Exploring The portfolio Approach In Purchasing And Supply Management

- the result of an international survey

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Summary

Facing the enhancing challenge from competition, growing pressure from dynamic economic environment and increasing demand form stakeholders, supply chain management is gaining higher popularity and as the supply side of the chain, purchasing has evolved from the traditional clerical function to a strategic imperative. Companies strive to find ways to improve the performance of purchasing in order to strengthen companies’ competitive advantage. Kraljic demonstrated in 1983 how portfolio approach could facilitate purchasing to live up to its strategic importance and contribute to company performance. Although Kraljic’s theory has been confirmed by many scholars; and many practitioners have applied portfolio approach in many purchasing activities to fulfill different tasks, there are still limited empirical researches to confirm that portfolio would actually create the benefits.

This study sets to narrow this gap. Based on a survey carried on a large number of European and North American manufacturing companies, the study gives strong evidence on the significant impact that the purchasing portfolio approach has on the business results. It also sheds lights on the strategic importance of purchasing as a direct explanation to the application of the approach by companies. The empirical study confirms that the competency of the purchasing professionals plays a prominent role on the path of transforming the strategic importance of purchasing, with the help of portfolio approach, to the success of improved purchasing performance. A cross-discipline theoretical study reveals that different models share a common theoretical foundation and consist of similar basic elements in their construct.

The results of this study contribute to deeper and better understandings about portfolio approaches. It fills the research gap in analyzing the causes of the application of portfolio approach; provides quantitative empirical proof on the usefulness of portfolio approach in the industrial companies and thus gives support to the existing theories. The current study contributes to a growing research stream on how to improve purchasing business performance, reflecting the increasing strategic role that purchasing is given. The results send useful messages to company managements and provide valuable insights on an important tool for improving purchasing business performance.

Key words:

Portfolio, role of purchasing, purchasing and supply management, strategic importance, performance, purchasing proficiency, buyer competency, purchasing capability
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Abbreviations

SP - share of purchasing
RL - reporting level of purchasing
IV – level of purchasing’s involvement in formulating strategies
RP - role of purchasing
BC - buyer competency
PA - portfolio analysis approach / portfolio approach / application of portfolio approach
PP - purchasing proficiency/quality of purchasing process
PF – purchasing business performance
Chapter 1 Introduction

This first chapter describes the background to the research, objective of the study; and illustrates the research problem, presents research purpose and research questions. The chapter ends with the presentation of the structure of the thesis.

1.1 Research background and research problem

In recent years, with the growing importance of supply chain management, the supply side of companies received increasing attentions (Ford, et al, 2003) and assumed more strategic importance. Purchasing has shifted away from the traditional administrative and transactional role. Nowadays it is recognized as having great potential for companies’ performance and competitiveness. Supply management is regarded as part of “the structural capital” (Chen, et al, 2004; Gadde and Håkansson, 1994; Rech and Long, 1988, Krause et al, 2007; and Lysons and Gilliongham, 2003).

On the issue of how purchasing could be used as a strategic weapon, previous literature noted different solutions. One opinion asserts an increase of the degree of involvement of purchasing function in strategic planning processes (Carr & Pearson, 1999; and Chen et al, 2004). One other opinion advocates for implementation of purchasing practices, tools and techniques (Narasimhan and DAs, 2001; and González-Benito, 2007).

Many tools have also been suggested to support purchasing activities, for instance TCO (total cost ownership); VA (value analysis), VE (value engineering); and supplier auditing, just to mention a few.

Portfolio analysis as one of the tools has received a great deal of attention during the last two decades and it has been appreciated by both practitioners and academics (Dubois and Pedersen, 2002). Many purchasing portfolio models have
been suggested in literatures about professional purchasing (Caniels and Gelderman, 2007).

The portfolio approach has its origin in the financial sector and has been widely used in many disciplines. The first portfolio model for purchasing was introduced by Kraljic (1983) as an important management instrument, when the strategic importance of purchasing became obvious and purchasing was in need of becoming supply management. Since then, there has been a growing number of applications of the approaches (Geldeman and Van Weels, 2002), and many models were suggested. Olsen and Ellram (1997) use portfolio model to better understand the supplier relationships. To have supplier relationship in focus is more prominent in Bensaou’s portfolio matrix (1999), where the categorization is carried out on the supplier relationships. A somewhat more different portfolio is presented by Trent and Monczka (1999). They suggest different supply management activities according to the levels of implication complexities, as well as the rate of improvement from these activities. The development of portfolio theory in supply management is ongoing. But what are the differences between the different portfolio approaches?

When studying portfolio approach one of the challenges is the fact that the portfolio approach has many dimensions and presents its usage in different fields for fulfillment of different tasks. There is therefore need for certain generalization of portfolio models based on the nature of portfolio approach.

Although there are many advocators for portfolio approach to be used in purchasing and supply management, there is lack of empirical evidence on whether the use of portfolio approach would actually benefit companies by improving their business performance. In addition, the area of what triggers the decision to adopt portfolio is still underexplored – it is lacking both theoretical studies and empirical study of large scale. Some scholars (Olsen and Ellram, 1997; and Cooper et al. 1999) called for further research including extensive empirical testing of the usefulness of the portfolio approach.

At the same time the development of purchasing is acknowledged to be in connection with the increasing importance of purchasing so that it is becoming

Against such background this current research sets to explore whether companies can improve the business performance of purchasing with the help of purchasing portfolio, i.e. the connections between the portfolio approach and the business performance; and the causes for the rise of portfolio in practice.

### 1.2 Research purpose and research questions

The purpose of the study is to explore why companies choose to use the portfolio approach; and to investigate the usefulness of applying portfolio approach by examining if applying such approach would affect both the quality and the business performance of purchasing. The research has been conducted by answering the following two research questions:

**RQ1:** What is the linkage between the strategic importance of purchasing in a company and the company’s decision on applying a portfolio approach?

**RQ2:** Does the application of portfolio approach in purchasing have positive effects on the performance of purchasing?

The research questions will be presented more in detail in chapter 2 together with the hypotheses and the conceptual model developed for this research.

### 1.3 Disposition

The thesis is structured in the following way: the background information about the research is given in the first chapter, regarding the research background, purpose, and the research questions.
The report on an extensive literature study is included in chapter 2. After a review on the evolution of purchasing and the history of portfolio, several chosen portfolio models from different disciplines were presented with focus on the purchasing portfolios. A cross-discipline examination threw lights on the common parts in the nature of portfolio approach which made it reasonable and workable to carry out tests on portfolio adoption using portfolio approach as a generalized concept.

Based on the summary of literature study, two research questions were derived. Seven hypotheses were formulated according to the research questions. A conceptual model was constructed including hypotheses as the elements with the purpose of putting the constructs in a connected context as in the real business world.

The strategy and approach of this project, the methods and processes for empirical research, as well as the critical assessment on the quality of the study were presented in chapter 3. Data analysis was reported in chapter 4. In chapter 5 the answers to the research questions and hypotheses were explored using the insights gained in theoretical study and the results from the data analysis. Even the implications and contributions to both the business world and the academia were presented. Based on the new relationship found in the empirical research, the conceptual model was adjusted accordingly. The summary on the research can be found in chapter 6.
Chapter 2  Theoretical study

This chapter presents the theoretical study which was carried out in two main areas: the first one was the concept of purchasing, mainly the evolution of the function as well as purchasing’s strategic importance; and the second one was portfolio.

The theoretical framework is obtained through a literature study which has two focuses. 1) Purchasing – what purchasing is and the evolution of its role hence the importance of purchasing in a company; 2) the development and the nature of the portfolio approaches.

To carry out the task and role of purchasing and to realize its strategic importance, different tools and techniques can be used. Portfolio analysis tool is one of them. On the long value chain and in the face of the complex of business activities portfolios are applied for different tasks, and in different parts of business, thus there are various portfolio models with different dimensions and different appearance.

In order to identify the relationship between the importance that purchasing possesses in a company and the tendency that portfolio approach is applied in purchasing, a generalization of the basic elements and typical characteristics are necessary. For this purpose a comprehensive literature review is carried out on portfolio approaches’ history, major developments, applications and scopes in different fields. Several purchasing portfolio models are described in detail in this study, including two extra models from different disciplines but with close relationship to purchasing portfolios. Then the common theoretical foundation for these portfolio approaches is revealed after across-discipline-analysis. On the basis of the literature review, a conceptual model and two research questions are presented at the latter part of the chapter.
2.1 Purchasing

2.1.1 Definition of purchasing

In the course of development both in practice and in the literature, a variety of terms are created and widely used in the area of purchasing, e.g. procurement, purchasing, sourcing, supply management, purchasing and supply management, and so on. Some scholars acknowledge the difference between the terms. One opinion is that sourcing is more connected with materials area, and procurement is a somewhat broader term than purchasing (Lysons and Gilliongham 2003, and Van Weele 2002). But as there are no commonly agreed definitions for sourcing, purchasing and procurement; these terms are often used interchangeably (Leenders and Fearon, 1997). In this paper I will use both purchasing, supply, and “purchasing and supply” to describe the business function and the process of purchasing.

There exist rich choices in the ways of defining purchasing: Purchasing as an occupation involves a variety of roles and activities, including sourcing, supplier selection, negotiating and supplier performance evaluation. A very clear focus on doing things correctly characterizes Lysons and Gilliongham’s (2003) classic definition of purchasing: “to obtain materials of the right quality in the right quantity from the right source, delivered to the right place at the right price”. Already in mid 80s the strategic status was highlighted by Lamming (1985). He views purchasing as external resource management and points out that purchasing has become a strategic function. Purchasing’s task should be to ensure that the correct external resources are in place to the complement of the internal resources. He even suggests that “perhaps ‘external resource managers’ is a term that future purchasing managers will adopt.”

In Cunningham’s (1982) interaction approach purchasing operates as the interface between a company and its supply market environment. “Its activities are essentially concerned with securing the resource imports of materials, components,
and equipment into the business, and in the selection and handling of suppliers of those imports.”

The meaning of the purchased items is broadened by Van Weele (2002) from products and services to even capabilities and knowledge. Combining Van Weele’s and Steele’s (1996) views, purchasing can be defined as following:

Purchasing is to obtain from external sources all goods, services, capabilities, knowledge, and competence required for running, maintaining and managing the company’s primary and support activities; and to fulfill the business objectives in the most timely and cost-effective manner.

2.1.2 Development of purchasing

Traditionally, purchasing was regarded as a primarily clerical function, responsible for procuring materials and services. Although the world’s largest branch organization for purchasing, the National Association of Purchasing Agents\(^1\), was founded as early as in the year of 1915; and the shortage of materials during the World Wars brought more attention to the importance of purchasing; it was not until the 1960s purchasing tended to be regarded as a managerial backwater, serving only in a supportive position with its main task of avoiding shutdowns due to stockouts (Keough 1993, Ellram and Carr 1994). The severe oil crisis in the middle of 1970s and shortage of almost all basic raw materials brought more light onto the importance of purchasing (Leender and Fearon 1997). Material supply entered the agenda for corporate strategic planning and purchasing, though still mostly referred to as material management, it received a managerial emphasis.

In the 1980s and 1990s many new concepts have emerged. Just-in-time supply, zero-mistake principle and emphasis on quality management, have put higher demand on inventory control and supplier quality, and more focus on purchasing

\(^1\) Later on changed name to the National Association of Purchasing Management (NAPM), and is today active under the name The Institute for Supply Management (ISM), www.ism.ws
as a discipline (Gadde and Håkansson 1998). Purchasing management started to become part of a company’s competitive strategy.

During the 1990s supply chain management dramatically changed the management philosophy in the business world. Following the understanding of “the supply chain is as strong as its weakest link” purchasing which handles large part of a company’s revenue, has been receiving increasing attention. Purchasing is not only responsible for acquiring the right materials, services, and technology from the right source of the right quantity and in a timely manner; but is also becoming more integrated into the overall corporate strategy. (Lysons and Gilliongham 2003; and Long 2004).

Turning into the new century, purchasing has experienced new strategic reorientation with increasing integration with supply networks and information technology. Kralic (1983) called more than 25 years ago for the transition of purchasing from a transaction-based and tactical function to a process-oriented and strategic one (www.napm.org). Since then the field has gradually changed from passive "purchasing" towards proactive "supply management" (Kralic, 1983).

Apart from timeline, the study of purchasing development can be approached from several perspectives. The following figure shows a stage-wise evolution path based on Keough’s (1993) five-stage prescription and Van Weele’s (2002) development model.

![Figure 2.1 Evolution of purchasing management. Source: the author.](image-url)
The model in Figure 2.1 presents purchasing’s journey from being purely clerical, administrative and transactional to strategic. Strategic purchasing is guided by the purchasing strategies, driven by the customer demands, business objectives, and based on global supplier network and value chain integration to strive for the optimal output of the supply chain, i.e. satisfaction of the final customer. In his study González-Benito (2007) confirmed that the strategic purchasing contributes to business performance.

2.1.3 The strategic importance of purchasing

In the increasingly dynamic world the strategic importance of purchasing is becoming more self-evidence in organizations, irrespective of the size of the company and the nature of the business, (see e.g. Reck and Long, 1988; Pearson and Gritzmacher, 1990; Spekman et al., 1992; Gadde and Hakansson, 1994; Steele and Court, 1996; Carter and Narasimhan, 1996; Anderson and Katz, 1998, and Lysons and Gillingham 2003). In the literature the strategic importance of purchasing has been described from different perspectives: purchasing’s impact on the economic results, purchasing’s involvement in strategic activities and the role of purchasing and supply.

2.1.3.1 Purchasing’s impact on economic results

The strategic importance held by purchasing can to a great extent be explained by the higher impact of purchasing costs on the firms’ income. Purchasing costs constitute the major port of the total cost of goods sold (Gadde and Håkansson 2001; Carr and Pearson, 1999; Zsidisin and Ellram, 2001). According to The Chartered Institute of Purchasing and Supply (www.cips.org), organizations spend 30-80 per cent of the turnover with their suppliers. Failure in purchasing and supply function adds directly to company’s costs. As Dobler and Burt (1996) pointed out purchased materials were the source of a large share of the firm’s
quality problems. Therefore improvement in purchasing and supply management is considered a more effective way to increase profit - much more effective than, for instance increasing price (Ellram and Billington. 2001).

2.1.3.2 Involvement in strategic activities

The fact that improving the effectiveness and efficiency of purchasing and supply can create value has made it a strategic imperative for companies to build up value-focused purchasing management (Monczka 1998). Purchasing strategies need to be integrated into companies’ business strategy. This can be testified by the increasing involvement of purchasing managers and professionals in various cooperate activities as one of the key decision makers for the development of policies and strategies, such as purchasing and purchasing category strategy, make or buy decision – “purchasing leverage considerations in the outsourcing” (Ellram and Billington, 2001:15), as well as purchasing’s critical participation in the firm’s strategic planning process (Cousins et al 2008; Dobler and Burt, 1996).

2.1.3.3 The role of purchasing and supply

The role and importance of purchasing go hand-in-hand. When purchasing is becoming a “function of business” (Dobler and Burt, 1996), it has got increased scope of activities and responsibilities, enhanced status, and requests on its performances which are in line with the business strategies.

A. Status and long-term focus

While the importance of purchasing increases, purchasing is receiving higher status in the organization. It is recognized by the top management as a function coequal in corporate importance with other functions like marketing and finance (Dobler and Burt 1996); the manager having overall responsibility for purchasing tends to be placed closer to the top management level or is a member of the top management. To support the efforts of improving purchasing process and function becomes more of top management’s concern.
Facing the ever-hardening competition in terms of customer, market share and resources, increasing outsourcing, purchasing has become a strategic weapon to keep competitive advantage (Monczka 1998). It focuses more on long-term issues, managing risks and uncertainties, and makes efforts to secure the resources for both short and long term needs.

B. Integration with other functions and as an important link in SCM

From a supply chain management point of view the strategic importance of purchasing is more prominent. Purchasing helps companies accomplishing a match between themselves and the changing supply environment. Its impact spans across the value chain, due to the fact that it connects the external suppliers and internal organizational customers for the purpose of creating value to external customers (Day & Lichtenstein 2007; Novack & Simco 1991). Purchasing and supply management is more and more regarded as part of “the structural capital” (Krause et al, 2007).

Purchasing is also a functional-barriers-breaker. It is an active part in organization-wide process improvement. One common phenomenon is that purchasing as the start of the supply chain, recommends and initiates changes; and it actively participates in new product development (Dobler and Burt, 1996; Trent and Monczka, 1998).

In recognizing the increasing important role of purchasing, the integration of the supply function with other areas of the organization also occurs (Johnson et al, 1998). Purchasing is no longer only implementing and supporting strategies but is also a driver for the competitive advantage (Cousins et al., 2008).

C. Performance requests seen from strategic perspective

“What you measure is what you get” (Butler, R. 1996, p 153) as the measurement encourages certain activities or behaviours. Traditionally the performance of purchasing was measured with price and delivery time. To fulfill the strategic role of purchasing and supply it is needed to incorporate the company’s strategic perspectives into purchasing and supply activities. One way is to measure the
performance of purchasing and supply in terms of its contributions to the firm’s strategic objectives.

2.1.3.4 The important prerequisites – purchasing capability

Purchasing capability is one of the prerequisites for realizing the strategic importance of purchasing. The results of Carr & Smeltzer (2000) and Cousins et al. (2006) show that before purchasing can be elevated to a strategic level, the function needs to possess a strong set of necessary skills and competencies. Whilst purchasing moves from simply focusing on routines and prices to more strategic issues with focus on long-term and supply management, the skills have also been undergoing considerable changes. Dobler and Burt (1996:13) state that the increased strategic importance of purchasing function and process has brought about challenges for the professionals – they have to be “both technically and commercially competent” which should be based on their education levels and knowledge about the purchasing, products and the business of the company. It can be referred to as skills or purchasing capability. All this gives reason to believe that the realized strategic importance of purchasing provides evidence on the improved skills and competency of the purchasing professionals.

But to move purchasing in a strategic direction is not possible in the absence of necessary tools (Long, 2004). The portfolio approach is recommended by scholars and adopted by practitioners as an efficient tool for strategic management of, among others, purchasing. As Caniels and Gelderman (2007:219) pointed out, “purchasing portfolio models have received much attention in recent literature about profession purchasing”. The next section is devoted to studies on the portfolio theory.
2.2 Portfolio theory

Portfolio is not an invention for purchasing, but has been employed in other disciplines long before it was introduced to the purchasing area. This section starts with a brief review on portfolio’s origin and then a study on two models in other disciplines which in certain ways have laid foundation for the purchasing portfolio models, followed by presentation of several important purchasing portfolio models. The primary objective for this section is to review the most import developments in portfolio theory to gain deeper understanding on portfolio approach for purchasing and supply management.

2.2.1 Concept of portfolio and the start of portfolio theory

The word portfolio has its roots in Italian from the early 18th century, meaning case or stiff holder for holding papers, prints etc. (online Oxford English Dictionary). In more modern social science the components in a portfolio can be of a range of distinguished but correlated items, for instance investments, products, services, assets, or qualities, customers, suppliers, projects, tools, know-how, technologies, business areas, and much more.

The portfolio theory was developed in 1952 by Markowitz, who is often called “the father of modern portfolio theory” (Markowitz 1999), and was rewarded the Nobel Prize in 1990 for his contribution.

Markowitz’s theory was developed for financial investment decision making. Based on assessment of the discounted future returns as well as the future uncertainty, the investor can select an efficient portfolio which gives maximized return/value with lowest possible variance/risks by implying efficient diversification (Markowitz 1952). The basic idea was that the risks attached to each security should not be viewed in isolation, but in terms of their contributions to the risk levels of the whole portfolio (Turnbull 1990).

The essence of Markowitz’s theory is to focus on the interrelationships between the variables and the collective result of the whole portfolio. This approach has
been acknowledged being useful by other disciplines. Subsequently, many portfolio models have been developed in diverse fields. In this paper I will first present portfolio models for strategic decision making and marketing, and then analyze several models used in the purchasing field. The reason for starting with strategic decision making and marketing models is their close connections to purchasing portfolio models.

2.2.1 Earlier portfolio models

2.2.1.1 Portfolio for strategic management

In the 1970s, portfolio entered the area of strategic management. This new strategic language caught great interest of many scholars and eventually won the enthusiasm of practitioners. Many portfolio matrices had been created, e.g. BCG’s Growth/share matrix, GE-McKinsey’s Attractiveness/business position grid, Arthur D. Little’s Industry maturity/competitive position grid, and Shell’s Directional Policy matrix (Hambrick, et.al 1982; Day 1986). Based on a survey Haspelagh (1982) estimated that 36% of the Fortune “1000” and 45% of the Fortune “500” industrial companies had introduced the portfolio approach to some extent.

One of the most influential strategic management portfolio models was presented by Ansoff and Leontiades 1976. It was a multi-step approach portfolio and applied to analyze the market opportunities which are available both at present and in the future and, thus produce the strategic decision on whether and how the firm should change the scope of the portfolio.

As a prerequisite Ansoff and Leontiades (1976) suggested the corporate should define and monitor the business environment by dividing the environment in an

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2 There are other steps in the portfolio management that Ansoff and Leontiades have suggested. But only the first part of the approach is relevant for the study purpose of this paper and thus only this part is presented here.
analytically meaningful way. One example is the SBA concept. SBAs (strategic business areas) should be relatively independent and not necessarily connected with organizational structure of the company. The criteria for division can be geographical if the markets are too different in terms of maturity, as well as in economic, political and social climates.

After having classified SBAs the company can conduct a portfolio life-cycle analysis (see Fig. 2.2) on the SBAs.

![Figure 2.2 Portfolio life-cycle analysis. Source: Ansoff and Leontiades (1976)](image)

The SBAs are scattered along two dimensions: the life cycle position of SBA and the profitability of the firm relative to the competitors. Each of the cells in Figure 2.2 has different merits, and should receive different priorities (strategies) and managerial actions. An emergent SBA which already shows a ROI above the average level, positioned in the upper left-hand cell holds the future and the strategy should be to give it priority in company's investment. An emergent in the lower left-hand cell needs further analysis before deciding either keeping the SBA and requiring improved performance, or dropping it. The upper right-hand cell is delivering good ROI. But it is not necessarily a candidate for further investment. But the life cycle indicates that the company should take precautions and make careful analysis before any reinvestment decision is made. If a SBA is performing badly and approaching the end of its life, no new resource should be allocated – SBA in the lower right-hand cell should divest.
2.2.1.2 Portfolio for key customer account analysis

Some very ambitious attempts started to take shape in the 1980s in the purpose of enhancing and promoting marketing planning and communication (Cambell and Cunningham 1983, York and Droussiotos 1994).

Fiocca’s (1982) account portfolio is among the early adoption of portfolio approach in marketing. Fiocca advocated that marketing strategy 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. The first step in his approach is on a general level and company’s complete account portfolio is considered. An in-depth analysis for each important account will be exercised in another portfolio at the second step.

**Step 1.** All accounts of the company are rated in a portfolio with a two-dimensional display of difficulty in managing the account and strategic importance of the account. When deciding criterion for the importance of the accounts, Fiocca suggested that company should consider the sales concentration, the structure of the power in the market, the complexity of the buying process, buyer/seller relationships, derived demand, and also the overall account desirability, e.g. accounts’ contribution to company’s diversifiability, technological strength, as well as opening new markets. It is suggested that “Difficulty in managing the account” is measured with three types of elements; product characteristics, account characteristics, and competition for the account.

Fiocca noted that not all customers are equally important. As the volume, values of their purchases and the market situations are different, some customers are more important than others, and some may possess strategic importance to the company. The accounts’ position in the portfolio reveals its characteristics (see Fig. 2.3). The key/difficult and key/easy accounts can be considered worthy of analysis in the next step.
Step 2. Fiocca (1982) based the second part of account portfolio analysis on a nine-cell matrix (see Fig. 2.4). Each key account, no matter the degree of difficulty to manage, will be further analyzed on the following two dimensions³:

- Customer’s business attractiveness, respective
- Strength of the buyer/seller relationship

The analysis of customer’s business attractiveness can be more or less sophisticated according to the size of the company’s business, number of customers and the actual needs. Fiocca (1982) provided a very comprehensive table containing a large number of factors for the measurement of the attractiveness. The measurement can be divided into five groups: market factors, competition, financial and economic factors, technological factors and sociopolitical factors.

³ Detailed measurement suggested by Fiocca is included in Appendix 1
Each key account is plotted according to its attractiveness and the relationship it has with the company. The analysis on the positioning will indicate the marketing strategy the company should have on this account and the profitability it can expect.

Three strategies were suggested by Fiocca:

- Improving the strength of the relationship if the attractiveness is high or moderate but relationship is weak (cell 1, 2, 4, or 5 in Fig. 4.) But precaution has to be taken for cell 1 and 4 as the attractiveness is just moderate and risk is higher.
- Hold the position if the relationship is strong (cell 3, 6, and 9)
- Withdrawal strategy is proper if an account has low level of attractiveness and the relationship is low or medium.

Regarding the profit, profitability is normally low for accounts in cells 1 and 4 due to the high level of marketing (new accounts) and product development (new products). Accounts in cell 6 and 3, on the contrary, are where the company can expect high profit because the marketing and sales costs are relatively low, and customers are less price-sensitive.

2.2.3 Purchasing portfolios

In line with the ascent of portfolio approaches in different disciplines, many studies have been conducted in the purchasing field. The following is the presentation of several purchasing portfolios dealing with different parts of purchasing management.

2.2.3.1 Kraljic’s classic portfolio approach for purchasing management

In the early 80s portfolio approach was introduced into purchasing fields. The first detailed, systematic and comprehensive portfolio approach for purchasing and supply management was presented in a journal article in Harvard Business Review in 1983. The architect behind it was Peter Kraljic, the director of McKinsey Company at its Düsseldorf office. Kraljic (1983) warned companies against the risks for “disastrous supply interruptions” because of material scarcity,
Chapter 2   Theoretical study
turbulence in political environment and on the global markets, intensified
competition, and technological development. He asserted that companies should
manage supply with comprehensive strategies to ensure long-term availability of
critical materials and components at competitive cost. Kraljic argued that
“Purchasing must become supply management”. Kraljic developed a methodology
for differentiation of purchased items and codification of purchasing activities
which “is commonly known as purchasing portfolio analysis” (Cox 1997:270),
and that subsequently became the dominant approach. There are a number of
authors who have also proposed portfolio models. But they are either rather
similar to Kraljic’s model with minor modifications or further development of
Kraljic’s model. (See Elliott-Shircore and Steele; 1985; Lilliecreutz and Ydreskog,
1997; Olsen and Ellram, 1997; Van Weele, 2002).

Kraljic’s comprehensive approach gives an effective framework for shaping the
supply strategy. It consists of four stages and engages two matrices (Figure 2.5).

![Figure 2.4 The four stages approach. Adopted from Kraljic (1983: 112)](image)

**Stage 1: Classification**

All the purchased products or components are classified on the basis of the profit
impact and supply risk in a matrix of these two dimensions.

*The profit impact* is defined in terms of volume purchased, percentage of
total purchase cost, or impact on product quality or business growth.

*Supply risk* is assessed in terms of availability, number of suppliers,
competitive demand, make-or-buy opportunities, and storage risks and
substitution possibilities.
Both dimensions have two possible values – low or high. The purchased items plotted in this matrix are sorted into four categories as shown in Figure 2.6: strategic (high profit impact, high supply risk); bottleneck (low profit impact, high supply risk); leverage (high profit impact, low supply risk); and noncritical (low profit impact, low supply risk).

This classification permits the company to have more differentiated and hence better focused approach to analyze the information available and make supply decision. Each of the four categories has different main tasks, required information and decision levels. Each requires a distinctive approach; and the complexity of the approach is in proportion to the strategic implications.

![Classification matrix in Kraljic's portfolio approach (1983: 112)](image)

**Stage 2: Market analysis**

Stage 2 is to study the company’s bargaining power as a customer and the strengths of the suppliers. At this stage the company first systematically reviews the supply market, assessing the availability of strategic materials in terms of both quality and quantity, as well as the relative strength of existing suppliers.

Table 2.1 shows the evaluation criteria that Kraljic suggested for the marketing analysis. When carrying out marketing analysis the company should be aware of two facts: 1) no list of evaluation criteria is equally applicable to every industry, and 2) changes, especially technological changes will change the pattern of the strength.
### Table 2.1 Classifying purchasing materials requirements.

<table>
<thead>
<tr>
<th>Supplier strength criteria</th>
<th>Company strength criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market size vs supplier capacity</td>
<td>Purchasing volume vs capacity of main units</td>
</tr>
<tr>
<td>Market growth vs capacity growth</td>
<td>Demand growth vs capacity growth</td>
</tr>
<tr>
<td>Capacity utilization or bottleneck risk</td>
<td>Capacity utilization of main units</td>
</tr>
<tr>
<td>Competitive structure</td>
<td>Market share vis-à-vis main competition</td>
</tr>
<tr>
<td>ROI and/or ROC</td>
<td>Profitability of main end products</td>
</tr>
<tr>
<td>Cost and price structure</td>
<td>Cost and price structure</td>
</tr>
<tr>
<td>Break-even stability</td>
<td>Cost of non-delivery</td>
</tr>
<tr>
<td>Uniqueness of product and technological stability</td>
<td>Own production capability or integration depth stability</td>
</tr>
<tr>
<td>Entry barrier (capital and know-how requirements)</td>
<td>Entry cost for new sources vs cost of own production</td>
</tr>
<tr>
<td>Logistics situation</td>
<td>Logistics</td>
</tr>
</tbody>
</table>

Source: Kraljic (1983:113)

### Stage 3: Strategic positioning

According to the result of marketing analysis, the purchased items which are classified in stage 1 will be positioned in the purchasing portfolio matrix at this stage. This matrix shows the company’s relative position by plotting company buying strength against the strengths of the supply market. These two strengths are the dimensions in the matrix and each has values of “high, medium, and low”. As shown in Figure 2.7 the nine cells belong to three risk categories, each associated with a different strategic thrust. If the company is dominant, a reasonably aggressive strategy is indicated, Kraljic called it “exploit”. If the supplier is strong, a defensive strategy is more proper (“diversify”) and the company should look for substitutes for the items or suppliers. A balanced strategy (“balance”) is recommended if the relative power is balanced for the two parties.
Stage 4: Action plans

The individual elements of the purchasing strategy for each of the three strategic thrusts are different. At the final stage of the approach, a range of supply scenarios should be exploited. The company should clearly define respective risks, costs, returns, and strategic implications, and develop action plans regarding policy issues, e.g. make-or-buy, purchasing volume, price, supplier selection, material substitution, inventory policy, and so on, to secure both short-term and long-term supply. The action plan will be needed (Figure 2.8).

<table>
<thead>
<tr>
<th>Elements of purchasing strategy</th>
<th>Strategy: Exploit</th>
<th>Strategy: Balance</th>
<th>Strategy: Diversify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>spread</td>
<td>keep or shift carefully</td>
<td>centralize</td>
</tr>
<tr>
<td>Price</td>
<td>press for lower</td>
<td>negotiate opportunistically</td>
<td>keep low profile</td>
</tr>
<tr>
<td>Contract</td>
<td>buy spot</td>
<td>balance contracts &amp; spot</td>
<td>ensure supply with contracts</td>
</tr>
<tr>
<td>New supplier</td>
<td>enforce supplier</td>
<td>selected vendor</td>
<td>search vigorously</td>
</tr>
<tr>
<td>Inventory</td>
<td>keep low</td>
<td>use stocks as &quot;buffer&quot;</td>
<td>bolster stocks</td>
</tr>
<tr>
<td>Own prod</td>
<td>reduce or do not enter</td>
<td>decide selectively</td>
<td>build up or enter</td>
</tr>
<tr>
<td>Substitution</td>
<td>stay in touch</td>
<td>pursue good opportunities</td>
<td>search actively</td>
</tr>
<tr>
<td>VE</td>
<td>enforce supplier</td>
<td>perform selectively</td>
<td>start own program</td>
</tr>
<tr>
<td>Logistics</td>
<td>minimize cost</td>
<td>optimize, selectively</td>
<td>secure sufficient stocks</td>
</tr>
</tbody>
</table>

Figure 2.7 Strategic implications of purchasing portfolio positioning.
Source: Kraljic (1983:115)
Kraljic model has gained ground in both academic researches as well as in practice (Nellore & Söderquist). It has become the dominant approach and the foundation of purchasing strategy for many organizations across different sectors (Gelderman & Weele, 2003). In the following section I will present several portfolio models developed for different operations in purchasing field.

2.2.3.2 Portfolios for relationship management

One of supply management’s most important task is to manage the relationships with suppliers. To achieve effective supply management, the company needs to keep balance between the relationships with its suppliers (Donaldson and O’Toole 2007), to allocate right portion of its resources to different relationships, and to develop strategic relationship with suppliers of strategic importance not only today but also for the future. Some authors have suggested using portfolio models for supplier relationship management (e.g. Turnbull 1990; Bensaou 1999; Tikkanen, et al 2007; Zolkiewski and Turnbull 2001; and Donaldson and O’Toole 2007). One of the earliest and cited by many as one of the most fundamental purchasing portfolio models is constructed by Olsen and Ellram (1997). Olsen and Ellram proposed a three-step normative portfolio model (Figure 2.9) for managing different kinds of supplier relationship.

![Figure 2.8 Portfolio model of supplier relationships. Source: Olsen & Ellram (1997:103)](image)

**Step one:**

In the first step Olsen and Ellram recommended a normative analysis of company’s purchases in a matrix with “Strategic importance of the purchase” and
“Difficulty of managing the purchasing situation” as the key classification dimensions.

1) The *strategic importance of the purchase* can be indicated with three groups of internal factors, though the factors can vary among companies:
   - competence factors, describing the extent to which the item purchased is a part of the company’s core competencies
   - economic factors, describing the economic importance of the purchase in terms of the dollar value and the impact on the company’s profits
   - image factors, describing the importance of the purchase to the company’s image among customers and suppliers.

2) The *difficulty of managing the purchasing situation* is defined with several external factors, that indicate which purchases require extra attention and effort to manage:
   - product characteristics which include the novelty and the complexity
   - supply market characteristics, e.g. supplier’s power or technical and commercial competence
   - environmental characteristics refer to the risks and uncertainty associated with the purchasing situation

When analyzing the purchases and then the relationships, the purchases need to be evaluated by assigning weights to each of the factors mentioned above. The weights are the perceived importance of the factor to the company’s operations and it is up to the decision-makers in the company to come to agreement on the relative importance of each factor. Olsen and Ellram suggested a methodology for determining the weights\(^4\). Based on the result from the evaluation the final task in the first step is categorization: plot the purchases in the portfolio model where four categories are illustrated (see Fig. 2.10).

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\(^4\) The description of the methodology is not included in this paper as it is out of the scope of this study.
Olsen and Ellram (1997) recommended the ideal relationships for each category: 

**Strategic category:** establish a close relationship, e.g. early supplier involvement or joint product development. **Leverage category:** create mutual respect and a two-way relationship, and communicate requirements further into the future. 

**Bottleneck category:** a relationship should focus on concurrent engineering and involve supplier value analysis in order to lower the operations costs. **Noncritical category:** the relationship should basically be able to manage itself.

**Step two**

In the **second step** the actual relationships are analyzed to get the understanding about how the current relationships are managed.

A second portfolio model is used based on analysis of relative supplier attractiveness and the strength of the relationship between the company and the suppliers. Similar to the first portfolio model, the dimensions in this model are associated with several factor groups:

1) factors influencing the Relative Supplier Attractiveness are regarding finance/economy, performance, technology, organization/cultural, strategy, etc;

2) factors describing the strength of the relationship are related to economy, character, cooperation, and distance between the two suppliers.
parties in terms of social, cultural, technological, time and geographic distance. The relationships can be viewed in the second portfolio shown in Figure 2.11, after having assigned weights to each factor and evaluated each relationship. The size of the circles illustrates the current allocation of resources to the relationship.

![Diagram of Relative Supplier Attractiveness vs. Strength of Relationship]

*Figure 2.10* Portfolio for analysis of supplier relationship. Source: Olsen & Ellram (1997:107)

**Step three**

After having compared the actual relationships with the ideal ones described in step one and the actual ones obtained in step two, the company can set up strategies and action plans for different categories and improve management of the portfolio of supplier relationships, i.e. “moving from the current to the ideal supplier relationship” and reallocate resources (Olsen and Ellram 1997). Their suggestions are:

- If the relative supplier attractiveness is high or moderate but the existing relationship is relatively low, action plans should be made to strengthen the relationship for the strategic category; and for bottleneck category strengthening is recommended only if no considerable resources need to be allocated. <cell 1,2,4>
- If both the relative supplier attractiveness and relationship are moderate or high and the existing relationship is strong or only average, the action
plans should be for maintaining the relationship for the strategic category. But for leverage categories, the company should decrease the resource allocation on the suppliers. For bottleneck category the relationship should either enhance the relative supplier attractiveness or reallocate resources.

- If the relative supplier attractiveness is low the goal of the action plans will be to change supplier if the relationship is weak; or to further develop the current supplier to improve the attractiveness for strong relationship.

Actions should be taken where there is a high degree of mismatch between the level of resources allocated and the relative supplier attractiveness and/or the strength of the relationship. While the goals for the action plans differ, the resources needed for carrying out the actions will also vary.

### 2.2.3.3 Portfolios with element of specification

Nellore and Söderquist (2000) observed that specifications were absent in modern portfolio approach. They state that specification forms the language for engineering. It refers to all activities that are necessary, from the identification to the generation of the component or product; and specifications vary for different types of suppliers due to the differences in both the type and the generators of the specifications (i.e. which party decides on the specification). To help component suppliers and the company to improve relationships and their performance, “even an outstanding procurement plan will not work if the specifications are not adapted to the capabilities and needs of suppliers”, argue Nellore and Söderquist (2000). They have developed a specification portfolio taking into account the connections between engineering, purchasing and supplier within the dynamic process of product development, based on case studies in automotive related industry and benchmarking at Toyota.

The *first stage* in this specification portfolio approach is very similar to Kraljac, Olsen and Ellrams’ portfolio approach, i.e. to classify purchases into different
categories (strategic, bottleneck, leverage and non-critical), based on the strategic importance and the difficulty of managing the purchasing situation. But unlike other portfolios here the categories are referred to components instead of products. The company will then evaluate its own competency for each category and decide who should be the generator for the specifications.

Then, in the **second stage**, the specification generators will be linked to the component categories. The result of such a combination becomes:

- **strategic components**: the specifications are generated jointly by the company and its supplier
- **non-critical components**: the specifications are generated either by the supplier or by the supplier without interference from the other party which is not generating the specification
- **leverage components**: the specifications are generated by the company with co-development by the supplier
- **bottleneck components**: the specifications are generated by the supplier with co-development by the company

The **final stage** is for linking the specification types and supplier categories.

According to Nellore and Söderquist the specifications can be of three types: standard, restrictive, and collaborative. The supplier categories are defined as partners, mature, child and contractual, based on Kamath and Liker’s (1994) typology. As shown in Table 2.2, for each category of supplier the company should establish different relationships. On a continuum with contractual on the left end and partner on the right, the responsibilities held by the suppliers increased when moving from the left to the right.
<table>
<thead>
<tr>
<th>Supplier category</th>
<th>Description and responsibility</th>
</tr>
</thead>
</table>
| Partner suppliers      | - First-tier supplier; relationship between equals; supplier has technology, size, global reach  
- Involved at the first instance of specification generation. Abilities to understand the interfaces and deliver a product that is compatible with all the necessary interfaces in the final product within the budget and quality levels decided jointly |
| Mature suppliers        | - The company has superior position; supplier takes major responsibility with close guidance for the company  
- Deliver the system within the quality and budget constraints as decided jointly  
- Supplier involved after the initial work of identifying overall design and critical dimensions has generated the critical (or rough) specifications. The critical (or rough) specifications contain functional data and rough envelopes of functionality. |
| Child suppliers         | - Supplier has superior position  
- Supplier involved after all the specifications have been cleared and simulated so that the supplier can deliver to OEM specifications |
| Contractual suppliers   | - Obtain a product by simply specifying out of the supplier’s catalogue. No need for any discussions concerning the product being bought.                                                                                   |

Table 2.2 Supplier category and supplier responsibility. Adopted from Kamath & Liker (1994:158, and Nellore & Söderquist (2000:259)

Nellore and Söderquist (2000) argued that it is not enough to simply state the characteristics of the suppliers in terms of attractiveness and strength of the relationship and it is wrong to believe that this would lead to delivery of component according to the required quality and within budget constraints. It is imperative that when using portfolios to indicate the characteristics of the supplier they should be linked to the specification generation, the required relationship and the required type of specification for a given component. Nellore and Söderquist
(2000) pointed out that because there was a tendency to over- or under-manage suppliers, the company should develop different strategic guidelines for each category to balance management, as well as to improve supplier performance and relationship. Figure 2.12 shows the final result after linking supplier types to the previous portfolio.

![Figure 2.11 The specification-portfolio link by Nellore and Söderquist (2000:259)]](image)

2.2.3.4 Portfolio for product development

Supplier involvement in new product development (NPD) has become increasingly popular element in supply management. It is believed that such involvement will improve both NPD-project effectiveness, such as project costs and quality; and project efficiency, e.g. development costs and time. But such involvement “may not always lead to improved effectiveness and efficiency”(Wynstra and Pierick, 2000), contrary to the expectation,

Based on an intensive case study on management of NPD projects, Wynstra and Pierick (2000) introduced a supplier involvement portfolio which acknowledges the difference in the types of supplier involvement, how to decide the suitable type of involvement a company should have in NPD, as well as the suitable communication with the suppliers, in order to improve the management of supplier involvement in new product development.
Wynstra and Pierick’s supplier involvement portfolio consists of two dimensions: the degree of development responsibility held by the supplier and development risk. It is shown in Figure 2.13.

![Figure 2.12 The Supplier Involvement Portfolio. Source Wynstra & Pierick (2000:51)](image)

1) The degree of development responsibility contracted out to the supplier is strongly related to the difference in suppliers’ expertise, and can be divided into four levels of building blocks as shown in Table 2.13:

<table>
<thead>
<tr>
<th>Levels of building blocks</th>
<th>Supplier’s responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical or purchasing</td>
<td>Supplier sets up his production process and manufactures according to the specifications</td>
</tr>
<tr>
<td>specifications</td>
<td></td>
</tr>
<tr>
<td>Detailed design</td>
<td>Supplier sets up his ultimate production and assembly process based on detailed design</td>
</tr>
<tr>
<td>Global design</td>
<td>On the basis of functional specifications in a global design of a building block the supplier is given responsibility for:</td>
</tr>
<tr>
<td></td>
<td>• detailed design</td>
</tr>
<tr>
<td></td>
<td>• construction and testing of the design</td>
</tr>
<tr>
<td></td>
<td>• setting up production and assembly processes</td>
</tr>
<tr>
<td>Functional specification</td>
<td>On the basis of the functional specifications of a building block the supplier is responsible for:</td>
</tr>
<tr>
<td></td>
<td>• global design</td>
</tr>
<tr>
<td></td>
<td>• testing the global and detailed design</td>
</tr>
<tr>
<td></td>
<td>• setting up production and assembly processes</td>
</tr>
</tbody>
</table>

Table 2.3  Level of building blocks for supplier involvement. Source: Wynstra & Pierick (2000:51)
The most important factor is which level of contribution the company needs from the supplier not what expertise the supplier has.

2) Development risk refers to the importance, newness and complexity of the object for the development. It is an indication of the time and effort required. Wynstra and Pierick (2000) suggest to gauge such risks by finding answers to the following questions which are crucial in determining the sequence in which building blocks need to be dealt with:

- How essential is the building block to the functionality of the overall system, as compared with previous systems?
- To what extent does this block determine the technical specifications and the design of other building blocks?
- How important is the development or ordering time of this building block to the entire development project?
- What is the internal complexity – how many different technologies are used?
- How new is the production technology or components to the company? Is the application new to the company?

The answers will then be accompanied by a 3 or 5-point ordinal answering scale. The higher the total scores are, the higher the risk is, the more development efforts are needed, and the earlier start of the development is required.

Then the building block should be placed in the supplier involvement portfolio according to the values of the degree of development responsibility held by the supplier and the development risk obtained from above procedures. The position indicates the different types of supplier involvement and the sequence in which suppliers are to be involved. These four distinguished types are:
1) Strategic Development - when both the supplier’s responsibility and development risk are high. For this type it is important to involve supplier early in the development project.

2) Critical Development is characterized by a low supplier’s responsibility and a high development risk. Supplier involvement is required. It would possibly need certain interfaces.

3) and 4) Arm’s-length Development respectively Routine Development. Both types should involve supplier in the development.

The next step of this approach is to look at the supplier interfaces associated with the positioning in the portfolio matrix. Wynstra and Pietrick (2000) also provided detailed recommendations on the form and intensity of communication with different suppliers.\(^5\)

\(^5\) These recommendations are regarded as out of the scope of the current study and are therefore not included in this paper
2.3 Analysis and conclusion from theoretical study

The purpose of this section is to analyze the differences and similarities of the various models for portfolio approaches and try to find the common nature of the approaches.

Fiocca’s account portfolio for marketing is included in the present study on purchasing because of the special relationship between the portfolios used in the two disciplines. Both deal with the company’s valuable assets – customers and suppliers (Cunningham, 1982; Cunningham and Homse, 1982), and it is essential to understand the needs from both in order to identify the central to the company’s competitive advantage (Zolkiewski and Turnbull 2002). The application of portfolio in marketing occurred earlier than in purchasing. As purchasing is the mirror image of marketing (Olsen and Ellram 1997), the theory and development of marketing portfolio models have been adopted by purchasing portfolios approaches (see e.g. Nellore and Taylor 2000). Therefore learning marketing portfolio models can contribute to gaining better understanding of the purchasing portfolio models.

2.3.1 Comparison

I start with comparing several characteristics of the portfolio models which are presented in detail in earlier section:

- The portfolio models are used in different disciplines, different areas, as well as at different stages of the operations; and therefore their focus are different: Ansoff and Leontiades on SBA for strategic management; Fiocca on customer accounts in marketing; and then in purchasing - Kraljic on products; Olsen and Ellram on buyer-supplier relationship; Nellore and Söderquist on products with consideration of specifications; and Wynstra and Pierick on new product development.

- These portfolios models share one common start point – classification which is carried out in a matrix/portfolio which consists of two dimensions.
But these dimensions differ from each other in their choice of variables. Dimensions with similar names are operationalized differently. Most of the models contain a second matrix with varying dimensions. All suggestions about strategies are made based on each of the portfolio analysis, though the strategies differ.

A brief summary over the focus and matrices in the portfolio models can be found in Table 2.4.

<table>
<thead>
<tr>
<th>Focus</th>
<th>Authors</th>
<th>Dimensions Matrix 1</th>
<th>Dimensions Matrix 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic management - SBA</td>
<td>Ansoff &amp; Leontiadès</td>
<td>Profitability compared with competitors</td>
<td>N/A</td>
</tr>
<tr>
<td>Customer (key) Account</td>
<td>Fiocca</td>
<td>Difficulty of managing the account</td>
<td>Customer attractiveness</td>
</tr>
<tr>
<td>Product, power, strategy</td>
<td>Kraljic</td>
<td>Profit impact</td>
<td>Company strength</td>
</tr>
<tr>
<td>Relationship</td>
<td>Olsen &amp; Ellram</td>
<td>Strategic importance</td>
<td>Supply market strength</td>
</tr>
<tr>
<td>Specifications</td>
<td>Nellore &amp; Söderquist</td>
<td>Difficulty of managing the purchase situation</td>
<td>Relative supplier attractiveness</td>
</tr>
<tr>
<td>Supplier involvement in NPD</td>
<td>Wynga &amp; Plerick</td>
<td>Strategic importance of the purchase</td>
<td>Average strength of relationship</td>
</tr>
</tbody>
</table>

Table 2.3 Focus and dimensions of the portfolio models presented in this paper

Nellore and Söderquist’s portfolio model has a third step where the supplier types are added to the previous matrices.

2.3.2 Analysis

2.3.2.1 Purchasing and marketing portfolios

A. Matrix 1 – first step in portfolio analysis

Table 2.4 reveals that “strategic importance” is the dimension for 3 models by Fiocca’s, Olsen and Ellram, as well as Nellore and Söderquist. The word “difficulty” appears in the other dimension of these three models. Because Nellore
and Söderquist admitted that their portfolio is basically based on Olsen/Ellram’s model, I will only mention Olsen/Ellram when Nellore/Söderquist’s portfolio is also referred to in this part of the analysis.

At the first glance Kraljic’s dimensions in his first matrix, “profit impact” and “supply risk”, seem different from above mentioned ones. Wynstra and Pierick seem to be on a totally different path when conducting their portfolio analysis: the only matrix in their model is based on “degree of development responsibility held by the supplier” and “development risk”. Are they really so different? What do they have in common with the other models mentioned earlier?

**The key for better understanding of the portfolios** is to look into how the dimensions are defined. The inventors of the models have operationalized the variable in the dimensions.

Kraljic included availability, number of suppliers, competitive demand, and substitution possibilities into the supply risks, i.e. the impact in both long and short term which no doubt is of difficulty in managing the purchase situation/account, and in this sense Kraljic’s supply risk is the same as Fiocca’s and Olsen/Ellram’s, though Kraljic’s operationalization is not as comprehensive as that of Fiocca, nor as of Olsen/Ellram. Kraljic’s profit impact was described by volume, the relative size of the purchasing in term of costs, the impact on growth of quality and overall business. Is this concept similar to Fiocca and Olsen/Ellram’s “strategic importance”? To answer this question I need to go over to Fiocca and Olsen/Ellram’s operationalizations.
First, the factors deciding the portfolios’ dimensions in Olsen and Ellram’s model and Fiocca’s operationalizations are shown in Table 2.5, 2.6 and 2.7.

<table>
<thead>
<tr>
<th>Factors Influencing the Strategic Importance of the Purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence factors</td>
</tr>
<tr>
<td>1. The extent to which the purchase is part of the firm's core competencies</td>
</tr>
<tr>
<td>2. Purchase improves knowledge of buying organization</td>
</tr>
<tr>
<td>3. Purchasing improved technological strength of buying organization</td>
</tr>
<tr>
<td>Economic factors</td>
</tr>
<tr>
<td>1. Volume or dollar value of purchases</td>
</tr>
<tr>
<td>2. The extent to which the purchase is part of a final product with a great value added</td>
</tr>
<tr>
<td>3. Criticality of the purchase to get leverage with the supplier for other buys</td>
</tr>
<tr>
<td>Image factors</td>
</tr>
<tr>
<td>1. Supplier’s critical image/brand name</td>
</tr>
<tr>
<td>2. Potential environmental/safety concerns</td>
</tr>
</tbody>
</table>

Table 2.5 Influencing factors in Olsen and Ellram’s portfolio (1997:104)

<table>
<thead>
<tr>
<th>Factors Describing the Difficulty of managing the Purchases Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product characteristics</td>
</tr>
<tr>
<td>1. Novelty</td>
</tr>
<tr>
<td>2. Complexity</td>
</tr>
<tr>
<td>Supply market characteristics</td>
</tr>
<tr>
<td>1. Supplier’s power</td>
</tr>
<tr>
<td>2. Supplier’s technical and commercial competence</td>
</tr>
<tr>
<td>Environmental characteristics</td>
</tr>
<tr>
<td>1. Risk</td>
</tr>
<tr>
<td>2. Uncertainty</td>
</tr>
</tbody>
</table>

Table 2.6 Describing factors in Olsen and Ellram’s portfolio (1997:104)

<table>
<thead>
<tr>
<th>Operationalization of the strategic importance</th>
<th>Operationalization of the difficulty of management accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Volume or dollar value of purchases</td>
<td>1) Product characteristics</td>
</tr>
<tr>
<td>2) Potential of the account</td>
<td>a. novelty</td>
</tr>
<tr>
<td>3) Prestige of the account</td>
<td>b. complexity</td>
</tr>
<tr>
<td>4) Customer market leadership</td>
<td>2) Account characteristics</td>
</tr>
<tr>
<td>5) Overall account desirability</td>
<td>a. customer’s needs and requirements</td>
</tr>
<tr>
<td>6) Diversification</td>
<td>b. customer’s buying behavior</td>
</tr>
<tr>
<td>7) Open new markets</td>
<td>c. customer’s technical &amp; commercial competence</td>
</tr>
<tr>
<td>8) Improve technological strength</td>
<td>3) Competition for the account</td>
</tr>
<tr>
<td>9) Improve/ spoil other relationships</td>
<td>a. number of competitors</td>
</tr>
<tr>
<td></td>
<td>b. competitors’ strengths/weaknesses</td>
</tr>
<tr>
<td></td>
<td>c. competitors’ position vis-à-vis the customer</td>
</tr>
</tbody>
</table>

Table 2.7 Operationalization of variables in Fiocca’s classifications portfolio. Based on Fiocca’s “factors determining the dimensions”. Source: Fiocca (1982: 55-56)
To use Fiocca’s definition in purchasing portfolios one only needs to transform the terms referring to customer/customer market to supplier/supplier market. According to Fiocca and Olsen/Ellram the strategic importance is measured by the value and size of the purchase, the competence as well as potential of the other party (customer or supplier), the impact on profit and possibility for the development of the business. When it comes to “difficulty of managing …”, the similarities between Fiocca and Olsen/Ellram’s definitions are more obvious: the characteristics of the product, the characteristics of the other party (customer or supplier), the technical and commercial competence, the power balance, and the market situation for the party.

Therefore we can conclude that “supply risk” and “difficulty of managing” are having similar meanings; such similarity exists between “strategic importance” and “profit impact”. The difference between the models is that Olsen and Ellram have given more complete operationalization than Kraljic and Fiocca. Although Kraljic (1983) did not give any reference in his article, one can probably sense some similarities in his and Fiocca’s ideas.

What we have revealed so far is that the first matrix in portfolio models by Fiocca, Olsen/Ellram and Nellore/Söderquist are having a similar construct. These authors agree that the purpose of the first matrix is to help the company to get an overall understanding on the objects accounts/products/relationships, etc, whichever are in the focus of portfolio analysis, and divide them into categories. The differentiation achieved through categorizing reflexes both internal factors - the impact on the company’s business in terms of profit - and external factors in terms of the risks and difficulties of getting the supply.

There is still one more model belonging to purchasing field, Wynstra and Pierick’s supplier involvement portfolio. I leave it to later part of the analysis.
B. Remaining steps in the portfolio approach

On the basis of the first matrix most of the portfolio approaches continue to the second and even more portfolios designed according to the context of the specific portfolio to achieve the objective of the analysis.

1) Account portfolio approach. By analyzing the position of the key accounts (sorted from the first portfolio) against the balance between customer’s business attractiveness and relative relationship, strategies for these specific accounts can be set up which also implicate certain actions for handling the accounts. It also becomes clear for the company to which accounts it should allocate resources to secure profitability.

2) Product portfolio approach. Analyses in the second portfolio indicate the power balance between the buyer and supplier, which leads to suggestion of different strategies for each scenario. The company can then set up action plan following the strategies to secure the supply with the lowest possible risks and get the most out of the supplier (Kraljic 1983).

3) In the approaches suggested by Olsen/Ellram and Nellore/Söderquist, the result from the first portfolio is analyzed against the variables chosen for the respective purposes. Strategies and action plans are then derived.

A common pattern for these approaches in the second and third steps is, based on further analysis, that strategies can be set up for each category classified in step one, as well as action plans.

C. Supplier involvement portfolio

This portfolio is about supplier involvement in new product development projects. It seems to have a completely different appearance compared with dimensions in the previous models. The two dimensions in this portfolio are “degree of development responsibility held by the supplier” and “development risk”. Wynstra and Pierick explained that “development risk” is about

1) the importance in relation to the overall system, as compared with previous systems;
2) the importance in terms of technical specifications and design in relation to other parts in the development project;

3) the importance to the whole development project regarding the project schedule;

4) the complexity of the building block (what is to be developed in the project);

5) the newness of the production technology or application to the company

Point 1) to 3) seem to fall into the group of factors deciding the strategic importance; point 4) and 5) are regarding the risks. This reveals that the analysis taken in the first step for other portfolio approaches can be seen as actually being included, and it is part of this supplier involvement portfolio. The understanding could be that the first and second portfolios are comprised into one in this approach.

The possible explanation to this phenomenon could lie in the nature of the objects of the portfolio analyses. Customer accounts and buyer-supplier relationships already exist at the time of analysis. In Kraljic’s approach which products to purchase are also known. But in Wynstra and Pierick’s approach, the extent of supplier involvement, i.e. what to buy, is yet to decide. A classification is therefore difficult. Wynstra and Pierick confirmed that in their empirical study, an experiment with Kraljic’s classification method was conducted. But the result proved to be wrong.

After having studied purchasing and marketing portfolios, I now move on to Ansoff/Leontiades’ portfolio and analyze why it is relevant in this study on purchasing portfolios.

2.3.2.2 Early portfolios

As stated earlier, Ansoff and Leontiades suggested a portfolio approach for analyzing SBAs (strategic business areas) in a life cycle perspective. Instead of examining individual SBAs in isolation, based on its past performance, i.e. ROI, the company can take a future perspective by applying the life cycle portfolio.
SBAs at different stages of life cycle face different challenges, competitions, and risks; they have different capabilities to deliver high financial performance. Such variations in the performance indicate differences in their importance to the company. SBAs therefore deserve differentiation in the management attention in form of investment and management efforts.

The rationale for portfolio life cycle analysis is the resemblance of that of the purchasing/marketing portfolio approaches analyzed in the earlier section, i.e. to combine the importance with the risks connected; and SBAs in different quadrants in the portfolio matrix should be granted different managerial actions and priorities.

Although Strategic management on a corporate and business unit level was the main theme for their research, Ansoff and Leontiades (1976) also gave an example for operating strategies - application of the approach in purchasing. They argued that companies should view and categorize the entire range of the suppliers, e.g. costs, performance, risks; and judge the tradeoffs with reference to the total portfolio and decide on the strategies and management accordingly.

To achieve balanced trade-off between risks and rewards and thus the highest return at the lowest risk is also the philosophy behind Markowitz’s diversification theory.

The analyses presented above provide strong evidence on the similarities between different portfolio models. In the next section I will look into the theoretical foundation to the portfolio approach.

2.3.3 Theoretical foundation to the portfolio approach

It is acknowledged by many authors that portfolio approach is closely associated with strategic management. This common characteristic of portfolio approach should root in its theoretical foundation – it is a tool for strategic analysis in strategic planning; and the latter is one of the cornerstones of strategic management.
Ansoff (1988) advocated that strategic management should consist of the following:

1) Formulating strategies
2) Designing the firm’s capability (and recourse allocation)
3) Managing implementation of strategies and capabilities.

The first point of strategic management, formulation of strategies, is to be realized through strategic planning. Figure 2.14 shows a model over a strategic planning process. According to Day (1996) such a process has four facets: external orientation, process for formulating strategies, commitment to action and methods for analysis of strategic situation and alternatives.

As shown in Figure 2.14, portfolio is included as one of the methods used for strategic analysis. Although portfolio models can be constructed differently, Day stated that some basic elements should normally be included in each portfolio model:

1) Establishment of level and units of analysis (business units, product, etc).
2) Identification of the factors deciding the dimensions in a portfolio matrix
3) Classification with help of the matrix
4) Further analysis. Assessment of the current position of each business or product on each factor
5) Development of strategy and plan for resource requirements and activities

A portfolio approach is applied in strategic management because it provides a structured way to solid strategic analysis from both internal and external perspectives. It includes identifying trends, forces, and conditions that would have influence on the company’s business activities and development. The external analysis is carried out on customers, competitors, market situation, and environmental issues, such as technological, economic, and cultural factors to identify opportunities, threats, and strategic uncertainties. Internally the analysis is about identifying the company’s strategic strengths, weaknesses, constraints, threats and uncertainties (David Aaker, 2005; Day, 1986).

All the portfolio models presented in this paper also support the theory that portfolio approach can be devoted to strategic management context and contain the elements described above, irrespective of the variations of construct of the model, nor the application areas, because they share the common theoretical foundation described above in this section.
2.4 Conclusion on the theoretical study, research questions and hypotheses

2.1.1 Conclusions

The first part of the theoretical study provided insights on the evolution of purchasing – its transformation from a clerical function with only operational and supportive responsibility of buying in a passive or reactive manner; to one of the most decisive processes for attaining competitive advantage by proactively functioning and integration with corporate strategies, as the consequences of increased strategic importance which pushes purchasing more in the strategic direction. In order to fulfill the business objectives and realize its strategic importance, it is necessary to get equipped with proper tools. Portfolio analysis is one of them which are recommended in previous literatures.

The purpose of the second part of the literature study was to gain deeper understanding about portfolio approach by analyzing the difference and the similarities between the various portfolio models both in general and in purchasing discipline more in particular to find out the common nature and foundation of the portfolio approach.

The result of the study has demonstrated more similarities than differences between different approach models: despite the difference in final application objectives the approach consists of similar basic elements: some sort of classification, differentiated strategic direction and operational action plan. The explanation revealed by this study is that

1) the portfolio models share common theoretical foundation and are used in strategic management as a strategic analysis tool; and

2) the models share common basic elements, characteristics, as well as advantages.

The major advantages of the portfolio perspective, no matter which model is adopted, are that it provides better understanding on external and internal environment, enables companies to establish distinctive approaches to “focus on
the interdependencies among the various decisions” (Wind and Douglas, 1981), optimizes utilization of resources, avoids sub-optimization, and minimizes risks. This finding is supported by Lamming and Harrison’s (2001) theory. They confirmed that portfolio remains the foundation of purchasing strategy for organizations across different sectors.

It can be concluded based on the result of the theoretical study that despite different models and dimensions that portfolio approach may have, it can be generalized as one generic tool. This conclusion is important because in the survey questionnaire the respondents were not asked about any detailed information on their purchasing portfolio analysis, only the degree of applying portfolio as such. But as aforementioned, literature has presented studies on for instance the applications of portfolio for classification purchased items, for supplier relationship management and involvement in product development. In real business the usages are surely richer than this list. Therefore the conclusion made here is critically important prerequisite for the empirical study.

The literature study also reveals that when management becomes more strategic, portfolio has become a central part of SBU management and marketing management. It gives reason to believe that it would be similar case in purchasing when, as stated in the first section of this chapter, purchasing is receiving increasing attention as a field of strategic interest and becoming more strategically important. It might be regarded as an indication on the possibility that the development process, in which purchasing has become more strategic, is accompanied by a growing acceptance as well as usage of purchasing portfolio approaches, due to the fact that portfolio is a tool used in strategic management. But there is no evidence found in previous literature that the growing strategic importance of purchasing would lead to increased application of portfolio.

What more that is lacking is the evidence on the positive impact that portfolio approach has on the business result of the company. Cooper et al (1999) claimed that there is too little evidence whether portfolio approaches have had positive
impact on business result. Olsen and Ellram (1997) and Cooper et al. (1999) called for further research regarding the usefulness of the portfolio approach.

*Based on the theoretical studies on portfolio approach and purchasing the following research questions are drawn and several hypotheses will be tested for answering the questions.*

2.1.2 Research questions and hypotheses

Earlier researches have studied the advantages that portfolio approach could create, and therefore advocated for its application. Other literatures proved the tendency for the development of purchasing and stated that its importance was increasing. The author of this thesis has proposed that there could exist a linkage between them and devoted the first research question to the relationship between the importance of purchasing and the adoption of the portfolio approach:

**RQ1:** *What is the linkage between the strategic importance of purchasing in a company and the company’s decision on applying a portfolio approach?*

In connection with the significance of purchasing being recognized in a company, purchasing will take on a more strategic and important role to achieve companies’ business objectives. The first hypothesis is to assume that this kind of development increases the possibility that companies will adopt the portfolio analysis approach.

**H1:** *a company’s decision on applying a portfolio approach for its purchasing and supply is positively related to a high acknowledged level of the strategic role of purchasing*

Reporting relationships is normally included when addressing issues in organizational considerations. In traditional purchasing, the reporting is at very low level (Dobler and Burt, 1996). Whilst the scope and importance of purchasing increased, the trend is the adoption of flatter organization structures with decision-
making responsibilities shifted to lower levels of the organization (Johnson et al., 1998); the reporting level will be raised.

\[ H2: \text{a company’s decision on applying a portfolio approach for its purchasing and supply is positively related to a high reporting level of purchasing.} \]

As the involvement of purchasing in formulating strategies increases when purchasing becomes more strategically important (Cousins et al 2008, and Dobler and Burt 1996), this study includes the following hypothesis:

\[ H3: \text{a company’s decision on applying a portfolio approach for its purchasing and supply is positively related to high involvement of purchasing in corporate strategic activities such as formulation of strategies.} \]

The criticality of strategic purchasing is demonstrated by the fact that it is responsible for more than half of the production costs for a firm’s products (Carr and Pearson, 1999; Zsidisin and Ellram, 2001). Many practitioners and academics acknowledge that companies become more aware of the importance of purchasing when increasing part of their revenue is consumed by purchased input. Thus the relationship between the share of purchasing and usage of portfolio will be tested by the next hypothesis:

\[ H4: \text{a company’s decision on applying a portfolio approach for its purchasing and supply is positively related to a high share of purchasing in the company.} \]

Purchasing capability is an important prerequisite for realizing the strategic importance of purchasing. If the strategic importance of purchasing in a company is high, it gives evidence on a high level of skills and competency of the purchasing professionals, which in turn would influence companies’ willingness and readiness to use portfolio approach.
**H5:** a company’s decision on applying a portfolio approach for its purchasing and supply is positively related to the high skills and competencies of the purchasing professionals in the company.

**The second research question:**

One of the major concerns for both practitioners and academics was how to improve the performance of purchasing. The second research question dealt with whether the portfolio approach would be a contributor to purchasing performance.

**RQ2: Does the application of portfolio approach in purchasing have positive effects on the performance of purchasing?**

This research question was tested with two hypotheses, one regarding the quality/proficiency of purchasing and the other regarding the purchasing’s business performance.

**H6:** the quality of purchasing process (i.e. the proficiency) is positively related to a company’s decision on applying a portfolio approach for its purchasing and supply

**H7:** the performance of purchasing process in terms of its contributions to company’s strategic objectives is positively related to a company’s decision on applying a portfolio approach for its purchasing and supply.
2.5 Conceptual model

A conceptual model has been developed based on the literature study. It consists of eight constructs and the assumed relationship between the constructs is illustrated with the seven hypotheses (see Figure 2.15).

The left-hand side of the model is the factors that previous literature included as indicators of Strategic Importance of Purchasing.

When purchasing function is shifting from a clerical function to an integrated element in supply chain management its role becomes more strategic.

The distance between purchasing and the top management could also be regarded as a signal of how important purchasing function is recognized in an organization.

As stated in the earlier sections, many scholars have pointed out that while purchasing is spending increasing part of the company’s income, purchasing
is assumed to be of pivotal importance that could give influence on company’s competitive advantage.

While realizing purchasing’s growing significance, companies tend to involve purchasing in strategy formulation, especially purchasing strategies, or make-or-buy decisions.

As the increased importance of purchasing demands higher capability of the purchasing professionals, the level of the buyer competence is regarded as an indicator of the strategic importance of purchasing in the model. This is in line with the result of previous studies. Cousins et al (2006, 2008), and Bengtsson et al (2010) confirmed that skills and competencies should be regarded as one of the distinct dimensions for purchasing.

The relationships between all these five factors to the central topic of the current research – portfolio approach - are included in 5 separate hypotheses to identify the source of motivation for company decision on choosing portfolio in purchasing management.

On the opposite side in the model are the two factors that can be regarded as the consequences of the use of portfolio approach in form of performance. The performance can be examined in two dimensions: 1) the quality of purchasing processes, in this thesis they are termed as purchasing proficiency; 2) the business performance of purchasing. To be able to undertake tests on these factors, operationalization of the concepts is necessary. The operational definitions will be presented in the next chapter.
Chapter 3  Methodology

The first part of this chapter presents the research type, strategy and approach of the current study. In the second part this chapter focuses on the empirical study and describes the process of data collection and data analysis; as well as the development of measures for this research and the operational definitions for the concepts in the conceptual model. The methods for statistical analysis are also presented in brief. The final section of the chapter is the critical analysis on the quality of this study.

3.1 Research strategy and approach

According to the background described in the previous chapters, the study of the central topic portfolio approach was initiated with a comprehensive literature study, finding the general characteristics of different models, and then followed by an empirical study on the portfolio approach, regardless differences in models.

3.1.1 Research strategy

According to the purpose of this research, the strategy is to combine theoretical study and survey.

In the first part of this research the author reviewed in the published literature, the origin of the portfolio approaches; and analyzed the similarities among the different models of the approach. Based on the facts from the literature study and the evidences gained through cross-discipline study, comparisons and examination, conclusions were drawn about the general theoretical foundations and basic elements for the portfolio approach. This provided the necessity for
further study in the empirical research where no models or specific details about the model applied were taken into consideration.

To address the scarcity of empirical evidence concerning the association between the usages of portfolio approach and purchasing’s strategic importance; as well as between portfolio and purchasing performance, the second phase of the research was an empirical study based on an international survey. The purchasing survey was conducted recently among more than 600 companies and organizations in Europe and North America. The current research has chosen to use the data from 427 manufacturing companies. These valuable data provided a robust base for the empirical study.

3.1.2 Research approach

The approach of research should be derived from the nature of the problem, and related to the type of data, as well as the method used in the analysis (Walliman, 2008).

There are traditionally two main types of research approach – induction and deduction. A simplified way to describe induction is “research then theory”, meaning to achieve scientific advances through formulating generalizations based on experiences and observation. Deduction goes in the opposite direction and is known as “theory then research”. Theories are first expressed as hypotheses and then tested. A fundamental element in deduction is that the hypotheses must be falsifiable. In case a hypothesis proves to be in conflict with test or observational statement, it can be falsified and thus rejected (Walliman, 2008).

In addition there is a so called hypothetical-deductive method which combines the two types mentioned above. It is also termed as scientific method. This methods contains several steps: 1) identifying problem; 2) formulating hypotheses; 3) practical or theoretical testing; 4) confirming or rejecting the hypothesis; 5) theory formation or confirmation (Walliman, 2008, and Merriam-Webster online dictionary)
This research followed the process of hypothetical-deductive method because firstly the research problem was identified - the underexplored relationship that the central topic (portfolio approach) has with some important elements in purchasing and supply management. Then seven hypotheses were formulated and tested. Six of them were then confirmed and one was falsified and thus rejected. New relationship was discovered. Finally the suggested conceptual model was modified.

3.2 Data and data collection

The data used in this research was collected under an online purchasing survey which took place in seven countries in Europe and North America. The survey was completed in January 2010. An invitation for participation was sent out to a large number of sample organizations. 675 responses were obtained from more than 12 sectors and among them 427 were from manufacturing industries. The respondents held positions of different levels in their organizations. Half of them (50%) were operative managers; one third were senior or middle level directors (13.4% respective 20.4%); others were on the daily operative level (12.7%). As all respondents worked in the field of purchasing, they could be recognized as reliable sources of information of good quality.

The questionnaire covered a large range of questions regarding strategy, practices, process, organization, and performance outcomes. This current research was based on respondents of part of the questions. Quantitative data were chosen as the purpose of the research was to systematically investigate the factors influencing the choice of portfolio approach, the spread of the approach among companies, and the performance of purchasing in connection with the application of the portfolio approach.

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6 The information on the response rate is not available for the current study.
3.3 Data analysis

3.3.1 Development of measures

As stated in previous chapter the concept of “the strategic importance of purchasing” was to be described with 5 factors (also termed as scales, variables or scale variables) - the role of purchasing; the share of purchasing; level of reporting; involvement in formulating strategy and purchasing competency. The performance of purchasing was to be examined from two perspectives (also called scales, variables or scales variable) – proficiency and business performance. Different measures were applied to these variables.

For measuring the role of purchasing, a 6-point Likert-type scale was used for all items included\(^7\), where 1=the lowest, and 6=the highest.

Regarding the decision level, i.e. purchasing’s involvement in formulating strategies the lowest (=1) in the 6-point Likert-type scale meant least involvement of purchasing and decisions was made at highest level in the company, while the highest (=6) means great involvement when purchasing supervisor was involved.

The competency of the buyers was measured in relation to whether it was adequate to the responsibilities assigned. Lowest score (=1) meant poorest adequacy and higher scores (=6) indicated better adequacy.

Even proficiency of purchasing was weighted on a 6-point Likert-type scale, where naturally the poorest proficiency got the lowest score (=1) and the opposite (=6) for the best proficiency.

The measurement for the business performance of purchasing was a 7-point Likert-type scale, where 1 meant the worst and 7 the highest performance.

The usage of portfolio analysis approach was described on a 6-point Likert scale. 1 meant portfolio was never used; 2 meant rarely used; 3 meant used sometimes; 4 meant frequently used; 5 meant very frequently used; and the highest – 6 was that

\(^7\) Details of the items as per the operationalization list in Chapter 2.5.2
portfolio was always used to support the purchasing activity and relationship with suppliers.

3.3.2 Operationalization of constructs

In order to make the abstract concepts in the constructs testable, operationalisation is needed. Operationalisation is to define how to measure degree, size or existence of what the concept is about. Based on literature study and also the data currently available in the survey, the constructs in the conceptual model are operationalized in the following way as listed in Table 3.1:

A. Strategic importance of purchasing

<table>
<thead>
<tr>
<th>Role of purchasing</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top management is supportive of efforts to improve the</td>
<td>Purchasing department</td>
</tr>
<tr>
<td>purchasing department</td>
<td></td>
</tr>
<tr>
<td>Purchasing’s views are considered important by most top</td>
<td>Purchasing is recognized as an equal partner with other functions</td>
</tr>
<tr>
<td>managers</td>
<td></td>
</tr>
<tr>
<td>Purchasing recommends and initiates changes in</td>
<td>Purchasing recommends and initiates changes in</td>
</tr>
<tr>
<td>products/services based on supply market analysis</td>
<td>products/services based on supply market analysis</td>
</tr>
<tr>
<td>Purchasing actively participates in new product</td>
<td>Purchasing actively participates in new product development</td>
</tr>
<tr>
<td>development</td>
<td></td>
</tr>
<tr>
<td>Purchasing participates in organization-wide process</td>
<td>Purchasing participates in organization-wide process</td>
</tr>
<tr>
<td>improvement</td>
<td></td>
</tr>
<tr>
<td>Purchasing is included in the firm’s strategic planning process</td>
<td>Purchasing is included in the firm’s strategic planning process</td>
</tr>
<tr>
<td>Purchasing focus on longer term issues</td>
<td></td>
</tr>
<tr>
<td>Purchasing performance is measured in terms of its</td>
<td>Purchasing performance is measured in terms of its contributions</td>
</tr>
<tr>
<td>contributions to the firm’s strategic objectives</td>
<td>to the firm’s strategic objectives</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Share of purchasing</th>
<th>Share of purchasing spent in relation to total annual sales</th>
</tr>
</thead>
</table>

| Level of reporting                                     | The levels between the highest-ranking member of purchasing and  |
|---------------------------------------------------------| the CEO                                                          |

| Involvement in                                          | Purchasing’s involvement in formulating purchasing strategies    |
|---------------------------------------------------------| and make-or-buy decisions                                        |

8 Steiner, L. Operationalization. – lecture material at the University of Gävle, 2009-03
Table 3.1 Operationalization list

The hypotheses and the truthfulness of the conceptual model will be tested and analyzed in the empirical study presented in the following chapters, using sample data from an international survey regarding purchasing, carried out at companies in several European and North American countries.
3.3.3 Statistical analysis methods

In the data analysis both descriptive and inferential statistical analysis methods were applied.

Descriptive statistics were obtained for basic information such as the mean and standard deviation of the data.

Among the inferential statistical methods, correlation analysis was to test the relationship among the variables for identifying the direction and strength of the relationships between the scale variables. Factor analysis was conducted together with reliability test to make sure that the data fit the factors and are OK for the empirical analysis – with the smallest number of common factors, the loadings of each item, and also the factor structure were found. A Kaiser-Meyer-Olkin test showed that the sample adequacy was .834 which was “meritorious” and above the acceptance level of .80 (Kaiser and Rice 1974), suggesting that the correlation matrix is appropriate for factoring. Regression and incremental tests were undertaken for testing the hypotheses and examining the conceptual model.

All statistical analysis operations were run with the help of the software SPSS.
3.4 Critical assessment on the quality of the study

The quality of the study is commonly assessed from the respects of validity and reliability. Validity refers to the degree to which a study accurately reflects the specific concept that the researcher is attempting to measure, and reliability is concerned with the accuracy of the actual measuring instrument or procedure\(^9\).

3.4.1 Validity

For an empirical study the validity is normally referred to as construct validity, internal validity and external validity (Yin 2009).

3.4.1.1 Construct validity

Construct validity is a scale evaluation criterion regarding establishment of correct operational measures for the concepts, ideas and relationships being studied (Remenyi, et al 2005). For the purpose of this study a number of questions were chosen from the comprehensive questionnaire either as the scale variables constructing the conceptual model, or as the item variables operationalizing the scale variables. A principal component factor analysis was performed on all multi-item scale variables, both dependent and independent ones. The results showed that 54.5 percent of the variance could be explained by the five distinct factors generated (used then as the scale variable in the study); and no single factor could explain most of the variance. This provided support for the construct validity of the scales variables.

3.4.1.2 Internal validity

Internal validity is “seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships” (Yin, 2009:40). Yin stated that the main concern for internal validity is to try to explain how and why the relationships exist. In order to ensure the internal validity in this study the causal relationships were examined both

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\(^9\) http://www.colostate.edu, accessed 2010-008-17
directly between the central variable portfolio approach and the antecedent and in the context of the conceptual model taking into consideration all the possible influences from other variables in the model. Efforts were made to explain the phenomenon with help of existing theories. In order to precise the causal relationships the study included a final step to quantify the relationships.

3.4.1.3 External validity

External validity is “concerned with knowing whether the researcher’s findings are generalisable to a wider universe beyond the immediate research” (Remenyi, et al 2005:178). The current study has avoided some common sources causing loss of external validity, such as small sample size and samples from a single geographic location. This study used data samples collected in an international survey covering different geographical areas - Europe and North America, as well as a large number of participants - 427 manufacturing companies. This gives good support for the external validity for generalization of the conclusions drawn from this study.

3.4.2 Reliability

The reliability of the constructs in the conceptual model was measured with Cronbach’s alpha and the reliability level for most of the scales was proved to be acceptable. More detailed description can be found in Chapter Four.

3.5 Limitations of the study

The data samples used in this paper were collected under an international survey. The questions in the survey regarding purchasing portfolio are quite in general and only concerned whether or not the portfolio approaches have been in use. The answers provide no detailed information about why companies choose to use portfolio, what are the business objectives, in which areas in the purchasing process and for what operative tasks the portfolios are applied. No information was given by the respondents about the dimensions and elements in their portfolio
models. Therefore the tests and analysis in the current study were carried out on the information available in the database.

Though the portfolio approach is widely used in many disciplines the scope of this study is those that are used in the purchasing discipline.

**Limitation for external validity**

Although all respondents were from the purchasing field and most of them are holding a management position, and they therefore should have good knowledge about the situation in their companies, but the fact that the questionnaire was answered by a single person from each respondent company could be a barrier for generalization as another person in the same company might have provided different answers.
Chapter 4  Data analysis

The data analysis was undertaken in 3 phases. First, the measurements for scales were tested; then correlations between the scale variables were examined; followed by the reliability test. Finally a 3-step regression run was conducted to test the hypothesized relationship among the constructs in the conceptual model.

4.1 Characteristics of the responses

The 675 data samples were the responses to an international survey received mainly from 12 sectors in 7 countries in Europe and North America. The distribution among the sections is shown in Table 4.1. Manufacturing was only 8.3 percent of the total number of the sectors but by far the biggest sector which amounts to 63.9 percent of the total responses\(^\text{10}\). This research was chosen to use data from the manufacturing sector as the data would be more homogeneous and the test result would possibly be more reliable.

![Figure 4.1 Sectors included in the study](image)

In the data analysis the expressions respondents, samples and cases will be used exchangeably.

\(^{10}\) In the data analysis the expressions respondents, samples and cases will be used exchangeably.
4.2  **Descriptive data on focal variable**

Descriptive statistical analysis was conducted on the portfolio approach which is the focus of this study. Judging from the data samples it seems that portfolio approach is widely used among manufacturing companies, only 14% of the respondents stated that they did not use portfolio in purchasing at all; some 41% used it now and then; about equally much (39%) companies used portfolio frequently (24%) or very frequently (15%). 6% of the respondents always applied the portfolio analysis approach.

The analysis result showed that the average usage of portfolio among the 414 usable samples was 3.27 on the 6 point scale, see Table 4.1.

**Table 4.1 Descriptive statistics on portfolio analysis approach**

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>D6b Portfolio analysis</td>
<td>414</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>3.27</td>
<td>.070</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>414</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Test for scale variable validity and reliability

4.3.1 Factor analysis

Before investigating the conceptual model, a factor analysis was undertaken to test the validity of the scale variables. Factor analysis is primarily used for data reduction and summarization, and is especially useful when there are a large number of variables (Malhotra, 2006). For this research factor analysis was used to test if there was a coherent set of data in accordance with the dimensions, so it could address the hypotheses and research questions. So the intention of conducting factor analysis was a kind of “backward” operation, as the underlying dimensions were known – they were predetermined as the level of involvement in formulating strategies, role of purchasing, buyer competency, purchasing proficiency and purchasing business performance. With factor analysis it was first to confirm that the items did fall apart instead of being only one block; second to check that the items were divided in the way as expected.

It is recommended that factor analysis should not be carried out with fewer than 50 cases (Howitt and Cramer, 2006). The data samples for this research were larger and therefore qualified to use.

During the test 5 components (factors) were first extracted and then refined by rotating with Kaiser Normalization. KMO test showed an adequacy of .834 and Bartlett’s test proved significance of .000 (P<.001) which indicated good reliability of the analysis. The loading of the item variables are shown in Table 4.2 on the next page.

The factor analysis provided a satisfactory result where the item variables were naturally divided according to five components. The components conformed to the scale variables, i.e.

1= purchasing proficiency,
2= role of purchasing,
3=purchasing business performance,
4=buyer competency and
5=purchasing involvement in forming strategies.
Table 4.2 *Factor analysis results*

<table>
<thead>
<tr>
<th>Component</th>
<th>Component</th>
<th>Component</th>
<th>Component</th>
<th>Component</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier selection and contracting</td>
<td>.832</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier development</td>
<td>.804</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier evaluation</td>
<td>.787</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sourcing strategy</td>
<td>.748</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supply market analysis</td>
<td>.732</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management of the order cycle</td>
<td>.643</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier involvement into NPD</td>
<td>.605</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier integration in order fulfillment</td>
<td>.584</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spend analysis</td>
<td>.558</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specification definition</td>
<td>.488</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make or Buy decisions</td>
<td>.479</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing is regarded as an equal partner with other functions</td>
<td>.834</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Most top managers considered purchasing’s opinions important</td>
<td>.785</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing included in the firm’s strategic planning process</td>
<td>.775</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top management supportive of efforts to improve</td>
<td>.731</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing actively participates in organization-wide process improvement</td>
<td>.703</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing performance measured in terms of its contributions to firm’s strategic objectives</td>
<td>.666</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing focus on longer term issues</td>
<td>.646</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing actively participates in new product/service design</td>
<td>.634</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing recommends and initiates changes in product/service based on supply market analysis</td>
<td>.601</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of supplier product/service quality</td>
<td>.787</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of supplier conformance to specs</td>
<td>.756</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of product/service delivery reliability</td>
<td>.737</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of product/service delivery speed from supplier</td>
<td>.736</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of user satisfaction with the purchasing</td>
<td>.625</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of end user contract compliance</td>
<td>.624</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplier time-to-market for new or improved product/service</td>
<td>.599</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of managing the procurement process</td>
<td>.504</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing price</td>
<td>.453</td>
<td>.428</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average education level of buyers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.817</td>
</tr>
<tr>
<td>Overall job competence of buyers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.807</td>
</tr>
<tr>
<td>Knowledge of buyers on business aspects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.713</td>
</tr>
<tr>
<td>Make or buy decisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.553</td>
</tr>
<tr>
<td>Formulation of purchasing strategy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.518</td>
</tr>
</tbody>
</table>

*Note:* \(N=427\)

*Extraction Method: Principal Component Analysis. Total variance explained: 54.5%*

*Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.*

*Multi item scales were included in the test. \(P<.001\)*
4.3.2 Reliability test

Reliability is a complex matter and of substantial importance in research. The basic idea is to assess how consistent a study or measuring device is. A measurement is said to be reliable or consistent if the measurement can produce similar results when used again in similar circumstances (Howitt and Cramer, 2002). Alpha reliability which is also called Cronbach’s coefficient alpha is one of the mostly used tests.

The reliability test was run on all the multi-item scales used in the conceptual model and the result as in Table 4.3.

<table>
<thead>
<tr>
<th>Table 4.3 Reliability test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Level of involvement in formulating strategies</td>
</tr>
<tr>
<td>Role of purchasing</td>
</tr>
<tr>
<td>Buyer competency</td>
</tr>
<tr>
<td>Purchasing proficiency</td>
</tr>
<tr>
<td>Purchasing business performance</td>
</tr>
</tbody>
</table>

Notes: N=427

The reliability for most of the scales ranged from 0.846 to 0.887, well exceeding 0.7 which is the normally accepted level (Gerbing and Anderson 1988, and Nunnally 1978), except level of involvement which arrived at .403 - it was a low reliability and could be due to the small number of the items in the scale.
4.4 Correlation

The next step was to examine whether the variables are associated and the strength of their relationship. This was done with the help of correlation analysis.

A correlation analysis calculates the correlation coefficient which is a numerical index that indicates the strength and direction of relationship between variables (Howitt and Cramer 2000). There are several different correlation coefficients, and the most common method is the Pearson’s correlation.

Table 4.4 presents the Pearson correlation between the scale variables.

Table 4.4 Correlation between scale variables

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP</td>
<td>.511</td>
<td>.173</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>RL</td>
<td>.693</td>
<td>.929</td>
<td>-.084</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>IV</td>
<td>3.590</td>
<td>.862</td>
<td>.035</td>
<td>-.204 *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>RP</td>
<td>4.415</td>
<td>.859</td>
<td>.066</td>
<td>-.052</td>
<td>-.019</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>BC</td>
<td>4.417</td>
<td>.798</td>
<td>.106 *</td>
<td>.009</td>
<td>-.084</td>
<td>.391 ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PA</td>
<td>3.271</td>
<td>1.43</td>
<td>.086</td>
<td>.036</td>
<td>.108 *</td>
<td>.304 ***</td>
<td>.233 ***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>PP</td>
<td>4.272</td>
<td>.636</td>
<td>-.057</td>
<td>.037</td>
<td>-.028</td>
<td>.434 ***</td>
<td>.402 ***</td>
<td>.424 ***</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>PF</td>
<td>4.199</td>
<td>.668</td>
<td>.032</td>
<td>.096</td>
<td>-.094</td>
<td>.140 **</td>
<td>.248 ***</td>
<td>.273 ***</td>
<td>.295 ***</td>
</tr>
</tbody>
</table>

Notes: *** p <.001; ** p <.01; * p <.05; N=427
SP: share of purchasing; RL: reporting level; IV: involvement in forming strategies
RP: role of purchasing; BC: buyer competency; PA: portfolio analysis;
PP: purchasing proficiency; PF: purchasing business performance

There was a significant relationship between the central variable (portfolio analysis approach) and scale variables of purchasing’s role, the buyer competency, the purchasing proficiency and the business performance. A moderate relationship exists between the portfolio and involvement of purchasing in formulating

11 All significance levels reported in this thesis are two-tailed, if no special statement
strategies. No significant relationship was found between the share of purchasing, the reporting level and the focal variable portfolio.

It is worth noticing that the role of purchasing and buyer competency also had a significant relationship to both purchasing proficiency and purchasing business performance; as well as purchasing proficiency to purchasing business performance.

4.5 \textit{Model testing}

Aiming at achieving rigorous results, the hypotheses were tested in 3 steps, where the conceptual model proposed in Chapter 2 was divided into 1) antecedent variables including share of purchasing, report level, involvement in formulating strategies, role of purchasing and buyer competency; 2) the focal variable (portfolio analysis approach), can also be termed central variable; and 3) the consequence variables - purchasing proficiency and purchasing business performance. The statistical method was regression analysis.

4.5.1 Antecedent variables against focal variable

In the first stage the regression was run between the antecedent variables and the focal variable. The result is included in Table 4.5.

\begin{table}[h]
\centering
\caption{Impact of antecedent variables on Portfolio analysis}
\begin{tabular}{lcc}
\hline
Variable & Standardized $B$ & \\
\hline
Share of purchasing (SP) & .112* & \\
Report level (RL) & .074 & \\
Involvement in forming strategy (IV) & .130** & \\
Role of purchasing (RP) & .253*** & \\
Buyer competency (BC) & .158** & \\
\hline
\textit{F} & 12.218*** & \\
\textit{R}^2 & .139 & \\
\hline
\end{tabular}
\end{table}

Notes: *** $p < .001$; ** $p < .01$; * $p < .05$. N=427
Dependent variable: Portfolio analysis
Cogent significance was identified in the relationship between role of purchasing and portfolio approach. The role of purchasing accounted for 25.3% (p<.001) of variance on portfolio approach. Purchasing’s involvement in formulating strategies (β=.13, p<.001) and buyer competency (β=.158, p<.001) had significant impact on portfolio approach. There was a considerable relationship between share of purchasing respective involvement in formulating strategies (β=.112, p<.001) and portfolio approach. But the reporting level did not seem to be a convincing predictor on portfolio approach.

So the hypotheses 1, 3, 4, and 5 were supported, and hypothesis 2 was falsified and thus rejected.

4.5.2 Focal variable’s impact on Purchasing Proficiency

Portfolio had very big impact on purchasing proficiency (β=.414, p<.001), as shown in the first Beta column in Table 4.6. This result gave clear support to hypothesis 6.

Table 4.6 Impacts on Proficiency

<table>
<thead>
<tr>
<th></th>
<th>Standardized B</th>
<th>Standardized B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio analysis (PA)</td>
<td>.424***</td>
<td>.300***</td>
</tr>
<tr>
<td>Share of purchasing (SP)</td>
<td>- .034</td>
<td></td>
</tr>
<tr>
<td>Report level (RL)</td>
<td>.013</td>
<td></td>
</tr>
<tr>
<td>Involvement in formulating strategy (IV)</td>
<td>- .035</td>
<td></td>
</tr>
<tr>
<td>Role of purchasing (RP)</td>
<td>.247***</td>
<td></td>
</tr>
<tr>
<td>Buyer competency (BC)</td>
<td>.226***</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>89.303***</td>
<td>30.525***</td>
</tr>
<tr>
<td>R²</td>
<td>.178</td>
<td>.329</td>
</tr>
</tbody>
</table>

Notes: *** p < .001; ** p < .01; * p < .05; N=427
Dependent variable: purchasing proficiency
As presented in the earlier chapter the conceptual model contains 5 antecedent variables; and some of the variables are significantly associated with portfolio approach. The next task for the analysis was to find:

- whether other predictors also had influences on purchasing proficiency
- if additional influence existed, whether the focal variable still had effect on purchasing proficiency.

So the analysis was carried out further by letting both the portfolio analysis and the antecedent variables regress against purchasing proficiency. The result presented in the second Beta column in Table 4.6 shows that neither the share of purchasing, the reporting level, nor involvement in formulating strategies had significant impact on purchasing proficiency; but portfolio analysis approach still did. In addition, the role of purchasing and buyer competency were also proved to be strong predictors ($\beta=.247$ and $\beta=.226$; in both cases $p<.001$). The strength of the impact on purchasing proficiency was improved compared with the previous test.

### 4.5.3 Impact on purchasing business performance

#### 4.5.3.1 Tests on predictors’ import on purchasing business performance

At this stage of data analysis the whole conceptual model was tested in three steps according to the following strategy:

*Firstly* to examine whether portfolio analysis impacts on purchasing business performance; *secondly* the combined impact of portfolio analysis and purchasing proficiency on purchasing business performance was tested. The *third* step was set to check the association that purchasing business performance had with all other variables jointly. *Finally* an additional test was made to distinguish how the variables individually and jointly give influence on purchasing business performance.
The result shown in the first Beta column in Table 4.7 confirmed that the portfolio approach was a significant predictor for purchasing business performance. The relationship is positive. This result confirmed hypothesis 7.

Based on this result and the strong association between purchasing proficiency and purchasing business performance, and the logic to expect that increased proficiency would lead to better performance, the combined impact of these two variables was tested. The test result (the second Beta column in Table 4.7) showed a significant and positive relationship.

**Table 4.7 Impacts on Purchasing Business Performance:**

<table>
<thead>
<tr>
<th></th>
<th>Standardized B</th>
<th>Standardized B</th>
<th>Standardized B</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>.128***</td>
<td>.178***</td>
<td>.177***</td>
</tr>
<tr>
<td>PP</td>
<td>.229***</td>
<td>.218***</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>-.023</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RL</td>
<td>.016</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>-.081</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP</td>
<td>-.064</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC</td>
<td>.128*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| F  | 33.030***      | 27.141***      | 9.278***       |
| R² | .075           | .117           | .149           |

Notes: *** p < .001; ** p < .01; * p < .05; N=427

Dependent variable: Purchasing business performance

PA: portfolio analysis; PP: purchasing proficiency

SP: share of purchasing; RL: reporting level;

IV: involvement in formulating strategies; RP: role of purchasing;

BC: buyer competency;
Then other variables in the model were tested for the purpose of identifying firstly whether they can act as predictors to purchasing performance, and secondly if the impact proved in the previous tests still existed. The output presented in the right-hand column in Table 4.7 revealed that the share of purchasing, the reporting level, the involvement in formulating strategies and the role of purchasing were not qualified as predictors; and buyer competency has moderate impact on purchasing business performance. Portfolio approach and purchasing proficiency were still proved to be significantly related to purchasing business performance.

4.5.3.2 Quantification of impact on Purchasing Business Performance

Although by now all seven hypotheses and the conceptual model were tested, in order to make the test more complete and give more precised evidence for the model the author extended the data analysis with a incremental test on the R-Square changes for the purpose of quantifying the impact from each type of the predictors. It could be clearly viewed in Table 4.8 that the contribution of impact from all variables on purchasing business performance consisted of 3.2% from purchasing proficiency and 2.4% from portfolio approach, which meant 2.6% overlapping in their individual impacts. (The variance explained by joint portfolio and proficiency 8.2% - 2.4% - 3.2% = 2.6%). As the total variance explained by the antecedent variables, portfolio and proficiency was 14.9%, and out of that by portfolio and proficiency combined was 8.2%, then the antecedent variables accounted for 6.7% of the variance of performance\textsuperscript{12}.

The influences of the variable on performance are all proved to be significant.

\textsuperscript{12} 14.9\% - 8.2\% = 6.7\%
Table 4.8 Impacts on Purchasing Business Performance - Incremental Test

<table>
<thead>
<tr>
<th></th>
<th>Test 1</th>
<th></th>
<th>Test 2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Step 0</td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 1</td>
<td>Step 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standardized $B$</td>
<td>Standardized $B$</td>
<td>Standardized $B$</td>
<td>Standardized $B$</td>
<td>Standardized $B$</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>-.002</td>
<td>-.029</td>
<td>-.023</td>
<td>-.003</td>
<td>-.023</td>
<td></td>
</tr>
<tr>
<td>RL</td>
<td>.036</td>
<td>.019</td>
<td>.016</td>
<td>.026</td>
<td>.016</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>-.058</td>
<td>-.088</td>
<td>-.081</td>
<td>.059</td>
<td>-.081</td>
<td></td>
</tr>
<tr>
<td>RP</td>
<td>-.053</td>
<td>-.011</td>
<td>-.064</td>
<td>-.036</td>
<td>-.064</td>
<td></td>
</tr>
<tr>
<td>BC</td>
<td>.216***</td>
<td>.179***</td>
<td>.128*</td>
<td>.139*</td>
<td>.128*</td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>.242***</td>
<td>.177***</td>
<td></td>
<td>.177***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PP</td>
<td>.218***</td>
<td>.278***</td>
<td>.218***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. F change</td>
<td>.001</td>
<td>.001</td>
<td>.001</td>
<td>.001</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
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<td>.117</td>
<td>.149</td>
<td>.125</td>
<td>.149</td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>.032***</td>
<td></td>
<td></td>
<td>.024***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: *** $p < .001$; ** $p < .01$; * $p < .05$; N=427
Dependent variable: Purchasing business performance

SP: share of purchasing
RL: reporting level
IV: involvement in formulating strategies
RP: role of purchasing
BC: buyer competency
PA: portfolio analysis
PP: purchasing proficiency
Chapter 5  Discussion of findings

The objective of this study was to gain a better understanding of the application of the portfolio approach by examining why companies choose to use it; and if companies benefit from it; on the basis of a generalization of the common nature of different models of portfolio approach.

The findings from data analysis have both provided answers to the research questions and to the hypotheses, and also given some additional important insights on the portfolio approach. In this chapter these results will be discussed.

5.1 Results from pretest

A large number of questions were included in the questionnaire and this study used only a little part of them. In the attempt to find the structure of the questions, factor analysis was undertaken. Whilst the result was to a large extent quite satisfactory (the five factors generated matched exactly scale variables that the author intended to use for the examination), one item was found belonging to two factor groups – purchasing price appeared in the factor group of purchasing’s involvement in formulating strategies as well as in the group of business performance of purchasing. That purchasing cost fell into the latter group was more logical than of any surprise. But what had it to do with formulating strategies? It could be because make-or-buy is the only example of strategy that was included in the questionnaire\textsuperscript{13} and the purchasing price was an important element when putting up strategies such as make-or-buy. Purchasing price should be regarded as strategic issue according to previous researches (e.g. Kraljic 1983).

\textsuperscript{13} As the questions were taken from a large survey, and were predetermined by the survey project, the author had no influence on the choice of questions.
It should also be noticed that purchasing price got the lowest loading in both factor groups, which might indicate that the relationships to the factors were not all that strong or certain.

The correlation analysis indicated close relationships between applying portfolio approach and three of the variables describing the importance of purchasing: buyer competency; the role of purchasing and to a certain extent involvement in strategy formulation. But no significant associations between the share of purchasing and the use of portfolio were identified, contrary to what many academics have stated. This interesting finding was compared with the result in model testing and will be described later in this chapter.

### 5.2 Test results of hypotheses and the model

#### 5.2.1 Relationship between purchasing importance and portfolio

The relationship between purchasing importance and the adoption of portfolio approach was partly proved to exist because of the significant linkage between the role of purchasing and the portfolio approach \((H1. \text{ Result: } \beta = .253^{***}, p < .001)\).

The empirical study showed that the role of purchasing was the most crucial factor for companies to decide whether or not to apply portfolio approach. “While the ability of purchasing to contribute to firm strategy and impact on performance has long been recognized” (Cousins et al 2008:10), both practitioners and academics are seeking ways so that purchasing can really play its role and maximize its contribution to the business results. This research result shows a functional way to realize purchasing’s importance and its profits potential, namely to use portfolio analysis approach as one of the strategic purchasing tools.

The positive relationship between purchasing importance and the adoption of portfolio approach was further supported by the findings of buyer competency being responsible for a company’s decision on applying a portfolio approach for its purchasing and supply \((H5. \text{ Result: } \beta = .158^{**}, p < .01)\). The strong influence
that buyer competencies had on the choice of portfolio does not only prove the truthfulness of hypothesis 5, but is also in line with the existing theory stating that buyer competency is a prerequisite for realizing the strategic importance of purchasing (Carr & Smeltzer, 2000; Dobler and Burt 1996; and Cousins et al. 2006). Only when having the sufficient education, knowledge and information, and are equipped with adequate skills and competencies the purchasing professionals will be able to face the challenges of elevating purchasing to strategic level, realize purchasing’s strategic importance. The prominent effect that buyer competency has on other constructs in the conceptual model will be dealt with shortly in this chapter.

A company’s decision of applying a portfolio approach for its purchasing and supply was proved to be decided by whether purchasing was involved in corporate strategic activities such as formulation of strategies. (H3. Result: $\beta = .130^{**}, p < .01$). It was supported by the empirical study that when purchasing was more involved in strategic activities, portfolio approach tends to be more often used. The importance of purchasing can be indicated in economic terms, for instance costs. But the strategic congruence comes more into the picture. In the pace of development in supply chain management purchasing is considered as a “key strategic issue” (Cousins et al 2008:8). Working strategically and being involved in strategic activities call for strategic tools. The portfolio analysis is testified by the empirical study to be an effective tool. This can be explained by the nature of the portfolio approach which was presented in the theoretical study of this thesis. Basically it facilitates companies to analyze and understand all the relevant factors, internal as well as external, to carry out the responsibilities with least possible resources, at the lowest level of risk and to achieve the highest possible performance.

Although it was widely acknowledged that the strategic impact of purchasing increases when the share of purchasing in relationship to companies’ total revenue increases (Gadde and Håkansson 2001; Carr and Pearson, 1999; Zsidisin and Ellram, 2001; and Cousins, et al. 2008), the relationship between the share of
purchasing and the decision on using portfolio approach was found surprisingly weak. (H4. Result: $\beta = .112^*, p < .01$). There was no very strong evidence from the empirical study supporting the notion that such increase would make companies inclined to use the portfolio approach. Recall that this variable failed to show significant correlation to portfolio in the correlation analysis. The study results revealed that the share of purchasing could explain only to a certain extent why companies chose to use portfolio analysis; and it was a weaker predictor compared with the role of purchasing, buyer competency and purchasing’s involvement in formulating strategy. It implicates that larger share of purchasing in the total revenue does not automatically link to the fact that the company brings portfolio approach in use and can enjoy the advantage of it. What is more important is that the competency of the personnel at purchasing has to be adequate and purchasing is needed to play a real strategic role.

The outcome of the test showed a very weak relationship between the reporting level - which was supposed to be associated with the importance of purchasing - and the use of portfolio. The result was contrary to the findings that Johnson et al (1998) reported about increasing number of CPO reporting direct to CEO or other highest senior management. This outcome might have reflected the fact that reporting level was not an ideal indicator of purchasing importance although the changes in importance would result in shift in reporting levels. Therefore it could to a certain extent explain the application of the portfolio approach; but was not a qualified predictor for such application when purchasing importance increases.

There are two possible explanations to this phenomenon: 1) the reporting level is part of the structure of the organization. Such a structure is not only based on the importance of the purchasing but more on the corporate strategy and has to follow the needs put forward by many other internal and external factors (Johnson et al, 2001); 2) reporting level can be a diffused concept and difficult to measure (Hatch, 1997). There are different types of activities which are conducted according to different types of decisions, and need to be reported to different levels of management.
The strategic importance of purchasing which was one of the key elements in the conceptual model had been proved to have very strong impact on companies’ decision for using portfolio approach ($R^2=0.139$, $F=12.218***$, $P<0.001$). This provided an excellent answer to the first research question and confirmed that there was a strong linkage between these two. It can therefore be concluded that when the importance of purchasing rises it will call for application of portfolio approach. This conclusion fills the gap in previous studies which was the lacking support for the direct relationship between portfolio applications and the increase in purchasing’s strategic importance.

As it was revealed that as much as 13.9% of the variance in portfolio usage might be explained by the changes in strategic importance of purchasing; and the fact that purchasing’s strategic importance is increasing, companies should prepare themselves for exploring the advantage of the portfolio approach.

5.2.2 Relationship between portfolio and purchasing performance

One of the objectives of the present research was to explore the usefulness of portfolio approach by investigating what support portfolio approach can give to the performance of the company. The purchasing performance was defined in this study as purchasing was both functioning well (measured with its proficiency) and delivering what the company needed (measured with purchasing’s business performance). It was proved in the empirical study that if portfolio approach was in place the quality/proficiency of the purchasing process would be enhanced. Similar finding was also obtained for the relationship between portfolio and the business performance of purchasing process in terms of its contributions to company’s strategic objectives.

The right section of the conceptual model was constructed by the two scale variables - proficiency and performance. But as commonly acknowledged, better proficiency will lead to improved performance. It would be more interesting to find out if such a cause-and-result relationship between proficiency and performance would be different when portfolio approach was adopted. In other
words, the purpose here was to identify the impact on the final output of the performance from combined portfolio approach and purchasing proficiency. The test result revealed that portfolio and proficiency together had significant positive impact on the performance, and these two could better explain the changes in purchasing business performance than if portfolio had acted alone\textsuperscript{14}.

The second research question thus got a positive answer: the application of portfolio approach in purchasing did have positive effects on the performance of purchasing.

But so far the findings were based on the tests limited to only isolated relationships between the variables. In order to be able to confirm the findings completely, the truthfulness of the whole model has to be assessed when all possible influences should be taken into consideration. Therefore more tests were run including all variables in the model.

Then an important truth was presented in the following test results:

\textit{When the impact from strategic importance of purchasing existed\textsuperscript{15}, the portfolio approach was still an important source for improved purchasing performance, both proficiency respective business performances.}

It was a startling result that this empirical study had revealed – the conceptual model could explain totally 14.9\% of the variance in purchasing’s business performance\textsuperscript{16}. This was a useful finding for both companies and academics, because it was acknowledged that despite the efforts over the years there was surprisingly little empirical research on whether these approaches have had positive results in real business. This result provides empirical evidence for the usefulness of portfolio approach.

\textsuperscript{14} \textit{R}^2=.075, F=33.030***, p < .001

\textsuperscript{15} \textit{R}^2=.329, F=30.525***, p< .001; respectively \textit{R}^2=.117, F=21.102***, p< .001

\textsuperscript{16} \textit{R}^2=.149, F=13.897***, p<.001
5.2.3 Further considerations

Although by now the conceptual model was fully tested; and therefore the magnificence of, as well as the prerequisite for portfolio approach were successfully uncovered; still, as the major concern for this research was the purchasing portfolio analysis approach, the result of the current research would be more meaningful if the influence from the portfolio approach out of the above mentioned 14.9% could be quantified. Figure 5.1 showed the quantification of the contributions from both the portfolio approach and other scale variables in the conceptual model.

![Figure 5.1 The contributions of the variables in the conceptual model to business performance](image)

Figure 5.1 The contributions of the variables in the conceptual model to business performance

*SP: share of purchasing; RL: reporting level; IV: involvement in formulating strategies; RP: role of purchasing; BC: buyer competency; PA: portfolio analysis; PP: purchasing proficiency*

The distribution of impact on purchasing business performance uncovered that more than half of the impact from portfolio approach (2.6%) was shared by portfolio and proficiency. In the conceptual model, the influence of portfolio on purchasing business performance was enhanced if proficiency was added on top.
This gave reason to believe that the conceptual model would be more adequate if it was altered as shown in Figure 5.2 (simplified).

The changes in the model reflect the path of real relationship supported by the empirical analysis of the 427 manufacturing companies: the dashed line between the portfolio approach and the purchasing business performance reflect the result of the study that such a causal relationship exists - the application of portfolio approach will raise the purchasing proficiency. The consequence of this is the improved purchasing business performance. This is illustrated by the added line from purchasing proficiency to purchasing business performance.

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17 11.7% respective 14.9%
5.2.4 The additional findings

Apart from the findings from the tests on the hypotheses and the model constructs, the author also observed that the buyer competency had a prominent and consistent effect on other constructs in the conceptual model. Buyer competency is a unique variable in its nature – it concerns people. No matter the importance or the status of the work and no matter the role the job is given, there have to be people who realize the importance, play the role, use the portfolio tool, and achieve the quality and proficiency. This finding supports the previous theory that buyer competency possesses the position as a prerequisite for, for instance, realizing the strategic importance of purchasing (Carr & Smeltzer, 2000 and Cousins et al., 2006). Capabilities were the enablers (Axelsson, et al., 2005). This additional finding can be put into the context of the conceptual model as per Figure 5.3.

![Figure 5.3 Additional finding about buyer competency](image)

The development of the causal relationship between buyer competency and other variables should be considered more like a spiral than a straight line simply because better purchasing business performance is expected to generate more resources which companies can invest further for the development of buyer competency; which in turn, with the help of portfolio approach, will create higher performance and even more resources. This development process continues.
5.3 Implications and contributions from this study

The implications to the business world and the contribution to the academia from the result of the current study are threefold.

5.3.1 Strategic relevance of purchasing

Some researches pointed out that purchasing is still, despite the strategic impact, essentially a support function, and play a tactical role (Ramsay 2001a,b; Kaufmann and Carter, 2004; Cox et al., 2005; and Ellram and Carter, 1996).

According to the understanding gained from the extensive literature study, companies should undoubtedly be aware of purchasing’s strategic relevance. In order to obtain and sustain the competitive differentiation (Eversbusch and Schimrock, 2003) or competitive advantage purchasing must be regarded as a strategic competitive weapon.

On the other hand despite the fact that purchasing has increasingly assumed a pivotal strategic role in management, the strategic importance of purchasing has not been fully subjected to empirical scrutiny. “Extant research has remained largely anecdotal” (Chen, et al, 2004).

The insight obtained from theoretical study in this research was strengthened by the result of the empirical study - the meaningful results for this study were the predictive impact that the strategic importance has on the application of purchasing portfolios and the clear linkage between the importance of purchasing and its business performance. This sends message to the management in companies to change their view on purchasing and acknowledge purchasing’s strategic importance, getting purchasing involved in strategic planning and giving purchasing full support, so that purchasing strategy can easier be integrated into corporate business strategies and objectives and that purchasing can be more value-adding to the company.
5.3.2 Active application of portfolio analysis approach

One of the missions for purchasing and supply management is to transform its increasing importance to the performance with the help of practices and tools, and to change the shape of the balance sheet (Christopher, 2005). Both companies and academics have been striving to find and prove proper tools which can carry out the mission.

But although the published literature over the past 30 years outlines many approaches for portfolio management, the academia is still calling for evidence regarding whether these approaches have had positive results. “There appears to be major gulf between theory and practice” (Cooper, et al., 1999).

The results from the current research provided significant empirical evidence that the application of portfolio approach had helped the respondent companies to change their purchasing performance in a positive direction.

Portfolio approach has been proved by the theoretical study to be closely associated with strategic management and therefore a very powerful tool to use when purchasing becomes supply management and more strategic. The empirical study showed that the respondent companies had successfully engaged portfolio approaches as an enabler to facilitate the transformation from purchasing strategic importance into enhanced purchasing proficiency and then improved business performance. The implication indicated by these research results would be: companies who wish to find ways to achieve better business results should actively take serious consideration about engaging the portfolio approach.

The construct of portfolio approaches can look different, and it could seem puzzled sometimes and practitioners might feel unsure when deciding whether or which portfolio to apply. The result of the theoretical study constituted evidence that the different models of portfolio approach have actually common nature – theoretical foundation and basic elements – so it should be considered relevant in both business and management activities. When purchasing is concerned, the example on usage of portfolio can be buyer-supplier relationship management, product/service classification, supply base leveraging, supplier development and
purchasing strategy formulation, etcetera. This proof gives insights that there are no definite limitations on where portfolio approach can or can’t be used, and there are no principle barriers preventing learning from models used in other fields and their experience, just like Kraljic’s purchasing portfolio model reflected the ideas from Fiocca’s marketing model.

5.3.3 Purchaser’s competency – an important link in the process

This study reconfirms the prominent role of purchasing competency – it has significant impact on other constructs in the conceptual model and thus many processes in purchasing. This result is in line with the well known notion: people are the most important capital and it is their capabilities which create difference and competitiveness. To secure buyer competency should be one of the priorities for the management.

The theoretical and empirical findings of the study have both provided useful message to the practitioners and to a certain extent filled the gap in the theoretical study.
Chapter 6  Conclusion

Based on a comprehensive literature research and an empirical study built on a large amount of data, the results of this study filled the research gap in analyzing the causes of the application of portfolio approach; provided quantitative empirical proof on the usefulness of portfolio approach in the industrial companies and thus gave support to the existing theoretical study. The results send useful messages to company managements and provide important insights on how the business performance can be improved.

6.1 Conclusion

In the last decades companies have witnessed the ever hardened competition in the business environment and a revolution in the supply chain management. The supply side of the companies is more recognized as one of the vital sources of competitive advantages. Improvement in the performance of purchasing and supply has become an imperative for realizing the corporate strategies and to fulfill the business goals of a company. To find ways to achieve this has become one of the most important issues for the management as well as of great interest for academics.

Portfolio approach is a powerful and dynamic strategic management tool. The findings in the previous chapters have revealed that different portfolio models, irrespective of the application fields or tasks, or the items that were included in the portfolio applications, share a common theoretical foundation, namely they essentially provide a structured way in understanding both internal and external factors, identifying risks, balancing the resources, and making strategic decisions. The basic constructs in the portfolio models are the same. Purchasing portfolio approach helps companies to distinguish the importance and risks of the
products/service, suppliers, and activities in purchasing; as well as to develop distinctive purchasing and supply strategies, and practices which can result in improved proficiency and performance.

The current study, based on an extensive survey among more than 400 manufacturing companies in both Europe and North America, reveals that the portfolio analysis approach can act as a contributor to purchasing’s performance. The approach affects directly the quality and proficiency of the purchasing process, which in turn act together with portfolio approach to increase the output of purchasing business performance.

The result of the study contributes to a growing research stream on how to improve purchasing business performance, reflecting the increasing strategic role that purchasing is given. The findings shed lights on the strategic importance of purchasing as a direct explanation to the application of the approach by companies. The study also reveals the significant impact that the purchasing portfolio approach has on the business results. Therefore the decision-makers at companies should be fully aware of this and take portfolio approach as one of the important influential tools in purchasing and supply management. A third important result of this study is that the competency of the purchasing professionals plays a prominent role on the path of transforming the strategic importance of purchasing, with the help of portfolio approach, to the success of improved purchasing performance.

### 6.2 Further research

The research results have confirmed the benefits that portfolio approach can bring about; but the empirical study shows that half of the 427 respondent companies do not or do not often use portfolio approach in purchasing. This gives reason for further research about why do not more companies use this tool.

There have been doubts on portfolio approach about its suitableness for managing relationship (Dubois and Pedersen, 2002), and there has also been critique that certain portfolio approaches can be to static (Furlan, et al., 2007). This indicates
the needs for further research on the performance of portfolio. For instance how
the portfolios are managed? Are the companies satisfied? What are the obstacles?
What are the reasons that some companies do not utilize portfolio approach?

The future research should be more in depth than the present survey, and may be
involving benchmarking. The latter would require development of more proper
and more standardized measurements.
Reference

Journal articles


Books


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Appendix

Appendix I

Measurement of dimensions in the second portfolio in Account Portfolio analysis

Source: Fiocca (1982: 57-58)

<table>
<thead>
<tr>
<th>Measurement of Customer’s (C’s) business attractiveness</th>
<th>Attractiveness of C’s market</th>
<th>Status/Position of C’s business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>size (dollars, units, or both)</td>
<td>Customer’s share</td>
<td></td>
</tr>
<tr>
<td>size of key segments</td>
<td>Customer’s share of key segments</td>
<td></td>
</tr>
<tr>
<td>growth rate per year</td>
<td>Customers’ growth rate</td>
<td></td>
</tr>
<tr>
<td>sensitivity to price, service features and external factors</td>
<td>Customer’s influence on the market</td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>types of competitors</td>
<td>Customers’ position, strength/weakness</td>
<td></td>
</tr>
<tr>
<td>degree of concentration</td>
<td>Customers’ vulnerability to new technology</td>
<td></td>
</tr>
<tr>
<td>changes in type</td>
<td>Customers’ level of integration</td>
<td></td>
</tr>
<tr>
<td>substitution by new technology degrees and types of integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial and Economic factors</td>
<td>contribution margins</td>
<td>customer’s margins</td>
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<tr>
<td>types of competitors</td>
<td>customer’s scale and experience</td>
<td>barriers to customer’s entry or exit</td>
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<tr>
<td>degree of concentration</td>
<td>customer’s capacity utilization</td>
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<tr>
<td>changes in type</td>
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<td>substitution by new technology degrees and types of integration</td>
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<tr>
<td>Technological factors</td>
<td>maturity &amp; frequency of changes</td>
<td>customer’s ability to cope with changes</td>
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<tr>
<td>types of competitors</td>
<td>complexity</td>
<td>depth of customer’s skills</td>
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<tr>
<td>degree of concentration</td>
<td>differentiation</td>
<td>types of customer’s technological skills</td>
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<td>changes in the environment</td>
<td>patents and copyrights</td>
<td>customer’s patent protection</td>
</tr>
<tr>
<td>Sociopolitical factors</td>
<td>changes in the environment</td>
<td>customer’s ability to cope and to fit</td>
</tr>
</tbody>
</table>

Factors for measuring the strength of the buyer/seller relationship

- Length of relationship
- Volume or dollar value purchases
- Importance of the customer
- Power of the participants (one or both)
- Friendship
- Cooperation in development
- Management “distance” (long and culture)
- Geographic distance