



Raquel Sofia Da Costa Carolo **Purchasing Strategies for Indirect Services**

Estratégias de Compras para Serviços Indirectos



Raquel Sofia Da Costa Carolo **Estratégias de Compras para Serviços Indirectos**

Purchasing Strategies for Indirect Services

Relatório de Projeto apresentado à Universidade de Aveiro para cumprimento dos requisitos necessários à obtenção do grau de Mestre em Engenharia e Gestão Industrial, realizada sob a orientação científica do Doutor Luís Miguel Domingues Fernandes Ferreira, Professor Auxiliar do Departamento de Economia, Gestão e Engenharia Industrial da Universidade de Aveiro

Dedico este trabalho em memória à minha mãe.

o júri

presidente

Prof.^a Doutora Ana Luísa Ferreira Andrade Ramos
professora auxiliar da Universidade de Aveiro

Prof. Doutor José António de Sousa Barros Basto
professor auxiliar da Faculdade de Engenharia da Universidade do Porto

Prof. Doutor Luís Miguel Domingues Fernandes Ferreira
professor auxiliar da Universidade de Aveiro

agradecimentos

O presente trabalho contém questões das áreas de Compras e Gestão da Cadeia de Abastecimento para as quais tive o incansável apoio do Professor Doutor Luís Miguel Domingues Fernandes Ferreira ao qual quero desde já agradecer.

Apesar de toda a tese ser de foro técnico, era incapaz de conseguir o seu término sem o apoio do meu pai, irmão e namorado que despenderam sempre o seu suporte, apoio e fonte de ânimo. Para além destes 3 pilares, não poderei deixar de agradecer ao resto da minha família que também deram o seu quê de apoio.

Obrigada a todos pela imensa ajuda, seja ela a nível de conhecimento ou mesmo de apoio emocional e psicológico.

palavras-chave

bens e serviços indirectos, estratégias de compras, Kraljic, portfolios de compras.

resumo

Na área de compras, existem vários estudos e pesquisas sobre compras de bens diretos com exemplos de aplicação em grandes empresas. Porém, estudos em compras indirectas tem sido perdidos em esquecimento, o que se torna contraditório, uma vez que todo o custo indirecto é de extrema atenção. Por forma a preencher esta lacuna na literatura, esta tese tem como principal objectivo a abordagem à compra de serviços indirectos de uma empresa de grande dimensão em Portugal. Desta forma, a abordagem do portfólio de Kraljic foi utilizada por forma a avaliar os serviços indirectos bem como perceber quais as estratégias a aplicar neste tipo de compras.

keywords

Indirect goods and services, indirect spend, purchasing, procurement, indirect purchasing, indirect procurement, procurement strategies, Kraljic, portfolios, purchasing portfolios, portfolio matrix.

abstract

In the purchasing environment, there are several studies and researches on purchasing of direct materials, with examples applied on big companies. However, studies on indirect purchasing have been lost in oblivion, which turns out to be contradictory, due to the very known fact that all indirect spend is of extreme attention. In order to fill in this gap in the literature, this thesis has the main goal of approaching the indirect spend on indirect services of a big company in Portugal. To do so, Kraljic's portfolio approach was used to assess the indirect services as well as understand which purchasing strategies are to be applied.

Table of Contents

1. Introduction.....	1
1.1. General.....	1
1.2. Problem Statement and research methods	1
1.3. Chapter Overview	1
1.4. Summary	2
2. Literature Review.....	3
2.1. Purchasing.....	3
2.1.1. Purchasing in the value chain	3
2.1.2. Definition of Purchasing.....	4
2.1.3. The Purchasing process.....	4
2.1.4. Strategic purchasing.....	6
2.1.5. Developing a purchasing strategy.....	6
2.2. Portfolio Theory	8
2.2.1. Modern Portfolio Theory	8
2.2.2. Purchasing portfolio models	9
a) Fiocca’s portfolio approach.....	9
b) Kraljic’s Matrix	10
c) Olsen & Ellram’s portfolio approach.....	17
d) Bensaou’s portfolio approach.....	20
2.3. Indirect Spend	22
2.3.1. Identifying, managing and reducing Indirect Spend.....	22
2.3.2. Classification of purchasing goods.....	24
a) Investment goods or capital equipment	24
b) MRO items (Maintenance, repair and operating material).....	24
c) Services.....	24
2.3.3. Purchasing Services.....	26
2.3.4. Classifying services in the Kraljic Matrix	29
2.4. Proposed Methodology.....	30
3. Bosch.....	31
3.1. Bosch Thermoteknik GmbH.....	31
3.1.1. Bosch Termotecnologia, S. A.....	31
3.2. PUI – Indirect Purchasing at Bosch Termotecnologia, S. A.	32
3.2.1. Purchasing Process.....	33
a) Bosch’s new Global Project.....	37
3.2.2. PUI’s Purchasing Strategies	41
4. Case Study.....	43
4.1. Methodology.....	43
4.2. Data collection	43
4.3. Data Analysis.....	46
4.4. Conclusions and limitations of the case-study	53
5. Conclusions	55
5.1. Fulfilment of proposed study.....	55

5.2. Reflections on the results	55
5.3. Future research.....	56
Bibliography	57
Appendixes.....	61
Appendix I.....	61
Appendix II.....	62

Figures

Figure 1 – Value chain from Porter, 1985.....	3
Figure 2 – Purchasing process model by Van Weele (2002).....	5
Figure 3 – Purchasing strategy process (Adapted from Monczka <i>et al.</i> , 2005).....	7
Figure 4 – Four steps to achieve the Kraljic purchase matrix.....	10
Figure 5 – Purchasing portfolio categories (Adapted from Kraljic, 1983)	11
Figure 6 – Purchasing portfolio evaluation criteria: Kraljic, 1983, pg. 114.....	12
Figure 7 – The purchasing portfolio matrix (Kraljic, 1983, pg. 114)	13
Figure 8 – Strategic implications of purchasing portfolio positioning (Kraljic, 1983, pg. 115)	14
Figure 9 – Overview of purchasing strategies for all portfolio quadrants (modified by Caniels and Gelderman (2005) from Gelderman and Van Weele (2003))	15
Figure 10 –Analysis of supplier relationships (Olsen and Ellram, 1997, cit por. Sjoberg (2010)).....	20
Figure 11 –Bensaou’s classification of relationships and contextual profiles (Roos, 2005).....	21
Figure 12 – Taxonomy for purchasing business services (Fitzsimmons, <i>et al.</i> (1998))	25
Figure 13 – Impact-based classification of business services (Wynstra and van der Valk (2005)).....	29
Figure 14 – Organization chart of the purchasing department of Bosch Termotecnologia, S.A.	32
Figure 15 – Responsibilities at PUI.....	33
Figure 16 – Purchasing process at AvP/PUI.....	34
Figure 17 – New organization of PUI after implementing the new Division Project (adapted from Bosch’s Intranet).....	38
Figure 18 - Categorization of purchased services of Bosch Termotecnologia with equal weights	50
Figure 19 – Categorization of purchased services of Bosch Termotecnologia with relative weights.....	51

Figure 20 – Categorization of purchased services with the volume as a third variable represented by the bubbles.....	52
--	----

Tables

Table 1 - Factors influencing the Strategic Importance of the purchase (Olsen and Ellram 1997).....	17
Table 2 - Factors describing the Difficulty of Managing the Purchase Situation (Olsen and Ellram 1997).....	18
Table 3 - Factors influencing the Relative Supplier Attractiveness.....	19
Table 4 - Factors describing the Strength of the Relationship.....	19
Table 5 - Comparison of portfolio models (Fiocca, 1982; Kraljic, 1983; Olsen & Ellram (1997); Bensaou, 1999).....	22
Table 6 - Classification of services of various authors (Fitzsimmons <i>et al.</i> (1998); Wynstra <i>et al.</i> (2006); Sonmez and Moorhouse (2010)).....	26
Table 7 - Advantages and disadvantages of contracting out (adapted from Weele, A. J. v. (2002)).....	27
Table 8 - Differences in PUI's process with the new project engaged.....	40
Table 9 - Material groups of all services purchased at AvP/PUI - Bosch Termotecnologia.....	45
Table 10 - Scale of importance.....	45
Table 11 – Comparison of 2010 and 2011 Indirect Services' Volumes	47
Table 12 - Comparison of number of suppliers for each Indirect Service between 2010 and 2011.....	48
Table 13 - Drake and Lee's five-point scale (Adapted from Drake and Lee, 2008)	49
Table 14 - Adaptation of initial scores to Drake and Lee's Five-point scale.....	49
Table 15 - Relative weights of all factors	50

1. Introduction

1.1. General

Purchasing of business services has been receiving growing attention both in research and practice due to increased use of outsourcing and general trends towards the “servization” of goods (Wynstra and van der Valk, 2005). At the same time, most of the existing knowledge in the field of Purchasing has been aimed at buying goods (van der Valk, 2008). As purchasing services is seen as more risky and difficult than purchasing goods, top managers have considered buying services easy and non-core, therefore assigning novice buyers to the acquisition of services and experienced employees for materials and goods (Schmitt, 2011). Hence uncountable studies have been carried out on purchasing materials and goods as well as frameworks for strategy understandings, whilst for services the interest, for some reason, has been relatively low.

1.2. Problem Statement and research methods

Kraljic (1983) was the pioneer in categorizing purchased items to understand how to approach them strategic wise. By using the portfolio approach, those responsible for proposing a strategy are able to comprehend the strategic importance of the items purchased (may them be goods or services) to the business. However the categorization of services using a portfolio approach is not common in the literature nor in practice. Therefore, the development of a portfolio for purchased services at Bosch, where an internship in the Indirect Purchasing Department was held, is an excellent way to understand how a big enterprise like itself is applying strategies for one of the areas with higher spend.

During the internship, besides being a part of the purchasing process and activities, the understanding of what and how strategies are being used for indirect spend with focus on services was the main objective in order to fill in the gap in the literature. Using a case study enables the passageway from conceptual studies to practice. At the same time, using a portfolio approach in a big enterprise may be encouraging for other.

In order to fulfil the categorization of Bosch’s services, gathering the two variables that define Kraljic’s Matrix (Importance of Purchasing and Complexity of Supply Market) was achieved by inquiring the buyers of the indirect purchasing department on the importance of several aspects of each material group associated to the service. However, due to the reduced number of buyers the results, despite being as realistic as possible, may induce in mal-categorization. Therefore, a detailed and impartial analysis of the results as well as a comparison on how the service is being approached in reality must be taken into account.

1.3. Chapter Overview

The thesis is divided into four other chapters starting with the literature review where subjects as Purchasing, Portfolio Theory, Indirect Spend and Services were described in detail to better understand the academic understanding of these matters and define a methodology. Chapter 3 characterizes the enterprise where the

internship was held as well as the various processes at the Indirect Purchasing Department. Going on to Chapter 4 the methodology is described on how the Portfolio was created and how Kraljic's Matrix was developed. After the categorization of the services in study, analysing and understanding the results may be found in Chapter 5 as well as the Conclusions in Chapter 6. Finally, to finish the thesis, the last Chapter is dedicated to the limitations found in applying the portfolio method as well as suggestions for further research.

1.4. Summary

The present chapter demonstrated the interest of applying a portfolio approach to purchased services in a big enterprise due to the low amount of research on Purchasing Services. So in order to counteract the lack of interest in purchasing services, the whole process of categorizing and strategy defining of an enterprises' purchased services is laid down in this thesis.

2. Literature Review

2.1. Purchasing

2.1.1. Purchasing in the value chain

Purchasing and all its inherent processes and procedures are deeply synced in the value chain management of all businesses. So what better way to understand the role of purchasing in this value chain than by analysing Porter's (1985)?

Porter composes the value chain as a number of value activities with the primary objective of achieving margin, as seen in Figure 1.

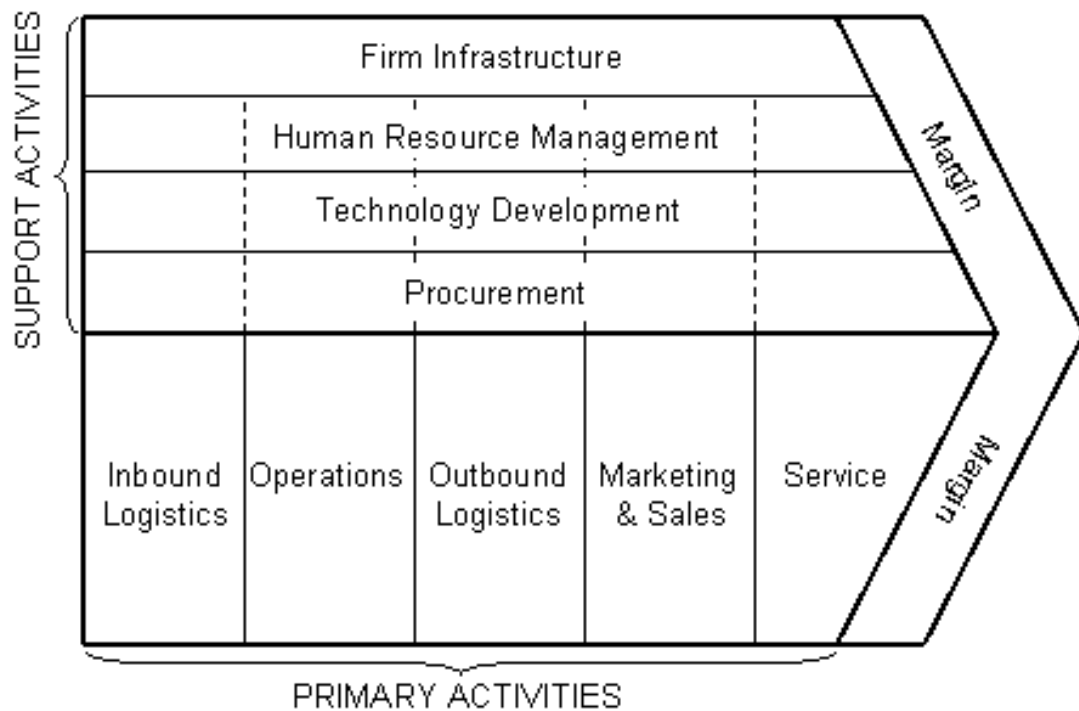


Figure 1 - Value chain from Porter, 1985

The value activities are divided into two essential types:

- Primary activities - consist of 5 generic categories:
 - Inbound logistics;
 - Operations;
 - Outbound logistics;
 - Marketing and sales;
 - Services.
- As support activities Porter categorizes 4 essential groups:
 - Procurement;
 - Technology development;
 - Human resource management;
 - Firm infrastructure.

Procurement is related to the function of purchasing inputs in the firm's value chain. These inputs may include raw materials, supplies, and other consumable items as well as machinery, equipment and buildings (Van Weele, 2002). Porter categorizes procurement as a support activity, due to the purchased inputs being related to both primary and support activities. *"I use the term procurement rather than purchasing because the usual connotation of purchasing is too narrow among managers. The dispersion of the procurement function often obscures the magnitude of total purchases, and means that many purchases receive little scrutiny"*, as cited by Porter in his book about Competitive Advantage.

Procurement activities vary among businesses due to very different manufacturing situations, operations and even their procurement functions. Some purchases may be of routine and repetitive and of low value, while others may have a project character and may be unique and high valued (Van Weele, 2002). As shown, procurement and purchasing are terms often used interchangeably. Besides these, some authors also use the terms supply management, sourcing, purchasing and supply management, and so on. There are various terms and respective definitions for the purchasing area, as literature has shown possible. However, this thesis will use Van Weele's (2002) definition as the tenet for purchasing.

2.1.2. Definition of Purchasing

The purchasing function traditionally encompasses the process of buying, which involves "obtaining from external sources all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities at the most favourable conditions" (Van Weele, 2002, p. 14).

Purchasing as an occupation involves a variety of roles and activities, including sourcing, supplier selection, negotiating and supplier performance evaluation (Sjoberg, 2010).

2.1.3. The Purchasing process

The purchasing process is essentially used to identify user requirements, effectively and efficiently evaluate the need, identify the suppliers, ensure that payment occurs promptly, ascertain that the need was effectively met, and drive continuous improvement (Monczka *et al.*, 2005), as shown in Figure 2. The description made on the process will be based on Van Weele's (2002).

The first step consists of determining the specifications to determine which items will be purchased, i.e., understand which products or activities will be produced by the company itself and which will be contracted out. There are two possible specifications: functional and technical – which enable the understanding of what level of detail the item carries. Both specifications are referred to as the purchase order specification, which is a document that comprises quality, logistics, maintenance, legal and environmental, and budget requirements. This document is sent to the supplier in order to prevent misunderstandings in the following stages of the purchasing process.

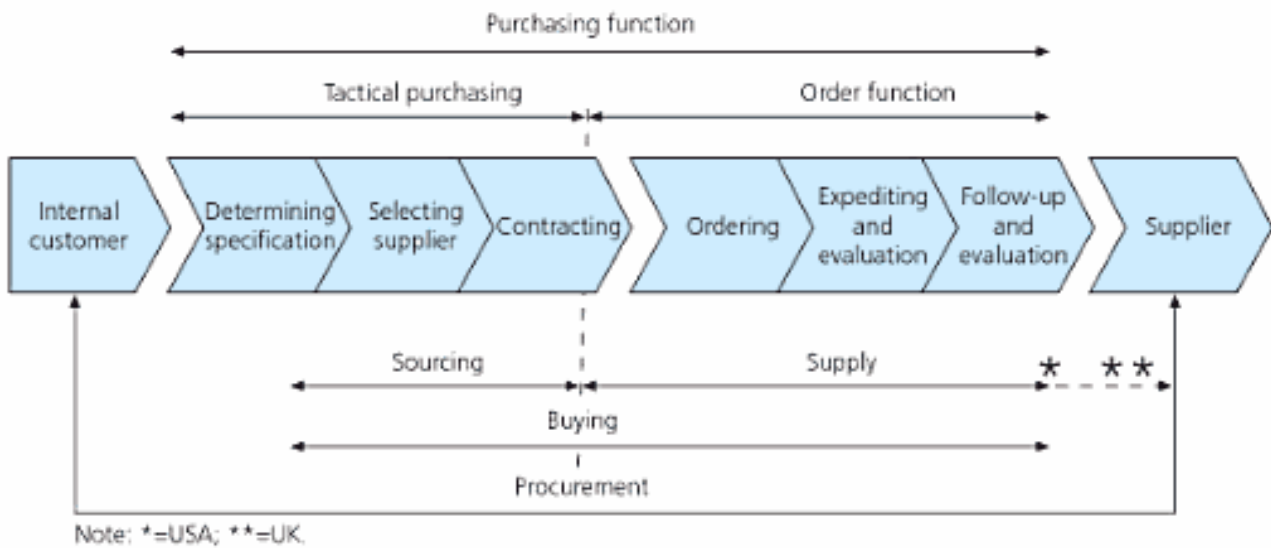


Figure 2 – Purchasing process model by Van Weele (2002)

Supplier selection is the second step of the purchasing process, which consists essentially in market exploration. These two steps are interwoven because the drawing up of specifications is frequently made with a few of suppliers in mind. However, the selection of suppliers has a few intermediate steps:

- Determining adequate ways of subcontracting;
- Identifying reliable supplier-partners by means of an adequate procedure of prequalification and proceeding with a preliminary selection of the most suitable suppliers by means of a tender and ranking procedure;
- Drawing up the request for quotation in order for later comparisons;
- Channelling of information between project team and supplier;
- Conducting a balanced analysis of quotations.

After the specifications and the supplier selection, it is now appropriate to approach the third step – contracting. The contract will refer specific terms and conditions on the product or project to be purchased. Those terms and conditions are often about specific commercial and legal matters such as:

- Prices and terms of delivery;
- Payment terms;
- Penalty clauses and warranty conditions;
- Other arrangements – insurance and safety regulations; rights and obligations; etc.

The next two steps comprise the ordering and expediting of the purchasing process. These steps are necessary to insure that efficient ordering routines between buyer and supplier are developed. Another characteristic is all purchase orders have to be confirmed by the supplier in order to proceed with the expediting step. And in order to have an efficient expedition, a computer-supported system is required to guarantee a sound procedure.

The follow up and evaluation is the last step of the purchasing process. As the step is defined, it is necessary to maintain records on supplier performance, product quality, specification compliance and contract compliance in order to assess whether the purchasing process is being properly used.

2.1.4. Strategic purchasing

Purchasing has evolved from a mere buying function into a strategic function, and has recently been recognized as a critical driving force in the strategic management of supply chains (Paulraj *et al.*, 2006). As a strategic function, purchasing has been in charge of several important activities and has engaged long-term responsibilities such as supplier relationship management; implementing best practices companywide using electronic systems; and managing critical commodities (Monczka *et al.*, 2005). Purchasing can in different and decisive ways influence and make a contribution to company's competitive strength, hence the increasing recognition of the strategic role of purchasing (Roos & Rydman, 2005; Paulraj *et al.*, 2006). According to Gadde & Hakansson (1993), there are three specific roles in strategic purchasing:

- The rationalisation role – purchasing in the day to day activities aim to decrease the total costs;
- The development role – guarantee that the company's and suppliers' research and development proceeds in the same direction and the attention given to the advantage a supplier can create by being a developmental resource;
- The structural role – purchasing has the function of controlling the structure and network the company is in.
(Roos & Rydman, 2005)

Since purchasing can play an instrumental role of integrating various supply activities and delivering superior supply chain performance, firms need to embrace advanced levels of strategic purchasing (Paulraj, *et al.*, 2006). These levels are classified into three characteristics or dimensions:

- a) Strategic focus – the purchasing function has a formally written long-range plan and focus is on longer term issues that involve risk and uncertainty;
- b) Strategic involvement – purchasing is included in the firm's strategic planning process and has a good knowledge of the firm's strategic goals. Whereby purchasing performance is measured in terms of its contributions to the firm's success where the professionals develop focuses on elements of the competitive strategy to guarantee purchasing's strategic role.
- c) Status and visibility of the purchasing professionals – top management consider purchasing being a vital part of the corporate strategy and the chief purchasing officer has high visibility within top management.
(Paulraj, *et al.*, 2006).

2.1.5. Developing a purchasing strategy

Monczka *et al.* (2005), define the purchasing strategy development process as shown in Figure 3 combined of 7 steps. The first step for developing a purchasing strategy is to define BUR – Business Unit Requirements. The business unit functional strategy

acts as a driver for the cross-organizational purchasing strategies and then translates to purchasing goals. First at the major products and services purchased by the business unit, passing on to the commodity level being only then where the deployment of defining the purchasing strategy happens.

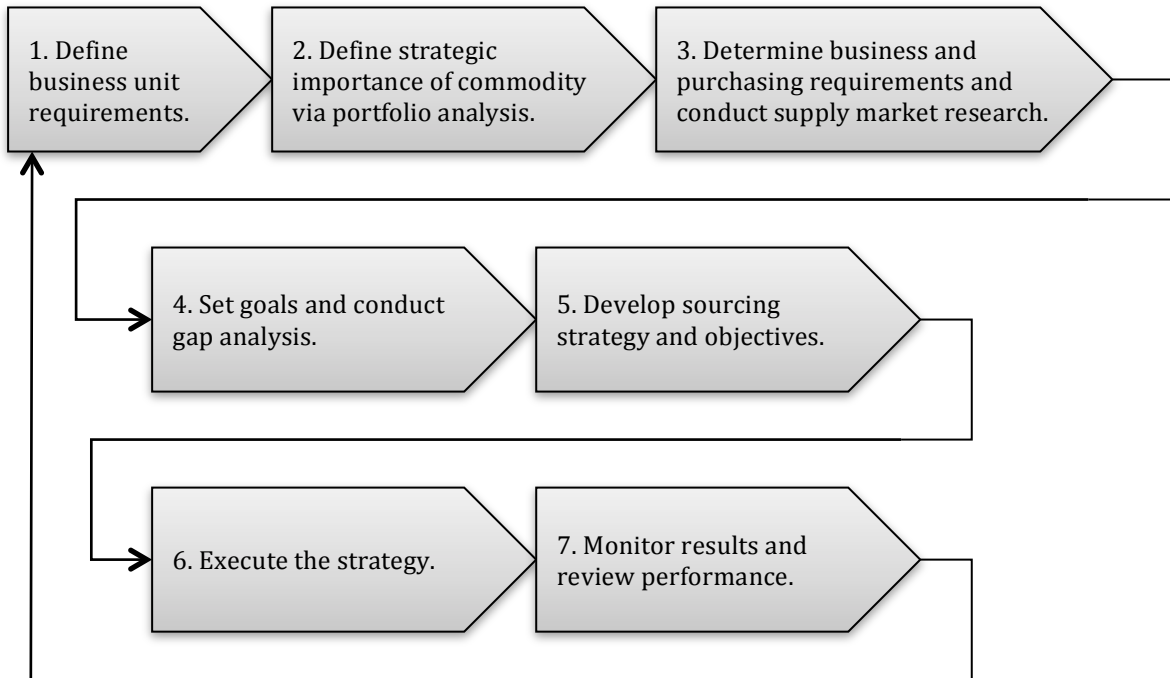


Figure 3 – Purchasing strategy process (Adapted from Monczka et al., 2005)

Secondly, using a portfolio analysis, the strategic importance of the purchase requirement is defined. By using the portfolio approach, those responsible for proposing a strategy are able to comprehend the strategic importance of the items purchased (may them be goods or services) to the business. This begins to define the effective purchase strategy.

The third major step is to conduct a full commodity research analysis. At first a business unit must accurately assess what it is currently spending for an item and where this spending is taking place and with which supplier. Then, a commodity report should be elaborated to provide a basis for making sound purchasing decisions presenting management with information concerning future supply, prices, and profit contribution of the purchased items.

In the fourth step of the process the goal is to establish specific targets for evaluating the progress of the strategy. These targets must be based on competitive analysis, comparison with market leaders, and future marketplace trends. In addition, the proposed strategy must include details on the specific actions required to realize those targets.

The proposed strategy should consider the relevant criteria included in the research, such as risk taken, profit potential, best suppliers, and so on. In this fifth step it is important to present to management the specific details of the strategy because many of the criteria are a function of the area of the matrix in which the commodities have

been classified using the portfolio approach, in step 2. Those developing the strategy must provide strong arguments for why the chosen strategy is best.

In order to execute the strategy (step six) it is necessary ownership and documentation concerning timing and tasks. All affected parties should be aware of the changes brought by the purchasing strategy. It is required that tasks with timelines be defined, ensure adequate resources for the process owners, explain the strategy to suppliers and internal customers and develop a contingency plan in case the events do not occur as planned. All these tasks mentioned are crucial in order to execute the strategy. Only then the team responsible for implementation can proceed with the negotiation of the contract, develop communication plans, and begin to execute the plan.

Finally, the seventh step is to verify that a strategy is achieving its stated objectives. Regular reviews must be held to determine if the strategy is successful and whether the strategy requires modification. It is essential that all parties be advised of the results and future expectations. The key goals established in step 4 should be revisited frequently to identify modifications to the original strategy.

2.2. Portfolio Theory

2.2.1. Modern Portfolio Theory

Markowitz (1952) in his Nobel Lecture on December the 7th, 1990, referred to portfolio theory being different in three major ways from the theory of the firm and of the consumer as normally taught in school. These three major differences are, first, portfolio theory is concerned with investors rather than manufacturing firms or consumers, secondly, it is concerned with economic agents that work under uncertainty, and finally, it is a theory that can be used to direct practice by large investors with sufficient resources. He explained, "It seemed obvious that investors are concerned with risk and return, and that these should be measured for the portfolio as a whole", becoming these two simple measures the basic elements of portfolio theory.

Markowitz (1952) defends that the investor can select an efficient portfolio, based on assessment of the discounted future returns as well as the future uncertainty, which gives maximized return with lowest possible risks by implying efficient diversification. Thus, the essence of the theory is to focus on the interrelationships between the variables and the collective result of the whole portfolio (Sjoberg, 2010).

Usually, portfolio models are used to categorize a product, a customer or a supplier relationship resulting in a number of possible action plans suggested, from which the company may choose to act (Olsen and Ellram (1997)). Turnbull concluded that portfolio models could be a useful tool when he defined that "from varied natures of the portfolio models reviewed, it is clear that the portfolio concept has a wide scope of application. The flexibility of the portfolio concept for use in the different levels of management and with different levels of sophistication further illustrates its usefulness as a powerful management tool" (Turnbull, 1990, cit por. Olsen, R. F. and L. M. Ellram (1997)).

2.2.2. Purchasing portfolio models

Purchasing portfolio models aim at developing differentiated purchasing and supplier strategies, which result in different solutions for the various purchasing systems an enterprise carries through (Gelderman & Van Weele, 2003; Van Weele 2002).

For years, the only tool for differentiating between purchases was the ABC-analysis. However, due to its large amount of limitations for product and supplier analysis this method cannot be considered a comprehensive portfolio method (Roos & Rydman, 2005).

To fill in the void on portfolio methods, various authors emerged with interesting and revolutionary methods in portfolio areas. The father of this kind of approach was Peter Kraljic who suggested a categorization of purchased items. The process of categorizing items is considered important because during the process, the decision-makers are obligated to analyse consistencies among themselves and agree on the importance of the different products, suppliers, or relationships that are being subjected to the classification in the portfolio model (Olsen and Ellram, 1997). On the other hand, Fiocca (1982) suggested a portfolio approach to manage customer accounts to understand the different importance that each customer has before the company (Olsen and Ellram, 1997; Sjoberg, 2010). Additionally, Olsen and Ellram as well as Bensaou, adopted Kraljic's approach to different areas of assessment: supplier relationship management.

The following sectors will be composed of short descriptions of what each author defined as their approach, however, Kraljic's method will be the adopted for this thesis and therefore the description will be presented in more detail.

a) Fiocca's portfolio approach

Fiocca (1982) was from the first to adopt portfolios in the marketing area, advocating that marketing strategies should be more customer-oriented because of customer's critical importance for companies and proposed account portfolio analysis for composing and complementing strategy for industrial marketing (Sjoberg, 2010). The accounts should be classified based on the strategic importance and the difficulty of managing the account, followed by an analysis using dimensions such as customer attractiveness and strength of the buyer-supplier relationship (Olsen and Ellram (1997)).

This portfolio is developed by following two steps:

- Step 1 - the accounts of the company are rated in a portfolio with a two-dimensional matrix, according to two variables: difficulty in managing the account and strategic importance of the account. By displaying the accounts in the matrix, Fiocca noted that as the volume, values of their purchases and the market situations are different, some customers are more important than others possessing different strategic importance to the company (Sjoberg, 2010).
- Step 2 – an analysis on a nine-cell matrix, based on two new dimensions – customer's business attractiveness and strength of the buyer/seller relationship – is proceeded in order to understand which marketing strategy

the company should have on a certain account and the profitability it can expect (Sjoberg, 2010).

b) Kraljic's Matrix

One of the first comprehensive portfolio approaches for purchasing and supply management was Kraljic's (1983). Peter Kraljic, through the Harvard Business Review presented the world to a concept that became clear to many:

"Instead of simply monitoring current developments, management must learn to make things happen to its own advantage. This calls for nothing less than a total change of perspective: from purchasing (an operational function) to supply management (a strategic one)."

"Purchasing must become supply management" - this statement is a result of the unstable markets and the upset of supply and demand patterns, as Kraljic explains in his paper.

To respond to this new perspective, *i.e.*, to understand if a company in fact needs a supply strategy, it should analyse two important factors: (1) the strategic importance of purchasing, and (2) the complexity of the supply market. By answering to these two factors, the top management and purchasing executives of the company can determine which supply strategy the company needs in order to exploit its purchasing power and reduce its risks (Kraljic 1983).

Throughout this thesis, the Kraljic approach will be used and so follows the explanation on how to create a purchasing portfolio. However, some nuances from several other authors will be introduced along the description.

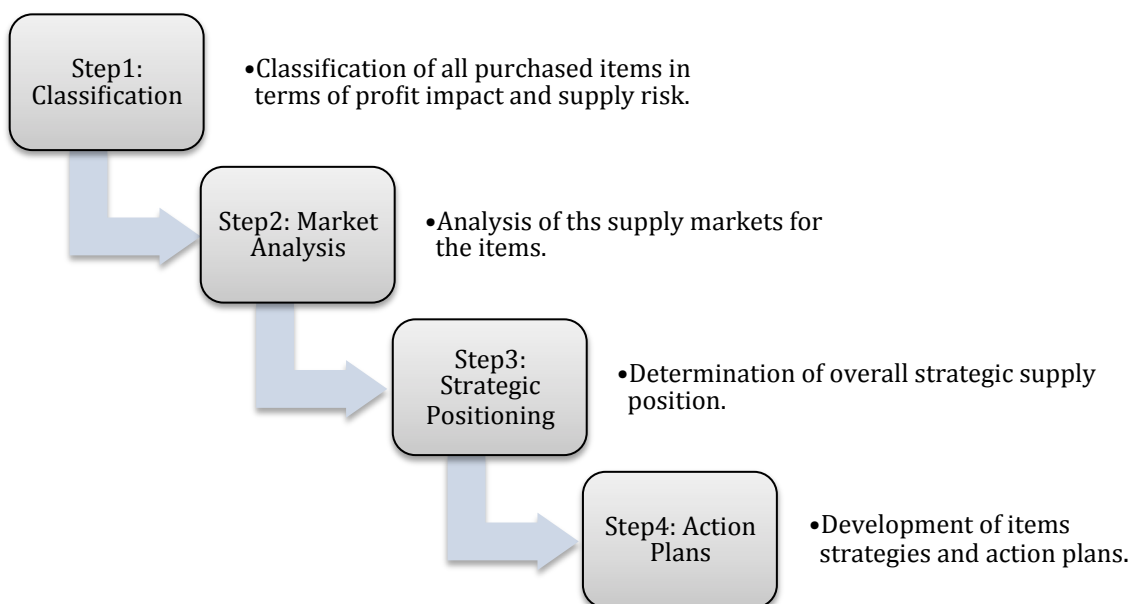


Figure 4 - Four steps to achieve the Kraljic purchase matrix

The general idea is to minimize supply vulnerability and make the most out of buying power, where the strategy is based on classifying purchase items into four portfolio quadrants vis-à-vis their relative contribution towards supply risk and profit impact for the firm (Padhi *et al.*, 2011). Kraljic recommends a four-stage approach (Figure 4)

to devise strategies, where marketing and corporate data is collected, forecasting future supply scenarios takes place, and identifying purchasing options available to develop individual supply strategies for critical items.

Stage 1: Classification

The company should start by sorting out all purchased items into four distinct categories: strategic, bottleneck, leverage and noncritical. They should do so by defining the two essential guidelines of each item, which will be the axis in the 2x2 formed matrix ranging “Low” to “High”: profit impact and supply risk (Figure 5). Kraljic (1983) defines the profit impact of a given item in terms of the volume purchased, percentage of total purchase cost, or impact on product quality or business growth. On the other hand, supply risk is defined in terms of availability, number of suppliers, competitive demand, make-or-buy opportunities, and storage risks and substitution possibilities.

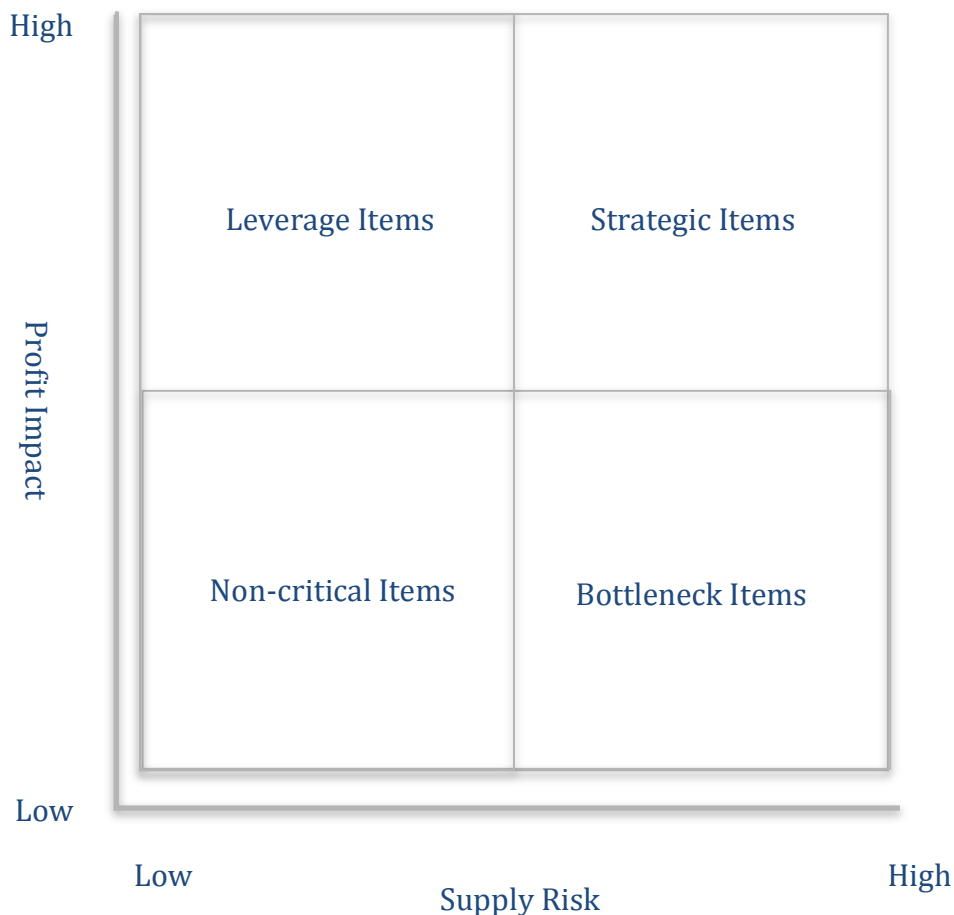


Figure 5 - Purchasing portfolio categories (Adapted from Kraljic, 1983)

However, using only one term for each axis is risky due to the lack of information for each item, i.e., it can lead to misclassification of items. For example, if a company only uses its volume for profit impact and the number of suppliers for supply risk, and for some reason the volume is not a realistic value, the item can be classified as non-critical whilst in reality it is a strategic item. To fill in this void, Padhi *et al.* (2011) use

a statistical approach where essentially obtained data through the use of questionnaires relative to the importance scores of the supply risk and profit impact attributes, and the performance scores from several items with respect to the two dimensions. By reaching out to purchasing experts as Padhi *et al.* (2011) did, the range of information obtained about each item is broader, in contrary to Kraljic's approach.

This classification enables a more differentiated and hence better-focused approach to the analysis of supply market data (Kraljic, 1983). Each of the four categories has different main tasks, required information and decision levels as well as a distinctive approach, where the complexity of the approach is in proportion to the strategic implications (Kraljic, 1983; Sjoberg, 2010). Kraljic only applies the following stages to the strategic items classified in this stage, giving only main tasks, as already referred, to the other classifications.

In the mean time, enterprises must remember that any purchasing portfolio classification calls for regular updating (Kraljic, 1983).

Step 2: Market Analysis

This next stage allows companies to weigh their own strength as customers against the bargaining power of its suppliers. To do so, a systematic review of the supply market is necessary. Assessing the availability of strategic materials in terms of both quality and quantity, as well as the relative strength of the existing vendors does this review. Then the *“company analyses its own needs and supply lines to gauge its ability to get the kind of supply terms it wants”* (Kraljic, 1983).

Figure 6 shows the criteria that Kraljic suggests for market analysis.

	Supplier strength	Company strength
1	Market size versus supplier capacity	Purchasing volume versus capacity of main units
2	Market growth versus capacity growth	Demand growth versus capacity growth
3	Capacity utilization or bottleneck risk	Capacity utilization of main units
4	Competitive structure	Market share vis-à-vis main competition
5	ROI and/or ROC	Profitability of main end products
6	Cost and price structure	Cost and price structure
7	Break-even stability	Cost of nondelivery
8	Uniqueness of product and technological stability	Own production capability or intergration depth
9	Entry barrier (capital and know-how requirements)	Entry cost for new sources versus cost for own production
10	Logistics situation	Logistic

Figure 6 – Purchasing portfolio evaluation criteria: Kraljic, 1983, pg. 114

When carrying out the market analysis, companies should be aware that no list of evaluation criteria is equally applicable to every industry and that the relative importance of different criteria may vary with technological change or with shifts in the industry's competitive dynamics.

Step 3: Strategic Positioning

After the market analysis is done for the strategic items classified in phase 1, these should be positioned in the purchasing portfolio matrix (Figure 7). This matrix plots the company and supply market's buying strength and can be used to develop counterstrategies vis-à-vis key suppliers – Reverse marketing. These two dimensions each have values of “High”, “Medium” and “Low”. The various resulting categories belong to a risk state where each has a different strategic thrust (Exploit, Balance and Diversify). The company stands a threefold in the matrix. If the company shows a dominant role, than a reasonable aggressive strategy should be considered for the items in this position– Exploit. On the other hand, items where the suppliers are strong and the company's role in the supply market is secondary, the company must go on the defensive and start looking for material substitutes or new suppliers – Diversify. Finally, when the relative power is balanced for the two parties, items should be managed with a well-balanced and intermediate strategy – Balance.

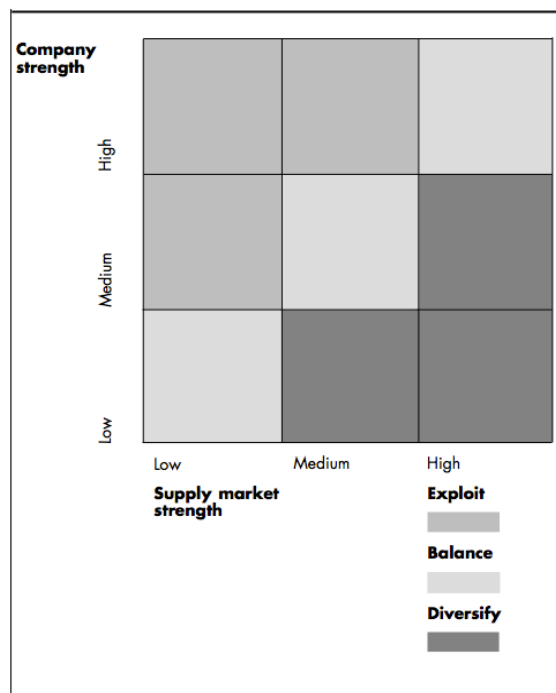


Figure 7 - The purchasing portfolio matrix (Kraljic, 1983, pg. 114)

Step 4: Action Plans

For each strategic thrust there are distinctive implications for the individual elements of the purchasing strategy as shown in Figure 8. The company should explore a range of supply scenarios where it defines short- and long-term opportunities as well as respective risks, costs, returns. Despite the definition of strategic implications, the company should also develop detailed preferred options with objectives, steps,

responsibilities, and contingency measures for top management approval and implementation. This last step enables a company to gain a set of documented strategies that specify timings and criteria for future actions when purchasing for critical items.

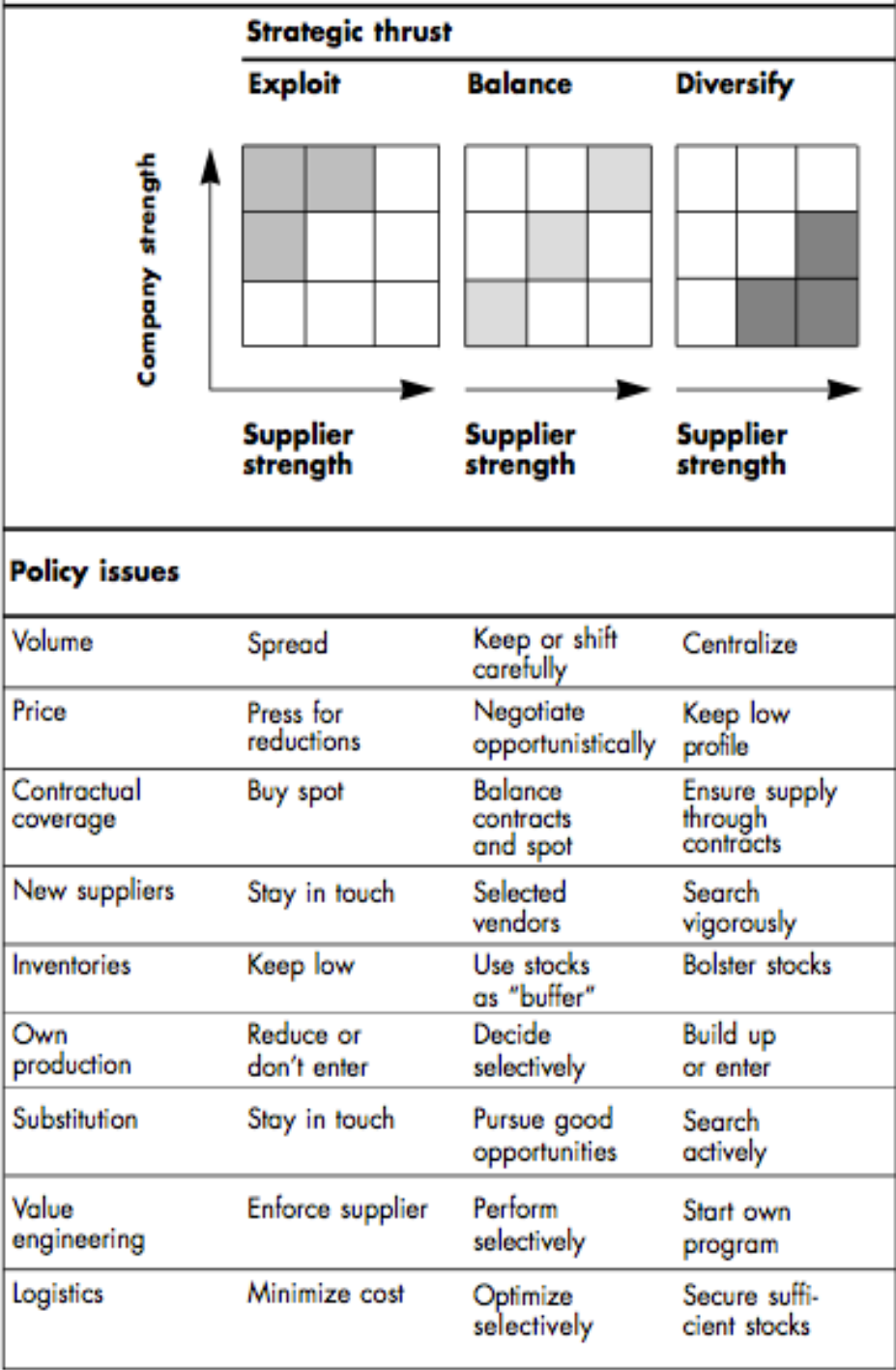


Figure 8 - Strategic implications of purchasing portfolio positioning (Kraljic, 1983, pg. 115)

By taking advantage of the use of this matrix, purchasers can differentiate between the various supplier relations and choose strategies that are appropriate for each category and thereby effectively manage supply (Caniëls, and Gelderman, 2005).

I. Strategic movements in Kraljic's Matrix

Gelderman (2003) studied several experienced purchasing companies to understand which adaptations were made to Kraljic's matrix. Different kinds of strategic responses were identified and described for each category, where a present dichotomy was identified: a strategy to hold a position or a strategy to move to another position in the matrix. Holding on to a position implicitly means that current circumstances are taken for granted mostly because the firm is convinced that it is the best position for a certain item or that the possibility of change is not realistic (Gelderman and Van Weele, 2003). For bottleneck and strategic items, movements are pursued in order to reduce a high level of supply risk, which means moving to the left in the matrix, as shown in Figure 9. Non-critical items are preferably moved upwards and leverage positions, exceptionally, are exchanged for strategic positions.

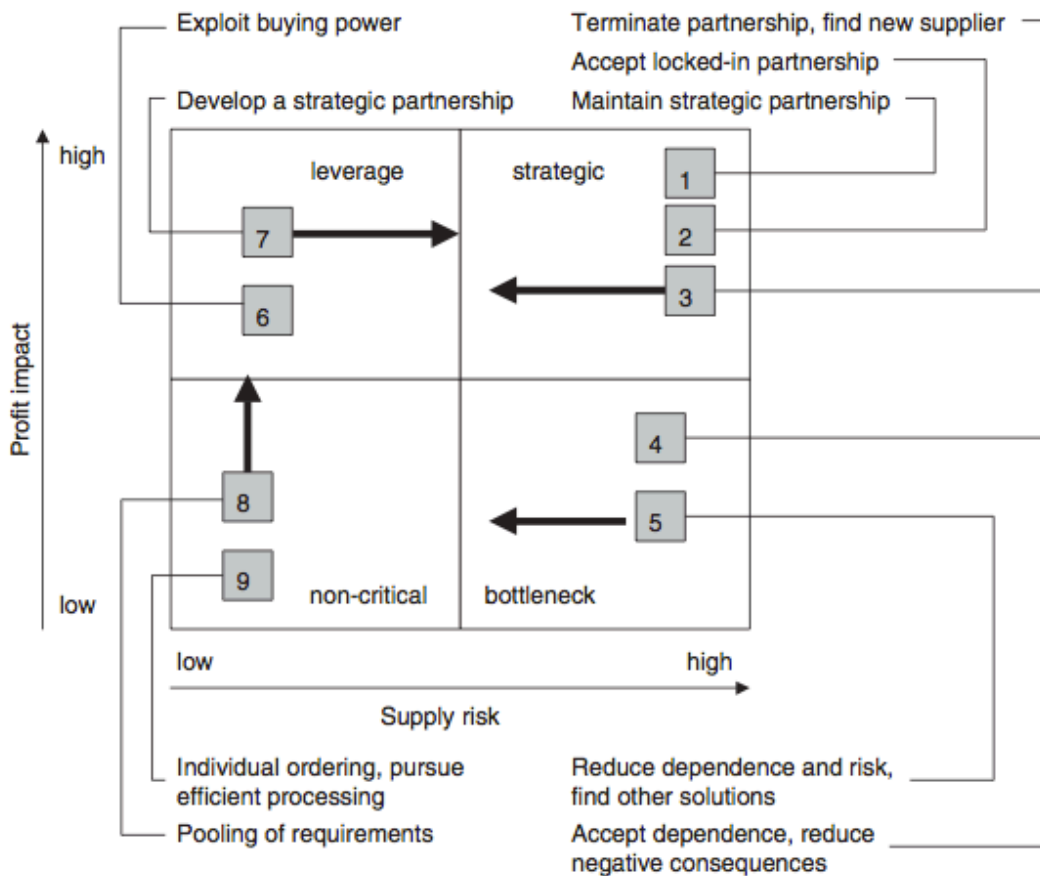


Figure 9 - Overview of purchasing strategies for all portfolio quadrants (modified by Caniels and Gelderman (2005) from Gelderman and Van Weele (2003))

As number 1 in the figure above indicates, the recommendation for maintaining a strategic partnership comes from the high supply risk consequence from the frequent purchase from a single supplier. A mutual trust and commitment associated with an

intensified relationship is likely to reduce the supply risk to a minimum (Caniëls and Gelderman, 2005).

If the supplier, for example, holds a patent to a certain product the buyer is unable to pull out of the suppliers' unfavorable conditions, which lead to the acceptance of a locked-in partnership, as number 2 indicates.

On the other hand, number 3 suggests an action to pursue another position in the matrix, namely to the Leverage quadrant which stands for the termination of the partnership. This strategy is employed when a supplier's performance has become unacceptable, so the buyer should reduce his dependence on the supplier by searching for alternative suppliers. In this situation the supplier still has a dominant position however to a less extent (Caniëls and Gelderman, 2005).

For bottleneck items, holding the position (number 4) stands for acceptance of dependence on a supplier and assuring supply (Gelderman and Van Weele, 2003). The main focus of this strategy is to employ contingency plans in combination with risk analysis, consignment systems, long-term contracting with an emphasis on quality and assurance of supply, and ultimately keeping extra stocks (Caniëls and Gelderman, 2005; Gelderman and Van Weele, 2003).

Number 5 in the matrix represents the shift from the bottleneck to the non-critical quadrant. This action is a result of dependence and risk reduction that is enabled by broadening specifications of the product and finding new suppliers (Caniëls and Gelderman, 2005; Gelderman and Van Weele, 2003).

Leverage items can be obtained from various suppliers and represent a relatively large share of the end product's cost price in combination with a low supply risk. These characteristics justify an aggressive approach to the supply market, so the purchasing strategy is directed towards the exploitation of the buying power by using competitive bidding (Caniëls and Gelderman, 2005), as shown in number 6. Besides this strategy the maintenance of a partnership of convenience is also pursued in order to guarantee feasible short-term contracts in order to exploit the leverage position. The other end of the option is to move to the strategic quadrant, number 7. This strategy is only followed when the supplier is willing and able to contribute to the competitive advantage of the buying firm and so develop a strategic partnership (Caniëls and Gelderman, 2005; Gelderman and Van Weele, 2003).

Finally, in the non-critical quadrant the dichotomy also applies. The handling of non-critical items (number 8) requires a purchasing strategy that enhances purchasing power by standardization and bundling of purchasing requirements – pool purchasing requirements (Caniëls and Gelderman, 2005). The strategic direction is toward the leverage quadrant, resulting in lower costs (Gelderman and Van Weele, 2003). The strategy to holding the position, as shown in number 9, is pursued whenever it is not possible to pool the purchasing requirements and the purchasers see themselves obligated to adopt individual ordering in order to become the processing efficient. This strategy is aimed at reducing the indirect purchasing costs (Caniëls and Gelderman, 2005).

c) Olsen & Ellram's portfolio approach

The importance of understanding the relationships held between buyers and suppliers, and consequently between enterprises have been subject of intense studies throughout the academic environment. By focusing resources in building sound relationships with suppliers, loyalty is fostered and valuable support is secured, which goes beyond terms and conditions of an order or a contract.

Olsen and Ellram (1997) present a three-step portfolio model to assist in managing different kinds of supplier relationships. These steps start out with a normative approach to analyze the company's purchases, going through an analysis of the current supplier relationships and finally develop action plans on how to adapt existing relationships.

Step 1: Analysis of the Company's Purchases

These authors adopted Kraljic's matrix altering the dimensions in study. Whilst Kraljic defined Importance of purchase and complexity of supply market as the two variables of his model, this step for Olsen & Ellram comprises the analysis of the following key classification dimensions: Strategic importance of the purchase and difficulty in managing the purchase situations. The strategic importance of purchase describes internal factors to the firm such as competence, economic and image factors as seen in Table 1.

Table 1 - Factors influencing the Strategic Importance of the purchase (Olsen and Ellram 1997)

Competence factors	
1.	The extent to which the purchase is part of the firm's core competencies
2.	Purchase improves knowledge of buying organization
3.	Purchase improved technological strength of buying organization
Economic factors	
1.	Volume or dollar value of purchases
2.	The extent to which the purchase is part of a final product with a great value added
3.	The extent to which the purchase is part of a final product with a good profitability
4.	Criticality of the purchase to get leverage with the supplier for other buys
Image factors	
1.	Supplier critical image/brand name
2.	Potential environmental/safety concerns

On the other hand, the difficulty of managing the purchase situation describes factors external to the company, regarding product, supply market and environmental characteristics as defined in Table 2.

After categorizing the purchases, Olsen and Ellram categorized them into Kraljic's four different categories in order to follow suggestions on how to manage the relationships associated with the purchases:

- The leverage category defines that the goal is to create mutual respect in the supplier relationship and communicate requirements further into the future.

- The noncritical category suggests the company to reduce the number of suppliers and the number of duplicate products/services.
- The purchases that fall into the strategic category require the company's attention on establishing a close relationship with the supplier, focusing on early supplier involvement and joint development of products and services, keeping a long-term value focus and lowering poor performance cost.
- Finally, those that are categorized as bottleneck purchases, the main action plan for the company is to try to standardize the purchases or find substitutes when possible.

Table 2 - Factors describing the Difficulty of Managing the Purchase Situation (Olsen and Ellram 1997)

Product characteristics	
1.	Novelty
2.	Complexity
Supply market characteristics	
3.	Suppliers' power
4.	Suppliers' technical and commercial competence
Environmental characteristics	
5.	Risk
6.	Uncertainty

Step 2: Analyze the Supplier Relationships

Olsen and Ellram (1997) recommend that the supplier relationships associated with the purchases are categorized based on the relative supplier attractiveness and the strength of the relationship between the buyer and the supplier. The first dimension describes the factors (Table 3) that make a company choose a specific supplier; however these factors and their importance will vary from company to company so a contingency approach is suggested. On the other hand, the strength of the relationship describes the factors that create bonds between two companies (Table 4).

After evaluating the various factors of each dimension, the company can categorize the actual supplier relationships in a portfolio model as the one presented in Figure 10 and then proceed with the development of action plans (Step3).

Table 3 - Factors influencing the Relative Supplier Attractiveness

Financial and economic factors	
1.	The supplier's margins
2.	The supplier's financial stability
3.	The supplier's scale and experience
4.	Barriers to the supplier's entry and exit
5.	Slack
Performance factors	
1.	Delivery
2.	Quality
3.	Price
Technological factors	
1.	The ability to cope with changes in technology
2.	The types and depth of supplier's current and future technological capabilities
3.	The supplier's current and future capacity utilization
4.	The supplier's design capabilities
5.	The supplier's speed in development
6.	The supplier's patent protection
Organizational, cultural, and strategic factors	
1.	Influence on the company's network position
2.	The internal and external integration of the supplier
3.	The strategic fit between buyer and supplier
4.	Management attitude/outlook for the future
5.	Top management capability
6.	Compatibility across levels and functions of buyer and supplier firm
7.	General risk and uncertainty of dealing with the supplier
8.	Feeling of trust in relation with the supplier
Other factors	
1.	Ability to cope with changes in the environment
2.	Safety record of the supplier

Table 4 - Factors describing the Strength of the Relationship

Economic factors	
1.	Volume or dollar value of purchases
2.	Importance of the buyer to the supplier
3.	Exit costs
Character of the exchange relationship	
1.	Types of exchange
2.	Level and number of personal contacts
3.	Number of other partners
4.	Duration of the exchange relationship
Cooperation between buyer and supplier	
1.	Cooperation in development
2.	Technical cooperation
3.	Integration of management
Distance between the buyer and the supplier	
1.	Social distance
2.	Cultural distance
3.	Technological distance
4.	Time distance
5.	Geographic distance

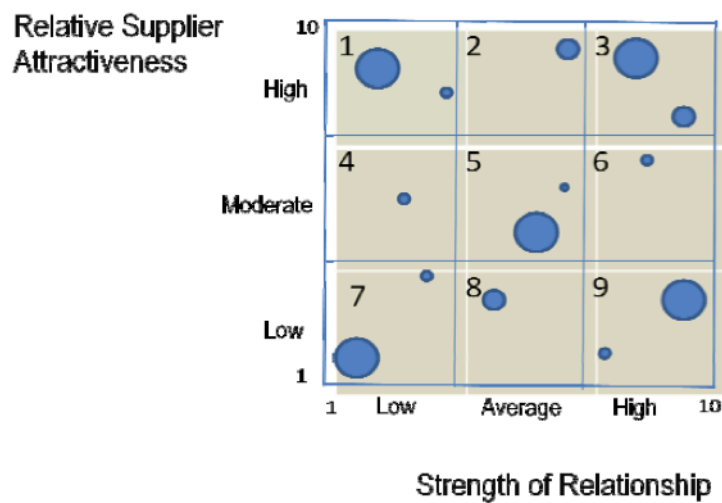


Figure 10 –Analysis of supplier relationships (Olsen and Ellram, 1997, cit por. Sjoberg (2010))

Step 3: Develop Action Plans

Depending on where the supplier relationship ends up to be categorized, various possible action plans are suggested. Analyzing Figure 10, purchases that were positioned in cells 1, 2 and 4 and were categorized as being strategically important Olsen and Ellram suggest that the relationship should be strengthened in order to keep a loyal supplier. On the other hand, if the purchase were to be a noncritical or leverage purchase, the company could consider strengthening the relationship without allocating considerable resources to the relationship. If analyzing those that were positioned in cells 3, 5 and 6, the strategy for the relationships of all types of purchases would be to relocate resources among different activities in order to maintain a strong relationship. Lastly, cells 7, 8 and 9 include relationships that warrant attention because a reasonable strategy would be to change the supplier.

In conclusion, Olsen and Ellram divide the action plans that they suggest into three essential groups:

- Group 1 – action plans with the purpose of strengthening a supplier relationship;
- Group 2 – action plans with the purpose of improving the supplier attractiveness or the performance of the relationship;
- Group 3 – action plans that suggest a reduction of the resources allocated to a relationship.

d) Bensaou's portfolio approach

Different from Olsen and Ellram (1997) and Kraljic (1983), Bensaou moved away from the use of one internal and another external dimension to assess purchases. Instead, this author decided to apply power-dependencies between buyer and supplier to differentiate between different types of relationship (Roos (2005)). Bensaou (1999) found the need for a differentiated way of dealing with relationships due to the significant correlation between the extent of specific investments made by either part to the relationship and activities commonly related to strategic

partnerships (cit por. Roos (2005)). In order to do so, three steps were developed to result in a framework on managing a portfolio of relationships.

- Step 1 – classification of the relationships between the company and the suppliers and identification of which type of relationships matched the competitive conditions surrounding product exchange (cit por. Roos (2005)). Like all portfolios, there are two dimensions to be studied and Bensaou defined Buyer’s specific investment and Supplier’s specific investment as the suggested dimensions, resulting in the classification of the relationships into 4 types (Figure 11).
- Step 2 – identification of the contextual profiles of the different quadrants considering three essential factors: the exchanged product and its technology; the character of the upstream markets; and the characteristics of the available suppliers. In each factor there were several important key characteristics found (Figure 11).
- Step 3 – the final step of Bensaou’s approach. In this step management profiles for each type of relationship were designed based on three different mechanisms that help coordination and exchange of knowledge: information sharing; characteristics of border tasks; and social climate (cit por. Roos (2005)).

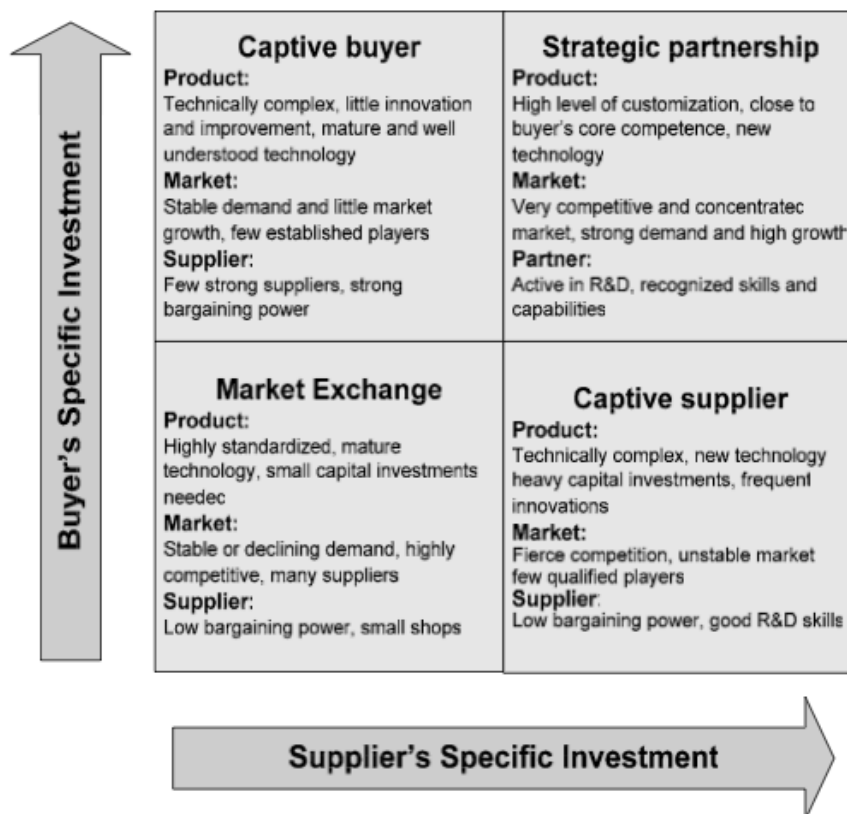


Figure 11 –Bensaou’s classification of relationships and contextual profiles (Roos, 2005)

Bensaou concluded that components with same features tend to be managed in the same way. On the other hand, relationships that are successful are the ones where the requirements of the relationship go with the actual capabilities of the relationship.

Finally, Bensaou’s guideline for the approach was to deliberately match the design of each relationship to its external context and make it easier to avoid the common traps of designing too much or too modest (cit por. Roos (2005)).

In order to better understand what differences exist between the previous described portfolio models, the following Table 5 is a summary of each portfolio of each author. By analysing the middle column of the table, the conclusion that portfolios have been used for several areas is made. As this thesis is regarding indirect services, Kraljic’s approach was the most appropriate; despite the greatest characteristic of services being their intangibility, they can be treated as items, and therefore Kraljic’s approach being the best choice.

Table 5 - Comparison of portfolio models (Fiocca, 1982; Kraljic, 1983; Olsen & Ellram (1997); Bensaou, 1999)

<i>Author</i>	<i>Description</i>	<i>Variables</i>
Fiocca (1982)	Classification of <u>accounts</u>	<ol style="list-style-type: none"> 1. Difficulty in managing the account; 2. Strategic importance of the account.
Kraljic (1983)	Categorization of purchased <u>items</u>	<ol style="list-style-type: none"> 1. Importance of purchase; 2. Complexity of supply market.
Olsen & Ellram (1997)	Categorization of <u>supplier relationships</u>	<ol style="list-style-type: none"> 1. Relative supplier attractiveness; 2. Strength of relationship.
Bensaou (1999)	Categorization of <u>buyer-supplier relationships</u>	<ol style="list-style-type: none"> 1. Buyer’s specific investment; 2. Supplier’s Specific investment.

2.3. Indirect Spend

According to the Centre for Advanced Purchasing Studies (CAPS) Critical Issues Report completed in September 2003, Indirect Spend is defined as: “*Any purchased good or service that does not end up in the product or service delivered to a customer*”. The importance of managing indirect spend has been increasing due to more active outsourcing of noncore capabilities, the growth of the service sector and the augmented cost pressure (Monczka and Handfield (2005)).

2.3.1. Identifying, managing and reducing Indirect Spend

According to the CAPS Research, companies have begun using two distinct methods to identify, manage, and reduce their internal spend: internal and external methods.

Internal Methods

The most important internal measures are applied to guarantee leveraging, establish accountability, automation and standardization. To achieve these measurements CAPS' Research suggest the following methods:

- Data collection and consolidation – in many cases, several units within one organization unknowingly purchase the same goods and services from different suppliers or even the same supplier but at different prices. This situation results in a loss of potential leverage with suppliers for the company. Comprehensive data collection and analysis allow companies to achieve maximum leverage as well as recognize similar, yet slightly different, goods and services that might be standardized and aggregated to aid in leveraging.
- Restructuring to establish accountability – Establishing supply management structure and setting up accountability for indirect purchases are closely connected with first method described above. By gaining a clear understanding of who is spending what, where, and when, procurement managers can install procedures and/or safeguards that deter and control maverick spend. At that point, the delegation of responsibility for cost saving is essential, whereby a chain of command is established that can respond with appropriate authority and ensure that the correct protocol be followed.
- Automating the requisition/purchasing process – the automation of the purchasing process with electronic requisitioning, routing, approval, and purchase order/release creation has become granted in companies. This approach facilitates receiving by automatically checking receipts against invoice and purchase order. This automation can also ensure that payment is made, once the supply or service is complete, saving time and money.
- Standardization – combining automated purchasing systems with e-catalogs supports standardization and aggregation of indirect spend. By limiting requisitioners to the catalogs of goods and services already under contract from selected suppliers, volume commitments can be achieved and maverick spending reduced.

External Methods

External methods for managing and reducing indirect spend include reverse auctions, consortiums, and outsourcing.

- Reverse auctions – allow buyers and supplier to economically communicate in real time, worldwide, via the Internet. Buyers are seeing substantial price reductions from reverse auctions. This type of auction has the potential to reduce the sourcing cycle-time.
- Consortiums – this method allows buyers from various businesses the opportunity to pool their buying power to reduce prices. However there can be problems with consortium management, being the most challenging one to do with getting the individual members to agree on exactly what is to be collectively purchased, resulting in lengthy and intense negotiations and sometimes the termination of consortium altogether.
- Purchasing outsourcing – some companies decided to outsource their indirect spend altogether.

The CAPS Research also gathered 9 strategies and tactics that can be employed to reduce the cost of indirect goods and services. However, only two of the nine strategies and tactics will be discussed due to the relevance for this thesis: Supplier Managed E-Catalogs and Commodity Coding for Indirect Spend. E-catalogs combined with automated requisitioning and purchasing systems, help companies ensure compliance to contracts. If possible, companies should rely on supplier-managed e-catalogs in order to lessen costs and difficulties arisen. The second strategy to be discussed involves commodity coding. Indirect goods can often be logically coded in different ways however it may lead to inconsistent coding or no coding at all. Companies should limit commodity codes to few levels in order to make it easier for the end user to properly identify commodities and to reduce the search time for the most accurate code.

2.3.2. Classification of purchasing goods

The purchasing process may concern a large variety of goods and, of course, services. In general, purchased materials and services can be grouped into several categories (Van Weele (2002)). Van Weele defined 9 categories for purchasing goods; however, only three of them are of interest when talking about indirect spend: investment goods or capital equipment, MRO items, and Services.

a) Investment goods or capital equipment

These are the products which are not consumed immediately, but whose purchasing value is depreciated over a period of time and where major capital investments are necessary for the business processes of the buying firm (Wynstra and van der Valk (2005)).

Examples of these types of goods are: machines used in production, computers and buildings.

b) MRO items (Maintenance, repair and operating material)

These products, sometimes referred to as indirect materials or consumable items, represent material, which are necessary for keeping the organization running in general, and for the support activities in particular. These products are often supplied from stock; examples are office supplies, cleaning materials and copy paper but also maintenance material and spare parts. The way these items are dispersed throughout an organization makes monitoring inventory difficult and the only way that the purchasing department knows when to order these items is by purchasing requisitions forwarded by internal customers (Monczka and Handfield (2005)).

c) Services

Services are activities that are executed by third parties on a contract basis. Services can range from providing cleaning services and hiring temporary labour to having a new production facility for a chemical company designed by a specialized engineering firm (a contractor). There has been a tendency to pay limited attention and management of service purchases however studies have shown that careful and specialized attention to these type of purchases can result in achieving high quality at low total costs (Monczka and Handfield (2005)).

Jackson and Cooper (1988)(cit por. Wynstra and van der Valk (2005)) classify four types of services based on how the buying company applies the service with respect to its own business processes. Furthermore, Wynstra and van der Valk (2005) extend the classification defining the following types of services:

- Component services – which are delivered to subsequent customers without transformation by the buying firm;
- Semi-manufactured services – that are transformed by the buying firm before being delivered to customers;
- Instrumental services – represent major investments in assets to execute the buying firm’s operations, and fall into the general category capital items. An instrumental service affects directly how the company’s primary processes are carried out, but it is not delivered to the end customer (Doty and Glick (1994) cit por. Wynstra and van der Valk (2005)).
- Consumption services – are consumed by and within the buying organization and typically include less expensive more routine-like services. These services do not directly affect how the buying company’s primary processes are carried out (Doty and Glick (1994) cit por. Wynstra and van der Valk (2005)).

Besides Wynstra and van der Valk (2005), other authors classified services into several types. For instance, Burt and Pinkerton (1996) suggested three distinct types of services: Professional Services, Technical Services, and Operating Services. Professional services include individuals and organizations whose services are obtained through professional service purchase orders and contracts. On the other hand, Technical Services include research and development work; the development and installation of management information system and materials requirement planning systems; and the development of technical manuals, printing services, and repair services. Finally, Operating Services are those services that could be performed by the organization itself but that, for any of several reasons, are performed under contract (Burt and Pinkerton, 1996).

Another classification would be of Fitzsimmons, *et al.* (1998) which proposed a taxonomy for purchasing business services by measuring the focus of the service in 3 different aspects (property, people and process) and the importance of service (high or low) (Figure 12).

		Importance of Service	
		Low	High
Focus of Service	Property	Facility Support: –Laundry –Janitorial –Waste Disposal	Equipment Support: –Repairs –Maintenance –Product Testing
	People	Employee Support: –Food Service –Plant Security –Temporary Personnel	Employee Development: –Training –Education –Medical Care
	Process	Facilitator: –Bookkeeping –Travel Booking –Packaged Software	Professional: –Advertising –Public Relations –Legal

Figure 12 – Taxonomy for purchasing business services (Fitzsimmons, *et al.* (1998))

A brief summary of the available classifications of services (from the pioneers to the more up to date authors) as well as a few other classifications can be found in the following Table 6.

Table 6 - Classification of services of various authors (Fitzsimmons *et al.* (1998); Wynstra *et al.*(2006); Sonmez and Moorhouse (2010))

<i>Authors</i>	<i>Date</i>	<i>Classification</i>
Alijan and Farrel	1982	- Professional; - Facilities and equipment related; - Personnel-related; - Labor and craft services.
Kraljic	1983	- Strategic; - Leverage; - Bottleneck; - Non-critical.
Dobler <i>et al.</i>	1992	- Personal; - Equipment and processing; - Personnel and employee-related.
Graw and Maples	1994	- Facility-related; - Materials/logistics-related; - Communication; - Employee-support; - Professional.
Jackson <i>et al.</i>	1995	- Maintenance and repair; - Operation and production.
Boyt and Harvey	1997	- Elementary; - Intermediate; - Intricate.
Fitzsimmons <i>et al.</i>	1998	- Facility support; - Employee support; - Facilitator; - Equipment support; - Employee development; - Professional.
Wynstra and Van der Valk	2005	- Component; - Semi-manufactured; - Instrumental; - Consumption.
Sonmez and Moorhouse	2010	- Professional; - Others.

2.3.3. Purchasing Services

Services differ from goods in many ways: they are intangible, they are not standardized (heterogeneous), and they are inseparable and perishable (Zeithaml *et*

al., 1985, cit por., Andersson and Norrman (2002)). A characterizing feature of services is that they are produced and consumed in interactive processes between buyers and sellers (van der Valk (2008)). The interaction is only successful when the buying company is satisfied with the process and the result of service provision during the contract period.

However, there are pros and cons for purchasing services, as Van Weele (2002) defines (Table 7). Despite the flexibility and enhancement of the know-how of third parties and the possibility of transferring risk to those same parties, dependency on suppliers may increase and the risk of communication problems during transfer of activities may turn out to be a setback for enterprises.

Table 7 - Advantages and disadvantages of contracting out (adapted from Weele, A. J. v. (2002))

<i>Advantages</i>	<i>Disadvantages</i>
Investments can be focused on core activities	Increased dependency on suppliers
Optimal use of knowledge, equipment and experience of third parties	Constant monitoring of costs related to contracting out is necessary
Flexibility is increased; fluctuations in workload can be absorbed more easily	Risk of communication and organizational problems during transfer of activities to third parties
Contracting out leads to a more simple primary process in the organization	Risk of information “leaks” (confidential information)
Input of an independent vision prevents organizational short-sightedness	Risk of social and legal problems in case of execution of activities by third parties
Part of the company risk is transferred to third parties	

Van Weele (2002) arguments that buying of services may be necessary because of insufficient internal capacity to perform the work planned – capacity buying. Besides insufficient capacity, the lack of expertise to perform the work internally at an acceptable quality level or at a justified cost level leads to the need of specialist buying. To do so, popular methods of selection of the best supplier are suggested: open tender with pre-selection and open tender without pre-selection. In the first method, the company indicates which other companies qualify for the activities and only invited companies can submit proposals. Without the pre-selection of suppliers, every company can submit a proposal.

Services can gain a certain degree of complexity due to factors such as the number of single or bundled services, the tangibility of the service definition, the value added, whether the service is pre-defined or if development and re-engineering is part of the scope, and if its focus is on the execution of activities or of management issues (Andersson and Norrman (2002)). In order to respond to this type of item, purchasing strategies should be in focus on standardizing the service by using

competitive bidding, global sourcing, and consolidating the services bought to a few providers both to achieve economies of scale and to reduce transaction costs.

Van Weele (2002) describes buying services as being more or less the same process as purchasing goods – buyers must have a sound knowledge of the supply-markets where operating (supply market structures determine buyer's tactics) and of the products bought. However, specific attention has to be given to matters such as laws concerning ultimate responsibility for payment of taxes and social security, insurances, safety regulations, and ownership.

On the contrary, Ellram, Tate and Billington (2004)(cit por. van der Valk, 2008) suggest that the inherent differences in services require specific supply chain management tools and therefore the implication that one cannot draw on knowledge on goods procurement for services buying. Another author, already 40 years ago stated, "Unfortunately, the tried and true rules for buying goods do not work when applied to the buying of professional services" (Wittreich (1966), cit por. Wynstra and van der Valk, 2005).

As services are intangible and their consumption and production occur simultaneously, there is often a lack of knowledge of what has really been bought in terms of type of service and volume in different categories. Therefore, it is important to define what the service is, what demand it should fulfil and what problem it should solve (Andersson and Norrman, 2002). The success of a service purchase is established during the on-going production and consumption of that service, which takes place in continuous interaction between buyer and seller. This interaction is considered effective when the buying company is satisfied with the process and the result of service provision during the contract period.

For component services, the interaction between buyer and seller concerns achieving an optimal fit (both in terms of quality and quantity) between individual component and the final product. The supplier's knowledge of its own product and also of the buying firm's final product and its ability to manage its internal service delivery capacity in accordance with the buyer's demand is a must capability of the interaction.

These objectives and capabilities are very similar for semi-manufactured services, however with the addition of optimizing the form and degree of processing of the service with respect to the buyer's application and a more directed knowledge on the service process (Wynstra and van der Valk, 2005).

Moreover, for instrumental services the main objective regards the integration of the service with the primary processes of the buying firm, achieve, maintain and improve integration against the background of a low frequency service delivery. Critical supplier capabilities for instrumental services include an understanding of the buying firm's production process, and the ability of sustaining and supporting the service for an extended period of time (Wynstra and van der Valk, 2005).

Finally, the central objective for consumption services is to optimally facilitate the buying organization, and its individual members, to carry out its primary tasks and also achieve a cost-efficient delivery process (Wynstra and van der Valk, 2005). As all the other types of services, consumption services also have certain capabilities

allocated: the supplier should be able to run an efficient service production and delivery process, by means of optimizing resource allocation and utilization (Wynstra and van der Valk, 2005)).

On the other hand, the customer also has its capabilities. For component and semi-manufactured services, the customer should be able to interpret, translate and communicate final customer demands and should have the capacity to synchronize and coordinate design and delivery of the different services. For instrumental and consumption services, the customer should interpret, translate and communicate the demands of the internal users and help implement and leverage these services within the own organization (Wynstra and van der Valk, 2005).

2.3.4. Classifying services in the Kraljic Matrix

Wynstra and van der Valk (2005) concluded that services which have a major potential impact on the buying firm’s customers or on the buying firm itself and its internal customers are likely to demonstrate more explicitly defined interaction structures than those that are of little impact. Thus, they expected patterns of interaction to surface most clearly for services with associated high degree of perceived risk, or high potential impact. To better understand the dependence on the degree of interaction and the perceived risk or impact, these authors were able to apply an adopted matrix from Kraljic’s original (Figure 13).

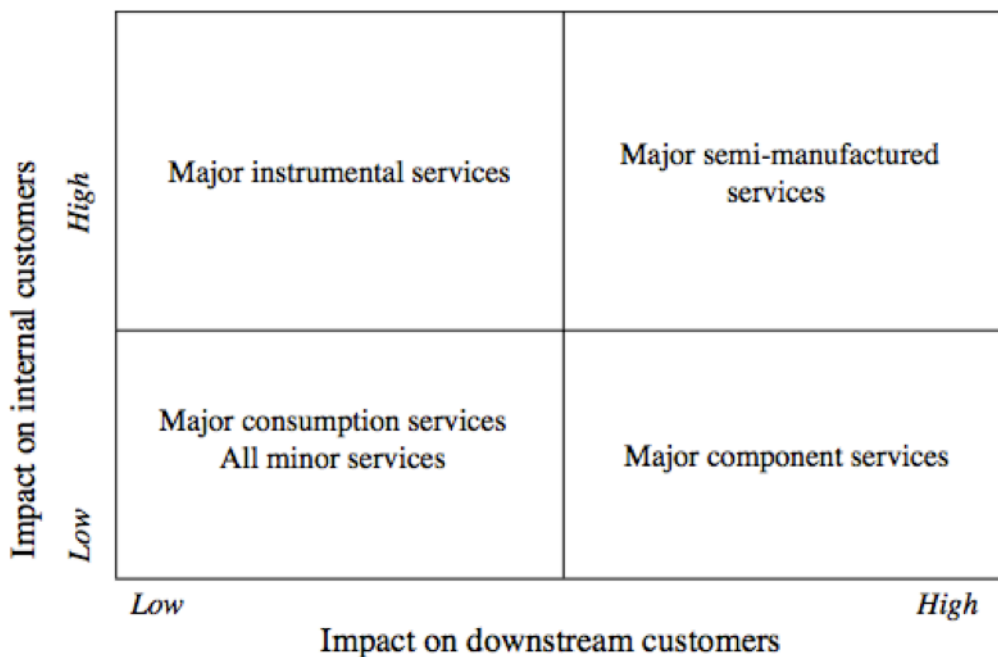


Figure 13 – Impact-based classification of business services (Wynstra and van der Valk (2005))

Wynstra and van der Valk (2005) found a way to combine their proposed classification of services with the level of impact and perceived risk by distinguishing business services on the basis of their possible direct impact on internal users and importance to downstream customers.

Wynstra and van der Valk (2005) have a very sane approach regarding the internal and final customers. When handling purchased services, you can only be able to categorize them by understanding the results for the internal and final customers, therefore. In a modest opinion, this would be a very good approach to categorize indirect services. But, unfortunately, due to lack of information regarding these two actors, it was not possible to follow Wynstra and van der Valk's approach when applying the case study.

However, each author classifies the services according to the two variables they intend to be important; whether it is according to the supply risk and profit impact, or impact on the internal customer and impact on downstream customer. It is then up to the company to decide which way is the better approach regarding the data available or whether to defy the scholars and come up with a new and more appropriate approach to its reality.

Nonetheless, the portfolio approach is being used and has countless studies on materials and goods, leaving services aside; which leads to a reasonable question: if various academic researches and authors state that purchasing services has become of higher importance, why are the attentions regarding categorization and strategies still focused only on materials and goods?

2.4. Proposed Methodology

In order to fill the gap in categorizing services by using a portfolio approach, a case study of an international enterprise with a big presence in Portugal (plant located at Aveiro) has been developed. This was the chosen company due to the author's internship being held at Bosch Termotecnologia S.A., a plant that is part of the thermotechnology division of Bosch. The internship was held in the Indirect Purchasing Department where direct contact with service purchases occurred and therefore the interest in understanding how these are handled.

Firstly, a thorough analysis of Bosch's purchasing process was assessed in order to understand which are the strategies currently applied and how the purchase of indirect material and services is held.

Adopting Kraljic's matrix for this matter, the gathering of the variables "Importance of Purchase" and "Complexity of the Supply Market" was attended by following Padhi *et al.*'s proposal of inquiring the buyers on characteristics that build up those variables. Wynstra and van der Valk's (2005) approach would be the best way to categorize the indirect services, however, there was no data available to do so. Therefore, Kraljic's approach, with the adaptation of Padhi *et al.* (2011) was intended due to the existence and processing of "indirect" information on services (annual volume, number of suppliers, importance of purchase, etc.)

3. Bosch

The Bosch Group comprises Robert Bosch GmbH and its more than 350 subsidiaries and regional companies in some 150 countries, including sales and service partners. This company was founded in Stuttgart, in 1886 by Robert Bosch (1861-1942) as “Workshop for Precision Mechanics and Electrical Engineering”. Along the years several business sectors were developed and within the business sector, various divisions:

- Automotive Technology – considered the world’s largest independent parts supplier to the automotive industry;
- Industrial Technology – this sector incorporates de divisions Drive and Control Technology, Packaging Technology, and Solar Energy;
- Consumer Goods and Building Technology – this sector provides a wide spectrum of products and solutions in the areas of Power Tools, Thermotechnology, Household Appliances, and Security Systems.

3.1. Bosch Thermotechnik GmbH

This division, within the Consumer Goods and Building Technology business sector, represents the Thermotechnology Division of the Bosch Group. The company is a leading supplier of heating products and hot water solutions in Europe. Bosch Thermotechnology has strong international and regional brands and manufactures a diversified product range in 21 plants all over the world: brands such as Bosch; Buderus; Junkers; Loos; Geminox; Vulcano; etc.

3.1.1. Bosch Termotecnologia, S. A.

The plant Bosch Termotecnologia, S. A., represents the Vulcano brand for water heaters in Aveiro Portugal. Besides Vulcano, Buderus and Junkers brands are represented in Portugal as well, however, only Vulcano will be of interest, due to the internship of the author being held at its specific division.

In Aveiro, Portugal, Bosch Termotecnologia consists of both the factory and the administrative sectors, as well as the various departments that make the plant a whole functional company. Within all the departments, from the financial, to infrastructures, and logistics to health department, the purchasing department is a central and fundamental department that the whole plant relies on.

The purchasing department starts out with the Vice-President of Purchasing of the division as well as the Head of Department and includes five purchasing sectors (Figure 14). As shown in the organization chart, the HoD – Head of Department – reports to the central Purchasing department of the TT division, Bosch Thermotechnik GmbH. Under the supervision of the HoD of AvP/PUR (Aveiro Plant/Purchasing), lie the five important sectors associated to the purchasing department:

- PUR1 – main responsibility for the purchase of direct material. Beside the purchasing itself, cost reductions, sourcing strategies, supplier development and contract negotiations are also elements of work in this sector;

- PUE – project teams which bear the responsibility for achieving target costs and investment, quality, capacity and deadlines for externally sourced parts before SOP (Start of Project) in new projects;
- PUI – has the responsibility of negotiating commercial conditions of all indirect materials (not incorporated in the final product) and services. This work area performs search and supplier selection for all goods and services in order to guarantee the QCD principals (Quality, Cost, Delivery/Services) for all internal customers;
- PUQ – focused on assuring a good quality performance of suppliers during the complete supply chain. The priority is to prevent failures and assure quality process audits with suppliers in very early stages;
- PUR-P - project purchasing – supplier development by using lean concepts, as well as coordination of sourcing activities (supplier development; quality assessment; delivery and lead times; implementation of logistics concepts). This responsibility ends at the warehouse of raw materials.

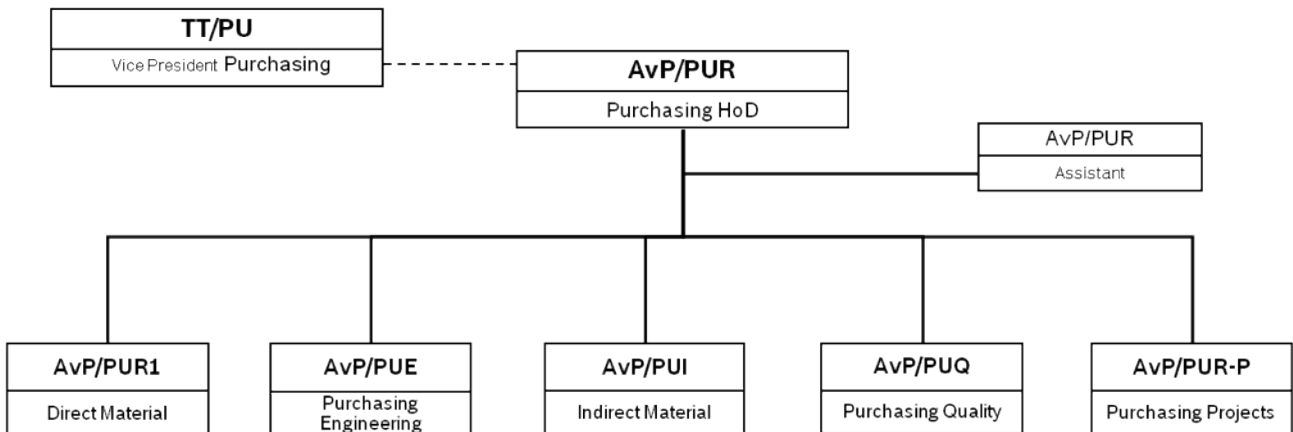


Figure 14 – Organization chart of the purchasing department of Bosch Termotecnologia, S.A.

3.2. PUI – Indirect Purchasing at Bosch Termotecnologia, S. A.

The team responsible for indirect purchasing at Bosch Termotecnologia, S. A. (PUI) consists of 4 elements, where each member is in charge of responding to a certain area/department of internal customers as shown in Figure 15. The group leader is responsible for all indirect purchases for the whole company as well as being in charge of coordinating and supporting the team, contract signatures and all decision making. The employees report all activities to the group leader, however with a certain level of autonomy of decision-making.

AvP's (assuming, in this chapter, as Bosch Termotecnologia, S. A.) indirect purchasing department activities have a nuance: the employees never get to buy, in the definition of buying (it is of the internal client's responsibility); instead, they are responsible for the whole process inherent before the purchase itself. This whole process includes sourcing suppliers, negotiation and decision making of to whom (supplier) the product/service will be awarded to (this process will be defined thoroughly further on the thesis). However, the term "purchase" will be used in this chapter, for the same

process, despite the previous explanation given. In addition, PUI is responsible for negotiating regional contracts, i.e., contracts which involve other plants in Portugal and not only for Aveiro on its own.

The main objective of PUI is to guarantee QCD principals: Quality, Cost and Delivery/Service. In order to fulfill this goal, supplier evaluation is essential and is assessed every year through a method that implies the participation of both buyer and internal customer. In the evaluation method, inquiring the internal customer about the quality and delivery/service of the supplier assesses the three principals of the QCD, whereas the responsible buyer evaluates the cost. However, this assessment is only applied to a certain amount of suppliers that depends on the annual volume, resulting in a lack of evaluation for the rest of the suppliers.

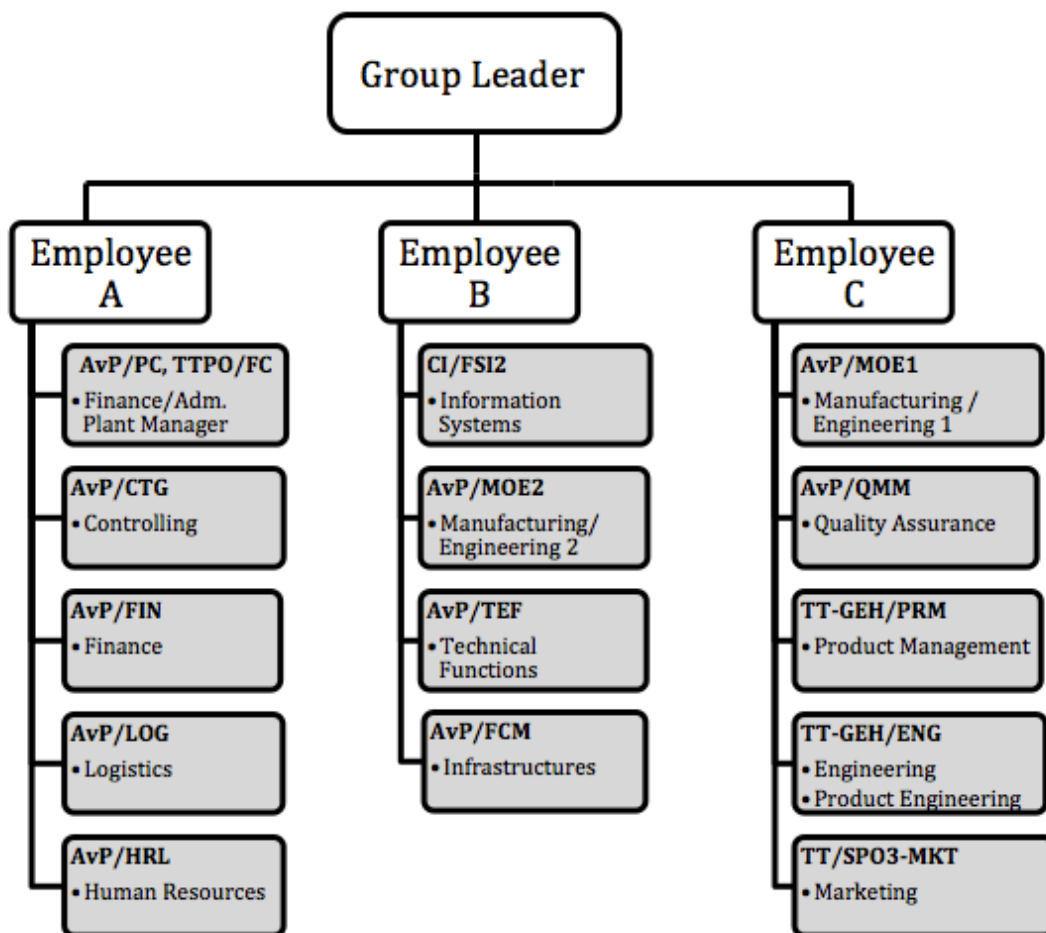


Figure 15 - Responsibilities at PUI

3.2.1. Purchasing Process

The purchasing process comprises six critical steps (Figure 16): Purchase Request, Request for Quotation, Negotiation, Strategy, Purchase Requisition and Purchase Order. In between these steps, there are others that are necessary in order to finalize the purchase process; without them the process will be incomplete and the purchase of the material or service does not occur. Each step is destined either to the

responsible buyer or to the internal customer. Every purchase for indirect materials or services is done following the process below; however, the process differs in the final strategy from PUI: contract, supplier decision, catalogue, or reference. All purchases are subjected to this process with exception of those of a total amount below a certain volume according to Bosch's Regulations. These are of the internal customer's entire responsibility, skipping the whole purchasing process: the internal customer is enabled to proceed with a request for quotation and skip directly to the purchase order, without PUI's involvement. However, this only happens for active suppliers in the system; for those who have never been used before, and therefore are not active, it is mandatory that PUI be involved. The whole Purchasing Process is accessed via internal and external network systems (SAP-ERP software; Workflow software; E-mail; Fax) that are identified in Figure 16.

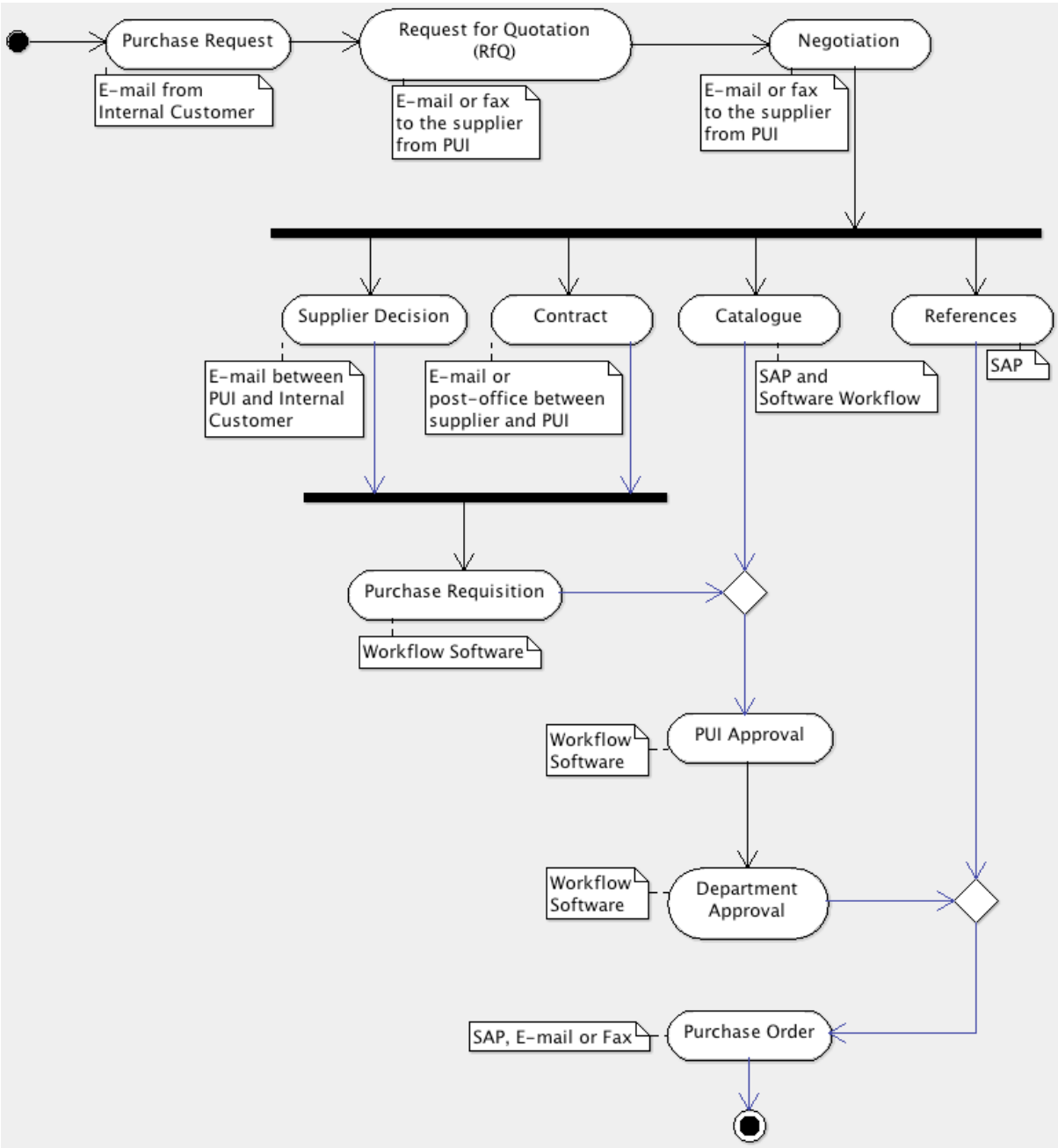


Figure 16 – Purchasing process at AvP/PUI

Step 1 – Purchase Request:

The whole purchase process starts out with a purchase request from the internal customer, which is forwarded to the responsible buyer (depending on the department of origin). This request contains the requirements for the product or service intended. Depending on the complexity of the request, the requirements may be presented with a simple description (reference, quantity, type of service, delivery date, etc.) or through a Specification List.

Step 2 – Request for Quotation:

This step requires a few actions from the responsible buyer; when all the information necessary regarding the specifications of the product or service is gathered, the responsible buyer:

- Sources for suppliers;
- Creates a supplier pool;
- Contacts the chosen suppliers requesting a quotation for the product or service intended by the internal customer. A date for the offer is defined and in case the supplier does not meet to this date, then normally it is ruled out from a possible purchase (depending on the precedents of the supplier).

Step 3 – Negotiation:

After analysing the price and delivery time of the various quotations of the tender, it is up to the buyer whether the negotiation should be taken in hand. However, before the negotiation occurs, all quotations are sent to the internal client for their technical report – to analyse whether the supplier responds to exactly all requirements requested and whether the price is within the department's budget. After having feedback from the internal customer, the negotiation process normally occurs depending on the delivery time and price, i.e., if for a certain service or product the price is above a certain limit (when the decision is about thousands of euros) the negotiation occurs, otherwise the tender is attributed to the supplier with best price or best delivery time, concerning the internal customer's requests.

Step 4 – Strategy:

Whatever the strategy, there are 2 steps that are mandatory before the purchase order is processed: Approval. The following strategies may occur independently or simultaneously, depending on PUI: Supplier Decisions are normally used for isolated purchases, whilst Contracts, Catalogues and References are applied for repeated purchases.

There may exist supplier decisions associated to contracts, catalogues and references (which is the ideal situation, except for references) however it is not mandatory and is in the responsible buyer's hand to decide whether to apply supplier decisions or not. The simultaneous scenario usually happens due to the delays of contracting (the contract requires signatures from both parties – AvP and supplier), cataloguing (creating and uploading to the system), and referencing (verifying existences, approvals, creation and uploading to the system) and is used as a substitute of the official strategy.

- **Supplier Decision**

This is the final step before the internal customer has the “OK” to proceed with the Purchase Requisition. The supplier decision comprises a series of documents, starting with the Purchase Decision and ending with the quotation from the supplier. The Purchase Decision (Appendix I) is a document that defines all the information necessary for the internal customer to apply the Purchase Requisition (this term will be defined in the next step): department, material group, name of responsible buyer, supplier, price, negotiated price, etc. After filled in, it is signed by the buyer and the group leader, and then sent to the internal client.

- **Contract**

Bosch’s legal department provides several types and templates of contracts depending on what type of contract is to be signed. These contracts are used as basis for PUI and can be altered according to what service is to be purchased. Usually, the contract is developed by AvP and after all clauses are discussed and defined between both parties, (AvP and supplier) signatures from the lead buyer, the head of department and the head of the administrative department are required, as well as the supplier’s signature. Upon completion of the whole contracting process, the responsible buyer sends a copy of the contract (in digital format) to the internal customer in order to proceed with the purchase requisition.

- **Catalogue**

Catalogues are not requested directly by the internal customer but are a result from repeated purchases of items and services. To avoid an infinite cycle of requests and supplier decisions for identical items, catalogues are created and uploaded to AvP’s internal system to enable the internal customer to autonomously order whatever is in the catalogue. This strategy does not require a supplier decision; therefore the internal customer applies an internal request of the items desired, subject to approval from its head of department (Figure 16). After the head of department approves the request, it is followed to PUI for approval and only then the Purchase Order (last step of the whole process) can be sent to the supplier.

- **References**

Referencing a certain item consists of creating an internal reference in the system to enable internal customers of sending Purchase Orders without having to follow the process as the other strategies do (avoiding supplier decisions, purchase requests and approvals, going straight to the Purchase Order step). In this particular case, the process has a nuance when concerning the initial phase. Instead of the internal customer simply sending a Purchase Request to PUI, there has to be a previous internal approval from its department, of whether the material to be referenced is of concern. If the approval is accepted, only then PUI proceeds with a tender and therefore the process follows as shown in Figure 16.

Step 5 – Purchase Requisition:

The purchase requisition is applied through a “workflow software” that is implemented at AvP. In this step, the internal customer defines what is to be

purchased, at what price (negotiated by PUI) and to what supplier, as well as attach all documents necessary (Supplier Decision) to backup the purchase requisition.

- **Approvals**

The requisition is subjected to a series of approvals, starting with PUI's approval, passing by the group leader and head of department of the applicant's department and ending with the administrative or financial department of the whole division (depending on the value of the purchase; the greater the value, the higher in the hierarchy).

Step 6 – Purchase Order

This is the last step of the purchase process, without considering the payment, which is done by the financial department under agreed conditions between supplier and AvP. The purchase order is a document created via SAP, which is sent to the supplier by the internal customer, after receiving the last approval in the workflow. This document contains all information necessary regarding what is to be ordered, the quantity, price, payment conditions and the supplier's as well as AvP's information (address, phone number, etc.). Once the Purchase Order is sent, the purchasing process is finalized.

There are several procedures at PUI concerning different types of purchases. The process described above is the most common procedure; however there are a few procedures that bend the normal purchase process, when concerning purchases of: certifications, customs duties, costs to be charged, insurances, and urgent purchases (the internal client has a justification letter signed by its head of department, justifying why PUI wasn't involved). These procedures do not have any involvement of PUI except an approval.

This purchase process has been AvP's process for years, only suffering minimum alterations in the procedures. In the mean while, the division had been planning a new strategy for indirect purchasing at Bosch, which resulted in a global project involving all plants and divisions, worldwide.

a) Bosch's new Global Project

The project stood for a cross divisional reorganization of Indirect Purchasing in order to steer Indirect Purchasing globally via the material groups, to increase the bundling of purchasing activities and to develop a powerful organization in terms of market approach and internal customer proximity. Thus, the main objectives of this project were standardizing processes and specializing buyers (creation of experts).

The project implied organizational changes in Bosch's indirect purchasing: implementation of a global organization; merging of existing Indirect Purchasing offices into 10 new regions worldwide with same target responsibilities; material group strategy with decentralized purchasing offices with presences in regions and locations; and bundling team leader with global responsibilities for assigned material groups. Due to the organizational changes, the previous hierarchy of AvP/PUI has been changed, as expected, resulting in Figure 17 where not only does each buyer have to respond to a Regional Leader, but to the Bundling Team Lead Buyer

(according to which material group the buyer is responsible for, there is a Bundling Team Leader corresponding) as well.

Starting at the highest point of the hierarchy, 2 separate identities are found that are responsible for either the regional spread or directly to Bosch Worldwide. The commodity buyers now have a Regional Leader as well as a Bundling Team Lead Buyer having to respond to both of them. The supervisor on site has the same responsibility as the Team Leader had in the previous organization at AvP/PUI. The supervisor reports directly to the Regional Leader whilst the Bundling Team Lead Buyer reports to both Regional Leader and Bundling Team Leader. At the bottom of the hierarchy there is the procurement function that ensure correct approval workflow of all IT systems and also guarantee that the purchase orders are being sent (this is a major difference from AvP/PUI's process which will be explained later on).

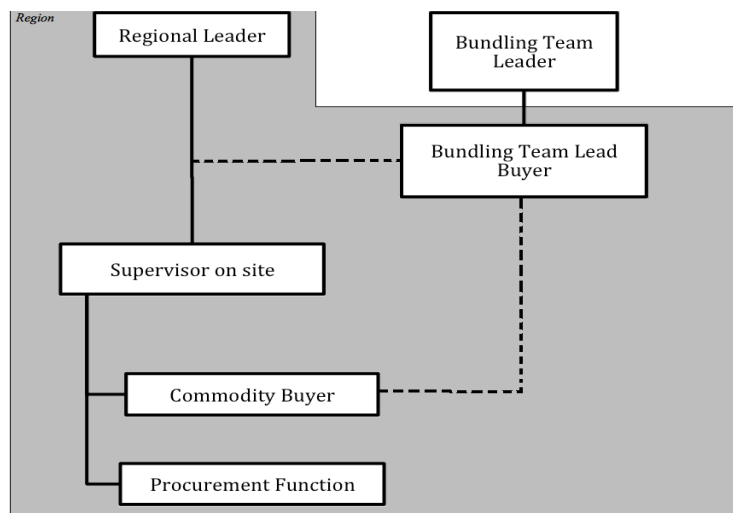


Figure 17 - New organization of PUI after implementing the new Division Project (adapted from Bosch's Intranet)

This project is based on 10 essential principals that enlighten in what exactly consists the whole project and what are the outcomes:

1. Challenge Demand - specification requirements with internal customer: contact with internal customer in order to secure neutral and complete information to guarantee precise fulfillment of demand and avoid change of specification during the RfQ process. A discussion and agreement on suppliers for the RfQ ensures saving potentials and also enables efficient RfQ processes.
2. Close cooperation with internal customers and early involvement in sourcing process - profound knowledge on whom the internal customers are as well as their demands in order to recognize bundling potentials early in the process strengthening the negotiation position of the buyer. The encouragement of internal customers to involve purchasing early enables purchasing planning and action plans. This last action is one of the biggest differences in AvP/PUI's process: the total volume which wasn't subjected to PUI's Purchasing Process

increased significantly resulting in less involvement of PUI in certain purchases. Hence the encouragement made to involve PUI as early as possible to guarantee that the process doesn't come to an end and is disapproved by PUI (Table 8).

3. Bundling demand as much as possible on regional or global levels - by involving the purchaser as early as possible enables a better knowledge of the demands within the purchasing area of its responsibility. Thus, the buyer can communicate those demands to the responsible bundling team lead buyer (to whom the buyer reports to, higher in the hierarchy – Figure 17) so that he/she can bundle on a higher level and agree on negotiation mandates. This way, a better negotiation position is achieved and the number of suppliers used reduced, enabling saving potentials for Bosch.
4. Use released suppliers according to global supplier pyramid - always use preferred suppliers that are part of the supplier pyramid (which contain all suppliers within a material field). A supplier pyramid ensures common basis for supplier management as well as enables the supplier to have recognition of Bosch's requirements regarding quality and delivery. Furthermore, frame agreements with preferred suppliers ensure legal certainty. This point is a completely new concept for AvP/PUI, before there was no control whatsoever on supplier organization.
5. Select sufficient number of potential suppliers for systematic competition via structured RfQ process - for different value limits, which differ per region, there are different numbers of quotations needed. This ensures competition and compliant RfQ processes and also contributes to ratio targets.
6. Ensure a transparent sourcing decision - using a worldwide method for sourcing decision which documents the reasons for decision, the procedure and the negotiation result, ensures that the decision is understandable, transparent and traceable, as well as documents ratio and ensures compliance.
7. Applying professional price negotiation methods - in order to achieve the best possible result for Bosch, the project suggests a definition of a negotiation design and excellent negotiation preparation before the RfQ as well as comparisons of quotations.
8. Use of standard Contract and Purchase Order documents - worldwide standards ensure legal certainty and transparency for the new global organization and are prerequisite for global cooperation in Indirect Purchasing at Bosch.
9. Signature guidelines - a worldwide standard process of electronic purchasing approvals and external signatures within Indirect Purchasing ensures that purchasing decisions are approved by defined roles within the organization, worldwide steering of purchasing areas, and compliance.

10. Standard indirect purchasing process landscape - electronic database within Bosch's intranet that contains all standardized processes of the regions and people responsible and also links all necessary documents for daily work of all associates. Having all information available saves time for the purchaser and ensures worldwide standardization of processes.

Table 8 - Differences in PUI's process with the new project engaged

<i>Old Organization</i>	<i>New Organization</i>
Responsibilities:	
Each buyer at PUI had departments without regard on material groups bought and therefore no specialization.	Specialized buyers. Each buyer is assigned several material groups and only buy items that are categorized as their material group.
The buyers at AvP/PUI were responsible for Aveiro's Plant solely.	With the definition of international regions and material group specialization, buyers are responsible for their material group disregarding which plant the purchase request is for (as long as the plant is from the respective region).
Process:	
PUI was the first to approve the purchase requisition.	PUI is the last approver in the workflow of the purchase request.
The value limit that did not require PUI involvement was set; above this limit it was a must the involvement of PUI.	The value limit that does not require PUI's involvement rose up to 42 times the initial value.
Each department was responsible of sending the purchase order to the selected supplier.	A Procurement function was introduced in the process. Now, the purchase orders are sent from PUI – Procurement – to the suppliers.
All buyers were authorized to approve any purchase request in the workflow.	Signatures are required from responsible buyers and therefore each buyer is responsible for approving Purchase requests of material groups of corresponding responsibilities.
The buyers did the approvals without regard on the value.	To a certain value, procurement is responsible of approving; above the set amount, the corresponding buyer is required to apply a signature and approve.

This project was engaged at Aveiro in March 2012 and implied some changes in the purchasing process as well as the responsibilities of the buyers. Fortunately, AvP/PUI already had its purchase process very similar to the requirements of the project resulting in a quicker adaptation. The main differences from one process to the other are explained in more detail in Table 8.

3.2.2. PUI's Purchasing Strategies

After presenting AvP/PUI's process and the new global project, the necessity in thoroughly depicting and enlightening the applied strategies is of interest for the theme of this thesis. Strategies from both organizations (old and new) will be discussed, however, the following sector will be solely regarding the old organization due to the majority of the internship being held before the implementation of the new project. Nevertheless, the study can and should be applied in parallel with the new organization, with the possibility of becoming a helpful asset.

In AvP/PUI's old organization, the four main strategies in approaching a purchase are defined in Figure 16. Starting out with the purchase decision, this is the most common approach. "In theory and best case scenario, the ideal approach would be having contracts or catalogues for every purchase", mentioned PUI's buyers. However, the other strategies are only applied when the annual volume of purchase reaches an "acceptable" amount. Therefore, non-frequent purchases require a purchase decision where the whole process is documented. Catalogues and references are created when repeated and highly frequent purchases occur; otherwise there is no previous analysis to decide which strategy should be considered.

With the new project employed, there weren't many differences in the strategies, except for the bundling goals and the supplier pyramid. Each of them has implications in the final result of the purchasing process with the main goal of guaranteeing a better negotiation position, enabling a contract or catalogue as a result.

In conclusion, there is no decision making on what strategy to apply, being left to each responsible buyer the decision of whether a purchase decision, contract, catalogue or reference should be used. In order to fill this gap, the categorization of AvP/PUI's purchased services will be engaged and Kraljic's matrix applied.

4. Case Study

This chapter starts out by presenting the research type, strategy and approach of the study. Later on, the process of data collection and analysis is described as well as the conclusions and all the limitations of the case study.

4.1. Methodology

In parallel with the theoretical review presented in the first chapter of the thesis, the definition of a strategy on what portfolio approach to use and how to adapt it to the company's reality was the main decision. To do so, an observational approach on how indirect services are purchased, during an internship, and the analysis and comparison of various portfolio approaches in detail led to the decision of using Kraljic's approach in order to achieve the categorization of the purchased services.

Kraljic's portfolio approach was not followed entirely; instead, an adaptation of the model was engaged. The study started out with a questionnaire to all the buyers at Bosch, regarding the two essential variables of Kraljic: Importance of Purchase and Complexity of Supply Market. Instead of categorizing the purchased services according to the profit impact and supply risk alone, as suggested, this thesis combined both Kraljic's and Padhi's models to achieve a more complete analysis of the two variables.

After collecting the data from the questionnaire, the purchased services were categorized into Kraljic's 4 categories: Non-critical, Leverage, Strategic and Bottleneck. Depending on what category the purchased item was set to an action plan is advised.

4.2. Data collection

In a first stage, all material groups were gathered and analysed in order to understand which were regarding to services and which were concerning indirect materials. Secondly, two essential variables considered to proceed with the study were Annual Volume and Number of Suppliers, of each material group of each type of service.

Finally, in order to develop Kraljic's portfolio approach to Bosch's reality, a questionnaire (Appendix II) was created with the main goal of assessing the degree of importance given to various factors regarding the services purchased (organized by material groups) by each buyer (Table 9). The questionnaire was handled out to the three essential buyers at AvP/PUI for their assessment. Despite being a very small population, the reality is that there are only these 3 active buyers justifying the reduced number of inquiries.

Instead of assessing the common variables for the portfolio approach (profit impact and supply risk) the main variables that Kraljic suggests are used and for each of them, several factors combined:

1. Importance of purchase – achieved by combining two essential factors:
 - a. Relevance of the material group for the company;
 - b. On time supply.
2. Complexity of supply market – this variable has four factors associated:

- a. Importance of having a reputed supplier – assessment of the importance of the reputation of a certain supplier which could lead the buyer to purchase from that same supplier instead of another;
- b. The dimension of the supplier in the market;
- c. Mutual dependence - the Material Groups that have a small amount of suppliers may create certain dependence, whereas those with a larger range of suppliers do not have that risk. To what degree is considered important a certain dependence, due to quality, price and delivery-time issues;
- d. Existence of alternative suppliers in the market.

The evaluation of the profit impact of each material group is not possible and does not make sense because the data assessed is concerning indirect services. Therefore, the association of two factors which combined define the Importance of Purchase was more accurate for indirect spend. One of the factors - relevance of the material group – was assessed in order to understand which material groups had more impact on the overall outcome of the company and thus required more attention from the buyers. The second factor chosen was to understand to what extent the on-time supply of certain services would overcome every other aspect in the decision making of a purchase.

For the second variable – Complexity of supply market – suppliers and market were assessed. To better understand how the suppliers influence a purchase choice their reputation and dimension were evaluated. On the other hand, dependences and alternatives were the factors oriented to market issues, and therefore, combined with the supplier factor defined the Complexity of Supply Market.

With both variables composed, the buyers were given a scale of importance from 1 to 10 (as Padhi *et al* suggested) to evaluate each material group according to several factors of each variable as seen in Table 10.

At the same time, the annual volume and total number of suppliers of each material group associated to the services were collected as one more factor to be analysed. This data will not be presented in detail due to confidential agreements between the company and the interns.

Table 9 - Material groups of all services purchased at AvP/PUI - Bosch Termotecnologia

<i>Material Groups of Indirect Services</i>
Services for tools and machines
MIE-repairs, -maintenance, and -cleaning
Repairs of MIE and devices
MIE-Rebuilding
Electrical workings, control engineering
Calibration
Car maintenance
Job-shop / commercial services
Temporary-employment agency work
Software development, IT-Support
Development of own products, SW- and system tests
Construction / Processing / Analysis
Consulting, coaching, process analyses
Seminars / Training courses
Disposal and recycling
Consulting, creation, campaign mounting
Media / advertising, sponsoring
Market research and analysis, surveys
Graphics, photo, film (design, realization)
Advertising materials, advertising gifts
Print-outs, print products
Trade fairs, events, activities
Presentations, sales training, merchandising
Other (Public relations, ...)
Train
Flight/air trips
Car rental
Hotel
Warehouse
Transport: Land Freight
Transport: Air Freight
Transport: Sea Freight
Transport: Express/Parcel
Other services
Catering, restauration service
Translation / documentation
Call-Center
Facility Mgmt Services

Table 10 - Scale of importance

<i>Scale</i>	<i>Rating</i>
1	None
2	Extremely low
3	Very low
4	Low
5	Medium low
6	Medium
7	Medium High
8	High
9	Very High
10	Extremely High

4.3. Data Analysis

Before building Kraljic's matrix, a brief analysis of the evolution of the annual volumes and number of suppliers was attended. This analysis would become of importance to understand some further results obtained by the categorization. The years of analysis would be of 2010 and 2011, being these the chosen years due to the internship being held mostly during 2011 and due to complete annual information. During both these years, the material groups maintained the same; there were no alterations in the classifications of the services. However, from one year to the other, volumes and number of suppliers changed as seen in Table 11 and Table 12, respectively.

It is interesting to notice that from one year to the other, there were some significant changes when analysing the annual volumes (Table 11). These are regarding the following services: "Other services"; "Job-Shop/Commercial Services"; "Construction/Processing/Analysis"; "Catering/Restoration services"; "Transport: Land Freight"; "Services for tools and machines"; Flight/air trips"; "Transport: Sea Freight"; "Seminars/Training Courses"; and other services related to marketing.

The first four services had a dramatic decrease volume-wise that can be associated to the economical state of the country, that implicated an awareness of the buyers among the spend on not so important services. On the contrary, the rest of the services mentioned above suffered a significant increase of the annual volume. The unstable fuel market could justify the behaviour regarding the transports; and the services related to marketing had an increase due to the low volumes that Bosch has been experiencing from 2010 to date.

Analysing the number of suppliers of each material group of indirect services between 2010 and 2011 (Table 12), there weren't any major reductions or increases, except for two material groups: "Services for tools and machines"; and "Other services"; where the first material group suffered an increase in the number of suppliers available and the second had a significant reduction.

With the data concerning annual volume spend and number of suppliers active for each indirect service at Bosch Termotecnologia, a pre-knowledge and finding on which could be the most important services that require a more thorough attention is achieved. Thus, a certain expectation of to how the categorization of the services would occur was created.

Despite assigning a scale from 1 to 10 for each buyer to evaluate the importance of a purchased service, an adaptation to the five-point scale of the AHP (Analytic Hierarchy Process) procedure of Drake and Lee (2008) was made (Table 13). This adaptation was made due to the understanding of the difference between attributing a low value in detriment of a high value, and vice versa. The adaptation was done by assuming that every 2 scores in the scale would be equivalent to the respective scale of Drake and Lee (2008) as seen in Table 14.

Table 11 – Comparison of 2010 and 2011 Indirect Services' Volumes

Material Group	% Volume 2010	% Volume 2011	Evolution from 2010 to 2011
Transport: Land Freight	10,75%	23,95%	-13,20%
Services for tools and machines	5,14%	17,01%	-11,87%
Other services	42,41%	9,23%	33,18%
Flight/air trips	1,17%	8,34%	-7,17%
Transport: Sea Freight	4,13%	7,51%	-3,38%
Seminars / Training courses	1,91%	5,54%	-3,62%
Media / advertising, sponsoring	3,20%	4,00%	-0,80%
Job-shop / commercial services	10,57%	3,84%	6,72%
Facility Mgmt Services	5,98%	3,62%	2,36%
Other (Public relations, ...)	0,73%	2,74%	-2,01%
Print-outs, print products	0,59%	2,47%	-1,88%
Advertising materials, advertising gifts	0,55%	2,13%	-1,59%
Transport: Express/Parcel	0,66%	1,79%	-1,13%
Trade fairs, events, activities	1,24%	1,36%	-0,13%
Presentations, sales training, merchandising	0,31%	1,22%	-0,91%
Calibration	0,15%	0,93%	-0,78%
Graphics, photo, film (design, realization)	0,14%	0,80%	-0,65%
Translation / documentation	0,21%	0,78%	-0,57%
Construction / Processing / Analysis	3,36%	0,61%	2,75%
Disposal and recycling	0,06%	0,38%	-0,32%
MIE-repairs, -maintenance, and -cleaning	0,11%	0,31%	-0,20%
Consulting, coaching, process analyses	0,41%	0,26%	0,15%
Catering, restauration service	3,59%	0,24%	3,35%
Electrical workings, control engineering	0,07%	0,18%	-0,11%
Transport: Air Freight	0,12%	0,17%	-0,05%
Consulting, creation, campaign mounting	0,09%	0,16%	-0,06%
Car rental	0,03%	0,12%	-0,10%
Call-Center	1,33%	0,08%	1,24%
Software developm., IT-Support	0,79%	0,06%	0,74%
Market research and analysis, surveys	0,17%	0,05%	0,13%
MIE-Rebuilding	0,01%	0,03%	-0,02%
Hotel	0,00%	0,03%	-0,02%
Temporary-employment agency work	0,00%	0,02%	-0,02%
Warehouse	0,00%	0,01%	-0,01%
Train	0,00%	0,01%	-0,01%
Repairs of MIE and devices	0,01%	0,01%	-0,01%
Car maintenance	0,00%	0,00%	0,00%
Software maintenance (standard software)	0,00%	0,00%	0,00%
Other travel management	0,00%	0,00%	0,00%
Moving, Relocation	0,00%	0,00%	0,00%
Development of own products, SW- and system tests	0,00%	0,00%	0,00%

Table 12 - Comparison of number of suppliers for each Indirect Service between 2010 and 2011











Material Group	N° Suppliers in 2010	N° Suppliers in 2011
Transport: Land Freight	23	26
Services for tools and machines	163	212
Other services	258	93
Flight/air trips	5	7
Transport: Sea Freight	13	18
Seminars / Training courses	88	69
Media / advertising, sponsoring	35	54
Job-shop / commercial services	87	109
Facility Mgmt Services	131	167
Other (Public relations, ...)	30	46
Print-outs, print products	16	17
Advertising materials, advertising gifts	16	18
Transport: Express/Parcel	13	21
Trade fairs, events, activities	29	16
Presentations, sales training, merchandising	6	4
Calibration	17	23
Graphics, photo, film (design, realization)	10	8
Translation / documentation	16	22
Construction / Processing / Analysis	22	34
Disposal and recycling	1	6
MIE-repairs, -maintenance, and -cleaning	9	7
Consulting, coaching, process analyses	20	12
Catering, restauration service	19	22
Electrical workings, control engineering	1	3
Transport: Air Freight	5	5
Consulting, creation, campaign mounting	2	2
Car rental	2	3
Call-Center	5	3
Software developm., IT-Support	8	10
Market research and analysis, surveys	3	4
MIE-Rebuilding	3	2
Hotel	4	3
Temporary-employment agency work	0	2
Warehouse	0	4
Train	1	2
Repairs of MIE and devices	2	3
Car maintenance	1	1
Software maintenance (standard software)	2	0
Other travel management	0	0
Moving, Relocation	1	0
Development of own products, SW- and system tests	0	1

Table 13 - Drake and Lee's five-point scale (Adapted from Drake and Lee, 2008)

Rating scale	Rating weight
Very High	0.51
High	0.26
Moderate	0.13
Low	0.06
Very low	0.04

In a first stage, the data gathered from the questionnaire was treated as equal, *i.e.*, all factors were considered as being equally important and therefore the scores were summed up (adding the respective score: 0,5 for each of the Importance of Purchase's factors; and 0,25 for each factor of the second variable – Complexity of market) and the average was used to position each material group in Kraljic's Matrix as seen in Figure 20. Considering the initial scale of importance (Table 10) from 1 to 10, the middle points (5,5) represent the boundary of Kraljic's 4 categories: non-critical; leverage; strategic; and bottleneck.

Table 14 - Adaptation of initial scores to Drake and Lee's Five-point scale

Score	Rating scale		Rating scale	Rating weight
1	None		Very Low	0.04
2	Extremely low		Low	0.06
3	Very low		Moderate	0.13
4	Low		High	0.26
5	Medium low		Very High	0.51
6	Medium			
7	Medium High			
8	High			
9	Very High			
10	Extremely High			

All purchased services were categorized as being non-critical (Figure 18). Nothing that wasn't to be expected, because all indirect spend is to be diminished. So, a low importance of purchase and a low complexity of supply market is the result for indirect services. This categorization confirms and explains why there isn't any previous strategy on how to handle indirect services at Bosch Termotecnologia.

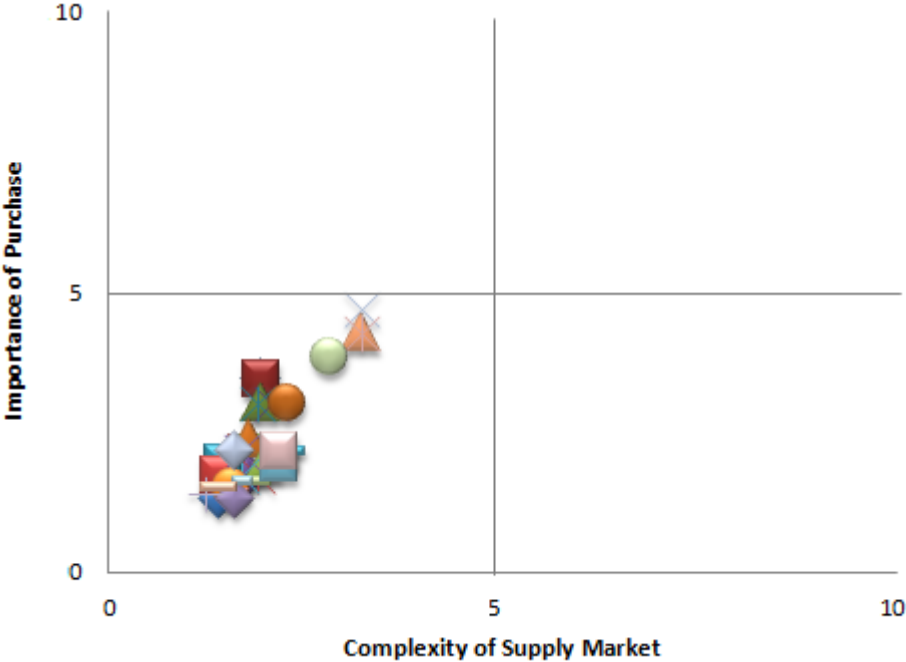


Figure 18 - Categorization of purchased services of Bosch Termotecnologia with equal weights

In a second phase the buyers were inquired on the degree of each factor, *i.e.*, for all factors represented in the questionnaire, they were asked to rate them in a scale from 0 to 100 and then the results were normalized, as seen in Table 15.

Table 15 - Relative weights of all factors

<i>Variables</i>	<i>Factors</i>	<i>Relative Weights</i>
Importance of Purchase	Relevance of the service	0.77
	On-time supply	0.23
Complexity of Supply Market	Reputation of supplier	0.23
	Dimension of supplier in the market	0.27
	Mutual dependence	0.18
	Existence of alternative suppliers	0.32

For the first variable, all buyers considered the relevance of the service as the most important factor, justifying this decision by stating that on-time supply was consequence of the relevance. For the second variable, the most important factor with the highest weight assigned was the existence of alternative suppliers. The next highest weight assigned was for supplier dimension. Buyers stated that a supplier with a significant dimension guarantees a certain level of trust and therefore becoming a preferred choice. Thus, the reputation of the supplier is scored in next

because one is consequence of the other. Finally, the least important factor was mutual dependence. One buyer stated that this factor was the least important due to the previous choice of a supplier with a big dimension in the market; one with a significant dimension would avoid dependence.

When considering the relative weights in the gathered data, surprisingly, the result maintained the same, with a slight difference in the positioning of each service (Figure 19). The services regarding transports are the ones that find themselves categorized very closely to the leverage boundary. But Transport - Air Freight is the only one which provokes the boundary between non-critical and leverage categories.

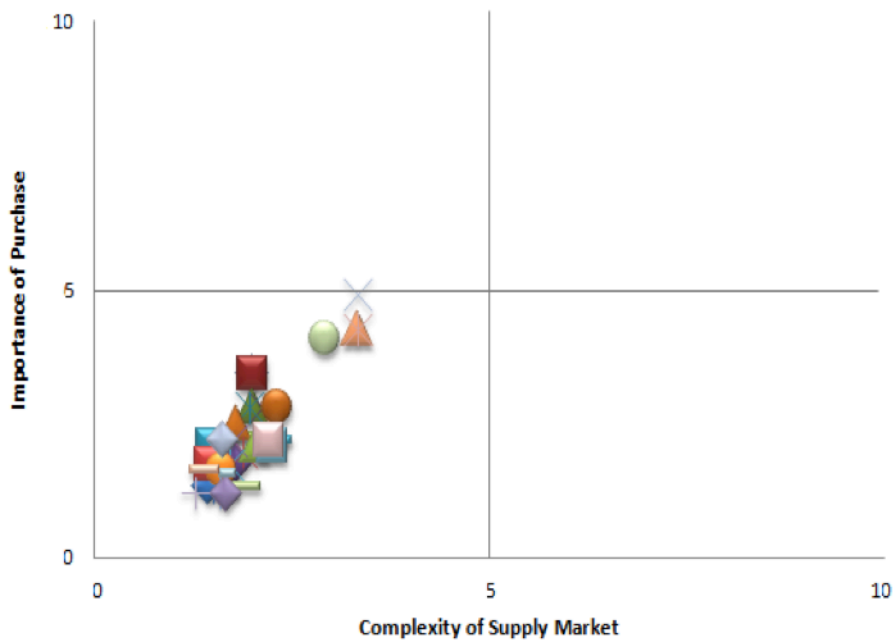


Figure 19 – Categorization of purchased services of Bosch Termotecnologia with relative weights

However, not great attention is paid to this service due to its very low volume (the bubble in Figure 20. is so little that cannot be seen, however its representation can be found in Figure 19 as the grey cross) and therefore it tends to be negligible. On the other hand, the other transport services are of relevant volume and require some finer attention.

The other purchased indirect service with some degree of relevance is regarding services for tools and machines (dark blue bubble in Figure 20). This material group of services carries a high annual volume and is positioned higher in the importance of purchase relatively to the other material groups.

It seems that this study has been already assessed in somehow, due to its results and nothing that wouldn't be of a surprise, given the dimension of Bosch. The most reasonable question to justify the results can be raised: was the sample too low? Well the answer is that there were no other buyers to inquire. The reality is that Bosch Termotecnologia only had 3 active indirect material and services buyers at its service and therefore the results can be assumed as fairly correct.

Of all services there wasn't any material group that needed more attention due to the number of suppliers, *i.e.*, having it classified as non-critical, the number of suppliers associated doesn't have much of relevance, unless when regarding one or only two suppliers for an entire material group of services, which does not occur. In the most critical case – transport: airfreight – this material group has 5 alternative suppliers. In the Portuguese market there aren't many companies that supply this type of service and therefore the rather reduced number of suppliers available. This can have a rather large influence on the positioning of the material group itself: due to the low amount of suppliers available, AvP/PUI may be subjected to all the conditions of the suppliers thanks to lack of alternative and therefore being categorized very closely to the leverage quadrant, where the importance of purchase is very high (4,9) and the complexity of supply market sharing its part as well (3,3).

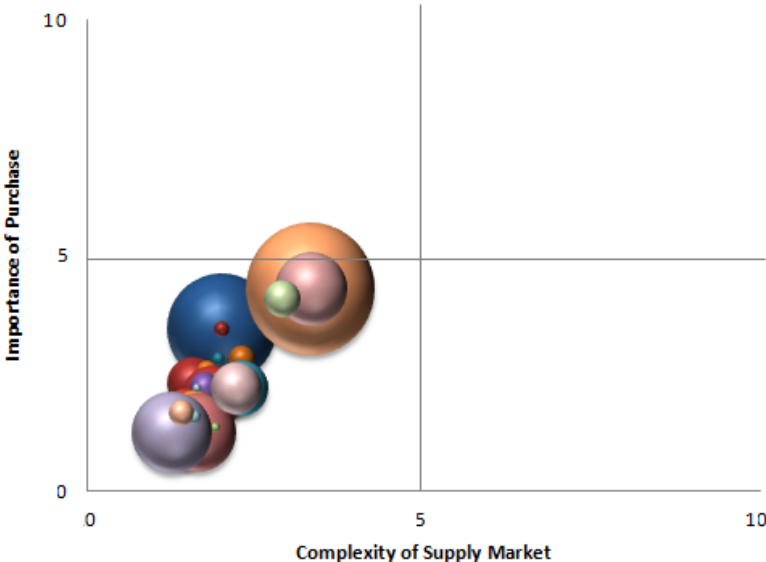


Figure 20 – Categorization of purchased services with the volume as a third variable represented by the bubbles

4.4. Conclusions and limitations of the case-study

After categorizing all the material groups of all indirect services purchased at Bosch Termotecnologia and given the results, despite the fact that the study is regarding indirect services, the categorization being all the same raises a few questions:

1. Did the sample of buyers influence the results?
2. Had someone, higher in the hierarchy of the company, already assess the categorization of indirect services?
3. Is Kraljic's portfolio matrix a viable approach for services and indirect services?

It is sane to say that all these questions have a certain degree of influence on the results. Bosch Termotecnologia only had at its service 3 active buyers at the indirect purchasing department, and therefore the results could be tampered due to the buyers loyalty to the firm and the excessive positive and therefore unrealistic attitude towards the importance inquired. However, it would be interesting to see this result for the new organization with the new project implemented. Now that Bosch has several buyers, from several plants, with a much higher level of expertise and responsibility for each material group, the sample is much larger and diverse, which could result in a different matrix.

On the other hand, as the company is a division, the strategies applied maybe such that teams in the mother company had already defined them to be so. Therefore always being categorized as non-critical, with the main objective of reducing indirect spend.

Finally, Kraljic suggests an analysis regarding profit impact, which is never assessed when talking about indirect materials and indirect services. Thus the question of whether it is or not the best approach. Besides, the approach used does not assess the impact on internal and final customers to understand to what extent the several material groups of services indeed need attention. To do so, the best approach would be of Wynstra and van der Walk (2005) that assess precisely these referred impacts. However, due to lack of information regarding internal and final customers, it was not possible to categorize the services as Wynstra and van der Walk (2005) suggested.

5. Conclusions

This chapter will be devoted to all conclusions of this thesis, beginning with the compliance of the proposed study, going on with the conclusions of the study and suggestions for future works and research.

5.1. Fulfilment of proposed study

This whole thesis is oriented towards categorization of purchased items. Starting with the research on several methods and ending with the decision of adopting the method that was pioneer in the area, a portfolio matrix was developed for Bosch Termotecnologia's Indirect Purchasing department.

Due to an internship at the Indirect Purchasing Department at Bosch's plant in Aveiro, with time the understanding that there was no exact strategy applied to the purchasing process led to the purpose of the thesis: to organize and categorize all indirect services bought at Bosch Termotecnologia. To do so, the importance of understanding at much detail the purchasing definitions and portfolio approaches was inevitable and therefore discussed in the review in Chapter 2. After gathering all theoretical information the need for knowledge on the purchasing process of the Indirect Purchasing department in the company target of the case study, was essential and defined in Chapter 3. Only then, all information was gathered in order to fulfil the proposed categorization of purchased indirect services (Chapter 4).

5.2. Reflections on the results

The fulfilment of categorizing all indirect services purchased was achieved by following 3 essential steps. Firstly by inquiring the buyers on the importance of several factors that then define the variables of the matrix, secondly scoring the factors and finally, positioning the indirect services purchased in the matrix.

The questionnaire assessed the importance that each buyer assigned to each factor to each respective material group of services. The factors of each variable were defined using both reviewed bibliography as well as the buyers experience in the purchasing area. After gathering the data, in order to be able to position each material group in the matrix, it was important that the buyers scored each factor.

After analysing the data the positioning of the matrix was achieved and the results weren't that much of a surprise because all material groups and thus, all indirect services, were categorized as being non-critical. Indeed indirect spend is to be diminished, however, the expectations for some material groups were rather different. There were only a few material groups, essentially regarding transports that defied the average getting very close to a different category.

With the categorization of the services the understanding of why Bosch Termotecnologia does not have defined strategies for each material group is enabled. And the free choice of whether to maintain, change, contract or simply spot buy is fairly accepted.

5.3. Future research

With the new project fully implemented for the Indirect Purchasing departments at Bosch, it would be interesting to thoroughly study each material group of all indirect purchases with the income of the specialized buyers. However, the best approach would be of Wynstra and van der Valk (2005) that have as variables the impact on both internal clients and final clients. Assessing these two clients is the best way to evaluate of the services purchased are satisfying and fulfilling.

This model was not chosen due to the lack of information on the two variables regarding the internal and final customers. Bosch has no way to evaluate the level of satisfaction on its internal customers and even less what impacts have indirect purchases on the final customer. As described in chapter 3, the indirect buyers only assess the strategic facet of the purchasing process and many times the internal customer does not go forward with the purchase and therefore the indirect purchasing department has no way to measure the internal customer's satisfaction.

In order to better manage the indirect purchases it would be ideal to implement a type of framework or tool that would assess the variables suggested by Wynstra and van der Valk (2005) and then categorize all services accordingly. Besides the services, the study on the indirect materials, applying another approach is important.

Certainly Bosch, like all companies, follow the tenet that indirect spend is to be diminished. However, there is no strategy applied in order to guarantee so (except the "better price wins" approach), nor there are tools for the assessment. The creation of tools to evaluate the spend and guarantee an on going compliance of a strategy is essential. This thesis was developed to understand to what extent indirect services, in particular, were being handled and due to the results, the urge for a better and more profound appraisal is suggested.

Bibliography

Andersson, D. and A. Norrman (2002). "Procurement of logistics services, A minutes work or a multi-year project?" *European Journal of Purchasing & Supply Management* 8(1): 3-14.

Bakker, E. F. and D.-J. F. Kamann (2007). "Perception and social factors as influencing supply management: A research agenda." *Journal of Purchasing and Supply Management* 13(4): 304-316.

Bensaou, M. (1999). "Portfolio of buyer-supplier relationships." *Sloan Management Review* 40(4): 35-44.

Burt, D. N., Pinkerton, R.L. (1996). *A Purchasing Manager's Guide to Strategic Proactive Procurement*.

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

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

Carter, P., Stewart Beall, Christian Rossetti, Eric Leduc (2003). *Critical Issues Report - Indirect Spend*, CAPS Research.

Doty, D. H., Glick, W.H. (1994). "Typologies as a unique form of theory building: toward improved understanding and modeling." *Academy of Management Review* 19(2): 230.

Drake, P. R. and D. M. Lee (2008). "Component prioritisation for strategic purchasing and the case study of a South Korean elevator manufacturer." *The International Journal of Advanced Manufacturing Technology* 43(9-10): 883-895.

Dubois, A. and A.-C. Pedersen (2002). "Why relationships do not fit into purchasing portfolio models, A comparison between the portfolio and industrial network approaches." *European Journal of Purchasing & Supply Management* 8(1): 35-42.

Ellram, L. M., Tate, W. L., Billington, C. (2004). "Understanding and managing the services supply chain." *Journal of Supply Chain Management* 40(4): 17-32.

Eriksson, A. (2006). Co-operation between different units to make the purchasing process of indirect material more effective. M. Nilsson. Växjö University, School of Mathematics and Systems Engineering: 66.

Fiocca, R. (1982). "Account portfolio analysis for strategy development." *Industrial marketing management: an international journal of industrial marketing and marketing research* 11(1): 53-62.

Fitzsimmons, J. A., J. N., Emil Thies (1998). "Purchasing Business services." *Journal of Business & Industrial Marketing* 13(4/5): 370-380.

Gadde, L. E., Håkansson, H. (1993). "Professional Purchasing." London: Routledge.

Gelderman, C. J. (2003). "A portfolio approach to the development of differentiated purchasing strategies." Retrieved 19-12-2011, 2011, from <http://alexandria.tue.nl/extra2/200312759.pdf>

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

Jackson, R. W., Cooper, P.D. (1988). "Unique aspects of marketing industrial services." *Industrial Marketing Management* 17: 111-118.

Kraljic, P. (1983). Purchasing must become Supply Management. *Harvard Business Review*: 107-118.

Luo, X., C. Wu, et al. (2009). "Supplier selection in agile supply chains: An information-processing model and an illustration." *Journal of Purchasing and Supply Management* 15(4): 249-262.

Markowitz, H. (1952). "Portfolio Selection." *The Journal of Finance* 7(1): 77-91.

Michael J, M. (2003). "Purchasing's strategic relevance." *Journal of Purchasing and Supply Management* 9(1): 43-50.

Monczka, R., Robert Trent, Robert Handfield (2005). *Purchasing and Supply Chain Management*, Thomson South-Western.

Nellore, R. and K. Soderquist (2000). "Portfolio approaches to procurement: Analysing the missing link to specifications." *Long Range Planning* 33(2): 245-267.

Olsen, R. F. and L. M. Ellram (1997). "A portfolio approach to supplier relationships." *Industrial Marketing Management* 26(2): 101-113.

Padhi, S. S., S. M. Wagner, et al. (2011) "Positioning of commodities using the Kraljic Portfolio Matrix." *Journal of Purchasing and Supply Management*.

Paulraj, A., I. J. Chen, et al. (2006). "Levels of strategic purchasing: Impact on supply integration and performance." *Journal of Purchasing and Supply Management* 12(3): 107-122.

Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*.

Roos, M., Rydman, L. (2005). *Portfolio Model Supporting Development of Purchasing Strategies: A case study concerning raw materials at Casco Adhesives*. Linköping University, Department of Management and Economics: 91.

Schmitt, D. (2011). *Purchasing Business Services and the Role of Buyer Sophistication: Moving towards a structured purchasing process and a more effective management for the service acquisition*, Maastricht University. Master Thesis: 43.

Sjoberg, I. F. (2010). *Exploring the portfolio approach in purchasing and supply management: the result of an international survey*. University of Gävle, Faculty of Engineering and Sustainable Development: 104.

Turnbull, P. W. (1990). "A Review of Portfolio Planning Models for Industrial Marketing and Purchasing Management." *European Journal of Marketing* 24: 7-22.

van der Valk, W. (2008). "Service procurement in manufacturing companies: Results of three embedded case studies." *Industrial Marketing Management* 37(3): 301-315.

van der Valk, W., Frank Rozemeijer (2009). "Buying business services: towards a structured service purchasing process." *Journal of Services Marketing* 23: 3-10.

van der Valk, W., Finn Wynstra, Björn Axelsson (2009). "Effective buyer-supplier interaction patterns in ongoing service exchange." *International Journal of Operations & Production Management* 29: 807-833.

Van Weele, A. J. (2002). *Purchasing and Supply Chain Management: Analysis, Planning and Practice*, Thomson Learning.

Wagner, S. M. and J. L. Johnson (2004). "Configuring and managing strategic supplier portfolios." *Industrial Marketing Management* 33(8): 717-730.

Wittreich, W. J. (1966). "How to buy/sell professional services." *Harvard Business Review*: 127-136.

Wu, I.-L. and Y.-C. Shen (2006). "A model for exploring the impact of purchasing strategies on user requirements determination of e-SRM." *Information & Management* 43(4): 411-422.

Wynstra, F., B. A., Wendy van der Valk (2005). "An application-based classification to understand buyer-supplier interaction in business services." *International Journal of Service Industry Management* 17: 474-496.

Zeithaml, V. A., Parasuraman, A., Berry, L.L. (1985). "Problems and strategies in service marketing." *Journal of Marketing* 49: 33-46.

Appendixes

Appendix I

SUPPLIER DECISION for:

Material Group:

Department:

Start date:

Plant:

Doc. Name:

Date:

Buyer:

Supplier	Quant.	Description	Commodity code	Weight	1st price	2nd price	Total	Delivery Time
Selected supplier:			Supplier SAP n°:			VAT:		
Choice criteria:								

Notes:

Payment conditions:

Attachments:

Buyer

Resp. PUI

Appendix II

Within the Thesis project of an internship at Bosch Termotecnologia, a model is being developed in order to classify purchased Services (Strategic, Leverage, Non-Critical and Bottleneck). This classification is of interest to understand which strategies are being applied and if there should be any changes on how each service is being approached strategic-wise.

This model contains 2 essential variables to be evaluated: Importance of purchase and the Complexity of the Supply Market. Within these 2 variables, there are some characteristics that will form the integer of the correspondent variable. These characteristics are approached in the form of questions, as seen below, to be scaled from 1 to 10.

In order to build the model, I hereby ask for you to answer the following questions as accurate as possible so that the results come close to Bosch's reality.

The following **scale of importance** is to be applied:

- 1 - None
- 2 - Extremely low
- 3 - Very low
- 4 - Low
- 5 - Medium low
- 6 - Medium
- 7 - Medium High
- 8 - High
- 9 - Very High
- 10 - Extremely High

Each question is directed to **you as a buyer** at Bosch and a brief explanation of each question can be found in comment. This questionnaire will take in average 30 to 60 minutes to end, thus I ask your kind attention for this matter, considering the importance of this study for the conclusion of the Thesis being developed.

Material Group	Importance of Purchase				Complexity of Supply Market			
	What is the relevance you give to the purchase of this Material Group?	What importance do you give to the quality in detriment of any other aspect?	What importance do you give to the price in detriment of any other aspect?	How would you consider the importance of on-time supply?	What importance do you give to a reputed supplier?	How do you consider the importance of suppliers' dimension in the market?	What importance do you give concerning mutual dependence with the supplier?	To what extent do you consider important the existence of alternative suppliers for this material group?
Services for tools and machines								
M/E-repairs, -maintenance, and -cleaning								
Repairs of M/E and devices								
M/E-Rebuilding								
Electrical workings, control engineering								
Calibration								
Car maintenance								
Job-shop / commercial services								
Temporary-employment agency work								
Software development, IT-Support								
Development of own products, SW- and system tests								
Construction / Processing / Analysis								
Consulting, coaching, process analyses								
Seminars / Training courses								
Disposal and recycling								
Consulting, creation, campaign mounting								
Media / advertising, sponsoring								
Market research and analysis, surveys								
Graphics, photo, film (design, realization)								
Advertising materials, advertising gifts								
Print-outs, print products								
Trade fairs, events, activities								
Presentations, sales training, merchandising								
Other (Public relations, ...)								
Train								
Flight/air trips								
Car rental								
Hotel								
Warehouse								
Transport: Land Freight								
Transport: Air Freight								
Transport: Sea Freight								
Transport: Express/Parcel								
Other services								
Catering, restauration service								
Translation / documentation								
Call-Center								
Facility Mgmt. Services								