ANALYSIS OF PROCUREMENT PROCESSES AND VOLUMES

Anssi Lindholm

Bachelor's Thesis
April 2012

Degree Programme in Logistics Engineering
Technology, communication and transport

JYVÄSKYLÄN AMMATTIKORKEAKOULU
JAMK UNIVERSITY OF APPLIED SCIENCES

Author(s)
LINDHOLM, Anssi

Type of publication
Bachelor´s Thesis

Date
10.04.2012

Pages
87

Language
English

Confidential

( ) Until

Permission for web publication
(X)

Title
ANALYSIS OF PROCUREMENT PROCESSES AND VOLUMES

Degree Programme
Logistics Engineering

Tutor(s)
NIEMINEN, Sanna

Assigned by
Vapo Oy

Abstract

Purchasing has started to gain a bigger role as time has gone by, and many studies have proved that purchasing has a major role in a company's profits and competencies. The procurement in Vapo Group is organized and depending on the business activity or purchasing type, the purchasing responsibilities are divided. The biggest needs and potential for cost savings were found under the biofuels business area.

The main objective of the Vapo Oy Biofuels project was to determine and deploy the centralized purchasing model for Finland's biofuels. The aim was to provide information and support to the ongoing project by mapping out the current state of biofuels purchases by collecting and analyzing the data from Vapo's databases.

The method of quantitative research was mostly used and interviews were conducted with three Vapo Oy employees. The data was collected from Vapo's databases to map out the current state of purchases, and the interviews were conducted in order to find out the purchasing processes.

As a result of this study, different improvement ideas and recommendations were presented. In addition, it was found out that Vapo needs to develop a more aligned strategic approach to purchasing in the Biofuels business area in order to prosper.

Keywords
Purchasing, portfolio analysis, spend analysis, purchasing process

Miscellaneous
On account of employer request some of the figures, tables and other information is hidden from web publishing

JYVÄSKYLÄN AMMATTIKORKEAKOULU
JAMK UNIVERSITY OF APPLIED SCIENCES

OPINNÄYTETYÖN
KUVAILULEHTI

Tekijä(t) LINDHOLM, Anssi	Julkaisun laji Opinnäytetyö	Päivämäärä 10.04.2012
	Sivumäärä 87	Julkaisun kieli Englanti
	Luottamuksellisuus ( ) saakka	Verkkojulkaisulupa myönnetty (X)

Työn nimi
HANKINTATOIMIEN PROSESSIEN JA VOLYYMIEN ANALYSOINTI

Koulutusohjelma
Logistics Engineering

Työn ohjaaja(t)
NIEMINEN, Sanna

Toimeksiantaja(t)
Vapo Oy

Tiivistelmä

Hankintojen osuus yritysten liiketoiminnasta on kasvanut viime aikoina ja monet tutkimukset ovat todistaneet, että hankinnalla on suuri merkitys yhtiön kilpailukyvylle. Vapo konsernin hankintatoimi on organisoitua ja vastuu hankinnoista on hajautettu eri tavoilla liiketoiminnasta ja hankinnan kohteesta riippuen. Suurimmat tarpeet ja mahdollisuudet hankintatoimen kehittämiselle löytyvät Vapon biopolttoaineliiketoiminnasta.

Vapon hankintojen kehittämisen projektin päätavoite oli biopolttoaineliiketoiminnan keskitetyn hankintatoimen toimintamallin määrittely ja jalkautus. Opinnäytetyön tavoite oli tarjota tietoa ja tukea meneillään olevalle projektille kartoittamalla biopolttoaineiden hankintojen nykytilanne keräämällä ja analysoimalla tietoja Vapon tietokannasta.

Opinnäytetyössä käytetään suurimmaksi osaksi kvantitatiivista tutkimusta, mutta myös kolmea Vapon työntekijää haastateltiin. Tiedot kerättiin Vapon tietokannoista, jotta hankintojen nykytilanne saatiin kartoitetuksi ja haastattelut suoritettiin, jotta hankintaprosessit saatiin avatuksi.

Tutkimuksen tuloksena esitetään parannusideoita ja suosituksia hankintatoimen kehittämiseksi. Vapon menestymisen kannalta on oleellista muokata biopolttoaineliiketoiminnan hankintoja enemmän strategisesti yhtenäiseksi.

Avainsanat (asiasanat)
Hankinta, portfolio analyysi, hankintojen kartoitus, spend-analyysi, hankintaprosessi

Muut tiedot
Toimeksiantajan pyynnöstä osa kuvioista, taulukoista ja tiedoista on piilotettu verkkojulkaisusta

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

Nowadays businesses are becoming more and more competitive, and for companies to preserve their competitive edge, purchasing has started to receive more attention. Campbell and Morris (2004) state that in many companies purchasing used to be seen as a cost center, naturally because money is spent to buy materials. These days purchasing is seen more as a profit center, because every cent that is saved in purchasing is a direct profit for a company; furthermore, purchasing is perceived as a value adding function.

Purchasing is an activity to acquire goods and services for achieving the organization's goals. Lysons and Farrington (2010, 6) state that the classic definition of purchasing objectives is to buy goods and services in the right quantity, at the right price, in the right quality, from the right suppliers at the right time. The difference between purchasing and procurement is that purchasing is an act of obtaining goods and services by paying money for it and procurement is the process of acquiring goods and services in any possible way. Purchasing is considered to be one form of procurement, making procurement a wider term.

1.1 Vapo Group

Vapo is an organization producing energy from peat, wood fuels and energy crops. In addition, Vapo Group Environmental business area is specialized in growing mediums and mulches and is an expert in fertilizing. Vapo Group consists of Vapo Biofuels, Vapo Bioheat, Vapo Timber and Vapo Environment, and it is the leading supplier and developer of bioenergy in Finland and the Baltic Sea Region, and also one of the world's leading peat industry companies. Vapo Group operates in Finland, Sweden, Estonia, Denmark, Norway, Spain, Poland and Latvia.

The parent company Vapo Oy is owned by the Finnish state (50,1%) and Suomen Energiavarat Oy (49,9%). In 2010 Vapo Group's turnover was 719,5 million euros and they employed more than 1300 people. Vapo Group established its name in 1945 even though the operations began at the beginning of 1940, when procurement of firewood and timber was appointed to Timber Office of the Board of Administration of Finnish State Railways.

Vapo Group is the leading supplier of local biofuels in the Baltic Sea area, and the main products are biofuels for heat and power plants. As biofuel Vapo Group uses milled peat, sod peat, wood fuels and energy crops. Peat is produced in Finland, Sweden, Norway, Latvia and Estonia. Peat is used for generating heat and power to towns, in industries as a fuel for generating power, heat and steam, and it is also used in products such as animal litter and growth peat and horticultural peat is used as a growing media for consumers and professionals. Wood fuels are delivered to heating and power plants and is used as a raw material for pellets. Vapo Oy uses reed canary grass as energy crops, which can be grown in fields or cut-away peat sites.

1.2 Aim of the thesis

The main aim of this thesis was to give information and support purchase process development project in Vapo Biofuels business area at Vapo Oy. The procurement in Vapo Group is organized, and depending on the business activity or the purchasing type, the purchasing responsibilities are shared. The goal was to study the current purchasing state of Vapo Biofuels by collecting and analyzing the data from their database, and with various tools to discover and report different findings, solutions and conclusions. The idea was to find answers to questions such as what is the current state of procurement in Biofuels, how are the purchasing processes like and how is purchasing organized.

1.3 Focus and limitations

Vapo Biofuels business area has the main focus in the thesis and furthermore Central Finland is the main geographical area of concentration. The Biofuels business area was chosen as the center of the thesis because it has the greatest necessities and potential for possible cost savings. Central Finland, on the other hand, was chosen as the area of focus to limit the scope of the thesis and to narrow down the amount of data.

1.4 Research methods

Research was mainly quantitative, meaning that the research was mostly done by using statistical, mathematical or computational techniques. Most of the findings are conclusions of the analyzed data, which were collected from Vapo's ICT systems. The purchasing process, on the other hand, was studied by interviewing three buyers of Vapo Biofuels. Interviewees were preparation engineer, regional manager and logistics director. They were chosen to cover the buying processes of the biggest purchasing categories. The data were collected from the ICT systems, which are mainly finance/accounting software systems. Vapo Oy is using ICT systems such as IBM Cognos, Microsoft Dynamics AX, IP Monitor and Potra. Research findings are presented and supported by using different purchasing theories, which are discussed later in the thesis.

2 PURCHASING MANAGEMENT

The purchasing function is traditionally perceived as buying, a task which is made along with own work without any bigger input. This is the main reason that many companies are not putting so much effort into purchasing, as into other business activities. The role of purchasing has started to take a bigger part as a successful business activity and many studies have proved that purchasing has a big role in a company's profits and competencies. (Weele 2010, 8.)

In supply chain management, purchasing has gained a crucial role and with it companies can develop competitive advantage by: keeping close relationship with few suppliers, having open communication between supply-chain partners and developing strategic orientation with liaisons. In time purchasing has evolved from an inconspicuous function to a key role by managing contacts between external suppliers and internal customers for creating more value to the end customers. Companies using strategic purchasing can achieve greater responsiveness to the supplier needs and maintain cooperative relationships and communication. Having close collaboration with suppliers, companies can gain cost savings and increase revenue. (Chen, Lado & Paulraj 2004, 505 - 508.)

Purchasing management refers to the activities which are compulsory for managing the vendor relationships in a manner that the activities are in line with the organization's overall business strategies and interests (Weele 2010, 11). Purchasing management is considered to carry out more strategic and long-term execution. This means that it is not directly connected to everyday purchasing processes, but to achieving or maintaining long-term competitive power.

Most companies spend over half of the sales turnover on purchasing parts and services. Weele (2010, 3) states that as businesses are becoming more and more competitive, purchasing is recognized as one of the key business drivers. With this in mind, not a single organization can bypass the importance of purchasing.

Several years earlier the buyer's role in purchasing actions was mostly to gain cost reductions. Nowadays the purchasing agenda has evolved from attaining reductions in costs to also managing the risks and improving the value, see Figure 1. In this type of agenda, the interaction is focusing more on establishing revenue and growth ra-

ther than getting the lowest possible price. Every purchasing decision needs a close balancing of costs, risks and value. (Weele 2010, 53 - 55.)

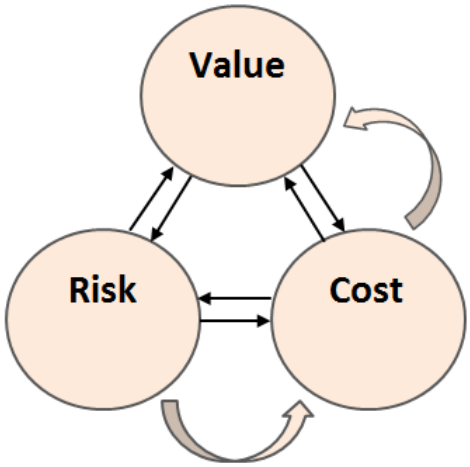


FIGURE 1. Cost-risk-value balancing

2.1 Cost reduction

Companies need to make sure that the goods and services are delivered at the best value or lowest total cost of ownership (TCO). Best value is affiliated with the best possible value a company can get for their money, but the goods and services also need to be bought at a fair price. Johnson, Leenders and Flynn (2011, 255) state that fair price is the lowest price that secures the constant supply of ordered items. TCO means that the buyers need to estimate the direct and indirect costs (logistics, materials handling, maintenance etc.) of the bought goods and services from purchase to disposal. Indirect costs can be decreased by getting rid of the unnecessary buffers or waste in the supply chain, e.g. quality inspections, safety stocks and field expediting. (Weele 2010, 53.)

There are many ways to reduce the costs. Normally in many companies there is an excess of suppliers used for similar goods or services, and therefore one way to reduce the costs is to decrease the number of the suppliers used. Other ways for getting better prices is to have more standardized products and source globally to exploit the global efficiencies. Outsourcing of certain goods and services can reduce the costs, because this way companies can focus more on their core competencies. In addition, with electronic auctions, companies can create larger competition and receive lower prices. (Op. cit. p. 53 - 55.)

2.2 Value improvement

Weele (2010, 73) says that purchasing and supply chain management should pursue constantly to enhancing the price/value ratio with suppliers. Benton (2010, 72) states that the so called best buy refers to goods or services with high value, and value is the ratio of quality and price. A company that concentrates on improving the value operates on the fact that the most important thing for success is to produce value to the end customers. Delivering the satisfaction to the end customers, companies have suppliers participating actively in product development and supporting their market strategies. The goal is to create the most effective and efficient value chain for serving the end user. (Weele 2010, 55 - 72.)

In many industries suppliers are considered to be a major source of innovation and that is why several companies involve suppliers in the early stage of new product development (NPD). Some suppliers and buyers can have a so called gain and risk sharing agreement, meaning that suppliers participate in the development of a new

product financially and a part of the suppliers' future income is dependent on the new products success. This kind of collaboration focuses more on growth and revenue generation than on getting the lowest possible price, possibly this could result in partnerships. (Op. cit. p. 53 - 55.)

Lysons and Farrington (2006, 453 - 454) identify the following purchasing techniques to get the best value for money:

- eliminating the non-essential features by making value analysis
- centralization of contract and price negotiation
- challenging the regular suppliers by doing proactive sourcing
- reducing the cost of spare parts and maintenance by standardization
- using total cost of ownership
- global purchasing
- e-procurement applications.

2.3 Risk management

According to the ISO 31000 standard (2009) all operations in companies contain risks; risks can be managed by identifying the risk, analyzing it and then assessing how to handle it. Risk management is a good way for minimizing, monitoring and controlling the probability and effect of unfortunate incidents and it can be applied to a whole company or to just a specific function or activity e.g. to the purchasing activity.

Assessing the risks can be managed by getting answers to three questions: What injurious occurrences can happen, what kind of financial impact the occurrences have and with what probability can they happen. To minimize the risks a detailed analysis needs to be made to decrease or get rid of the probability and gravity of harmful events. Monitoring the risks involves continuous evaluation of the state of the supply chain to avoid or decrease potential risks and with monitoring, companies can anticipate possible defects. (Benton 2010, 195.)

Managing the risks has become an important topic for companies and nowadays, the supply risks should be made transparent and visible. The risk exposure of a company is related to the supply markets and for reducing this exposure companies need to know their suppliers' markets. Companies should not get too reliant on just a few suppliers, both in technology and supply, to lower the risks. In case they are dependent only on a couple of suppliers, they should broaden their supply base for diminishing the risks. It is more important to focus more on quality and precise delivery rather than just price; for long term reduction of supply risks, companies should aim at spreading the purchasing requirements amongst various suppliers. (Weele 2010, 53 - 55.)

Global sourcing and outsourcing is considered to be one of the key factors in the increase of supply risks, and one good way to lower these risks is making various contingency plans. It is impossible to get rid of all of the risks in technology and the supply chain, and that is why companies need to have plans for how to overcome certain catastrophic events, e.g. having a backup generator in case of a power outage. (Benton 2010, 195.)

2.4 Organizing purchasing

Purchasing can be organized in various ways in different companies; in practice this means that the purchases should be organized by having an up-to-date purchasing strategy for making purchasing effective. Organizing is made according to the company's unique needs, restrictions and opportunities, and it is done for example for getting the best possible benefits from suppliers. Traditionally purchases can be organized by centralized or decentralized purchasing models. (Iloranta & Pajunen-Muhonen 2008, 158 - 159.)

2.4.1 Centralized purchasing

Centralized purchasing is one of the three organizational models. Centralization does not refer to where the purchasing staff is located geographically, but to where the spending decisions are made. In this model the purchasing power and responsibility of the company is assigned to the central unit of the organization. (Johnson et al. 2011, 51.)

What Johnson et al. (2011, 51) are basically saying is that the bought goods and services are handled by a single purchasing department. In larger companies this department is managed by a purchasing manager and the purchasing department is buying the required goods and services for all the other units in the company. According to Iloranta and Pajunen-Muhonen (2008, 160 - 161) in the centralized purchasing model unit resources can be focused on their core competencies. Only the demand is determined by every unit individually, and after that, the purchasing department is handling the rest.

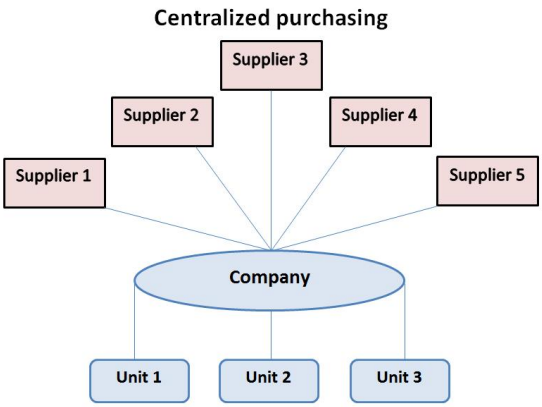


FIGURE 2. Centralized purchasing model

Advantages

Centralized purchasing is advantageous when departments have similar needs, they are located close to each other and have good transportation connections. Furthermore, it is advantageous when the supplier has a negotiation advantage against the buyer, purchased materials need specialization and the product prices are delicate and fluctuating. (Iloranta & Pajunen-Muhonen 2008, 161.)

There are many advantages in using centralized purchasing. Iloranta and Pajunen-Muhonen (2008, 160) and Johnson et al. (2011, 52) list the following advantages of centralized purchasing:

- Bulk buying
- Personnel centralization
- Reduced transportation costs
- Common suppliers
- Effective planning and research

- Easier managing of inventory and purchasing organization.

Goods that are bought in bulk, give the buyer a great negotiation power over the supplier and this way a better price can be bargained for a purchased item. In personnel centralization, the significance of education is emphasized by giving opportunities to the purchasing personnel to specialize and be much more efficient and experienced buyers. Transportation costs are reduced in centralized purchasing because the items are bought in bulk and, for example, full container loads can be used. The costs of transportation are only reduced between the supplier and the buyer in a case where the transportation distances between the company's departments are too long.

Common suppliers can be used in centralized purchasing to make it easier to manage a few big suppliers rather than many small ones. In centralized purchasing it is more effective to plan, for example inventories, and do research for fewer suppliers. The purchasing organization is compact in centralized purchasing and it is easier to manage, measure and reward.

Disadvantages

Naturally there are also disadvantages in centralized purchasing. Iloranta and Pajunen-Muhonen (2008, 160) and Johnson et al. (2011, 52) have listed the following points as disadvantages:

- Narrow specialization
- Narrow view of the buyer on other business activities
- Resistance from other units
- Supplier options are smaller

- Not suitable if units are not located close to each other
- Material replacement.

Specialization of an individual buyer is narrowed down because they are concentrating more on a certain supplier or on a certain item. The buyer's view or knowledge of other business activities is also narrower due to the fact that they focus more on purchasing related issues. In a company, centralization might arouse resistance from other units because one unit's success might depend on the performance of the purchasing department and other units cannot handle their own purchasing.

A company is centralizing their purchases to a few suppliers, hence supplier options are smaller. The geographical location of the units is a big reason for when to centralize purchasing or not, if there are long distances between departments, one needs to determine if it is profitable to use centralization. In centralized purchasing, material replacement is harder to accomplish in time, unless a company has an excellent contingency plan, for example in a case that the materials are somehow defective.

2.4.2 Decentralized purchasing

Decentralized purchasing is the second organizational structure model. Johnson et al. (2011, 51) state that, unlike in centralized purchasing, in decentralized purchasing the purchasing power and responsibility of the company is scattered throughout the whole organization. In other words, purchases are made individually from every department inside the company.

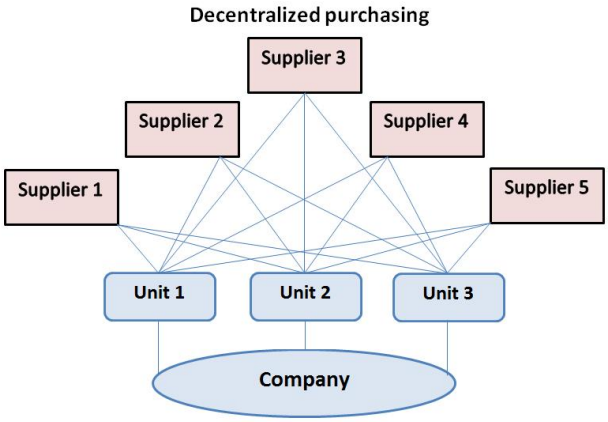


FIGURE 3. Decentralized purchasing model

Advantages

Decentralized purchasing is considered advantageous in cases where a customer has a great influence on a company's buying decisions, the variety of needs between units are big, units are not located on the same continent and are relatively big. In addition, it is advantageous if units have negotiation advantage even individually, purchasing procedures are simple and prices in supplier markets are stable. (Iloranta & Pajunen-Muhonen 2008, 161.)

Decentralized purchasing is usually not considered to be as effective as centralized purchasing, but it does have its advantages. Below are listed the advantages of de-centralized purchasing (Johnson et al. 2011, 52; Iloranta & Pajunen-Muhonen 2008, 160).

- Coordination and communication is easier

- Faster response
- Broad job definition
- Local sources
- Straight profit responsibility
- Supplier usage in product development.

In decentralized purchasing, the coordination and communication are easier than in centralized purchasing because the suppliers are in immediate contact with the users of goods or services, not only with the buyers. With decentralized purchasing the response time is faster from the supplier and this way it is easier to replace e.g. defective materials. The job definition of the staff, who are taking part in the purchases, is broader and hence the view or knowledge of other business activities is also vast.

In decentralized purchasing local sources can be used effectively and needed goods and services bought as and when required. Decentralization gives the possibility of unlimited decision making in terms of business, leading to direct profit responsibility and suppliers can be used better in product development, making it easier to develop new or improve old products.

Disadvantages

Below one can find the list of summarized disadvantages of the decentralized purchasing model (Johnson et al. 2011, 52; Iloranta & Pajunen-Muhonen 2008, 160).

- Buying volumes are scattered
- Focus on local sources
- Preferences between departments vary
- Level of standardization

- Communication between business units
- Not enough planning.

In decentralized purchasing, a company loses the benefit of bulk purchasing and therefore the negotiation power over the supplier is lost. When the focus is on the local suppliers, it is harder to benefit from global and better supply opportunities. Preference variety between departments means that the preferences might not be congruent with the corporate preferences and different units have separate contracts, prices and terms.

The level of standardization is lower and harder to accomplish in decentralized purchasing. The communication between business units is more difficult when goods and services are bought separately making it difficult to do proper co-operation and co-ordination between various departments. Decentralized purchasing is also lacking in good planning and even encouraging buyers not to plan so much ahead, because they can in a faster and more effortless way buy from local suppliers.

2.4.3 Hybrid purchasing

Hybrid purchasing is the third model of purchasing in the organizational structure. In various situations, complete centralization or complete decentralization might be the best possible way to conduct business, in theory. However, in practice by taking either of these models to the extremes is rarely the best way to go. Most of the times the best way to conduct business is the so called hybrid purchasing model, meaning that part of the purchases are made following the decentralized model and another part following the centralized model. (Iloranta & Pajunen-Muhonen 2008, 162.)

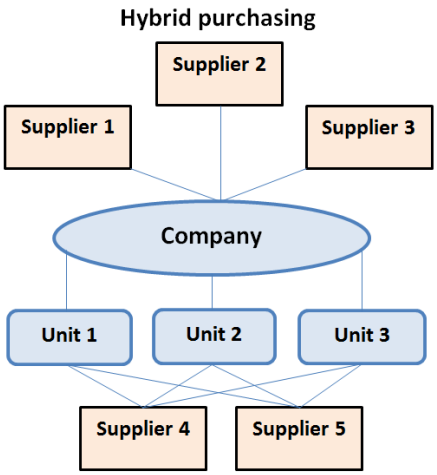


FIGURE 4. Hybrid purchasing model

Weele (2010, 409) states that the idea of the hybrid purchasing model is to find common materials requirements between two or more departments inside the company. In this fashion, the buyer can obtain purchasing leverage over suppliers to negotiate overall material costs, and with the more powerful negotiation position he can improve the service levels of suppliers.

The hybrid purchasing model is working towards the goal of capturing the benefits of both centralized and decentralized models by maximizing the advantages and minimizing the disadvantages of both the models. The hybrid model may be leaning more heavily to either centralization or decentralization, depending on a company and its purchases. (Johnson et al. 2011, 51 - 53.)

3 PURCHASING PROCESSES

Weele (2010, 11) states that purchasing management is focused on structuring and continuously enhancing purchasing processes inside the organization and between the vendor and the organization. When compared to purchasing management, purchasing processes are not carrying out strategic and long-term execution, but focusing more on the operational level in everyday buying. A process is described to be a set of activities having inputs and outputs, beginning and end and usually the process is occurring in a certain sequence. (Johnson et al. 2011, 78.)

According to Weele (2010, 28 - 29), the basic purchasing process model includes six basic phases: defining the specification, supplier selection, contract agreement, ordering, expediting and evaluation. Each of these phases is connected in different ways, and to get a good hold of the purchasing operation, each of these phases needs to be clearly defined. Without the proper pursuit of these phases, purchasing will not be as systematic and coordinated as it should be, leading to different operational problems.

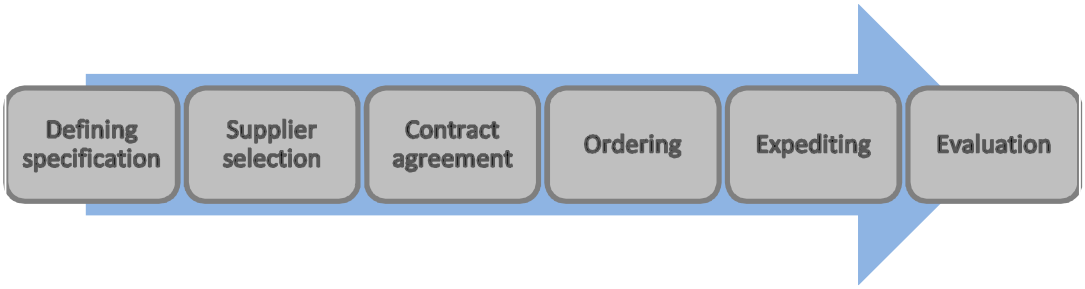


FIGURE 5. Weele's basic purchasing process model

Purchasing is considered to be a cross-functional responsibility; therefore the purchasing process is not limited only to the purchasing department. The first three steps in the purchasing process are called initial or tactical purchasing functions and mainly the first three steps are considered to have technical-commercial characteristics. The other three steps are a part of the ordering function and their characteristics are more logistics-administrative. (Weele 2010, 30.)

3.1 Defining specification

Johnson et al. (2011, 80) state that a purchase is originated when an exact need has arisen in a company, a need defining what, how much and when. Defining the specification is the first step in the purchasing process. Business needs and requirements are the triggering force for specification and they may be defined in a very detailed or in a more general manner. The first thing the company has to figure out is if they are making the needed items themselves, or if they are going to be bought from somewhere else. There are two kinds of specifications, functional and technical ones. A functional specification tells the supplier the functionality of the product and a technical specification the technical properties, product characteristics and supplier activities. (Weele 2010, 28 - 33.)

Furthermore, both of these specifications are a part of a bigger concept called the purchase order specification. Purchase order specification has the following features: quality specification, logistics specification, maintenance specification, legal and environmental requirements and a target budget. With all these different features, the decision on picking up the right supplier is made. (Op. cit. p. 33.)

Specifying is done by doing cooperation with suppliers and other departments within the company. When specification is done by doing cooperation, for example, the buyers can help the engineers to design parts to make sure that the parts are not over specified, thus making it cheaper to buy from the suppliers. Unless the specification is not done correctly it could lead to costs, for example, for some spare parts being higher and the number of possible suppliers being lower. (Op. cit. p. 28 - 33.)

3.2 Supplier selection

After the specification is done, it is time to move into selecting the supplier. Supplier selection is considered to be one of the most important steps in the purchasing process. Now here one can see that if the specifications are too detailed, it will narrow down the suppliers and make the buyer have less buying power over the supplier. Supplier selection is usually made in cooperation with buyers and e.g. engineers, and it is in relation to all the activities that need to be done to find the best supplier. (Weele 2010, 29 - 36)

First of all, the buyer needs to determine an answer to the 'make-or-buy' question, and then identify the potential suppliers from the already existing suppliers or find new ones. After the decision to buy is made, the second step for the buyer is to determine the method of subcontracting (turnkey or partial subcontracting). In turnkey subcontracting, the whole responsibility is on one supplier and in partial subcontracting the responsibility is divided between various suppliers. After this the buyer needs to decide whether to pay the supplier on a fixed-price or cost-reimbursable basis. (Weele 2010, 34; Johnson et al. 2011, 315 - 322.)

The next move in supplier selection is to exclude the non-fitting suppliers from the approved vendors list (AVL), by making the preliminary qualification. In a case where there is still an excess of suppliers, a buyer can make the list shorter by requesting for information (RFI) or visiting the suppliers. The next task is to submit requests for quotation to the remaining suppliers and wait for bids. After the bids are received and analyzed, the buyer may want to ask explanatory questions and negotiate with the suppliers, before selecting the best one. (Weele 2010, 35 - 37.)

New suppliers are sought through market research if there is not a sufficient number of possible suppliers after RFI or RFQ. New suppliers can be found by starting the seeking process through the Internet. Using different search engines, the buyer can find many options and narrow down the possible suppliers. In addition, the supplier databases, such as D&B and CorporateInformation, can provide a lot of good information. Nevertheless, the buyer should never forget the oldest and fastest way to find out more about the suppliers, a phone call. (Iloranta & Pajunen-Muhonen 2008, 255 - 257.)

According to Iloranta and Pajunen-Muhonen (2008, 255 – 257) there are other possible ways to find new suppliers:

- From colleagues, acquaintances or familiar suppliers
- Embassies and commercial representative offices
- International special journals
- Companies' own purchasing sites
- Industrial fairs and exhibitions
- Different countries schools (universities and polytechnics) and their students.

3.3 Contract agreement

When the supplier is selected, the third and final step of initial or tactical purchasing function is to draw up a contract. Benton (2010, 48) describes a contract being an agreement between the buyer and the supplier and before the sale can take place, both parties must agree to the transaction of buying. It is important for a buyer to understand contracts, contract laws and how to manage them. Furthermore, there are also many parts that are beyond the buyer's know-how and then legal counseling should be considered. (Iloranta & Pajunen-Muhonen 2008, 305.)

In a contract, the prices and terms and conditions are determined. Ideally the supplier should accept all the risks, and be responsible for e.g. late deliveries, which are not included in a contract. Normally the buyer should demand a fixed price arrangement, through competitive bidding or negotiation, making it easier to control the costs. This is an ideal situation for the buyer, but there might be different price arrangements in a contract. (Weele 2010, 38.)

There are four different components for a contract to be enforceable; the absence of any of these components makes the contract not binding. First, both of the parties must know what they are doing, meaning that neither of the persons signing the contract can be insane, alcoholic or a drug addict. Secondly, the contract must be legal in a way that the product or service is not illegal or against public policy. The third component is mutual consideration, meaning that for a contract to be binding a certain promised value must be delivered. These values are usually price, quality, quantity and delivery. The last component is the agreement by both parties; in this both of the parties have accepted and signed the contract. (Benton 2010, 28 - 29.)

Contracts usually include some kind of penalty clause to make sure the supplier delivers the goods and services in the agreed condition. According to Weele (2010, 29 - 30) a contract is incomplete if it does not provide penalty clauses, which will determine what will happen if obligations are not carried out, e.g. late deliveries.

3.4 Ordering

Ordering is done after the contract is signed with a supplier, and the buyer knows when the required goods or services are needed. In routine buying, where a known product is bought from a known vendor, the buyer will place an order for a longer time period, usually no less than a year. Furthermore, the buyer will bargain a call-off agreement for certain materials, meaning that the buyer can invite agreed materials to be delivered to them according to the contract. (Weele 2010, 42.)

Weele (2010, 30) states that "Ordering refers to the placing of purchase orders at a supplier". A purchase order (PO) is a legally binding contract when accepted by the supplier and in some cases it is the actual contract. A purchase order is sent to the supplier to request the delivery of goods or services; it includes things such as quantities, the description of the product and unit price (Op. cit. p. 408).

A purchase order should have a proper contract form to avoid any legal complications or to follow a proper documentation. When an order is being placed via telephone, still a proper documentation, e.g. confirming the order should follow. Usually a purchase order is in electronic form and it takes place after a requisition for the needed goods or services has been sent to the buyer. Generally a purchase order

contains very specific information and instructions to the supplier so that the needed expectations are carried out. (Weele 2010, 42; Johnson et al. 2011, 85.)

3.5 Expediting

Expediting is the second last step in the purchasing process and after the purchase order is issued, the buyer may expedite the order. Expediting is a method to pressure the supplier to meet the timeline or to be even ahead of schedule. Expediting is done only to a small percentage of purchased items. Usually expediting is indicating to an incomplete planning from the buyer or from the whole organization. (Johnson et al. 2011, 88 - 89.)

Expediting usually requires a lot of time and effort from the buyer and that is why it is important to follow the earlier steps precisely. Weele (2010, 42 - 43) states that there are three types of expediting:

1. Exception expediting. In this type, the internal customer informs the buyer on not receiving the needed goods or services. After receiving this information, the buyer takes immediate action to deliver. Exception expediting is not recommended because the damage has already been done before the action.
2. Preventive expediting. The buyer does routine status checks to prevent exception expediting and other surprises, by calling the suppliers a few days earlier to confirm the delivery dates.
3. Field expediting. An advanced status check is usually limited to high risk or expensive contracts. The buyer is checking the delivery development, accord-

ing to an agreed schedule, from the supplier regularly via phone or even sending someone to the production factory.

3.6 Evaluation

The supplier evaluation is the last step in the six step purchasing process, although it needs to be done in every step, and is a part of almost every buying decision. Supplier evaluation, with supplier selection, is considered to be one of the most critical parts of the purchasing process. In every decision the buyer, at some level, somehow evaluates the supplier by creating some kind of idea about it. The buyer evaluates the different risks for certain products which are bought from certain suppliers. The suppliers and the manufacturers are usually first evaluated by the price, even though it is not always done consciously. (Iloranta & Pajunen-Muhonen 2008, 259 - 260.)

There are seven tips to rate and evaluate the supplier. First the buyer needs to create performance indicators, which means creating certain performance criteria to track and evaluate the supplier. In a case where there are many suppliers to be evaluated, the second step is to separate suppliers into levels to make the process easier to manage. The third tip is to plan an evaluation method by generating reports or measurements of the supplier. After this, it is important to determine who is going to be in charge of the whole evaluation process (reviewing the data etc.). The fifth tip is to maintain good relationships with the suppliers by doing, for example, cooperation with them. Next, it is important to know when to compliment a good supplier and when to criticize a poor supplier; this way the buyer can keep the suppliers and own company happy. The last tip is to know when to cut a supplier loose; there is no point

of keeping a supplier who repeatedly fails to carry out the ongoing tasks. (Brown 2010.)

The purchasing process described in this chapter is based on Weele's (see Figure 4) purchasing process model, and the processes may vary to a great extent, for example, Lysons and Farrington (2006, 4). By using the purchasing process model correctly, a buyer can systematically improve and study processes, and to make it effective cross-functional approach is needed. For a company to achieve optimal results the efforts of every department need to be guided and directed. (Weele 2010, 49.)

4 TOOLS FOR ANALYSING PURCHASE SPEND

In this chapter, a few purchasing tools which are used to find out and improve the purchasing activities are presented. The chapter includes a spend analysis, which is used to give a starting point for analyzing the purchases, categories to divide all bought items into various groups, a portfolio analysis to determine the allocation of the bought items, and the ABC analysis to identify the items which have a significant impact on overall costs.

4.1 Spend analysis

A spend analysis is a tool to map out all the purchased goods and services and it is a natural way to start improving purchasing. In many companies the information about purchases is spread out, and it cannot be told instantaneously how much money is spent on purchases every year, or how the purchases are divided. The objective of this tool is to present comprehensively what the money is spent on. After the spend analysis is made, the buyer can see the information about all the purchases made in different parts or categories inside the company. (Iloranta & Pajunen-Muhonen 2008, 477.) The following figure is a made-up example of how service purchases could be distributed in a company.

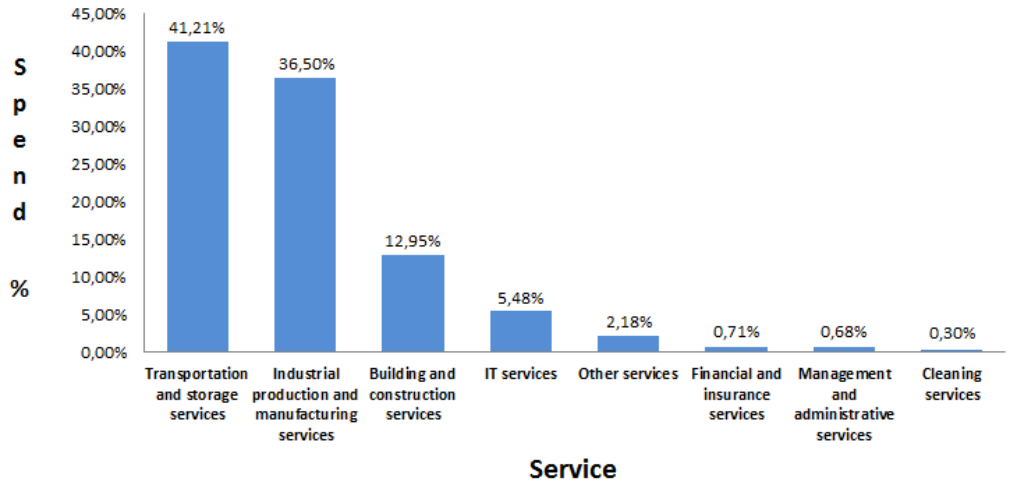


FIGURE 6. Possible layout of purchased services

The idea of a spend analysis is to analyze historical spend and examine the acquired data to find opportunities for savings. Many times it is hard to find answers to the wanted questions from the raw historical data and that is why the data needs to be

organized, cleansed, enriched and consolidated. Consolidation and organization of the data from various systems takes time and is a challenge, merely because of the sheer volume of data. (Pandit & Marmanis 2008, 5 - 9.)

The crucial part in a spend analysis is to identify the relative importance of different purchases to a company. This can be presented, for example, as a total sum spent in every department in a company on different items. With a spend analysis, the buyer can find answers to questions such as: What, where, how often, how much, what for and from what kind of suppliers are the items bought. Furthermore, the buyer can find out who is buying, who decides when to buy, where is information received, how have the prices been developing and how are savings, benefits and the development measured. In addition, what kinds of prices are paid to various suppliers and in which department? (Iloranta & Pajunen-Muhonen 2008, 478 - 479.)

A spend analysis always represents a past time period, e.g. the previous year, and with it a buyer can create important initial data for classifying and guiding the purchases and for managing and classifying the suppliers. A comprehensive spend analysis will help to identify the concealed potential for development in purchasing activities, and with the continuous following of crucial matters it is easier to intervene, for example, in possible defects. (Op. cit. p. 479.)

Many times a company decides to implement a spend analysis program, which is usually an extended application to the already existing sourcing applications. This application is to support the spend analysis and to make it easier to handle the data in the future. Although making a successful spend analysis goes far past an IT application, it is a vital part in having the maximum benefits from the analysis. The success of the IT application depends firmly on setting the objectives, leadership, having support from the management and on scaling the implementation into parts that can be

managed. In addition, for increasing the staff endorsement of the application, one needs to sell success stories about it. (Pandit & Marmanis 2008, 47 - 63.)

A spend analysis can give many saving opportunities for a company and those opportunities can be divided into two separate groups. First, there are aggregate spend-level opportunities, where the opportunities are easy to recognize because they can be seen from normal spend analysis reports. The second group is the transaction-level opportunities, where opportunities are hard to discover and they need special knowledge and reports, e.g. contract violations. Most of the opportunities can be identified straight from aggregate-level reports, but if all the benefits are drained from that level, transaction-level opportunities should be explored. (Op. cit. p. 65 - 81.)

4.2 Categories

Weele (2010, 216) states that after the spend analysis is made it allows the buyer to set up a category tree which will indicate the company's most important spend categories. Weele (2010, 216) defines a category as:

> *A category has been defined as a group of products or services, which are purchased from the supply market and which are used as an element of the value proposition that our company offers to its customers or which are to be used in the internal company's operation.*

According to Dussart (1998, 51), Nielsen (1992) says that category management is set to customize product categories for satisfying the customer needs. Furthermore, it is a process to manage the product categories as strategic business units. Categories

are described as a flexible organizational approach where every product has an impact on a category's profits (Dussart 1998, 51).

Dividing all the purchased goods and services into categories is always a major challenge for companies. When the product range is complex and the company has many different departments, it is even hard to categorize one bought item because of product overlapping. Although it is a cumbersome and resource requiring process, over a long term period it is wise to develop the same categories for all the departments. Another possibility is to pursue changing the categories in different departments so that they are similar to one another, only for common reporting and coordination. (Iloranta & Pajunen-Muhonen 2008, 475 - 476.)

There are two main strategic objectives in categorizing. First, specific brands or product lines should not determine the categories, because decisions concerning one brand usually have an effect on the other products in the category. This is why categories should be formed according to similar goals and criteria. The second objective is to do the marketing according to local shopping patterns, are the items bought locally or globally etc. (Dussart 1998, 51.)

Category management is considered to be a strategy for increasing return on investment, sales, profits, etc. On the other hand, it can be seen as a strategy for reducing waste and costs; however, it may not change the final results, which are customer satisfaction, behavior and attitudes. There are other major pitfalls in category management, but so far the skepticism has not overcome the willingness to succeed. (Op. cit. p. 56.)

Weele (2010, 15) states that, generally speaking, purchased goods and services can be divided into eight different categories:

1. Raw materials – materials that have experienced no or minimal transformation, such as coal, iron ore, coffee and different grains.
2. Supplementary materials – materials that are used or consumed in a production process and are not absorbed physically to the end product e.g. cooling waters and lubricants.
3. Semi-manufactured products – those that have gone through transformation before and will go through it again, for example steel billets and cloths.
4. Components – those that are manufactured goods built into an end product and they will not go through additional transformation anymore. Components are items such as electronic parts, batteries and engine parts.
5. Finished products or trade items – items which are bought already finished, just to be usually sold with other items, e.g. in automotive industry navigation systems, special headlights and alloy wheels.
6. Investment goods or capital equipment – products that are bought, and used for a long time, for example production machines, computers and even buildings.
7. MRO items (Maintenance, Repair and Operating materials) – items that are usually referred to as consumable items or indirect materials. They support activities and generally speaking keep the company running. Examples of MRO items are spare parts, office supplies and copy papers.
8. Services – services that are being carried out by third parties e.g. suppliers or other company's business units. Examples of service providers are cleaning companies, transportation companies and other contractors.

4.3 Portfolio analysis

The portfolio analysis model was invented by Peter Kraljic in 1983 and though there are other similar matrixes made after it, it is the most applicable. The starting point in this analysis is that all purchased items, from a buyer's point of view, are not strategically equivalent and thus they are compartmentalized by their risks and importance. In purchasing, the portfolio analysis is considered to be a surprisingly versatile and important tool, even though the method is quite simple. (Iloranta & Pajunen-Muhonen 2008, 142.)

Some European companies in the 70's and in the 80's started successfully to use a four-stage approach to design strategies to obtain the best possible buying power, and to get rid of supply vulnerabilities. The first stage was to classify all the purchased items into categories by e.g. total purchase cost. The second phase was to make a market analysis by comparing their own bargaining power strength against their supplier's. The next phase was to position the categories into a purchasing portfolio matrix (Figure 5) to identify opportunities and vulnerabilities. The last stage was to make action plans to different items in different categories. (Kraljic 1983, 112 - 114.)

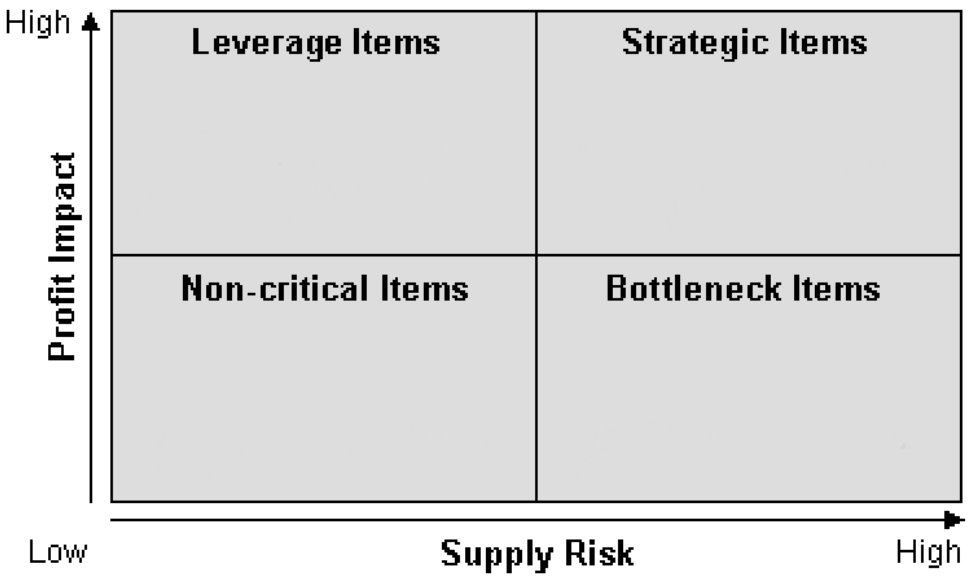


FIGURE 7. Kraljic two-dimensional matrix in portfolio analysis

Profit impact, shown in Figure 7 on the y-axis, can basically be described as a purchasing volume in currency. Furthermore Weele (2010, 195) says that a purchased item can be measured by criteria, such as the percentage of total purchase cost, the purchasing volume, material costs, total costs, or impact on the quality of product or business growth. However, it is easier to start the purchasing analysis by choosing the scale to be the purchasing volume of the bought goods or services (Iloranta & Pajunen-Muhonen 2008, 143).

Supply risk on the x-axis reflects how challenging the supplier markets are and what kind of risks they include. Supply risk includes many different criteria but to make it simpler, usually the number of possible suppliers is the main criteria. In a buying situation, when a bought item is on the right side of the supply risk (Figure 7), the market is the so called supplier market, meaning it has only a few possible suppliers. In

this case the supplier has more power than the buyer and the supplier can e.g. over-price the goods or services. On the other hand, if there are many possible suppliers, the bought item is on the left side of the supply risk, and the buyer has more power, making it the buyer market. Depending of the quadrant in the portfolio analysis, the purchasing strategy varies, but the buyer should avoid spending too much time on buying routine items and concentrate more on strategic and leverage items. (Iloranta & Pajunen-Muhonen 2008, 144; Weele 2010, 195 - 198.)

4.3.1 Leverage items

Leverage/volume items, in the portfolio analysis, have a big purchasing volume with a low purchasing risk, and there are various suppliers to choose from. Leverage items usually consist of goods and services such as packaging, raw materials, bulk chemicals and standard semi-finished products. These items illustrate a relatively large share of the end product's costs, causing a small change in the price to have a big effect on the end product cost. (Weele 2010, 197 - 198.)

The items in this quadrant might have, altogether, a small part in products and services, but they usually form the biggest money value part in the purchased items. A buyer can have many opportunities with these goods and services by using various ways of tendering to get the best possible price. With bidding wars a buyer can lower the price of the items and improve the service of the suppliers and even a small percentage in savings can mean big savings in currency. Among electronic trade solutions, the best way to proceed is by using e-auctions in an efficient way. (Iloranta & Pajunen-Muhonen 2008, 145 - 146.)

4.3.2 Non-critical items

Non-critical items or so called routine products usually have a small value per item and there are many available suppliers. Items in this segment are usually inventory items such as office supplies, maintenance supplies and cleaning materials. These are tricky items because of their nature of having higher handling costs than purchasing costs. About 80% of the energy and time of the buyer goes to managing these items and that is why the buying of these items should be organized efficiently. (Weele 2010, 198.)

Everyday items such as gloves, pens, bolts, screws etc. should be bought in bulk for everyone to use, because the time the buyer uses to search and buy these items might come to be more expensive to the company than the actual goods. Some of the routine products can be handled in a way that certain workers can place an order themselves if certain items are running out. Many times, also the suppliers can manage some of the routine products by having them fill up the items in certain time periods and bill the company after calculating how many items have been used. This supplier management of certain items is called vendor managed inventory (VMI). (Iloranta & Pajunen-Muhonen 2008, 146 - 147.)

4.3.3 Bottleneck items

In the quadrant bottleneck items, the buying volume of the goods and services is relatively low with a low value in money and with a low number of possible suppliers to supply these items. Different industries have different items in this segment e.g. food industry has natural flavorings and vitamins, and chemical industry catalytic products. In bottleneck items, the supplier has a dominant position over the buyer,

which may lead to high prices, long delivery times and bad service. (Weele 2010, 198.)

Many companies end up in this situation already in the product development phase because of thoughtlessness and poor planning. For example, a company might be trying to get an advantage against competitors by choosing a new component which can be supplied only by one supplier. Buying an information system might be one of these situations. Although bottleneck items have a low money value, they can form operational bottlenecks if they are not available. The buyer needs to keep in mind that professional vendors might be consciously setting up these kinds of traps. (Iloranta & Pajunen-Muhonen 2008, 148.)

4.3.4 Strategic items

Strategic items are high value items, they have few possible suppliers and they are critical for the company to operate and prosper. In the most extreme situation, there is only one possible supplier. Usually items in this quadrant are unique or tailored, for example computer microprocessors and airplane engines. Items bought in this segment give the buyer the biggest challenges, and even if the buyer might have an opportunity to change suppliers, it is an arduous and time taking process. The only way to somehow manage the supplier relationship is by doing extensive co-operation with the supplier. (Iloranta & Pajunen-Muhonen 2008, 149.)

Weele (2010, 196 - 197) states that communication and interaction with the supplier is usually intensive and complex and there are three different segments in power balance. The first segment is the buyer-dominated segment, meaning that the buyer dictates demands to the supplier and the supplier just has to deliver according to the demands. The second one is the supplier-dominated segment where the supplier

imposes the conditions to a buyer and the buyer needs to accept the conditions. The last segment is a balanced relationship, where neither the supplier nor the buyer has power over each other and they have a joint interest to keep the relationship stable.

4.4 ABC-analysis

At the beginning of the 19th century an Italian economist Vilfredo Pareto noticed that despite a country studied, a rather small part of the population controlled the wealth. He perceived that about 20% of population owned circa 80% of the wealth. Later on this observation led to the so called Pareto curve or the 80/20 rule, and this basic principle is known to apply to various situations. The ABC analysis is based on Pareto's 80/20 rule and is widely used in purchasing. (Johnson et al. 2011, 217.)

The ABC analysis is one of the most used basic tools in purchasing and with it a buyer can classify purchases and put them in order of importance. The main idea is that none of the items are mediocre, different items are emphasized differently, and they need to be controlled in different ways. In the ABC analysis, the purchasing items are positioned in a descending order by their money value, and then the cumulative percentage is calculated to each item. This way the buyer can find out which of the items are most important and which are least important. (Iloranta & Pajunen-Muhonen 2008, 479.)

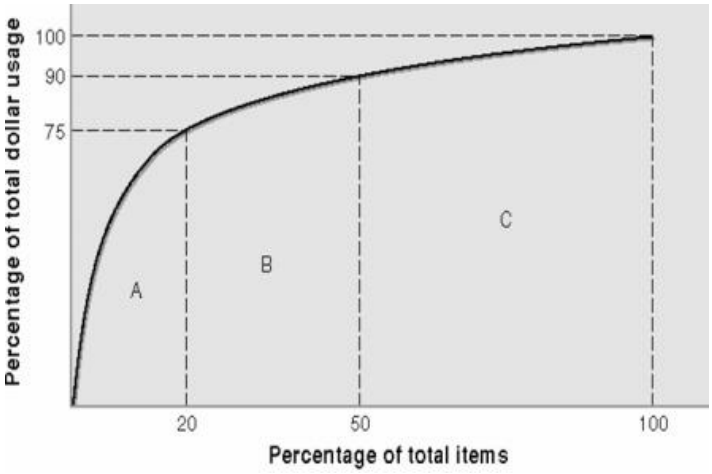


FIGURE 8. Typical ABC Analysis curve

The ABC analysis is known to apply in different situations because of its universal feasibility. In addition to using it as a tool in purchasing, it is used in customer service and even more in inventory management. The usage of this analysis is the same in all of these fields, but it is used to measure and define the classification for different purposes. The use of the ABC analysis in inventory management and purchasing is connected because items which are bought to stock are the items in inventory, and the classification is also usually done by money value. In all these different analysis applications, the main goal is the same; to rank items into different groups to find out the best possible way to handle them. (Stock & Lambert 2001, 256 - 258.)

Usually in the ABC analysis, the bought items are divided into three different groups A, B and C. A is the most important group by creating the biggest part of purchasing volume, making the activities in group A the target of precise controlling. The A group represents about 75% of the cumulative percentage value and has only approximately 20% of the items involved. Items in group B are medium-value items

containing circa 30% of the items and about 15% of the cumulative value. C group is the low value group containing about 50% of the items and having only 10% of the cumulative value. In many situations, to make the analysis wider, there are one or more groups added to the original three. (Op. cit. p. 480 - 481.)

TABLE 1. Approximate values of ABC-analysis classification

Group	Cumulative %	Items %
A	75	20
B	15	30
C	10	50

The ABC analysis is being widely used in purchasing and in many other situations, and naturally there are many different ways to use it. Benton (2010, 85 - 86) has documented the following four step procedure as one possible way to implement the ABC analysis:

1. Calculating the annual value of each item
2. Listing the items in descending order
3. Developing a cumulative percentage value for each item
4. Determining the groups that represent percentage values (see Table 1).

5 CURRENT PURCHASES AT VAPO OY BIOFUELS

This chapter concentrates on the current purchasing situation of Vapo Oy Biofuels. The chapter will reflect the procurement related issues, discuss and analyze the mustered data and report the problems and challenges. The current state analysis is made by dividing all the bought items into categories and by using a spend analysis and portfolio analysis various solutions and information will be presented throughout this chapter.

The purchasing data is collected from 2010 and the purchases are narrowed down to Vapo Biofuels business area, because the greatest needs and opportunities are found under this business area. Due to the excessive data on Biofuels purchasing, the collection of data needed to be narrowed down. Vapo Oy has divided Finland into eleven different regions and Central Finland was picked up as the main geographical area of focus. Central Finland's purchase distribution to different sectors was close to the purchases of the entire Finland and generally speaking it reflects the average region (see Figure 9). These things were the major reasons for taking Central Finland as the area of focus.

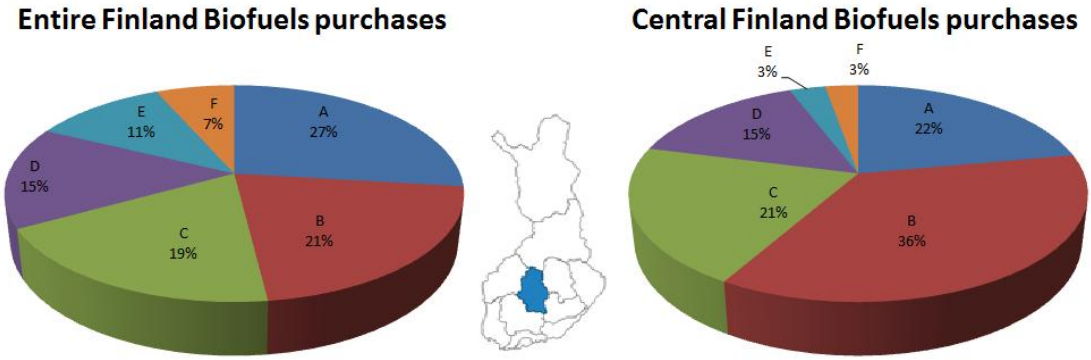


FIGURE 9. Layout of purchasing groups in entire Finland and in Central Finland

5.1 Current state analysis

5.1.1 Spend analysis

The spend analysis started by collecting all the purchases from Vapo's ICT systems. The original reports for 2010 were collected from the ICT reporting system Cognos, which is a business intelligence and performance management software. All the expenses were found from the ERP systems, Microsoft Dynamics AX and Potra. IP Monitor has the actual physical bills that are sent to the company and Potra is collecting the other expenses which come from e.g. peat contractors who are sending the charges, for example via text messages. All the mustered data was inserted to Excel files and the information is presented in the following paragraphs.

Vapo Biofuels had approximately x million euros revenue in Finland in 2010 and it spent around x million euros on biofuels goods and services in the same year. The biofuels purchases consist of income statement and invested expenses. Approxi-

mately 11% of all purchases came from Central Finland, making it one of the largest regions in the purchasing volume. All purchases were divided into six different groups (see Table 2) to see how the purchases were distributed in different areas. It should be noted that the collected data, at this point, is raw data gathered from the ICT system Cognos.

TABLE 2. Distribution of bought goods and services in groups

	Whole Finland		Central Finland	
Category	**€**	**%**	**€**	**%**
A	x	27%	x	22%
B	x	21%	x	36%
C	x	19%	x	21%
D	x	15%	x	15%
E	x	11%	x	3%
F	x	7%	x	3%
Total purchases 2010	**x**	**100%**	**x**	**100%**

From the table above it can be seen that the percentage distribution of all the groups are not equal in Central Finland and in the entire Finland. The biggest variations are between B categories (15 units), D categories (8 units) and A categories (5 units). The main explanation for discrepancies between these categories is the weather. For example, in peat production, the weather is one of the driving forces for getting the best possible outcome; this is because peat is only produced in summer and it needs a certain number of sunny/dry days for it to be dry enough for collecting. In case the summer is bad (rainy etc.) e.g. in Central Finland, the production of peat is lower, hence the lower level of bought production services. This also means that there is

not enough peat in Central Finland, so it needs to be transported from somewhere else, therefore making transportation distances longer and logistics costs a lot higher. The variety between product purchases is simply because Vapo Oy is not buying as much finished goods in Central Finland as it is in other regions.

In Central Finland's purchases, 91,8% are made under the fuel peat production group and the remaining 8,2% are spent in the three other product groups. Wood products is the second largest product group with the expenses of 5,2%)and the remaining 3% is spent on environmental peat (2,3%) and agro fuels (0,7%). The Agro fuel product group is the only group which actually spends more money than its revenue is. Looking at these percentages, it is obvious that peat production is by far the largest and the most important product group in Vapo Biofuels, and therefore it has the most opportunities and savings potential.

The data collected from Cognos needed to be cleansed since the raw data included transactions which are not proper purchases. Some of the transactions which are not actual purchases were:

- Vapo Group's internal purchases
- Subsidies
- Personnel costs (salaries, travel and allowances)
- Losses in sale and expense transfers
- Real estate taxes, public certificates and licenses
- Increases and reductions in environmental obligation reserves.

After the data cleansing, Vapo Oy spent around x million euros in the entire Finland and around x million euros in Central Finland. Vapo Oy has in the entire Finland a circa 86% proportion and in Central Finland an about 66% proportion, when compar-

ing the money that is spent on purchases to the revenue. In a nutshell, Central Finland had a lower share of the compared purchases than most of the other regions in Finland.

FIGURE 10. Revenue versus purchased goods and services

The figure above reflects the comparison between how much money is used for purchases and the revenue in Central Finland by Vapo Biofuels in 2010. The information provided is after the data cleansing and the purchases are divided into six categories, varying a little from the earlier allocation (Table 2). It can be seen that Vapo Biofuels spends most of the money on services, especially on logistics and production ser-

vices. Most of the services are outsourced to third parties such as production contractors and logistics service providers. The table below provides percentage value to these categories and explains what kind of goods or services each category includes.

TABLE 3. Central Finland purchases and category content

Category	Eur	Percentage	Percentage from Revenue	Examples of goods and services the category includes
Total				

5.1.2 Categories

Purchases can be distributed to different categories/groups as shown in the previous chapter. This chapter provides information on how all the purchases were given a reasonable classification of product labels and codes and also serves a new category as the basis for the portfolio analysis.

First of all, Vapo Biofuels business area was divided into four different expense groups: production, investments, logistics and fixed costs. All the groups were then split into goods and services to make it easier to come up with product labels and avoid overlapping different items under the same label. Altogether, 191 different product labels were uncovered and all of them were given their own product codes varying from 3 to 5 characters (see Appendix 1). The labels were not just concerning Central Finland, but they covered the whole Finland's biofuels purchases.

The next step for mapping the purchases was to distribute all the purchases under a certain product label, so it could be seen where the money was spent. After all the purchases were allocated to different labels, two different category groups were made. The first category groups were already presented in the earlier chapter (see Table 3) and those categories were opened up for the portfolio analysis. The idea was to make it clearer to the reader to understand from the category name what kind of goods or services it includes. For example, it is not easy to understand from the category name what "logistics services" or "production services" categories contain.

TABLE 4. Portfolio analysis categories

No.		€	%	Cumulative %
1	Selling freights	x	x	x
2	Peat production	x	x	x
3	Peat production preparation	x	x	x
4	Production products	x	x	x
5	Loadings	x	x	x
6	Product purchases	x	x	x
7	Other delivery services	x	x	x
8	Fixed products	x	x	x
9	Fixed services	x	x	x
10	Raw materials	x	x	x
11	Other production	x	x	x
12	Intermediate transfers	x	x	x
Total		**x**	**100%**	**100%**

The redefined category group has 12 different categories and basically logistics services and production services categories were split into smaller categories. From the table above (Table 4) it can be seen that about 76% of the purchases are in the first three categories and the next four categories (33%) have only around a 19% share of

the purchases involved. The remaining five categories have only approximately 42% of the purchases involved. From this redefined category group a conclusion can be made that the purchased items are pretty closely following the ABC analysis curve (Figure 7).

5.2 Portfolio analysis

A portfolio analysis was performed for the purchased items in the Biofuels business area. The starting point for the portfolio analysis is that all the bought goods and services, from the buyer's point of view, are not strategically equal. The results are reported and analyzed to give an idea of what kind of different strategic approaches should be introduced for certain categories to get the best possible outcome.

5.2.1 Execution

The portfolio analysis was executed by using the categories which were presented in the earlier chapter. The profit impact (y-axis in the Kraljic matrix) was chosen to be the purchasing volume and the buying volume numbers were also stated earlier. The next step was to find the supply risk for each category, and this was probably the most challenging task when making the analysis. The supply risk specification was carried out by dividing the x-axis in the Kraljic matrix into a scale from 1 to 5 and determining the supply risk number for each of the product labels (Appendix 2).

The average of the biofuels supply risk was calculated, and it was 2,9 so purchases are on the average, located in the middle of the x-axis. After the labels were graded, the average supply risk number for each category was calculated and then the cate-

gories were positioned into the Kraljic's four quadrant matrix. It should be noted that supplier markets were not analyzed separately and the supply risk numbers were determined by a few Vapo Oy employees who are dealing with the suppliers. The surface area of the circle, in the figure below, reflects the year 2010 money value for each of the category.

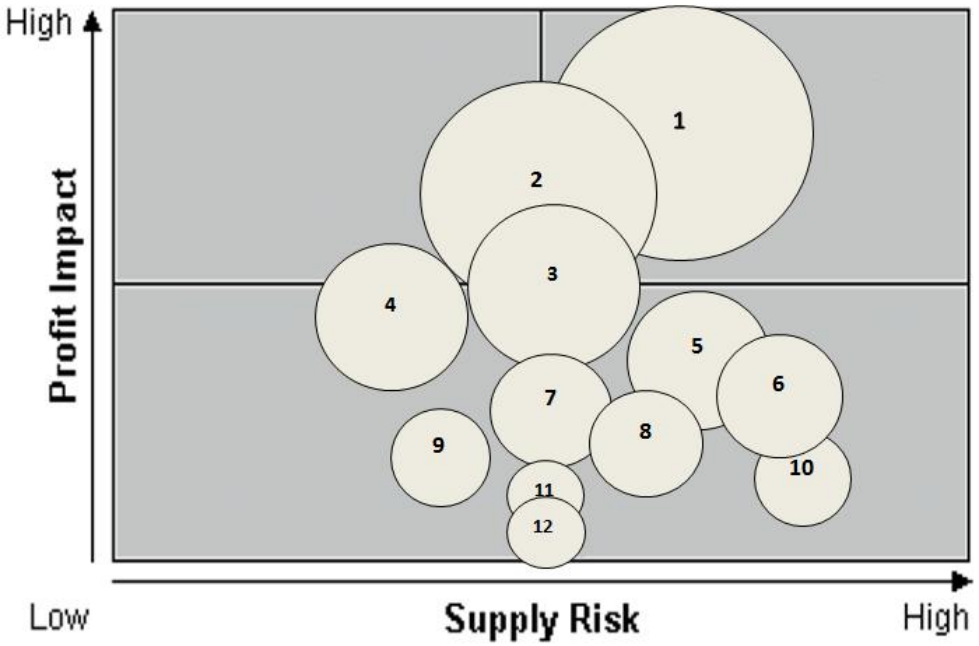


FIGURE 11. Vapo Biofuels purchases in the Kraljic matrix

5.2.2 Purchasing strategies

From the figure it can be seen that under the Biofuels business area most of the purchases in volume are strategic items and the number of leverage items is clearly low. There are five categories distinctly located in the bottleneck items and two categories clearly located in non-critical/routine items quadrant.

The selling freight category is clearly located in the strategic items and it is the biggest category in volume. Basically this means that the shipping of the sold items e.g. peat, gives Vapo Oy the biggest challenges, at least from the purchasing point of view, and these items are critical for Vapo Oy to prosper. The peat production category is located in the middle of the strategic and leverage items, so it should also be handled with care and time, like the selling freight category. The basic strategy for these items is to do co-operation with certain suppliers or even form partnerships. In case that it is possible to change suppliers, it should be explored by trying to find other possible suppliers and create competition between them.

Preparation for peat production, production products and fixed services are placed under the non-critical items quadrant. A typical feature of these routine items is that the actual purchasing process causes relatively more expenditure compared to the price of the goods and services. Other production and intermediate transfers are in the middle of the non-critical and bottleneck items, but surely they do not need the attention of bottleneck items. The strategy for handling these items is to make sure that the operational performance is working and by centralizing the fragmented purchases into bigger groups for increasing the supplier's interest.

The remaining five categories (loadings, product purchases, other delivery services, fixed products and raw materials) are in the bottleneck items section. The buying volumes of these items are quite small, but they need attention (especially loading and product purchases) because if these goods or services are missed, they can create operational bottlenecks and this may cause big problems for the company's operation. A strategic approach for handling these items is to ensure the availability of the products or try to change the goods or services into more standardized items.

5.3 Organizing purchases

Vapo Biofuels purchases are organized in different ways and centralized purchasing agreements are made if any financial or operational advantage can be achieved by them. Vapo Oy launched a purchasing project in 2009 (the project was never finished) and with this project some of the scattered small purchases were combined. For example, Vapo Oy had about 30 different accounts for the same company and when this was discovered, the accounts were cut to only one. With this simple act, Vapo Oy started receiving the negotiated discounts, and this made it easier and less time taking to handle that company's account. Even though centralized patterns are attempted to be accomplished, the purchases still mostly follow a decentralized purchasing model due to the nature of biofuels production.

Next, the organization structures are presented to get a better understanding of the layout of Vapo Biofuels. In addition, the structure will help to get an idea of the positioning of the employees who are making the supplier contracts, orders and call-offs. See Appendix 3 for all the employees who are making contracts or buying and making call-offs.

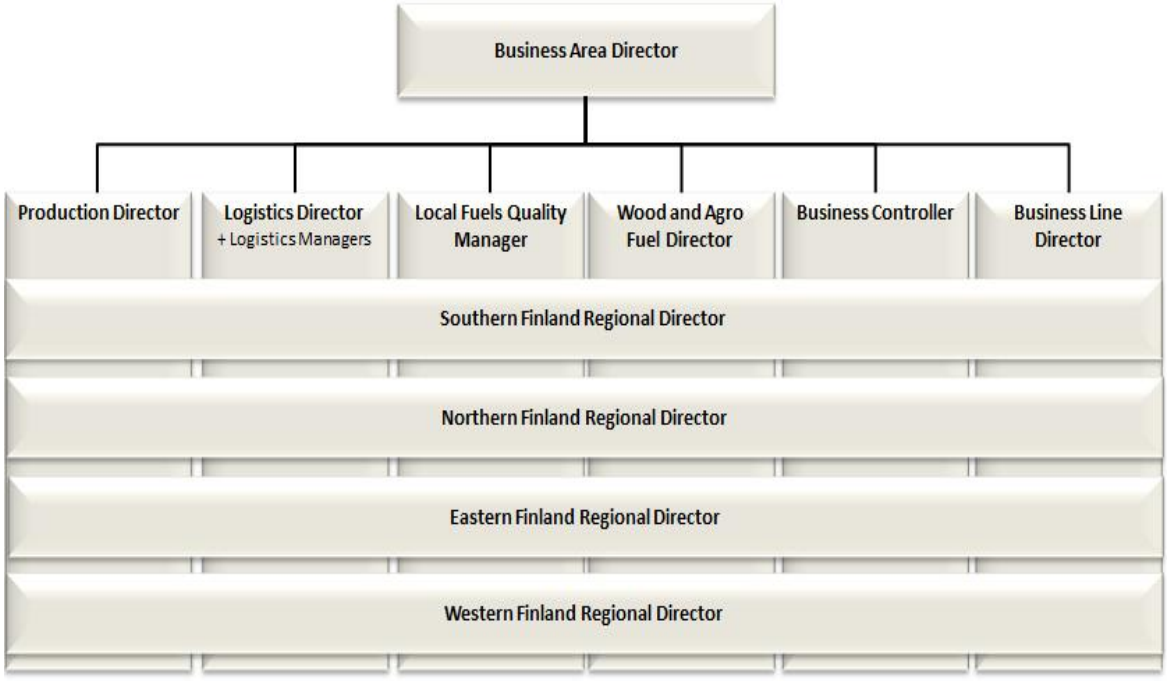


FIGURE 12. Biofuels organization structure

Figure 12 shows the structure where the Biofuels business area director is on top and other managers and directors beneath. Logistics managers make most of the contracts, and buy the logistics goods and services, sometimes with the help of the logistics director. Other managers and directors, at this level, only sign and recheck some of the agreements, but generally speaking they are not that involved in purchasing functions.

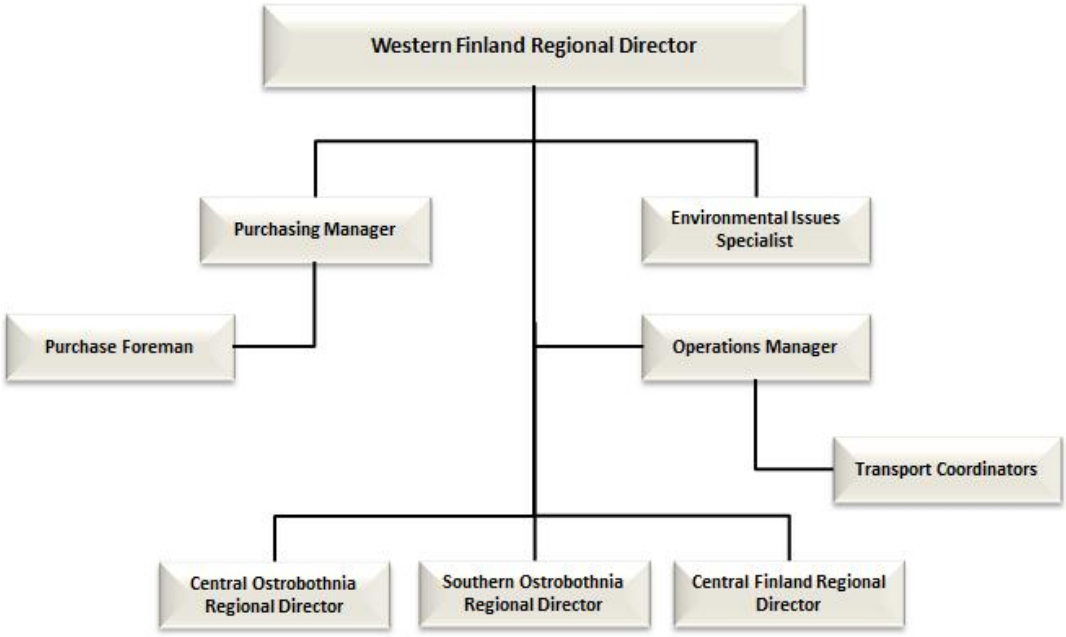


FIGURE 13. Western Finland Biofuels organization structure

Western Finland structure (Figure 13), was taken under a closer look, since the Central Finland region is under this area. Generally speaking, the regional director does not participate much in purchasing functions and the purchasing manager and purchasing foreman only handle items under product purchases or production services. The environmental issues specialist only takes part in purchases which are related to monitoring functions in the production sites. The operations manager is the most involved in buying, from the aspect of money, but most of these purchases are from logistics goods and services, which are made with the logistics managers. Transport coordinators do not negotiate the contracts or do the actual buying, but they do almost all of the call-offs of logistics goods or services.

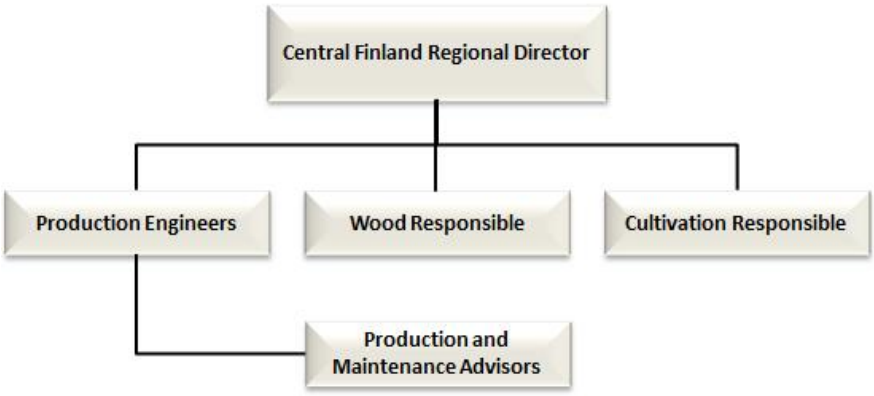


FIGURE 14. Central Finland Biofuels organization structure

The regional director in Central Finland mostly takes part in purchases which are related to logistics, except the selling freights. The regional director's level of involvement in buying and signing contracts is quite low, participating only in about 2% of the purchases, but the regional director is more involved in the call-offs of goods and services. The production engineers' situation is similar to that of to the regional director's, as they are not as involved in making the contracts or buying, but they are making most of the goods or services call-offs (participating in about 45% of the call-offs). The wood responsible and cultivation responsible are only involved in the call-offs of items which are related to their own line of work, for example cultivation responsible call-off items concerning reed canary grass and wood responsible items concerning wood, products such as woodchips.

It can be seen from Appendix 3 that all the bought goods and services are not yet allocated to different buyers, and for example preparation engineers cannot even be seen in the previous organization structures. This is due to the fact that the rest of the buyers are under the production structure and to understand where production

is located see Figure 12. For allocating the rest of the purchases to the buyers the organization structure of production is presented in the following Figure 15.

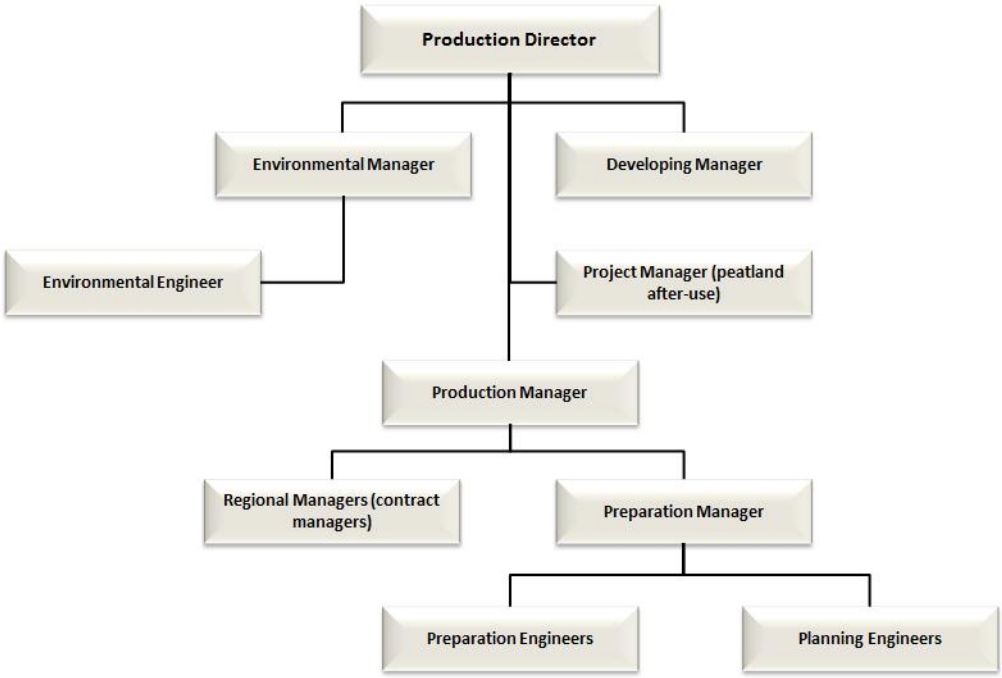


FIGURE 15. Biofuels production structure

On top of the structure, only the environmental manager and environmental engineer are involved in purchasing and they are just buying and doing call-offs for goods and services related to monitoring functions. The production manager is not involved much in the buying process, but the regional managers (contract managers), the preparation manager and preparation engineers are. Contract managers alone buy approximately 25% of the goods and services in production and preparation engineers with the help of contract managers and preparation manager buy over 10%. From the three of these, preparation engineers are the only ones doing call-offs for the purchased items.

In production, Vapo Oy is using key buyers to handle the most important materials, such as fuels, mineral aggregates and IT related goods and services. The role of the key buyer is to tender the suppliers for certain materials, choose the suppliers, negotiate the price and payment terms etc. If necessary, the key buyer makes the contract and informs superiors about what has been done. The supplier contracts/agreements can be found in the production purchases section in the Notes-database.

The key buyers are listed as the fourth biggest buyer group in the buying volume, spending over x million euros in 2010. These key/responsible buyers are nominated on the Vapo-level for handling the most important materials to ensure the production functionality. The key buyers do not just buy these items, but they handle these responsibilities while continuing their normal jobs. The key buyers are employees whose job titles are such as preparation engineers, production managers, manufacturing unit managers, environmental issues specialists and system specialists. The items these buyers are handling are pumps, pipes, chemicals, information technologies, mineral aggregates, filter fabrics etc.

In a case that the purchasing budget is exceeded or a single purchase value is more than 50 000 euros for a single new item in production, a key buyer cannot buy without the approval from a superior or from the procurement manager. Purchases which are not included in the budget or investments always need to be accepted as follows:

- Under 10 000 €, an employee under the business line director (eg. regional director or purchasing manager)
- Under 20 000 €, business line director
- Under 50 000 €, business area director or country manager

- Over 50 000 €, chief executive officer or chief financial officer.

The investment costs of certain goods or services can be rather high and that is why there are a number of Vapo authorities who are involved in the decision making process. The Vapo Oy Board of Directors decides on investments exceeding the annual plan over 250 000 € or investments included in the annual plan of over 1,0 million euros. The Vapo Group Management Team or the Managing Director or a person authorized by him, decides on investments included in the annual plan of less than 1,0 million euros or investments exceeding the annual plan less than 250 000 €. The business area director, production director or a person authorized by them can decide on investments included in the annual plan of less than 250 000 €. The business line director or similar unit manager can decide on the investments included in the annual plan of less than 50 000 €.

5.4 Purchasing processes

Vapo Group has already described the basic purchasing process of goods and services that are bought for production; this process chart was last updated in the autumn of 2010. The process description includes the following:

1. Recognition and specification of need
2. Searching and choosing the supplier
3. Agreement
4. Order, delivery and receiving the goods
5. Checking the invoice

6. Follow-up, evaluation and claims.

The process description follows almost precisely Weele's purchasing process model described earlier in Chapter 3 on purchasing processes (process model in Figure 4). In Appendix 4 the already existing production process chart of Vapo Oy can be found. The process description is found in Vapo's procurement instructions, so it helps the buyers to know how the purchases should be made properly by following the buying process.

Vapo Oy procurement must mainly be based either on an annual agreement or on an offer of each purchase. In cases where purchases have minor monetary value, tendering is not done, but purchases need to be performed cost efficiently. Otherwise, if possible, there is an instruction to send enquiries (verbal or written) to at least three potential suppliers. The buyers need to negotiate with the chosen suppliers before choosing, and after that, the contract is signed. Orders of great value are always made in writing and suppliers need to provide order confirmation or a delivery contract. Less significant orders only need some written document and can even be made verbally.

Payment terms must be checked before ordering and at least 30 days payment terms should be pursued, and when buying capital goods the part payments are agreed in a way that more work has been done than what is paid for. Advance payments are avoided as much as possible but if they are used, collateral security must be demanded and it needs to cover at least the amount of the advance payment. The person who orders or makes call-offs needs to make sure that the bought goods and services arrive in time in the right quality and at the right price. In the case of a late delivery or other deviations, compensation needs to be claimed and the person who receives the delivery must check that the delivery matches the order.

The process described earlier only gives a vague idea of what is the actual purchasing process is. In order to find out the whole process three different employees were interviewed. The interviewed buyers were chosen based on the biggest purchasing volumes (see Appendix 3). Most of the purchases are handled by logistics managers/operations managers, contract managers, preparation manager/preparation engineers and key buyers.

The first interview was with preparation engineer who is also acting as a key buyer handling goods such as pumps, pipes, aggregates, steel drums and filter fabrics. He was chosen as an interviewee because he is a part of the purchasing project group and he can cover the purchasing process of a key buyer and preparation of peat production sites. The Figure 16 below gives a basic idea what the steps are for purchasing goods and services to peat production sites. This process will be explained in a more detailed way in the next paragraphs.

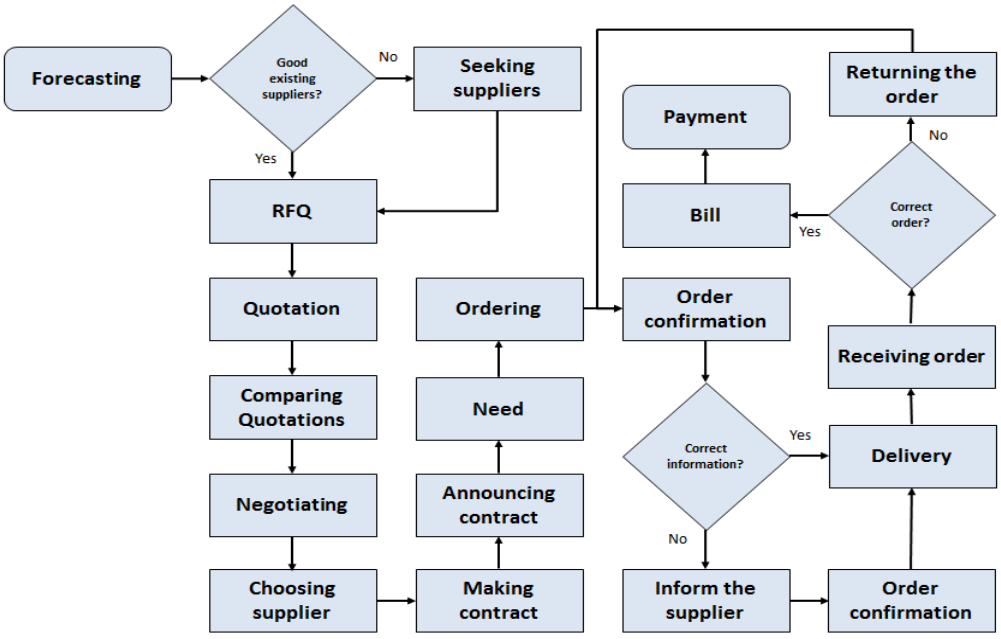


FIGURE 16. Peat production purchasing flowchart

The process starts with forecasting the needs, which is predicted from earlier years' demands. Forecasting is done by defining what is needed at a peat production site, but it is not accurate due to the nature of peat production which is very dependent on the weather. The next step is to look at the existing suppliers' performance and decide if the performance is good enough even to audit the supplier or cutting the supplier loose. In the case that the supplier's performance is poor and it is not worth getting quotations from the supplier, new suppliers are being sought. After new possible suppliers are found and it is decided what old suppliers could be used, a request for quotations (RFQ) are sent to the chosen suppliers. After receiving the quotations from the suppliers, the quotations are being compared and prices, terms and conditions etc. are negotiated. Quotations are always written and usually in electronic form and they are being compared by the buyer in Excel files. The preparation engineer states that the prices and terms and conditions of old suppliers are usually negotiated over the phone, but typically new suppliers are paid a visit.

The best suppliers are generally being chosen through the buyer's own decision, but sometimes the opinions of other colleagues are sought and approval from foreman asked. After the suppliers are chosen, the contract is written and signed usually by a buyer himself and sometimes by other employees; this policy was explained in chapter organizing purchasing. Next phase is to save the signed contracts in Notes database where Lotus Notes automatically sends an email to the chosen employees informing them that a new contract is made. These contracts are typically annual contracts (6 – 12 months) made with different goods or service providers. In the production site the next step in the purchasing process is ordering the needed goods or services which are triggered by the need of these items. Ordering is done electronically and after that, the supplier replies with an order confirmation where the buyer can check that information such as quantities, receiver, delivery time and place are cor-

rect. In the case that the information in an order confirmation is not according to the buyers order, the supplier is informed about this and a new order confirmation is sent.

Delivering the items takes place after the order confirmation is correct and then the items are received and signed by the receiver. The receiver should always check that the items are the same as in the order and that the items are not in any way damaged or out of order. In the case that the order or ordered items are somehow defective the order is returned and the process starts back from order confirmation where the order is being processed over again. If the received items are in order the supplier sends the bill to the company and company pays, through IP Monitor program, for the goods or services.

As mentioned earlier, the informant's main work is preparing the production sites ready for peat production, but he is also a key buyer in Vapo Oy. As a key buyer he acts mainly independently creating new or renewing contracts with suppliers. This task takes most of the time in the beginning of the year (about two months) and altogether the role takes about one month of a whole year's contribution. The rest of the time goes to preparing the peat production sites and there are many time taking projects ongoing at the same time. One of the big functions of preparing the peat production sites is to buy the needed goods or services and in Finland there are 8 people handling the preparation related tasks. The main responsibilities as a key buyer and preparation engineer is to guarantee, for example, with material purchases that the production sites are functional, prepare new production sites to replace old ones and with all of these, ensure the availability of peat to the customers.

The second interview was done with logistics director, who was chosen to illustrate the purchasing process of logistics services because he is a part of the purchasing

project's steering group and has a great insight to logistics related functions. Even though logistics managers and operation managers are buying most of the logistics related goods or services, the logistics director is consulting them and managing more of the entities. The next flowchart is done with the same frame as in Figure 16 to illustrate the differences.

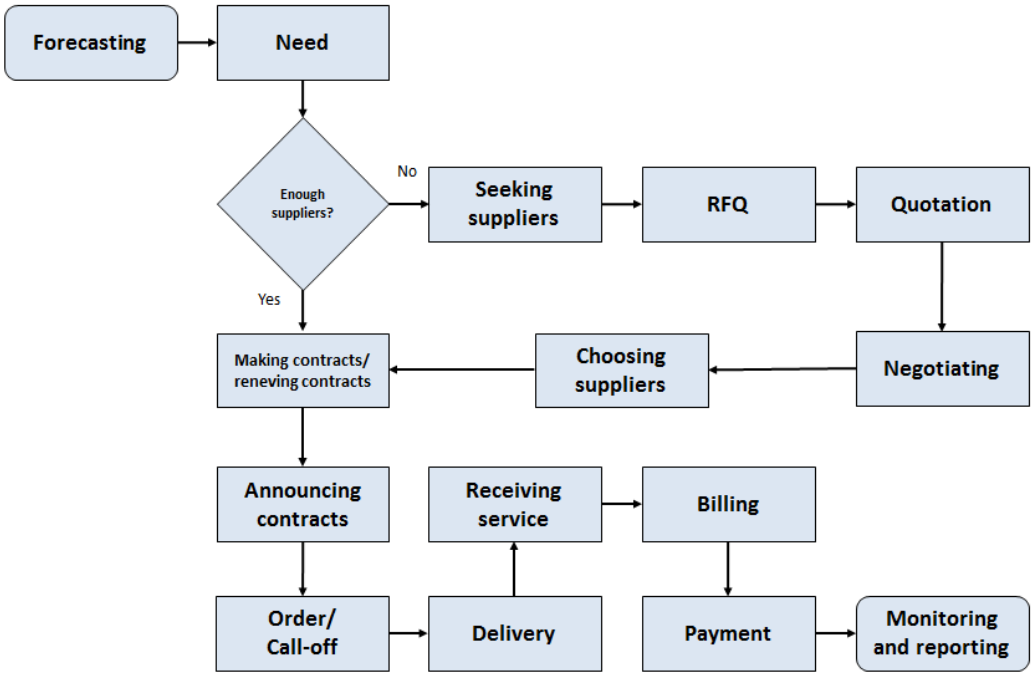


FIGURE 17. Logistics service purchasing flowchart

The logistics process starts with forecasting, likewise in production information is not too reliable, but after that comes the need for the goods or services. Forecasting comes from the sales department which informs the logistics department the volumes and other crucial information for logistics managers and operational managers

to create capacity need calculations. Forecasting triggers the need for the operational managers to meet up with the volumes of the calculations and check if they have enough suppliers to meet that estimation. It should be noted that these calculations are becoming more precise as time goes by. In the case that they do not have enough suppliers, new ones are sought. Basically the process of finding new suppliers is ongoing all the time, as it is informed in Vapo's website that they are seeking new transport entrepreneurs continuously.

The logistics director states that after enough suppliers are found, they are sent RFQ's and suppliers respond with the quotations. Quotations are received and the operational manager, with the help from the logistics manager, starts negotiating with the suppliers and determining the terms and conditions, prices etc. Next step is to determine the best suppliers and choose from them, in practice there is no excess of suppliers to choose from, and basically operational managers are negotiating with the suppliers, who have responded with a quotation, a deal that they can both manage with. The new suppliers, and the old ones that need a new contract, sign up normally a five year contract where there is either from 10 – 11 or 5 – 8 month working periods. In addition, Vapo Oy also have back-up suppliers who are doing singular transports if needed.

The new contracts are saved in the Notes contract database and the information about the new contracts is announced to regional managers and transport coordinators. The next step in the process is for a transport coordinator to order/call-off the needed service from a supplier and after that the supplier delivers. When a supplier is carrying out a task (receiving service) they send a text message of how many ton-kilometers, for example, milled peat they have been transporting. This text message is basically acting as a bill. The text message information goes to the ERP system Potra and Vapo Oy is paying 80% of the output to the supplier every second week and

the remaining 20% is paid yearly after a precise ton-kilometer reading. The employees are monitoring the suppliers all the time and then reporting about the performance so that it can be decided if it is rational to keep the same suppliers or steer them to the right operation direction.

The logistics service contracts are mainly created during the summer (May – August) in about 4 months. Logistics managers spend around 70% - 80% of their time in purchasing related functions and the logistics director about 50% - 60%. Altogether there are two logistics managers and four operational managers who are mainly handling the logistics service purchases with the help from the logistics director.

The last interview was with Central Finland's regional manager to cover the buying process of contractor services. The regional manager was chosen as an interviewee because he has been doing some advising and revisions to the Vapo Oy purchasing project and he has several years of experience in buying contractor services. Even though most of the contractor services are bought by contract managers, regional manager is giving support, for example, by mapping out the possible contractors. Most of the contractors are handling many different tasks rather than concentrating only on one or two tasks.

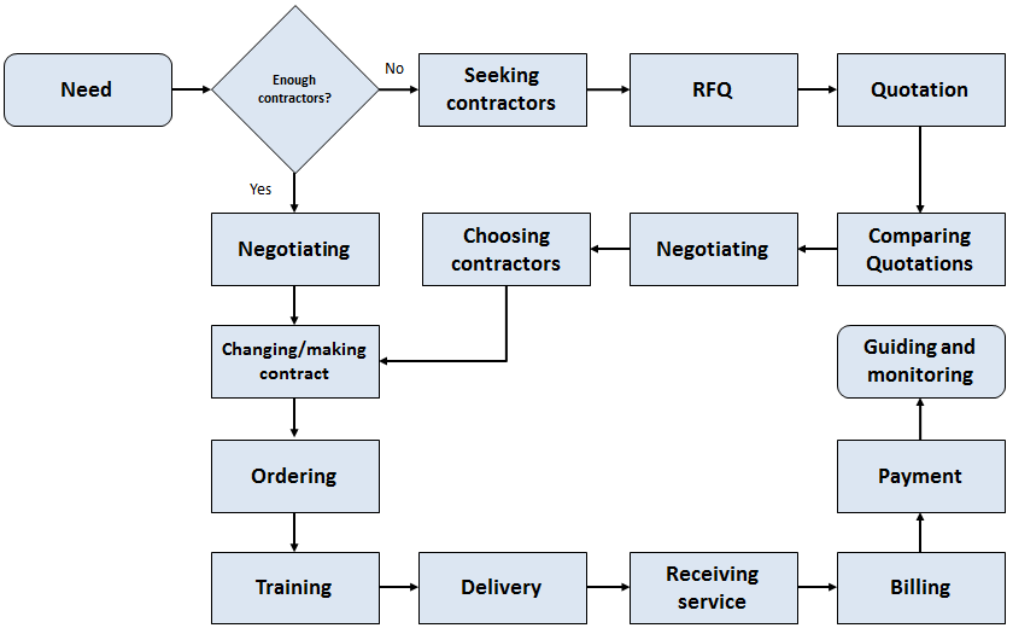


FIGURE 18. Contractor service purchasing flowchart

The process of buying contractor services start from the need of certain services or from the ending of a contract. Part of the need information is received from the sales department but the actual knowledge of what services are needed comes from the production engineers. Most of the time the process flowchart above goes through the route that there are not enough or no existing contractors, for example, doing maintenance in peat production site. This triggers the task of finding the needed contractors. As in earlier processes, the contract managers start sending requests for quotations and receiving the quotations electronically or sometimes via written letters. The quotations are compared, but most of the time the situation is same as in the logistics side in that there are not an excess of or even enough quotations, which leads to negotiating terms that both parties can cope with. After the negotiations are finished the contractors are chosen and contracts are made. In the case that there is

already a possible contractor who could handle a certain service, a contract manager reviews the existing contract and decides whether it is valid or negotiates a new contract with the contractor (changing contract).

The ordering of a service is done at the same time as signing the contract in a way that the contract is the actual order. The contractor contracts include all the different job descriptions but Vapo Oy only has the price unit for a whole operation. As an example, a contractor is doing excavations, building roads and shaping the fields and does not get paid different prices for all the tasks but a calculated average sum in total. When the contractor starts fulfilling the task they are being trained for it as the tasks goes on (driving permits, going through the environmental permit terms etc.). At the same time, naturally, the contractor starts delivering the services and the buyer starts receiving the services. Billing is done in the same way as in logistics services; the contractor sends text messages, information goes to Potra about what has been done and the contractor gets paid for the work every second week. While the contractors are delivering the services they are being guided and monitored by the employer.

Altogether contract managers and production engineers use 50% - 60% of their work contribution in purchasing related functions. Contracts are normally signed fast, but some take more than three months to negotiate and the main responsibility for the regional managers, contract managers and production engineers is to guarantee the availability of biofuels to end customers such as industrial heat and power plants and municipalities' heat plants.

The presented purchasing processes all have a common systematical approach, but they are all done in different ways. The first process is about buying goods to the peat production sites so it is natural that the process differs from buying the services,

although the part in all of the processes is the same after the suppliers are sought and the requests for quotations are sent to the part of choosing the suppliers. Basically the purchasing processes of buying services are containing fewer steps and this is mainly because of the shortage of suppliers and the nature of receiving the service from the suppliers, for example, confirmations are not sent and checked and orders are fixed later (e.g. ditch excavated in wrong place) rather than returned.

5.5 Problems and challenges

In Finland, the used ERP system is Potra and in Estonia and Sweden, Vapo Group is using Microsoft Dynamics AX (DAX) instead. It is planned that Vapo Oy is going to replace Potra with DAX in Finland in the future. The improvement opportunities and development direction of purchasing is directly linked to the replacing schedule, which is not confirmed yet. This development is probably forming the greatest problems and challenges for Vapo's purchasing in the near future.

Vapo's whole production and selling of peat is revolving around the weather. Quality of the peat is dependent on the weather and as mentioned earlier, peat needs a certain number of sunny days to be drained enough for collecting and at the same time it should not be too dry. The selling and transporting of the peat, on the other hand, depends on how cold is the winter, the colder it is the more peat is needed to heat up apartments etc. This is a big challenge to overcome because this is a problem that is out of anyone's influence. The only thing to do is try to manage the resources in a way that they are flexible enough to meet the fluctuations caused by the weather.

The lack of a purchasing director or employee being in charge of the purchases made mapping out the purchases very challenging for Vapo Oy. The fact that the purchases were not earlier mapped out took a lot of time and effort and because there was no one looking after the bigger picture none of the employees had insight to which would be the biggest spend categories. The biggest problem in this was that the whole project started almost from scratch (there was some information from the earlier purchasing project) and therefore it took a lot of time and efforts to organize the purchases and categories.

The forming of product labels (Appendix 1) and defining the supply risk rates (Appendix 2) created a lot of work and they were defined by a small group. This was a challenge and a problem because the data is not necessarily as reliable as it could possibly be, even though the small group consisted of Vapo Oy employees who have been working in the company for many years and have different jobs and different perspectives to the purchasing aspects.

The ERP system Potra had the already existing labels, which were changed a bit, and because of this it was easier to map the purchases under a certain label. The ICT system IP Monitor, on the other hand, did not have these kinds of labels, so they had to be sorted out one bill at a time. Although bill mapping was done by Vapo Oy professionals, such a way always creates chances for human errors and because there are over 4 500 physical bills (in Central Finland), there are bound to be some mistakes.

When the supply risk rates (Appendix 2) and the buyers (Appendix 3) were being mapped out a problem occurred. This information was found out by the same small group of Vapo Oy employees as earlier, but after it had been finished it was sent over to Central Finland's regional manager for new ideas, perspectives and opinions. The regional manager made a few changes to the supply risk rates and a lot of changes to

the buyers' column. The challenge was to determine whose idea the correct one was. Supply risk rates were determined to be kept unchanged, because e.g. suitable contracting markets, on the logistics side, are better in Central Finland than in other regions and hence the supply risk rate was thought to be lower. The variation in the buyers' column, on the other hand, was chosen to follow the regional manager's thought to fit better in Central Finland's region.

6 DEVELOPING PURCHASING

This chapter gives the author's personal improvement ideas and recommendations for improving the procurement functions of Vapo Biofuels. The whole purchasing development relies heavily on the data gathered throughout the whole thesis and that data is where most of the ideas are summoned from. The improvement ideas chapter presents different improvement options that could be done to get a better purchasing performance. The recommendations chapter, on the other hand, points out the improvement ideas that are easiest to deploy with a small input and the ideas that are most critical, to make the purchasing activities more effective and efficient.

6.1 Improvement ideas

In this chapter there are the author's ideas for improving the purchasing functions of Vapo Oy. Nine different improvement ideas are presented but the most important of them are: hiring a new purchasing director, creating spend analysis program, deepen the performance measurement, standardizing bottleneck items and dividing contractor responsibilities.

Hiring purchasing director

One important thing Vapo Oy should execute is hiring a new purchasing director under the Biofuels business area. In Figure 12, the organizational structure is presented and the new purchasing director could be working in the same level with production director, logistics director etc. to support the purchasing and, generally speaking, keep the whole purchasing pallet under control. A purchasing director would help organize the purchases in biofuels, manage the big picture of purchasing and steer the buyers to follow protocols for getting the best output from purchasing related functions. Purchasing director could be possibly hired to Vapo Group level, where purchasing director could also coordinate Group level purchasing and purchases across the business areas.

Spend analysis program

Vapo Oy should implement a spend analysis program to support the created categories and spend analysis and that way be always up to date with where the money is spent. This program could be an extended application to the ERP system DAX because all of the information is already going through DAX even though it is not used in practice. In DAX there could be a column for the buyer to choose a product label

or a product code for the purchased item. The layout of DAX can be found in Appendix 5. This way all the purchases would already be mapped out to different categories and it would utilize the work that has already been done in this project. The extended application should not be too expensive to put to use and it would be a massive help in following the purchases and saving time.

Measuring performance

The performance measurement of purchases at Vapo Oy is not at an optimal level, the suppliers are assessed but, for example, the effectiveness and efficiency of the buyers is at a poor level. For Vapo Oy to know more about their buyers, suppliers and generally about their purchases, they should deploy some performance measurement indicators. Four dimensions can be established on which evaluation and measurement of purchasing functions can be based: price/cost, product/quality, organizational and logistics. From these dimensions Vapo Oy is deploying quite effectively price/cost and logistics dimensions and because the quality of the peat is really important to Vapo Group for getting the best out from it, the product/quality dimension can be seen as the key performance indicator (KPI). The organizational dimension on the other hand is at a poor level and there is a definite enhancement opportunity. Vapo Oy should start measuring the performance of the major resources that are applied to fulfill the objectives and the goals of purchasing activities. These major resources include the purchasing staff and management, procurement instructions and purchasing information systems. It should be determined what kind of indicators these are, how to set them up and who is in charge of monitoring them.

Key buyers

The role of the key buyers should be changed. From Appendix 3, it can be seen that the key buyers are only taking part in 7% of the purchases in Central Finland, making the number pretty low. The key buyers are mostly involved in peat production and preparation of peat production, as it is planned to ensure the functionality of peat production. For example, the biggest category, selling freights, is a key buyer free zone and even though a lot of attention for these purchases comes from logistics managers and operation managers, there could be buyers concentrating only on these. The conclusion from this is that the number of key buyers should be increased and they should be spread to different areas, or the key buyer responsibilities should be broadened according to their know-how.

Portfolio analysis

The portfolio analysis reports that selling freights is the biggest category in the buying volume and it is located in the strategic items quadrant and thus should be treated with a lot of attention. One solution for Vapo Oy to decrease the dependence on a certain supplier is trying to move the selling freights category more to the volume items quadrant by systematically finding new suppliers and creating competition. In case there are no other possible suppliers, the markets are not beneficial for the buyer, and changing the suppliers is a challenging and time taking process, Vapo Oy should enhance the strategic co-operation with certain suppliers even further, and try to generate mutually beneficial partnerships. The logistics suppliers are somewhat networking together, at least comparing their incomes, and this opens opportunities for creating a cooperation between the suppliers, not just between Vapo Oy and a supplier. With this kind of arrangement the suppliers could appoint one person from their respective companies as a spokesperson to handle the negotiations. This

would save a lot of time for Vapo Oy employees by having to negotiate and discuss with only one entrepreneur instead of all of them.

Loadings, product purchases, fixed products and raw materials are clearly located in the bottleneck quadrant in the portfolio analysis. The risk rate is high due to the fact that most of the items are related to peat production, where the already operating contractors are doing the services and the goods are bought from the existing peat production sites (e.g. peat and woodchips raw materials). One solution is to accept the dependency on certain suppliers and make sure that these goods and services are available when needed for avoiding operational bottlenecks. Another solution is to decrease the dependency by trying to find new suppliers, and if new suppliers cannot be found, the goods and service should be changed into more standardized items. For example, making contractor contracts in a way that they do not handle the loadings, and instead Vapo Oy uses other third-party logistics providers for handling the loadings.

Contractor responsibilities

The job responsibilities of contractors should be divided into smaller pieces. Like told earlier in chapter purchasing processes, the contractors get paid a calculated overall sum from the services they are doing. If Vapo Oy would divide the tasks and pay different prices for each task it would help the contractors to perceive what tasks are important and they would not treat one or two tasks as main responsibility and other tasks as extra jobs which are done without bigger input. For example, a contractor would have a different price for doing excavations or building roads. In addition, the monitoring of contractor tasks would get easier and from a purchasing point of view it could be more easily be seen in what tasks are the money put into in contractor services.

Third-party logistics

In 2010 Vapo Oy had 110 transport vehicles operating the whole year from 10 – 11 months (65 entrepreneurs) and 87 transport vehicles operating 5 – 8 months a year hired for seasonal peaks (60 entrepreneurs). In addition, there were a bit over 100 so called gig vehicles, which are contract entrepreneurs' spare vehicles or occasional entrepreneurs, driving biofuels when the contract vehicles could not handle the entire work load. In overall, the gig vehicle costs more and that is why there is too many of them and the number should be reduced. Mainly the excess of gig vehicles is because it is almost impossible to forecast the yearly transports because it cannot be known if the winter is going to be cold enough to sell a lot of peat or if the summer is going to be warm enough to produce a lot of peat. Basically the situation is that Vapo Oy should find and hire more contract entrepreneurs to lower the costs of transports and even though this task is hard and time taking an additional study should be performed.

Purchasing instructions

Vapo Oy has not updated their procurement instructions or performed purchasing education for employees after the last purchasing project in 2010. Mainly this is because the employee carrying out the project, who was supposed to start educating workers, was appointed to different work tasks. Education for purchasing is needed for improving the buyers' know-how and it is necessary for the field workers so that they do the purchases or call-offs through proper channels and from the right suppliers. The procurement instructions that are applied at the moment are way too universal and do not restrict or give proper guidelines for the buyers and because the instructions are universally too applicable, they are encouraging the buyers to do the purchasing in the easiest way, not the best way.

Supplier networks

Nationwide contracts are made and the information goes forward inside the business areas, e.g. from peat production to peat production preparation, but it is not necessarily transmitted on the corporation level. This information flow is much related to the change of the ERP system, because now the contracts are in the Notes database all separately under a certain business area and DAX could provide having the contracts under certain supplier information. This is one point that could be improved and explored to get the best possible negotiation power (corporation wide contracts) and to make the information more available. One solution could be that there is only one buyer in whole Vapo Oy negotiating and making a contract for a certain product or with a certain supplier. This way there would only be only a small amount of suppliers where some needed goods or services could be bought.

6.2 Recommendations

One of the first steps in getting better control over the purchases would be hiring a purchasing director. Like told in the previous chapter the director should be working closely with other biofuels directors and managers to keep track of all the purchases. A purchasing director could be even working at a corporation level, not just in biofuels, to keep track of all purchases in Vapo Oy and create purchasing strategies which would be aligned throughout Finland. The purchasing director should be hired outside the company rather than appointing one from the Vapo Oy employees, to get a new perspective and an unbiased attitude toward the purchases.

To make it faster, easier and less effortless to follow up the purchases and for the work of this project not to go to waste, Vapo Oy should add functions to their programs, for example, an additional column in DAX like described in the previous chapter. In addition, Vapo Oy should create indicators for how to measure the performance of organizational dimensions and try to improve the other three performance dimensions. Simple enquiries could be introduced to the buyers and employees that are associated with purchases. An employee or a small group should be appointed to study and analyze the enquiries or even all of the performance indicators to find the performance level of the staff related to the purchasing activities. An example of a performance indicator could be how much time people are using in purchasing functions.

There should be an attempt to standardize some of the items located in the bottleneck quadrant to make the supply risk lower and Vapo Oy not to be so dependent on the suppliers who supply products which can create operational bottlenecks. Vapo Oy should also divide the contractor responsibilities into pieces so that it would be a lot easier to see in what contractor services most of the money is spent. An example of this is that now Vapo Oy is spending about x million euros on preparation for contractors and the bills are stating what work the contractor has done but if the contractor has many tasks they are paid a solid wage and they do not get paid according to the task type. Now it is hard to find out whether Vapo Oy is paying too much for a certain easy but time taking task and this is why the task types should be divided.

7 CONCLUSION

Procurement is an important field in businesses nowadays and purchasing functions should be continuously questioned and improved for a company to prosper and gain cost savings. Purchasing should not only be an individual field of buying, it should be dealt with as part of the bigger picture of managing the supply chain because the purchasing activities have a big impact on the supply chain and on other related fields.

Vapo's purchasing, as mentioned earlier, is organized and the purchasing responsibilities are divided according to the business activities and the purchasing types. The purchasing project's original objective was to determine a biofuels centralized purchasing operation model and set up an aim for cost savings and increased working capital. The thesis objective was to study and analyze the purchasing of Vapo Biofuels and report the findings to support and give information to the project. The objective of the thesis remained the same throughout the whole project but the objective of the project changed from finding the operation of centralized purchasing model more to improving the all-round purchasing functions.

The study in the thesis shows that Vapo Oy is actually improving their purchasing all the time by improving their cash flow problems by negotiating better prices and longer payment terms. The biggest problem is that Vapo Oy is concentrating more on improving the practical and operational level purchasing instead of trying to create higher level purchasing strategies at a Biofuels business area level or even corporate level which would be a lot more beneficial for the company in the long run. A wanted

desire for the purchasing project is that it does not end up as the old project that the purchasing is studied but the study remains incomplete and the benefits from the project stays minimal.

The aim of the thesis was to find answers to questions what is the current state of procurement in biofuels, how the purchasing processes are like and how is the purchasing organized. The thesis gives good and solid answers to all of these questions throughout the whole thesis. Basically the research questions are related to mapping out the current state of Vapo Biofuels purchases and the thesis is providing additional information by studying and analyzing the findings and suggesting improvement ideas and recommendations. The recommendations are given a proper thought and they are created with a critical mindset that the actions are lucrative.

Some of the improvement ideas presented in the thesis are quite simple to execute, for example, hiring a purchasing professional to manage the biofuels or corporate level purchases, and ideas should be more closely examined and considered. Most of the improvement ideas are based on the studied data and interviews. The ideas are not biased on how the employees think the things should be done, to avoid personal gains, and they are overseen with critical views. Vapo Oy can determine which of the ideas are best and easiest ones to execute and simply start implementing them as soon as possible by introducing and training the staff in a new way of buying.

REFERENCES

Benton, W. C. Jr. 2010. Purchasing and Supply Chain Management. Second edition. New York: McGraw-Hill.

Brown, C. M. 2010. 7 Tips for Rating and Evaluating Your Suppliers and Vendors. Accessed on 12 January 2012. http://www.inc.com/guides/2010/12/7-tips-to-rate-and-evaluate-your-suppliers-and-vendors.html

Butler, R. E. & Campbell, T.R. 2004. Transforming the Procurement Department from Cost Center to Profit Center. Accessed on 2 February 2012. http://www.ism.ws/files/Pubs/Proceedings/DFCampbellButler.pdf

Chen, I. J., Lado, A. A. & Paulraj, A. 2004. Strategic Purchasing, Supply Management, and Firm Performance. Journal of Operations Management 22, 505-523.

Dussart, C. 1998. Category Management: Strengths, Limits and Developments. European Management Journal 16, 50-62.

Farrington, B. & Lysons, K. 2006. Purchasing and Supply Chain Management. 7th edition. New York: Financial Times/Prentice Hall.

Flynn, A. E., Leenders, M. R. & Johnson, P. F. 2011. Purchasing and Supply Management. 14th edition. New York: McGraw-Hill.

Iloranta K. & Pajunen-Muhonen H. 2008. Hankintojen johtaminen: ostamisesta toimittajamarkkinoiden hallintaan. Helsinki: Tietosanoma.

ISO 31000. 2009. Risk management: Principles and guidelines. Geneva: International Organization for Standardization.

Kraljic, P. 1983. Purchasing Must Become Supply Management. Harvard Business Review 83509, 109-117.

Lambert, D. M. & Stock, J. R. 2001. Strategic Logistics Management. 4th edition. Boston: McGraw-Hill.

Marmanis H. & Pandit K. 2008. Spend Analysis: The Window into Strategic Sourcing. Fort Lauderdale FL: J. Ross Publishing Inc.

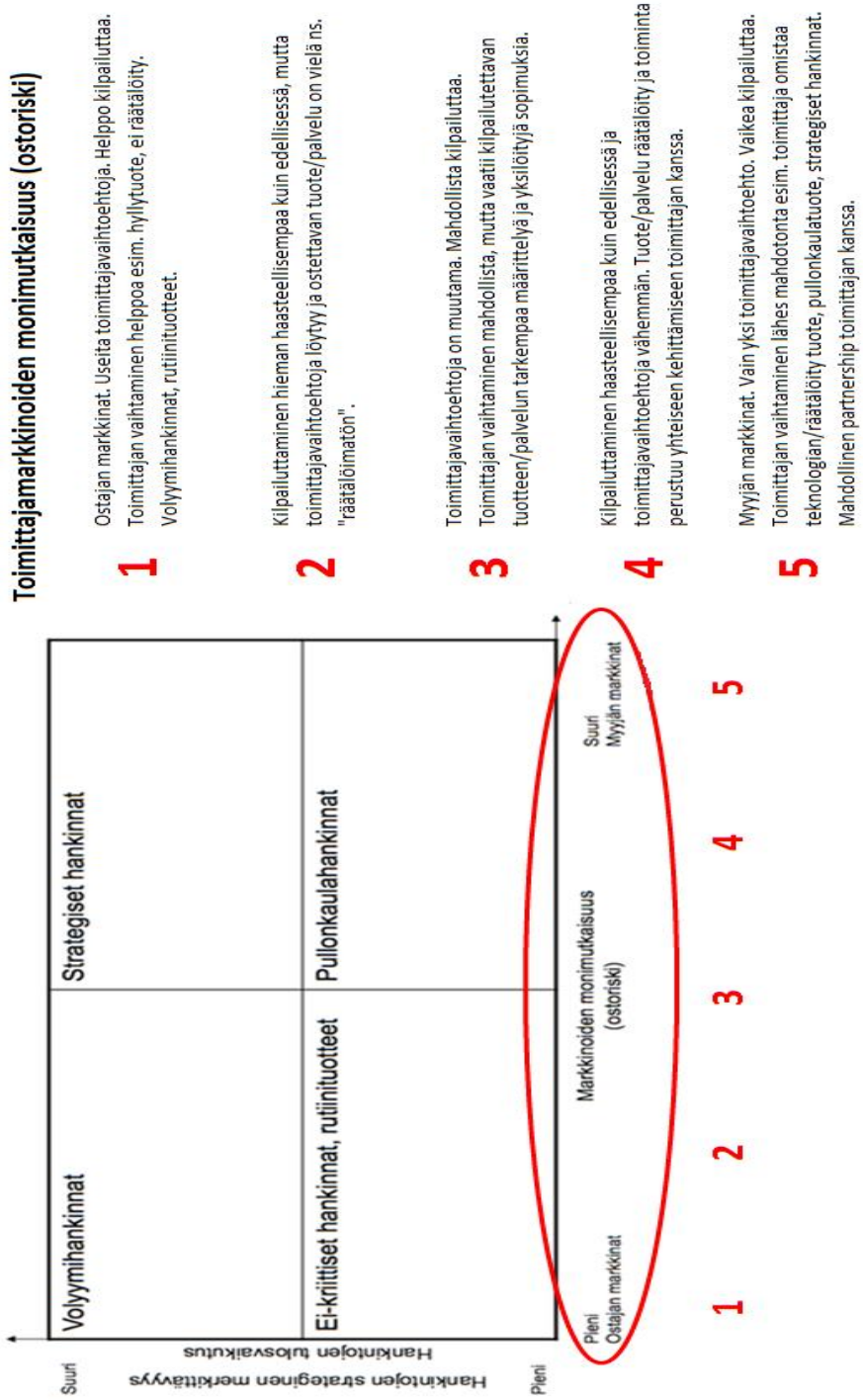
Weele, A. J. van 2010. Purhcasing and Supply Chain Management. 5th edition. London: Cengage Learning.

APPENDICES

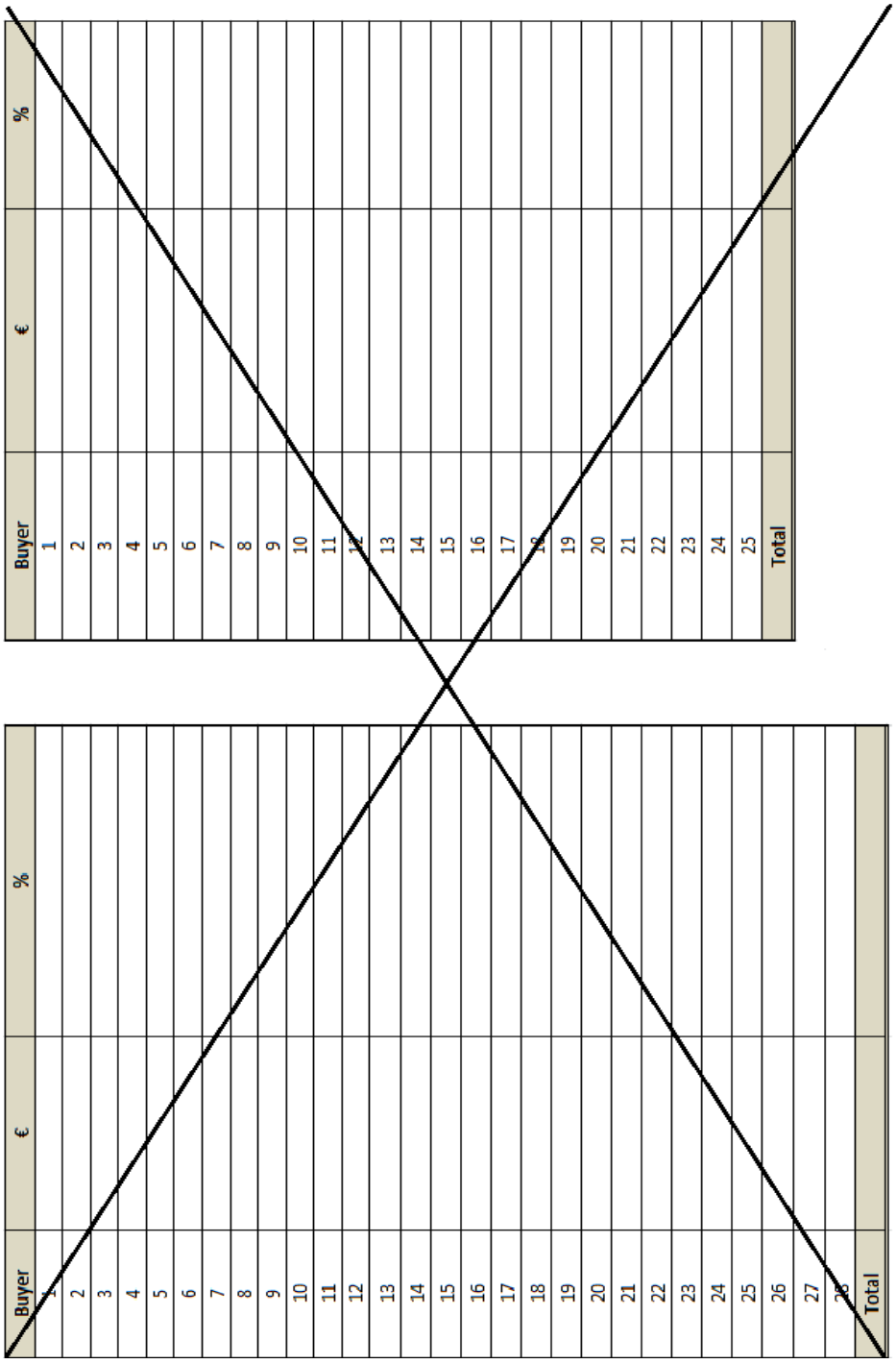
Appendix 1. Product codes and labels

Product code	Product label	Product code	Product label	Product code	Product label	Product code	Product label	Product code	Product label
TT1	Rummut (päisteputket ja rummut)	IT6	Pintapuomit	LT7	Mittavälineet	KP15	Työmatkat	LPT1	Muut toimitukset JPT
TT2	Paineputket	IT7	Mittalaitteet	LP1	Tienhoito	MI1	Maa-alueet	LPT2	Muut toimitukset PT
TT3	Lietteenpidätin	IT8	Pientarvikkeet (mutterit, ruuvit, hanskat jne.)	LP2	Kuormaus	MI2	Taimikot	LPT3	Muut toimitukset Metsähake
TT4	Mittakaivot	IT9	Pientyökalut (porat, lapiot, vasarat jne.)	LP3	Seulonta	MI3	Puustot	LPT4	Muut toimitukset Hakeraaka-aine
TT5	Avopadot	IT10	Pumppaamot	LP4	Punnitukset	MI4	Koneet	LPT5	Muut toimitukset Puru-ja kutteri
TT6	Pintapuomit	IT11	Agregaatit ja polttoainesäiliöt	LP5	Muut palvelut	VU1	Pinta-alaperusteiset vuokrat	LPT6	Muut toimitukset Ruokohelpi
TT7	Mittalaitteet	IT12	Kemikaalit	LP6	Aumojen kuorinta	TOR1	Hakeraaka-aine	LPT7	Muut toimitukset Ympäristöturve
TT8	Pientarvikkeet (mutterit, ruuvit, hanskat jne.)	IT13	Poltto- ja voiteluaineet	LP7	Laivarahdit	TOR2	Helpipaaliraaka-aine	LPT8	Muut toimitukset Kuiviketurve
TT9	Pientyökalut (porat, lapiot, vasarat jne.)	IT14	Kiviainekset (hiekat, murskeet, kivet)	LP8	Junarahdit	TOT1	Jyrsinpolttoturve	LPT9	Muut toimitukset Kuviketurve, pyöröpaali
TT10	Pumppaamot	IT15	Sähköenergia	LP9	Autorahdit	TOT2	Palaturve	LPT10	Muut toimitukset Kutteripyöröpaali
TT11	Agregaatit ja polttoainesäiliöt	IT16	Dataliittymät (hälytyslaitteet)	LP10	Muut rahdit	TOT3	Hakeraaka-aine	LPT11	Muut toimitukset huolto-asennus ja korjauspalvelut
TT12	Kemikaalit	IT17	Varastot ja katokset	LP11	Laboratorio palvelut	TOT4	Kuori	LPM1	Autorahdit JPT
TT13	Poltto- ja voiteluaineet	IT18	Liittymät (sähkö, vesi, viemäri)	LP12	Korjaus-ja huoltopalvelut	TOT5	Puru-ja kutteri	LPM2	Autorahdit PT
TT14	Koneiden varaosat	IT19	Kemikalointiasemat	LP13	Murskaus ja haketus	TOT6	Ympäristöturve	LPM3	Autorahdit Metsähake
TT15	Kiviainekset (hiekat, murskeet, kivet)	IT20	Rakennukset	LP14	Toimituksen välisiirrot	TUP1	Tuotannon palvelut JPT	LPM4	Autorahdit Kantohake
TT16	Sähköenergia	IT21	Kankaat ja geovahvisteet	KT1	Työsuojelu ja työvarusteet	TUP2	Tuotannon palvelut PT	LPM5	Autorahdit Hakeraaka-aine
TT17	Dataliittymät (hälytyslaitteet)	IT22	Palosuojelu	KT2	Poltto-ja voiteluaineet (työmaa-autot, leasing autot)	TUP3	Tuotannon palvelut Metsähake	LPM6	Autorahdit Kuori
TT18	Aumamuovit ja peitteet	IT23	Tuotantokoneet	KT3	Toimisto - ja atk tarvikkeet	TUP4	Tuotannon palvelut Kantohake	LPM7	Autorahdit Puru-ja kutteri
TT19	Varastot ja katokset	IT24	Polttoaine-ennakkot	KT4	Mainonnan ja tiedotuksen tarvikkeet	TUP5	Tuotannon palvelut Hakeraaka-aine	LPM8	Autorahdit Ruokohelpi
TT20	Palosuojelu	IP1	Puuston poisto	KT5	Julkiset todistukset ja luvat	TUP6	Tuotannon palvelut Kierrätyspolttoaine	LPM9	Autorahdit BF yhteiset
TP1	Turvetuotannon urakointipalvelut	IP2	Kenttien muotoilu	KT6	Vesi-ja jätevesi	TUP7	Tuotannon palvelut Ruokohelpi	LPM10	Autorahdit Ympäristöturve
TP2	Kenttien muotoilu	IP3	Ojitustyöt	KT7	Sähköenergia ja siirtomaksu	TUP8	Tuotannon palvelut Ympäristöturve	LPM11	Autorahdit Kuiviketurve
TP3	Ojanpuhdistus	IP4	Kaivuutyöt	KT8	Lämmitys	TUV1	Tuotannon palvelut välisiirrot JPT	LPM12	Autorahdit Kuiviketurve, pyöröpaali
TP4	Kaivuutyöt	IP5	Koneiden korjaukset ja huollot	KT9	Muut	TUV2	Tuotannon palvelut välisiirrot Kantohake	LPM13	Autorahdit Kuiviketurvelevy
TP5	Koneiden korjaukset ja huollot	IP6	Kantojen poisto	KT10	Tiemaksut	TUV3	Tuotannon palvelut välisiirrot Hakeraaka-aine	LPM14	Autorahdit Kuiviketurvepaali 250 l
TP6	Kantojen poisto	IP7	Pumppaamoiden käyttönotto ja huolto	KT12	Tukikohdat	TUV4	Tuotannon palvelut välisiirrot Kuori	LPM15	Autorahdit Kutteripyöröpaali
TP7	Pumppaamojen korjaukset ja huollot	IP8	Palosuojelun työt	KT13	Vakuutukset	TUV5	Tuotannon palvelut välisiirrot Kierrätyspolttoaine	LPM16	Autorahdit Kate
TP8	Palosuojelun työt	IP9	Mittaustyöt	KP1	Tuotantokenttien vuokraus	TUV6	Tuotannon palvelut välisiirrot Ruokohelpi		
TP9	Tarkkailut	IP10	Ympäristönsuojelutyöt	KP2	Kalusto vuokrat	TUH1	Tuotannon palvelut huolto ja korjaus JPT		
TP10	Mittaustyöt	IP11	Tienrakentaminen	KP3	Autojen vuokrat	TUM1	Tuotannon palvelut muut JPT		
TP11	Ympäristönsuojelutyöt	IP12	Rahti -ja kuljetuspalvelut	KP4	Tietoliikennepalvelut	TUM2	Tuotannon palvelut muut Turvetuotanto		
TP12	Tuotannon välisiirrot	IP13	Muut palvelut	KP5	Puhelin	TUM3	Tuotannon palvelut muut Metsähake		
TP13	Tienrakentaminen	IP14	Valmistelun kokonaisurakointipalvelut	KP6	Posti	TUM4	Tuotannon palvelut muut Hakeraaka-aine		
TP14	Rahti -ja kuljetuspalvelut	IP15	Kunnostusnosto	KP7	Koulutuspalvelut	LPK1	Kuormaus JPT		
TP15	Muut palvelut	IP16	Massansiirto	KP8	Muut vieraat palvelut	LPK2	Kuormaus PT		
TP16	Massansiirto	LT1	Pientarvikkeet (mutterit, ruuvit, hanskat jne.)	KP9	Konsulttipalvelut	LPK3	Kuormaus Metsähake		
IT1	Rummut (päisteputket ja rummut)	LT2	Pientyökalut (porat, lapiot, vasarat jne.)	KP10	Neuvottelu ja kokous	LPK4	Kuormaus Kantohake		
IT2	Paineputket	LT3	Poltto- ja voiteluaineet	KP11	Jätehuolto	LPK5	Kuormaus Kuori		
IT3	Lietteenpidätin	LT4	Koneiden varaosat	KP12	Siivous	LPK6	Kuormaus Ruokohelpi		
IT4	Mittakaivot	LT5	Kiviainekset (hiekat, murskeet, kivet)	KP13	Tukikohtien huolto ja korjaus	LPK7	Kuormaus Ympäristöturve		
IT5	Avopadot	LT6	Näytepussit	KP14	Verot	LPK8	Kuormaus Kuiviketurve		

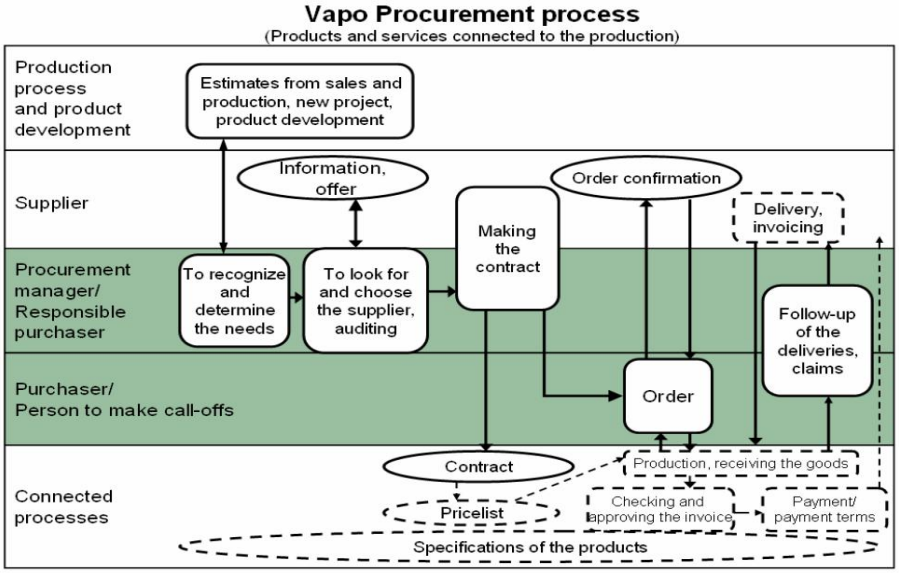
Appendix 2. Creating supply risk rates



Appendix 3. Vapo Oy Biofuels buyers



Appendix 4. Basic production purchasing process of Vapo Oy



Appendix 5. Screenshot of ERP System DAX