vault by the lead buyer.

4. Result

In coherence with the discussion in section 5.1, this activity will be generally centralized. It will be the base for the availability of information during later activities. Contract sheets that should be made and distributed by the lead buyers provide tangible information for the operational users. This way, it should be avoided that

maverick orders are placed or that the agreed conditions are not complied to. Locally, the contract sheets are stored in an index. It is the responsibility of the lead buyer to (timely) update the contract sheets.

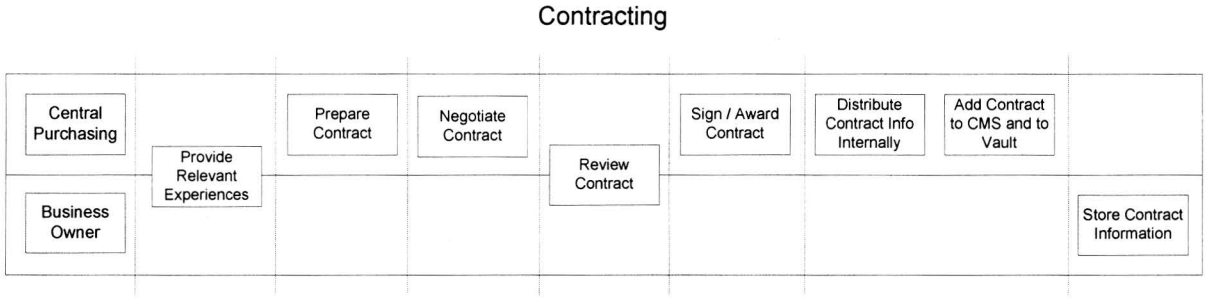

Figure 5-4: Final Redesign of Contracting

The first step mentioned in Figure 5-4 is optional; whenever a contract is renegotiated, or when a supplier has been selected with whom Campina has already had relevant experiences, this information should be included in the activity. In some cases, relevant information from other suppliers might even be used, for example when the type of engineers that should be included in the agreement is to be discussed. In such a case, experience from the past might learn that there is little need to include Junior Engineers in the agreement, because only Senior Engineers are hired, for example.

5.3.3 Redesign: Ordering

After contracting a (preferred) supplier, the next activity is placing an order. In this section, the redesign for this activity will be discussed. Ordering should be principally a local activity, while it has a more operational nature than the preceding (central or centrally coordinated) activities.

1. *Points for Improvement*

It has been remarked in the previous sections that information availability is important in the ordering activity. It should be clear to the local purchaser what agreements have been made with the suppliers and how an order should be placed and processed. Thus, the contract information should be easily accessible in this stage and uniform ordering procedures should be applied to the extent possible.

2. *Process Steps*
    1. Jointly establish an Ordering Routine. In this routine, operational steps should be defined, assuring that local purchasers will follow a uniform ordering process that satisfies their own expectations and that is feasible in practice. An Ordering Routine will also help in fighting Maverick Buying and stimulating a consistent supplier approach
    2. Communicate the ordering routine towards the internal (local) users. This should only be done when relevant by the lead buyer.
    3. Look up the contract information before placing an order locally.
    4. Define order specification locally.
    5. Apply ordering routine (by the local purchaser)

In case of purchases with a high frequency, the ordering cycle might be shorter (although a routine should be followed anyway to avoid inconsistencies).

Routine

Setting up an Ordering routine will ensure that the procedures are performed in a consistent and repeatable way. This will make the process more transparent and hence make it easier to identify any (future) problems in the process. Moreover, all internal and external stakeholders are approached in a consistent and uniform way and there will be few differences between the various types of data that is stored during the process at the different locations. The routine should describe how an operational purchaser should place his order; how to use the SAP system (or any supporting system) and how to apply the agreements in the contract manual. Moreover, it should mention how to act in case of a problem (either order- or supplier-related).

3. *Result*

From this activity onwards, routines will be used to make the processes repeatable and controllable. It is essential that these routines are developed in close cooperation between local and central purchasers. This way, agreement should be reached regarding the steps in the routine and it can be avoided that users refuse to comply with the new agreements.

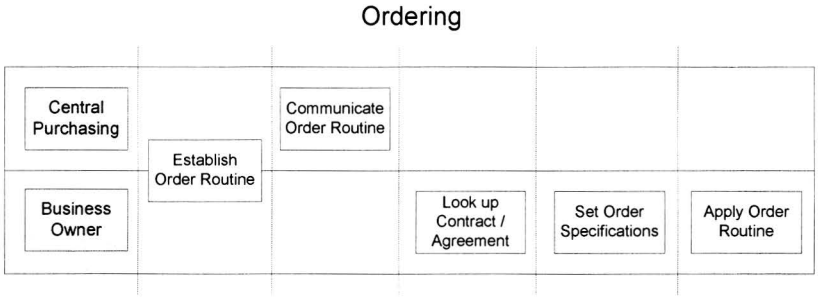

Figure 5-5: Final Redesign of Ordering

During the establishment of the Ordering Routine, existing routines should also be evaluated. The most pertinent Ordering Routine refers to the handling of invoices, which are currently handled centrally. According to local stakeholders, there seems to be no agreement on the benefits of this routine, which points out the need to evaluate such routines. Moreover, it indicates the importance of setting routines in close cooperation and consultation.

5.3.4 Redesign: Expediting

The next activity concerns the expedition of the order, hence the activities performed between the moment the order has been placed until it has been received and stored/processed.

1. *Points for Improvement*

In the preceding chapters, it has been concluded that there is a lack of monitoring and evaluation in general, which also includes the order follow up (i.e. check accordance of delivery with agreements). Thus, the main point for improvement is to develop a fixed routine for expedition, referring to the use of -for example- exception reports (e.g. delivery overdue lists and incoming inspection reports). In a later stadium, the findings in this activity should be used for evaluation purposes.

2. *Process Steps*

1. Jointly establish an expedition routine. This routine will avoid inconsistencies, improve the uniformity of dealing with an order/supplier and it will help structuring the subsequent performance monitoring and evaluation process. The development of the expediting routine should include the design of uniform report forms to be used for ad-hoc supplier comments. Furthermore, the handling of these forms (e.g. enter them in SAP) should be defined.
2. Communicate the expedition routine internally (by the lead buyer).
3. Apply the expedition routine locally. This would mean that the local expeditors take notes with regard to the order handling/follow-up by the supplier. The responsible local purchaser should process these notes and prepare them to be used in a later evaluation stage

Routine

The expediting routine will describe all activities to be taken care of when expediting an order. Although all activities between order and delivery might be formally described in the routine, only the key elements will be highlighted here.

The main element is that the expeditors (e.g. a warehouse or a planning employee) fill in their exception reports. All situations that are not conform to the agreement should be written down in a repeatable way, thus using fixed indicators. The main indicators to be used during expedition will be:

- Timeliness of delivery (only report overdue deliveries in number of days overdue).
- Faults/errors at delivery (report any inconsistencies during delivery regarding quality, quantity, etc.)

The local responsible purchasers should collect the reports periodically and enter them in the SAP system. Another option is to use online/digital exception reports that are collected automatically.

The expediting routine should include an escalation procedure. In case of an urgent situation, immediate and effective action is needed. Some situations can be handled locally, while other situations might call for corporate action. Some situations will be mentioned here:

- Contract related situations
  Contracting will be part of corporate purchasing, hence situations during expedition that are not in line with contractual agreements will call for corporate action. When a supplier indicates that it can not or will not keep the agreements, the responsible local purchaser should signal this to the corporate lead buyer so that appropriate action can be taken. Examples of such situations might be: an unapproved price rise by supplier, rejection of order/job by supplier.
- Order related situations
  When a supplier has problems delivering a certain specific order (in time), the problem should in principle be handled locally, since the effect is mainly on the operational processes. The local responsible purchasers will have to act as a link between the internal customer and the supplier and deal with the delay or the other consequences. The results will have to be fed back to the central purchasers. This data might be used by corporate purchasers to take preventive action (van Weele, 2002).

3. *Result*

Ad-hoc evaluation data should be collected during the expedition activity, as a basis for subsequent evaluation and feedback activities.

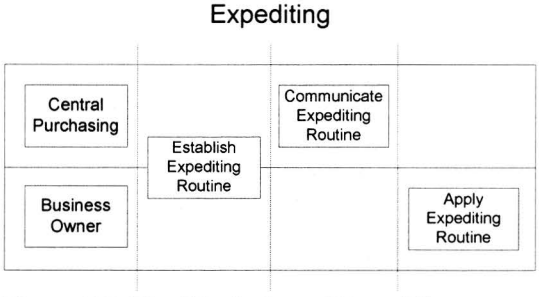

Figure 5-6: Final Redesign of Expediting

For the sake of data collection, exceptions reports can be used. These exception reports should be filled in whenever a delivery date is not met by a supplier, or when the quality of the goods or services delivered is not up to the agreements. It should be noted, however, that the use of exception reports might be replaced by another way of monitoring. A suggestion was made by one of the stakeholders to link the reception of goods in SAP to the order confirmation (in which a delivery date is agreed), although this would require extra administrative effort. The eventual decision depends on the discussion that leads to the Expediting Routine.

5.3.5 Redesign: Evaluation & Feedback

The final purchasing activity to be redesigned concerns the Evaluation and Feedback.

1. *Points for Improvement*

Evaluation and Feedback of supplier performances has been lacking in the past at Campina. In order to improve the supplier performances, an efficient evaluation and feedback process has to be developed. All the performance-related data that is gathered in the preceding activities should be transferred and processed in a fixed and repeatable way. Furthermore, new (post-expedition) data should be created and processed.

2. Process Steps
   1. Jointly establish an evaluation routine. The routine should describe how the monitoring-data gathered in the preceding activities should be processed. Furthermore, it should describe what new data should be created. This data might include post-expedition comments on the supplier performance such as[8]: reliability, cost, order accuracy, delivery/timeliness, quality, business relations, personnel, customer support, and responsiveness
   2. Communicate evaluation routine internally (by the lead buyer).
   3. Apply the evaluation routine locally.

[8] Evaluation criteria based on Past Performance Evaluation™ by Open Ratings and Dun & Bradstreet (http://www.openratings.com/services/Services_PastPerformanceEvaluations.html)

4. Document evaluation data locally in a prescribed way, for example in standardized (management) feedback reports, preferably electronically.
5. Create central (corporate) supplier reports of all evaluation data.
6. Provide internal feedback.
7. Jointly review and discuss feedback.
8. Provide corporate feedback towards suppliers

Routine
The evaluation routine will describe formally how the stakeholders should act with regard to supplier evaluation. This routine will concern two aspects:

I. The data gathered in the preceding steps (mainly in the Expediting step) will have to be processed. Although this data should already be uniform to a certain extent, it is important that there are as few as possible dissimilarities between the evaluation results from different locations. When there are too many dissimilarities, it is hard to create a corporate view on the performance of a certain supplier.
II. Additional post-expedition evaluation results have to be noted down. Since this should be done in a repeatable and uniform way, questionnaires might be used that are filled in periodically in case of a regular supplier.

Formalisation of the data processing can best be facilitated electronically. The exception reports, that are filled in locally by the employee handling a certain order, might be entered in SAP by the local purchaser. The same system should be used to generate feedback reports for central purchasers.

3. *Alterations to the Process Steps*
   - The lead buyer should provide any evaluation tools that are needed to apply the evaluation routine, such as questionnaires.
   - During the establishment of the Evaluation Routine, there should be enough room for discussion with the local operational purchasers. There might be a lot of current experiences or even frustrations that require considerable attention in order to develop an evaluation routine that is to everyone's satisfaction.

4. *Result*
The Evaluation activity is currently one of the least structured activities at Campina. Only a certain degree of subjective evaluation is already performed through periodical meetings with all the Chief Technicians. Cooperation and communication is the basis for an efficient and more structured evaluation process.
The lead buyer will take responsibility for communicating a common Evaluation Routine to the local responsible persons, as well as for providing possible evaluation tools (e.g. questionnaires). Recently, an initiative has been deployed to evaluate performances using such a questionnaire. This form of evaluation would require a more proactive approach of the lead buyer and would put less initiative with the local user. Performance indicators for objective evaluation will be discussed during the establishment of the routine.

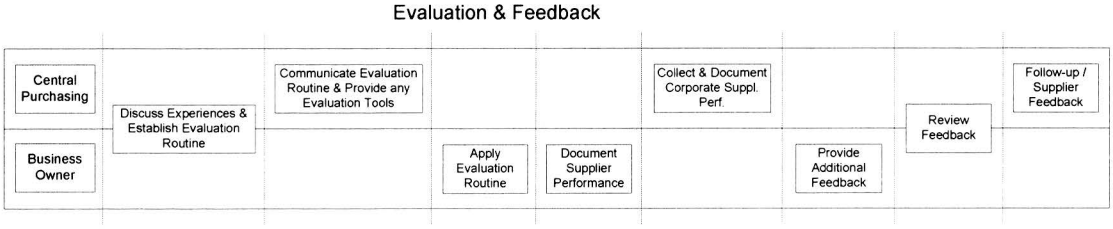

Figure 5-7: Final Redesign of Evaluation

The objective and subjective evaluation that have been mentioned in sections 5.2.3 and 5.3.5 are mentioned in Figure 5-7 as respectively 'Supplier Performance' and 'Additional Feedback'. There is no mutual step between the local 'Document Supplier Performance' and the central 'Collect & Document Corporate Supplier Performance' since it can be assumed that these documenting steps will be performed via (reports in) SAP. The reviewing of feedback should be done during a mutual effort in which the most operational buyers (e.g. warehouse employees, planning employees) should also be involved and not only Chief Technicians and Lead Buyers, since the former have the most day-to-day contact with suppliers. Currently, the operational purchasers feel rather ignored.

5.3.6 Redesign: Local Effects

The redesigns presented in the preceding sections will cause some changes when implemented. These changes will have an effect both locally and centrally. Although currently the Chief Technicians are already regarded responsible for local technical purchasing, they should be properly introduced to this task. These changes will be discussed in this section.

Locally, there will be effects for the local purchasers and the expeditors. The role of local responsible purchasers should preferably be fulfilled by the Chief Technicians, because they are closely related to the MRO products and services and have a leading role in the related processes. Moreover, they are already responsible for the purchases to a certain extent, in the current situation. The more operational purchasing tasks, however, ought to be performed by either a warehouse employee or a planning employee.

Currently, there is a general responsibility of the Chief Technicians with regard to purchasing activities. In the new situation, the local purchasers should have a clearer and better described purchasing task; the Chief Technician ought to have a more leading or controlling role over the operational purchasers such as warehouse and planning employees. Essential for this redesign is local acceptance that suppliers will be contracted centrally, influenced by the specifications they provide (and in a later stage, the feedback they give). Based on a functional and technical specification, the responsible local purchaser will have to take part in a constructive discussion with the lead buyer. He will also have to take part in the review of quotations and contracts. Since local suppliers are not contracted on a weekly basis, and one representative will be assigned when multiple locations are concerned, it is not to be expected that these tasks will demand a lot of time from the Chief Technician.

Another task that will demand some effort from the Chief Technician will be the management of Contract Information. Lead Buyers will supply Contract Sheets with the most important agreements to the Chief Technicians, these sheets will have to be stored and updated when new information arrives. Furthermore, the Chief Technician has to be aware of how to look up extra information in the Contract Management System.

The Chief Technicians of all plants will have to agree on an order routine together with the central purchasers. During this process, they should consider their possibilities and settle on practicable agreements. Eventually, they will have to apply (or manage) the agreed routine when placing an order. Perhaps this will require some training, but the routine should be designed as user-friendly, effective and workable as possible. Also in this situation, the Chief Technicians ought to pay attention to the contract information that they received from the Lead Buyer(s).

During the expediting phase, the Chief Technicians will have to take on a more leading or coaching role. In the subsequent evaluation phase, the local purchasers (i.e. the Chief Technicians) should sponsor the evaluation routine (jointly designed by all local and central purchasers) and personally process the evaluation data (i.e. exception reports), for example in SAP. Additionally, the local purchaser should provide internal feedback regarding suppliers on a regular basis (i.e. periodically) and review the feedback jointly with his fellow Chief Technicians and Lead Buyer(s).

Overall, the main effect on the Chief Technicians is that they will officially be assigned a purchasing function and that the tasks and responsibilities to this function will be documented.

The task of the local expeditors (i.e. warehouse employees or planners) will be slightly influenced by the proposed redesign. They are expected to place orders applying the ordering routine, and whenever possible to use the contract information that is available locally. Furthermore, these employees will have to be aware of supplier performance. Using standardized evaluation sheets (i.e. exception reports), any irregularities or other comments should be recorded. Lastly, they should be aware of the local purchasing function and actively support this function by giving any kind of relevant feedback.

5.3.7 Redesign: Central Effects

The current purchasing role of the central purchasers is already a strategic one; this status will not be altered by the redesign. However, the Lead Buyers for MRO components and services will have to operate more closely with the local stakeholders. After all, the analysis has shown that the sharing of information and the application of knowledge is not always considered to be optimal by local employees. A closer cooperation

with the local responsible purchasers, the Chief Technicians, as well as with the truly operational purchasers, will be requested.

First of all, cooperation will take place in preparing the final specification for a certain product or service and in pre-qualifying suppliers. This way, the central purchaser will give the Chief Technician and the operational purchasers the opportunity to initially restrict the number of suitable suppliers. After quotations have been received from the selected suppliers, the central purchaser will once again have to approach the responsible local purchaser to jointly review the received quotations. By following this protocol, the chance that a supplier is chosen that does not fit the local expectations is reduced.

More or less the same approach should be used when reviewing the eventual proposed contract. This will allow the responsible local purchaser to approve the contents of the contract, which will reduce the chance of local resistance. After the contract has been awarded to the selected supplier, the central Lead Buyer will have to make a sheet with contract information and distribute this information internally. Moreover, he/she should add a digital copy of the awarded contract to the Contract Management System.

In order to stimulate the use of preferred suppliers and enhance the possibilities for collecting purchasing management information, central purchasers should cooperate with (representatives of) all local purchasers in developing an order routine and communicate this routine within the company. The same should be done for establishing an expediting routine. This last routine will lead to management information with regard to supplier performance. For processing and controlling this and other management information, an evaluation routine will be developed and communicated.

Eventually, the Lead Buyer has to collect supplier performance information, possibly through SAP, and document this in Management Reports. Additional feedback should be reviewed jointly with local purchasers and eventually the Lead Buyer should periodically perform Follow-Up actions or provide feedback towards the supplier.

5.3.8 Redesign: Resistance

Resistance to change is a common phenomenon in any organizational change. Resistance might be caused by four main reasons, according to Woldring (1999); (1) stakeholders do not *understand* the change, (2) stakeholders do not have the *time* to engage with the change, (3) stakeholders do not have the *competencies* to engage with the new situation, and (4) stakeholders do not *share the values* that drive the change.

All these reasons might be relevant at Campina. In the current situation, the first reason for resistance might exist due to the fact that local employees are not fully aware of corporate interests. According to Nelson et al. (2005), however, carefully introducing the redesign and the economical benefits might take away this form of resistance, while discussing the change on basis of equality will contribute to this.

The second reason is to be expected as one of the main difficulties mentioned by Chief Technicians. They already have their operational responsibilities with regard to the every-day work at the plants. Hence, it has to be carefully considered and discussed whether the new tasks and responsibilities can be taken up by the Chief Technicians, or that (1) some of their current tasks have to be reassigned or reorganized or (2) some of the purchasing tasks have to be assigned to another (new) employee.

A lack of competencies might also be a motivation for resistance. Chief Technicians are trained in technical and engineering matters and are no purchasing professionals. However, given the fact that the responsibilities and tasks in their purchasing function largely have an operational or managerial nature, it should be expected that they are capable of performing them. However, training should be given during the introduction of the redesign and the accompanying routines.

Finally, it might occur that Chief Technicians and/or warehouse and planning employees do not share the values that drive the change. Their focus is on assuring and maintaining the operational processes, and less on achieving savings or engaging in relationships with suppliers. The importance of strategic (purchasing) goals should therefore be made clear and agreement on these goals should be reached.

Nelson et al. (2005) add 'fear' as another reason for resistance. Fear of job loss, fear of having to learn new processes, or fear of having to move to another area are examples of such fear. The first and the last mentioned will not be relevant, while the fear of having to learn new processes might be reduced by providing decent information and instruction regarding the change of the background. Nelson et al. (2005) mention that the fear is largely taken away when the before and after are presented in spend management dollars.

Concluding, it can be remarked that most of the resistance should be taken away by proper training and introduction. However, attention should be given to the function of Chief Technician. The renewed purchasing tasks will take some effort and planning, which has an impact on their daily business. Hence, the new situation should be discussed with Chief Technicians extra carefully and operational problems should be considered seriously.

5.3.9 Redesign: Benefits for Campina

Now that the optimal redesign for the MRO Purchasing Process at Campina has been decided on, the actual benefits for Campina can be defined.

Intentionally, the redesign improves the availability of information for local purchasers. Doing this, the risk of maverick buying should be reduced and contract compliance improved. Although it is difficult to quantify these benefits, since data on maverick buying and contract compliance with regard to MRO purchases at Campina are not available as yet, it can be assumed that providing the right information will deliver positive results in this context. During a panel discussion published in Supply Management (Anonymous, 2001b), it was suggested that the costs of non-compliance might lead to an average extra costs of €32 million[9] per year and that the main reason for non-compliance is that "users didn't know about the deal".

Given that the annual spend for MRO Specific at Campina CPE Netherlands is around [redacted][10], and that the corporate deals lead to an average *proposed* ten percent saving[11], a 10% improvement of compliance might already lead to an addition in the achievement of savings of [redacted] per year. Note that this figure refers to the spend of only six plants in the Netherlands. Eventually, reduced maverick buying and improved contract compliance might enhance the leverage effects at suppliers and stimulate further savings.

Furthermore, the looking up of contracts by local purchasers requires less effort and time, when the information can be looked up in an ordering manual with contract sheets for all the agreements. Another benefit for Campina would be the improved communication regarding (settling) corporate agreements. When the communication is optimal, the risk of contracting the wrong suppliers or making incomplete deals is reduced. Currently, one of the most important suppliers for Electro-technical services is not contracted centrally. Assuming that at least 50% of the spend at this supplier (approximately [redacted] in 2005 for Campina CPE Netherlands) can be assigned to services (instead of projects), a corporate deal with a 10% saving might lead to savings of [redacted] and more per year (again, for only six CPE NL plants).

The documented procedures (i.e. the routines) should lead to an improved overall efficiency in both the ordering process as well as in the follow-up processes (expediting, evaluation). Repeatable processes reduce the need for extra checks and reduce the chance that certain tasks are performed more than once or not at all. This benefit can not be quantified as yet.

5.4 Implementation of the Redesign

The MRO procurement organization will have to switch from the current situation to the new situation. In this section, the implementation of the redesign will be discussed in phases.

5.4.1 Preparation Phase

During the preparation phase, project teams will have to be formed. In order to develop the various routines, *lead buyers* should gather in a team with *operational buyers* (i.e. Chief Technicians as well as warehouse and planning employees). Such teams should be formed to develop:

[9] Measured among companies with an annual turnover in excess of €300 million (~£200 million)
[10] Based on the budgets for 2006 (excl. Technical Department costs)
[11] Based on TASC deals for *MRO Generic Services* at Campina

- An Ordering Routine
  It should be kept in mind that not all plants currently have the same systems. Therefore, a user of at least each non-standard 'system' (e.g. MP2, SAP PM Module) should be represented in this team. One or more of the lead buyers should also take place in this team, as well as one of the SAP Administrators to exemplify any SAP-related matters.
- An Expediting Routine
  Gathering data will be one of the key points of this routine, thus the team should include someone with knowledge of supplier performance in SAP (this is currently under development within Campina). Representatives of the operational purchasers as well as lead buyers should also take place in this team
- An Evaluation Routine
  SAP will play an important role in the Evaluation routine. Therefore, someone with expertise regarding supplier evaluation in SAP should take place in the team. Possibly, this is one of the SAP Administrators. Once again, lead buyers and operational purchasers ought to complete the team

The teams mentioned above will have to be managed by the NPR Procurement Manager.

Enabling the monitoring and evaluation activities in SAP should also be part of the preparation phase. However, this is already part of other projects within Campina (SAP re-implementation and a study of Supplier Performance Measurement in SAP). Therefore, these aspects of the redesign should be integrated in other projects to the extent possible. Next to the evaluation in SAP, other evaluation tools (e.g. subjective questionnaires) ought to be used. During the preparation phase, lead buyers should develop such tools.

5.4.2 Introduction Phase

During the Introduction Phase, a kick-off meeting should take place with all the relevant stakeholders. The Procurement Director will take the lead during this kick-off meeting, to indicate the importance of the changes to take place. Obviously, each redesigned activity should be presented step by step, and the main changes will have to be highlighted during the meeting. Other goals of the kick-off meeting are:

- Give attention to the importance of cooperation and communication
- Give attention to the central and local responsibilities
- Introduce the routines and explain the benefit of these routines
- Introduce the use of Contract Sheets
- Instruct purchasers with regard to new monitoring and evaluation approach
- Provide a platform for *all* the stakeholders on which they can express their opinions.

Other training and instruction will be needed for some users. The operational purchasers ought to be instructed on how to properly use the SAP system and the supporting systems and on how to act in case of problems. One of the lead buyers should provide the instruction in cooperation with a SAP administrator. The lead buyers should be clearly instructed on how to manage their contracts in the CMS. That is, their responsibility should be clear and the main functionalities of the system ought to be known. The current system administrator for the CMS (one of the SAP Administrators) will have to take care of this instruction.

5.4.3 Operational Phase

At the beginning of this phase, the redesign will be launched; the redesigned processes will be put into practice. Especially during the first months of this phase, there is an important role for the Procurement Manager for NPR. It will be his task to manage the process and oversee the cooperation between lead buyers and operational purchasers. Moreover, he will oversee the compliance to the processes through on-site visits and meetings with operational purchasers.

The operational purchasers will have to become accustomed to consistently using the contract sheets and applying the various routines. Lead buyers will have to take a leading, or even managing role. They manage their purchasing process and will have to maintain the contact with plants and suppliers. Chief Technicians will be a vital link between central purchasing and the operational purchasers.

Process evaluation should be performed on a continuous basis. The Procurement Manager for NPR will control the generic, overall, process. The lead buyers will also take a managing role and control the process on a higher level. Internal audits might be used to identify any problems or bottlenecks in the process, and contact with the operational buyers should be maintained. However, the frequency of such actions will decrease with time.

6 Redesign of Spend Management

One of the research questions that has been deducted from the analysis in this project, is *"Is there a more appropriate Information Structure possible for MRO Spend Data? What methods and tools could be used and how should they be used?"*.

The analysis in chapter 3 showed that a redesign is needed in order to create insight in the actual spend on MRO purchases. Currently, such an overview is missing which reduces the possibilities of Spend Management and relevant Management Reports. Eventually, the Information Structure for MRO Spend Data should enable the use of the Business Warehouse system CATIS for generating spend reports in this category. Information Structure refers here to the way in which the data and information in the IT infrastructure (i.e. SAP/CATIS) are organized and in which way the information (structure) is employed for Spend Reporting purposes.

First, the redesign procedure will be discussed after which the design steps will be filled in.

6.1 Redesign Procedure

Minahan and Dignan (2005) studied and identified a number of strategies for effective spend data management. They defined several best practice steps in order to come to efficient, accurate, and complete spend management. The first steps of their list are:

I. Audit existing spend data management capabilities
II. Access all spend data sources
III. Adopt a common classification schema
IV. Create a repeatable process using software or services

These steps can be translated to the current project to a great extent. First, the current infrastructure and/or architecture with regard to Spend Management should be examined, after which data can be traced from all Spend Data sources. A classification, or categorization, scheme would be the next step, while a repeatable process is in fact already facilitated through the Business Warehouse system CATIS. This process should, however, be adapted to the new situation.

The following sections will discuss the four steps mentioned in this section.

6.2 Existing Spend Data Management Capabilities

This section will explore the current capabilities for Spend Management. First, the current relevant data infrastructure at Campina will be discussed. Next, the current categorization will be discussed.

6.2.1 Current Infrastructure

The figure in Appendix H: ERP and BW Infrastructure / Functionality provides an overview of the infrastructure for the Warehouse system MP2, ERP system SAP, and Business Warehouse (BW) system CATIS. In MP2, which is not used at every location, users can enter their orders for warehouse items. Once in a while, these order(line)s are combined, or merged, manually and entered in the SAP system.

All Purchase Orders (POs) can be looked up in SAP, as well as Creditor (i.e. Supplier) information. Using Supplier and PO Data, CATIS can retrieve basically three main kinds of reports; Supplier Reports, Category Reports, and Location Reports. The differences between these three reports can be found in the hierarchic structure of the reports. Supplier reports offer an overview of spend categorized on suppliers, while categorization on category/commodity and location are the other options. All these reports are put together based on Material Codes (UNSPSC[12]) and/or Supplier Codes (DUNS[13]). Thus, in order to create useful Management (Spend) Reports, these codes should be used consistently and uniformly for all Purchase Orders. Another option might be to apply a different coding system for MRO (or NPR). I will discuss this matter later.

[12] Universal Standard Products and Service Codes: A set of product and service classifications which assigns a unique code to every commodity.
[13] A 9 digit number created for an organization by Dunn & Bradstreet. A different DUNS number shall be assigned for each physical location, address, and co-located legal division of an organization.

Another possible source of spend information are General Ledger Account Numbers or the Accounts Payable administration. This does not seem an optimal situation for Campina, however, given the fact that CATIS already offers potential to automate the generation of reports based on article or supplier codes. Spend Reports that are provided by suppliers may also be a valuable source of spend data, either for the generation of reports or for a check on the completeness of the internal reports. These reports should be processed manually, however, since they can not be handled by CATIS.

There are several alternatives to be considered in order to achieve the optimal functionality, which will be discussed in the next sections. First, the current lay-out (i.e. classification or categorization) will be examined.

6.2.2 Current Classification/Categorization

Currently, there are several classifications that might offer potential in the context of this research. These classifications will be discussed briefly in this section.

Classification	Comment
UNSPSC Number	Currently only used for PR-articles. The number can be used to zoom in and out on categories. Provided that UNSPSC numbers are assigned correctly and consistently, these numbers can be very useful for classification purposes. However, in case of technical suppliers that supply hundreds (or more) of slightly different components, such a classification might lead to an explosion of UNSPSC codes
Supplier DUNS Number	Currently each PR supplier has a unique DUNS number, which can be used for grouping and/or categorization purposes. The analysis would gain in depth when each DUNS number could be linked to a certain category of products and/or services. Originally, the DUNS numbers are designed to trace mother/daughter-relationships between companies
Good/Commodity Group	Currently stored for each Purchase Order. There are 151 Campina-specific groups, which might be used for categorization purposes. Although these groups might be useful for analyzing the spend in certain categories, they seem to be rather broad and unspecific.
General Ledger Account Nr.	Within Accounts Payable, there are 500 General Ledger Account Numbers. These numbers can also be used to trace and group expenditures. They are, however, not 'designed' to deliver specific commodity-related reports, but for internal, functional, reports.

For an optimal analysis, data classifications should be accurate and of sufficient depth. In this context, classifications are accurate when they can be used to give insight in specific categories. Thus, to what extent can a classification pinpoint a certain category? Depth refers to the extent to which one can zoom in on a certain category until the end is reached. Thus, depth is the extent to which you can keep zooming in, while accuracy refers to the chance that you will find the right information (i.e. the desired -type of- category).

UNSPSC Numbers can be generally considered the most accurate as well as containing the most depth. Classification by Supplier DUNS Numbers would contain slightly less depth, and would be substantial less accurate. This option could be more accurate when each supplier is generally restricted to one product or service. When this is the case, the reports will deliver the desired level of detail (i.e. the level needed to generate Spend Management reports). The depth of this classification is generated by combining Suppliers in categories and subcategories

Good/Commodity Groups can be considered rather accurate, depending on the number of groups, whereas the current use of such group contains little depth. Lastly, the general ledger numbers are not quite accurate nor deep, since they were not specifically designed for the functionality desired here.

There are several considerations with regard to applicability and implementability that should be considered before a choice can be made. Such considerations will be included in the discussion in the next section. Article codes (e.g. UNSPSC numbers) and supplier codes (e.g. DUNS numbers) will be selected as a starting point.

6.3 Towards a Common Classification

First, two main options (with two sub options each) will be considered that are based on the current 'Architecture' (i.e. MP2/SAP/CATIS, Appendix H: ERP and BW Infrastructure / Functionality), but with a new Information/Data Infrastructure. Another option with an alteration in the architecture will be considered as well.

6.3.1 Introduce UNSPSC Coding for NPR (1)

The first option is to introduce the Coding system (UNSPSC) for all NPR purchases, which is currently not the case. For MRO, all components and services should be assigned a UNSPSC code, which should be applied at all locations in the Netherlands, Germany and Belgium.

The option would involve exploring and documenting all the commodities within NPR or MRO, categorizing them and assigning a unique UNSPSC code to them. When entering an order, the user has to select the correct UNSPSC code. This code will be stored with the Purchase Order and it can be used by CATIS to create customized reports. The UNSPSC codes in SAP could be predetermined, allowing the user to select the correct code from a list or menu. However, codes may also (have to) be entered manually by the user.

The categorization to be considered here is on a quite low level of abstraction, because each single component or service would be assigned a UNSPSC code and thus be considered as a category. Detailed relevant knowledge is essential in the design of the categorization and thus, input from stakeholders is an important factor in order to come to such a categorization.

A constraining factor may be the infrastructure/architecture offered by the SAP systems (Netherlands, Belgium and Germany) and the Business Warehouse system (CATIS); the concept of the categorization should be implementable in this architecture. The categorization should eventually offer more transparency into what is bought at the different locations of Campina, and which synergy potentials might exist.
A concept for the lay-out of the categorization is shown in Figure 6-1. The top level category (i.e. Category A) is relatively broad, while the subsequent lower level categories are in more detail.

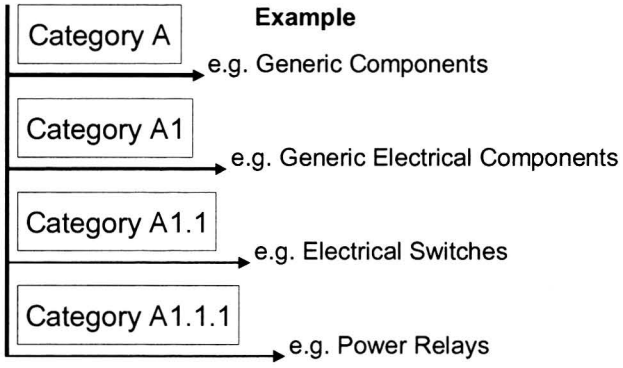

Figure 6-1: Categorization Lay-out

Within this option, two alternatives can be identified:

1a) All the UNSPSC codes assigned to the categories and commodities will be entered as an article in SAP. Users might be obliged to always select an article out of a predetermined list with all the codes/descriptions and subsequently fill in the remaining PO Data. In case of a new commodity, an administrator should create the new article in SAP and assign a correct UNSPSC code.

1b) The user has to look up and select the correct UNSPSC code manually and enter this code in the Purchase Order. Thus, there is no need to enter all the new articles and edit existing articles in SAP, although an up-to-date UNSPSC source has to be available.

6.3.2 Attach classification codes to Supplier (2)

Another option is to attach a classification code to a supplier, instead of to a commodity. The categorization will then no longer be on a product/article level, but on a supplier level. This would involve assigning a certain code to each supplier within SAP and tuning the CATIS system in order to process these codes.

Once again, the infrastructure/architecture offered by the SAP systems (Netherlands, Belgium and Germany) and the Business Warehouse system (CATIS) may be a constraining factor, since this option should be implementable in the current systems.

There are two alternatives within this option:

2a) A UNSPSC Code is attached to each supplier in the SAP system. Whenever an order is placed at that supplier, it is automatically assigned to a commodity through the UNSPSC code. It should be kept in mind that a supplier can only be assigned a single UNSPSC code in this set-up. Thus, if a supplier can not be restricted to one single (UNSPSC) commodity for, for example, 95% of all purchases at that supplier, this option might not lead to reliable management information.

2b) Another, tailored code is attached to each supplier in the SAP system. UNSPSC codes are not used in this alternative, because it is not always possible to describe a certain product/service by a UNSPSC description. The restriction that a supplier should be restricted to one single commodity is more flexible in this setup, since a categorization might be designed with categories that cover multiple commodities.

6.3.3 New Spend Management System (3)

There are various Spend Management Systems available that provide good functionality for the situation at Campina. Although the combination of SAP and CATIS (potentially) offers most of the functions currently needed, it might be an option to invest in a new system for NPR or MRO purchases.

6.3.4 Discussion

All options have some advantages as well as some disadvantages. Table 6-1 shows the main advantages and disadvantages, and their effect in the various options mentioned above.

Advantages & Disadvantages	1a	1b	2a	2b	3
Uniform functionality for all categories (NPR & PR)	+	+	0	-	-
High level of detail possible	+	+	0	0	+
Effort needed before and during implementation (i.e. training, programming)	--	0	-	-	--
Effort needed after implementation	0	-	++	++	0
Risk of errors before and during implementation	-	+	-	-	-
Risk of errors after implementation	0	-	++	++	0
Flexibility with regard to suppliers	0	0	--	-	+
Flexibility of coding system	0	0	-	+	
Identification of key- and bottleneck suppliers	0	0	+	+	+

Table 6-1: (Dis)advantages of various options

For options 1a and 1b, one of the main advantages is that it would lead to a uniform functionality for all categories, both NPR and PR, as a result of the matching information structures. Another main advantage of categorization on article level (i.e. options 1a and 1b) is the high degree of detail that is possible. Especially option 1a would require a lot of effort before and during implementation, since all the UNSPSC codes should be implemented in SAP. Option 1b, however, would require extra effort from the user when entering a Purchase Order in SAP, since he/she would have to look up the correct code. This also leads to risk of errors.

Additionally, stakeholders mentioned that various locations of Campina are currently in a different state of development with regard to a classification scheme. Whereas some locations have assigned codes to MRO articles already, most of them have not. Moreover, non-repetitive purchases are not coded in any case. Hence, the time-investment for option 1a at several locations would be enormous indeed, and there can be no truly similar approach for all locations.

One of the main advantages of options 2a and 2b is that the extra effort needed from the user when placing an order is minimized. Given the fact that for any PO a supplier is entered/selected, there will be no need to either enter or select an additional code. This would also considerably reduce the risk of (manual) errors.
A key disadvantage of options 2a and 2b, however, is the fact that suppliers should be restricted (for at least ~95%) to one category to enhance the correctness of the output (i.e. the spend reports). This reduces the

flexibility with regard to suppliers of these options, although I already mentioned that a tailored coding system (option 2b) might take away some of this problem. Furthermore, the UNSPSC code is not genuinely designed to be assigned to suppliers (option 2a), whereas a different coding system (option 2b) might be tailored to the situation and lead to more unambiguous codes and improved flexibility.

Stakeholders mentioned several additional considerations with regard to options 2a and 2b. First of all, the lead buyer for MRO Generic considers classification by supplier not to be suitable for MRO Generic. Generic Components are purchased from a single source supplier. Hence, there is only one supplier that delivers all the Generic Components. When a Spend Management Report is generated for this category, there will be no detail on commodities. A reply to this objection, stated by two other stakeholders, is that one should ask which level of detail is needed for this group of commodities. Is it valuable to retrieve a Spend Report on every single type of bolts, for example? Categorization on supplier level was considered the best option by these stakeholders. For this purpose, SIC Industry Codes[14] were suggested. These codes have been developed to classify individual companies in categories (industries and/or segments) and might therefore be a suitable basis for option 2b.

In addition to the previous comments, it was mentioned that the suppliers ought to be able to offer an overview in detail of the spend. Hence, when the detail is not sufficient due to a high spend in a certain category, the option of asking details at the supplier should be considered

The obvious disadvantage of option 3 is the high investment that will be needed up-front, as well as a lot of training and extra effort. One of the stakeholders considered this investment to be enough reason not to consider this option. Moreover, more research would be needed before suggesting such a radical change.

It can be concluded that options 2a and 2b will presumably lead to the least extra effort for the user and for a reduced number of errors in the categorization, while option 3 would initiate a large project of which the implications are currently not clear. By attaching a code to a supplier in option 2a/2b, instead of to an article in SAP, the processing of the categories will be done automatically. This would be the greatest advantage of options 2a and 2b compared to the first options. The greatest difficulty, however, is that suppliers should be restricted to one product/service as much as possible. This might not be feasible in practice for categories outside the scope of this research. Moreover, the current architecture of SAP/CATIS should allow the linkage and processing of codes with suppliers.

One of the stakeholders, the lead buyer for MRO Generic Components, expressed a preference for option 1a. The majority (2 lead buyers and the procurement controller; one lead buyer expressed no preference), however, stated that option 2b offered the best potential for Campina. Moreover, it was mentioned that the majority of suppliers within the MRO Specific category could in fact be linked to one category. This is also supported by a benchmark of MRO procurement at another company (NedTrain). Based on this discussion, option 2b will be initially used for the redesign. This redesign will be discussed in the next section.

6.4 Redesign of Spend Management Categorization

The redesign of the Spend Management System will be based on the option 2b ("Attach another Code to Supplier"). First, the expected advantages and disadvantages will be highlighted, followed by a discussion of functional requirements, user requirements, and design restrictions. Eventually the design will be presented and discussed and, lastly, the implementation of the redesign is discussed.

6.4.1 Advantages & Disadvantages

As mentioned before, the chosen redesign has some benefits in comparison with the current situation and alternative options, although disadvantages do also exist. Both are mentioned in Table 6-2.

[14] SIC Codes are replaced by the North American Industry Classification System (NAICS) (http://www.census.gov/epcd/www/naics.html)

Advantage	*Comment*
No effort needed to look up correct codes	*Since the classification code will be attached to this supplier, there is no need for the user to look up a code elsewhere and enter it in the system manually*
Unambiguous codes	*UNSPSC codes might be incomprehensible without the right documentation. By developing an internal coding systems, codes might be chosen that express a certain meaning to the user.*
Highly reduced risk of errors	*Since the manual effort will be reduced to a minimum, the likelihood of errors is equally reduced once the codes have been entered and attached to the correct suppliers.*
Easy identification of key-/bottleneck-suppliers	*The collection of suppliers with spend in certain product categories offers possibilities in identifying key-suppliers per (spend) category, and bottleneck-suppliers likewise*

Disadvantage	*Comment*
Differences between coding for PR and for NPR/MRO	*Within the concept of 'standardization', it might be considered unwanted when two categories within the organization are approached differently.*
Limited level of detail	*In comparison to the option of using UNSPSC codes for every article, this option will generate reports on a lower level of detail. However, it has already been mentioned that the goal is not to create as much detail as possible, but to create as much detail as needed (with the least effort).*
Suppliers restricted to one type of product/service	*When one supplier supplies a lot of different components or services to Campina, this option would be negatively influenced. However, the majority of MRO Service suppliers, for Generic Services as well as Specific Services, have a specialization (i.e. Electro technical Services, Installation Services, etc.) that can well be considered as a category or subcategory for the Spend Management reports. Hence, this option is suitable within the scope of this research*

Table 6-2: Advantages and Disadvantages

6.4.2 Design Specifications

In this section, functional requirements, preconditions, and user requirements will be discussed to shape the design environment for the Spend Management redesign.

Functional Requirements	*Comment*
Provide an overview of how much is spent on MRO Specific and where it is spent	This is the basic requirement. The redesign should be able to create an overview of the total spend in a certain category and the spend per supplier in that category[15].
Generate customizable Spend Management reports (i.e. for categories, locations, etc.).	The information structure should enable the generation of various Spend Management Reports that are part of the general functionality of the Business Warehouse System CATIS.
Allow the separation of investment/projects and out-of-the-pocket operational expenses	One of the current challenges is to separate investments and projects from the true operational expenses. Since, in most cases, the deals with preferred suppliers relate to these operational expenses, it is important to be able to separate these expenses from investments and projects with fixed prices.

[15] The level of detail of such an overview should enable the comparison of suppliers within a certain category. Hence, it would be sufficient to deliver detail on the level of categories such as "Pumps and Pumping Equipment" instead of, for example, "Centrifugal Pumps" (given the general assumption that a suppliers supplies a variety of pumps and related equipment).

Preconditions	*Comment*
The redesign should be compatible with (i.e. implementable in) the ERP System SAP and the Business Warehouse System CATIS.	It should be possible to assign a certain code to a supplier in SAP. Moreover, the functionality of CATIS should enable the retrieving of data and subsequent generation of reports using these codes.
The spend at one relevant supplier (i.e. MRO supplier) should be traceable for the largest part (e.g. 95%) to one category (product/service).	For the infrastructure based on supplier codes to work, it is important that all MRO suppliers can be traced back to one spend category. Furthermore, this leads to the precondition below.
The scope of the redesign should be set to MRO	Other NPR categories have not been considered in the research and therefore this approach can not be copied straight away for other NPR categories

User Requirements	*Comment*
The redesign infrastructure (and possible interface) should be comprehensible for all users.	For the main user (the controller), the system after the redesign should behave in a predictable way and the interface should be usable. For the local, operational users (purchasers), the redesign should pose no problems in the usage of the SAP system.

Limitations	*Comment*
Project lead-time	No limitation has been set. It is advisable to limit the lead-time of the Spend Management redesign for MRO to the lead-times of more-or-less parallel projects that are currently deployed at Campina (e.g. re-implementation of SAP within Campina Netherlands)
Funds	No limitation has been set. Investment will be a time (effort) investment rather than an economical one. Implementing any kind of coding system for MRO would require such a time investment (regardless of the definite design). Wherever possible, the effort to be invested should be 'streamlined' between parallel projects in order to avoid inefficiencies.

Table 6-3: Design Specifications of Spend Management Redesign

6.4.3 System Architecture of the Design

The current architecture that is displayed in Appendix H: ERP and BW Infrastructure / Functionality will be used in this section in order to present a redesign of the infrastructure in the new situation. The architecture itself (i.e. the hard- and software) will not be altered. Hence, the basis will be formed by the SAP systems and the CATIS system. The MP2 warehouse system is considered as a supporting system, which is not within the scope of this redesign.

6.4.4 Coding System

The choice has been made to apply 'another code' for the classification. Hence, a choice will have to be made between three key options:

I. Use an existing classification, such as DUNS[16] numbers or SIC[17] numbers
There is a genuine difference between these two examples. A DUNS code is unique for each company (supplier). A SIC code indicates a certain category and can be assigned to multiple companies. DUNS codes are most suitable to track and trace 'parental' relationships between companies, for example. An example of the classification that is used with SIC codes (Description for 1731: Electrical Work) can be found in Figure 6-2.

[16] https://eupdate.dnb.com/dunsnumberinfo.html
[17] http://www.osha.gov/pls/imis/sicsearch.html

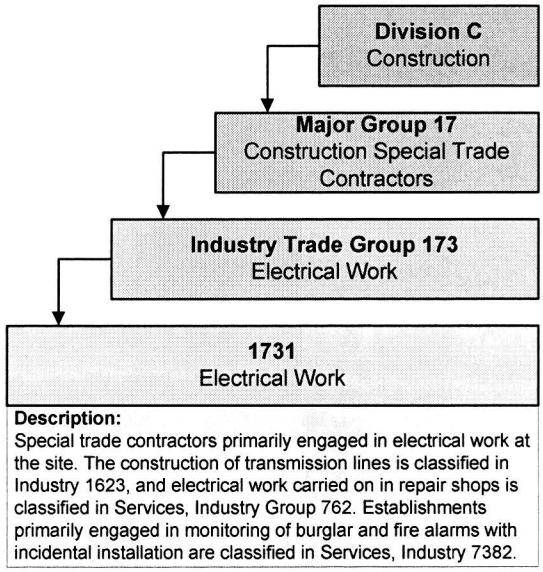

Figure 6-2: SIC Description for 1731: Electrical Work

II. Develop an own classification
In this situation, a new coding system is designed. Such a system might be more transparent by using comprehensible codes. The example above (Figure 6-2) might, for example, lead to the following code:
MROGS151, which might stand for MRO Generic Services, group 15 (Electrical Services), instance (supplier) 1. Obviously, this is a random example.

III. Alter an existing classification and tailor it to the Campina situation
This option is a combination of the preceding two. In this situation, an existing code (e.g. SIC code) might be extended with an internal addition, numbers or strings.

The benefit of the first option is that the structure has already been created. The codes can be selected from a rather complete list. The second option, however, has the benefit that it allows us to create a classification that is completely tailored to the situation at Campina. Option three, in consequence, combines benefits of both the options. For example, the SIC code can be used as a (four digit) basis, which can be extended with a four digit Campina code. This addition can be used to implement further detail in the classification. This might, for example, lead to a classification as illustrated in Figure 6-3.

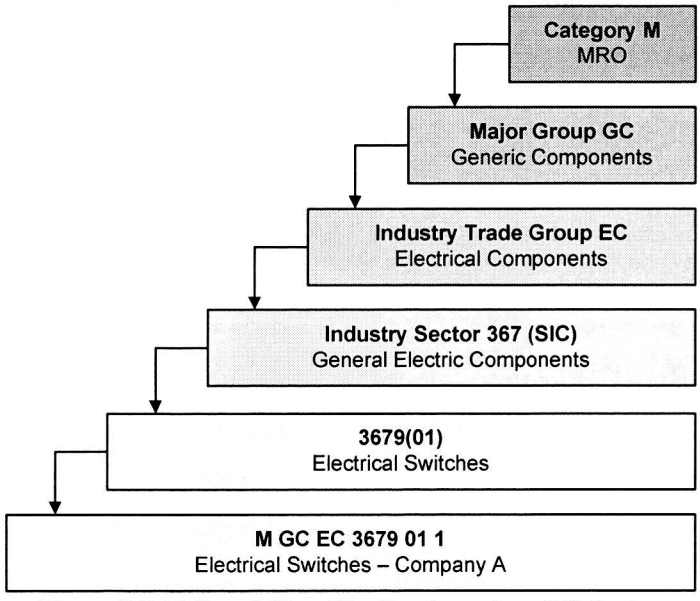

Figure 6-3: Tailored Classification based on SIC Codes

The disadvantage of this (tailored) option is that it will have to be designed manually. However, since the codes will have to be entered in SAP anyway, this should lead to few additional effort/costs. In Appendix I: MRO Categorization Proposal, a proposal is included for a total categorization of MRO using the coding scheme of Figure 6-3.

6.5 Implementation of the Spend Management Redesign

The previous sections have described the redesign of the Spend Management structure for MRO at Campina. The next step is discussing the application of this redesign and its implementation. In this discussion, the following aspects will be included: stakeholders and their tasks in the implementation process, and actions that have to be undertaken to realize the change.

6.5.1 Stakeholders

There are several stakeholders that are related directly or indirectly to the redesign. The main stakeholder is the procurement controller, which is the relevant user of the CATIS system, since he collects and processes spend data and provides (management) reports. The procurement controller will have a key role during the implementation. His stake is that the functionality mentioned in the previous section is present. Hence, he will have a guiding role as well as a leading role (i.e. providing feedback to the system developer and motivating other stakeholders to participate in the implementation). Other stakeholders include:

- The CATIS system owner/maintainer
  During the implementation, his/her stake will be to keep the system up and running and to launch the changes in the infrastructure / information structure
- The SAP system (procurement-related) administrator(s)
  The SAP administrator(s) will have a role in the assignment of supplier codes to the various suppliers.
- The operational purchasers
  They will have a passive role during the implementation; they will have to be informed about the changes and the new functionality.
- The relevant lead buyers for MRO
  They will have a key role during the development of the classification in the earlier phases of the implementation. During the roll-out, they will have to supervise the implementation/operation in their category.

For each stakeholder, it will be discussed which steps he/she will have to take during the implementation of the redesign. This will be done phase by phase, the following phases will be included (chronologically): preparation, programming, pilot, pilot evaluation, start-up, and final evaluation phase.

6.5.2 Preparation Phase

During the preparation phase of the implementation, the *Procurement Controller* will have to gather with the *Procurement Director* and the *Procurement Manager for NPR* to set the final specifications and goals for the project. Agreement on the final coding system also has to be reached, although this should be done in cooperation with the *lead buyers*. Furthermore, the *Procurement Controller* has a leading role in developing the categorization for MRO during the preparation phase (i.e. 'filling in' the chosen coding system). This task includes maintaining the right level of detail and securing the desired functionality.

The input will be delivered by the *lead buyers*. Supplier codes, based on the SIC code for the relevant industry and complying to the coding system, should be assigned to suppliers, which places them in a category and in a set of sub-categories. In case of ambiguous responsibility, it should first be discussed who is responsible for the various sub-classifications (i.e. the categorization on a higher level).

Finally, the categorizations for the various categories have to be merged in a definite list. It might be considered whether this task is assigned to the *Procurement Controller*, or to one of the *lead buyers*.
Another task during this Preparation Phase is instructing (and training) the *operational purchasers*. Although little extra effort is needed from them, they should be informed about the changes, which enhances their awareness of how the system works.

6.5.3 Programming Phase

The programming phase will entail all activities that are related to implementing the categorization/ classification into SAP and CATIS. This concerns both the entering of the supplier codes into SAP as the modi-

fication of CATIS to include the new classification. Since the subsequent phase will be the pilot phase, it might be considered to start with entering only one or two categories that are chosen for the pilot phase.

Inserting the codes into SAP will be a task for one or more *SAP administrators*. They will assign the correct supplier code to each supplier in the SAP system. However, a field will have to be available for this code. Hence, there will be a task for the *SAP system owner* in creating this field in the Supplier form in SAP. This field will have to be used by the CATIS system to gather and classify the data. The *developer/owner of the CATIS system* should implement this functionality in the system code during this programming phase.

6.5.4 Pilot Phase

During this phase, the redesign will have to be tested in order to find any errors or bugs. From the definite categorization, one or two categories will be assigned to be tested during the pilot phase. Hence, one or two of the *lead buyers* will have to be assigned to participate in this pilot phase. They will take place in the Pilot team, next to the *Procurement Controller* as well as the *System developer(s)*. During this phase, the *Procurement Controller* will have to check whether the results are equal to the anticipated results. If not, corrective actions have to be taken in cooperation with the *developer of CATIS*. The pilot phase should take about one month, a category should be chosen with enough activity to provide substantial results.

6.5.5 Pilot Evaluation Phase

After the Pilot Phase has been ended, *all stakeholders* that were involved should gather to discuss the experiences, including the *operational purchasers* who might have come across unexpected problems. Based on the experiences, the design might be refined. Subsequent to this last fine-tuning, a kick-off meeting should be held with all relevant stakeholders. During this meeting, the effects of the redesign should be discussed and demonstrated by the pilot team. It should be communicated by the project owner (i.e. the Procurement Director) what the benefits are, and which responsibilities are divided over the stakeholders.

6.5.6 Start-up Phase

Finally, the total redesign should be deployed in practice. Hence, the complete categorization has to be finalized in SAP and CATIS. The *Procurement Controller* should perform random checks to ensure that the redesign is deployed correctly and to avoid later complications. All the *lead buyers* involved should keep their category up-to-date continuously, since *SAP administrators* should be able to assign the correct supplier code when creating a new MRO supplier in SAP.

6.5.7 Final Evaluation Phase

The performance of the redesigned system/structure should be evaluated continuously. The data should be compared to the anticipated data by the *Procurement Controller,* and the project owner (the *Procurement Director*) should compare the reports to the anticipated reports (e.g. "Is the right level of detail reached?"). After the implementation, there should be periodical evaluation meetings. The first year after implementation, the performance should be evaluated frequently (e.g. once per 3 months), while the frequency might drop in the following period. In case of escalation (i.e. when the system fails) the *Procurement Controller* should be the first to notice. Subsequently, he should contact the *CATIS developer* and, when needed, the *SAP administrators*.

6.5.8 Resistance

During the implementation and start-up, the project team should be aware of resistance against the changes. Since the goal of the redesign (improved spend reports) is not within the scope of everyone's personal goals and activities, it should be secured that the goals and benefits of the project are communicated correctly.

The SAP administrators could be amongst the stakeholders that resist against the extra effort that is needed during the implementation, especially during the Programming Phase. They will be responsible for entering the supplier codes in SAP, and since they do not have a direct (personal) benefit there might exist lack of understanding that has a negative effect on the motivation. If there are any effects on the tasks of the operational buyers, they should also be informed thoroughly in order to create understanding and to motivate the users to comply with the new approach. Lastly, the system owners for both SAP and CATIS might resist against the changes that ought to be introduced in the systems. Although the CATIS system owner indicated that the (technical) changes that will be needed are in fact feasible, they might have a preference for other solutions which -perhaps- require less effort.

7 Conclusions and Recommendations

In this chapter, conclusions will be presented in the light of the research objectives. Furthermore, a general conclusion is provided and additional recommendations are made. Finally, some suggestions for further research are presented.

7.1 Conclusions

The initial objective of this project was to improve the control over the procurement of MRO Specific Services at Campina. In order to gain more insight in this subject, the first step taken in the project was to analyze the current MRO purchasing process.

Through discussions with representatives of all the relevant stakeholders that were identified, the main problem areas in the current process and in the Spend Management practices were identified. Next, some developments that have an influence on the process have been investigated in literature, and the findings were combined into an overview of key problem statements. Eventually, this led to the primary problem statement. The objective of this project became to 'facilitate and improve the spend control of MRO purchases' and 'to improve the MRO purchasing process to achieve cost reductions'.

Based on the initial analysis, two redesigns were introduced as deliverables to resolve the main problems. The first redesign mentioned in this report is the redesign of the MRO Purchasing Process, which started with an evaluation of, and elaboration on, Centralization/Decentralization issues. This evaluation led to the insight that a situation based on 'Approved Vendorlist' (Beker and Faas, 2000) ought to be most suitable for Campina. This situation has been used as a fundamental idea, based on which the actual process was redesigned. Furthermore, functional requirements for this redesign were based on the problem areas defined earlier.

Using the concept of Constrained Idealized Design (Ackoff, 2003), a step-by-step redesign for each purchasing activity was initially designed while neglecting some possible practical objections. In order to reduce the current scattered nature of the process, with tasks, responsibilities and approaches varying through the organization, each step was assigned to a central purchaser, a local purchaser (i.e. the business owner) or to a joint committee. In a next step, the initial designs were used as input for discussions with relevant stakeholders, which led to feasible redesigns that ought to resolve some of the main problem issues and improve the efficiency, effectiveness, and TCO. Highlights of the redesign are: (1) repeatable routines to be applied in order to make processes more transparent and uniform (and hence, controllable), and (2) pro-active information sharing and communication between stakeholders.

The second redesign in the report is the redesign of the Spend Management structure. The analysis led to the insight that it is currently not possible to retrieve spend data on MRO purchases centrally. It was also learned that this inability is due to a lack of categorization or classification. Hence, it was decided to develop a categorization ('information structure') for MRO purchases.

The first analysis on this subject concerned the classification system to be used for such categorization. A number of options were retrieved from research, which were discussed with relevant stakeholders. This discussion led to the conclusion that a classification using supplier codes was most suitable for MRO. Finally, based on a set of requirements and limitations, a classification (or coding) scheme was developed that provides an alternative Information Structure for MRO Spend Data. Using this scheme, all suppliers will be assigned a supplier code, which automatically places a purchase in a set of (sub)categories. These categories ought to be used by the Business Warehouse system CATIS to generate standardized Spend Reports. The categorization designed is suitable for providing the same functionalities as the current infrastructure for Product-Related purchases

As an addition to the conclusions above, it can be stated that throughout the project, its value and its usefulness clearly showed. Meetings with stakeholders showed that there is not a uniform approach towards the purchasing of MRO components and services at the various plants, which made it quite hard to analyse the current process. More importantly, it proved to be very difficult to determine the current spend, since spend data was simply unavailable in most cases. In cases where spend data was available, the way in which it was stored varied largely per Campina CPE Group.

7.2 Basis for Acceptation and Implementation

During the analysis at the beginning of the project, stakeholders were closely involved in order to collect facts and opinions regarding the current processes and practices. I validated the problem areas that were found through this analysis with the main stakeholders (including the problem owner). The information gathered in the analysis phase was used as a lead to present the eventual redesigns. By presenting the redesigns to the involved stakeholders, and continuously referring to the problem areas identified in the analysis, I warranted the acceptation and support for the solution. The presentations and discussions led to the conclusion that both redesigns are feasible in practice, and that there is confidence that the redesigns will provide solutions to some of the key problem areas. Nevertheless, some objections were mentioned that mostly regarded the feasibility of the solution outside the project scope (MRO).

The implementability of the solutions has been verified with the process owners as well as with the system owners. Hence, it can be concluded that the redesigns are implementable at Campina. Moreover, the implementability has been warranted as far as possible by considering current parallel projects during implementation and by taking the current systems as a starting point ('Containing Systems'; Ackoff, 1993). A decision to implement the actual redesigns has not been made as yet, however.

7.3 Limitations to the Research

Some limitations of the research project presented in this report can be named. First of all, the majority of the stakeholders that was approached during the analysis is connected to Campina CPE Netherlands. Hence, employees of other CPE groups have been involved only incidentally. This choice has been made while it proved to be rather hard in practice to maintain an even amount of contact with CPE Germany and CPE International (Belgium).

Another limitation is the number of benchmarks that has been used. Initially, the intention was to use benchmarking as one of the tools to come to a feasible redesign. The companies that were approached for such benchmarks, however, (1) did not have much experience on the subject, (2) did not allow the researcher to visit their company, or (3) did not react to the proposals. Since the research progressed, I decided not to put extra effort in this aspect of the research due to time restrictions. Eventually, one company (NedTrain) was used as a benchmark, which provided useful insights in Spend Management in a multi-location environment.

The last limitation to be mentioned here is the scope of the research. It might be advisable to start an implementation project for the types of redesign in this report for the whole of NPR, and not only for MRO. The scope of this research, however, has been limited to MRO, which might make it less applicable directly in a corporate setting, without considering other NPR categories first. That is not to say, however, that this research project is not a decent basis for such an extended study.

7.4 Recommendations

In this section, some recommendations will be made that could not be (fully) mentioned within the previous chapters.

7.4.1 Investments as a part of the Procurement Cycle

Whenever an investment in a (new) piece of machinery is made, agreement is reached with regard to service and warranties, for example. These agreements will lead to a service agreement, which will influence MRO-related decisions in the future. The development of such a service agreement should therefore in fact be part of a Procurement Cycle in which the relevant stakeholders are involved (according to the redesign in this report). Hence, the agreement that is made with an OEM of a piece of machinery should be considered in the light of later procurement decisions: "Are there any Third Party Service Suppliers that might be used?" and "Will warranties be lost when non-original components are used?" are examples of the questions that should be asked. When one is aware of the MRO procurement activities that are influenced by the choices during an investment, the Total Cost of Ownership might improve.

7.4.2 Assess use of Intranet

The current intranet at Campina (R@dar) has been designed to share large amounts of information in an effective and efficient way. The platform offers a lot of potential for the Purchasing Department as well, in sharing information within the company to the internal customers. However, it seems that the system is con-

sidered user-unfriendly as well as slow. Moreover, a lot of content is rather outdated. Hence, it might be worthwhile to assess the current use of Intranet as well as the potential of the system for Purchasing.

7.4.3 Promote Professional Purchasing Company-wide

It seems that various internal customers consider Purchasing to be a rather operational activity, whose main goal is to reduce the direct costs. It is not entirely clear what activities are included in purchasing 'functional portfolio' and which considerations are made. Additionally, people do not know 'who is who' within the purchasing department. Therefore, it ought to be recommended that Purchasing is re-introduced at Campina as a strategic part of the company and as a full-fledged partner in various projects. Moreover, information on 'who is who' should be available to internal customers, enabling them to contact the right person whenever needed. The previously mentioned intranet might play a role in this.

7.5 Further Research

The current research can be extended in the future in order to expand the reach of the solutions.

The Spend Management redesign that has been discussed in chapter 6 was approved by the relevant stakeholders. Given the scope of the research, the level of detail that was chosen as well as the level at which categorization takes place (i.e. at supplier level) was considered feasible for MRO Specific and, with some additional comments, also for MRO in general. However, in order to avoid inefficiencies, it might be considered to introduce a new categorization for all NPR categories. The categories within the field of NPR are not homogeneous, and therefore the approach developed in this report might not be practicable in case of, for example, IT, Telecom, or Marketing & Communication.

The research delivered in this report can be the basis for extending the approach in order to make it feasible for all NPR categories. The main difference between MRO and other NPR categories is the number of (homogeneous) commodities (potentially) delivered by one supplier. Where one MRO supplier might deliver 75 slightly different types of pumps or hundreds of bolts, an IT supplier ought to be restricted to a fair number of services or goods that might be implemented in the SAP/CATIS infrastructure as different articles. A solution may be found in creating commodity-groups. Using such groups, suppliers with an extensive range of commodities, as well as suppliers with fewer (less homogeneous) commodities can be assigned to one or more commodity-groups. Hence, a settlement between categorization on article-level and categorization on supplier-level is made.

Such commodity-groups, however, should be implemented in SAP (i.e. which field is to be used/created?) and an unambiguous coding system should be developed, for which the categorization designed in this report might be a starting point. However, it is not within the scope of this project to decide whether a common classification scheme for the complete NPR category should be designed. Nor is it within the scope to test the feasibility of such a classification. This research might be developed further in the future at Campina, taking the comments in this section as well as the design and the design criteria in the rest of the report as a basis. Further research might even prove that MRO asks for a differentiated approach, which can hardly be 'streamlined' with other categories within NPR.

Additionally, it might be considered to extend this rather qualitative research with extra quantitative research. Section 3.4.1 introduced some indicators (total number of contracts, number of suppliers, and number of contracts per supplier, time consumed by various tasks, average tariff reductions, and one-off incentives) that ought to be used to calculate (potential) synergy effects. Further research might include monitoring these indicators and using them to support this research with calculated benefits.

Another lead for extra research relates to the personnel fulfillment of the process redesign. Currently, it has been assumed that the Chief Technician at a plant is the responsible local purchaser, while a warehouse employee or a planning employee performs the operational purchasing tasks. Neither of them, however, considers himself a genuine purchaser. The redesign introduces some extra purchasing-related responsibilities for the Chief Technician (i.e. monitoring, performance evaluation, supervision over ordering routines, etc.), but it has not been objectively measured to what extent a Chief Technician can perform these activities sufficiently. Therefore, extra research may be accomplished to investigate these matters. In such research, it should also be considered to introduce a purchasing assistant at each plant, who will have a rather administrative role.

From a scientific viewpoint, it might be considered to perform further research into the concept of centralized purchasing in a technical environment. The literature study at the beginning of (as well as continuously during) this research showed that a lot has been written on centralization of procurement, decentralization of procurement, central coordination of procurement, and so on. Most authors, however, consider either PR purchases or non-technical NPR purchases (e.g. office supplies) in their research. This research project taught that a technical purchasing category such as MRO requires a different approach, and even more so in case of a specialized category such as MRO Specific at Campina. Detailed technical knowledge is more important, TCO considerations are essential (a direct saving on a component or a service might lead to standstill of machinery, which means loss of production), learning-cycles at service suppliers (familiarization) have a direct effect on their efficiency in a certain technical environment, etc. Hence, the characteristics of the situation differ from a standard procurement setting, which justifies a tailored approach to the subject of centralization.

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Appendix A: Organizational Structures

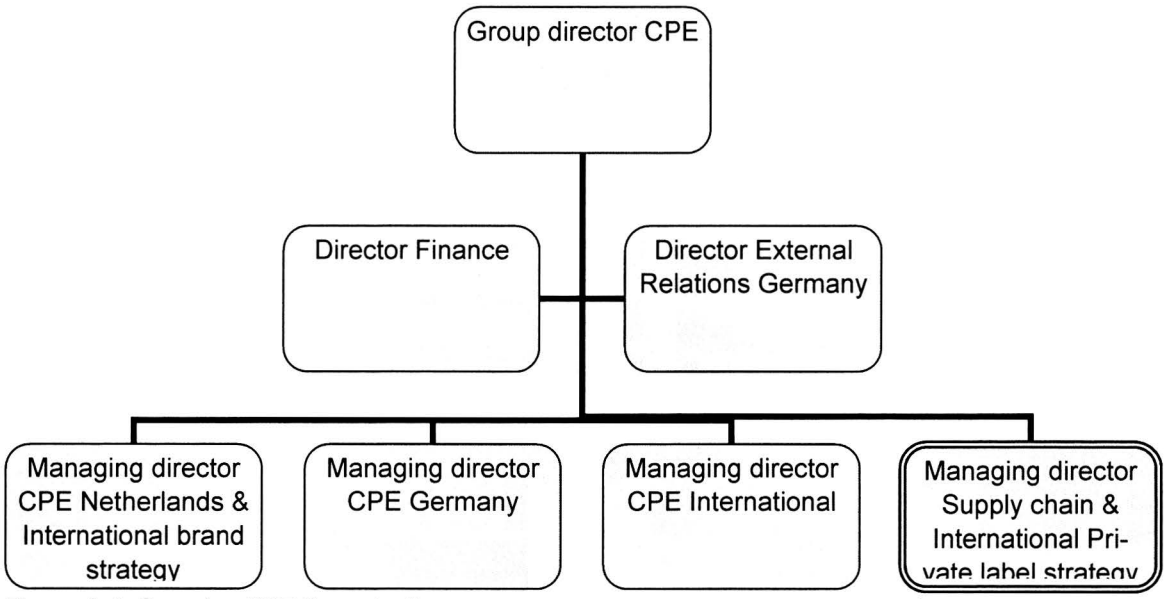

Figure A-1: Campina CPE Organisation

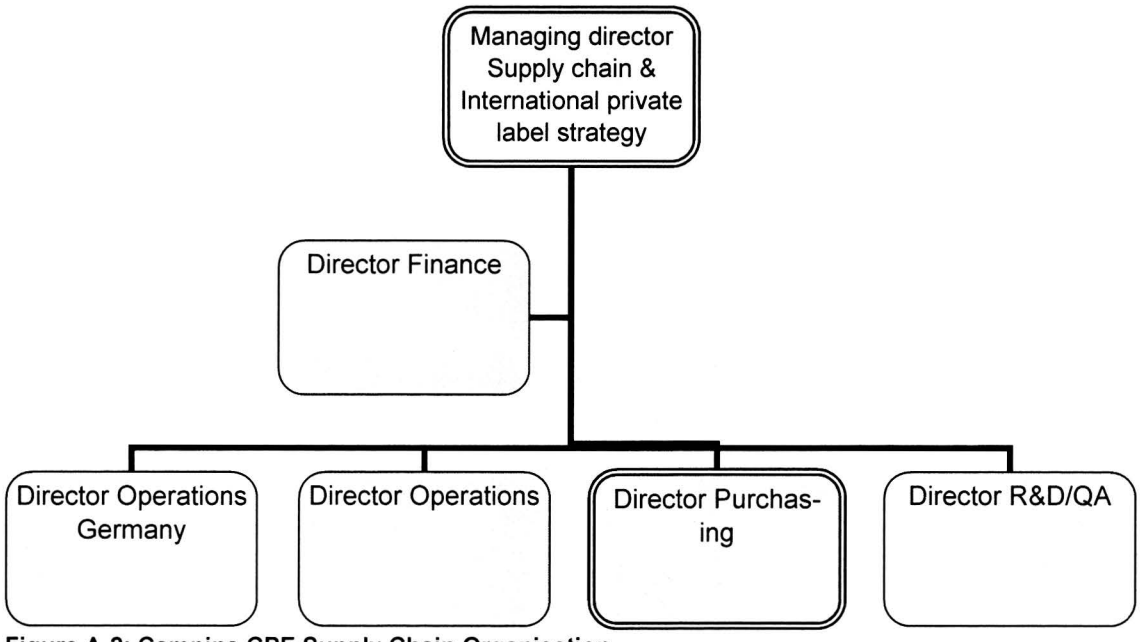

Figure A-2: Campina CPE Supply Chain Organisation

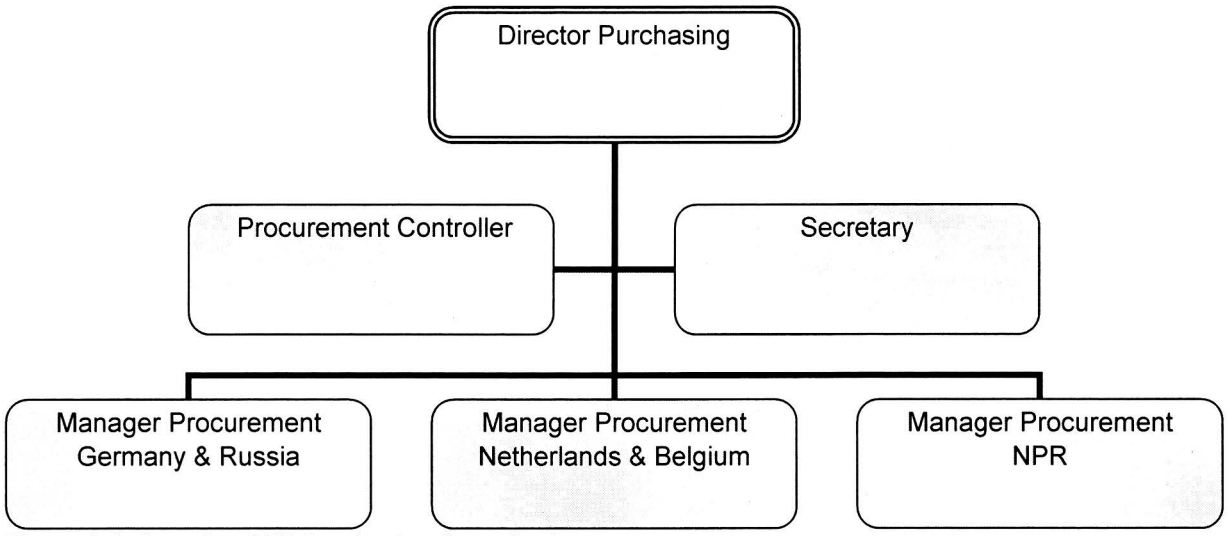

Figure A-3: Campina CPE Purchasing Organization

Appendix B: Supplier Data

The supplier data in this appendix are based on a list of the 119 main MRO suppliers and are meant to give an indication of the relevant supplier base

Graphical representation of Supplier Distribution

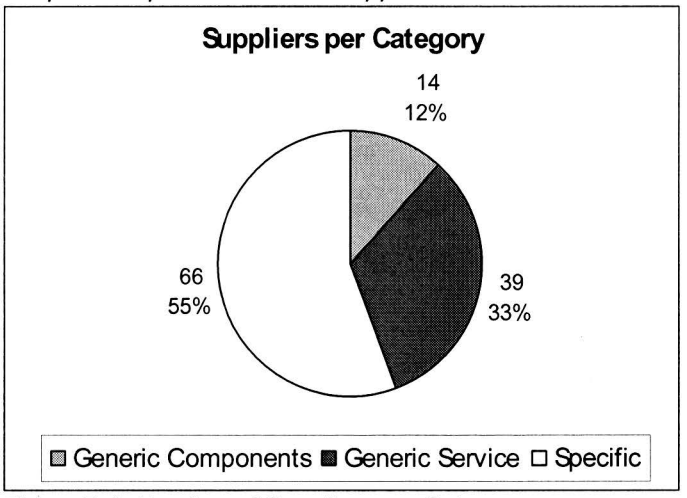

Figure B-1: Number of Suppliers per Category

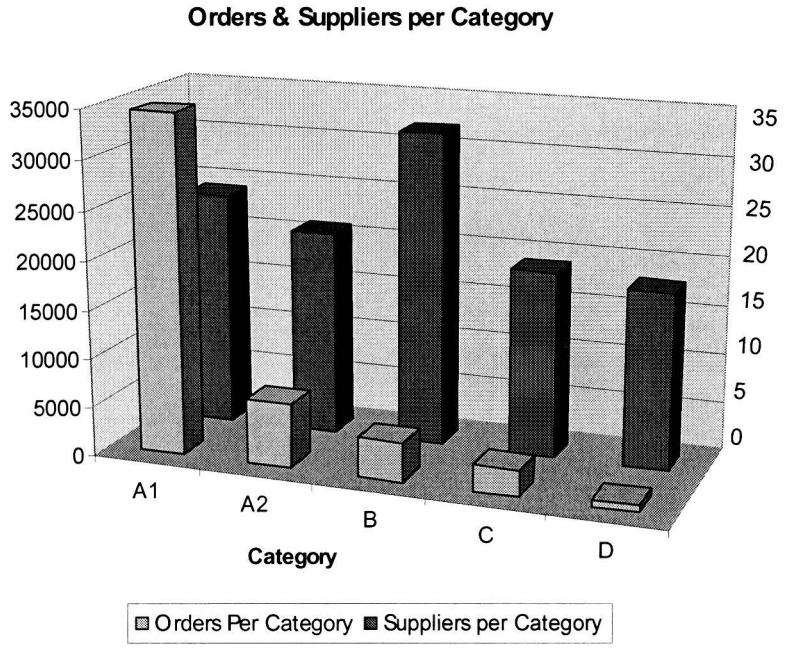

Figure B-2: Orders & Suppliers per Category (Segment)

Data per Location

Location:	Heiloo
Number of MRO Suppliers:	69
Number of Suppliers MRO Generic Components:	7
Number of Suppliers MRO Generic Services:	20
Number of Suppliers MRO Specific:	42

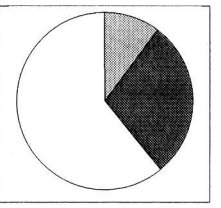

Table B-1: Supplier Data Location Heiloo

Location:	Rotterdam
Number of MRO Suppliers:	51
Number of Suppliers MRO Generic Components:	7
Number of Suppliers MRO Generic Services:	16
Number of Suppliers MRO Specific:	28

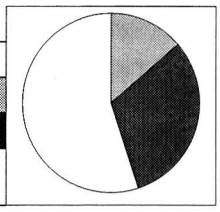

Table B-2: Supplier Data Location Rotterdam

Location:	Maasdam
Number of MRO Suppliers:	48
Number of Suppliers MRO Generic Components:	6
Number of Suppliers MRO Generic Services:	11
Number of Suppliers MRO Specific:	31

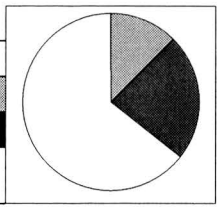

Table B-3: Supplier Data Location Maasdam

Location:	Eindhoven
Number of MRO Suppliers:	55
Number of Suppliers MRO Generic Components:	4
Number of Suppliers MRO Generic Services:	15
Number of Suppliers MRO Specific:	36

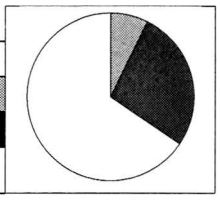

Table B-4: Supplier Data Location Eindhoven

Appendix C: Spend Data Figures

In order to give insight to the distribution of the spend over Generic Components, Generic Services, and Specific, the total expenditures at the main MRO suppliers have been used. Since these expenditures are extracted from SAP and include investments, they do not correspond with the Spend Data mentioned in section 0.

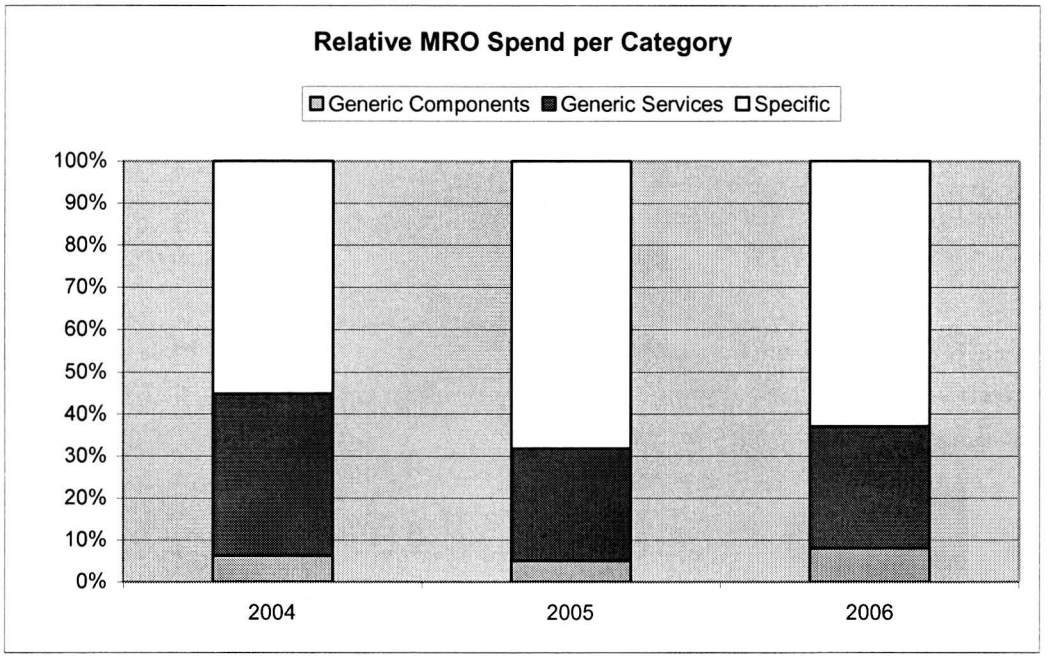

Figure C-1: Relative MRO Spend per Category[18]

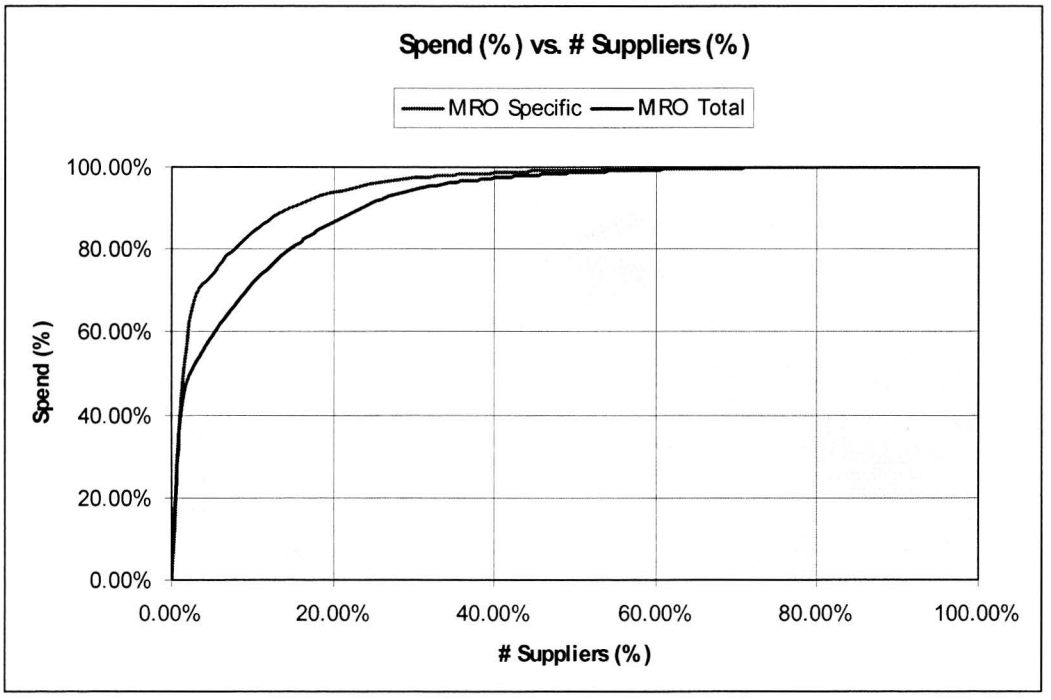

Figure C-2: Percentage of Spend vs. Percentage of Suppliers

[18] Data for 2006 until May 22nd, 2006.

Appendix D: Cause-and-Effect Diagram

In order to come to the root of the problem(s), a cause and effect diagram can be a valuable tool. For this diagram, a so-called Fishbone, or Ishikawa, diagram will be used[19]. The basic categories for the Manufacturing Industry will be applied in this diagram: Machines, Methods, Materials, Measurements, Mother Nature (Environment), Manpower (People). First, these categories will be tuned to this situation in the following definitions.

Machines: Since the specific environment is a combination of a manufacturing and a service (purchase) environment, this category will be extended to Technology in general. This way, information systems can also be covered by this category,
Methods: This category entails all procedures, processes, tools and techniques applied, with the exception of tools and techniques applied for measurement purposes.
Materials: All commodities (components & services) considered in the process
Measurements: All data-collecting and –analysing activities in the process, as well as specific tools or techniques used for these measurements. This category will be extended to 'Information' in general, as the information in this process does not only refer to measurement results.
Mother Nature (Environment): All external influencing factors. Factors inside Campina, who have an influence on the process will also be considered.
Manpower: All aspects directly considering the people (users, stakeholders, etc.) such as their competences, responsibilities, etc.

The main effect that follows from the previous sections is an inefficient, or sub-optimal, purchasing process for MRO Specific. The term 'purchasing process' refers to the Purchasing Process Model by van Weele (2002), in which the purchasing process entails all activities between 'determining specification' and 'follow-up and evaluation' (i.e. including spend control & analysis in this case).

In the diagram in Figure D-1, the main effect is displayed on the far right. All causes have been linked to one of the categories. Secondary causes have been defined wherever possible.

[19] E.g. http://www.isixsigma.com/library/content/t000827.asp

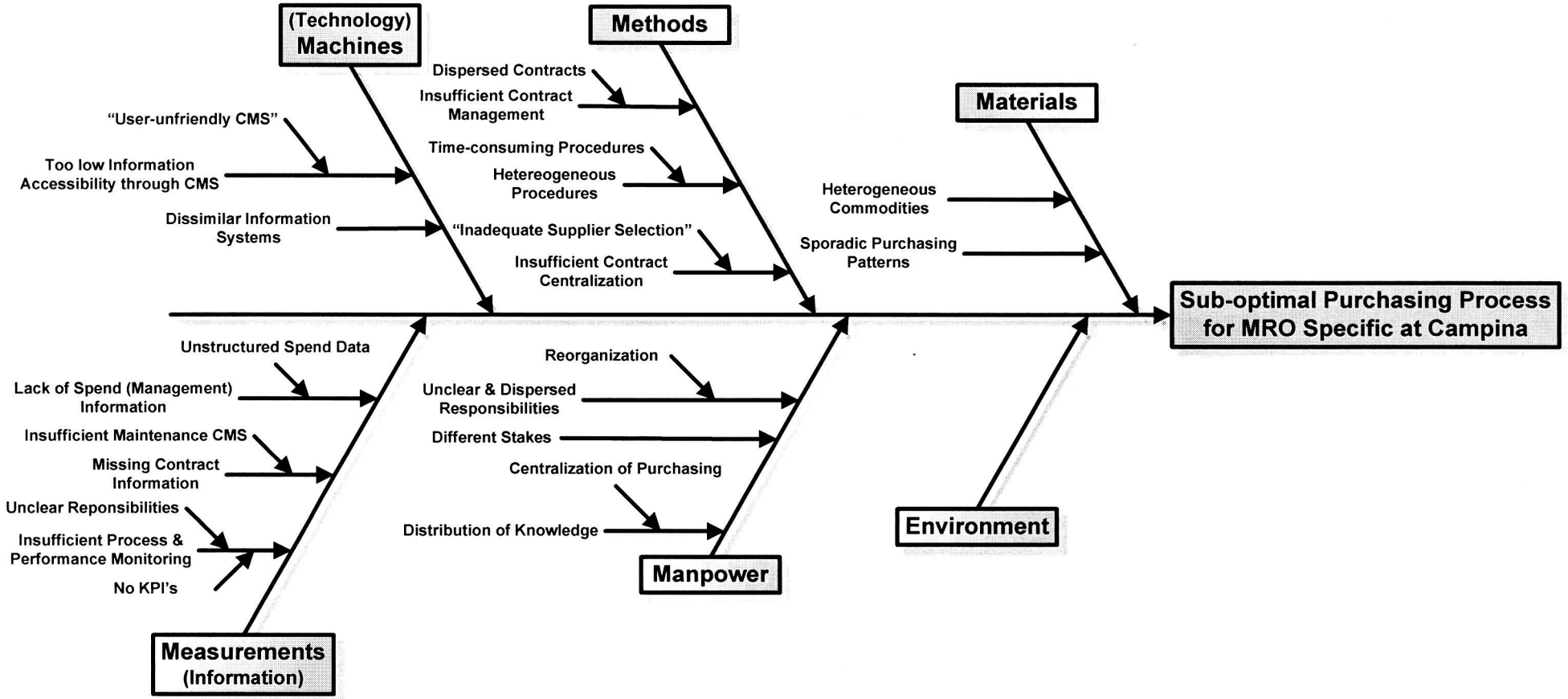

Figure D-1: Cause-and-Effect Diagram

Appendix E: Maturity and Corporate Coherence Questionnaires

The questionnaires in this appendix were filled in by me, with some consultation of full-time employees.

The more questions are answered with 'correct', the higher the purchasing maturity	
Q:	The purchasing spend with outside parties is high and increasing.
A:	*Correct. The majority of MRO Services is outsourced and the spend on other MRO purchases is substantial.*
Q:	Top management recognises Purchasing as an important contributor to the competitive position
A:	*Partly correct. It is expected that purchasing achieves saving, but it is not always considered an essential part of the Supply Chain.*
Q:	In our company the purchasing function reports directly to top management.
A:	*Incorrect. The purchasing function (i.e. the purchasers) report to the Procurement Director.*
Q:	In our company purchasing relates to strategic and truly cross-functional processes, with high involvement of line management.
A:	*Partly correct. This process is ongoing. The strategic importance and cross-functional impact of purchasing is growing, this is also one of the results of the TASC project.*
Q:	In our company, purchasing's main goal is achieving the lowest total cost against highest value.
A:	*Correct. Campina competes in the market more on price than on product differentiation. Reducing the Total Cost of Ownership is one of the main targets.*
Q:	In our company there is a high degree of homogeneity in purchasing needs across the BU's.
A:	*Correct. For MRO, there is a large overlap between the components and services that are needed at the various plants and even at the various groups.*
Q:	There are no significant differences in the role and position of the different purchasing departments across the BU's of our company.
A:	*Correct. The purchasing functions at the various groups are equal and comparable.*
Q:	The skills and capabilities of purchasing personnel in the different BU's are more than adequate for participating in formulating corporate purchasing strategies.
A:	*Partly correct. The purchasers at the various groups are sufficiently trained in purchasing skills. The purchasers at the plans have less purchasing knowledge.*
Q:	The purchasing departments in the different BU's operate on comparable levels of professionalism.
A:	*Incorrect. There are differences between the approach of purchasing at the various groups.*
Q:	The skills and capabilities on the corporate level are adequate for managing corporate purchasing synergy.
A:	*Correct. The skills and capabilities at corporate level are adequate. The data, however, is not.*

Questionnaire 1: Purchasing Maturity

The more questions are answered with 'correct', the higher the corporate coherence	
Q:	Our company only concentrates on strongly related business areas.
A:	*Correct. Activities that are no core activities are generally outsourced.*
Q:	Our company has grown mainly through internal growth (instead of through mergers and acquisitions).
A:	*Incorrect. The strategy formulation of Campina[20] states that since the 1990s, international growth is achieved through mergers and acquisitions.*
Q:	Our company is not structured around completely autonomous and stand-alone business units (BU)
A:	*Correct. There are no autonomous BU's. All the groups and locations are part of a larger organization with corporate responsibilities.*
Q:	In our company, BU managers are compensated for participation in corporate synergy initiatives.
A:	*Correct. BU managers are actively stimulated to take part in such initiatives and room is created in their function to take part in project teams*
Q:	Co-ordination and co-operation between business units is strongly encouraged and supported by corporate staff groups in other areas than purchasing.
A:	*Correct. Besides purchasing activities, there is also intra-organizational cooperation in research and design as well as in engineering.*
Q:	Our company has a corporate culture that encourages co-operation across business units.
A:	*Correct. There is a good cooperation between the various groups and people from one group visit offices of the other group on a regular basis.*
Q:	In our company the national organisations have only a limited amount of authority which is combined with global efficiencies through co-ordination (transnational organisation).
A:	*Correct. The national organizations are the groups that belong to the larger organization Campina. The authority of the groups is restricted, they take part in international projects and policies.*
Q:	Our company has a uniform and strong corporate identity.
A:	*Correct. Recent initiatives have been deployed to enforce this identity both externally and internally.*
Q:	In our company there is little (political) conflict between the different 'blood groups' (e.g. hierarchical levels and functional departments).
A:	*Incorrect.*
Q:	Our company management information systems are compatible.
A:	*Partly correct. Not all systems are completely compatible as yet.*

Questionnaire 2: Corporate Coherence

[20] http://www.campina.nl/?selected=camnl.ondernemin.Strategie&l=nl

Appendix F: Centralization Issues

Several reasons to centralize procurement or not to centralize procurement have been mentioned in chapter 5. Some additional commentary to these reasons will be presented in this appendix.

Reasons to Centralize

Suppliers

Several stimulators for centralization refer to the suppliers and supplier relationships. When demand from a (decentralized) company is bundled, it offers leverage effects for the supplier and can therefore help in establishing a better relationship with mutual benefits. Moreover, a company whose procurement is centralized or centrally coordinated approaches its suppliers uniformly and thus has a more professional approach towards suppliers. Evaluation of suppliers (e.g. through Supplier Audits) is also part of this professionalism; the possibilities to execute such evaluation are enhanced by centralization while it allows the auditors to focus on a restricted number of key suppliers. FInally, the buying company can reduce its supplier base by replacing various local suppliers by one or more central suppliers, which increases the purchasing efficiency.

The aspects mentioned above are ought to improve relationships with suppliers and improve the efficiency of purchasing. However, one limitation is that local suppliers should be replaceable; there should be alternative suppliers available that are suitable as central supplier. Also, the purchasing portfolios of the various decentral divisions should be homogeneous at least to a certain extent to achieve leverage effects at a supplier.

1. Facilitate and improve supplier relationships through leverage effects (e.g. Baily et al., 2005; Poupaert, 2003)
2. Approach suppliers uniformly (e.g. van Weele, 2005; Arnold, 1997)
3. Enhance possibilities for supplier audits/evaluation
4. Reduce number of suppliers (e.g. Ribbers and Visser, 1993; Poupaert, 2003)

Internal

Within the buying organization, some reasons might also exist to decide in favour of centralization. For example, management might prevent divisions from facing price anomalies and from competing with each other in getting the right deals at certain suppliers. Furthermore, by centralizing the procurement functions, local divisions can improve their focus on core activities and processes. Another reason for centralizing purchasing mentioned in literature is that it stimulates the internal exchange of information between divisions and between central and local units. However, it has already been noted earlier in the project that information exchange might as well be considered an enabler for centralization rather than a result.

5. Avoid price anomalies and competition between group units (e.g. Baily et al., 2005)
6. Improve the local focus on core activities
7. Stimulate internal exchange of information (e.g. Faes and Mathijssens, 1998; van Weele, 2005; Arnold, 1997)

Performance

Some reasons for centralization stimulate the performance of the purchasing department(s). The most important reason is that synergy might lead to cost savings (administration, handling, ordering, search costs, etc.).

8. Achieve cost savings through synergy (e.g. Beker and Faas, 2000; Ribbers and Visser, 1993; Faes and Mathijssens, 1998; Arnold, 1997)

Market

The reasons in this category refer to the market position of the (centralized) buyer. Reasons often mentioned in literature include:

9. Improve negotiation strength (e.g. Ribbers and Visser, 1993; Baily et al., 2005)
10. Improve market negotiation strategy (e.g. Faes and Mathijssens, 1998)
11. Improve impact on monopolistic supply markets (e.g. Faes and Mathijssens, 1998)
12. Improve insight in market and cost structures (e.g. Faes and Mathijssens, 1998)

Thus, by bundling the demands from several locations (i.e. centralizing procurement), a buyer can gain in negotiation strength and can deploy a more effective negotiation strategy. Moreover, the buying company can enforce a bigger impact on monopolistic markets and improve its insight in market and cost structures through a better focus.
Eventually, this will lead to lower prices and improved supply conditions. Hence, centralization can be a way to price reduction when the reasons mentioned above can be achieved (i.e. there is a monopolistic/oligopolistic market, local negotiation strength is suboptimal, etc.).

Reasons not to Centralize

Suppliers

Choosing for decentralized purchasing can also have positive effects with regard to suppliers. For example, the relationships with suppliers might be shorter or more direct. Also, the organization will be less dependent on one or few suppliers when the various divisions have their own suppliers.

1. Keep close (short/direct) relationships with suppliers (e.g. Beker and Faas, 2000; Gadde and Hakansson, 1994; van Weele, 2005)
2. Avoid dependence on one or few suppliers

Internal

The most reasons that might lead to a decision not to centralize refer to internal considerations.
First, it might be considered important to keep the problem solving capabilities and the ability to respond to emergency situations close to the actual processes. Furthermore, the responsibility for the general performances might be kept local to avoid uncontrolled situations. Also, decentralization reduces the chance that purchasers alienate from the core processes and from the internal customers. Relevant detailed knowledge referring to internal customers and local suppliers might also decrease when purchasing functions are centralized. In general, the aspects mentioned above state that decentralization of purchasing strengthens the link with what happens locally and might improve the relationships with internal customers.

3. Keep problem solving capabilities close to where the problems occur (e.g. Gadde and Hakansson, 1994)
4. Improve ability to respond quickly to emergency requirements (i.e. responsiveness in case of machine failure, etc.) (e.g. Baily et al., 2005)
5. Keep responsibility local (e.g. van Weele, 2005; Baily et al., 2005)
6. Prevent purchasers to alienate from core processes/internal customers (e.g. Beker and Faas, 2000; van Weele, 2005; Baily et al., 2005)
7. Enhance relevant detailed knowledge (of internal customers and local suppliers) (e.g. Baily et al., 2005)

Next to the previous list, there are some other internal reasons not to centralize purchasing. Firstly, an organization might want to contain costs strictly in each profit centre. Secondly, purchasing portfolios between separate divisons might be so different that centralization would not lead to any synergy benefits but would only decrease flexibility. Also, divisions might be spread geographically to an extent that centralization would pose practical differences (e.g. with regard to culture, legal constraints, etc.).

8. Contain costs in each profit centre (e.g. Gadde and Hakansson, 1994)
9. Handle heterogeneous purchase portfolios between divisions (e.g. Ribbers and Visser, 1993)
10. Handle geographical spread of divisions (e.g. Ribbers and Visser, 1993)

Performance

Not centralizing purchasing affects the performance of the purchasing functions in several ways. Firstly, bureaucracy might be reduced as users have easier access to their local purchaser. Also, flexibility is higher in a decentralized environment, since it is easier to react to local developments and to implement (minor) changes. Finally, centralization of purchasing can be a very time consuming project which could be avoided.

11. Reduce bureaucracy (e.g. Ribbers and Visser, 1993; van Weele, 2005)
12. Improve flexibility (e.g. Beker and Faas, 2000; Ribbers and Visser, 1993; van Weele, 2005)
13. Avoid time consuming centralization project

Appendix G: Organizational Structure for Redesigned Process

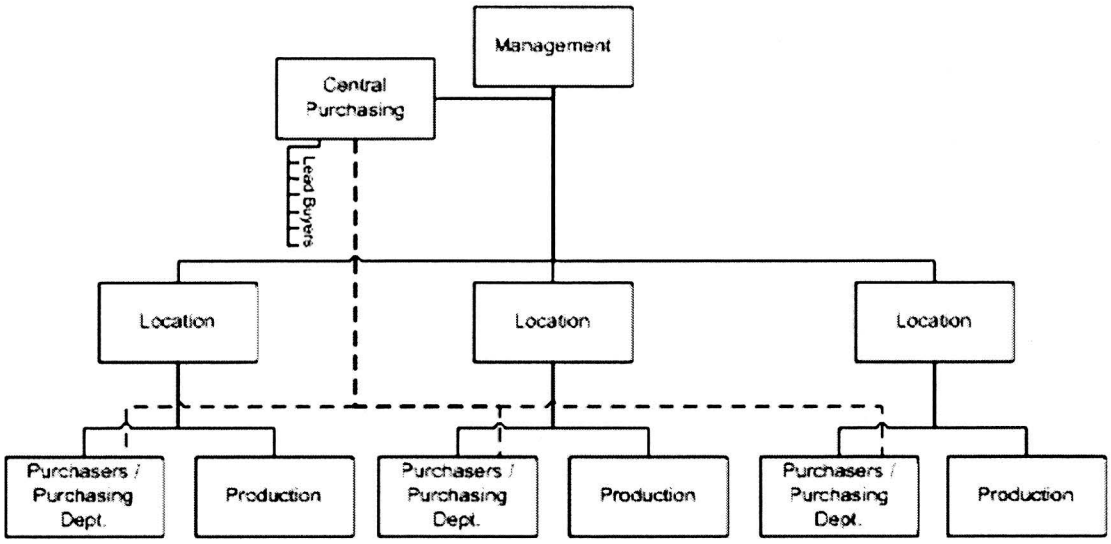

Figure F-1: Organizational Structure for the redesigned MRO Procurement process

Appendix H: ERP and BW Infrastructure / Functionality

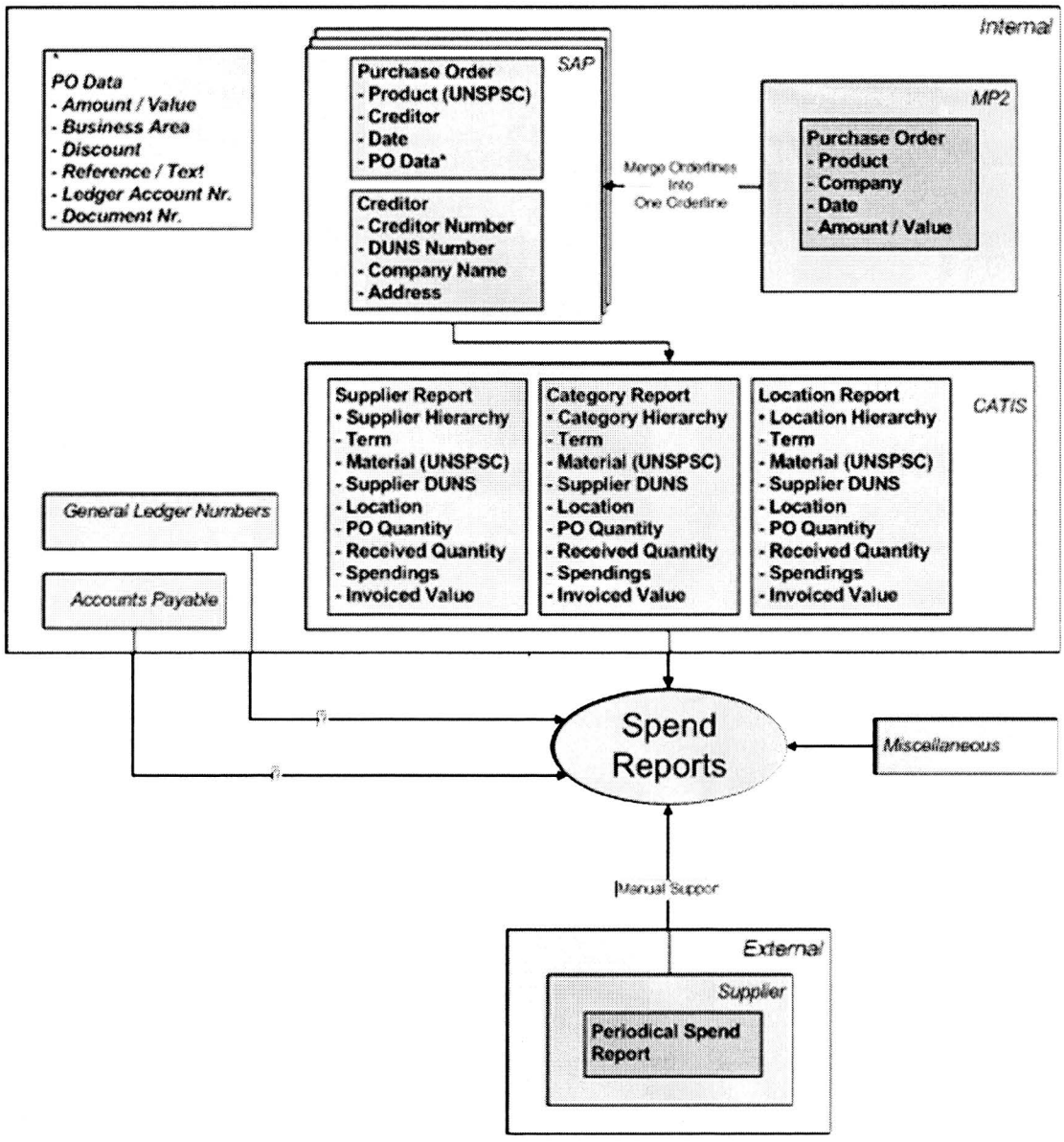

Figure H-1: Current ERP & BW Infrastructure/Functionality

Appendix I: MRO Categorization Proposal

I	II	III	IV	V	SIC Code	SIC Description	Extended	Complete
MRO (M)								
	Generic Components (GC)							
		Electrical Components (EC)						
			General Electric Components (367)	General Electric Components	3679	Electronic Components, Not Elsewhere Classified	367900	MGCEC367900
				Electrical switches	3679	"	367901	MGCEC367901
				Heaters	3679	"	367902	MGCEC367902
				Transformer	3679	"	367903	MGCEC367903
				General installation material	3679	"	367904	MGCEC367904
				Electric cabinet	3679	"	367905	MGCEC367905
				Cables	3679	"	367906	MGCEC367906
				Cable tray	3679	"	367907	MGCEC367907
			Electric Transmission & Distribution (361)	Circuit breaker	3613	Switchgear and Switchboard Apparatus	361301	MGCEC361301
				Bus equipment	3613	"	361302	MGCEC361302
				Rectifiers	3612	Power, Distribution, and Specialty Transformers	361201	MGCEC361201

			Analytical / Optical Components (382)	Frequency controller	3825	Instruments for Measuring and Testing of Electricity and Electrical Signals	382501	MGCEC382501
				Soft-starters	3825	~~~	382502	MGCEC382502
				Net filters	3825	~~~	382503	MGCEC382503
				General process control equipment	3823	Industrial Instruments for Measurement, Display, and Control of Process Variables; and Related Products	382300	MGCEC382300
				Proximity switches	3823	~~~	382301	MGCEC382301
				General Measuring, Observing & Testing	3823	~~~	382302	MGCEC382302
				Pressure transmitters	3823	~~~	382303	MGCEC382303
				Flow transmitters	3823	~~~	382304	MGCEC382304
				Level transmitters	3823	~~~	382305	MGCEC382305
				Conductivity transmitters	3823	~~~	382306	MGCEC382306
				Miscellaneous transmitters	3823	~~~	382307	MGCEC382307
			Lighting Equipment (364)	General lighting equipment	3648	Lighting Equipment, Not Elsewhere Classified	364800	MGCEC364800
				Emergency lighting	3648	~~~	364801	MGCEC364801
				Lamps	3641	Electric Lamp Bulbs and Tubes	364101	MGCEC364101
				Fittings	3644	Noncurrent-Carrying Wiring	364401	MGCEC364401

						Devices		
			Batteries (369)	Batteries	3691	Storage Batteries	369101	MGCEC369101
				No break installation	3691	---	369102	MGCEC369102
				Generators	3621	Motors and Generators	362101	MGCEC362101
			Safety equipment (356)	General Safety Equipment	3569	General Industrial Machinery and Equipment, Not Elsewhere	356900	MGCEC356900
				Machine safety equipment	3569	---	356901	MGCEC356901
				Fire detection	3569	---	356902	MGCEC356902
				Gas detection	3569	---	356903	MGCEC356903
			Transportation & Handling equipment (353)	Internal Transportation equipment	3537	Industrial Trucks, Tractors, Trailers, and Stackers	353701	MGCEC353701
		Mechanical Components (MC)						
			Metal Mechanical Components (349)	General Metal Mechanical Components	3499	Fabricated Metal Products, Not Elsewhere Classified	349900	MGCMC349900
				Bar stock	3499	---	349901	MGCMC349901
				Valves	3491	Industrial Valves	349101	MGCMC349101
				Hoses	3492	Fluid Power Valves and Hose Fittings	349201	MGCMC349201
				Solenoid valves	3492	Fluid Power Valves and Hose Fittings	349202	MGCMC349202
				Pipes and fittings	3494	Valves and Pipe	349401	MGCMC349401

						Fittings, Not Elsewhere Classified		
				Fasteners	3496	Miscellaneous Fabricated Wire Products	349601	MGCMC349601
			Generic Industrial Supplies & Tools (508)	Bearings	5085	Industrial Supplies	508501	MGCMC508501
				Lubricants	5085	~~~	508502	MGCMC508502
				Seals	5085	~~~	508503	MGCMC508503
				Wheels	5085	~~~	508504	MGCMC508504
				General Tools	5084	Industrial Machinery and Equipment	508400	MGCMC508400
				Workshop equipment	5084	~~~	508401	MGCMC508401
				(Elec.) Hand operated tools	5084	~~~	508402	MGCMC508402
				Cutting tools	5084	~~~	508403	MGCMC508403
				Welding and solding	5084	~~~	508404	MGCMC508404
			Gearing Equipment (356)	General Gearing Equipment	3566	Speed Changers, Industrial High-Speed Drives, and Gears	356600	MGCMC356600
				Drive chain	3568	Mechanical Power Transmission Equipment, Not Elsewhere Classified	356801	MGCMC356801
				V belt	3568	~~~	356802	MGCMC356802
				Gearbox	3568	~~~	356803	MGCMC356803
			Miscellaneous	Pneumatics Compo-	3593	Fluid Power Cyl-	359301	MGCMC359301

			Industrial Components	nents		inders and Actuators		
			Building material	General Building Material	5032	Brick, Stone, and Related Construction Materials	503200	MGCMC503200
	Generic Services (GS)							
		Technical Services (TS)						
			Building Services & Engineering (154)	General Contracting	1541	General Contractors-Industrial Buildings and Warehouses	154100	MGSTS154100
			Industrial Systems / Installation Services (179)	General Industrial Contractors (non-building)	1796	Installation or Erection of Building Equipment, Not Elsewhere	179600	MGSTS179600
				Automation services	1796	---	179601	MGSTS179601
				Installation services	1796	---	179602	MGSTS179602
				Other Industrial Services	1799	Special Trade Contractors, Not Elsewhere Classified	179900	MGSTS179900
			Engineering (871)	General Engineering Services	8711	Engineering Services	871100	MGSTS871100
			Plumbing, Heating & Cooling (171)	Piping & Fitting Services	1711	Plumbing, Heating and Air-Conditioning	171101	MGSTS171101
				Plumbing	1711	---	171102	MGSTS171102
			Electrics Services (173)	General Electrics Services	1731	Electrical Work	173100	MGSTS173100
				Electrician General	1731	---	173101	MGSTS173101

				Electrical Installation and Engineering	1731	~~~	173102	MGSTS173102
			Programming and Data Processing (737)	General Software services	7371	Computer Programming Services	737100	MGSTS737100
				PLC programs	7371	~~~	737101	MGSTS737101
				Scada software	7371	~~~	737102	MGSTS737102
			General Mechanic Services (769)	General Mechanical Services	7699	Repair Shops and Related Services, Not Elsewhere Classified	769900	MGSTS769900
				Maintenance Services (Preventive)	7699	~~~	769901	MGSTS769901
				Repair Services	7699	~~~	769902	MGSTS769902
				Inspection Services	7699	~~~	769903	MGSTS769903
		Various Services (VS)						
			Laundry & Cleaning (721)	Laundry Services	7218	Industrial Launderers	721801	MGSVS721801
			Transport & Handling Services (478)	General (Internal) Transportation Services	4783	Packing and Crating	478300	MGSVS478300
				Handling	4783	~~~	478301	MGSVS478301
				Crates (rental)	4783	~~~	478302	MGSVS478302
				Containers and Storage (rental)	4783	~~~	478303	MGSVS478303
				Pallets (rental)	4783	~~~	478304	MGSVS478304
			Training Services (824)	General Training	8249	Vocational Schools, Not Elsewhere Classified	824900	MGSVS824900
				Installation Training	8249	~~~	824901	MGSVS824901

				Engineering Training	8249	---	824902	MGSVS824902
				Electrics Training	8249	---	824903	MGSVS824903
	Specific Components and Services (SP)							
		Processing & Packaging (PP)						
			Primary processing (355)	General Food (Processing) Machinery	3556	Food Products Machinery	355600	MSPPP355600
				Filling Machines	3556	---	355601	MSPPP355601
				Mixers	3556	---	355602	MSPPP355602
				Other Primary Machinery	3559	Special Industry Machinery, Not Elsewhere Classified	355901	MSPPP355901
				Robots	3559	---	355902	MSPPP355902
			Secondary processing (355)	Secondary Machinery & Processing Equipment	3559	Special Industry Machinery, Not Elsewhere Classified	355910	MSPPP355910
			Primary packaging (356)	Primary Packaging Equipment	3565	Packaging Machinery	356500	MSPPP356500
			Secondary packaging (356)	Secondary Packaging Equipment	3565	Packaging Machinery	356510	MSPPP356510
				Labeling Equipment	3565	---	356511	MSPPP356511
			Pumps (356)	Pumps and Pumping equipment	3561	Pumps and Pumping Equipment	356100	MSPPP356100
			Other Industrial Apparatus (362)	General Industrial Apparatus	3629	Electrical Industrial Apparatus,	362900	MSPPP362900

						Not Elsewhere Classified		
				Drive Technology / Engine Equipment	3621	Motors and Generators	362100	MSPPP362100
		Measurement, Control and Coding (MC)	Measurement & Control equipment (382)	General Measurement & Control Equipment	3823	Industrial Instruments for Measurement, Display, and Control of Process Variables; and Related Products	382300	MSPMC382300
				Sensors	3823	---	382301	MSPMC382301
				Thermometers	3829	Measuring and Controlling Devices, Not Elsewhere Classified	382901	MSPMC382901
				Weighing Equipment	3829	---	382902	MSPMC382902
				Analysis Equipment	3829	---	382903	MSPMC382903
				Lab Processing	3821	Laboratory Apparatus and Furniture	382101	MSPMC382101
				Tanks	3821	---	382102	MSPMC382102
			Testing / Certification Services (873)	Testing Laboratories	8734	Testing Laboratories	873400	MSPMC873400
			Computer Peripheral equipment (357)	Coding Systems	3577	Computer Peripheral Equipment, Not Elsewhere Classified	357701	MSPMC357701
				Printing Equipment	3577	---	357702	MSPMC357702
				Coding & Scanning Equipment	3577	---	357703	MSPMC357703

			Climate Control equipment (507)	Climate Control / Cooling	5075	Warm Air Heating and Air-Conditioning Equipment and Supplies	507501	MSPMC507501